

DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
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State Demonstrations Group

May 12, 2026

Meghan Groen
Chief Senior Deputy Director
Health Services Administration
Michigan Department of Health and Human Services
400 South Pine Street, 7th FL Lansing, MI 48933

Dear Director Groen:

The Centers for Medicare & Medicaid Services (CMS) completed its review of the Flint Michigan Section 1115 demonstration Summative Evaluation Report, “Flint Michigan Section 1115 Demonstration” (Project No: 11-W-00302/5). The demonstration was approved on March 2, 2016 and effective through September 30, 2031. This Summative Evaluation Report covers the period from March, 2016 through September, 2021. CMS determined that the Evaluation Report, submitted on November 29, 2022 and revised on October 3, 2023, is in alignment with the CMS-approved Evaluation Design and the requirements set forth in the STCs, and therefore, approves the Flint Michigan Section 1115 demonstration’s Summative Evaluation Report.

Despite factors that limited the state’s ability to fully assess the demonstration’s impact, the demonstration achieved some positive gains in meeting the demonstration goals. The demonstration participants had better outcomes in timeliness of prenatal care, and rate of lead testing in pregnancy than the comparison group. Survey results indicated a statistically significant increase in proportion of children with “excellent” overall health status. Although administrative health care data on access to targeted case management services suggest room for improvement, we look forward to further analysis that will come as the state continues to refine processes to improve service delivery during the current demonstration period.

The approved Summative Evaluation Report may now be posted to the state’s Medicaid website within 30 days. CMS will also post the Summative Evaluation Report on Medicaid.gov.

States are responsible for following all applicable federal law and regulations when they claim and use federal Medicaid and CHIP funds and must fully comply with all applicable Medicaid and CHIP statutes and regulations under a section 1115 demonstration, except where specific provisions have been expressly waived or identified as not applicable for that demonstration. This obligation includes all requirements in Title XIX and Title XXI of the Social Security Act and implementing regulations governing provider screening and enrollment activities, pre- and

post-payment review claiming, payment methodologies and rate-setting, utilization controls, and program integrity including processes to identify, investigate, and refer suspected fraud, and methods to receive complaints and identify questionable practices. States must maintain effective systems and safeguards to prevent, detect, and address any fraud, waste, or abuse (FWA) in the delivery of and payment for Medicaid and CHIP services, including referrals to law enforcement when appropriate.

States should have heightened monitoring and oversight mechanisms in place featuring robust internal controls to identify and remediate all vulnerabilities (including, but not limited to, FWA and beneficiary access issues) inherent in service areas approved as part of a demonstration. At any time, CMS may request that the state provide a plan detailing the state's systems and safeguards to prevent, detect, and address any FWA relative to this demonstration. Failure to meet program integrity obligations under federal statutes and regulations or under the terms and conditions of this demonstration approval may result in compliance actions or other enforcement measures that could include requirements to develop and implement corrective action plans, withholdings, deferrals, disallowances, and termination of demonstration authority.

We look forward to our continued partnership on the Flint Michigan section 1115 demonstration. If you have any questions, please contact your CMS demonstration team.

Sincerely,

DANIELLE DALY -S Digitally signed by
DANIELLE DALY -S
Date: 2026.05.12
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Danielle Daly
Director
Division of Demonstration Monitoring and Evaluation

cc: Christine Davidson, State Lead, CMS Medicaid and CHIP Operations Group



Flint, Michigan Section 1115 Demonstration

#11W 00302/5

March 3, 2016 – September 14, 2021

Summative Evaluation Report *Revision*

Submitted: *09/18/2023*



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Executive Summary

In April 2014, Flint, Michigan experienced a public health crisis related to its water supply. The City of Flint switched the water source, from Lake Huron and the Detroit River to the Flint River, to reduce costs. This switch, and its water treatment process, caused lead and other toxins to leach from old pipes that delivered water into homes. Neighborhoods with aging lead pipes and infrastructure experienced a 6% increase in lead levels in the drinking water (Hanna-Attisha, et al., 2016). As a result, many residents experienced serious health problems particularly from ingesting the water.

The primary concern was the lead exposure affecting pregnant women and children. Health providers discovered the incidence of elevated blood lead levels (EBLL) in Flint children significantly increased from 2.4% in 2013 to 4.9% in 2015, after the water source changed (Raymond et al., 2017). Lead is a neurotoxin and EBLL can affect the developing brain and neural systems. Lead exposure in utero and in young children has the potential to cause serious physical and developmental delays. These neurodevelopmental effects can impact intelligence, behavior, and a healthy life trajectory. In unborn children, lead crosses the placenta as a toxin and may cause miscarriage, low-birth weight, and affect major organs (Reuben et al., 2017). These effects are difficult to ameliorate and are often sustained into adulthood.

In 2016, the federal government declared the Flint Water Crisis an emergency and leveraged funds to assist residents facing immediate effects of the contaminated water. To address the sustained public health crisis directly, the Centers for Medicare and Medicaid Services (CMS) administered funds via the Michigan Department of Health and Human Services (MDHHS) to expand eligibility and access to health care for children under 21 years of age and pregnant women. The Flint Medicaid Expansion (FME) was approved March 3, 2016, and enrollment commenced on May 9, 2016, approximately two years after the water switch date of April 25, 2014. This Medicaid Section 1115 Waiver expanded eligibility and services in two ways: 1) increased the income eligibility from a maximum of 212% FPL to 400% FPL, and 2) included Targeted Case Management (TCM) of specialized services.

After the FME waiver received preliminary approval, MDHHS engaged Michigan State University's Institute for Health Policy (IHP) to evaluate the expansion of Medicaid services in the waiver application's four domains: 1) Access to Care; 2) Access to Targeted Case Management (TCM); 3) Improved Health Outcomes; and 4) Lead Hazard Investigation. The four domains offered specific hypotheses to guide the evaluation. Refinements were necessary during the evaluation activities in collaboration with MDHHS and CMS. One example was the process used to identify Saginaw County as the Comparison Group. CMS approved the evaluation plan on August 8, 2017. The contract between IHP and MDHHS authorizing the work was effective January 2018. During this demonstration period, CMS also authorized an extension for the original waiver approval while a renewal application was being reviewed. Therefore, the end point for the waiver was extended from February 28, 2021, to September 14, 2021. Thus, the final evaluation submission date was moved from the original April 2021

date to October 31, 2022. This summative report covers evaluation of waiver activity occurring from the original waiver approval date, March 3, 2016, through the extension date, September 14, 2021.

To coincide with the initial waiver enrollment date of May 9, 2016, the anchor point selected for evaluation activities was May 1, 2016. Given the two-year gap between the water switch and waiver enrollment, three timeframes were considered (Table 1).

Table 1: Evaluation Timeframe Reference

Timeframe Code	Timeframe Description
T1	Baseline year prior to the water switch (May 1, 2013 – April 30, 2014).
T2	Post water switch, FME not implemented (May 1, 2014 – April 30, 2016).
T3	Post water switch, FME implemented (May 1, 2016 – September 14, 2021).

The timeframe codes and corresponding color coding are utilized throughout the report to give context to data and activities. Predominant evaluation activities carried out during the 2018 calendar year included acquisition of data, data preparation, securing resources to implement the evaluation, engaging key stakeholders, and preliminary analyses. Evaluation activities during the 2019 calendar year included expansion of available results as well as implementation of enrollee and TCM provider surveys. Evaluation work during the 2020 calendar year was affected by the coronavirus pandemic and associated government stay-home orders, however, the team continued to acquire and prepare data. The coronavirus pandemic continued to affect evaluation activities during the 2021 calendar year. The team noted significant variation in the data extracted from the state’s data warehouse for the timeframe 5/1/2020 – 4/31/2021. Additionally, compared to prior years, fewer claims/encounters, lab test results, and live birth data were identified. Multiple data pulls were performed throughout calendar year 2021 without notable improvement. No systematic issues affecting data quality were identified by state partners. Available evidence suggests the observed decreases were likely due to the state’s shut-down as declines were documented in other programs as well according to personal communications with staff. However, despite the adverse impacts of the pandemic related government shutdowns on available administrative health data, opportunities arose during the 2021 evaluation period. Particularly, the waiver extension period offered an opportunity to obtain an additional wave of survey data from enrollees and TCM Providers. The extension further allowed for the inclusion of claims/encounter data through 9/30/2021.

Waiver data obtained through September 2021 indicated the FME Waiver had improvements, particularly for children, in meeting the overarching goal to identify and address any physical or behavioral health issues associated with actual or potential exposure to lead hazards. Specific analytic methods for the sub-hypotheses varied by measure. **A breakdown of key findings is presented in each of the four Domains (a summary table is in Appendix 7).**



The revised hypothesis for **Domain 1**, Access to Care, stated *“Enrollees will access services to identify and address physical or behavioral health issues associated with lead exposure at a rate higher than non-enrollees with similar individual and neighborhood characteristics”* (herein referred to as the Comparison Group). Statistical analyses based on tests comparing the difference in trends in T3 between the FME group and the Comparison Group documented some statistically significant differences. ***Although the final two years of data were affected by the COVID-19 pandemic and hindered definitive answers, the key findings throughout the evaluation found that the FME group generally outperformed the Comparison Group and the majority of enrollees reported increased satisfaction in accessing care as a result of the waiver. Additionally, pregnant FME enrollees had significantly higher rates of lead testing and timely prenatal care than the comparison group for all years.*** The impact of FME on outcomes related to follow-up test of EBLL and post-partum care were less robust.

Limited impact of the waiver was documented for **Domain 2**, Access to TCM. This was related to low TCM uptake and participation. The hypothesis for this domain stated, *“Enrollees who access TCM services will access needed medical, social, educational, and other services at a rate higher than enrollees with similar individual and neighborhood characteristics who do not utilize TCM services.”* ***A key finding for Domain 2 was that*** administrative health care data and provider supplied TCM enrollment/participation data showed overall engagement at less than 5%. Data issues were observed starting in 2020 requiring more reliance on enrollee survey and TCM provider key informant interview reports. Compared to the administrative data findings, slightly more, 10%, enrollee survey participants acknowledged participation. TCM participants reported sustained interaction and satisfaction with the benefit. Due to the low participation documented through administrative health care data, statistical testing to compare participants vs. non-participants among the cohort of FME enrollees was not performed.

Domain 3, Improved Health Outcomes, were expected because of FME enrollment. The hypothesis read *“Enrollees will have improved health outcomes compared to non-enrollees with similar individual and neighborhood characteristics.”* Small cell sizes impacted the ability to conduct statistical testing on the combination childhood (2 years of age) immunization measure, however the FME adolescent enrollees had a higher immunization trend than the comparison group. The comparison for low-birth-weight rate between the FME enrollees and the comparison group was not statistically significant. ***An additional finding for Domain 3 was that FME enrollees reported statistically significant increases in the proportion of children having an “excellent” overall health status over time from Wave 1 to Wave 4. Another key finding was a statistically significant decrease in the proportion of respondents reporting their child was diagnosed with a learning problem or behavioral/emotional problem by a health care or school provider.***

Administrative data to support **Domain 4** was not available. The lead investigation data were collected and managed by agencies outside of Medicaid. The hypothesis stated, *“The lead hazard investigation program will reduce estimated expected ongoing or re-exposure to lead hazards in the absence of this program.”* Data sources to inform this domain included the enrollee survey and *Flint Lead Free* community reporting. The enrollee survey provided



additional information regarding EBLL and ongoing potential exposures from the city water supply. A significant decrease in the proportion of children having self-reported EBLL was reported from Wave 1 to Wave 4 surveys. The ability to expand investigation services without requiring an existing documented EBLL further extended the capacity to identify children at risk for exposure. The proportion of environmental investigations done on homes without documented EBLL rose from 13% to 97%, according to the 2021 *Flint Lead Free* report.

Evaluators found lower than expected enrollment in FME and hypothesized several reasons for this under-enrollment including a two-year lag between when the water crisis was declared a federal emergency and when FME began. During these two years, residents impacted by the water likely sought resources and support from local organizations to meet their real-time needs. Within this time, some residents relocated and may have believed they eliminated the potential risks associated with exposure to the water and thus did not enroll in the waiver. Additionally, individuals with higher income levels were consistently underrepresented. The evaluators hypothesized that this may have been related to disinterest in the FME Waiver due to current coverage, associated stigma with utilizing assistance programs, or were unaware of their waiver eligibility.

The FME Waiver was intrinsically different than typical demonstration waivers. This waiver was designed to react to an environmental emergency rather than testing options to improve existing services or innovate payment structures. More effort was directed to identifying and obtaining possible data sources ***in reaction to the approved waiver compared to a traditional demonstration waiver*** where there may be more planning time available. The results in this report reflect the evaluation findings regarding the FME Waiver period of 3/3/2016-9/14/2021. The waiver provided varying levels of success in achieving the state's overarching goal to *"identify and address any physical or behavioral health issues associated with actual or potential exposure to lead hazards."*



General Background Information

In 2016, the Michigan Department of Health and Human Services (MDHHS) received an 1115 waiver from the Centers for Medicare and Medicaid Services (CMS) to expand Medicaid coverage and benefits to individuals affected by the Flint Water Crisis.

The Flint Water Crisis occurred when the city's water source was changed in April 2014 to the Flint River. This water source did not receive proper treatment and subsequently caused lead and other toxins to leach from pipes into the city's drinking water. The main effect was increased incidence of elevated lead levels in tap water and in children's blood (Sadler et al., 2017). Over 100,000 residents were affected and among those were approximately 25,000 infants and children (Census Bureau, 2014). In January 2016, President Obama declared an emergency in Flint, leveraging federal aid to support state and local response efforts.

The Flint Medicaid Expansion (FME) Waiver provided expansion of health services to address potential health risks and diseases possibly incurred during exposure to lead during the Flint Water Crisis. As of the waiver end date, September 14, 2021, lead exposure continued to be an environmental risk in the community since all water supply lines were not replaced. Because lead is a known neurotoxin and most of the community was affected, MDHHS applied for the waiver to expand Medicaid coverage to individuals who may have been exposed but were not eligible for Medicaid due to income limitations. Given the known adverse impact on early neurological development, the target populations identified in the original application included infants and children as well as pregnant women (HEDIS, 2019).

The overarching goal of the MDHHS waiver application was to *"identify and address any physical or behavioral health issues associated with actual or potential exposure to lead hazards."* The demonstration waiver expanded eligibility of all Medicaid benefits for low-income children (up to age 21 including children born to eligible pregnant women) and pregnant women (through two months post-delivery) served by the Flint water region from 4/25/2014 through a date where the water was deemed safe. As of the end date of this waiver period, September 14, 2021, the water was not yet considered safe throughout the community although lead levels were below national thresholds. The specific expansion of eligibility modifications included:

- Increased income threshold to offer coverage to children in households with incomes from 212% federal poverty level (FPL) up to and including 400% FPL.
- Increased income threshold to offer coverage to pregnant women in households with incomes from 195% FPL up to and including 400% FPL.
- Eliminated cost sharing and Medicaid premiums for eligible children and pregnant women served by the Flint water system.
- Permitted eligible children and pregnant women above the 400% FPL and served by the Flint water system to buy into Medicaid benefits by paying premiums.

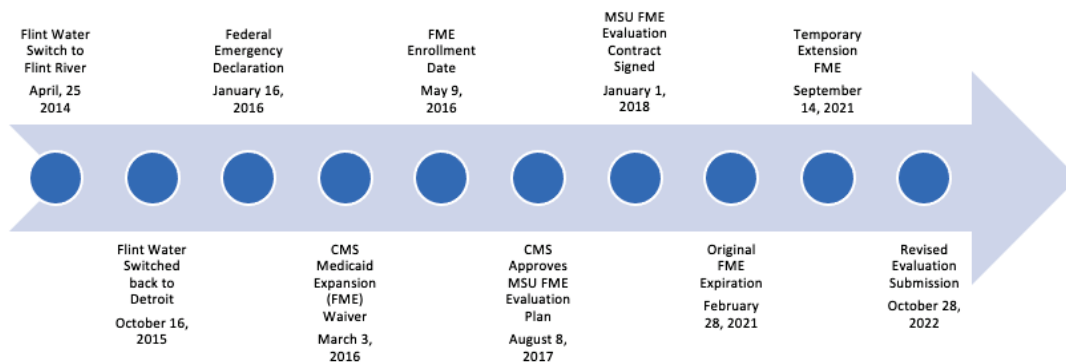
The demonstration also added a TCM benefit to all low-income children (up to age 21 including children born to eligible pregnant women) and pregnant women (through two months post-delivery) served by the Flint water system until the water was declared safe. The intent of the TCM benefit was to:

- Assist enrolled eligible children and pregnant women served by the Flint water system to gain access to needed medical, social, educational, and other service(s).

The *Flint, Michigan Section 1115 Demonstration #11W 00302/5* waiver was approved March 3, 2016, and enrollment commenced on May 9, 2016, approximately two years after the water switch date of April 25, 2014. A condition of this waiver authorization was the requirement for an independent evaluation. Michigan State University’s Institute for Health Policy (IHP) collaborated with CMS on the evaluation goals and activities. The evaluation plan was approved by CMS on August 8, 2017. The contract between MDHHS and MSU to authorize the work was effective January 1, 2018.

Multiple key dates were considered to anchor the evaluation work including water switch date, waiver approval date, and waiver enrollment date. Figure 1 provides a timeline of the key dates associated with the Flint Water Crisis that were under consideration.

Figure 1: Flint Water Crisis Timeline of Key Events



The original anchor point identified for evaluation activities was April 1, 2016. Shortly after the start of the evaluation work, the anchor point was revised to May 1, 2016, to coincide with the initial waiver enrollment date of May 9, 2016. Rationale for this decision was that the influence of the waiver activity would be most closely accounted for with a twelve-month reporting cycle running from May through April. Due to the two-year gap between the water switch and waiver enrollment, three main timeframes were considered (**Table 1**).



Table 1: Evaluation Timeframe Reference

Timeframe Code	Timeframe Description
T1	Baseline year prior to the water switch (May 1, 2013 – April 30, 2014).
T2	Post water switch, FME not implemented (May 1, 2014 – April 30, 2016).
T3	Post water switch, FME implemented (May 1, 2016 – September 14, 2021).

The evaluation team included faculty and staff from IHP as well as faculty from the College of Human Medicine’s Department of Epidemiology and Biostatistics, Division of Public Health, and the Office of Research. Additionally, faculty and staff from the College of Social Science and Office for Survey Research were members of the evaluation team. Faculty and staff from the College of Education contributed expertise and assistance in obtaining and interpreting publicly available MI Schools Data Dashboard information during calendar year 2021. The evaluation findings contained in this report reflect the findings of the original FME Waiver authorization period extending through September 14, 2021.

The MSU evaluation team included:

- Hong Su An, PhD; Institute for Health Policy, CHM, MSU
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- Mona Hanna-Attisha, MD, MPH, FAAP; Department of Pediatrics, CHM, MSU/Hurley Medical Center
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- Richard Sadler, PhD; Division of Public Health, CHM, MSU
- Lin Stork; MA Office of Survey Research, MSU
- Liang Wang, PhD student; Department of Epidemiology and Biostatistics, CHM, MSU



Evaluation Questions and Hypotheses

The MDHHS Waiver application referred to four domains and specific hypotheses in which the expanded Medicaid offerings would support attaining the overall waiver goal. IHP developed specific sub-hypotheses intended to support the MDHHS hypotheses. A summary matrix of all measures by domain and steward is available in Appendix 1. A copy of the approved evaluation plan is provided in Appendix 2 and contains detailed specifications of each of the individual measures included under each domain.

- Domain 1: Access to Care
- Domain 2: Access to Targeted Case Management
- Domain 3: Improved Health Outcomes
- Domain 4: Lead Hazard Investigation

Domain 1: Access to Care

The approved demonstration provided Medicaid coverage and access to health care services to a cohort of individuals who were exposed to lead contaminated water and therefore potentially at risk for physical and behavioral issues. The original Hypothesis 1 proposed in the waiver application was *“Enrollees will access services to identify and address physical or behavioral health issues associated with lead exposure at a rate higher than others with similar levels of lead exposure.”*

The evaluation team did not have sufficient power to test Hypothesis 1 as originally planned because the number of individuals with EBLL was found to be low. A complete description of this finding and implications is presented in the Results: *“Comparison Group Considerations”* section. Thus, the evaluation team modified the wording of the hypothesis to reference another comparison population, that being *non-enrollees with similar individual and neighborhood characteristics*. The revised hypothesis read *“Enrollees will access services to identify and address physical or behavioral health issues associated with lead exposure at a rate higher than non-enrollees with similar individual and neighborhood characteristics.”* The related sub-hypotheses were similarly adjusted to reference the available comparison group.

Nine (9) sub-hypotheses made up Domain 1 and several of the sub-hypotheses included multiple discrete measures addressing children and pregnant women eligible for the waiver. The overall objectives were to evaluate the use of specified services, including well-child visits, developmental screening assessments, testing and retesting of blood lead levels in pregnant women and children, prenatal and postpartum care, maternal infant health program (MIHP) participation, and improved care and satisfaction.



Children/Pediatric Measures:

1. A greater proportion of enrollees will obtain age-appropriate well-child exams than non-enrollees with similar individual and neighborhood characteristics.
2. A greater proportion of enrollees will receive age-appropriate developmental screening/assessments than non-enrollees with similar individual and neighborhood characteristics.
3. A greater proportion of enrollees will receive age-appropriate lead testing than non-enrollees with similar individual and neighborhood characteristics.
4. A greater proportion of enrollees with high blood lead levels will receive re-testing at the appropriate intervals than non-enrollees with similar individual and neighborhood characteristics.

Pregnancy Measures:

5. Enrollees who are pregnant will have timelier prenatal and postpartum care than non-enrollees with similar individual and neighborhood characteristics.
6. A greater proportion of enrollees who are pregnant will have recommended lead testing than non-enrollees with similar individual and neighborhood characteristics.
7. A greater proportion of enrollees will participate with MIHP services than non-enrollees with similar individual and neighborhood characteristics.

Improved Care & Satisfaction Measures:

8. The majority of enrollees will attest to improved access to health care as a result of the expanded coverage.
9. The majority of enrollees will report improved satisfaction with their ability to access health care as a result of the expanded coverage.

Domain 2: Access to Targeted Case Management (TCM)

The approved demonstration provided expanded benefits, specifically TCM to facilitate needed medical, social, educational, and other services to a cohort of individuals exposed to the contaminated water and potentially at risk for physical or behavioral health consequences. Required elements of TCM were described in MDHHS policy and included assessments, planning, linkage, advocacy, coordination, referral, monitoring and follow-up activities. In response to enrollee feedback, TCM was relabeled as Family Supports Coordination (FSC). In the interest of consistency for this report and alignment with the Waiver application and approval materials, the services continued to be referred to as TCM throughout this evaluation report.

The original hypothesis proposed in the waiver application stated, *“Enrollees who access TCM services will access needed medical, social, educational, and other services at a rate higher than others with similar levels of lead exposure.”*



Hypothesis 2 was modified by the evaluation team to allow a more robust comparison because of the same issue of low numbers of persons with elevated lead levels. The revised hypothesis read: “*Enrollees* who access TCM services will access needed medical, social, educational, and other services at a rate higher than *enrollees* with similar individual and neighborhood characteristics but do not take up TCM services.” Hence, the intent was to compare TCM users vs. TCM non-users among all the FME enrollees. Hypothesis 2 encompassed four sub-hypotheses. The first two reflected operational aspects of the new benefit while the remaining two assessed selected improvement in receipt of specific health care services.

1. Referral source and participation levels with TCM will be tracked among enrollees.
2. All TCM participants will have at least one re-assessment within one year of original assessment.
3. A greater proportion of TCM participants will have age-appropriate well child exams than the comparison.
4. A greater proportion of TCM participants will have completed age-appropriate developmental screening than the comparison.

Domain 3: Improved Health Outcomes

The third domain targeted improvements in health outcomes that were consistent with the goal of the waiver. The original Hypothesis 3 proposed to evaluate whether “*Enrollees will have improved health outcomes compared to others with similar levels of lead exposure.*”

The evaluation team modified this hypothesis in a manner like that done for Hypothesis 1. Specifically, the comparison group was re-stated as non-enrollees having similar individual and neighborhood characteristics. The revised Hypothesis 3 read “*Enrollees will have improved health outcomes compared to non-enrollees with similar individual and neighborhood characteristics.*” Three sub-hypotheses were identified to serve as proxy measures for optimal health status. These proxy measures targeted immunization, birth weight and self-reported health status. The health status measure did not have data available for a comparison group. For this measure, enrollees served as their own controls and changes in health status were tracked over four survey waves.

1. Enrollees will have higher completed age-appropriate immunization statuses than non-enrollees with similar individual and neighborhood characteristics.
2. Enrollees who are pregnant will deliver infants with higher birth weights than non-enrollees with similar individual and neighborhood characteristics.
3. Enrollees report an increase in their self-reported health status over the duration of their enrollment.

Three provisional (designated by a leading “P”) descriptive sub-hypotheses of neurocognitive, behavioral, and educational outcomes of eligible children were proposed. These outcomes



were deemed provisional due to the following concerns. Options for suitable comparison groups were considered during the evaluation period including specific populations of persons having developmental disturbances such as children enrolled in the Serious Emotional Disturbance (SED) waiver. The children enrolled in the SED waiver had significant medical demands compromising their suitability as an appropriate comparison. More detail is provided in the *Target and Comparison Population* section of this report. Attempts were also made to obtain individual level education data that could be merged at the person-level with the available administrative health data. Access to individual education data was denied for the evaluation. Ultimately, questions were included into the Child version of the enrollee survey to obtain parent/guardian self-report of education and development measures. Specifically, respondents were asked if their child was in the grade level for their age as well as if they received identification of learning problems or behavioral problems from school or health care providers.

- P4. We will conduct a descriptive analysis of the proportion of children diagnosed with severe emotional disturbance and other developmental/learning disabilities
- P5. Descriptive analysis of behavioral health conditions among enrolled children (i.e., rate/proportion of children suspended or expelled), and
- P6. Descriptive analysis of educational delays among enrolled children (i.e., rate/proportion of children receiving special education services, i.e., individual education plans “IEPs,” early preschool performance, and reading and math scores at end of grades 3, 4, and 5).

Domain 4: Lead Hazard Investigation

The final domain was intended to support identification of persons at risk for lead exposure. The waiver expanded access to lead investigation services even when blood lead levels of persons in the residence were not elevated. The FME approval did not cover mitigation or abatement activities. Hypothesis 4 proposed in the waiver application stated, *“The lead hazard investigation program will reduce estimated expected ongoing or re-exposure to lead hazards in the absence of this program.”* Hypothesis 4 included two sub-hypotheses.

1. Enrollees participating in TCM services will access lead hazard investigation services at a higher rate than beneficiaries not participating in TCM.
2. Beneficiaries found to be at risk for ongoing lead exposure will be referred for additional environmental investigation.

Because of the barriers to obtaining administrative data housed by agencies or organizations external to MDHHS, other sources were identified as proxies. This included adding questions to the enrollee surveys about other sources of potential lead exposure, ongoing use of city water and elevated blood lead levels. The *Flint Lead Free* reports were also referenced as this tracked metrics related to lead exposure in the community.



Methodology

Evaluation Design

The approved evaluation plan (Appendix 2) proposed a pre-post design to evaluate the degree to which the FME met the overarching goal to identify and address any physical or behavioral health issues associated with actual or potential exposure to lead hazards. Critical timeframes for the purposes of the evaluation were revised to May 1, 2013 – April 30, 2014, to reflect the “pre” water switch time period (T1), the timeframe of May 1, 2014 – April 30, 2016, was considered post water switch but “pre” FME implementation (T2), and each subsequent years since enrollment into FME as of May 2016 was considered “post” FME implementation through waiver extension date of 9/14/21 (T3) (Table 1, page 11).

Target and Comparison Populations

Another design strategy of the evaluation proposal was to test a variety of comparison groups in addition to the pre-post design. The evaluation team considered a variety of potential comparison groups. The target population of the FME included individuals from any of the following groups acknowledged to be at risk for adverse outcomes related to lead exposure via the Flint Water system:

- Any pregnant woman and/or child up to age 21 with a household income up to and including 400% of the Federal Poverty Level (FPL) who had been exposed to the Flint water system on or between 4/1/2014 and the date water is deemed safe. As of the waiver end date, September 14, 2021, lead exposure continued to be an environmental risk in the community since all water supply lines were not replaced.
- Any child born to a pregnant woman exposed to the Flint water system during the specified period. The child will remain eligible until age 21.
- Exposure is defined as having consumed water drawn from the Flint water system during the specified period and
 - resides or resided in a dwelling connected to Flint water system service lines;
 - is employed and/or had employment at a location served by the system; or
 - is receiving or received childcare and/or education at a location connected to this system.

The Eligibility Protocol further clarified eligibility criteria to include individuals who were incarcerated or who resided in a health care facility at a location served by the Flint water system. Four potential comparison groups were considered in the original evaluation proposal:

1. Medicaid enrollees residing in the target Flint area based on water exposure map in the year prior to the water switch.
2. Commercially insured individuals in Michigan.
3. Communities known to have similarly elevated blood lead exposures.
4. Enrollees covered through Michigan’s Serious Emotional Disturbances (SED) waiver.

Each of these was associated with limitations. The main concern for Comparison Group 1 was that even if these enrollees had similar water lead exposure prior to the water switch, they would not have similar exposure after the water switch. The main concern for Comparison Group 2 was an inability to acquire commercial insurance data. The main concern for Comparison Group 4 was the relatively small number of enrollees in the SED waiver (approximately 400 statewide) along with the significantly greater acuity and need for services these enrollees were known to require. Specifically, SED waiver enrollment requires an individual to meet criteria for admission to the state inpatient psychiatric hospital. Upon reflection of the cohort in Comparison Group 4, the evaluation team concluded the groups were more dissimilar than similar which compromised their ability to serve as comparators. Thus, we focused on exploring communities potentially having similar elevated lead exposures identified as Comparison Group 3. Unfortunately, Group 3 was compromised by the low numbers of persons having EBLL (**Table 2**). The impact of the coronavirus pandemic for the 5/1/2020 – 4/30/2021 reporting period further depressed the reporting numbers. Published statewide reporting from the MITracking data portal of lead testing for all of Genesee and Saginaw counties decreased by nearly half from 2019 to 2021. The decline was attributed to stay-home orders, business closures and the increase in virtual care as a replacement for in-person visits (MDHHS, 2020).

Table 2. Number of children under 6 years with elevated blood lead level in Genesee & Saginaw counties

Race/Ethnicity	FME status	5/16 - 4/17	5/17 - 4/18	5/18 - 4/19	5/19 - 4/20	5/20 - 9/21
non-Hispanic White	non-FME	58	52	50	58	39
non-Hispanic White	FME	51	32	29	11	9
non-Hispanic Black	non-FME	42	44	54	53	39
non-Hispanic Black	FME	90	52	37	25	7
Hispanic/Other	non-FME	13	18	17	16	*
Hispanic/Other	FME	*	*	*	*	*
Unknown	non-FME	9	11	14	11	*
Unknown	FME	*	6	8	*	*

*Cells less than or equal to 5 suppressed

Ultimately, the evaluation team developed a more robust Comparison Group 5.

- Beneficiaries with similar individual and neighborhood characteristics at the census tract level.

Statistical methods were applied resulting in the identification of Saginaw County as a reasonable community comparison. The evaluation team considered two main approaches in the selection of Comparison Group 5 (see Appendix 8 for more detail). In the first approach, we considered the K means method (Tibshirani et al., 2001) to find a lower-peninsula county like



Genesee County in health outcomes, health behavior, clinical care, social economic environment, and physical environment. These vital health factors are used by the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute to rank counties in the U.S. We chose these confounding characteristics (a total of 48 variables) under the assumption that counties with similar characteristics affecting lead exposures would have similar levels of lead exposures. We used the Gap statistic to first estimate the number of clusters in the data and then used 5,000 random starting values to run the K means algorithm to count how many times a county was assigned to the same cluster as Genesee County. The county that was most often clustered together with Genesee County was chosen as the comparison county. The evaluation team used this method for a similar evaluation project (Strutz et al., 2021).

The second approach the evaluation team considered was the synthetic control (SC) method (Abadie et al., 2010). Since no single county was similar enough to Genesee County in all characteristics under consideration, we explored using a weighted combination of counties as the “control” county. The key data for this approach was the Michigan Childhood Lead Poisoning Prevention Program Data Report series from 2012 to 2019. The SC idea was to impute a counterfactual Genesee as a weighted average of other lower peninsula counties. The weights were computed by minimizing a vector of distance between Genesee and other counties over a set of pre-treatment covariates that are predictive of the outcome (e.g., EBLL). A limitation of the SC method is that it requires re-calibration of weights for each hypothesis because different counterfactual weights may be required to construct a synthetic control that is similar in the respective hypothesis being tested. Summary measures at the county level for each hypothesis several years prior to the water switch or waiver expansion would also be required. County level estimates of the majority measures identified for this evaluation were not available.

Both approaches were limited by data availability and comparisons would have been ideal at the city level. The cities of Pontiac and Saginaw were considered because they were similar in size, racial composition, socioeconomic distress, initial development, economic trajectory, and current housing landscape to Flint. Thus, risk factors for lead exposure were reasonably suspected to be similar across all three communities. Pontiac was additionally suitable as a comparison community because, like Flint, it was served by the Great Lakes Water Authority (formerly the Detroit Water & Sewerage Department). These communities further shared the existence of a spread of wealthier suburbs surrounding them which may offer comparison opportunities. Additional potentially suitable communities included the smaller metropolitan areas of Jackson, Muskegon, and Kalamazoo. However, city-level data were difficult to obtain which made it difficult to quantify the similarities. Thus, we restricted our choice of geographic comparison group to the county level.

The K-means analysis confirmed that Saginaw County was a suitable option for Comparison Group 5. Upon identification of the comparison community, the MDHHS Data Warehouse was accessed for claims/encounter data for all Medicaid enrollees residing in Saginaw County from May 2013 through September 2021. History of comorbidity and/or census-tract level

social/economic background were adjusted when appropriate in regression models. A detailed description of the procedure and analyses for selecting the comparison group is described in the Results section and Appendix 8.

Evaluation Period

The original FME approval was for the period 3/3/2016 - 2/28/2021 with a state identified enrollment date of 5/9/2016. CMS approved the evaluation proposal 8/8/2017 and the evaluation contract between MDHHS and MSU was established in December 2017. Formal evaluation activities began in January 2018. MDHHS was granted an extension of the FME Waiver through September 14, 2021, allowing additional evaluation activity to occur during calendar year 2021. This report provides a cumulative account of the evaluation activities throughout the project, incorporating utilization and additional survey and TCM provider key informant interview data collected through 9/30/2021.

Although formal evaluation activities commenced January 2018, historical data to reflect the years prior to the water switch or prior to FME approval were obtained where available. Due to the pre-post design and the predominant reliance on administrative datasets for many of the evaluation sub-hypotheses, the full timeframe of health care claims/encounter and blood lead testing data reached back to 5/1/2013. This provided one year prior to the water switch (T1) to provide baseline estimates. While this allowed a small number of days of “post water switch” to be included in the baseline timeframe, the impact on measure reporting was believed to be negligible. Table 1 (page 11) reflects the periods included in the evaluation.

Evaluation Measures

As previously stated, the overarching goal of the FME was to *identify and address any physical or behavioral health issues associated with actual or potential exposure to lead hazards*. Thus, specific evaluation measures were selected for their relevance to known impacts of lead as a neurotoxin on developing physiological systems. In addition, recommended measures of preventive and screening services were included. The waiver authorized individuals at higher income levels to qualify, offering a chance to measure uptake in targeted services across socioeconomic levels. The summary matrix of all measures by domain and steward is available in Appendix 1. Detailed specifications regarding each measure including information on sponsoring/endorsing organization, numerator and denominator definitions, and potential data source are presented in Appendix 2 as part of the approved Evaluation Proposal.

The specific evaluation measures associated with Hypothesis 1 included specific Health Plan Employer Data Information Set (HEDIS) measures endorsed by the National Quality Forum (NQF).⁴ The focus of the first hypothesis was to evaluate enrollee access to services and compare enrollee access with a comparison group. The selected measures included:

- 1.1. Age-appropriate well-child exams;



- 1.2. Age-appropriate developmental screening;
- 1.3. Age-appropriate blood lead testing;
- 1.4. Appropriate re-testing for individuals with elevated blood lead levels;
- 1.5. Timely prenatal and postpartum care for pregnant women; and
- 1.6. Recommended blood lead testing for pregnant women.

The remaining measures included items that were specific to Michigan. For instance, participation in a program intended to support positive birth outcomes, the Maternal Infant Health Program (MIHP) was added. It was expected that individuals receiving TCM support would be more likely to receive referrals to, and participate in, MIHP.

- 1.7. Pregnant women participation in MIHP.

The evaluation team felt it was important to solicit feedback directly from FME participants to understand whether the expanded eligibility and TCM services supported them in accessing services. An enrollee survey was designed to address the final two measures:

- 1.8. Enrollee attestation to improved access to health care; and
- 1.9. Enrollee report of improved satisfaction with ability to access health care.

Hypothesis 2 focused on the additional TCM service added as a new benefit with the waiver. The intention of this benefit was to facilitate needed medical, social, educational, and other services for those who were exposed to the contaminated water. TCM provided an opportunity for enrollee education and support as well as assistance navigating the health care system and helping to mitigate barriers to care. Therefore, the measures associated with the sub-hypotheses were selected for their significance to the operational and implementation aspects of the benefit. As such, these measures were specific to Michigan.

- 2.1. Use of referral services by TCM participation level;
- 2.2. Proportion receiving at least one re-assessment within one year of original TCM assessment;
- 2.3. Proportion of TCM recipients having well-child exams; and
- 2.4. Proportion of TCM recipients having developmental screenings.

Hypothesis 3 in the waiver application addressed improved health outcomes. Because the full impact of lead exposure on a child's developing nervous system cannot be assessed for several years, three process measures were identified as proxies for clinical outcomes.³ Process measures validated by national organizations were used to measure clinical outcomes based on known associations between these metrics and general health status.⁴

- 3.1. Age-appropriate immunization completion;
- 3.2. Infants birth weights; and
- 3.3. Self-reported health status.



As the enrollee survey was designed, the potential for TCM providers to impact enrollees holistically with their health care needs was realized. The TCM providers had opportunities to ensure appropriate referrals and services for a host of health conditions including chronic conditions. Thus, several additional questions regarding chronic disease and self-management capacity were included in the enrollee survey to inform evaluation questions regarding changes in health status.

This domain also included three *provisional* hypotheses regarding educational measures and performance. These measures were developed in-house. The following measures were deemed provisional due to concerns regarding the identification of an appropriate comparison group and the availability of the necessary data to fully investigate them.

- 3.4. Proportions of children diagnosed with severe emotional disturbance and other developmental/learning disabilities;
- 3.5. Behavioral health conditions among enrolled children (i.e., rate/proportion of children suspended or expelled); and
- 3.6. Educational delays among enrolled children (i.e., rate/proportion of children receiving special education services – IEPs, early preschool performance, reading and math scores at end of grades 3, 4, and 5).

The federal Department of Education denied the state’s request for a FERPA waiver which limited the evaluation’s ability to link health and education data at an individual level. Information regarding the presence of behavioral health conditions and educational delays was collected from parents/guardians of children enrolled in the waiver from the enrollee survey. The evaluation team also used publicly available education data through MI School Data to provide a high-level accounting of reported educational delays and provision of special services at a school district level.

Hypothesis 4 referenced the Lead Hazard Investigation that was expanded through the FME Waiver. Mitigation and abatement efforts to home sites with lead hazards were not funded through the Medicaid expansion. The FME Waiver authorized funding to conduct screening and assessment of environments to assist with case finding. Prior to the FME Waiver, documentation of an EBLL was necessary to refer a property for lead exposure investigation. This requirement was relaxed by the FME Waiver so that home sites could be assessed in the absence of a documented EBLL. The details of environmental assessments and mitigation efforts were supported and documented by governmental agencies outside of Medicaid. This affected the evaluation team’s ability to quantify levels of lead exposure. Thus, the team developed metrics that took into consideration the effect of additional Medicaid funds in facilitating additional screening and case finding. The enrollee survey was again targeted to provide some information regarding ongoing lead exposures.

- 4.1. Prevalence of lead hazard assessment/investigation; and
- 4.2. Prevalence of those at risk for ongoing lead exposure receiving referrals for additional environmental investigation.



Data Sources

Sources of data used to support evaluation activities included: 1) the MDHHS Health Services Data Warehouse (Medicaid enrollment, claims/encounter data, blood lead lab test data), 2) TCM program information (administrative data and Wave 1, 2, and 3 TCM Provider Key Informant Interviews), 3) Enrollee Survey (Waves 1-4), and 4) MDHHS Key Informant Interviews. Community level, publicly reported datasets were required to support elements of the evaluation. These included: 5) Lead Poisoning Prevention Program Data, 6) MI Schools Dashboard, 7) County Health Rankings, and 8) American Community Survey (for census tract data).

MDHHS maintains a data warehouse containing information at an individual level regarding a variety of health-related services and data points. IHP employs staff with the necessary permissions and expertise to access the MDHHS Health Services Data Warehouse and acquire the elements needed to support analyses through an honest broker arrangement. However, despite the storage of a variety of health-related program data in the Health Services Data Warehouse, access to these data were controlled by each program.

MDHHS Health Services Data Warehouse – Enrollment and Utilization

Specific information contained within the data warehouse included Medicaid eligibility/enrollment records, final paid Medicaid claims/encounter data, and blood lead lab test data. While much of the Medicaid claims/encounter data lack clinical care values, the Michigan Childhood Lead Poisoning Prevention Program collected this information. The State of Michigan further maintains a master person index to facilitate matching of individuals between different programs so that individuals covered through Medicaid will be linked to their blood lead testing dates and values when present. Access to the Michigan Care Improvement Registry (MCIR) was granted during 2021 which provided additional information regarding vaccinations provided regardless of payer. The data contained in the Data Warehouse served as a primary source to test the bulk of the sub-hypotheses in Domain 1. This source also supported elements of Domains 2 and 3.

An ongoing review of routinely reported information was conducted by MDHHS program and warehouse staff to identify potential issues with data loading or when changes to warehouse tables were made. The evaluation team did not validate the data extracted from the warehouse with primary sources such as medical record reviews. Instead, conversations between the IHP staff responsible for pulling data and state program staff occurred to ensure that relevant fields were captured, and coded variables were correctly interpreted. Data review was an ongoing, iterative process and continued throughout the duration of the evaluation. Independent review and validation of codes used to process data and conduct statistical analyses was performed by evaluation team statisticians.



The health care data acquired for the timeframe 5/1/2020 – 9/14/2021 was less than prior years based on a raw number of total claims/encounters for the enrolled population. This was attributed in large part to the impact of the state stay-home orders that were mandated during the coronavirus pandemic. These stay-at-home orders were imposed mid-March 2020 with end dates varying based on industry. Accompanying outright closures, shifts in delivery of services to telemedicine, and patient concern over potential exposure from having preventive type of services may all have contributed to these declines. The availability of telemedicine visits unfortunately, would not result in services like blood testing or immunizations being performed. With the waiver extension period through 9/14/2021 available, the evaluation team used the 5/1/2020 - 9/30/2021 timeframe as the last evaluation period in an effort to increase the sample size.

Targeted Case Management Program Information

The supplementary TCM benefit approved in the waiver required additional data sources to support the evaluation beyond the claims/encounter information contained in the MDHHS Health Services Data Warehouse. While the provision of TCM services was identified through specific procedure codes entered into billing data, the ability to discriminate between specific services was not available via this administrative data. The evaluation team established a Business Associates' Agreement (BAA) with Genesee Health System (GHS) to authorize access to their records for the purposes of this evaluation. The hope was that additional details regarding specific service delivery would be available from this source. Unfortunately, the available documentation did not permit evaluators to discriminate between referrals to address needs associated with the water exposure versus referrals to address other pre-existing or concomitant social, physical, or behavioral needs. GHS continued to provide enrollment data to the evaluation team to support evaluation efforts until 4/30/2020. As with other health care associated data, the TCM enrollment numbers were likewise adversely affected by the pandemic.

An additional data source regarding the TCM benefit was a key informant interview conducted with individuals employed as TCM case managers at GHS and the Greater Flint Health Coalition (GFHC). These data were obtained through a telephone survey implemented during the second quarter of 2019 (Wave 1) and one year later in 2020 (Wave 2). A discussion guide was established to facilitate consistency of information and one registered nurse staff member from IHP conducted all the telephone interviews for Waves 1 and 2. In 2021, a third survey was administered, via a Qualtrics online survey, to the TCM case managers at these same organizations. Survey questions closely aligned with the in-person telephone survey. Draft summary reports were shared with the informants to ensure accurate representation of their information. Refer to Appendix 4 for the TCM Key Informant Interview documentation. These sources supported testing of hypotheses in Domain 2.

Enrollee Survey and Reporting

Enrollee survey data represented another major data source to inform the evaluation. Key measures of the evaluation such as inquiries regarding improvements in access to care or health outcomes required input from those enrolled in the FME Waiver. The original survey plan included three survey waves approximately twelve months apart to capture trends over time. Modifications to the original survey plans were necessary due to the period of time involved with evaluation plan approval and contracting. The original design was modified to maintain three waves but had each wave spaced approximately nine months apart. The extension granted to the state through September 14, 2021 allowed the evaluation team to implement a fourth wave to enrollees in 2021. The addition of a web-based participation option implemented in response to community feedback before Wave 1 was kept for all four waves. Enrollees were offered an additional \$10 incentive payment to complete this extra wave (Ford et al., 2022).

The enrollee survey provided education-related information since the information was not available from the Michigan Department of Education (CEPI et al., 2020). The evaluation team included several questions on the child version of the survey inquiring about school grade level and whether children had been identified as having learning problems and behavioral/emotional problems. The goal of these questions was to provide self-reported data regarding the impact of the lead exposure on educational performance and child development.

Wave 1 was conducted between 2018-2019; Wave 2 was in the field from 2019-2020; Wave 3 was fielded from 2020-2021; and Wave 4 was conducted between 2021-2022. The follow-up rate between Wave 1 and Wave 2 was 72%. Wave 3 had a 56% retention rate of the Wave 1 participants. Wave 4 had the lowest retention rate at 32%. All paper surveys were blind double data entered. Surveys completed by telephone were subjected to real-time monitoring by supervisory staff. Web-based responses to the survey were directly entered by the respondent. In addition to using a two-factor authentication process for a selected respondent to access the online survey, the web survey allowed only one response per unique credential. This prevented participants from completing more than one survey. The online survey was further protected from non-FME enrollee participation by restrictions imposed on the ability of internet search engines to locate the survey. Refer to Appendix 3 for copies of the survey tools as well as the detailed summary survey report.

MDHHS Key Informant Interview

The evaluation team conducted interviews with key MDHHS personnel who were involved with the application and administration of the FME Waiver. The original intent was to obtain data and perhaps quantify the costs that were associated with implementing the waiver. Mathematica Policy Research's Express Lane Eligibility evaluation was used as a template to generate waiver specific questions and considerations. These interviews were deemed important to inform the evaluation as administrative and operational issues would only be known to those having these responsibilities. The strategies used to manage this type of



environmental response waiver might require different considerations because of the reaction to an external event. This is different than what a typical demonstration waiver, i.e., a prospective effort to improve or innovate existing Medicaid offerings, could impose. Interviews were necessary since existing data sets to house these considerations were not able to be identified. In-person interviews were conducted through two sessions in July 2019.

Community Level, Publicly Available Data

The evaluation team identified publicly available datasets due to the realization that certain data elements proposed in the original evaluation plan were not available. Compared to typical demonstrations, the evaluation team explored more public datasets to support the FME Waiver that was responding to an environmental crisis. The usual sources of data for typical demonstrations were not sufficient to address the full scope of the evaluation. These publicly available data sources could not be relied upon to test any hypotheses targeting FME enrollees versus non-enrollees. However, they served to provide context to findings of the evaluation with the intention of documenting larger, community-wide shifts in similar measures over similar timeframes.

Particularly, the provisional hypotheses 3.4 – 3.6 were compromised due to the FERPA exemption denial. Public reporting of education system information was available for Michigan through the MI Schools Data dashboard. Comparison datasets containing historical data back to 2012 for Genesee County and Saginaw County were identified. The County Health Rankings published by the University of Wisconsin contained health status questions as well as measures of access to care and general preventive services. The American Community Survey was used to provide socio-economic data at the census tract level to assist with comparison community selection.

MI School Data

Adverse impacts of lead can be identified through education/learning delays and behavioral problems. Thus, several meetings were held with representatives from the Michigan Department of Education (MDE) in 2018 regarding permissions needed to link children covered through the FME Waiver to MDE data. MDE representatives clarified FERPA restrictions and explained that an exemption from the federal government would be required to access data at the individual level. Unfortunately, the federal Department of Education denied the exemption request. CMS colleagues were unable to reverse this decision at the federal level.

Due to the inability to link individual level school data to existing Medicaid data, the evaluation team leveraged school district publicly available reporting through MI School Data dashboard. The publicly available MI School Data dashboard allows users to access aggregate data from Michigan Schools pertaining to early childhood through high school. Available metrics reported through MI School Data include participation in early childhood programs, grade progression (i.e., students retained in grade), and educational delays. Four-year graduation and drop-out rates were also available. Continuity of special education services was reported both for the



Early Childhood period including pre-Kindergarten as well as through secondary education. Distribution of selected disabilities was available. State standardized testing was reported through the dashboard including performance at 3rd, 4th, 5th, 6th, 7th, and 8th grade content. Generally, these data were reported annually. However, a gap in state testing was experienced in 2020 and 2021 during the COVID-19 pandemic.

It was noted that Flint and Genesee County had a total of 22-25 school districts that served the area. The organization of the districts was distinct from many other Michigan counties because of the large number of charter schools. The Flint Community School District (FCSD) was the largest school district, but not all FME enrollees attended FCSD. An additional complexity to Michigan schools was the state's Schools of Choice policy which permitted students to attend schools outside of the district in which they reside.

University of Wisconsin County Health Rankings

County Health Rankings published by the University of Wisconsin were accessed for the years 2010 – 2016. These reports were obtained to provide community-based context to key measures that were related to the evaluation hypotheses. Target measures available through these reports included self-reported health status, low birth weight rate, and uninsured rate information.

MI Medicaid Statewide Weighted HEDIS Measures

Although the MI Medicaid summary HEDIS statewide report reflects statewide estimates rather than county level information, these reports were obtained to provide additional context to the results attributed to FME enrollees and the Saginaw County Medicaid enrollee comparison group. In addition to the inability to restrict analyses based on geography, the utility of the summary HEDIS report was compromised by the realization that several of the targeted measures allowed for hybrid (administrative and medical record review) reporting method by health plans. The evaluation team was restricted to using just administrative data which was known to under-report service rates.

The statewide HEDIS reporting also provided some indication of broader trends in selected health care utilization that may have resulted from the coronavirus pandemic. The 2021 HEDIS Aggregate report identified statistically significant decreases in weighted statewide averages for the following measures: Childhood Immunization Status (combinations 2, 3, 4, 5 and 7), lead screening in children, Adolescent Immunization Status (combinations 1 and 2), prenatal and postpartum care. Thus, we may reasonably expect the declines noted among the FME enrollees were not unique to this cohort but more systematically reflective of the pandemic environment.

American Community Survey Census Tract Level Data

We clustered individual beneficiaries to census tracts and used two existing data sources to measure neighborhood characteristics when evaluating similarities between FME enrollees and the comparison group. These data are:



- Childhood opportunity index¹⁴ (COI), a multidimensional depiction of the neighborhood beyond the population composition and socioeconomic conditions. It includes health and environmental measures such as access to green space, walkability, and health insurance coverage in 2015.
- Social vulnerability index (SVI: CDC, 2016) a ranking of census tracts on 15 social factors in four related themes (domains): socioeconomic (income, poverty, employment, education), household composition and disability (age, single parenting, disability), minority status and language (race, ethnicity, English-language proficiency), and housing and transportation (housing structure, crowding, vehicle access). Each tract receives a ranking for each of the four themes, and an overall ranking. We used the 2016 and 2018 SVI data from the Centers for Disease Control and Prevention (CDC) website for the periods before and after the waiver expansion.

Analytic Methods

Tests of significance (Chi-square and t-tests, etc.) to ascertain group differences and change over-time were originally planned to monitor the measures reported on an annual basis. However, as the evaluation evolved, the team changed to regression-based methods. Outcomes that permit longitudinal assessments were tested using cluster-robust methods accounting for the potential nesting of observations within the same individual; and outcomes that do not permit longitudinal assessment were tested using logistic regression with cluster-robust standard errors clustered at the census tract level. Because the expansion criteria had the potential to change the population composition of enrolled individuals over time, the evaluation team monitored the population composition. Propensity scores for enrollment in the FME Waiver were estimated using age, residence, race/ethnicity, FPL, and census tract level COI and SVI measures. Inverse probability weighted regression models were used to compare the differences in trends of the measures in the T3 period between FME enrollees and the Comparison Group. ***Models with linear time trends did not fit the data as well as models with differential yearly effects. Thus, the null hypothesis for each domain measure was that the differences between the FME group and the Comparison group did not change over time in the T3 period. When the null hypothesis was rejected, i.e., when the data suggested the differences between groups varied over time, we calculated the marginal effect for each year based on the adjusted models.***

Enrollee Survey Sample Selection

The population eligible to participate in the initial survey included enrollees who had at least six months of continuous enrollment in the FME Waiver and were enrolled as of November 1, 2018. This inclusion criteria identified 24,080 unique enrollees. The sample was selected in two stages to identify a sample pool of 11,452 for Wave 1. In the first sampling stage, the sampling frame was divided into three groups based on the enrollee's residence. These residential categories were selected upon the evaluation team's recognition that the FME Waiver enrolled

individuals were more geographically dispersed than had been anticipated. The residential categories established included:

- Only Genesee County – enrollees who appeared to only reside in Genesee County based on available enrollment record history.
- Partial Genesee County – enrollees who resided both in and out of Genesee County based on the available enrollment record history.
- Never Genesee County – enrollees who had no enrollment data to suggest they ever resided in Genesee County. However, these individuals were flagged as being enrolled in the FME Waiver per benefit plan assignment by MDHHS and therefore were included.

We applied stratified random sampling by residence category resulting in 11,452 potential participants for Wave 1 (refer to **Table 3**). The first stratum was residential category, and the second stratum was age group. Among those in the Only Genesee and Never Genesee categories, we randomly selected approximately 10,000 enrollees and 1,000 enrollees, respectively. However, due to the small number of enrollees in the Partial Genesee category, the team decided to retain all individuals identified regardless of Age Category (n=596). The total number of enrollees selected for survey inclusion were then equally split into four batches to manage the mailing process.

Table 3. Number of enrollees selected for survey sample out of total eligible population

Population		Residence Category			Total (24,082)
		Always in Genesee (21,584)	Partial Genesee (384)	Never in Genesee (2,114)	
		N (row %)	N (row %)	N (row %)	N (column %)
Age Category	0-6	7,657 (88.3%)	163 (1.9%)	855 (9.9%)	8,675 (36.0%)
	7-17	11,791 (90.6%)	181 (1.4%)	1,051 (8.1%)	13,023 (54.1%)
	18-22	2,068 (90.1%)	36 (1.6%)	193 (8.4%)	2,297 (9.5%)
	23-64	68 (78.2%)	4 (4.6%)	15 (17.2%)	87 (0.4%)
Selected Sample		Always in Genesee (10,068)	Partial Genesee (384)	Never in Genesee (1,001)	Total (11,453)
		N (row %)	N (row %)	N (row %)	N (Column %)
Age Category	0-6	3,559 (86.3%)	163 (4.0%)	404 (10.0%)	4,126 (36.0%)
	7-17	5,480 (89.0%)	181 (2.9%)	497 (8.1%)	6,158 (53.8%)
	18-22	961 (88.3%)	36 (3.3%)	92 (8.5%)	1,089 (9.5%)
	23-64	68 (85.0%)	4 (5.0%)	8 (10.0%)	80 (0.7%)

Nearly 50% of the population was selected to ensure enough sample size for the longitudinal follow-up. The evaluation team was concerned with retaining enough participants in order to allow for robust analysis at the end of Wave 3 in the original evaluation design. The period required to implement all three waves was eighteen months. A larger than normal sample was also deemed necessary based on concerns regarding the level of participation among these



individuals who were inundated with survey requests by a multitude of organizations. The evaluation team received anecdotal reports that some attorneys recommended area residents refrain from participating in surveys due to potential future civil litigation. The impact of these recommendations on all survey response rates was not quantifiable. Since the waiver received an extension through September 14, 2021, the evaluation team quickly assembled and disseminated a fourth survey wave to enrollees. Any enrollee who had participated in any of the prior three survey waves was included in this last data collection effort. The same distribution methods were used including postal mail, email, and text invitation.

Enrollee Survey Analysis

Because the target population was fixed (N=24,082), all analyses incorporated the survey design, sampling weights, post-stratification weights, and finite population correction. The design-based sampling weight (bw_i) for individual i was the inverse of the probability of being sampled, which was generated by dividing the number of target population by the number of selected samples in each stratum in **Table 3**. The finite sample correction was used to derive the target population in each sampling stratum. We also used post-stratification weights to ensure the race/ethnicity and adult/child distributions were the same as those in the target population. Weighted descriptive statistics for each wave were presented separately.

Non-response and loss-to-follow-up in longitudinal surveys were inevitable. The non-response adjusted weight for individual i in Wave 1 was the product of bw_i and the inverse of the probability of responding at Wave 1. This weight, denoted by aw_i was the individual-level (level 2) weight in longitudinal analyses. In the follow-up waves, the inverse of the conditional probability of response at each wave conditional on being in Wave 1 was multiplied by aw_i to generate the final wave-specific weight fw_{it} . Dividing fw_{it} by aw_i produced the level 1 weight for individual i at Wave t , denoted by $cw_{t|i}$, as it was the conditional weight of being a responder in Wave t given individual i who responded in Wave 1. We used the Medicaid enrollment file to identify the demographic information (e.g., gender, age, race, special program enrollments, buy-in, and/or poverty level) that were predictive of non-response in each wave. Longitudinal analyses of time effects were carried out with cluster robust standard errors accounting for nesting of observations within the same beneficiary.

To assess changes of outcomes of interest we had two inferential choices: design-based approach and multi-level model-based approach (Rabe-Hesketh et al., 2006). The former was similar to a marginal modeling approach using the generalized estimating equations technique and the latter was a subject-specific modeling approach using random effects models. Since there was not one gold standard modeling choice (Carle et al., 2009), we compared 1) unweighted analysis, 2) marginal models, 3) multi-level models with three scaling methods of the level 1 weights. The first scaling method led to $sw1_{t|i} = cw_{t|i} \frac{\sum_{t=1}^{n_i} cw_{t|i}}{\sum_{t=1}^{n_i} cw_{t|i}^2}$; the second scaling method led to $sw2_{t|i} = cw_{t|i} \frac{n_i}{\sum_{t=1}^{n_i} cw_{t|i}}$; and the third scaling method changes the level 1 weight to $sw3_{t|i} = 1$ but scales the level 2 weight to $\sum_{t=1}^{n_i} cw_{t|i} \times aw_i$. We estimated three sets of



models: unadjusted, adjusted by person-level covariates (age, race/ethnicity, residence county, poverty), and adjusted by person-level as well as census tract-level covariates (Social Vulnerability Indices in 2016 [SVI] and Childhood Opportunity Indices in 2015 [COI]). Higher SVI scores indicate more disadvantaged neighborhoods; but higher COI scores indicate more opportunities. The results reported in Appendix 7 were based on scaling method 1 of the random effects models with person- and census tract-level covariates.

Additional Considerations

IHP engaged in discussions with MDHHS and CMS regarding evaluation tasks and activities during the evaluation approval and contracting process. Upon execution of the contract, the evaluation team submitted the project to the MSU Institutional Review Board for review. The project was determined to not meet the definition of research on 1/22/2018 and was considered exempt (refer to Appendix 5).

The evaluation team communicated and met regularly in workgroups at the onset of the evaluation to ensure progress and efficiency. All evaluation team members were members of the Full Workgroup with topical workgroups established to focus attention and activities on discrete elements of the FME workplan (see **Table 4**). In response to changes in the execution of the evaluation over time, some of the original workgroups were modified. Specifically, the meeting cycle of the Full workgroup was decreased to a quarterly basis as many of the members had roles in the Data and Survey groups. The Data and Survey groups were merged during 2021 and continued to meet bi-weekly. The Community Asset Inventory group was disbanded early in the evaluation due to concerns expressed by representatives of the Flint community. Additionally, membership of the Education workgroup evolved to a partnership with the College of Education considering the need to rely on public data sources. Outside of the workgroups, communication to troubleshoot and resolve questions occurred as they arose. Drs. Ford and Oberst remained responsible for project supervision.



Table 4: Flint Medicaid Evaluation Workgroups

Workgroup Title	Frequency	Purpose
Full	Quarterly	Full team meets regarding progress and communication between the other workgroups.
Survey	Bi-Weekly	Design and administration of the enrollee surveys. Communication with Flint community partners to avoid duplication and enrollee surveys. Design and administration of TCM key informant interviews.
Data	Bi-Weekly	Updates on data preparation, data management and analyses. Creating data files to include target variables.
Community Asset Inventory	<i>Disbanded</i>	Create and maintain inventory of all community entities and key stakeholders that provide services related to Flint Water Crisis. Communication with major key stakeholders to inform the evaluation. Work group was disbanded due to community fatigue and concerns.
Education	As Needed	Ongoing communication with Flint Community Schools, Genesee Intermediate School District, GHS, Neurodevelopmental Center of Excellence (NCE), and other key stakeholders. Due to the inability to obtain individual level education data, publicly available MI School Data was identified as the target data source with support from the MSU College of Education.

Timeline Modification

The timeline proposed in the original evaluation plan submission required initial modification to adjust for the time required for evaluation plan approval and contracting activities. As the activities unfolded between 2018 and 2021, further adjustments became necessary as additional information regarding potential data sources became available. Delays in some activities were also encountered due to government shut-downs in response to the COVID-19 pandemic. The evaluation’s operational timeframe was based on calendar year to coincide with federal reporting timelines and as a result activities spanned more than one state fiscal year which reflected the contracting year. The timeline was further modified after CMS approval of the waiver extension through 9/14/2021.



Methodological Limitations

The underlying basis for this waiver was a federally declared public health emergency. Because of the urgent need to respond to the EBLLs by expanding targeted case management services as well as the number of people eligible to be enrolled in Medicaid in Flint due to their exposure to lead in the water, MDHHS staff acknowledged in the Administrative Operations Key Informant Interviews that their priority was to submit the waiver application as quickly as possible (Appendix 9). This led to several methodological limitations in the planning and execution of the FME Waiver evaluation. Most of these were related to the lack of involvement of experienced evaluators until later in the waiver authorization timeframe. When the evaluators were eventually able to investigate how they could measure the approved hypotheses, they realized that reliable data sources were not available. Barriers were identified related to the availability of data to measure the impact of the waiver that could not be overcome even with the assistance of federal CMS colleagues. This required seeking out proxy data sources as measures. Including experienced evaluators, along with earlier consideration and planning for waiver goals and potential quality data sources beyond state Medicaid data, would have reduced the time and effort spent pursuing data that did not exist or was unavailable to be included in the evaluation. In these situations, it would be beneficial to include potential evaluators earlier in the application process to prevent additional undue delays.

The major activities in the 2018 calendar year included organization of administrative data sources already available to the team as well as planning activities to implement the various surveys needed to supplement the health care claims/encounter data. The evaluation team faced issues early on regarding proposed methods to distinguish Medicaid enrollees potentially eligible for the FME Waiver regardless of enrollment as well as how to handle problematic cases (i.e., missing, or incomplete data). The execution of three main surveys (enrollee, TCM Provider and MDHHS waiver staff) as well as expanding the scope of the programming needed to report on the measures based on administrative health care data were a focus in the 2019 calendar year. The enrollee and TCM provider surveys were extended through December 2020 despite the shutdowns associated with the COVID-19 pandemic. The extension granted by CMS allowed the evaluation to implement a Wave 4 enrollee survey and a third TCM Provider Key Informant Interview during 2021. These efforts along with the opportunity to pull additional utilization data and refine publicly available education data were the focal activities of 2021.

The evaluation team further dealt with the observation that some enrollees had moved out of the area and were more geographically distributed than originally expected. The original assumption was that all potential FME enrollees would come from City of Flint residents. However, lead exposure was based on the Flint Water System delivery network of service lines which did not fully align with the city's geographic boundaries. In addition, at the start of the waiver period which occurred two years after the water switch, some individuals had already moved out of the area. This caused the team to adjust the planned approach for acquiring data from the MDHHS Data Warehouse for enrollees and potential comparison groups. The sampling



strategy for the enrollee survey also needed adjustment to incorporate a stratified method to accommodate this observation.

Another significant limitation was the inability to secure a federal-level Department of Education waiver to permit MDE to share education data at the individual level for linking with health care data. The evaluation team identified other data sources in response to this barrier. The evaluation team reached out to MSU faculty involved with school based public reporting in the MI Schools Dashboard. These data provided context to the impact of the lead exposure on the educational attainment of students in the community schools. The enrollee survey was the final data source designated to obtain education related information. Several questions were designed to inquire about learning and emotional/behavioral problems for the child survey. While self-report was not without limitations, the evaluation team chose to pursue all available options.

The evaluation team also faced the limitation of individualized program data management. Several state-sponsored health related registries were not housed in Medicaid due to their inclusion of populations beyond Medicaid enrollees. This included both the lead screening and the MCIR data. Separate data access request and approvals were needed to acquire these data elements. Ultimately, the relevant health programs provided approval to use their data. Other data sets outside Medicaid, specifically housing and lead investigation, were not available to support the evaluation.

As the evaluation team began meeting with organizations involved in serving Flint community residents, they became aware of entities involved in FME Waiver service delivery beyond what was initially identified. Thus, the evaluation was expanded to include certain data elements such as TCM provider input. Additionally, we encountered timing barriers affecting our plans to implement the enrollee survey. The extended approval and contracting timeframe shortened the original timeline of proposed activities. Shutdowns associated with the COVID-19 pandemic further impacted evaluation activities, particularly with respect to having staff available to process Wave 2 and Wave 3 telephone and mail surveys. A partial return to normal university operations during 2021 provided opportunities to catch up survey entry activity.

The hypotheses as written in the waiver application referenced comparing individuals enrolled in the FME Waiver to others with similar blood lead levels. Available data from the state's lead monitoring system documented the proportion having elevated levels overall to be low. State data reported substantial declines in lead testing during the year 2020 compared to prior years which was attributed to the impact of the government stay-home orders. The evaluation team linked available blood lead values to individuals enrolled in the waiver and found that very few individuals had reported EBLLs as presented in the Comparison Group Considerations section (**Table 2**). Thus, insufficient numbers were available to conduct matching. ***As a result, all hypotheses were modified to compare FME enrollees to Medicaid beneficiaries with similar individual and neighborhood characteristics at the census tract level.***



Despite using propensity score methods to render the groups being compared as similar as possible in the observed characteristics, an inherent limitation of the methods is that unmeasured confounding variables might exist and bias the estimates.

Another limitation that would have warranted consideration assuming sufficient numbers was the realization that single blood tests did not accurately reflect an individual's full, cumulative lead exposure over time. Thus, even presuming sufficient data counts, the accuracy of matching based on a single blood lead level value would have remained potentially flawed as a measure of cumulative exposure. Current water testing described lead levels below accepted national standards, but the water system still had not yet been deemed "safe" as of September 14, 2021, reflecting the end of the waiver extension period. This designation cannot be granted until all affected (corroded) water service lines have been replaced. Thus, there may be ongoing exposure occurring in the population which remains difficult to quantify.

Despite the limitations, elements of the evaluation reflected positive attributes. Partnerships and communications with key stakeholders were invaluable in understanding alternatives for data. The extension of this evaluation project through September 2021 provided an additional year for data collection including health utilization and enrollee survey and TCM Provider Key Informant Interview data. The additional time also offered a period that may contribute post-pandemic health utilization which may reflect a return to expected patterns.



Results

A key finding of this evaluation was the lower than anticipated enrollment in the FME Waiver. Initially, MDHHS estimated that approximately 15,000 individuals would be newly eligible due to the expanded eligibility criteria for Medicaid coverage while only 8,000 enrolled in the program. At the peak of FME enrollment, in 2017-2018, there were approximately 34,000 beneficiaries enrolled in this waiver. We were unable to officially determine the cause for this under-enrollment. The evaluation team hypothesized this could have occurred due to the timing of the waiver being released to the public, individuals moving away from Flint, disinterest due to current coverage, and/or lack of awareness regarding the waiver and eligibility.

The ***following section of the*** summative report presents key findings by Evaluation Domain and relevant hypotheses (a comprehensive summary table is available in Appendix 7). ***A modified version of the summary table in Appendix 7 is available below. This modified version provides the measures used and the main findings for all evaluation hypotheses (see Tables 5-A through 5-D). Within each of the following Domain-oriented tables, the interpretation is color coded with green indicating the FME group performed better than the Comparison group, orange indicating no statistically significant difference between groups, and red indicating the Comparison group performed better than the FME group. Throughout the results section, where available, administrative health care claims or enrollment data as far back as May 2013 were obtained to provide estimates for the baseline year (T1) that reflected the period 12 months prior to the water switch. Data through September 14, 2021, were included to coincide with the extension period. The following tables reflect the three timeframe categories presented in Table 1 (page 11).***

Summary of Key Findings

Domain 1, Access to Care: Enrollees will access services to identify and address physical or behavioral health issues associated with lead exposure at a rate higher than non-enrollees with similar individual and neighborhood characteristics, a.k.a., the comparison. Statistical analyses between the FME group and the Comparison group uncovered that the FME group generally outperformed the Comparison group for Domain 1 hypotheses. A key finding for this domain was that the majority of enrollees reported increased satisfaction in access to care as a result of the waiver. Additionally, the FME group had statistically higher rates of lead testing and prenatal timely care than the comparison group. Table 5-A provides a summary of evaluation measures and findings for Domain 1 hypotheses.

Table 5-A. Domain 1 Hypotheses, Evaluation Measures, and Outcomes

Hypotheses	Specific Measures	Outcomes
H1.1: A greater proportion of enrollees will obtain any age-appropriate well-child exams <i>than the comparison.</i>	1. HEDIS Well Child Visits in the First 15 months of Life (any visit) measures “the percentage of children who had between one and six or more well-child visits by the time they turned 15 months of age.”	FME and Comparison did not have jointly significantly different rates across the 5 years. The two groups had statistically similar rates in five years.
	2. HEDIS Well Child visits in the Third, Fourth, Fifth and Sixth Years of Life measures “The percentage of members 3–6 years of age who had one or more well-child visits with a PCP during the measurement year.”	FME and Comparison had jointly significantly different rates across the five years. Although both groups had a decrease in well child visits, the FME group had statistically higher rates in year 4 and lower rate in year 5. These differences were likely the influence of COVID.
	3. HEDIS Adolescent Well-Care Visits measures “The percentage of enrolled members 12–21 years of age who had at least one comprehensive well-care visit with a PCP or an OB/GYN practitioner during the measurement year.”	FME and Comparison had jointly significantly different rates across the five years. Although both groups had a decrease in well child visits, the FME group had statistically higher rates in year 4 and lower rate in year 5. These differences were likely the influence of COVID.



Hypotheses	Specific Measures	Outcomes
H1.2: A greater proportion of enrollees will receive age-appropriate developmental screening/assessments <i>than the comparison.</i>	1. Developmental Screening in the First Three Years of Life (percentage of children screened for risk of developmental, behavioral and social delays using a standardized screening tool (CPT 96110) in the first three years of life.)	FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in year 4 and lower rates in years 1, 2, and 5.
	2. Socio-emotional/ Behavioral Screening for Children 4-17 years of age (percentage of children/adolescents 4-17 years of age who had at least one socio-emotional/behavioral screen (CPT 96127) with a primary care provider or an OB/GYN practitioner during the measurement year.)	FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in year 3, 4 and lower rate in year 1, 2, 5. Difference in year was likely due to data issues.
H1.3: A greater proportion of enrollees will receive age appropriate lead testing <i>than the comparison.</i>	Modified HEDIS Lead Screening in Children (The percentage of children 2 years of age who had 1 or more capillary or venous lead blood test for lead poisoning by their second birthday.)	FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically lower rates in years 2, 5 but the data quality in year 5 is questionable.
H1.4: A greater proportion of enrollees with high blood lead levels will receive re-testing at the appropriate intervals <i>than the comparison.</i>	1. Follow-up of elevated blood lead level (greater proportion of enrollees with high blood lead levels will receive re-testing at the appropriate intervals). We followed the CDC guideline for recommended time frame for follow up. https://www.cdc.gov/nceh/lead/ACCLPP/Final_Document_030712.pdf	FME and Comparison had statistically similar rates across the 5 years. Although the FME group had higher rates in years 1-5, the difference was not statistically significant.
H1.5: Enrollees who are pregnant will have timelier prenatal and postpartum care <i>than the comparison.</i>	1. HEDIS Timeliness of Prenatal Care	FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in years 4 and 5.
	2. HEDIS Postpartum Care	FME and Comparison did not have jointly significantly different rates across the five years. The FME group had a statistically lower rate in post-partum care in years 3 and 5.



Hypotheses	Specific Measures	Outcomes
H1.6: A greater proportion of enrollees who are pregnant will have recommended lead testing <i>than the comparison</i> .	1. Lead screening in pregnancy	FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in all years.
H1.7: A greater proportion of enrollees will participate with Maternal Infant Home Program services <i>than the comparison</i> .	1. Maternal Infant Health Program Participation	FME and Comparison did not have jointly significantly different rates across the five years. The FME group had statistically similar rates in years 1-3 and 5.
H1.8: Majority of enrollees will attest to improved access to health care as a result of the expanded coverage.	1. Enrollee Attestation for Improved Access to Care (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Child Survey: Not significant between all waves.
H1.9: Majority of enrollees will report satisfaction with their ability to access health care as a result of the expanded coverage.	1. Enrollee satisfaction score with Medicaid expansion coverage (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Child Survey: Not significant between all waves.
	2. Enrollee satisfaction with providers working in their interest (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Child Survey: Significant increase in the strongly agree category between W1 and W2, leveled off in W3, and slight decrease in W4.



Domain 2, Access to TCM: Enrollees who access TCM services will access needed medical, social, educational, and other services at a rate higher than enrollees who do not access TCM services. The measures for Domain 2 were impacted by the low uptake and participation with the service. Administrative health care data and TCM provider supplied enrollment and participation data showed overall engagement at less than 5%, while 10% of enrollee survey participants’ reported utilizing TCM services. Enrollees reported higher use in waves 1 and 2 followed by decreases in waves 3 and 4. This supports a theory that once needs are met through TCM, individuals do not continue participation. The benefits of the TCM were evident through the TCM participants reported satisfaction with the benefit. Table 5-B provides a summary of evaluation measures and findings for Domain 2 hypotheses.

Table 5-B. Domain 2 Hypotheses, Evaluation Measures, and Outcomes

Hypotheses	Specific Measures	Outcomes
H2.1: Referral source and participation levels with TCM will be tracked among enrollees	1. Referral Source for TCM	Referrals Increased in 2019; but there was no data in 2020.
	2. TCM Participation	Admin Data: No claims with CPT and NPI codes in 2020 for TCM participation.
	3. Have you ever used any Family Supports Coordination/Targeted Case Management services for you (your child) since enrolling in the Flint Medicaid waiver? (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Child Survey: A slight non-significant increase in those who reported ever using FSC/TCM from W1 to W2 but decreased in W3-W4.
H2.2: All TCM participants will have at least one re-assessment within one year of the original assessment.	1. Annual TCM assessment (at least one reassessment within one year of original assessment).	Number of observations are small in years 1-4 and zero in year 5 based on claims data.
	2. Have you ever used any Family Supports Coordination/Targeted Case Management services for you (your child) last Survey Date? (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Child Survey: No notable changes in proportions from W2 to W4.



Hypotheses	Specific Measures	Outcomes
H2.3: A greater proportion of TCM participants will have age-appropriate well child exams compared to <i>enrollees who do not access TCM services.</i>	1. HEDIS well child visits in the first 15 months of life (W15) measures “the percentage of children who had between one and six or more well-child visits by the time they turned 15 months of age.”	Number of observations are small in years 1-4 and zero in year 5 claims data.
	2. HEDIS well child visits in the third, fourth, fifth and sixth years of life (W34) measures “The percentage of members 3–6 years of age who had one or more well-child visits with a PCP during the measurement year.”	Number of observations are small in years 1-4 and zero in year 5 claims data.
	3. HEDIS adolescent well-care visits measures “The percentage of enrolled members 12–21 years of age who had at least one comprehensive well-care visit with a PCP or an OB/GYN practitioner during the measurement year.”	Number of observations are small in years 1-4 and zero in year 5 claims data.
H2.4: A greater proportion of TCM participants will have completed age-appropriate developmental screening compared to <i>enrollees who do not access TCM services.</i>	1. Percentage of children screened for risk of developmental, behavioral and social delays using a standardized screening tool (CPT 96110) in the first three years of life.	Zero observation in claims data in all years.
	2. Percentage of children/adolescents 4-17 years of age who had at least one socio-emotional/behavioral screen (CPT 96127) with a primary care provider or an OB/GYN practitioner during the measurement year.	Number of observations are small in years 2-4 and zero in years 1 and 5 claims data.



Domain 3, Improved Health Outcomes: Enrollees will have improved health outcomes compared to non-enrollees with similar individual and neighborhood characteristics, a.k.a. the comparison. The administrative data documented the FME cohort outperforming the comparison group in complete adolescent immunization with complete childhood immunization and low birth weight rate not having statistically significant differences over time. Additionally, enrollee survey data provided information showing that, at the individual level, parents/guardians were reporting increases in their child’s health status and specifically physical health and mental health. As with the health status, significant improvements were reported in parent/guardians documenting decreases in children being diagnosed with behavioral or learning problems.

Table 5-C. Domain 3 Hypotheses, Evaluation Measures, and Outcomes

Hypotheses	Specific Measures	Outcomes
H3.1: Enrollees will have higher completed age-appropriate immunization statuses <i>than the comparison.</i>	1. HEDIS Childhood Immunization Status (percentage of children 2 years of age who had four diphtheria, tetanus and acellular pertussis (DTaP); three polio (IPV); one measles, mumps and rubella (MMR); three haemophilus influenza type B (HiB); three hepatitis B (HepB), one chicken pox (VZV); four pneumococcal conjugate (PCV); one hepatitis A (HepA); two or three rotavirus (RV); and two influenza (flu) vaccines by their second birthday)	FME and Comparison had significantly different rates in the five years. The FME group lower rates in the first 3 years.
	2. HEDIS Immunizations for Adolescents (percentage of adolescents 13 years of age who had one dose of meningococcal conjugate vaccine, one tetanus, diphtheria toxoids and acellular pertussis (Tdap) vaccine, and have completed the human papillomavirus (HPV) vaccine series by their 13th birthday)	FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in years 4 and 5.
H3.2: Enrollees who are pregnant will deliver infants with higher birth weights <i>than the comparison.</i>	1. Low Birth Weight Rate (live births with birthweight < 2500 grams)	FME and Comparison did not have significantly different linear trends across the five years.



Hypotheses	Specific Measures	Outcomes
H3.3: Enrollees report an increase in their self-reported health status over the duration of their enrollment.	1. Enrollee Self-Reported Health Status (overall health) (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Child Survey: a statistically significant, although small increase in those who reported having excellent or very good health.
	2. Enrollee Self-Reported Health Status (physical health) (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Child Survey: a statistically significant increase in those who reported having excellent or very good physical health.
	3. Enrollee Self-Reported Health Status (emotional/behavioral health) (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Child Survey: a statistically significant increase in those who reported having excellent or very good mental health.
PROVISIONAL H3.4: Descriptive analysis of the proportion of children diagnosed with severe emotional disturbance and other developmental/learning disabilities.	1. Proportion of enrollees having diagnosis code(s) of interest	Data not available.
PROVISIONAL H3.5: Descriptive analysis of behavioral health conditions and supportive care among enrolled children.	1. Prevalence of behavioral health conditions among enrolled children	See #4 below.
	2. Count of children enrolled in Early Childhood Programs	Data not available.
	3. Proportion of students in kindergarten who participated in Early Childhood Programs	Data not available.
	4. Enrollee survey – has your child been diagnosed with behavioral/emotional problem (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Child Survey: a statistically significant decrease in those who reported their children being diagnosed with behavioral/emotional health.
	5. Enrollee survey - Since enrolling in the Flint Medicaid waiver, I have access to more resources that help with management of my child's chronic health condition(s). (Child Survey data)	Child Survey: a statistically significant increase in those who strongly agreed with the statement.



	*Adult Survey data did not have sufficient numbers to conduct statistical testing.	
Hypotheses	Specific Measures	Outcomes
PROVISIONAL H3.6: Descriptive analysis of educational delays among enrolled children	1. Prevalence of educational delays among enrolled children	Data not available.
	2. Counts of children remaining in same grade	Data not available.
	3. Educational Progress Standardized Testing (M-STEP, MI-Access)	Data not available.
	4. Enrollee survey - Has anyone told you that your child should be tested for learning problems? (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Child Survey: a statistically significant decrease in those who identified their child needed to be tested for a learning problem.

Domain 4, Lead Hazard Investigation: The lead hazard investigation program will reduce expected ongoing or re-exposure to lead hazards in the absence of this program. The lead investigation data were collected and managed by agencies outside of Medicaid and were not available to the evaluation team. The enrollee survey provided additional information regarding EBLL and ongoing potential exposures from the city water supply. A significant decrease in the proportion of children having self-reported EBLL was reported from Wave 1 to Wave 4 surveys while the Flint Lead Free report documented a significant increase in the proportion of homes able to participate with investigations in the absence of a documented EBLL.

Table 5-D. Domain 4 Hypotheses, Evaluation Measures, and Outcomes

Hypotheses	Specific Measures	Outcomes
H4.1: Enrollees without participating with TCM services will access lead hazard investigation services to the same degree as beneficiaries without TCM services.	1. Prevalence of Lead Hazard Assessment/Investigation	Flint Lead Free: Increase in proportion of investigations without EBLL 13% to 97% Data not available.
H4.2: Beneficiaries found to be at risk for ongoing lead exposure will be referred for additional environmental investigation	1. Prevalence of Lead Hazard Follow-up Investigation	Data not available.
	2. Have pipes been replaced? (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Children Survey: No statistically significant difference in trend.
	3. Does your child have high blood lead level? (Child Survey data)	Child Survey: A statistically significant decrease in those who reported their children having high blood lead level.

Comparison Group Considerations

Many of the measures identified for the hypotheses were worded in such a manner to propose that FME enrollees would have better access *compared with others with similar levels of lead exposure*. The reference to others reflected on the selection of an appropriate comparison group. However, after linking the lab results of lead testing and the enrollment data, the evaluation team found very few individuals with EBLLs **in both groups** (Table 2, p. 16).

As described in the Target and Comparison Populations section, each of the four original potential comparison populations suffered from limitations. In addition to the limitations



described in that section, a common limitation was the inability to accurately quantify the level of lead exposure from what was most frequently a one-time blood draw. Due to this issue which the team acknowledged to persist among all the potential comparison groups, a decision was made to focus on a fifth group described as a *comparison group of similar individual and neighborhood characteristics at the census tract level*.

The K-means analysis confirmed that Saginaw County would be a suitable option for Comparison Group 5 (for details see Appendix 8). Upon identification of the comparison community, the MDHHS Data Warehouse was accessed for claims/encounter data for all Medicaid enrollees residing in Saginaw County from May 2013 through September 2021. History of comorbidity and/or similar census-tract level social/economic background were adjusted when appropriate in regression models.

Potentially Eligible Waiver Population Characteristics

The expansion enrollment date was 5/9/2016. Residency in the City of Flint or Genesee County was not required for enrollment into the FME Waiver. The State of Michigan became aware that the initial method to identify potentially eligible individuals using a list of seven Flint zip codes (48501, 48502, 48503, 48504, 48505, 48506, 48507) was incomplete when compared to the City's water service distribution network. Therefore, they added four zip codes (48509, 48519, 48529, 48532) representing areas that existed outside of the City of Flint's geographic boundaries yet were exposed to the affected water. This complete list of eleven zip codes represented the Flint Water Service Area (FWSA) and was used to identify potentially eligible individuals. The eleven zip codes were all contained within the geographic boundaries of Genesee County.

We initially employed a two-step method to independently construct the population of eligible individuals. The first step was to assign a flag to indicate potential eligibility using available general Medicaid enrollment files each year. Individuals did not have to meet any continuous enrollment criteria. We coupled this information with Modified Adjusted Gross Income (MAGI) information collected during the Medicaid determination process to confirm individuals would qualify per the FPL limitations. We did not believe that all of Genesee County would be eligible. This initial selection was performed with the interest in exploring their ability to serve as a comparison group.

Enrollment in the FME Waiver did not require residential history at one of the eleven zip codes served by the Flint Water System. Individuals would be eligible to enroll if they could document exposure to the water source despite living outside the FWSA. This determination could not be made using existing administrative data. In fact, the evaluation team identified individuals enrolled in the FME Waiver through administrative data that had no history of having lived at one of the eleven zip codes or even in Genesee County. This could occur when an individual resided outside the geographic boundaries but attended school, work, or spent time in the eleven zip codes of FWSA. Individuals meeting the requirement for documented exposure without geographic residence formed a second group of eligible individuals. The decision was to

classify these individuals as eligible since they were in fact already enrolled into the waiver. Specifically, they had the appropriate FME Waiver benefit plan identifier assigned by Michigan Medicaid.

The ability to qualify for FME without requiring residence in the FWSA meant the evaluation team was unable to determine the true number of potentially eligible individuals that may have been exposed to the water but never applied to the State of Michigan for the waiver-based Medicaid coverage. This limitation was expected to have a greater impact on the ability to determine the FME Waiver's impact on those who were at the increased FPL thresholds. Individuals at these higher levels may have had a history of trying to access Medicaid coverage in the past and been denied due to income. Despite the public information campaigns of the expanded coverage options, these individuals may have assumed they would still be denied. Another factor potentially impacting enrollment for those at higher FPL may be that individuals at the higher levels were not interested in waiver-based Medicaid coverage for a variety of reasons including having other forms of insurance and/or perceived stigma of being enrolled in Medicaid.

After assembling the potential pool of eligible persons, the evaluation team evaluated options to identify those officially enrolled in the waiver using Medicaid Benefit Plan codes available through the MDHHS Health Services Data Warehouse. There was very little gain, less than 2%, when combining the Benefit Plan codes with a Modified Adjusted Gross Income (MAGI) code beginning with "F". Pregnant women eligible and enrolled in the Waiver were identified through a combination of eligible MAGI codes along with claims related to live births. The prenatal care related claims with a birth record combination were found to be the most accurate method to identify pregnant women. These coding algorithms were reviewed with MDHHS colleagues for accuracy.

A second method to identify the potentially eligible population was implemented using the FWSA as the target eligible population. This was done to identify those who were likely exposed to the contaminated water. **Table 6** reflected the enrollment that would have been expected based on the estimates of people that were able to be specifically tied to the target eleven zip codes included in the FWSA. As expected, the potential denominator decreased from the county-wide area estimate (n=125,480) to the eleven-zip code area estimate (n=**79,094**). FME enrollment, in the first year of the expansion, based on the eleven-zip code area was approximately 38% (29,939/79,094). However, we observed enrollment of individuals that were unable to be linked to the target eleven zip codes resulting in total enrollment for the first year of 33,528. The proportion of individuals who were unable to be linked to the zip codes reflected just 11% of the total enrollment while the bulk of waiver enrollment, 89% (29,939/33,528), came from the FWSA.

Table 6 further described the socio-demographic characteristics of the potentially eligible cohorts, those in Genesee County, those residing in the FWSA and those who enrolled in the FME waiver. Minimal variation was observed between the two timeframes (pre-post FME start) for population characteristics of the potentially eligible cohort residing in Genesee County. As



we restricted to the FWSA geographic region which included the City of Flint, little variation was noted among the age and gender proportions. However, the proportion of non-Hispanic, African American enrollees identified as potentially eligible increased more than 10 percentage points with a corresponding decrease noted in the number of non-Hispanic, White enrollees. This observation was consistent with the racial make-up of the City of Flint.

Table 6: Population characteristics of Potentially Eligible before and after May 1, 2016, corresponding to T2 and T3.

	Medicaid Eligible in Genesee County plus Statewide FME Waiver Enrollees		Medicaid Eligible in Eleven Zip Code FWSA		FME Waiver Enrollees (5/1/16 – 4/30/17)	
	T2: Post Water Switch and Pre FME Waiver 5/1/15—4/30/16	T3: Post Water Switch and Post FME Waiver 5/1/16—4/30/17	T2: Post Water Switch and Pre FME Waiver 5/1/15—4/3/16	T3: Post Water Switch and Post FME Waiver 5/1/16—4/30/17	T3: Total	T3: FWSA Subgroup
Count of unique Medicaid enrollees	N=126,486	N=125,480	N=80,351	N=79,094	N=33,528	N=29,939
Age (Years, as of October 1 of each year)						
0-6	21.8%	22.1%	22.6%	22.6%	39.8%	39.5%
7-16	24.9%	25.0%	24.2%	24.5%	41.2%	41.7%
17-21	11.5%	11.4%	11.5%	11.1%	14.9%	14.7%
22-64	38.3%	37.9%	38.6%	38.7%	4.1%	4.0%
65+	3.5%	3.6%	3.1%	3.2%	(22+)*	n/a
Gender						
Male	29.4%	29.4%	29.3%	29.2%	47.9%	48.2%
Female	70.6%	70.6%	70.7%	70.8%	52.1%	51.8%
Race/Ethnicity						
non-Hispanic white	54.6%	54.3%	42.4%	42.4%	30.9%	28.5%
non-Hispanic black	34.4%	34.7%	47.3%	47.4%	59.0%	61.7%
Hispanic/Other	4.3%	4.4%	4.3%	4.3%	4.7%	4.6%
Unknown	6.7%	6.5%	6.0%	5.9%	5.4%	5.2%
Residence Category						
Always Genesee County	99.9%	97.6%	100.0%	98.5%	91.0%	96.1%
Partial Genesee County	0.0%	1.1%	0.0%	1.5%	3.9%	3.9%
Never Genesee County	0.0%	1.4%	0.0%	0.0%	5.1%	0.1%
FME Waiver Enrollment						
Proportion having any FME enrollment	n/a	26.7%	n/a	37.9%	100%	100%
Pregnancy Indicator	2.6%	3.2%	2.8%	3.4%	4.9%	4.8%
Federal Poverty Level Category (% FPL)						
FPL 0 - 99%	81.5%	79.6%	83.9%	81.4%	76.6%	77.1%
FPL 100 - 195%	17.0%	18.4%	15.0%	16.8%	19.5%	19.2%
FPL 196 - 212%	1.1%	1.0%	0.7%	0.7%	1.0%	0.9%
FPL 213% +	0.4%	1.0%	0.5%	1.1%	3.0%	2.8%

*Categories collapsed due to small cell sizes



FME Waiver Enrollment

Table 7-A displays the change in socio-demographic characteristics among those who were enrolled in the FME waiver, regardless of residence, since the start of the FME waiver in May 2016 through September 2021. As the years elapsed, the proportion of children six years of age or younger decreased and the proportion of enrollees residing outside of Genesee County in each 12-month evaluation period increased. **Note that the last evaluation timeframe was extended from 12 months to 17 months because of the approved waiver extension.** The observation of a decline in overall enrollment since waiver approval confirmed the pattern anticipated by MDHHS informants. The waiver allowed individuals at higher FPL to qualify for the FME benefit and for those exceeding the 400% threshold, the ability to buy into the program to secure access to TCM services. The evaluation team noted that FPL estimates were not reliably transferred to the Medicaid data warehouse that served as the evaluation team's data source. For the subset having this data available, we noted waiver enrollment by individuals at income thresholds over 212% FPL was small at less than 5%.

Over the five evaluation periods (four 12-month periods and one 17-month period), a total of 45,227 unique enrollees had at least one FME enrollment month, among whom 21,152 (47%) were enrolled for all five periods. The numbers of new beneficiaries, those who did not have any Medicaid coverage before FME enrollment, were 3282, 1424, 1098, 1103, and 1335, respectively over the five periods of the evaluation. Approximately 4% (n=2172) of unique enrollees (including 837 existing and 1355 new Medicaid beneficiaries) newly enrolled during the most recent 5/1/2020-9/30/2021 timeframe.

We examined how enrollees differed from those who were potentially eligible (identified through combinations of zip code data, age, and gender as in Table 6) but lacked an enrollment flag in the T3 period. Table 7-B compared the demographic variables between Genesee County residents with and without an FME enrollment flag. The proportions of young adults (aged 17-21) in the non-FME group were always higher than in the FME group, over the T3 period. Additionally, the FME group had higher proportions of non-Hispanic black beneficiaries over the period compared with the non-FME group. Among pregnant women, the non-FME group had higher proportions aged 21 and older and with income less than the FPL compared with the FME group, which cannot be completely explained by the increase in income limit for the program. The results indicated more young adults (aged 17-21), non-Hispanic white beneficiaries (Table 7-B upper panel), and older and lower-income pregnant women (Table 7-B lower panel) should be targeted for enrollment to reduce the disparities in enrollment.

Similarly, among FME enrollees, assuming we correctly identified all individuals utilizing the TCM services by the procedure codes in claims data, we also examined how TCM utilizers differed from those who did not utilize the service. Table 7-C compared the demographic variables between TCM users and non-users among those with at least one FME enrollment flag. Interestingly, among FME enrollees, the TCM utilizers and non-utilizers had similar proportions of children aged 17-21 but the proportions of non-Hispanic whites were higher in



the TCM user group than the non-user group (Table 7-C upper panel). There was an increasing trend of non-Hispanic black pregnant women utilizing the service over time but the number of pregnant women utilizing the TCM service was small throughout this timeframe (Table 7-C lower panel). The results indicated that non-Hispanic black children should be encouraged to utilize the TCM services.

Given the differences between enrollees and non-enrollees, the propensity score adjusted estimates in the sections below should be interpreted as applying to the self-selected group only.



Table 7-A: Total Medicaid statewide FME Waiver enrollees from May 1, 2016, to September 30, 2021

	FME Waiver Enrollee (T3: 5/1/16-4/30/17)	FME Waiver Enrollee (T3: 5/1/17-4/30/18)	FME Waiver Enrollee (T3: 5/1/18-4/30/19)	FME Waiver Enrollee (T3: 5/1/19-4/30/20)	FME Waiver Enrollee (T3: 5/1/20-9/30/21)
Count of unique Medicaid enrollees	N=33,528	N=33,917	N=31,850	N=30,996	N=29,815
Age (Years, as of October 1 of each year)					
0-6	39.8%	38.0%	35.4%	32.7%	29.9%
7-16	41.2%	42.6%	45.6%	47.8%	50.1%
17-21	14.9%	16.1%	16.3%	16.7%	17.1%
22+	4.1%	3.3%	2.8%	2.9%	2.9%
Gender					
Male	47.9%	48.6%	49.1%	49.0%	49.3%
Female	52.1%	51.4%	50.9%	51.0%	50.7%
Race/Ethnicity					
non-Hispanic white	30.9%	31.9%	32.4%	32.2%	35.7%
non-Hispanic black	59.0%	58.0%	57.4%	56.8%	59.6%
Hispanic/Other	4.7%	4.6%	4.6%	4.6%	1.3%
Unknown	5.4%	5.5%	5.7%	6.3%	3.3%
Residence Category in the 12-month Period (17 months in the last column)					
Always Genesee County	91.0%	88.6%	87.4%	86.4%	85.4%
Partial Genesee County	3.9%	4.0%	3.5%	3.5%	3.6%
Never Genesee County	5.1%	7.3%	9.0%	10.1%	11.0%
Federal Poverty Level Category (% FPL)					
FPL 0 - 99%	76.6%	75.3%	74.6%	76.1%	76.3%
FPL 100 - 195%	19.5%	20.1%	20.3%	18.6%	18.5%
FPL 196- 212%	1.0%	1.1%	1.1%	1.1%	3.9%
FPL 213% +	3.0%	3.5%	4.0%	4.2%	1.3%

Table 7-B Demographic characteristics by FME enrollment status among those potentially eligible for the program*

	5/1/16—4/30/17		5/1/17—4/30/18		5/1/18—4/30/19		5/1/19—4/30/20		5/1/20—9/30/21	
	No FME flag	With FME flag	No FME flag	With FME flag	No FME flag	With FME flag	No FME flag	With FME flag	No FME flag	With FME flag
Children age <=21	N=17,203	N=28,737	N=17,649	N=28,054	N=19,436	N=25,512	N=20,801	N=24,166	N=23,095	N=22,683
Age (Years, as of October 1 of each year)										
0-6	34.9%	41.2%	38.6%	38.9%	41.6%	35.9%	43.4%	33.3%	46.1%	30.4%
7-16	39.9%	43.5%	38.1%	44.6%	36.6%	47.4%	36.0%	49.5%	34.6%	51.7%
17-21	25.2%	15.3%	23.3%	16.5%	21.8%	16.7%	20.6%	17.2%	19.2%	17.9%
Race/Ethnicity										
non-Hispanic white	56.8%	28.1%	54.8%	28.4%	51.8%	28.0%	50.1%	27.3%	52.2%	30.2%
non-Hispanic black	31.7%	62.0%	33.0%	61.8%	36.1%	62.0%	36.7%	62.3%	41.2%	65.9%
Hispanic/Other	4.8%	4.6%	5.2%	4.5%	5.0%	4.5%	5.2%	4.5%	1.4%	1.2%
Unknown	6.7%	5.2%	6.9%	5.3%	7.0%	5.5%	7.9%	6.0%	5.3%	2.7%
Federal Poverty Level Category (% FPL)										
FPL 0 - 99%	76.6%	76.9%	75.3%	75.7%	75.7%	75.0%	78.2%	76.9%	78.5%	76.6%
FPL 100 - 195%	21.4%	19.3%	22.4%	19.8%	22.2%	20.1%	19.9%	18.3%	19.4%	18.5%
FPL 196- 212%	1.5%	1.0%	1.8%	1.0%	1.6%	1.1%	1.4%	1.1%	1.4%	0.9%
FPL 213% +	0.4%	2.9%	0.4%	3.5%	0.5%	3.8%	0.5%	3.8%	0.7%	4.0%
Pregnant women										
	N=1,236	N=1,433	N=1,383	N=1,030	N=1,610	N=797	N=1,601	N=771	N=1,726	N=676
Age (Years, as of October 1 of each year)										
17-21	17.6%	25.3%	15.3%	27.9%	15.7%	31.4%	15.8%	31.5%	14.7%	30.2%
>21	82.4%	74.7%	84.7%	72.1%	84.3%	68.6%	84.2%	68.5%	85.3%	69.8%
Race/Ethnicity										
non-Hispanic white	51.1%	34.8%	48.2%	34.4%	45.2%	31.9%	45.8%	28.5%	48.5%	33.9%
non-Hispanic black	38.3%	56.6%	42.5%	55.5%	45.0%	57.6%	44.5%	62.0%	48.5%	62.3%
Hispanic/Other	5.5%	4.1%	4.6%	4.5%	5.7%	4.9%	5.5%	4.5%	1.4%	1.3%
Unknown	5.1%	4.5%	4.6%	5.6%	4.2%	5.6%	4.1%	4.9%	1.6%	2.5%
Federal Poverty Level Category (% FPL)										
FPL 0 - 99%	81.1%	82.3%	82.7%	76.7%	83.9%	74.3%	84.4%	78.5%	80.4%	73.1%
FPL 100 - 195%	18.9%	16.5%	17.3%	21.5%	16.1%	22.7%	15.6%	18.3%	19.6%	22.9%
FPL 196- 212%	0.0%	0.1%	0.0%	0.6%	0.0%	0.9%	0.0%	0.1%	0.0%	0.9%
FPL 213% +	0.1%	1.0%	0.0%	1.3%	0.0%	2.1%	0.0%	3.1%	0.0%	3.1%

* Children with at least one Flint zip code and in the age range and pregnant women with at least one Flint zip code were considered potentially eligible.

Table 7-C Demographic characteristics by TCM utilization status*

	5/1/16—4/30/17		5/1/17—4/30/18		5/1/18—4/30/19		5/1/19—4/30/20		5/1/20—9/30/21	
	Non-user N=27,780	TCM user N=957	Non-user N=26,967	TCM user N=1,087	Non-user N=24,396	TCM user N=1,116	Non-user N=23,143	TCM user N=1,023	Non-user N=21,632	TCM user N=1,051
Children age <=21										
Age (Years, as of October 1 of each year)										
0-6	41.6%	28.7%	39.3%	28.0%	36.3%	28.0%	33.6%	26.3%	31.0%	19.3%
7-16	43.1%	55.4%	44.1%	55.9%	47.0%	56.3%	49.1%	58.3%	51.2%	62.7%
17-21	15.3%	15.9%	16.5%	16.1%	16.8%	15.8%	17.3%	15.4%	17.9%	18.0%
Race/Ethnicity										
non-Hispanic white	27.8%	36.7%	28.0%	38.5%	27.6%	37.4%	26.9%	36.5%	29.7%	39.7%
non-Hispanic black	62.2%	55.3%	62.1%	52.8%	62.3%	55.4%	62.5%	56.9%	66.3%	57.2%
Hispanic/Other	4.7%	3.9%	4.5%	3.4%	4.6%	2.5%	4.5%	2.8%	1.2%	1.1%
Unknown	5.3%	4.2%	5.4%	5.2%	5.5%	4.7%	6.1%	3.8%	2.8%	2.0%
Federal Poverty Level Category (% FPL)										
FPL 0 - 99%	76.5%	88.7%	75.2%	88.8%	74.6%	85.8%	76.4%	87.0%	76.0%	88.6%
FPL 100 - 195%	19.6%	9.1%	20.2%	9.2%	20.5%	11.5%	18.6%	10.1%	18.9%	9.3%
FPL 196 - 212%	1.0%	0.5%	1.0%	0.6%	1.1%	0.4%	1.1%	0.3%	1.0%	0.5%
FPL 213% +	2.9%	1.7%	3.6%	1.5%	3.9%	2.4%	3.8%	2.6%	4.2%	1.6%
Pregnant women										
Age (Years, as of October 1 of each year)										
17-21	25.3%	25.0%	27.9%	25.0%	31.7%	19.0%	15.8%	31.5%	30.2%	29.2%
>21	74.7%	75.0%	72.1%	75.0%	68.3%	81.0%	84.2%	68.5%	69.8%	70.8%
Race/Ethnicity										
non-Hispanic white	34.2%	52.5%	34.4%	32.1%	32.0%	28.6%	45.8%	28.5%	34.2%	25.0%
non-Hispanic black	56.9%	45.0%	55.6%	53.6%	57.6%	57.1%	44.5%	62.0%	61.8%	75.0%
Hispanic/Other	4.2%	2.5%	4.4%	7.1%	4.9%	4.8%	5.5%	4.5%	1.4%	0.0%
Unknown	4.7%	0.0%	5.6%	7.1%	5.5%	9.5%	4.1%	4.9%	2.6%	0.0%
Federal Poverty Level Category (% FPL)										
FPL 0 - 99%	82.1%	92.5%	76.4%	85.7%	73.6%	100.0%	84.4%	78.5%	72.5%	87.5%
FPL 100 - 195%	16.7%	7.5%	21.7%	14.3%	23.3%	0.0%	15.6%	18.3%	23.3%	12.5%
FPL 196 - 212%	0.1%	0.0%	0.6%	0.0%	0.9%	0.0%	0.0%	0.1%	0.9%	0.0%
FPL 213% +	1.1%	0.0%	1.3%	0.0%	2.2%	0.0%	0.0%	3.1%	3.2%	0.0%

* TCM utilizations were identified by the CPT code "T1017" or "T2024"



Domain 1: Access to Care

The main hypothesis for Domain 1 focused on Access to Care. The comparison group was non-enrollees having similar individual and neighborhood characteristics from the comparison county. Nine specific sub-hypotheses were identified to provide measures of access for both targeted populations. Sub-hypotheses 1.1 through 1.4 were chosen for their applicability to a pediatric population while items 1.5 to 1.7 were relevant for pregnant women. These seven sub-hypotheses used administrative health care claims for evaluation. Information was calculated for the T1 pre-water switch timeframe (May 2013 – April 2014) through the most recently completed available data year (May 2020 – September 2021). The last two sub-hypotheses acquired the necessary data through the enrollee survey process.

Sub-hypotheses 1.1: Improved Access to Care

1.1: A greater proportion of enrollees will obtain age-appropriate well-child exams than non-enrollees with similar individual and neighborhood characteristics.

The Well-Child Check HEDIS Measure was defined in terms of three age groups. The first metric included the percentage of children 15 months old who had at least one well-child visit with a primary care provider (PCP) during their first 15 months of life. The second metric focused on children 3-6 years of age having a well-child visit during the year. The last metric reported on adolescents from 12-21 years of age.

Table 8 reflects the proportion of children continuously covered by Medicaid who received at least one well-child check. The evaluation team restricted to children who were continuously enrolled in Medicaid during the appropriate reporting period to ensure that complete claims/encounter data were available through the Medicaid Health Services Data Warehouse when assessing service use. An enrollee who was flagged as being enrolled in FME for at least one month during the continuous period was classified as an FME enrollee for the full reporting period.

Imposing the requirement for continuous Medicaid enrollment retained a majority (>70%) of all enrollees for all three age groups. When the team compared the reporting rates between those who were not continuously enrolled (i.e., ever enrolled) with those who were continuously enrolled, the results were within approximately five percentage points with the “not continuously enrolled” cohort consistently reporting lower rates. This was expected as there would be no way to document health services delivered and paid for by other insurances or programs during periods of Medicaid ineligibility.

The FME enrollees were compared to the selected Comparison group (Saginaw) using the inverse propensity score weighted regression methods to test for the trends of the outcome between FME enrollees and their comparison, controlling for child sex, race, and, when possible, census-tract level socioeconomic and environmental factors (see Appendix 7



regarding the tests performed for the hypotheses). There was no statistically significant difference in yearly effects between the FME and Comparison groups in having any well-child visit in the first 15 months of life during the 5/2016 to 9/2021 period ($p=0.061$). There was a 5 percentage-point decrease in the proportion of the FME group across the 5/2020-9/2021 period, whereas the comparison group had a 3 percentage-point decrease.

The relative rates of well child visits for the FME and comparison groups were similar for the first three years of the waiver (5/1/16-4/30/19) for all age groups. While both the FME and Comparison groups had decreases in children aged 3-6 having any well-child visits in the two years (2019-2021), the FME group had higher rates in 2019-2020 than the Comparison but lower rates in 2020-2021. For adolescents, again both groups decreased in the two years (2019-2021). The FME group had a higher rate in 2019-2020 and a lower rate in 2020-2021 than the Comparison. The decreases in well-child visits in children 3 to 6 and in adolescents may have been more impacted by the COVID pandemic than the younger age group. This was hypothesized to be related to the influence of school enrollment and required vaccinations. Since the schools were shut down for the pandemic, these age groups may have been less likely to seek routine preventive care.



Table 8. H1.1: Well-Child Visits by Age Groups: 5/1/2013 – 9/30/2021 *

	T1: 5/1/13– 4/30/14	T2: 5/1/14– 4/30/15	T2: 5/1/15– 4/30/16	T3: 5/1/16– 4/30/17	T3: 5/1/17– 4/30/18	T3: 5/1/18– 4/30/19	T3: 5/1/19– 4/30/20	T3: 5/1/20– 9/30/21	P- value**
Well-Child Visits in the First 15 Months of Life									0.061
Had any visits				FME Enrollees					
	N=4328	N=4274	N=3617	N=1072	N=1538	N=887	N=483	N=753	
				1046 (97.6%)	1500 (97.5%)	867 (97.7%)	473 (97.9%)	700 (93.0%)	
	2782 (64.3%)	4072 (95.3%)	3483 (96.3%)	Comparison Group					
				N=2595	N=2447	N=3025	N=3287	N=4926	
			2478 (95.5%)	2344 (95.8%)	2907 (96.1%)	3136 (95.4%)	4539 (92.1%)		
Well-Child Visits at Age 3, 4, 5, and 6 Years									<0.01
Had any visits				FME Enrollees					
	N=16143	N=15413	N=14714	N=5736	N=6280	N=6158	N=5934	N=5552	
				4060 (70.8%)	4554 (72.5%)	4453 (72.3%)	4103 (69.1%)	3290 (59.3%)	
	11979 (74.2%)	11414 (74.0%)	10485 (71.3%)	Comparison Group					
				N=9538	N=9464	N=9613	N=9514	N=13241	
			6591 (69.1%)	6674 (70.5%)	6766 (70.4%)	4759 (50.0%)	8767 (66.2%)		
Adolescent Well-Care Visits Age 12 -21 years.									<0.01
Had any visits				FME Enrollees					
	N=29090	N=30122	N=28931	N=9010	N=10015	N=10051	N=10074	N=12102	
				3736 (41.5%)	4141 (41.3%)	4252 (42.3%)	3896 (38.7%)	4129 (34.1%)	
	11459 (39.4%)	12121 (40.2%)	12070 (41.7%)	Comparison Group					
				N=20620	N=20479	N=20924	N=20975	N=26082	
			8580 (41.6%)	8798 (43.0%)	8867 (42.4%)	6206 (29.6%)	9476 (36.3%)		

* % are unadjusted column percentages for each measure.

**P-values for interactions between enrollment and year dummies are based on the tests of differential time effects using propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables, with standard errors clustered at the census tract level.

Sub-hypotheses 1.2: Improved Access to Care

1.2: A greater proportion of enrollees will receive age-appropriate developmental screening/assessments than non-enrollees with similar individual and neighborhood characteristics.

This hypothesis was based on the percentage of children screened for risk of developmental, behavioral, and social delays using a standardized screening tool (CPT 96110) in the first three years of life.

It is known that lead is a neurotoxin and that children exposed to high levels of lead may experience poor developmental and behavioral health. Thus, developmental and behavioral screening is necessary to assess problems early for timely treatment to mitigate poor



outcomes. To address sub-hypotheses 1.2, observed rates based on administrative claims data for any number of developmental and behavioral screening visits in the first three years of life are presented in **Table 9**. As with sub-hypothesis 1.1, rates reported were based on continuous enrollment in Medicaid during the 12-month reporting periods from 5/2013 - 9/2021 for children aged 1, 2 or 3 years old.

For 2013-2014, before the water crisis, 12% of children had developmental screening visits. As with the limitation of the 0-15 month well child visit rate, just 12 months of historical administrative data was obtained. This rate increased to 28% in 2014-2015, during the first year of the water crisis, and to 33% in 2015-2016 before the FME waiver was available. The proportion having at least one developmental screening visit for those enrolled in the waiver continued to increase over time, with the highest level at 48% in 2019-2020. The proportion dropped to 40% in 2020-2021. This may be an artifact of the impact of the pandemic upon access to care. In the waiver period, the comparison group had stable rates (between 40 and 44%). We used inverse propensity score weighted logistic regression to compare the trends of the outcome between FME enrollees and the comparison, controlling for child sex, race, FPL, other insurance and census-tract socioeconomic and environmental factors ($p < 0.01$). FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in year 4 and lower rates in years 1, 2, and 5 than the Comparison group.

Table 9. Developmental/Behavioral Screening visits in the First Three Years of Life: 5/1/2013-9/30/2021*

	T1: 5/1/2013— 4/30/2014	T2: 5/1/2014— 4/30/2015	T2: 5/1/2015— 4/30/2016	T3: 5/1/2016— 4/30/2017	T3: 5/1/2017— 4/30/2018	T3: 5/1/2018— 4/30/2019	T3: 5/1/2019— 4/30/2020	T3: 5/1/2020— 9/30/2021	p- value**
Had any visits	N=13565	N=12466	N=12202	FME Enrollees					<0.01
				N=4323	N=4846	N=3709	N=2673	N=1912	
	1573 (11.6%)	3469 (27.8%)	4007 (32.8%)	1501 (34.7%)	1886 (38.9%)	1660 (44.8%)	1276 (47.7%)	756 (39.5%)	
				Comparison Group					
				N=7497	N=7698	N=8601	N=9598	N=12336	
			2996 (40.0%)	3323 (43.2%)	3812 (44.3%)	3930 (40.9%)	5079 (41.2%)		

* % are unadjusted column percentages for each measure.

**p-value for interactions between enrollment and year dummies based on the tests of differential time effects using inverse propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables, with standard errors clustered at the census tract level.

Sub-hypotheses 1.3: Improved Access to Care

1.3: A greater proportion of enrollees will receive age-appropriate lead testing compared to non-enrollees with similar individual and neighborhood characteristics.

For this hypothesis, we focused on the HEDIS metric “the percentage of children 2 years old or less who had 1 or more capillary or venous lead blood test for lead poisoning by their second birthday.” We used both claims and lab data to identify children who had a lead test. Examining lead screening using administrative claims and lab data for children continuously enrolled for the reporting periods from 5/1/2013-9/30/2021 showed steady increases from 5/2016 to 4/2019. However, the rates in 2020-2021 were low likely due to the impact of the pandemic’s shutdowns.

As shown in **Table 10**, in 2013-2014 reported claims and labs revealed a lead screening rate of 61%. During the first year of the water crisis, 2014-2015, screening jumped to 79% and 80% in 2015-2016. Screening in the first year of the waiver implementation (2016-2017) was more than 82% for waiver enrolled children as well as the comparison. However, the rates started to decline in 2017 in both the enrollees and comparison groups. In 2020-2021, the testing rate was 50% for waiver enrolled children, while the comparison children had a 52% testing rate. The p-value 0.01 indicated the enrollee and comparison groups had statistically different rates across the years in the T3 period. The difference was up to 2 percentage points in favor of the comparison group.

Table 10. Lead Screening in Children Aged 2 Using Claims or Lab Data: 5/1/2013-9/30/21*

	T1: 5/1/2013— 4/30/2014	T2: 5/1/2014— 4/30/2015	T2: 5/1/2015— 4/30/2016	T3: 5/1/2016— 4/30/2017	T3: 5/1/2017— 4/30/2018	T3: 5/1/2018— 4/30/2019	T3: 5/1/2019— 4/30/2020	T3: 5/1/2020— 9/30/2021	p- value**	
Had any BLL testing (N, %)	N=9230	N=8530	N=8464	FME Enrollees					0.01	
	5628 (61.0%)	6775 (79.4%)	6803 (80.4%)	N=2869	N=3248	N=2187	N=1200	N=1232		
				2371 (82.6%)	2445 (75.3%)	1634 (74.7%)	857 (71.4%)	616 (50.0%)		
				Comparison Group						
				N=5205	N=5344	N=6264	N=7095	N=8759		
	4222 (81.1%)	4127 (77.2%)	4691 (74.9%)	4916 (69.3%)	4545 (51.9%)					

* % are unadjusted column percentages for each measure.

** p-value for interactions between enrollment and year dummies based on the tests of differential time effects using inverse propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables, with standard errors clustered at the census tract level.

Sub-hypotheses 1.4: Improved Access to Care

1.4: A greater proportion of enrollees with high blood lead levels will receive re-testing at the appropriate intervals compared to non-enrollees with similar individual and neighborhood characteristics.

For some children, blood lead levels can be elevated and, given the recent elevated lead content in Flint supplied water, re-testing for those children was critical. Children documented with elevated blood lead values need to be re-tested to monitor impacts of treatment. We followed the CDC guidelines for the recommended time frame for re-test based on the blood lead level in the first test (CDC, 2018).

In 2013-2014, blood lead level re-testing was 9.2% before the water crisis and 13% to 19% during the two years of water crisis (**Table 11**). For the first two years the waiver was implemented, 31% of enrollees needing to be re-tested were re-tested. Rates increased in 2018-19 to 36% and remained similar in 2019-2020. In the same time periods, the re-testing rates in the comparison children fluctuated between 24% and 31%. The blood lead level re-testing sample size for children with EBLL was low in 2020-2021, potentially influenced by the pandemic. Although the FME group had higher rates in years 1-5, the difference was not statistically significant.

Table 11. Blood lead level re-testing with children with EBLL, 5/1/2013-9/30/21*.

	T1: 5/1/2013 — 4/30/2014	T2: 5/1/2014 — 4/30/2015	T2: 5/1/2015 — 4/30/2016	T3: 5/1/2016 — 4/30/2017	T3: 5/1/2017 — 4/30/2018	T3: 5/1/2018 — 4/30/2019	T3: 5/1/2019 — 4/30/2020	T3: 5/1/2020 — 9/30/2021	p- value**
Had any blood lead level retesting (N, %)	N=413	N=460	N=563	FME Enrollees					0.759
				N=278	N=183	N=120	N=71	N=25	
				85 (30.6%)	56 (30.6%)	42 (35.0%)	23 (32.4%)	12 (48.0%)	
				Comparison Group					
	38 (9.2%)	61 (13.3%)	109 (19.4%)	N=208	N=205	N=212	N=211	N=124	
			60 (28.8%)	49 (23.9%)	58 (27.4%)	59 (28.0%)	46 (37.1%)		

* % are unadjusted column percentages for each measure.

** p-value for interactions between enrollment and year dummies based on the tests of differential time effects using inverse propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables, with standard errors clustered at the census tract level.



Sub-hypotheses 1.5: Improved Access to Care

1.5: *Enrollees who are pregnant will have timelier prenatal and postpartum care compared to non-enrollees with similar individual and neighborhood characteristics.*

Prenatal and postpartum care is essential especially during environmental crises whereby the mother and baby may be at physical (lead exposure, miscarriage) and behavioral risks (toxic stress, postpartum depression). To address sub-hypothesis 1.5, claims data were examined to assess timeliness of prenatal care according to accepted HEDIS specifications (e.g., percentage of deliveries that received a prenatal care visit in the first trimester, on the enrollment start date or within 42 days of enrollment in the organization). HEDIS specifications for identifying prenatal and postpartum care require the practitioner type to be “an OB/GYN or other prenatal care practitioner or PCP.” At times, the administrative claims data did not fully document the billing and rendering provider information.

The evaluation team compared three algorithms for identifying prenatal and postpartum care. In algorithm #1, we used only the procedure (CPT) and diagnosis (DX) codes related to prenatal care (bundled to stand alone visits); in algorithm #2, we considered either the CPT/DX codes or the provider taxonomy codes to capture the most records; and in algorithm #3, we used both the CPT/DX codes and the provider taxonomy codes, which applied the most stringent criteria, but were subject to missing provider information. The first two algorithms led to similar results and the last algorithm resulted in underestimation of the proportions. Thus, we reported the results based on algorithm #2. The HEDIS specifications for prenatal care required counting the enrollment accurately to days. Because the administrative enrollment data did not have the exact date the women became eligible, the team operated under the assumption that enrollment began on 15th of the month for all women.

Table 12 shows that although there was a steady decline in the number of births, the proportion of timely prenatal care remained relatively high. Because of the look-back period required for these perinatal care measures, T2 does reflect to some degree T1 activities. Claims data prior to 5/1/13 were not acquired so separate reporting of T1 was not available. **For the prenatal care measure**, the Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had p-value = 0.051 using propensity score weighted logistic regression adjusting for race, FPL, other insurance, and census tract variables. FME and Comparison had jointly significantly different rates across the five years. The FME group had a statistically higher rate in prenatal care in years 4 and 5. **In contrast, for the postpartum care measure**, the Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had p-value = 0.161 using propensity score weighted logistic regression adjusting for race, FPL, other insurance, and census tract variables. FME and Comparison did not have jointly significantly different rates across the five years, however, the FME group had a statistically lower rate in post-partum care in years 3 and 5.



Table 12. Timeliness of Prenatal Care 5/1/2014 - 9/30/21 *

	T2: 5/1/2014— 4/30/2015	T2: 5/1/2015— 4/30/2016	T3: 5/1/2016— 4/30/2017	T3: 5/1/2017— 4/30/2018	T3: 5/1/2018— 4/30/2019	T3: 5/1/2019— 4/30/2020	T3: 5/1/2020— 9/30/2021	p- value**
Prenatal Care								0.051
Had prenatal care visit (N, %)	N= 4004	N= 3637	FME Enrollees					
	2944 (73.5%)	2812 (77.3%)	N= 1004	N= 781	N= 541	N= 431	N=559	
			770 (76.7%)	595 (76.2%)	429 (79.3%)	380 (76.2%)	416 (74.4%)	
	Comparison Group							
	N= 2520	N= 2646	N= 2711	N= 2084	N=3117			
1906 (75.6%)	2055 (77.7%)	2091 (77.1%)	1418 (68.0%)	2139 (68.6%)				
Postpartum Care								0.161
Had post-partum care visit (N, %)	N=4004	N=3637	FME Enrollees					
	1971 (49.2%)	1962 (53.9%)	N=1004	N=781	N=541	N=499	N=559	
			512 (50.0%)	347 (44.4%)	229 (42.3%)	181 (36.3%)	259 (46.3%)	
	Comparison Group							
	N=2520	N=2646	N=2711	N=2084	N=3117			
1460 (57.9%)	1341 (50.7%)	1357 (50.1%)	839 (40.3%)	1840 (59.0%)				

* % are unadjusted column percentages for each measure.

** p-values for interactions between enrollment and year dummies based on the tests of differential time effects using inverse propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables, with standard errors clustered at the census tract level.

Sub-hypotheses 1.6: Improved Access to Care

1.6: A greater proportion of enrollees who are pregnant will have recommended lead testing compared to non-enrollees with similar individual and neighborhood characteristics.

Lead screening for pregnant women is important to mitigate adverse birth outcomes associated with the exposure to high levels. This sub-hypothesis reported lead screening in pregnant women having a live birth. Although the CDC and American College of Obstetricians and Gynecologists do not recommend routine screening of all pregnant women, there is consensus that lead testing should be done when the mother is identified as having a single risk factor for exposure. Particularly, for the FME cohort, it was reasonable to expect all women to have at least one risk factor. Thus, the evaluation team expected to see more lead screening as a prenatal service compared to rates reported in the general population.

Prior to the water crisis, 5/1/2013-4/30/2014, very few data points were identified as evidence for this screening (**Table 13**). However, in 2015-2016, during the time when pregnant women were mostly likely exposed to lead and the crisis was public, lead screening increased to 8.6% of



the Medicaid continuously enrolled beneficiaries. These rates continued to increase even higher for women continuously enrolled in the FME Waiver, up to 78% in 5/2017-4/2018; whereas in the Comparison group the rates only increased to 40% in the same year. In the 5/2019-4/2020 period, the rates decreased in the FME Waiver enrollees to 60% whereas the Comparison group rate remained close to 45%. In the last year of the evaluation, both groups continued to experience decreases in lead screening, although the Wald test indicated the FME group had statistically higher rates in all years ($p < 0.01$) using a propensity score weighted logistic regression adjusting for race, FPL, other insurance, and census tract variables.

Table 13. Lead Screening in Pregnant Women with Live Birth Using Claims and Lab Data, 5/1/2013-9/30/21*

	T1: 5/1/2013 — 4/30/2014	T2: 5/1/2014 — 4/30/2015	T2: 5/1/2015 — 4/30/2016	T3: 5/1/2016 — 4/30/2017	T3: 5/1/2017 — 4/30/2018	T3: 5/1/2018 — 4/30/2019	T3: 5/1/2019 — 4/30/2020	T3: 5/1/2020 — 9/30/2021	<i>p-value**</i>
Had any BLL testing* (N, %)	N=4675	N=4547	N=4174	FME Enrollees					<0.01
	7 (0.1%)	11 (0.2%)	359 (8.6%)	N=1118	N=890	N=638	N=576	N=717	
				859 (76.8%)	690 (77.5%)	486 (76.2%)	347 (60.2%)	256 (35.7%)	
				Comparison Group					<0.01
				N=2895	N=3063	N=3087	N=2394	N=3971	
982 (33.9%)	1203 (39.3%)	1353 (43.8%)	1066 (44.5%)	753 (19.0%)					

*Due to additional requirements for prenatal and postpartum care measures, the sample sizes in Tables 12 and 13 are slightly different. % are unadjusted column percentages for each measure.

** *p-value for interactions between enrollment and year dummies based on the tests of differential time effects using inverse propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables, with standard errors clustered at the census tract level.*

Sub-hypotheses 1.7: Improved Access to Care

1.7: A greater proportion of enrollees will participate with home visiting services compared to non-enrollees with similar individual and neighborhood characteristics.

In Michigan, enhanced prenatal services were available through a home visiting service called the Maternal Infant Health Program (MIHP). This program was intended to address high risk pregnancies by providing additional specialized services. The program may also offer transportation and birthing classes along with professional visits. Since the interest in this measure was to evaluate active program engagement, the team relied on claims/encounters for professional visits rather than including all services such as transportation.

Prior to the water crisis, 28% of live births showed evidence of MIHP participation. This rate was essentially unchanged during the two years of the initial water crisis. Waiver enrollees appeared to have a slight increase in participation followed by a downward trend. Reasons for this decline were



not well-understood. Outreach to the MIHP program staff identified similar declines statewide for MIHP participation over the same timeframe. Within Genesee County, anecdotal reports identified increased availability of other home visiting programs after the water crisis. During the same period after 5/2016, the participation rates in the Comparison group were much lower than that in the waiver group.

We compared the trend for the FME enrollees against the trend for the Comparison group using a propensity score weighted logistic regression adjusting for race, FPL, other insurance, and census tract variables. The Wald test for differential yearly effect between FME and Comparison using data from 5/2016-9/2021 was not significant with $p=0.187$, suggesting that the FME and Comparison did not have jointly significantly different rates across the five years. The FME group had statistically similar rates in years 1-3 and 5, and higher rate in year 4 (**Table 14**).

Table 14. MIHP participation with Medicaid deliveries of live births (5/1/2013-9/30/2021)*.

	T1: 5/1/2013— 4/30/2014	T2: 5/1/2014— 4/30/2015	T2: 5/1/2015— 4/30/2016	T3: 5/1/2016— 4/30/2017	T3: 5/1/2017— 4/30/2018	T3: 5/1/2018— 4/30/2019	T3: 5/1/2019— 4/30/2020	T3: 5/1/2020— 9/30/2021	p- value**
Had any MIHP visit N (%)	N=4663	N=4540	N=4170	FME Enrollees					0.187
	1290 (27.7%)	1270 (28.0%)	1229 (29.5%)	N=1114	N=884	N=631	N=570	N=717	
				356 (32.0%)	255 (28.9%)	166 (26.3%)	156 (27.4%)	191 (26.6%)	
				Comparison Group					
				N=2884	N=3047	N=3070	N=2372	N=3971	
			755 (26.2%)	686 (22.5%)	678 (22.1%)	456 (19.2%)	941 (23.7%)		

* % are unadjusted column percentages for each measure.

** p-value based on the tests of differential time effects using inverse propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables, with standard errors clustered at the census tract level.

Sub-hypotheses 1.8: Improved Access to Care

The enrollee survey was the primary vehicle to obtain data regarding enrollee rating of the success of the waiver in improving their health care as specified in sub-hypotheses 1.8 and 1.9.

1.8: *Enrollees will attest to improved access to health care as a result of the expanded coverage.*

For Wave 1, a notification letter was sent to beneficiaries that included instructions on how to access the online survey website address or to call-in to the MSU Office of Survey Research to complete the survey. Participants were informed they would receive a paper version after four weeks if no response was received through either telephone or internet. In Wave 1 the survey requested an email and telephone number and permission to use them for purposes of the survey. The notification process for Waves 2, 3, and 4 included electronic reminders with embedded survey links (if respondents gave their email or cell phone) or completed Wave 1 via

the online survey. If no response to the electronic notification occurred, these individuals received the paper mailing invitation following the same protocol devised for Wave 1. Check-in postcards were also sent between survey waves asking respondents to update contact information. **Table 15** displays the survey response rates for Waves 1 through 4. Wave 4 was initiated after the extension was granted. For the children selected as part of the survey sample, all communications were directed to the parent or guardian on record. These communications identified the child for inclusion to assist the parent or guardian to answer for the correct child when more than one child was in the household.

When calculating response rates, beneficiaries whose mailing address was wrong or whose mail was returned without forwarding services were excluded. Out of the 11,453 randomly selected beneficiaries, 1,669 invitations were undeliverable. Among Wave 1 responders, at the time of the Wave 2 survey, 169 beneficiaries had undeliverable mail. Column 2 in **Table 15** shows the corrected denominators (n=2,442) and response rates at Wave 2. Similar statistical corrections were carried out for Waves 3 and 4. The number in the denominator in Wave 3 increased because some Wave 2 non-responders participated in the survey again.

A total of 2,611 responded in Wave 1, with 2,386 children (27% response rate) and 225 adults (22% response rate). In Waves 2 through 4, we followed participants who responded to the Wave 1 survey with the response rates for the three follow-up waves documented as 72%, 56%, and 32%, respectively. Due to the Wave 4 survey being added during the extension period, beneficiaries were not expecting to receive the last survey. This may have contributed to the lower response rate.

Table 15: Response Rates for Waves 1 through 4

Respondent Pool (N)	Wave 1 Responses (Response %)	Wave 2 Responses (Response % of Wave 1 Responders with correct address)	Wave 3 Responses (Response % of Wave 1 Responders with correct address)	Wave 4 Responses (Response % of Wave 1 Responders with correct address)
Child (8,760)	2386 (27.2%)	1625/2232 (72.8%)	311/2315 (56.6%)	774/2320 (33.4%)
Adult (1,024)	225 (22.0%)	39/210 (66.2%)	103/220 (46.8%)	32/216 (14.8%)
Total (9,784)	2611 (26.7%)	1764/2442 (72.2%)	414/2535 (55.8%)	806 (31.8%)

Web based survey completion continued to be the most frequent modality, compared to telephone or paper survey response rate, through Wave 4. During the initial planning, the prevailing belief was most of these enrollees would not be able to access internet-based surveys. Also, the evaluation team believed that implementation of full online modality without email addresses would potentially limit distribution. However, in response to community suggestions, the online modality was added as an initial option with the opportunity for participants to provide email addresses for future waves. This activity was fruitful with over 70% of Wave 1 participants providing an email address for Wave 2.

In Wave 1 of the enrollee survey, 85% of child surveys and 80% of adult surveys stated that the target individuals were already enrolled in Medicaid. However, over 400 out of the 2611 survey



participants reported this as a new form of coverage. The proportion of enrollees representing the expanded income levels (over 212% FPL) continued to be less than 5%.

When asked about the ease of accessing health care since enrolling in FME, caregivers' responses in the child survey revealed that over 80% thought it was easy or fairly easy to access. However, there was no statistically significant change over time (p-value=0.57 for a linear trend with a Wald test) in the proportion of respondents who had difficulties accessing medical care (**Table 16-A**). **The sample sizes for adults were too small, especially in Wave 4, to warrant a statistical test (Table 16-B).**

Table 16-A: General Ease of Getting Health Care – Child

Question	Child				P-value*
	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	
Since enrolling in the Flint Medicaid waiver, how easy was it to get the medical care, tests, or treatment you/your child needed?					
Easy	1285 (54.3%)	866 (53.7%)	693 (52.5%)	401 (52.3%)	0.569
Fairly Easy	683 (28.5%)	482 (29.3%)	440 (33.8%)	254 (33.0%)	
Not Easy, Not Difficult	308 (12.8%)	176 (10.9%)	120 (9.2%)	78 (9.7%)	
Difficult	69 (2.9%)	69 (4.1%)	40 (3.0%)	31 (3.8%)	
Very Difficult	15 (0.6%)	15 (0.9%)	10 (0.8%)	7 (0.6%)	
Missing	26 (1.0%)	17 (1.1%)	8 (0.6%)	**	

* p-value **for wave dummies** based on multi-level ordinal logistic regression models adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

** Cells less than or equal to 5 suppressed.



Table 16-B: General Ease of Getting Health Care – Adult

Question	Adult*			
	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)
Since enrolling in the Flint Medicaid waiver, how easy was it to get the medical care, tests, or treatment you/your child needed?				
Easy	94 (41.8%)	43 (30.9%)	33 (32.0%)	**
Fairly Easy	80 (35.6%)	55 (39.6%)	40 (38.8%)	9 (30.0%)
Not Easy, Not Difficult	38 (16.9%)	16 (11.5%)	11 (10.7%)	6 (20.0%)
Difficult	6 (2.7%)	18 (12.9%)	17 (16.5%)	**
Very Difficult	**	**	**	**
Missing	**	**		**

* Adult survey, no statistical test was conducted due to small sample size.

** Cells less than or equal to 5 suppressed.

Sub-hypotheses 1.9: Improved Access to Care

1.9: *Enrollees will report improved satisfaction with their ability to access health care as a result of the expanded coverage.*

Beyond simply offering the opportunity for expanded access and coverage, another aspect related to the uptake of waiver services was overall satisfaction. The expanded coverage was offered through the health plans that operated in the affected geographic region. Thus, waiver participants had the benefit of existing health plan relationships with a variety of health care and community providers.

Satisfaction ratings were obtained through several questions in the survey. One question asked about overall satisfaction as a numeric score from 0 to 10 (0 being the worst and 10 the best). For children, the average rating was above 7 in four waves (**row 1 Table 17**). **The weighted linear mixed model indicated no significant trend in the rating (p -value=0.165), and neither did the weighted mixed ordinal logistic regression (p -value=0.495). For adults, the smaller sample size led to larger standard errors (row 2 Table 17), especially in Wave 4 with only 32 respondents (Table 15). Neither the linear mixed model nor the ordinal mixed model showed a statistically significant trend with p -values being 0.213 and 0.059, respectively.**



Table 17. Survey Participant Satisfaction with Health Care/Health Care Providers

Question	Wave 1	Wave 2	Wave 3	Wave 4	P-value*
	<i>Child</i>				
Average Satisfaction Score (standard error)	7.4 (0.04)	7.4 (0.04)	7.3 (0.05)	7.3 (0.07)	0.495
	<i>Adult</i>				
	7.0 (0.11)	6.7 (0.15)	7.4 (0.18)	7.1 (0.35)	0.059

*p-value for wave dummies based on multi-level ordinal logistic regression models adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

When asked whether the health care providers are working in their child’s best interest, the proportion of child survey participants who strongly agreed or agreed with the statement significantly increased over time (p-value<0.01, **Table 18**). **The corresponding data for adults are not shown due to small sample sizes.**

Table 18. Survey Participant Satisfaction with Health Care/Health Care Providers

Question	<i>Child*</i>				P-value*
	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	
Since enrolling in the Flint Medicaid waiver, I feel that the health care providers are working in my/my child’s best interest.					
Strongly Agree	596 (25.4%)	565 (35.0%)	458 (34.5%)	253 (32.5%)	<0.01
Agree	926 (38.9%)	652 (40.0%)	571 (44.1%)	288 (37.3%)	
Neutral	711 (29.3%)	326 (19.9%)	232 (17.3%)	179 (23.0%)	
Disagree	99 (4.1%)	50 (3.1%)	34 (2.8%)	23 (2.8%)	
Strongly Disagree	31 (1.3%)	19 (1.2%)	9 (0.7%)	18 (2.4%)	
Missing	23 (1.0%)	13 (0.9%)	7 (0.6%)	15 (2.0%)	

*p-value **for wave dummies** based on multi-level ordinal logistic regression models adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

Domain 2: Access to Targeted Case Management

TCM was intended to facilitate access to services and mitigate barriers to care. Thus, the evaluation group anticipated that among those enrolled in FME, TCM participants would have greater access and follow-through on health care compared to those who did not have these supports to navigate services. A variety of data sources contributed to the evaluation activities for Domain 2, “enrollees who access TCM services will access needed medical, social, educational, and other services at a rate higher than enrollees with similar individual and neighborhood characteristics but do not take up TCM services.”



Enrollees were identified through administrative data as individuals having any FME flag in the eligibility data. ***TCM users were identified through administrative claims and data as well as client data from GHS' tracking system that was instituted during the operational period of TCM services.*** These ***data*** were compared against each other for completeness ***and discrepancies*** between the two sources were noted ***but*** were unable to be fully reconciled. ***It is important to note that*** GHS reported a change in enrollment count methodology during 2021 ***and this may slightly impact the data collected through their tracking system.***

The comparison group for Domain 2 was identified using administrative claims data and consisted of FME enrollees who did not utilize TCM services. In addition to these ***data*** sources, survey data ***collected through the*** enrollee ***surveys*** and TCM provider ***key informant interviews*** offered qualitative information regarding use and satisfaction with TCM services. ***This information was utilized to identify the impact of the FME Waiver on Domain 2 hypotheses.***

Sub-hypotheses 2.1-2.2: Improved Access to TCM

2.1: *Referral source and participation levels with TCM will be tracked among enrollees.*

2.2: *All TCM participants will have an annual assessment conducted.*

To validate the eligibility data pulled from the warehouse, we compared the referral cases from GHS' tracking system. Table 19 provides a detailed breakdown of the proportion of cases identified in GHS' referral data that were matched to unique beneficiary IDs from FME eligibility data. In the 2016-2017 period, GHS submitted 966 referrals and identified 868 unique beneficiary IDs. Of these, 860 were matched to cases found in the FME warehouse data and 8 IDs from the GHS data could not be matched. Out of 860 identified beneficiaries, 737 (85.7%) had at least 1 FME enrollment flag during this time, 172 (20.0%) had a claim with HCPCS codes T2024 (service assessment/plan of care development) or T1017 (TCM services), and 181 (21.1%) had a claim with Z77.011 diagnosis (exposure to lead). Over time, GHS reported fewer referrals. This was anticipated as referrals were more in demand the first year FME was available and decreased as the timeframe from the acute water crisis elapsed and individuals had needs met through TCM or other community resources.



Table 19. Genesee Health System referral data linked to FME enrollment data

GHS Referral data linked to eligibility data from the Warehouse	T3: 5/1/2016— 4/30/2017	T3: 5/1/2017— 4/30/2018	T3: 5/1/2018— 4/30/2019	T3: 5/1/2019— 4/30/2020	T3: 5/1/2020— 9/30/2021
# of records from GHS	966	281	174	332	*
# of Unique IDs from GHS	868	272	165	330	*
# of Unique IDs from GHS data that did not match the FME eligibility data	8	1	2	0	*
# of Unique IDs from GHS data matched to FME eligibility data	860	271	163	330	*
Any month with FME enrollment flag <i>within matched cases</i>	737 (85.7%)	220 (81.2%)	149 (91.4%)	263 (79.7%)	*
Any claim with HCPCS codes T2024 or T1017	172 (20.0%)	40 (14.8%)	52 (31.9%)	90 (27.3%)	*
Any claim with diagnosis Z77.011 (contact with and (suspected exposure to lead)	181 (21.1%)	49 (18.1%)	50 (31.7%)	59 (17.9%)	*

*Data not available *during first year of COVID-19.*

While the referral rate decreased from the 2016-2017 time period to 2018-2019, there was an uptick in referral rates in the 2019-2020 period. From 2018-2019 to 2019-2020, the referral rate increased 90% from 174 to 332 and the number of unique beneficiaries identified increased from 163 to 330. This increase in the referral rate may have occurred due to the stay-at-home orders implemented at the beginning of the COVID-19 pandemic. During this time, individuals may have experienced new needs that could not be addressed at the social and educational institutions that closed and therefore sought out new ways to access care. Additionally, because Flint Registry was available to any individual at an address serviced by, and potentially exposed to, the contaminated Flint water system, they may have contributed to the increased rate of referrals; however, the predominant number of referrals were received from Medicaid Health Plans.

GHS staff described being contacted by several Community Mental Health organizations in different areas of the State where FME enrollees had relocated; none of these organizations ultimately provided formal TCM services. No claims with the appropriate CPT and NPI codes were identified between 5/1/2020 – 9/30/2021. Data were extracted several times without changes in results. The timeframe began after the pandemic stay-home orders, beginning March 2020, which likely impacted the availability and utilization of these services. The approved reimbursement policy for TCM mandated face-to-face visits and was not modified to permit telehealth visits. During this time, TCM providers reported their shift to service delivery through audio or video visits. This provided rationale for the inability to document these services through administrative health care claims/encounter data and, because of the lack of claims data, the evaluators were unable to quantify TCM utilization during this time.



Under-utilization of TCM services was confirmed using administrative data sources per **Table 20**. Specific codes were authorized for the billing of TCM annual assessments (CPT T2024) and follow-up visits (CPT T1027). These CPTs were allowable codes for other programs. Thus, it was necessary to link the allowable CPT with the appropriate provider through Provider ID. As mentioned, no claims were identified in the most current reporting year with the correct combination of identifiers.

Table 20: Number and Proportion of Total FME Enrollees Using TCM Services per Administrative Health Care Data

	5/1/2016— 4/30/2017	5/1/2017— 4/30/2018	5/1/2018— 4/30/2019	5/1/2019— 4/30/2020	5/1/2020— 9/30/2021
FME enrollees statewide	33,526	33,916	31,849	30,996	29,841
Had any TCM visit (N, %) defined by CPT “T2024” or “T1017”	1088 (3.2%)	1279 (3.8%)	1371 (4.3%)	1293 (4.2%)	1395 (4.7%)
Had any TCM visit (N, %) defined by CPT “T2024” or “T1017” with authorized TCM Provider ID	145 (0.4 %)	71 (0.2%)	60 (0.2%)	63 (0.2%)	*
TCM participant had annual assessment (N, %) defined by CPT “T2024” or “T1017” with authorized TCM Provider ID	34 (23.4%)	18 (25.4%)	18 (30.0%)	16 (25.4%)	*

*No observations with combination of CPT codes and NPI code for GHS.

Provider reported (GHS, MDHHS) administrative health metrics of TCM participation were found to be less than that reported through the Wave 1 enrollee survey. Approximately 10% of Wave 1 enrollee survey participants reported accessing these services and there was a slight non-statistically significant increase for children in Wave 2 and decreases in W3 and W4 (p-value=0.112) (**Table 21**). This was interpreted as a positive finding because sustained utilization of TCM was documented despite the limitations on TCM in-person visits associated with pandemic related stay-home orders. This may reflect an enhanced sensitivity of survey participants to the water crisis. Those interested in taking advantage of the TCM services might have been more likely to take the opportunity to respond to the surveys as they were more invested in the program overall.

Table 21: TCM Participation Reported by Enrollees

Question	Child				P-value*
	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	
Have you ever used any Family Supports Coordination (Targeted Case Management) services for you (your child) since enrolling in the Flint Medicaid waiver?					
Yes	239 (10.2%)	191 (12.0%)	132 (10.3%)	66 (9.1%)	<0.01
No	2111 (88.3%)	1395 (85.5%)	1157 (88.0%)	701 (89.8%)	



Missing	36 (1.5%)	39 (2.5%)	22 (1.7%)	9 (1.1%)	
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* p-value **for wave dummies** based on multi-level ordinal logistic regression models adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

The evaluation team also conducted Key Informant Interviews (KII) with TCM Professionals at GHS and Greater Flint Health Coalition in 2018, in 2020 before the government shut down due to the COVID-19 pandemic, and again in 2021 after the government shut down ended. Findings from the first interview were generally confirmed in the second and third waves.

Mental/behavioral health services, persistent lack of clean water, and transportation were consistently identified as key needs during all waves. Education was identified as a top need area in the third wave, presumably due to greater interaction with schools as children aged during this time.

The third wave also brought to light the ongoing provision of TCM services to clients through telehealth despite the inability to bill the FME waiver for these services as the policy was not modified to reflect constraints imposed by the pandemic. Representatives of both organizations indicated they were able to accommodate all clients and TCM referrals that had been received to date. Staffing levels did not require stratification or triage of referrals. They did note that at times, delivery of services by external partner organizations were delayed for a variety of reasons. These reasons included lack of reliable contact information for clients and community resource limitations. The City of Flint was a high need community due to years of disinvestment prior to the water crisis exacerbation which was then further compounded by the COVID-19 pandemic.

When asked their impressions, TCM providers offered potential reasons for the low overall uptake of TCM services by FME enrollees. They identified enrollee frustration stemming from the time involved to implement certain elements of care plans such as housing. Problems with enrollee contact information impacted not only service delivery, but the ability of the TCM providers to follow-up and advocate for their clients. One of the TCM providers identified an altruistic reason for lack of follow-up with service referrals. Some enrollees specifically cited concerns about taking advantage of referrals when they believed there were other individuals with greater needs. The TCM providers mentioned operational aspects that had opportunities for improvement. These included ongoing FME education to case workers and those involved with Medicaid eligibility determinations, evaluating continuity of specific coverage programs during redeterminations, and considering households as a unit to ensure all children were appropriately covered. Regardless of the challenges, the TCM informants believed their clients had trust in their services and the relationship.

The COVID-19 pandemic's influence appeared to increase client interactions during the second wave of interviews for staff from both GHS and GFHC which had then decreased by the third interview. The increase followed the increased client need for resources at the same time resource availability was compromised due to government-imposed shutdowns. The TCM provider from GHS reported the number of referrals decreased at the third wave while the GFHC staff member noted that the number of client referrals remained consistent since the



COVID-19 pandemic began. The TCM providers reported increased staff time was needed to identify resources in the post-pandemic era. Delivery of TCM services pivoted to using technology to continue their work including video and telephone, zoom and video chat. Through telehealth they could continue to complete assessments, plans of care, and referrals. The incorporation of telehealth contributed efficiencies to the TCM assessment and follow-up processes compared to the home visit model of delivery.

Sub-hypotheses 2.3-2.4: Improved Access to TCM

Two additional sub-hypotheses were developed to document the impact of TCM on individual receipt of care. The logic was FME enrollees who participated with the TCM program received additional encouragement and assistance in recognizing the importance of the identified screenings and mitigating barriers to securing these screenings. While the waiver itself was hypothesized to increase access to care, TCM specifically was hypothesized to maximize the impact through direct assistance to FME enrollees in navigating the health care system.

2.3: A greater proportion of TCM participants will have age-appropriate well child exams compared to TCM non-participants.

2.4: A greater proportion of TCM participants will have completed age-appropriate developmental screening compared to TCM non-participants.

During the analytic processes, the evaluation team recognized the use of applicable procedure codes in Medicaid enrollees who did not appear to be enrolled in the FME Waiver specifically. When TCM participation was identified using CPT codes (T2024 or T1017) together with the designated billing NPI for GHS, the number was quite low. Using these numbers, with caution, we examined 3 HEDIS metrics for sub-hypothesis 2.3 and 2 HEDIS metrics for sub-hypothesis 2.4. These metrics were defined in sub-hypothesis H1.1 and H1.2. The data for these hypotheses were suppressed for this report because the numbers were too low, except for the well child visits in the third, fourth, fifth and sixth years of life metric. These metrics appeared to be impacted by the coronavirus pandemic which affected health service delivery during the data year 5/1/20 – 9/30/21.

For this well child visit measure only, FME enrolled/TCM participants appear to have higher proportions of obtaining these visits compared to the FME enrolled but TCM non-participants (**Table 22**). However, due to the small numbers and severe imbalance in sample sizes between participants and non-participants, the evaluation team did not carry out statistical tests for this comparison.



Table 22: Comparison of Proportion of TCM Participants vs. TCM Non-Participants Among FME Enrollees Having Well Child Visits and other developmental screening.

Measure		T3:	T3:	T3:	T3:	T3:
		5/1/2016— 4/30/2017	5/1/2017— 4/30/2018	5/1/2018— 4/30/2019	5/1/2019— 4/30/2020	5/1/2020— 9/30/2021
Well Child Visits (0-15 mos.)	TCM*	9 (100.0%)	**	5 (100.0%)	**	**
	Non-TCM	1249 (97.3%)	1490 (97.6%)	853 (97.8%)	452 (97.8%)	**
Well Child Visits (3, 4, 5, 6 yrs.)	TCM*	29 (78.4%)	17 (94.4%)	18 (90.0%)	16 (84.2%)	**
	Non-TCM	4030 (70.7%)	4537 (72.5%)	4435 (72.3%)	4086 (69.1%)	**
Well Adolescent Visits (12-21 yrs.)	TCM*	*** (20.0%)	13 (54.2%)	**	10 (52.6%)	**
	Non-TCM	3730 (41.5%)	4127 (41.3%)	4249 (42.3%)	3885 (38.6%)	**
Developmental Screening (0-3 yrs.)	TCM*	**	**	**	**	**
	Non-TCM	12 (0.3%)	167 (3.5%)	102 (2.8%)	19 (0.7%)	**
Behavioral Screening (4-17 yrs.)	TCM*	**	**	7 (17.9%)	*** (10.2%)	**
	Non-TCM	50 (0.3%)	858 (5.1%)	1519 (9.0%)	1213 (7.2%)	**

* TCM defined by the combinations of CPT codes and GHS NPI code.

**No *claims* with combinations of CPT codes and NPI code for GHS.

*** Cells less than or equal to 5 suppressed.

Domain 3: Improved Health Outcomes

A variety of data sources contributed to the evaluation activities for Domain 3, “Enrollees will have improved health outcomes compared to non-enrollees with similar individual and neighborhood characteristics.” Six sub-hypotheses were identified. Three of these (3.4, 3.5, 3.6) were deemed provisional at the time of evaluation approval since it was unclear whether the evaluation team would be granted access to the necessary data. Unfortunately, individual level data maintained by the MDE and protected under FERPA laws was not available for evaluation purposes. In response, the evaluation team drafted education and child development related questions to include in enrollee surveys.

Sub-hypotheses 3.1-3.2: Improved Health Outcomes

- 3.1. *Enrollees will have higher completed age-appropriate immunization statuses than the comparison.*
- 3.2. *Enrollees who are pregnant will deliver infants with higher birth weights than the comparison.*

The immunization measures were intended to reflect the proportions of children and adolescents who were fully immunized as recommended. These were referred to as combination measures and the specific HEDIS metrics included:

- Combination 10: The percentage of children 2 years of age who had four diphtheria, tetanus and acellular pertussis (DTaP); three polio (IPV); one measles, mumps and



- rubella (MMR); three haemophilus influenza type B (HiB); three hepatitis B (HepB), one chicken pox (VZV); four pneumococcal conjugate (PCV); one hepatitis A (HepA); two or three rotavirus (RV); and two influenza (flu) vaccines by their second birthday. The numbers reported below are the enrollees having all 10 vaccines.
- Combination 2: The percentage of adolescents 13 years of age who had one dose of meningococcal conjugate vaccine, one tetanus, diphtheria toxoids and acellular pertussis (Tdap) vaccine, and have completed the human papillomavirus (HPV) vaccine series by their 13th birthday. The numbers reported below are the enrollees having all 3 vaccines.

The birth weight measure was designated as a proxy for optimal perinatal care. Women receiving this care would be expected to deliver fewer infants with low birth weights. Low birth weight has been associated with a variety of adverse outcomes in infants. The measure reported was:

- The proportions of live births with birth weight < 2500 grams (i.e., low birth weight, LBW) with higher proportion corresponding to worse outcome.

Table 23 displays the comparisons of these combined health outcome measures. The childhood immunization and adolescent immunization measures were updated using the combination of CPT codes from Medicaid claim data and immunization records from the Michigan Care Improvement Registry (MCIR). The immunization rates in children 2 years of age were around 10% across 2016-2020 and increased to 12% in 2020-2021 for the FME enrollees' group. In the comparison group, the rates decreased from 15% to 10%. The Wald test for differential yearly effect between FME and Comparison using data from 5/2016-9/2021 had $p=0.021$ using propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables. However, the results were in favor of the comparison group.

The adolescent immunization rates were steady in the waiver enrollees whereas there was a decline in the comparison group especially for the last period. The Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had $p<0.01$ using propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables. FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in years 4 and 5.

The LBW proportions in the waiver enrollees declined over time whereas the comparison group had a stable rate. The Wald test for differential time effects between FME and Comparison using data from 5/2016-9/2021 had $p=0.749$ using propensity score weighted logistic regression adjusting for race, FPL, and census tract variables. FME and Comparison did not have significantly different linear trends across the five years.



Table 23: Comparison of FME Enrollees and Comparison Group non-FME for Sub-hypotheses 3.1. and 3.2 (the n is the numerator for each measure and % is the proportion of n in the appropriate denominator) *

Sub-hypothesis	Target population	T2: 5/1/2014- 4/30/2015	T2: 5/1/2015- 4/30/2016	T3: 5/1/2016- 4/30/2017	T3: 5/1/2017- 4/30/2018	T3: 5/1/2018- 4/30/2019	T3: 5/1/2019- 4/30/2020	T3: 5/1/2020- 9/30/2021	p-value**
3.1.1 Childhood Immunization Combination #10	FME Enrollees	N.A.	N.A.	141 (10.3%)	173 (11.1%)	165 (10.9%)	70 (10.7%)	81 (11.6%)	0.021
	Comparison Group	128 (3.2%)	536 (14.1%)	333 (14.9%)	393 (15.7%)	428 (16.8%)	452 (13.7%)	498 (9.6%)	
3.1.2. Adolescent Immunization Combination	FME Enrollees	N.A.	N.A.	667 (64.4%)	757 (64.3%)	777 (64.1%)	832 (66.6%)	1275 (61.5%)	<0.01
	Comparison Group	1201 (33.8%)	2143 (64.2%)	1467 (63.9%)	1387 (61.3%)	1454 (61.8%)	1417 (59.1%)	1941 (47.8%)	
3.2 Proportion Infants with Low Birth Weight	FME Enrollees	N.A.	N.A.	211 (15.0%)	87 (13.9%)	69 (13.7%)	67 (12.6%)	89 (12.5%)	0.749
	Comparison Group	381 (15.5%)	593 (13.0%)	388 (11.7%)	485 (12.4%)	4834 (12.4%)	399 (12.2%)	602 (12.1%)	

These individuals are the Genesee target population without FME flag plus Saginaw target population. "Target" refers to the appropriate denominator for each sub-hypothesis.

* Cell sample sizes changed from previous reports because the evaluation team had access to immunization records in MCIR data. % are unadjusted column percentages for each measure.

** p-value for interactions between enrollment and year dummies based on the tests of differential time effects using inverse propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables, with standard errors clustered at the census tract level.

Sub-hypotheses 3.3: Improved Health Outcomes

3.3: Enrollees report an increase in their self-reported health status over the duration of their enrollment.

Reported health rankings improved for child survey participants in the proportion reporting the excellent category (**Table 24**). Approximately 80% of both survey populations classified their health in the top three rating categories for Waves 1 through 4. For child survey results, improvements were statistically significant ($p < 0.01$) using a mixed ordinal logistic regression adjusting for age, race, residence county and poverty level at person-level as well as census tract-level SVI and COI scores, although the size of the improvement was small. Adult survey responses revealed no change except for improved reporting of "Excellent" from Waves 1 to 3 and "Good" from Wave 1 to 4. This improvement appears to be derived from a decrease in the proportion reporting Fair/Poor health status over the four years. However, due to the lack of responses, statistical testing was not appropriate.



Table 24: Enrollee Self-Reported Overall Health Status

Question	Child				P-value*
	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	
In general, how would you rate your/your child's overall health (both physical and behavioral/emotional) since enrolling in the Flint Medicaid Waiver?					
Excellent	546 (23.1%)	432 (26.9%)	350 (26.6%)	204 (26.1%)	<0.01
Very Good	670 (27.8%)	482 (29.5%)	409 (31.5%)	213 (27.5%)	
Good	706 (29.7%)	437 (26.8%)	374 (28.5%)	248 (32.1%)	
Fair	378 (15.9%)	227 (13.8%)	148 (11.2%)	89 (11.6%)	
Poor	74 (3.1%)	35 (2.2%)	28 (2.1%)	18 (2.3%)	
Missing	12 (0.5%)	12 (0.8%)	2 (0.1%)	4 (0.4%)	
	Adult				
In general, how would you rate your overall health (both physical and behavioral/emotional) since enrolling in the Flint Medicaid Waiver?					P-value**
Excellent	29 (13.9%)	28 (22.7%)	20 (22.1%)	* (12.6%)	n.a.
Very good	53 (22.2%)	31 (22.0%)	24 (22.0%)	* (20.1%)	
Good	84 (37.6%)	43 (30.4%)	34 (34.7%)	17 (52.1%)	
Fair	45 (19.6%)	29 (19.2%)	18 (14.2%)	* (13.0%)	
Poor	12 (5.3%)	6 (4.1%)	7 (7.0%)	* (2.2%)	
Missing	* (1.0%)	* (1.6%)	0	0	

* Child survey, p-value **for wave dummies** based on multi-level ordinal logistic regression models with linear trends adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

** **Adult survey, no statistical test due to small sample size.**

Health status ratings were subdivided by 1) physical and 2) behavioral/emotional health aspects. The experience of the individuals affected by the Flint Water Crisis revealed significant impacts on both physical and emotional well-being particularly for children. Survey estimates reinforced this observation with generally higher rankings for physical health compared to behavioral/emotional health (**Tables 25 and 26**). In the child survey, there was a significant increase in physical and behavioral/emotional health over time (p-value<0.01). The adult survey responses were not sufficient for statistical testing, raw numbers are available in the FME Enrollee Survey Summary Report located in Appendix 3.



Table 25: Enrollee Self-Reported Physical Health Status (Wave 1 to Wave 4)

Question	Child				P-value*
	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	
In general, how would you rate your/your child's physical health since enrolling in the Flint Medicaid Waiver?					
Excellent	622 (26.3%)	512 (31.9%)	452 (34.5%)	248 (31.6%)	<0.01
Very Good	704 (29.3%)	512 (31.2%)	422 (32.1%)	234 (30.1%)	
Good	666 (28.0%)	411 (25.1%)	329 (25.5%)	212 (27.6%)	
Fair	320 (13.3%)	162 (10.1%)	91 (6.7%)	66 (8.9%)	
Poor	57 (2.4%)	14 (0.8%)	14 (1.0%)	9 (1.0%)	
Missing	17 (0.7%)	14 (0.9%)	3 (0.2%)	7 (0.8%)	

* Child survey, p-value **for wave dummies** based on multi-level ordinal logistic regression models adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

Table 26: Enrollee Self-Reported Behavioral/ Emotional Health Status (Wave 1 to Wave 4)

Question	Child				P-value*
	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	
In general, how would you rate your/your child's behavioral/emotional health since enrolling in the Flint Medicaid Waiver?					
Excellent	419 (17.5%)	299 (18.1%)	252 (19.0%)	155 (20.1%)	<0.01
Very Good	463 (19.1%)	379 (23.2%)	319 (24.3%)	179 (22.7%)	
Good	660 (27.8%)	381 (23.7%)	335 (25.5%)	198 (26.0%)	
Fair	548 (23.0%)	391 (23.9%)	287 (22.3%)	167 (21.3%)	
Poor	276 (11.7%)	154 (9.7%)	111 (8.4%)	67 (8.8%)	
Missing	20 (0.8%)	21 (1.4%)	7 (0.5%)	10 (1.2%)	

* Child survey, p-value **for wave dummies** based on multi-level ordinal logistic regression models adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

Sub-hypotheses 3.4-3.6: Improved Health Outcomes (Provisional)

The remaining sub-hypotheses were deemed provisional due to concerns over data availability and appropriateness of potential comparison group identification. These sub-hypotheses were intended to report on the educational and development delays that might be expected from lead exposure. Questions were added to the enrollee surveys to obtain similar self-reported measures.

The MI School Data Dashboard was also referenced to provide community level data on these educationally focused hypotheses. Although the data could not be linked to FME enrollment status, these data were presented for Flint City Schools as well as Saginaw City Schools to provide some context to larger shifts occurring in the communities.

P3.4. Descriptive analysis of the proportion of children diagnosed with severe emotional disturbance and other developmental/learning disabilities.

Children enrolled in the SED waiver were identified to not be an appropriate comparison group. The SED Waiver enrolls just approximately 400 enrollees statewide. However, the acuity and eligibility criteria were significant requiring child psychiatric hospital admission or risk of admission in absence of the SED Waiver services. Therefore, the evaluation team decided against reporting descriptive results for this category of children.

The MI School Data Dashboard did provide selected educational system classifications on developmental and learning disabilities for K-12 and early education.¹⁰ However, MI School data did not directly address behavioral health other than special education services for emotional impairment (EI). The pandemic caused schools across the state to close and move to virtual instruction during the 2019/2020 school year. Thus, any publicly reported data is incomplete and not included for this report.

P3.5. Descriptive analysis of behavioral health conditions and supportive care among enrolled children.

P3.6. Descriptive analysis of educational delays among enrolled children.

School enrollments in Flint City Schools have been decreasing steadily for the last four decades. Much was due to loss of jobs in the Flint area tied to the automobile industry and the proliferation of charter schools located throughout the city. Flint and Genesee County had a very complex school system with approximately 25 school “districts”. This includes charter schools that qualify as independent school districts. Flint City Schools were selected as the appropriate data to report and compare because they were most closely aligned with the target geographic area defined by the 11 zip codes of the FWSA. However, many cell sizes were suppressed and not viable for comparison.

Although enrollment decreased, special education and Individualized Education Program (IEP) annual rates steadily increased for Flint City Schools (Green 2019). This increase may be partly due to families with resources leaving the school district or even traveling to charter schools within the region. Charter schools in Michigan are open to children not residing in their area.

Because of the issues obtaining MDE data, the Child Survey provided information regarding behavioral and educational issues for enrolled children. Participants in the child survey were asked to report if they had been informed by a health care professional or daycare/school staff that the child had a behavioral or emotional problem (**Table 27**). Less than 25% of respondents indicated they were informed of a behavioral or emotional problem at Wave 1. This proportion



decreased over the four waves and was statistically significant (p-values<0.01) using a multi-level ordinal logistic regression models adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

Table 27: Child Behavioral/Emotional Problem Reporting

Question	Wave 1	Wave 2	Wave 3	Wave 4	
Have you ever been told by a doctor or nurse that your child has a behavioral or emotional problem?	Unweighted n (weighted %)	Unweighted n (weighted %)	Unweighted n (weighted %)	Unweighted n (weighted %)	P-value
No	1773 (74.2%)	1257 (77.1%)	1043 (79.3%)	610 (78.1%)	<0.01
Yes	541 (22.8%)	314 (19.4%)	235 (18.2%)	139 (17.7%)	
Don't know	57 (2.4%)	30 (2.0%)	27 (2.1%)	15 (2.0%)	
Missing	15 (0.6%)	24 (1.5%)	6 (0.5%)	12 (2.1%)	
Question	Wave 1	Wave 2	Wave 3	Wave 4	
Has a daycare or school teacher or school nurse ever told you that your child has a behavior or emotional problem?	Unweighted n (weighted %)	Unweighted n (weighted %)	Unweighted n (weighted %)	Unweighted n (weighted %)	
No	1528 (63.7%)	1148 (70.2%)	997 (75.5%)	596 (75.8%)	<0.01
Yes	601 (25.5%)	345 (21.6%)	214 (17.1%)	123 (15.7%)	
Don't know/Don't remember	47 (2.0%)	23 (1.5%)	26 (2.0%)	12 (1.7%)	
Child is not in school aged/not in school	194 (8.2%)	89 (5.4%)	71 (5.2%)	35 (4.8%)	
Missing	16 (0.6%)	20 (1.3%)	3 (0.2%)	10 (1.9%)	

* p-values **for wave dummies** based on multi-level ordinal logistic regression models adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

There was an increasing proportion of respondents reporting their children achieving their expected grade level although the trend was not statistically significant (p-value=**0.055**) as shown in **Table 28**. This was attributed to children aging through the period and entering school. We noted fewer “not in school responses” from Waves 1 to 4. However, a statistically significant decrease in the reports of a child needing to be tested for a learning problem was noted over the four waves from 23% to 13% (p<0.01).



Table 28: Child Educational Status Reporting

Question	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	
Is your child in the grade level expected for his or her age?	N (%)	N (%)	N (%)	N (%)	P-value
No	371 (15.7%)	242 (15.0%)	181 (14.2%)	99 (12.8%)	0.545**
Yes	1625 (68.0%)	1196 (73.7%)	1015 (77.3%)	619 (79.1%)	
Don't know	35 (1.5%)	18 (1.2%)	25 (2.0%)	12 (1.6%)	
Not school aged	344 (14.4%)	152 (9.0%)	87 (6.4%)	31 (4.0%)	
Missing	11 (0.4%)	17 (1.1%)	3 (0.2%)	15 (2.5%)	
	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	
Has anyone told you that your child should be tested for learning problems?	N (%)	N (%)	N (%)	N (%)	
No	1756 (73.5%)	1307 (80.2%)	1088 (82.8%)	640 (82.0%)	<0.01
Yes	547 (23.0%)	261 (16.1%)	193 (14.9%)	102 (13.2%)	
Don't know	63 (2.7%)	37 (2.4%)	25 (2.0%)	22 (2.7%)	
Missing	20 (0.8%)	20 (1.3%)	*** (0.4%)	12 (2.1%)	

* p-value **for wave dummies** based on multi-level logistic regression models adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

** **Test based on school aged children.**

*** Cells less than or equal to 5 suppressed

Domain 4: Lead Hazard Investigation

The evaluation team was unable to secure individual level data to support Domain 4, “*The lead hazard investigation program will reduce estimated expected ongoing or re-exposure to lead hazards in the absence of this program.*” Particularly, direct access to information regarding lead hazard mitigation services was housed outside of MDHHS Medical Services Administration (MSA). MSA was the unit responsible for Medicaid program administration and relevant data were not available through administrative health claims/encounter files. Effective 3/21/22, MSA was renamed Behavioral and Physical Health and Aging Services (BPHASA) subsequent to MDHHS reorganization. The intent of the lead hazard investigation benefit was to expand lead screening and investigation services for individuals affected by the water but not having a documented EBLL. The assumption was that early identification of environmental exposures or risks could ensure access to services intended to minimize those risks.

Two sub-hypotheses were drafted and supplemental data sources including the enrollee survey and key informant interviews were identified. The evaluation team drafted lead exposure related questions to include in the enrollee surveys to provide contextual information. The TCM KII survey also included questions regarding ongoing environmental exposures. In addition to these survey data, community reporting of lead hazard mitigation was shared by the Flint Registry through the published Flint Lead Free reports. The full 2017 and 2021 reports are attached in Appendix 6.

Sub-hypotheses 4.1-4.2: Lead Hazard Investigation

- 4.1. *Enrollees participating with TCM services will access lead hazard investigation services.*
- 4.2. *Beneficiaries found to be at risk for ongoing lead exposure will be referred for additional environmental investigation.*

The following enrollee survey questions addressed potential lead exposure from Flint water use. According to the child survey participants, slightly more than half continued to use water supplied by the Flint water system (**Table 29**). In the child survey, there was a **marginally** statistically significant increase in the proportion of respondents who used tap water across Waves 1 through 4 (p-value=**0.06**), although the magnitude of the increase was small. The adult survey did not have sufficient numbers to conduct statistical testing.

Table 29: Enrollee Survey Reported Use of Flint Water

Question	Child				P-value*
	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	
Does you/your child use water supplied by the City of Flint, also known as tap or faucet water right now?					
No	1159 (47.5%)	785 (47.3%)	629 (46.5%)	361 (44.1%)	0.058
Yes	1203 (51.5%)	815 (51.2%)	670 (52.6%)	401 (54.1%)	
Don't Know/Unsure	15 (0.6%)	9 (0.5%)	9 (0.7%)	4 (0.5%)	
Missing	9 (0.4%)	16 (1.0%)	3 (0.2%)	10 (1.2%)	

* p-value **for wave dummies** based on multi-level ordinal logistic regression models adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

In addition to assessing the use of city water, the enrollee survey obtained information on water pipe replacement (**Table 30**). Among the child survey respondents, the proportion of households that reported water pipes having been replaced remained relatively constant (p-value=**0.187**). A limitation with reporting confidence was observed with approximately one-quarter of participants being unsure of the replacement status.



Table 30: Enrollee Survey Reported Water Pipe Replacement

Question	Child				P-value*
	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	
Since the last survey, have the water pipes to your home or residence been replaced					
No	1092 (45.5%)	786 (48.0%)	679 (51.5%)	416 (52.6%)	0.187
Yes	577 (24.6%)	420 (26.2%)	374 (28.8%)	181 (25.9%)	
Don't know/unsure	648 (27.0%)	390 (24.0%)	253 (19.3%)	165 (23.0%)	
Missing	69 (2.9%)	29 (1.9%)	5 (0.4%)	14 (1.7%)	

* p-value **for wave dummies** based on multi-level ordinal logistic regression models adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

The prevalence of pediatric EBLL according to available administrative data was quite low. Child survey respondents were asked about their history of diagnosed EBLL (**Table 31**). There was a significant decrease in self-reported child EBLL over time (p-value<0.01). Due to differences in collection methods, we cannot directly compare or correlate EBLL between administrative data and the self-reported data. Specifically, the administrative data sets were restricted to children less than 2 years of age while the survey included children less than 18 years of age. However, there is a consensus that EBLs have declined since the start of the water crisis.

Table 31: Enrollee Survey Reported Elevated Blood Lead Levels

Question	Child				P-value*
	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	
Has a doctor or nurse ever told you that your child had a high blood lead level?					
No	1963 (82.1%)	1429 (87.6%)	1158 (88.1%)	669 (85.6%)	<0.01
Yes	200 (8.5%)	56 (3.5%)	47 (3.7%)	31 (3.8%)	
Don't know/Unsure	204 (8.7%)	108 (6.8%)	99 (7.6%)	57 (7.6%)	
Missing	19 (0.8%)	32 (2.1%)	7 (0.6%)	19 (3.0%)	

* p-value < 0.01 based on multi-level ordinal logistic regression models with linear trends adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

The TCM Case Managers identified the lack of safe water as an ongoing exposure risk through 2020 with clients continuing to use bottled water in the community. Drinking water safety concerns were no longer among the top three concerns reported by the TCM Providers at the time of the third survey.

Full remediation of water as an exposure threat will only be completed when the water service lines have been fully replaced. Although this was a community priority, work was expected to continue through 2022.



Collaboration with the CDC funded Flint Registry provided community level information regarding lead exposures published in the *Flint Lead Free 2021 Report*. The report provided a comprehensive summary of trends emphasizing lead prevention efforts (a copy of the report is available in Appendix 6). Notably, the percentage of residential water testing with elevated lead levels decreased from 2015 to 2019 and the number of environmental investigations increased from 2015 to 2019. With respect to the waiver’s authorization of expanding Lead Safe Home Program services to the targeted population without documented EBLL, the proportion of investigations for children not having elevated lead levels increased from approximately 13% in 2015 to 97% in 2019. Although not directly related to FME waiver documentation, this observation suggested the community was able to obtain home investigations without documented EBLL.



Conclusions

The Flint Water Crisis affected a community that was economically vulnerable, often medically underserved, and exposed to environmental and social stressors. The FME Waiver was established in part to address potential health effects from lead exposure and improve health outcomes. This report describes the impact of the FME Waiver approved March 3, 2016, with implementation from May 3, 2016, through April 30, 2021. The waiver end date was adjusted to September 14, 2021, due to an extension granted by CMS. This extension supported evaluation efforts by allowing **an additional** timeframe to collect administrative health data as well as field an additional wave of enrollee survey and TCM provider key informant interview.

Throughout the waiver, enrollment was lower than estimated. Originally, MDHHS estimated that approximately 15,000 individuals would have been newly eligible for Medicaid coverage, due to the expanded eligibility criteria, in addition to the estimated 30,000 persons in the geographic region already insured by Medicaid. Instead, approximately 8,000 individuals became newly eligible for Medicaid and enrolled in the program. Of these new enrollees, approximately 50% were newborns. The total FME enrollment reached a peak at approximately 34,000 in 2017-2018 and decreased over time; this was confirmed by MDHHS enrollment pattern reporting.

The last two years of the waiver period timeframe were significantly affected by COVID-19 pandemic related restrictions and closures. Particularly, health care and preventive service utilization experienced declines compared to prior years. This finding was documented in other programmatic statewide reporting of lead screening and statewide HEDIS reporting. Thus, the statistical analyses focused on trends across all five waiver years would confound the ability to compare the FME cohort to the selected comparison group, Saginaw County, and therefore should be interpreted with caution.

The FME evaluation found the demonstration was successful in meeting elements of the overall stated goal. A summary table of findings, broken down by domain and hypotheses, is presented in Appendix 7. Several measures in Domain 1: *Access to Care* demonstrated increased service utilization among the FME enrollees. Three sub-hypotheses measures had lower rates in the waiver group compared to the comparison group. The impact of Domain 2: *Access to TCM* could not be accurately quantified due to lack of data. Enrollee survey responses indicated satisfaction among those who had engaged. TCM providers provided input regarding capacity to serve all referrals for TCM without having to triage during the FME timeframe. They further noted client satisfaction as evidenced by ongoing engagement and identified administrative opportunities to potentially improve participation. Statistical comparisons to quantify Domain 3: *Improved Health Outcomes* suggested the FME group had statistically higher rates of adolescent immunization completion in years 4 and 5 compared to the comparison group. Child survey responses documented significant improvement in health status, across all four survey waves along with significant decreases in the reports of children needing to be tested for learning problems or behavioral/emotional problems. Self-reported data on decreasing child



EBLL provided some evidence that lead hazard investigations were increasing, as described in Domain 4.

Domain 1, Access to Care, was documented with administrative data and supported with self-reported survey data from enrollees. Most enrollees reported the waiver made it easier for them to access care and services across the four waves of the survey although the variation was not statistically significant. Based on administrative health care data before the pandemic, several measures suggested increased utilization since the water switch (e.g., developmental, or behavioral screening, retesting of children having EBLL and lead testing in pregnant women). **Mixed results were identified when comparing the trends for the specific metrics. Several measures showed no statistically significant difference between the FME cohort and the comparison group. Some of the measures displayed contrasting relationships between the communities based on age category and across the evaluation timeframe. We are unable to pinpoint specific causes associated with the varying relationships.** Reviewed here are the hypotheses for Domain 1.

1. *A greater proportion of enrollees will obtain age-appropriate well-child exams than non-enrollees with similar individual and neighborhood characteristics. These exams were **analyzed** for three specific age groups: up to 15 months, 3-6 years and 12-21 years. **For the up to 15 months age group, the FME and Comparison groups had similar rates across all survey years. For the 3-6 and 12-21 age categories, the FME and Comparison groups were similar for the first 3 years (05/01/2016 - 04/20/2019).** The proportion of FME children in the categories 3-6 years and 12-21 years outperformed the Comparison group in year 4 (**2019-2020**) of the waiver, **then the rate decreased in year 5 (2020-2021). It is hypothesized that the decrease of well-child visits for these age groups may have been impacted by the Covid-19 pandemic due to the Stay-at-Home order in Michigan.***
2. *A greater proportion of enrollees will receive age-appropriate developmental screening/assessments than non-enrollees with similar individual and neighborhood characteristics. **For children up to 3 years of age, the FME group had statistically higher rates than the Comparison group in year 4 (2019-2020) while they had lower rates in years 1, 2, and 5. It is unknown why the Comparison group outperformed the FME group in years 1, 2, and 5.***
3. *A greater proportion of enrollees will receive age-appropriate lead testing than non-enrollees with similar individual and neighborhood characteristics. **The lead screening data revealed a slow decline in rates after year 1 (2016-2017) with a sharp decline in year 5 among both the FME and Comparison groups. However, there were statistically significant differences in the proportion of children receiving lead testing within the FME cohort in years 1 and 4 (2019-2020) when compared to the comparison group. It is hypothesized that **the decrease in rates from 2019-2021 was likely due to the state-wide stay-at-home orders decreased clinical operations adapted to mitigate potential exposure to the COVID-19 virus.*****



4. *A greater proportion of enrollees with high blood lead levels will receive re-testing at the appropriate intervals than non-enrollees with similar individual and neighborhood characteristics.* Although BLLs were higher for FME children than for the Comparison group, analyses revealed no statistically significant differences in retesting. ***This could be a result of the state-wide media attention related to the Flint Medicaid Waiver increasing the awareness for the necessity of testing for high blood lead levels. Additionally, as time passed in the affected community, the provision of in-home lead reduction strategies (i.e. in-line water treatment systems) may have provided a sense of protection where the importance of lead testing was not thought to be as necessary.***
5. *Enrollees who are pregnant will have timelier prenatal and postpartum care than non-enrollees with similar individual and neighborhood characteristics.* Conflicting patterns were noted for these measures. Timely prenatal care ***was present for more*** FME enrollees compared to the Comparison group. ***The increased performance of the FME cohort on the pregnancy metrics compared to the comparison group may indicate increased recognition of the potential lead exposure on the developing fetus among providers in the affected region.*** The difference for post-partum care was not statistically significant between the FME enrollees and the Comparison group. ***This might be interpreted as the relatively low risk of lead on an adult female and extra attention post-delivery with respect to lead exposure not being emphasized to the same degree.***
6. *A greater proportion of enrollees who are pregnant will have recommended lead testing than non-enrollees with similar individual and neighborhood characteristics.* The FME enrollees had significantly higher rates of lead testing than the comparison group in all years, ***which correlates with higher use of prenatal services.***
7. *A greater proportion of enrollees will participate with Maternal Infant Home Program (MIHP) services than non-enrollees with similar individual and neighborhood characteristics.* Statistical analyses revealed similar proportions of FME enrollees participated with MIHP compared to the Comparison group in MIHP participation.
8. *The majority of enrollees will attest to improved access to health care as a result of the expanded coverage.* More than half of the child survey respondents reported that accessing care was “easy” at Wave 1. No statistically significant change was observed ***over time*** from Wave 1 ***in 2018-2019*** to Wave 4 ***in 2021-2022 (post-pandemic).*** Insufficient responses from adult survey participants over the four waves prevented statistical testing.
9. *The majority of enrollees will report improved satisfaction with their ability to access health care as a result of the expanded coverage.* Two specific metrics were included for this hypothesis: ***an*** overall satisfaction score and satisfaction with providers working in the child’s ***best*** interest. Scaled satisfaction scores did not change significantly ***over time*** from Wave 1 to Wave 4 for the child survey cohort. Responses from the child survey revealed statistically significant improvement in the strongly agree category from Wave 1 to Wave 2, but it leveled off in Wave 3 and



decreased in Wave 4. Insufficient responses from adult survey participants over the four waves prevented statistical testing.

Domain 2, Access to TCM, experienced greater barriers to data for statistical testing likely due to low uptake and participation. ***Due to the low participation documented through administrative health care data, statistical testing to compare participants vs. non-participants among the cohort of FME enrollees was deemed inappropriate and not performed.*** Both administrative health data and TCM data provided by the TCM Designated Provider Organization showed overall participation rates of less than 5% while survey participants reported approximately 10% participation. Despite lower than anticipated ***utilization***, enrollees who participated reported sustained satisfaction.

1. *Referral source and participation levels with TCM will be tracked among enrollees.* The administrative claims for evidence of TCM enrollment with the correct provider identifiers were very few. The raw number of referrals did increase in 2019. The pandemic's impact on ***tracking lower TCM observations*** was significant since the policy was not adjusted to permit telehealth services ***to replace*** in-person home visits. ***Thus, it appeared that*** no claims data were found for 2020 ***despite affirmation from the TCM provider that services continued through audio and visual means.*** Data captured by the TCM Provider Organization was not sufficient to distinguish visits specific to FME from visits authorized through other programs. The enrollee survey data did not indicate a statistically significant change over time in TCM participation.
2. *All TCM participants will have at least one re-assessment within one year of original assessment.* Because observed participation rates were lower than expected, it was difficult to discern reassessment of TCM enrollees after one year. Administrative data were insufficient to perform statistical testing. Data provided through the child survey indicated no statistical changes in proportions from Wave 2 through Wave 4.
3. *A greater proportion of TCM participants will have age-appropriate well child exams compared to TCM non-participants.* Administrative claims data yielded numbers too low to conduct statistical tests to compare TCM participants against TCM non-participants.
4. *A greater proportion of TCM participants will have completed age-appropriate developmental screening than the non-participants.* Administrative claims data were insufficient to conduct statistical testing to compare TCM participants against TCM non-participants.

Domain 3, Improved Health Outcomes is supported by data collected from the enrollee survey as well as administrative data. Most ***children*** reported health status rankings as good, very good, or excellent. Responding enrollees further report increased confidence and resources to ***enable them to*** manage chronic conditions since enrollment. The provisional hypotheses are included here and indicated as P4, P5, and P6.



1. *Enrollees will have higher completed age-appropriate immunization statuses than non-enrollees with similar individual and neighborhood characteristics.* Two specific combination immunization categories were included: Childhood Immunization and Adolescent Immunization. There was no statistically significant difference of the HEDIS Childhood Immunization Combination #10 in children 2 years of age between the FME cohort and the Comparison group. However, the FME enrollees had significantly higher Adolescent Immunization Combination #2 rates compared to the Comparison group.
2. *Enrollees who are pregnant will deliver infants with higher birth weights than non-enrollees with similar individual and neighborhood characteristics.* The differences for low-birth-weight rate between FME enrollees and the Comparison group were not statistically significant.
3. *Enrollees report an increase in their self-reported health status over the duration of their enrollment.* The child survey responses revealed statistically significant increases in reports of overall, physical, and emotional/behavioral health status from Wave 1 to Wave 4; **even during the state-wide stay-at-home orders implemented to decrease exposure to the COVID-19 virus.** Insufficient responses from adult survey participants over the four waves prevented statistical testing.
- P4. *Descriptive analysis of the proportion of children diagnosed with severe emotional disturbance and other developmental/learning disabilities including comparing rates to others with similar lead exposures.* Due to concerns about **how enrollees with developmental/learning disabilities were captured in the administrative data and the low yield in SED enrollee it was not possible to compare FME and Comparison group. Additionally, children in the SED waiver were deemed inappropriate as a comparison because of the acuity level required for eligibility. Thus, this measure was omitted.**
- P5. *Descriptive analysis of behavioral health conditions and supportive care among enrolled children. **Most developmental, cognitive and behavioral health conditions are reported by the schools.*** Due to the **inability to** obtain identifiable MDE data, accurate counts of enrollment in Early Childhood programs among FME enrollees was not possible. However, according to publicly available data, both Flint and Saginaw City schools experienced steep declines in school enrollment over the past decade. Based on the enrollee survey results, there was a statistically significant decrease in the proportion of children diagnosed with a behavioral/emotional problem during the waiver. Likewise, for children with chronic conditions, a statistically significant increase in respondents strongly agreed they had more resources and confidence in managing these conditions.
- P6. *Descriptive analysis of educational delays among enrolled children (i.e., rate/proportion of children receiving special education services, i.e., individual education plans “IEPs”, early preschool performance, and reading and math scores at end of grades 3, 4, and 5).* The lack of identifiable education data prevented counts of grade school progression and comparison of standardized testing scores. The enrollee survey again provided important data to inform this hypothesis. Child



survey participants reported a statistically significant decrease in those who identified their child needed to be tested for a learning problem.

Domain 4, Lead Hazard Investigation, was largely informed by ongoing community efforts. The 2021 Flint Lead Free Report prepared by Flint Registry indicated positive trends in service line pipe replacement, decrease in water lead values, and increased number of environmental investigations completed.

1. *Enrollees without elevated blood lead levels and participating with TCM services will access lead hazard investigation services to the same degree as beneficiaries with elevated blood lead levels.* Relevant reporting was accessed via the Flint Lead Free 2019 and 2021 reports. Community reporting revealed that more investigations have been completed among a cohort of children without EBLL, **most likely due to increased community awareness**. Also, the number of environmental investigations has increased **to support early identification without requiring a documented EBLL in a household**.
2. *Beneficiaries found to be at risk for ongoing lead exposure will be referred for additional environmental investigation.* The enrollee survey reported several measures of lead exposure risk. History of EBLL was also included in the child survey. No significant difference was documented in the proportion of child survey participants acknowledging pipe replacement **from those who did not**. However, a statistically significant decrease in the proportion reporting children having high blood lead levels was reported across all four waves.

As stated, FME enrollment **was low, some data sources were not available, and the pandemic's impact on health care delivery due to shut-downs restricted complete reporting of outcomes for some of the domain hypotheses**. We were unable to ascertain the full scope of reasons that could have **contributed to** under-enrollment. However, a likely reason is the two-year time lag between the onset of the environmental crisis and the availability of FME. During this time, potentially eligible individuals may have pursued access to real-time resources and support. Thus, when the FME waiver was publicized, community members may not have felt this could help them at this time. Those at the higher income levels that were authorized under the waiver were consistently underrepresented. This could be due to those at the higher FPL limits having disinterest in FME enrollment because they **had other existing coverage**, and/or refrained from enrollment due to stigma associated with utilizing entitlement programs. Additionally, individuals who relocated may have believed they eliminated their potential risks as they were no longer exposed.

Despite participation being lower than originally expected, administrative health data, survey responses, and TCM provider interviews indicated that enrollees who did participate benefited from FME enrollment. Throughout the demonstration period, the evaluation team documented statistically significant increases in enrollee satisfaction with providers, enrollee health status and availability of resources to deal with chronic conditions with corresponding decreases in children being diagnosed with behavioral/emotional problems or learning problems. When



comparing the FME enrollees to the Comparison group, the FME cohort had significantly better performance on recommended health services including well child visits in the 3-6 and 12-21 age groups, timely initiation of prenatal care, lead screening during pregnancy, and full adolescent immunization. Thus, benefits of FME extended beyond potential lead exposure risk.

Opportunities remain for the ongoing FME waiver renewal period to focus on areas where the FME group appear to have not outperformed the Comparison group. Several of these patterns may have been impacted by the COVID-19 pandemic and the government shutdowns that interrupted health care delivery across the state and country, particularly for those services that would require traditional in-person contacts. These included developmental screenings for children up to 3 years and between 4-17 years of age as well as obtaining recommended immunizations and conducting routine blood lead testing. Additional operational aspects such as communication, dissemination, training and administrative eligibility determinations and redeterminations of FME may promote higher engagement with the affected community.



Interpretations, Policy Implications, and Interactions with Other State Initiatives

Clear and intentional coordination of Medicaid coverage with other programs and efforts to provide a full suite of ongoing services (e.g., prenatal services, medical services, child development services and timely, preventative screening, lead mitigation, etc.) was needed for those affected by the water crisis. Holistic coordination of services was critical not only at the time of the event, but ongoing to sustain healthy behaviors particularly when potential effects of lead exposure in children might not manifest until puberty.

As of January 1, 2017, CMS and the State of Michigan worked together on a Michigan State Plan Amendment. The collaboration resulted in a five-year Title XXI state designed Health Services Initiative (HSI) to cover expanded lead abatement services that targeted children and pregnant women impacted by the crisis in Flint. Although not directly a medical benefit, this partnership supported the health and well-being of individuals. Medicaid also supported the referral of individuals for lead investigation by collaborating with outreach and engagement agencies in the affected region.

Additionally, to strengthen administrative and enrollee survey findings, TCM case managers shared their experiences through Key Informant Interviews. What they revealed was a need for ongoing training and education for the community, social support case workers, and health care personnel pertaining to FME Waiver eligibility. They noted that the referral process was often complicated and at times they encountered children in the same household having different access to FME benefits. Thus, considerations to improve services might include offering comprehensive guidance to referral sources, health providers, and community partners about eligibility for coverage at different income levels. Likewise, enrollees need education about specialized services (TCM), what these services include, and how to access them to address health conditions possibly related to the water crisis. Of note, the current TCM policy restricts reimbursement for TCM services to in-person assessments. This restriction was not modified during the pandemic. However, TCM providers reported ongoing provision of services during the pandemic via telephone or telehealth options. No administrative claims/encounters for TCM services **could be** reported because the televisit delivery was not a covered method of service delivery in the original TCM policy. This resulted in the **underrepresentation** of service delivery, **even though TCM providers implemented unbillable interventions to maintain continuity of care.**



Lessons Learned and Recommendations

This report offers information that can improve the evaluation proposals for future Medicaid Expansion authorizations intended to respond to environmentally related health emergencies. These are intrinsically different than typical demonstrations in that they are reactive rather than prospective. The evaluation plan was designed for monitoring FME service utilization, enrollment, and disenrollment, use of preventive services, and efforts to “catch-up” on well-child services such as lead screening and immunizations.

The enrollee survey presented a unique opportunity to test various methods of survey participation. Participation in the survey provided evidence that Medicaid enrollees were interested and able to participate in web-based surveys. The willingness to engage in internet interactions may represent opportunities for future expansion of outreach **and communication of Medicaid waivers** to underserved populations. Since web-based access to health services information and referrals may reduce barriers to accessing health care services, the use of web-based services can offer substantial cost and time savings for the delivery of health care for federal, state, and local health systems and should be considered **for future demonstrations**.

The two-year timeframe between the start of the environmental crisis to the availability of FME was significant. This was believed to adversely affect enrollment. In this time, individuals likely pursued real-time services in the face of acute needs. The sources or descriptions of those pre-FME services were not available to the evaluation team. The suggestion to collect this information from the community was met with frustration and fatigue. One possible approach to expedite processing of programs intended for public health emergency response may be through establishing **rapid response teams**. These teams would be made up of state and federal representatives having the authority needed to ensure essential services needed to mitigate health crises and improve health outcomes are deployed in a timely manner.

The COVID-19 pandemic further affected health care and service delivery throughout the state. Mandated shutdowns prevented individuals from accessing non-emergent care even when they were unafraid to be out in public. **Early and clear communication and education efforts to the community and health providers at the re-opening of services regarding eligibility and the importance of catching up on missed services may be considered.**

To address low waiver enrollment in future demonstrations several strategies should be considered. One recommendation is early communication with the public and provider communities through detailed mass media messaging to inform the affected community about the benefit. Likewise, ongoing messaging and regular education opportunities and updates to the affected community should have continued throughout the demonstration.

Social and mass media are excellent ways to get maximum outreach coverage in a community (Stellefson et. al., 2020). Social media, when disseminated through trusted community partners such as the Flint Registry, Genesee Health System, Greater Flint Health Coalition, the



Genesee County Health Department, etc., is an effective way to provide education on how to enroll and the resources available. (Ford et al., 2022). Mass media can also be utilized through Public Service Announcements disseminated via radio, television, and public-facing media such as posters in clinics and community-based health organizations. This tactic can reach not only individuals but also the entire community.

Additionally, as with any specialized health service, enrollment and follow-up were important activities necessary to drive the success of TCM utilization. A suggested approach to successfully providing TCM is to address barriers to follow-up. The TCM Key Informant Interview (KII) identified barriers such as lack of childcare, transportation not being readily accessible in their neighborhoods, and low education surrounding these “new” resources. Above all, enrollees with racial and ethnic distrust of health services may need additional encouragement from established and trusted community resources. Therefore, it is recommended that TCM providers partner with trusted organizations to educate enrollees. For example, this partnership could provide the community with information on where to enroll in TCM, what services are available, how to follow-up with services, how to access additional information on the internet, transportation assistance, etc. Studies show that those with few resources rely on electronic communication, and it is recommended that TCM providers ask enrollees for permission to text and contact via other electronic resources to provide timely reminders and communication.

Moreover, providers from the TCM KIIs identified several administrative and organizational suggestions to improve operations. These were offered with the belief that timelier interventions and connections with clients would result. An increase in the number of authorized visits allowed per policy was suggested with the belief that such increases could still be accommodated by existing staffing. Allowing the use of televisits in addition to in-home visits was also identified. The TCM providers had independently moved to this method of delivery because of the pandemic, despite being unable to bill FME for these visits. As a result, they noted decreases in the time needed to schedule assessments and follow-up with clients. Improved capture of client contact information was identified as another means to improve timeliness. Developing or implementing standardized reporting between TCM providers and service providers may present an opportunity for enhancing client engagement, follow-up and advocacy for services. An unexpected reason given for individuals being hesitant to participate with TCM services was that some potential enrollees did not want to take away services from those they felt may need it to a greater extent. Appropriate messaging related to the timely availability ***and ample supply*** of services for those who need them could mitigate this concern.

The evaluation team also noted opportunities to improve the overall evaluation process. One issue that was identified was the length of time to engage evaluators and secure approval for the evaluation plan design. This represents a significant, unreimbursed commitment of potential evaluators. Thus, this may inadvertently limit the pool of qualified colleagues a state may have available. It may also be the case, particularly for demonstrations being designed to respond to an emergency, that the application of a waiver had already been processed before potential evaluators could be included. In these cases, this could result in those who are writing



the waiver application making assumptions as to the availability of data. In turn, these assumptions may identify aspects of evaluation that are difficult or impossible to operationalize. During this evaluation, the team found that the complexity of data retrieval of electronic health records for Medicaid enrollees was cumbersome and unreliable. When implementing a comprehensive roll-out of a federal emergency benefit to address an environmental and health crisis, additional technical assistance in programming tools such as assessments and electronic medical records may be helpful. Data experts would be an important part of the ready response team(s) to provide input into the waiver design in order to facilitate implementation and data necessary for the evaluation. This could improve access to more accurate reporting in relation to other state administrative data.

Unfortunately, the impact of the pandemic affected access to and receipt of preventive health services in the latter years of the waiver, affecting the rates published in this report. Despite this, available data suggest that the FME waiver was successful in meeting the overall stated goal. The waiver has since been approved for a renewal period of 9/15/21 - 9/30/26. Therefore, opportunities remain for eligible individuals to enroll. The Flint Registry, a partner to MSU and MDHHS, continues to be fully operational and will continue to screen enrollees for eligibility and referrals. This report may be used to guide modifications in the administration, operations and evaluation of the renewal.



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Appendix 1: Matrix of Evaluation Domains including Hypotheses and Measures

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
DOMAIN 1: Access to Care			
H1.1: A greater proportion of enrollees will obtain age-appropriate well-child exams compared to others with similar lead exposures.	1. Well Child Visits in the First 15 months of Life	National Committee for Quality Assurance/NQF 1392	Administrative claims/encounters in the MDHHS Health Services Data Warehouse
	2. Well Child visits in the Third, Fourth, Fifth and Sixth Years of Life	National Committee for Quality Assurance/NQF 1516	Administrative claims/encounters in the MDHHS Health Services Data Warehouse
	3. Adolescent Well-Care Visits	National Committee for Quality Assurance	Administrative claims/encounters in the MDHHS Health Services Data Warehouse
H1.2: A greater proportion of enrollees will receive age-appropriate developmental screening/assessments compared to others with similar lead exposures	1. Developmental Screening in the First Three Years of Life	Oregon Health & Science University /NQR 1448	Administrative claims/encounters in the MDHHS Health Services Data Warehouse
	2. Socio-emotional/ Behavioral Screening for Children 4-17 years of age	n/a	Administrative claims/encounters in the MDHHS Health Services Data Warehouse
H1.3: A greater proportion of enrollees will receive age appropriate lead testing compared to others with similar lead exposures	1. Lead Screening in Children	National Committee for Quality Assurance	Administrative claims/encounters in the MDHHS Health Services Data Warehouse
	H1.4: A greater proportion of enrollees with high blood lead levels will receive re-	Early and Periodic Screening, Diagnostic, and Treatment (EPSDT)-	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to lead

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
testing at the appropriate intervals compared to others with similar lead exposures		CMS/American Academy of Pediatrics	screening and TCM monitoring data
H1.5: Enrollees who are pregnant will have more timely prenatal and postpartum care compared to others with similar lead exposures.	1. Timeliness of Prenatal Care	National Committee for Quality Assurance/NQF 1517	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to Vital Records
	2. Postpartum Care	National Committee for Quality Assurance/NQF 1517	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to Vital Records
H1.6: A greater proportion of enrollees who are pregnant will have recommended lead testing compared to others with similar lead exposures	1. Lead screening in pregnancy	American Congress of Obstetricians and Gynecologists	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to Vital Records data
H1.7: A greater proportion of enrollees will participate with home visiting services compared to others with similar lead levels.	1. Maternal Infant Health Program Participation	MI defined measure	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to MIHP visit and TCM monitoring data
H1.8: Enrollees will attest to improved access to health care as a result of the expanded coverage.	1. Enrollee Attestation for Improved Access to Care	Agency for Healthcare Research and Quality – Consumer Assessment of Healthcare Providers	Enrollee survey responses



Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
H1.9: Enrollees will report satisfaction with their ability to access health care as a result of the expanded coverage.	1. Enrollee satisfaction with Medicaid expansion coverage	Agency for Healthcare Research and Quality – Consumer Assessment of Healthcare Providers and Systems (AHRQ-CAHPS) Question Modification	Enrollee survey responses
DOMAIN 2: Access to Targeted Case Management			
H2.1: Referral source and participation levels with TCM will be tracked among enrollees	1. Referral Source for TCM 2. TCM Participation	MI defined measure MI defined measure	TCM documentation visit data Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to TCM billing/documentation
H2.2: All TCM participants will have an annual assessment conducted.	1. Annual TCM assessment	MI defined measure	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to TCM billing/documentation
H2.3: A greater proportion of TCM participants will have age-appropriate well child exams compared to TCM non-participants	1. A greater proportion of TCM participants will have age-appropriate well child exams compared to TCM non-participants	National Committee for Quality Assurance /NQF 1392	TCM Program documentation linked to Administrative claims/encounter data available through the MDHHS Health Services Data Warehouse
H2.4: A greater proportion of TCM participants will have	1. Impact of TCM in assuring enrollees obtain age-	Oregon Health & Science University/NQF 1448	Administrative claims/encounters in the MDHHS Health Services

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
completed age-appropriate developmental screening compared to TCM non-participants	appropriate developmental screenings.	and new evaluation measure (socio-emotional/behavioral screening)	Data Warehouse linked to TCM billing/documentation visit data
DOMAIN 3: Improved Health Outcomes			
H3.1: Enrollees will have higher completed age-appropriate immunization statuses compared to others with similar lead exposures	1. Childhood Immunization Status 2. Immunizations for Adolescents	National Committee for Quality Assurance/NQF 0038 National Committee for Quality Assurance/NQF 1407	Administrative claims/encounters in the MDHHS Health Services Data Warehouse Administrative claims/encounters in the MDHHS Health Services Data Warehouse
H3.2: Enrollees who are pregnant will deliver infants with higher birth weights compared to others with similar lead exposures	1. Low Birth Weight Rate	Agency for Healthcare Research & Quality/NQF 0278	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to Vital Records
H3.3: Enrollees report an increase in their self-reported health status over the duration of their enrollment.	1. Enrollee Self-Reported Health Status 2. Enrollee Self-Reported Efficacy of Chronic Condition Management	AHRO/CAHPS Question Modification Adult and Pediatric Condition Management Self-Efficacy (ex. Asthma Control Test)	Enrollee survey responses Enrollee survey responses
PROVISIONAL H3.4: Descriptive analysis of the proportion of children	1. Proportion of enrollees having diagnosis code(s) of interest	MI defined measure	Administrative claims/encounters in the MDHHS Health Services Data Warehouse

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
diagnosed with severe emotional disturbance and other developmental/learning disabilities including comparing rates to others with similar lead exposures.			
PROVISIONAL H3.5: Descriptive analysis of behavioral health conditions and supportive care among enrolled children.	<ol style="list-style-type: none"> 1. Prevalence of behavioral health conditions among enrolled children 2. Count of children enrolled in Early Childhood Programs 3. Proportion of students in Kindergarten who participated in Early Childhood Programs 	MI defined measure	Enrollee survey responses MDE Data Summary data available through MI Schools Dashboards
PROVISIONAL H3.6: Descriptive analysis of educational delays among enrolled children.	<ol style="list-style-type: none"> 1. Prevalence of educational delays among enrolled children 2. Counts of children remaining in same grade 3. Educational Progress Standardized Testing (M-STEP, MI-Access) 	MI defined measure	Enrollee survey responses MDE Data Summary data available through MI Schools Dashboards
DOMAIN 4: Lead Hazard Investigation			
H4.1: Enrollees without elevated blood lead levels and participating with TCM services will access	<ol style="list-style-type: none"> 1. Prevalence of Lead Hazard Assessment/Investigation 	MI defined measure	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to Blood lead levels



Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
lead hazard investigation services to the same degree as beneficiaries with elevated blood lead levels. H4.2: Beneficiaries found to be at risk for ongoing lead exposure will be referred for additional environmental investigation	2. Prevalence of Lead Hazard Follow-up Investigation	MI defined measure	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to Blood lead levels



Appendix 2: Approved Evaluation Plan



Flint Expansion
Evaluation Final2_CM



Appendix 3: Enrollee survey Summary Report and Materials



FINAL_Enrollee
Survey Report Final.pdf



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child.pdf



cover
letter_Flint_benie_chil



prenotif_Flint_benie_
adult.pdf



cover
letter_Flint_benie_adu



Reminder_SurveyMai
l1.pdf



Nonresponder_Surve
yReminderLetter_Mail



Child - Flint - WAVE 1
Final.pdf



Child - Flint - WAVE 2
Final.pdf



Child - Flint - WAVE 3
Final.pdf



Child - Flint - WAVE 4
Final.pdf



Adult - Flint - WAVE 1
Final.pdf



Adult - Flint - WAVE 2
Final.pdf



Adult - Flint - WAVE 3
Final.pdf



Adult - Flint - WAVE 4
Final.pdf



Appendix 4: TCM Provider Key Informant Summary Report and Materials



FINAL_TCM Provider
Structured Interview Fi



TCM_ProviderSurvey_
phone.pdf



TCM Medicaid
Provider Policy.pdf



KII_Tables.pdf



Appendix 5: MSU Human Research Protection Program – Determination Letter



MSU HRPP
Determination Letter.



Appendix 6: Flint Lead Free 2017 and 2021 Reports, Flint Registry



Lead-Free-Report-V5.
pdf



Flint-Lead-Free-Rep
ort-2021.pdf



Appendix 7: 2018 – 2021 Results Summary



Appendix 7
10_24_22.pdf



Appendix 8: Comparison Group Selection



Appendix 8
Comparison group se



Appendix 9: Administrative Operations Key Informant Summary Report and Materials



FINAL_Administrative
Operations Key Inform



Flint 1115 Key
Informant Interview Fc

Matrix of Evaluation Domains including Hypotheses and Measures

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
DOMAIN 1: Access to Care			
H1.1: A greater proportion of enrollees will obtain age-appropriate well-child exams compared to others with similar lead exposures.	1. Well Child Visits in the First 15 months of Life	National Committee for Quality Assurance/NQF 1392	Administrative claims/encounters in the MDHHS Health Services Data Warehouse
	2. Well Child visits in the Third, Fourth, Fifth and Sixth Years of Life	National Committee for Quality Assurance/NQF 1516	Administrative claims/encounters in the MDHHS Health Services Data Warehouse
	3. Adolescent Well-Care Visits	National Committee for Quality Assurance	Administrative claims/encounters in the MDHHS Health Services Data Warehouse
H1.2: A greater proportion of enrollees will receive age-appropriate developmental screening/assessments compared to others with similar lead exposures	1. Developmental Screening in the First Three Years of Life	Oregon Health & Science University /NQR 1448	Administrative claims/encounters in the MDHHS Health Services Data Warehouse
	2. Socio-emotional/ Behavioral Screening for Children 4-17 years of age	n/a	Administrative claims/encounters in the MDHHS Health Services Data Warehouse
H1.3: A greater proportion of enrollees will receive age appropriate lead testing	1. Lead Screening in Children	National Committee for Quality Assurance	Administrative claims/encounters in the MDHHS Health Services Data Warehouse

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
<p>compared to others with similar lead exposures</p>			
<p>H1.4: A greater proportion of enrollees with high blood lead levels will receive re-testing at the appropriate intervals compared to others with similar lead exposures</p>	<p>1. Follow-up of elevated blood lead level</p>	<p>Early and Periodic Screening, Diagnostic, and Treatment (EPSDT)-CMS/American Academy of Pediatrics</p>	<p>Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to lead screening and TCM monitoring data</p>
<p>H1.5: Enrollees who are pregnant will have more timely prenatal and postpartum care compared to others with similar lead exposures.</p>	<p>1. Timeliness of Prenatal Care</p>	<p>National Committee for Quality Assurance/NQF 1517</p>	<p>Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to Vital Records</p>
<p>H1.6: A greater proportion of enrollees who are pregnant will have recommended lead testing compared to others with similar lead exposures</p>	<p>2. Postpartum Care</p> <p>1. Lead screening in pregnancy</p>	<p>National Committee for Quality Assurance/NQF 1517</p> <p>American Congress of Obstetricians and Gynecologists</p>	<p>Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to Vital Records</p>

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
H1.7: A greater proportion of enrollees will participate with home visiting services compared to others with similar lead levels.	1. Maternal Infant Health Program Participation	MI defined measure	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to MIHP visit and TCM monitoring data
H1.8: Enrollees will attest to improved access to health care as a result of the expanded coverage.	1. Enrollee Attestation for Improved Access to Care	Agency for Healthcare Research and Quality – Consumer Assessment of Healthcare Providers and Systems (AHRQ-CAHPS) Question Modification	Enrollee survey responses
H1.9: Enrollees will report satisfaction with their ability to access health care as a result of the expanded coverage.	1. Enrollee satisfaction with Medicaid expansion coverage	Agency for Healthcare Research and Quality – Consumer Assessment of Healthcare Providers and Systems (AHRQ-CAHPS) Question Modification	Enrollee survey responses
DOMAIN 2: Access to Targeted Case Management			
H2.1: Referral source and participation levels	1. Referral Source for TCM	MI defined measure	TCM documentation visit data
	2. TCM Participation	MI defined measure	Administrative claims/encounters in the

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
with TCM will be tracked among enrollees			MDHHS Health Services Data Warehouse linked to TCM billing/documentation
H2.2: All TCM participants will have an annual assessment conducted.	1. Annual TCM assessment	MI defined measure	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to TCM billing/documentation
H2.3: A greater proportion of TCM participants will have age-appropriate well child exams compared to TCM non-participants	1. A greater proportion of TCM participants will have age-appropriate well child exams compared to TCM non-participants	National Committee for Quality Assurance /NQF 1392	TCM Program documentation linked to Administrative claims/encounter data available through the MDHHS Health Services Data Warehouse
H2.4: A greater proportion of TCM participants will have completed age-appropriate developmental screening compared to TCM non-participants	1. Impact of TCM in assuring enrollees obtain age-appropriate developmental screenings.	Oregon Health & Science University/NQF 1448 and new evaluation measure (socio-emotional/behavioral screening)	Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to TCM billing/documentation visit data
DOMAIN 3: Improved Health Outcomes			
H3.1: Enrollees will have higher completed age-appropriate immunization statuses	1. Childhood Immunization Status	National Committee for Quality Assurance/NQF 0038	Administrative claims/encounters in the MDHHS Health Services Data Warehouse

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
<p>compared to others with similar lead exposures</p>	<p>2. Immunizations for Adolescents</p>	<p>National Committee for Quality Assurance/NQF 1407</p>	<p>Administrative claims/encounters in the MDHHS Health Services Data Warehouse</p>
<p>H3.2: Enrollees who are pregnant will deliver infants with higher birth weights compared to others with similar lead exposures</p>	<p>1. Low Birth Weight Rate</p>	<p>Agency for Healthcare Research & Quality/NQF 0278</p>	<p>Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to Vital Records</p>
<p>H3.3: Enrollees report an increase in their self-reported health status over the duration of their enrollment.</p>	<p>1. Enrollee Self-Reported Health Status</p>	<p>AHRQ/CAHPS Question Modification</p>	<p>Enrollee survey responses</p>
	<p>2. Enrollee Self-Reported Efficacy of Chronic Condition Management</p>	<p>Adult and Pediatric Condition Management Self-Efficacy (ex. Asthma Control Test)</p>	<p>Enrollee survey responses</p>
<p><i>PROVISIONAL</i> H3.4: Descriptive analysis of the proportion of children diagnosed with severe emotional disturbance and other developmental/learning disabilities including comparing rates to</p>	<p>1. Proportion of enrollees having diagnosis code(s) of interest</p>	<p>MI defined measure</p>	<p>Administrative claims/encounters in the MDHHS Health Services Data Warehouse</p>

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
<p>others with similar lead exposures.</p> <p><i>PROVISIONAL</i> H3.5: Descriptive analysis of behavioral health conditions and supportive care among enrolled children.</p>	<ol style="list-style-type: none"> 1. Prevalence of behavioral health conditions among enrolled children 2. Count of children enrolled in Early Childhood Programs 3. Proportion of students in Kindergarten who participated in Early Childhood Programs 	MI defined measure	<p>Enrollee survey responses</p> <p>MDE Data Summary data available through MI Schools Dashboards</p>
<p><i>PROVISIONAL</i> H3.6: Descriptive analysis of educational delays among enrolled children.</p>	<ol style="list-style-type: none"> 1. Prevalence of educational delays among enrolled children 2. Counts of children remaining in same grade 3. Educational Progress Standardized Testing (M-STEP, MI-Access) 	MI defined measure	<p>Enrollee survey responses</p> <p>MDE Data Summary data available through MI Schools Dashboards</p>
<p>DOMAIN 4: Lead Hazard Investigation</p>			
<p>H4.1: Enrollees without elevated blood lead levels and participating with TCM services will access lead hazard investigation services to the same degree as beneficiaries with</p>	<ol style="list-style-type: none"> 1. Prevalence of Lead Hazard Assessment/Investigation 	MI defined measure	<p>Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to Blood lead levels</p>

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
<p>elevated blood lead levels.</p> <p>H4.2: Beneficiaries found to be at risk for ongoing lead exposure will be referred for additional environmental investigation</p>	<p>2. Prevalence of Lead Hazard Follow-up Investigation</p>	<p>MI defined measure</p>	<p>Administrative claims/encounters in the MDHHS Health Services Data Warehouse linked to Blood lead levels</p>

Flint Michigan Section 1115 Demonstration
#11W 00302/5
Evaluation Proposal
(10/1/2017 - 4/30/2021)

Introduction

Flint, Michigan has experienced decades of social and economic challenges as its population has shrunk from nearly 200,000 to under 100,000 people. According to recent U.S. Census data, 41% of the population is in poverty and 14% of the population under age 65 lack health insurance. (1) This contrasts with a statewide poverty estimate of 16.2% and just 10% of the statewide population under 65 years of age lacking health care coverage.(1) Additionally, the dropout rate in Flint Community Schools exceeds 21%. Over 80% of the students are classified as economically disadvantaged and nearly all students (96%) participate in free and reduced lunch programs. (2,3) According to 2011-2012 attendee and absence data published by Flint Community Schools, the proportion of children with absences during the school year exceeded 10% in elementary school, increased dramatically to over 30% for middle school years and decreased to 13% for high school.(2) Compounding these challenges, the city's water source was changed in April 2014, which subsequently caused lead to leach from pipes, increasing the incidence of elevated lead levels in tap water and in children's blood. In January 2016, President Obama declared an emergency in Flint, leveraging federal aid to support state and local response efforts. (4) The declaration expired 8/14/16 although some federal resources remained. These efforts were pursued because lead is a known neurotoxin, and lead poisoning may result in growth, developmental, and educational difficulties. (5) Young children (under 6 years) and children experiencing *in utero* exposure are most at risk. (5) Access to health care and support services is necessary to ensure appropriate screening and monitoring to identify and manage individuals with elevated blood lead levels. The Michigan Department of Health and Human Services (MDHHS) estimates that approximately 27,000 individuals are currently covered by Medicaid in the Flint area. The State of Michigan applied for a Medicaid Section 1115 waiver in February 2016 to expand eligibility and benefits in recognition of the cohort of individuals potentially exposed to the contaminated water yet lacking insurance coverage and the ability to seek care to address this exposure. (6,7)

Goals/Objectives

The U.S. Center for Medicare & Medicaid Services (CMS) granted the Medicaid waiver application to support access to care and targeted case management for at-risk persons affected by the contaminated water. As described in the Special Terms and Conditions (STC) of the waiver, *"This population consists of children in households with incomes from 212 percent of the federal poverty level (FPL) up to and including 400 percent of the FPL and pregnant women in households with incomes from 195 percent up to and including 400 percent of the FPL."* The waiver further eliminates all cost-sharing and premiums for this population and allows *"... the state to offer screening and evaluation of potential lead exposure in the home for all eligible children and pregnant women who were served by the Flint water system during the specified period..."*. The population resulting from the expanded eligibility is projected to be approximately 14,000 and MDHHS anticipates 50% (~7,000) of these individuals will take advantage of this coverage. These projections include pregnant women. The demonstration has been approved through 2/28/2021.

The approved demonstration is intended to support an overarching goal *to identify and address any physical or behavioral health issues associated with actual or potential exposure to lead hazards*. The specific objectives intended to support attainment of the goal are to:

1. Expand eligibility of all Medicaid benefits for low-income children (up to age 21 and including children born to eligible pregnant women) and pregnant women (through two months post-delivery) served by the Flint water system from 4/1/2014 through (*Date TBD*) and not otherwise eligible for Medicaid.
 - a. Increase income threshold to offer coverage to children in households with incomes from 212% federal poverty level (FPL) up to and including 400% FPL.
 - b. Increase income threshold to offer coverage to pregnant women in households with incomes from 195% FPL up to and including 400% FPL.
 - c. Eliminate cost-sharing and Medicaid premiums for eligible children and pregnant women served by the Flint water system.
 - d. Permit eligible children and pregnant women above the 400% FPL and served by the Flint water system to buy into Medicaid benefits by paying premiums.
2. Add a Targeted Case Management (TCM) benefit to all low-income children (up to age 21 and including children born to eligible pregnant women) and pregnant women (through two months post-delivery) served by the Flint water system from 4/1/2014 through (*Date TBD*).
 - a. Assist enrolled eligible children and pregnant women served by the Flint water system to gain access to needed medical, social, educational, and other service(s).

Evaluation Activities

Independent Evaluator

The Michigan State University Institute for Health Policy (MSU-IHP) has been involved with health care quality improvement, program evaluation, and health services research for nearly two decades. The mission of MSU-IHP is to improve the health status of Michigan residents through health services research, policy analysis, education and outreach, and support of quality improvement activities. MSU's College of Human Medicine maintains a community campus in Flint, Michigan, with associated clinical practices and faculty who may interact with MDHHS regarding Medicaid policies or reimbursement. The evaluation team at MSU-IHP, however, operates independently of the clinical practices and has no business interest in the expansion of Medicaid and the provision of services to the affected population. Thus, we believe no conflict of interest exists to conducting the evaluation. The evaluation team is made up of:

- Hong Su An, PhD; Institute for Health Policy, College of Human Medicine, MSU
- Debra Darling, BSN, RN, CCP; Institute for Health Policy, College of Human Medicine, MSU
- Julie DuPuis, MPA, Institute for Health Policy, College of Human Medicine, MSU
- Mona Hanna-Attisha, MD, MPH, FAAP; Department of Pediatrics, College of Human Medicine, MSU/Hurley Medical Center
- Joan Ilardo, PhD, LMSW; Office of Research, College of Human Medicine, MSU
- Christine Karl, RN, BA; Institute for Health Policy, College of Human Medicine, MSU

- Zhehui Luo, PhD; Department of Epidemiology and Biostatistics, College of Human Medicine, MSU
- Kathleen Oberst, PhD, RN; Institute for Health Policy, College of Human Medicine, MSU
- Richard Sadler, PhD; Division of Public Health, College of Human Medicine, MSU
- Lin Stork, MA Office of Survey Research, MSU
- Leslee Wilkins, Institute for Health Policy, College of Human Medicine, MSU

Scientific Rigor

MSU-IHP has assembled an evaluation team consisting of faculty and staff from additional MSU departments and units where subject matter expertise is needed to support the scientific rigor of evaluation efforts. Selection for the evaluation team also included review of potential conflicts of interest. The evaluation team will identify and seek to use the best available data with the appropriate statistical methodologies to answer the proposed research questions. Reports and analytic summaries will acknowledge potential limitations of selected data and methods with discussion of impacts on generalizability of findings.

Anticipated data sources to address the research questions include Medicaid eligibility and enrollment data as well as health service claims/encounter data adjudicated through Medicaid. These data elements will support evaluation of utilization and costs of care and are available to MSU-IHP through the MDHHS Data Warehouse. We will use the Census Tract level and Block Group level characteristics to derive indicators for socioeconomic status and/or find potential matching comparison persons. Additionally, beneficiary surveys are planned to provide a data source for exposure, satisfaction and outcomes that cannot be measured through health care administrative data. Other targeted data include data maintained through the MI Care Improvement Registry which retains lead testing records. The TCM process will generate clinical assessment and referral data and we will attempt to incorporate this information as it becomes available. Lastly, we seek to collaborate with others including local service providers and/or researchers to incorporate elements of socio-emotional and developmental scoring and delivery of educational supports collected and maintained outside MDHHS. Ultimately, the completeness of reporting will depend on the extent to which necessary data elements are available to the evaluation team.

Limitations associated with this evaluation will be the difficulty identifying one suitable comparison group and the availability of certain data elements. For those individuals already covered through Medicaid in the targeted region, our plans to leverage Medicaid and lead screening data include identifying multiple comparison groups that will vary based on sub-population and applicable measure(s) (i.e., children vs. pregnant women and developmental screening). As an example, children under age 19, without the expansion are eligible for MICHild if their household income is at or below 200% of FPL. We can use the Regression Discontinuity Design (RDD) to form a quasi-experiment to recover the causal effect of the expansion (8). Moreover, we will report multiple rates per measure. One rate will restrict to existing Medicaid eligibility limitations to facilitate comparisons to published estimates while a second rate will be calculated for those who are eligible through the expanded FPL limits. We may spatially link

beneficiaries in Flint and vicinity to corresponding Census Tract and Block Groups and compare regional-level outcomes such as changes in well child or development screening visits.

Of specific concern, the *expansion* population exceeding the existing FPL limits represents a cohort of individuals for whom utilization baseline data is not readily available. We will look to published commercial utilization estimates and engage collaboratively with health plans in the state to request their assistance with providing similar commercial estimates on the targeted Flint area. Thus, with reasonable controls for income and geographic organization of health care services, we can compare rates of pre/post-natal care and pediatric services among children and adolescents. This expansion cohort further presents challenges due to missing data after enrollment. We will attempt to document these participants who have other forms of health care coverage through documentation collected by the state for coordination of benefit processing which may give us additional strata for comparison. To better understand the participation process we plan to use the survey mechanism and use non-participants as the second comparison group. We will use the propensity score matching methods to make the two groups (participants vs. non-participants) as similar as possible based on the self-reported data and the outcomes will include self-reported healthcare access, utilization, and overall health status.

The evaluation will analyze the impacts of the demonstration while controlling for other activities occurring in the affected area as documented. The ability to directly attribute observed changes in access, utilization and outcomes to the implementation of the waiver services will be complex. The federal declaration has provided access to significant federal resources that are operating in the affected area. Additionally, there are many supports and services being offered by local/state governmental, private, and public non-profit organizations in the region. As mentioned, the availability of other forms of health care coverage will impact the ability to determine the effectiveness of the waiver due to incomplete Medicaid claims/encounter data. The TCM services may overlap with other services provided by current Medicaid health plans, other support agencies, and/or health care providers. We propose conducting a community inventory to account for the prevalent activities and will seek opportunities to identify appropriate comparison groups and regions. For those measures based on administrative data, we will describe the pre-exposure experience of beneficiaries in the affected region for later comparisons and may further reference state or national benchmarks. Our pre-exposure timeframe will reflect April 1, 2013 – March 31, 2014. For new enrollees coming into the program as a result of the expansion eligibility, we will use their initial year experience with utilization as a baseline and monitor their experience over the ensuing years of their participation. The exposure period will begin April 1, 2014 and continue through (*Date TBD*).

We originally proposed convening an Advisory Panel for the evaluation that would include community leaders and representatives of the Healthy Flint Research Coordinating Center that is being established in the region. The Research Coordinating Center includes Michigan State University, University of Michigan-Ann Arbor, University of Michigan-Flint, and Community Based Organization Partners with the goal being to coordinate projects that may have already started or are being developed related to economic, environmental, behavioral and physical health of residents. Since our initial proposal, a team in Flint has received funding to plan and establish a registry that will track not only activities occurring in the area but also individual health, education

and social markers. Dr. Mona Hanna-Attisha is the principal investigator (PI) on that effort and we will be engaging with this initiative and their accompanying Advisory Committee and subcommittees where appropriate. (11) In turn, she has been added to this evaluation team. We have shifted our approach from 'creating our own' to joining with others. Our goal in doing so is to realize the benefits of collaborative efforts and avoid subjecting community members and leaders to 'committee fatigue'. We anticipate we will be able to identify pertinent data points and maximize reporting quality and quantity by collaborating.

There is no shortage of research questions that can be generated in response to this event. For the purposes of this evaluation however, we will confine our efforts to evaluation questions relevant to evaluating authorized waiver activities. We will cooperate with the registry planning efforts to identify and suggest reporting elements that could be used to inform the evaluation. Community leaders would assist the evaluation team in documenting the breadth of activities and be able to direct members of the evaluation team to key contacts.

The following describes a high level overview of the target population, including overarching considerations for timelines, potential comparison groups, and cost analyses. Domain specific detailed evaluation plans and hypotheses generated in response to review of the state's documented objectives with consideration and identification of necessary data elements begin on page 12.

Target Population for Waiver

The eligibility criteria for receiving Medicaid coverage has been established by MDHHS policy to include:

- Any pregnant woman or child up to age 21 with a household income up to and including 400% of the Federal Poverty Level (FPL) who has been served by the Flint water system on or between 4/1/2014 and the date water is deemed safe (*Date TBD*).
- Any child born to a pregnant woman served by the Flint water system during the specified time period. The child will remain eligible until age 21.
- Water service is defined as:
 - consumed water drawn from the Flint water system during the specified time period and:
 - resides or resided in a dwelling connected to this system;
 - is employed or had employment at a location served by this system; or
 - is receiving or received child care or education at a location connected to this system.

The Eligibility Protocol further clarifies these criteria would also include individuals who were incarcerated or who resided in a health care facility at a location served by the Flint water.

Per MDHHS Policy, pregnant women covered under the waiver will remain eligible throughout their pregnancy and for a period of two months post-partum. Children will remain eligible until age 21 as long as other eligibility requirements are met.

Individuals above the 400% FPL but otherwise meeting the eligibility criteria may enroll in Medicaid by paying the appropriate premiums and participating with cost-sharing as described per current Medicaid policy.

MDHHS will use specific program codes to identify existing beneficiaries and newly enrolled beneficiaries who meet criteria for this waiver. These codes will facilitate tracking of individuals who could have been exposed to the contaminated water. Enrollment data contained in the warehouse may also contain reference to FPL so that beneficiaries can be categorized appropriately as expansion eligibility or not. These program and poverty level codes will be used when selecting target populations and potential comparison groups.

Overall Evaluation Timeline

This evaluation plan will cover activities from 7/1/2017 through 4/30/2021. The demonstration project is scheduled to conclude 2/28/2021. Table 1 shows the proposed schedule of activities.

Table 1: Proposed Timeline for Evaluation Activities

Time Period	Activities
Partial Year 1: 7/1/2017 – 9/30/2017	<ul style="list-style-type: none"> • Identify key contacts for targeted data sources • Participate with Registry Advisory Committee • Draft beneficiary survey • Implement Wave 1 beneficiary survey (~15 months post-enrollment target: September/October 2017) • Draft TCM Provider Survey/Key Informant Interview • Implement Wave 1 TCM Provider Survey/Key Informant Interviews (~15 months post TCM implementation: September/October 2017) • Draft community inventory tool • Program administratively derived measures and report for pre-exposure year (4/1/13 – 3/31/14), year 1 (4/1/14 – 3/31/15) and year 2 (4/1/15 – 3/31/16) • Assemble and test different methods to generate comparison groups • Identify and test data sources for TCM (needs assessments, plans of care, screenings, referrals, etc.) • Identify and test data sources and methods for linkage with Department of Education information • Identify research co-occurring studies and evaluation for possible incorporation into evaluation • Generate quarterly updates • Generate interim annual report
Year 2: 10/1/2017 – 9/30/2018	<ul style="list-style-type: none"> • Continuing Wave 1 beneficiary survey (~15 months post-enrollment target: September 2017) • Wave 1 Beneficiary Survey analysis and report findings • Implement Wave 2 Beneficiary Survey (~24 months post-enrollment: June/July 2018) • Continue Wave 1 TCM Provider Survey/Key Informant Interviews (~15 months post TCM implementation: September/October 2017) • Wave 1 TCM Provider Survey/Key Informant Interviews analysis and report findings • Implement Wave 2 TCM Provider Survey/Key Informant Interviews (~24 months post TCM implementation: June/July 2018)

Time Period	Activities
	<ul style="list-style-type: none"> • Ongoing community inventory surveillance • Ongoing monitoring of community based co-occurring studies and evaluation for possible incorporation into evaluation • Run TCM measures and conduct data analysis for timeframe 5/1/16 – 4/30/17 (year 1 delivery) • Run annual administrative measures and conduct analysis and trending for timeframe 4/1/16 – 3/31/17 • Monitor increase in enrollment and services for cost evaluation for timeframe(s) • Generate quarterly updates • Generate interim annual report
<p>Year 3: 10/1/2018 – 9/30/2019</p>	<ul style="list-style-type: none"> • Research and report potential commercial comparison group estimates for expanded financial limit cohort • Wave 2 Beneficiary Survey analysis and report findings • Summarize Wave 2 TCM Provider Survey/Key Informant Interviews and report findings • Ongoing community inventory surveillance • Ongoing monitoring of community based co-occurring studies and evaluation for possible incorporation into evaluation • Run TCM measures and conduct data analysis for timeframe 5/1/17 – 4/30/18 • Run annual administrative measures and conduct data analysis/trending for timeframe 4/1/17 – 3/31/18 • Monitor change in enrollment and services for cost evaluation • Generate quarterly updates • Generate interim annual report
<p>Year 4: 10/1/2019 – 9/30/2020</p>	<ul style="list-style-type: none"> • Implement Wave 3 Beneficiary Survey (~48 months post-enrollment: June/July 2020) • Implement Wave 3 TCM Provider Survey/Key Informant Interviews (~48 months post TCM implementation: June/July 2020) • Ongoing community inventory surveillance • Ongoing monitoring of community based co-occurring studies and evaluation for possible incorporation into evaluation • Run TCM measures and conduct data analysis for timeframe 5/1/18 – 4/30/19 • Run annual administrative measures and conduct data analysis/trending for timeframe 4/1/18 – 3/31/19 • Monitor increase in enrollment and services for cost evaluation • Generate quarterly updates • Generate interim annual report
<p>Year 5 – Wrap Up: 10/1/2020 – 4/30/2021</p>	<ul style="list-style-type: none"> • Wave 3 Beneficiary Survey analysis and report findings • Summarize Wave 3 TCM Provider Survey/Key Informant Interviews and report findings • Ongoing community inventory surveillance • Ongoing monitoring of community based co-occurring studies and evaluation for possible incorporation into evaluation • Run TCM measures and conduct data analysis for timeframe 5/1/19 – 4/30/20 • Run annual administrative measures and conduct data analysis/trending for timeframe 4/1/19 – 3/31/20 • Monitor increase in enrollment and services for cost evaluation

Time Period	Activities
	<ul style="list-style-type: none"> • Generate quarterly updates • Generate final evaluation report (4/30/2021)

General Data Sources

The evaluation will require multiple data sources to test the hypotheses. Some of the data elements are currently available to members of the evaluation team and measures relying on these data could be implemented immediately. Other sources include state departments other than MDHHS and further investigation will be required to determine the full scope and nature of available data. Additionally, access to these data may be limited by state or federal statutes and the evaluation team will be bound by such regulations. Lastly, there are certain data points that will support the evaluation but will require new data collection processes. The full scope of activities and timeframes will depend on data availability to the evaluation team.

MDHHS Medicaid Data: (Currently Available, Evaluation Team has access)

We anticipate analyzing Medicaid administrative data sources (e.g., enrollment, claims/encounter) available through the MDHHS Data Warehouse at least semi-annually. Some access/quality of care measures to be evaluated (e.g., immunization status) will be conducted on an annual basis as recommended by the measure stewards. Claims/encounter data will require a lag period to allow for claim processing. No less than 180 days will be used for this claim run-out period.

MDHHS Program Data: (Currently Available, Evaluation Team *does not yet have access*)

Since Medicaid covered services represent only a portion of the services for which beneficiaries will be eligible, we will further seek to collaborate with other units in MDHHS (e.g., Lead Screening Program, Maternal Infant Health Program, etc). Efforts will be made to link external datasets with the enrollment data so that we can look for variation by group (ex. existing enrollees vs new enrollees).

MDE Early Education Service Data: (Full scope unknown, Evaluation Team *does not yet have access*)

Early education services such as Early Head Start will be important to support children who have been exposed to the contaminated water. A portion of the referrals to these services could be captured through claims data but data would be lacking on those that self-refer. Screening outcomes and resultant service delivery would also be incomplete if the team was to rely solely on Medicaid claims/encounter data. Education data will be increasingly important over the years of the evaluation and primary/secondary school data elements will need to be identified. We have scheduled preliminary meetings with MDE representatives to begin to discuss mechanisms by which data may be shared. We will further collaborate with the registry planning to begin to identify pertinent elements that should be incorporated into this registry and support efforts to address legal barriers to these data.

Per MDE, school data may be split into “Early Childhood” and “K-12 grade” populations. For the “Early Childhood” population, summary data regarding:

- 1) counts of children enrolled/participating in Early Childhood Programs (e.g. Early On Michigan, Great Start for Kids, MI HeadStart), and
- 2) proportion of students in Kindergarten who participated in Early Childhood programs,

are currently available by county and school district. This data will be useful to provide general community trends prior to the water switch and then annually thereafter. These two measures will be obtained through the MDE website with ability to report by gender, disadvantaged status, race/ethnicity, and homelessness.

Kindergarten – 12th Grade education has similar summary reporting available for a variety of metrics by county, school district and school. Specifically, we will trend measures of academic performance and behavioral elements:

- 1) student counts
- 2) pupil:teacher ratios
- 3) counts of children retained in same grade
- 4) drop-out rate
- 5) graduation rate
- 6) attendance
- 7) educational progress standardized tests (grades 3-9, 11)

It is important to note the educational progress standardized testing in Michigan changed with the 2014-2015 school year from the Michigan Educational Assessment Program (MEAP) to the Michigan Student Test of Educational Progress (M-STEP). We will require consultation from MDE staff to assist in the interpretation of data as this coincides with the water switch. MI-Access is an alternate test available for students with cognitive impairments when the others are felt to be inappropriate. We will identify discrete elements of the standardized testing in collaboration with MDE colleagues and would appreciate the opportunity to pull in CMS colleagues for further discussion.

The evaluation team plans to trend these metrics at the levels aggregated by the MDE data. Our main interest however remains in linking standardized test scoring and program participation at the individual beneficiary level. We are interested in linking education metrics to health service utilization in order to detect associations between these items using chi-square or t-tests as indicated. We would appreciate the opportunity to work with CMS to work through federal legislation that limits disclosure of student information. The individuals responsible for designing the Flint Registry also have identified this as a potential barrier and will be seeking guidance from a variety of sources on this. We anticipate that consolidating our efforts will benefit both teams.

U.S. Census Data: (Currently Available, Evaluation Team has access)

We will use available census data (in partnership with MSU medical geographer Dr. Richard Sadler) as well as federal agencies operating in Flint to assist us in identifying characteristics of the Flint region to better categorize waiver participants versus non-participants. Census Tract or Block Group level data will support the evaluation efforts to better describe the affected area, pinpoint key population sub-groups, and provide data needed to construct comparison groups.

Beneficiary Survey Data: (Collection Planned)

We further propose to conduct brief interviews with beneficiaries. The beneficiary survey is necessary to document levels of exposure to the contaminated water, satisfaction with accessing health care and TCM services and self-reported health status. Elements not readily available through administrative health care data sets will be incorporated into the survey including family characteristics, knowledge of benefits (e.g., TCM, transportation) and **additional educational and behavioral characteristics of enrollees**. The survey document will be shared with MDHHS and CMS representatives for review and input prior to implementation. Additionally, the survey may be expanded to include elements identified by the registry planning that could be used to support future evaluations. The survey will permit more accurate reporting of the level of exposure for sub-group analyses. Additionally, surveys will also permit us to track services received through formal or informal community action so that we can appropriately consider these influences during the evaluation. In order to carry out these surveys, IHP will partner with MSU’s Office for Survey Research (OSR), part of MSU’s Institute for Public Policy and Social Research. OSR has provided instrument development, data collection and analysis to university, state, county and municipal government and businesses since 1989.

The survey will be conducted via multiple methods. Initially, telephone contact will be employed with a print survey used for telephone non-response or at beneficiary request. This print survey will also direct respondents how to complete the survey via web or to call a toll free number if they prefer. Print surveys will also permit inclusion of water-affected individuals attending the Michigan School for the Deaf which is based in Flint. The survey will be conducted in English and we will work with community representatives to determine the need for Spanish or other translation services. Although the proportion of households reporting a language other than English as the primary language in the home is small overall, we anticipate the prevalence to be higher among the cohort of individuals eligible for expanded Medicaid. These individuals would also be associated with greater access to care issues due to potential language barriers. All enrollees will be included in the sampling frame and weighting used as necessary to ensure a representative sample. Parents or guardians will be targeted to complete the survey on behalf of beneficiaries less than 18 years of age.

We plan to conduct surveys at several intervals. The first survey wave will occur approximately 12 months of enrollment. A follow-up survey will be conducted approximately 24 months after enrollment and we will attempt to contact the same individuals for this second wave in order to track changes over time in their knowledge about the expansion program and services, utilization and health status. A final wave is being considered at 48 months post-enrollment and the goal would be to follow-up with the same respondents. We anticipate using non-monetary incentives (i.e. newsletters) to promote longitudinal participation with the surveys. The required sample size is estimated using following formula:

$$N = \frac{Z_{\alpha/2}^2 * P * (1 - P)}{E^2}$$

Where P is the proportion of event of interest for the survey, E is the margin of error (precision) deemed acceptable, α is level of significance, and $Z_{\alpha/2}$ is the $\frac{\alpha}{2}$ -th normal quantile. We applied a 5% of margin of error with a 95% confidence level. The number of new enrollees secondary to the waiver is approximately 2500; when combined with the existing Flint Medicaid covered population (approximately 25,000) there are nearly 27,500 individuals who would be eligible to participate with the survey. Using the formula above, to estimate the proportion of event of interest with 5% margin of error would require 384 completed surveys. We have rounded up for simplicity to 400 completed surveys as our target.

Since we are interested in doing 3 waves so we must plan accordingly to ensure that we are left with at least 400 at the end. Thus, we will significantly oversample for wave 1 to ensure we can sustain our end goal acknowledging loss to follow up. We assume our loss to follow-up will be 33% at wave 2 and 50% at wave 3. Assuming an original response rate of 30%, we will target 4000 individuals in wave 1.

Our community comparison samples (individuals who are not enrolled in Medicaid) will be selected at each wave. We will not attempt to retain community members longitudinally. The community responses will provide a comparison for the results obtained from our target beneficiaries for outcome(s) such as self-reported health status and access to care. We will test for independence between these estimates using chi-square or t-tests as appropriate. We will also explore obtaining Michigan BRFSS data at the zip code level to provide estimates of general health status and access to care measures for the region prior to the survey period. We plan to ask CMS to assist negotiating with CDC to facilitate obtaining these data.

We may use an address based sample informed by the Flint Water department service area and drawn from a city parcel database. This will allow us to select individuals in the targeted geographic region. This address based sample further encourages the participation of households that no longer have landline telephones. We are further exploring the feasibility of adding relevant questions to the *MI State of the State Survey* to provide statewide level comparisons.

TCM Provider Survey/Key Informant Interview: (Collection Planned)

The evaluation team proposes a TCM Provider Survey/Key Informant Interview in order to obtain additional qualitative and quantitative data elements that would not be available through MDHHS administrative claims/encounter sources. Topic areas to be included in the interviews include satisfaction with assessment tools, ease of reporting activities, enrollee engagement, prevalent areas of involvement, referral and interest as well as other metrics as the TCM policy is finalized. IHP quality improvement (QI) staff with experience in conducting interviews will conduct these in-person when possible or via telephone.

Genesee Health System is the Designated Provider Organization for TCM and all services are to be carried out through the use of case managers. Case managers must have current Michigan licensure as a registered nurse or social worker. We plan to survey or interview 100% of these case managers working at each time point. The first wave will occur within 12 months of TCM

implementation. A follow-up survey will be conducted approximately 24 months after implementation. A final wave is being considered at 48 months post-implementation.

Community Assessment Data: (Collection Planned)

We will conduct a community assessment to identify additional supports and services being offered to residents other than those provided through Medicaid coverage. Key informant interviews are planned with leading governmental, private, and public non-profit organizations operating in the region to carry out this assessment.

Human Subjects Review

Elements of this evaluation might require human subjects review. Investigators will submit a formal request for determination to the MSU Human Research Protection Program (HRPP) and the MDHHS Institutional Review Board (IRB) offices and provide evidence of the review and determination. Should a formal human subjects review be warranted, applications will be submitted and approved by MSU and MDHHS review boards as necessary prior to any proposed work.

Potential Comparison Populations

The hypotheses put forward by the State of Michigan and refined into sub-hypotheses by the evaluation team reference conducting comparisons to “...others with similar levels of lead exposure.” The unfortunate fact is that we will be unable to accurately describe the extent of the exposure of the affected individuals. Moreover, the process followed for lead screening before and during the exposure period does not permit us to know true blood lead levels at the individual level and how they fluctuated over time. The population most at risk would normally not be tested per American Academy of Pediatrics (AAP) recommendations (i.e. screening starts at 1 year of age). This means that the infants being exposed through formula and their maximum levels will remain unknown. The only true measure of lead exposure would be available through bone or dental samples. Dr. Hanna-Attisha reports that they are planning to collect dental samples as part of the surveillance registry which will be the most accurate measure. We may be able to leverage these data in the final years of the evaluation.

We will use existing data on Medicaid beneficiaries in the same geographic region for a timeframe immediately preceding the water supply switch and compare to those eligible for the demonstration but already covered (~21,000), enabling the community to act as its own control. We will generate two cohorts within the Flint area – the first cohort will align beneficiaries with the water service maps while the second cohort will encompass Genesee County. We are exploring the electronic availability of assessment data for the approximately 330 beneficiaries covered through the Serious Emotional Disturbance Waiver (SEDW) as a potential comparison cohort and will further consider whether this would be a suitable control population. We will further investigate relevant characteristics through existing geographically-related data sources such as the U.S. Census, the American Community Survey, and/or community health profiles such as the Speak To Your Health Community Survey. Based on the recognized difficulty measuring actual exposure and uptake levels of lead, we will emphasize socio-economic characteristics of communities which may help promote consistency in other known methods of lead exposure.

We look forward to collaborating with federal agencies (i.e. CDC, CMS, etc.) to obtain data from communities in other states that have experienced water based lead exposures (i.e. Washington DC). Reuters recently reported over 3,000 communities nationwide with greater prevalence of elevated blood lead levels. (10) While we cannot drill down to individuals, community reporting may serve as reasonable comparison communities.

The expansion population further represents a cohort of individuals who are at higher socio-economic status than existing Medicaid beneficiaries. Therefore, it is possible members of the cohort may have access to health care coverage through other avenues. For these individuals, we may encounter either a lack of data due to absence of coverage or incomplete data due to another insurer having primary responsibility for health care claims. We will explore the feasibility of collaborating with commercial payers in the region along with provider organizations to obtain data elements to support the evaluation. The team anticipates conducting stratified analyses based on presence/absence of other insurance in an effort to determine true lack of services versus services paid for by other insurance.

Table 2 summarizes the various comparison groups that we could target as part of the evaluation.

Table 2: Comparison Group Characteristics

Group #	Group Description	Pros	Cons
1	Medicaid beneficiaries residing in the target Flint area based on water exposure map in the year prior to the water switch (4/1/2013 – 3/31/2014)	<ul style="list-style-type: none"> • Representative of the involved community • Administrative health data available through MDHHS Data Warehouse • Individuals remaining in region could act as own controls • Lead screening values available through MDHHS Childhood Lead Prevention Program and MCIR for all screened children (regardless of insurer) 	<ul style="list-style-type: none"> • Does not incorporate beneficiaries qualifying with higher SES levels • Population change over time • Observed changes in
2	Commercially insured individuals in Michigan	<ul style="list-style-type: none"> • Address experience of higher SES (133-400% FPL) • Lead screening values available through MDHHS Childhood Lead Prevention Program and MCIR for all screened children (regardless of insurer) 	<ul style="list-style-type: none"> • Administrative health data not available to evaluators • Not all commercially covered children tested for lead
3	Communities known to have elevated lead exposures nationally	<ul style="list-style-type: none"> • Could represent reasonably similar cohort • Consider county health rankings reporting to provide comparison information 	<ul style="list-style-type: none"> • Individual level data not available • Community action reporting anticipated to be incomplete and poorly documented
4	Beneficiaries covered through the Michigan SEDW	<ul style="list-style-type: none"> • Could have assessment data (behavioral, educational, developmental, etc) available through administrative means 	<ul style="list-style-type: none"> • Population by definition already known to have significant diagnoses and might not have sufficient data points to create appropriately matched samples (individuals eligible for waiver at risk for psychiatric inpatient admission and require 24 hour care)

Cost Comparisons

According to the Waiver STCs, analysis of total costs is a required element of the evaluation. The costs associated with the Flint waiver will be reported as a proportion of total state costs. Additionally, the total state costs over recent years (including prior to the water supply switch) will be trended. Components of total costs such as administrative expenses, provider rates, and healthcare utilization will be evaluated individually, comparing historical spending (with appropriate inflationary adjustments) for existing Medicaid beneficiaries. Concurrent spending

comparisons with geographic areas thought to represent areas at high risk for lead exposure along with similar socio-economic characteristics and demographics may also contribute to the overall cost analyses. We will further describe the additional costs associated with the expanded population (those who would otherwise not have met criteria for Medicaid coverage) and the expanded TCM benefit.

Post-hoc power and statistical considerations

As we will extract administrative data for most of the comparisons between the waiver enrollees and corresponding comparison groups in Table 2, we will have approximately 2,500 new enrollees and can select group 1 comparison from a large reservoir of existing beneficiaries based on water exposure map. These comparisons can be matched on important confounding characteristics. Thus the minimum detectable effect size (MDEZ) for matched samples at 80% power for continuous outcomes is .06 and the range of MDEZ for proportions is from 1% to 3% when the null prevalence is from .05 to .5. Any clinically meaningful effect size would be bigger than the MDEZs that we can detect. Thus we have enough power to generate meaningful comparisons.

Domain 1: Access to services

The approved demonstration will provide Medicaid coverage and access to health care services to a cohort of individuals who were exposed to the contaminated water and potentially at risk for physical and behavioral issues but possibly lacking ability to seek services.

Hypotheses

1. *“Enrollees will access services to identify and address physical or behavioral health issues associated with lead exposure at a rate higher than others with similar levels of lead exposure.”*
 - Hypothesis 1.1: A greater proportion of enrollees will obtain age-appropriate well-child exams compared to others with similar lead exposures.
 - Hypothesis 1.2: A greater proportion of enrollees will receive age-appropriate developmental screening/assessments compared to others with similar lead exposures.
 - Hypothesis 1.3: A greater proportion of enrollees will receive age appropriate lead testing compared to others with similar lead exposures.
 - Hypothesis 1.4: A greater proportion of enrollees with high blood lead levels will receive re-testing at the appropriate intervals compared to others with similar lead exposures.
 - Hypothesis 1.5: Enrollees who are pregnant will have more timely prenatal and postpartum care compared to others with similar lead exposures.
 - Hypothesis 1.6: A greater proportion of enrollees who are pregnant will have recommended lead testing compared to others with similar lead exposures.
 - Hypothesis 1.7: A greater proportion of enrollees will participate with Maternal Infant Home Program services compared to others with similar lead levels.
 - Hypothesis 1.8: The majority of enrollees will attest to improved access to health care as a result of the expanded coverage.
 - Hypothesis 1.9: The majority of enrollees will report improved satisfaction with their ability to access health care as a result of the expanded coverage.

Performance Measures

The State of Michigan proposed an over-arching hypothesis focused on measuring access to care as part of the waiver application. The evaluation team drilled down to identify additional hypotheses that could be tested using endorsed measures published through the National Quality Forum (NQF). Moreover, the selection of nationally recognized measures provides opportunities for comparison of results both within the targeted region (pre-post exposure estimates) as well as potentially comparing results to somewhat similar (based on socio-economic similarities) groups. Selected comparisons may be restricted to individuals who meet the exposure categories and previously identified Medicaid income thresholds to ensure similarities. For pre-post comparison we will use paired *t*-test or McNemar chi-square test. For comparisons between groups we will use *F*-test or Mantel-Haenszel test stratified by matching factors. As we begin to assemble the data to address the hypotheses, we may require modifying eligible timeframes to ensure congruence with exposure periods. While we may shift start or end dates, we will adhere to requirements for total observation months and continuous enrollment. For example, the measures requiring a 12 month observation could shift from January – December timeframes to April – March timeframes. Thus,

references to measurement “year” in NQF documentation will be replaced with measurement “period”.

The sub-hypotheses identified for Domain 1 were selected for their relevance to screening, the identification and management of individuals who would be identified as high-risk for lead exposure, and represent the target population for the waiver application.

H1.1: A greater proportion of enrollees will obtain age-appropriate well-child exams compared to others with similar lead exposures.

Characteristic	Detail Description	Detail Description	Detail Description
Measure Title	Well Child Visits in the First 15 months of Life	Well Child visits in the Third, Fourth, Fifth and Sixth Years of Life	Adolescent Well-Care Visits
Measure Description	The percentage of children 15 months old who had the recommended number of well-child visits with a PCP during their first 15 months of life.	The percentage of children 3-6 years of age who had one or more well-child visits with a primary care provider during the measurement year.	The percentage of children/adolescents 12-21 years of age who had at least one comprehensive well-care visit with a primary care provider or an OB/GYN practitioner during the measurement year.
NQF Number	1392	1516	N/A
Measure Steward	National Committee for Quality Assurance	National Committee for Quality Assurance (Child Core Set)	National Committee for Quality Assurance (Child Core Set)
Numerator	<p>This measure has 7 discrete numerators:</p> <ul style="list-style-type: none"> • # Children who received 0 well-child visits • # Children who received 1 well-child visit • # Children who received 2 well-child visits • # Children who received 3 well-child visits • # Children who received 4 well-child visits • # Children who received 5 well-child visits • # Children who received 6 or more well-child visits 	<p>This measure has 1 discrete numerator:</p> <ul style="list-style-type: none"> • At least one well-child visit with a primary care provider 	<p>This measure has 1 discrete numerator:</p> <ul style="list-style-type: none"> • At least one comprehensive well-care visit with a PCP or an OB/GYN practitioner during the measurement year.

Characteristic	Detail Description	Detail Description	Detail Description
Denominator	Children 15 months old during the measurement period.	This measure has 1 discrete denominator: <ul style="list-style-type: none"> Children 3-6 years of age during the measurement period. 	This measure has 1 discrete denominator: <ul style="list-style-type: none"> Children/adolescents 12-21 years of age during the measurement period.
Baseline Value(s)	Baseline values will be obtained from multiple sources: <ul style="list-style-type: none"> Existing statewide Medicaid weighted average reports Region specific estimates will be calculated for a measurement period prior to the water switch. 	Baseline values will be obtained from multiple sources: <ul style="list-style-type: none"> Existing statewide Medicaid weighted average reports Region specific estimates will be calculated for a measurement period prior to the water switch. 	Baseline values will be obtained from multiple sources: <ul style="list-style-type: none"> Existing statewide Medicaid weighted average reports Region specific estimates will be calculated for a measurement period prior to the water switch.
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data	No sampling – plan to use 100% available claims/encounter data	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse	Administrative claims/encounters in the MDHHS data warehouse	Administrative claims/encounters in the MDHHS data warehouse

H1.2: A greater proportion of enrollees will receive age-appropriate developmental screening/assessments compared to others with similar lead exposures.

Characteristic	Detail Description	Detail Description
Measure Title	Developmental Screening in the First Three Years of Life	Socio-emotional/Behavioral Screening for Children 4-17 years of age
Measure Description	The percentage of children screened for risk of developmental, behavioral and social delays using a standardized screening tool in the first three years of life.	The percentage of children/adolescents 4-17 years of age who had at least one socio-emotional/behavioral screen (CPT 96127) with a primary care provider or an OB/GYN practitioner during the measurement year.
NQF Number	1448	n/a
Measure Steward	Oregon Health & Science University	n/a
Numerator	This measure has 4 discrete numerators: <ul style="list-style-type: none"> # Children who had screening for risk of development, behavioral and social delays using a standardized screening tool that was documented by their first birthday. # Children who had screening for risk of development, behavioral and social delays using a standardized 	This measure has 1 discrete numerator: <ul style="list-style-type: none"> At least one socio-emotional/behavioral screen with a PCP or an OB/GYN practitioner during the measurement year.

Characteristic	Detail Description	Detail Description
	<p>screening tool that was documented by their second birthday.</p> <ul style="list-style-type: none"> # Children who had screening for risk of development, behavioral and social delays using a standardized screening tool that was documented by their third birthday. # Children who had screening for risk of development, behavioral and social delays using a standardized screening tool that was documented by their first, second, or third birthday. (<i>Combination estimate</i>) 	
Denominator	<p>This measure has 4 discrete denominators (respectively):</p> <ul style="list-style-type: none"> # Children who turn 1 by the end of the measurement period. # Children who turn 2 by the end of the measurement period. # Children who turn 3 by the end of the measurement period. # Children who turn 1 or 2 or 3 by the end of the measurement period. 	<p>This measure has 1 discrete denominator:</p> <ul style="list-style-type: none"> Children/adolescents 4-17 years of age during the measurement period.
Baseline Value(s)	<p>Baseline values will be obtained from multiple sources:</p> <ul style="list-style-type: none"> Existing statewide Medicaid weighted average reports Region specific estimates will be calculated for a measurement period prior to the water switch. 	<p>Baseline values will be obtained from multiple sources:</p> <ul style="list-style-type: none"> Region specific estimates will be calculated for a measurement period prior to the water switch.
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse	Administrative claims/encounters in the MDHHS data warehouse

H1.3: A greater proportion of enrollees will receive age appropriate lead testing compared to others with similar lead exposures.

Characteristic	Detail Description
Measure Title	Lead Screening in Children
Measure Description	The percentage of children 2 years of age who had 1 or more capillary or venous lead blood test for lead poisoning by their second birthday.
NQF Number	n/a
Measure Steward	National Committee for Quality Assurance
Numerator	# of children with at least one lead capillary or venous blood test on or before the child's second birthday.
Denominator	# of children who turn 2 years old during the measurement period.
Baseline Value(s)	Baseline values will be obtained from multiple sources:

Characteristic	Detail Description
	<ul style="list-style-type: none"> Existing statewide Medicaid weighted average reports Region specific estimates will be calculated for a measurement period prior to the water switch.
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data matched with MCIR and Childhood Lead Prevention Program
Anticipated Data Source	Administrative claims/encounters, MCIR, and Childhood Lead Screening Data in the MDHHS data warehouse

H1.4: A greater proportion of enrollees with high blood lead levels will receive re-testing at the appropriate intervals compared to others with similar lead exposures.

Characteristic	Detail Description
Measure Title	Follow-up of elevated blood lead level
Measure Description	The percentage of children with elevated blood lead levels having retests according to recommended timeframes established by MDHHS Lead Policy.
NQF Number	n/a
Measure Steward	Early and Periodic Screening, Diagnostic, and Treatment (EPSDT)-CMS/American Academy of Pediatrics
Numerator	# of children with elevated blood lead levels having re-testing with specified timeframes.
Denominator	# of children with elevated blood lead levels during the measurement period.
Baseline Value(s)	Baseline values will be obtained from multiple sources: <ul style="list-style-type: none"> Region specific estimates will be calculated for a measurement period prior to and after the water switch.
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse linked to state lead screening and TCM monitoring data

H1.5: Enrollees who are pregnant will have more timely prenatal and postpartum care compared to others with similar lead exposures.

Characteristic	Detail Description	Detail Description
Measure Title	Timeliness of Prenatal Care	Postpartum Care
Measure Description	Percentage of Medicaid live birth deliveries between February 4 of the year prior to the measurement period and February 3 of the measurement period	The percentage of deliveries that had a postpartum visit on or between 21 and 56 days after delivery.
NQF Number	1517	1517
Measure Steward	National Committee for Quality Assurance	National Committee for Quality Assurance
Numerator	Percentage of deliveries that received a prenatal care visit as a patient in the first trimester or within 42 days of enrollment.	Percentage of deliveries that had a postpartum visit on or between 21 and 56 days after delivery.
Denominator	Medicaid deliveries of live births between February 4 of the year prior to the measurement period and February 3 of the measurement period.	Medicaid live birth deliveries between February 4 of the year prior to the measurement period and February 3 of the measurement period.

Characteristic	Detail Description	Detail Description
Baseline Value(s)	Baseline values will be obtained from multiple sources: <ul style="list-style-type: none"> Existing statewide Medicaid weighted average reports Region specific estimates will be calculated for a measurement period prior to and after the water switch. 	Baseline values will be obtained from multiple sources: <ul style="list-style-type: none"> Existing statewide Medicaid weighted average reports Region specific estimates will be calculated for a measurement period prior to and after the water switch.
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse linked to Vital Records	Administrative claims/encounters in the MDHHS data warehouse linked to Vital Records

H1.6: A greater proportion of enrollees who are pregnant will have recommended lead testing compared to others with similar lead exposures.

Characteristic	Detail Description
Measure Title	Lead screening in pregnancy
Measure Description	The percentage of pregnant women screened for elevated blood lead levels during pregnancy.
NQF Number	n/a
Measure Steward	American Congress of Obstetricians and Gynecologists
Numerator	Percentage of deliveries that received 1 or more capillary or venous lead blood test during pregnancy.
Denominator	Medicaid live birth deliveries between February 4 of the year prior to the measurement period and February 3 of the measurement period.
Baseline Value(s)	Baseline values will be obtained from multiple sources: <ul style="list-style-type: none"> Region specific estimates will be calculated for a measurement period prior to and after the water switch.
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse linked to Vital Records data

H1.7: A greater proportion of enrollees will participate with Maternal Infant Health Program (MIHP) services compared to others with similar lead levels.

Characteristic	Detail Description
Measure Title	MIHP Participation
Measure Description	The percentage of deliveries participating with the Maternal Infant Health Program.
NQF Number	n/a
Measure Steward	n/a
Numerator	Percentage of deliveries receiving 1 or more visit with MIHP during pregnancy or after birth.
Denominator	Medicaid deliveries of live births between February 4 of the year prior to the measurement period and February 3 of the measurement period.
Baseline Value(s)	Baseline values will be obtained from multiple sources:

Characteristic	Detail Description
	<ul style="list-style-type: none"> Region specific estimates will be calculated for a measurement period prior to and after the water switch. Comparison to historical participation estimates
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse linked to MIHP visit and TCM Monitoring data

Hypothesis 1.8: Enrollees will attest to improved access to health care as a result of the expanded coverage.

Characteristic	Detail Description
Measure Title	Enrollee Attestation for Improved Access to Care
Measure Description	Surveyed enrollees will agree or strongly agree with a statement acknowledging the Medicaid program as one method for improving access to health care.
NQF Number	n/a
Measure Steward	Agency for Healthcare Research and Quality – Consumer Assessment of Healthcare Providers and Systems (AHRQ-CAHPS) Question Modification
Numerator	<p>Number of respondents who report they “agree “ or “strongly agree” with a statement about Medicaid improving health care access.</p> <p><i>Sample questions:</i></p> <p>“In the last 6 months, how often was it easy to get the care, tests, or treatment you needed?” (never/sometimes/usually/always)</p> <p>“Overall, enrolling in the Medicaid expansion made it easier to get the health care that I needed” (strongly agree to strongly disagree)</p>
Denominator	Number of survey participants.
Baseline Value(s)	--
Sampling Methodology	Random/weighted sampling
Anticipated Data Source	Beneficiary survey

Hypothesis 1.9: Enrollees will report satisfaction with their ability to access health care as a result of the expanded coverage.

Characteristic	Detail Description
Measure Title	Enrollee satisfaction with Medicaid expansion coverage
Measure Description	Surveyed enrollees ranking of their health care coverage using 0-10 scale (0=worst health care possible, 10=best health care possible)
NQF Number	--
Measure Steward	AHRQ CAHPS Question Modification
Numerator	<p>Mean of health care scores provided by survey beneficiaries.</p> <p><i>Sample question:</i></p>

Characteristic	Detail Description
	"Using any number from 0 to 10, where 0 is the worst health care possible and 10 is the best health care possible, what number would you use to rate all your health care"
Denominator	Number of survey participants.
Baseline Value(s)	--
Sampling Methodology	Random/weighted sampling
Anticipated Data Source	Beneficiary survey

Domain 2: Access to TCM

The approved demonstration would provide an expanded benefit, specifically TCM, to facilitate needed medical, social, educational and other services to a cohort of individuals who were exposed to the contaminated water and are potentially at risk for physical or behavioral health consequences. Required elements of TCM have been described in MDHHS policy and include assessments, planning, linkage, advocacy, coordination, referral, monitoring and follow-up activities.

The sub-hypotheses identified for Domain 2 were selected for their relevance to aspects of the TCM responsibilities and goals. Specifically, the measures focus on the TCM objectives to facilitate needed screening as well as identify and manage individuals believed to be high-risk for lead exposure.

We would explore the feasibility of adding an additional hypothesis to this domain focusing on utilization of educational supports for children however these data are limited by federal regulation. The work to create the newly funded registry could help address the legal and data seeking hurdles we will face. The evaluation team will continue to pursue opportunities by which these data can be accessed or made available to contribute to the evaluation. For continuous outcome measures we will use *t*-test and for discrete outcomes we will use chi-square test if the sample size is large. In the event that few individuals access TCM services we will use nonparametric rank test for continuous outcomes and exact test for discrete outcomes to carry out the analyses.

Hypotheses

2. *“Enrollees who access TCM services will access needed medical, social, educational, and other services at a rate higher than others with similar levels of lead exposure.”*

- Hypothesis 2.1: Referral source and participation levels with TCM will be tracked among enrollees.
- Hypothesis 2.2: All TCM participants will have an annual assessment conducted.
- Hypothesis 2.3: A greater proportion of TCM participants will have age-appropriate well child exams compared to TCM non-participants.
- Hypothesis 2.4: A greater proportion of TCM participants will have completed age-appropriate developmental screening compared to TCM non-participants.

Hypothesis 2.1: Referral source and participation levels with TCM will be tracked among enrollees.

Characteristic	Detail Description	Detail Description
Measure Title	Referral Source	TCM Participation
Measure Description	The percentage of enrollees in the region who participate with the TCM expanded benefit by referral source (primary care physician vs. Medicaid health plan vs. self-referral)	The percentage of enrollees in the region who participate with the TCM expanded benefit.
NQF Number	n/a	n/a
Measure Steward	n/a	n/a

Characteristic	Detail Description	Detail Description
Numerator	Percentage of enrollees having at least 1 visit with TCM referred by: <ul style="list-style-type: none"> • their primary care physician • their Medicaid Health Plan • Self-referral • Others 	Percentage of enrollees having at least 1 visit with TCM
Denominator	Total number of enrollees participating with TCM	Total number of enrollees eligible to receive TCM
Baseline Value(s)	n/a	n/a
Sampling Methodology	No sampling – plan to use 100% TCM documentation	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	TCM documentation visit data	Administrative claims/encounters in the MDHHS data warehouse linked to TCM billing/documentation visit data

Hypothesis 2.2: All TCM participants will have an annual assessment conducted.

Characteristic	Detail Description
Measure Title	Annual TCM Assessment
Measure Description	The percentage of TCM participants who had 1 reassessment within one year of original assessment.
NQF Number	n/a
Measure Steward	n/a
Numerator	Number of enrollees having a completed reassessment within 365 days of initial assessment.
Denominator	Total number of enrollees who had contact with TCM.
Baseline Value(s)	n/a
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse linked to TCM billing/documentation visit data

Hypothesis 2.3: A greater proportion of TCM participants will have age-appropriate well child exams compared to TCM non-participants.

Characteristic	Detail Description
Measure Title	Impact of TCM in assuring enrollees obtain age-appropriate well-child exams.
Measure Description	Reference to Hypothesis 1.1 – will further analyze NQF #1392 measure by TCM participation status.
NQF Number	1392
Measure Steward	National Committee for Quality Assurance
Numerator	TCM participants meeting Hypothesis 1.1 numerator elements
Denominator	Total number of enrollees eligible to receive TCM.
Baseline Value(s)	--
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse linked to TCM billing/documentation to identify participation status

Hypothesis 2.4: A greater proportion of TCM participants will have completed age-appropriate developmental screening compared to TCM non-participants.

Characteristic	Detail Description
Measure Title	Impact of TCM in assuring enrollees obtain age-appropriate developmental screenings.
Measure Description	Reference to Hypothesis 1.2 – will further analyze measures by TCM participation status (both #1448 and the new evaluation measure: socio-emotional/behavioral screening)
NQF Number	1448
Measure Steward	Oregon Health & Science University
Numerator	TCM participants meeting Hypothesis 1.2 numerator elements
Denominator	Total number of enrollees eligible to receive TCM.
Baseline Value(s)	--
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse linked to TCM billing/documentation to identify participation status

Domain 3: Improved Health Outcomes

The approved demonstration would provide opportunities for access to health care and additional supports leading to improved overall health status and health outcomes for eligible individuals who were exposed to the lead contaminated water and who are potentially at risk for physical and behavioral health consequences.

The sub-hypotheses identified for Domain 3 were selected for their relevance to health outcomes that might be susceptible to lead exposure among individuals who would be identified as high-risk for lead exposure and represent the target population for the waiver application. They represent measures of optimum care which presumably would be facilitated through the increased access to health care coverage and the involvement of TCM. While some of these more accurately may be described as process measures, the association of each with optimized health status is well documented.

Using the potential comparison groups identified in the prior section, we will carry out the testing of the hypotheses using the paired *t*-test, McNemar chi-square test. When certain risk factors are not balanced despite the effort of matching we will use regression adjustment to control these factors via linear or generalized linear mixed effects models.

Hypotheses

3. *“Enrollees will have improved health outcomes compared to others with similar levels of lead exposure.”*
 - Hypothesis 3.1: Enrollees will have higher completed age-appropriate immunization statuses compared to others with similar lead exposures.
 - Hypothesis 3.2: Enrollees who are pregnant will deliver infants with higher birth weights compared to others with similar lead exposures.
 - Hypothesis 3.3: Enrollees report an increase in their self-reported health status over the duration of their enrollment.

The following hypotheses are suggested as outcomes that may be investigated should the necessary data be made available to the evaluation team. We will incorporate some questions regarding behavioral and educational development for parent/guardian self-report into our planned surveys. We will further work with the registry development team to explore opportunities to work collaboratively and potentially share data with Michigan Department of Education staff at the beneficiary level.

- *Provisional Hypothesis 3.4: We will conduct a descriptive analysis of the proportion of children diagnosed with severe emotional disturbance and other developmental/learning disabilities including comparing rates to others with similar lead exposures.*
- *Provisional H3.5: Descriptive analysis of behavioral health conditions among enrolled children (i.e. rate/proportion of children suspended or expelled).*
- *Provisional H3.6: Descriptive analysis of educational delays among enrolled children (i.e. rate/proportion of children receiving special education services – IEPs, early preschool performance, reading and math scores at end of grades 3, 4, and 5)*

Hypothesis 3.1: Enrollees will have higher completed age-appropriate immunization statuses compared to others with similar lead exposures.

Characteristic	Detail Description	Detail Description
Measure Title	Childhood Immunization Status	Immunizations for Adolescents
Measure Description	Percentage of children 2 years of age who had 4 diphtheria, tetanus and acellular pertussis (DtaP); three polio (IPV); one measles, mumps and rubella (MMR); three H influenza type B (HiB); three hepatitis B (HepB); one chicken pox (VZV); four pneumococcal conjugate (PCV); one hepatitis A (HepA); two or three rotavirus (RV); and two influenza (flu) vaccines by their second birthday.	Percentage of adolescents 13 years of age who had the recommended immunizations (meningococcal vaccine and one tetanus, diphtheria toxoids and acellular pertussis vaccine (Tdap) or one tetanus, diphtheria toxoids vaccine (Td)) by their 13 th birthday.
NQF Number	0038	1407
Measure Steward	National Committee for Quality Assurance	National Committee for Quality Assurance
Numerator	# children who received the recommended vaccines by their second birthday. Separate rates calculated for each vaccine as well as 9 separate combination rates.	# adolescents 13 years of age who had one dose of meningococcal vaccine and one tetanus, diphtheria toxoids and acellular pertussis vaccine (Tdap) or one tetanus, diphtheria toxoids vaccine (Td) by their 13 th birthday.
Denominator	# children who turn 2 years of age during the measurement period.	# adolescents who turn 13 years of age during the measurement period.
Baseline Value(s)	Baseline values will be obtained from multiple sources: <ul style="list-style-type: none"> Existing statewide Medicaid weighted average reports Region specific estimates will be calculated for a measurement period prior to and after the water switch. 	Baseline values will be obtained from multiple sources: <ul style="list-style-type: none"> Existing statewide Medicaid weighted average reports Region specific estimates will be calculated for a measurement period prior to and after the water switch.
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse	Administrative claims/encounters in the MDHHS data warehouse

Hypothesis 3.2: Enrollees who are pregnant will deliver infants with higher birth weights compared to others with similar lead exposures.

Characteristic	Detail Description
Measure Title	Low Birth Weight Rate
Measure Description	Low birth weight (<2500 gram) infants per 1,000 newborns (excluding transfers)
NQF Number	0278
Measure Steward	Agency for Healthcare Research & Quality
Numerator	# of newborns, among cases meeting inclusion/exclusion rules for the denominator, with any-listed ICD-9-CM (ICD-10) diagnosis codes for birth weight less than 2,500 grams.
Denominator	# of newborns in region
Baseline Value(s)	Baseline values will be obtained from multiple sources: <ul style="list-style-type: none"> Existing statewide Medicaid weighted average reports Region specific estimates will be calculated for a measurement period prior to and after the water switch.
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse linked to Vital Records

Hypothesis 3.3: Enrollees report an increase in their self-reported physical and behavioral/emotional health status and their ability to manage chronic conditions over the duration of their enrollment.

Characteristic	Detail Description	Detail Description
Measure Title	Enrollee Self-Reported Health Status	Enrollee Self-Reported Efficacy of Chronic Condition Management
Measure Description	Surveyed enrollees self-evaluation for overall health status.	Surveyed enrollees self-evaluation for managing chronic conditions
NQF Number	--	--
Measure Steward	AHRQ CAHPS/BRFSS Question Modification	--
Numerator	<p>Number of respondents participating with at least 2 survey waves who have an increase in the level of self-reported health status.</p> <p><i>Sample questions:</i> “In general, how would you rate your overall health?” (excellent/very good/good/fair/poor)</p> <p>“In general, how would you rate your overall mental or emotional health?” (excellent/very good/good/fair/poor)</p>	<p>Number of respondents participating with at least 2 survey waves who report efficacy in managing chronic conditions.</p> <p><i>Sample Tools:</i> Adult/Pediatric Asthma Control Test</p>
Denominator	Number of survey participants.	Number of survey participants.

Characteristic	Detail Description	Detail Description
Baseline Value(s)	--	--
Sampling Methodology	Random/weighted sampling	Random/weighted sampling
Anticipated Data Source	Beneficiary survey responses	Beneficiary survey responses

Provisional Hypothesis 3.4: We will conduct a descriptive analysis of the proportion of children diagnosed with severe emotional disturbance and other developmental/learning disabilities including comparing rates to others with similar lead exposures.

Characteristic	Detail Description
Measure Title	Enrollee Diagnosed with Severe Emotional Disturbance, Developmental and/or Learning Disabilities
Measure Description	Proportion of enrollees having diagnosis code(s) of interest
NQF Number	--
Measure Steward	--
Numerator	Number of enrollees diagnosed with condition(s) of interest
Denominator	Number of enrollees
Baseline Value(s)	--
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse

Provisional Hypothesis 3.5: Descriptive analysis of behavioral health conditions and supportive care among enrolled children (i.e. rate/proportion of children suspended or expelled).

Characteristic	Detail Description	Detail Description	Detail Description
Measure Title	Prevalence of behavioral health conditions among enrolled children	Count of children enrolled in Early Childhood Programs	Proportion of students in Kindergarten who participated in Early Childhood Programs
Measure Description	Surveyed enrollees identify behavioral health conditions that exposed children are experiencing according to parent/guardian report.	MDE reporting based on county and school district level.	MDE reporting based on county and school district level.
NQF Number	--	--	--
Measure Steward	--	--	--
Numerator	Number of children identified as having behavioral health condition diagnosed by a health care provider and reported by parent/guardian. <i>Sample questions:</i> "Has a health care provider ever diagnosed your child with a behavioral health condition?"		

Characteristic	Detail Description	Detail Description	Detail Description
	“Has a daycare or school employee ever told you your child has a behavioral health condition?”		
Denominator	Number of survey participants.		
Baseline Value(s)	--	Historical reporting back to 2013.	Historical reporting back to 2013.
Sampling Methodology	Random/weighted sampling	n/a	n/a
Anticipated Data Source	Beneficiary survey	MDE Reporting	MDE Reporting

Provisional Hypothesis 3.6: *Descriptive analysis of educational delays among enrolled children (i.e. rate/proportion of children receiving special education services – IEPs, early preschool performance, reading and math scores at end of grades 3, 4, and 5).*

Characteristic	Detail Description	Detail Description	Detail Description
Measure Title	Prevalence of educational delays among enrolled children	Counts of children remaining in same grade	Educational Progress Standardized Testing (M-STEP, MI-Access)
Measure Description	Surveyed enrollees identify educational delays that exposed children have received from education providers.	MDE reporting based on county and school district level.	MDE reporting based on county and school district level.
NQF Number	--	--	--
Measure Steward	--	--	--
Numerator	Number of children identified as having educational delays identified by an educational provider. <i>Sample questions:</i> “Has a daycare or school employee ever told you your child does not learn as other children who are the same age?”		Specific elements TBD in collaboration with MDE
Denominator	Number of survey participants.		
Baseline Value(s)	--	Historical reporting back to 2013.	Historical reporting back to 2013.
Sampling Methodology	Random/weighted sampling	n/a	n/a
Anticipated Data Source	Beneficiary survey	MDE Reporting	MDE Reporting

Domain 4: Lead Hazard Investigation

The waiver supports a lead hazard investigation program intended to reduce the estimated expected ongoing or re-exposure to lead hazards. This benefit covers an evaluation of potential sources of lead for eligible members even in the absence of elevated blood levels. Abatement services are not directly funded through this mechanism.

The hypothesis identified for Domain 4 will rely on monitoring the frequency with which eligible beneficiaries receive lead hazard assessment/investigation services (screening through the TCM process and formal environmental investigation). We will request information on abatement activities conducted by authorized organizations and include this as available.

Hypothesis

- 4. *“The lead hazard investigation program will reduce estimated expected ongoing or re-exposure to lead hazards in the absence of this program.”*
 - 4.1: Beneficiaries without elevated blood lead levels and participating with TCM services will access lead hazard assessment/investigation services to the same degree as beneficiaries with elevated blood lead levels.
 - 4.2: Beneficiaries found to be at risk for ongoing lead exposure will be referred for additional environmental investigation.

Hypothesis 4.1: Beneficiaries without elevated blood lead levels and participating with TCM services will access lead hazard assessment/investigation services to the same degree as beneficiaries with elevated blood lead levels.

Characteristic	Detail Description
Measure Title	Prevalence of Lead Hazard Assessment/Investigation
Measure Description	Proportion of beneficiaries covered by the waiver having a lead hazard investigation conducted. This will be further subdivided by elevated blood lead level (>=5 mcg) and proportions compared for non-elevated vs. elevated cohorts.
NQF Number	--
Measure Steward	--
Numerator	# of beneficiaries covered by the waiver participating with TCM (submission of T2024)
Denominator	# beneficiaries covered by the waiver
Baseline Value(s)	Baseline values may be available through billing for environmental investigations – this would provide a reference for the cohort of individuals having elevated lead levels.
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse linked to Blood lead level data

Hypothesis 4.2: Beneficiaries found to be at risk for ongoing lead exposure will be referred for additional environmental investigation.

Characteristic	Detail Description
Measure Title	Prevalence of Lead Hazard Follow-up Investigation
Measure Description	Proportion of beneficiaries covered by the waiver found to be at high-risk/fail a lead assessment and referred for follow-up environmental assessment. This will be further subdivided by elevated blood lead level (≥ 5 mcg) and proportions compared for non-elevated vs. elevated cohorts.
NQF Number	--
Measure Steward	--
Numerator	# of beneficiaries covered by the waiver with elevated blood lead level receiving environmental investigation (submission of T1028EP, T1029, T1029TS)
Denominator	# beneficiaries covered by the waiver
Baseline Value(s)	Baseline values may be available through billing for environmental investigations – this would provide a reference for the cohort of individuals having elevated lead levels.
Sampling Methodology	No sampling – plan to use 100% available claims/encounter data
Anticipated Data Source	Administrative claims/encounters in the MDHHS data warehouse linked to Blood lead level data

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
DOMAIN 1: Access to Care			
H1.1: A greater proportion of enrollees will obtain age-appropriate well-child exams compared to others with similar lead exposures.	1. Well Child Visits in the First 15 months of Life	National Committee for Quality Assurance/NQF 1392	Administrative claims/encounters in the MDHHS data warehouse
	2. Well Child visits in the Third, Fourth, Fifth and Sixth Years of Life	National Committee for Quality Assurance/NQF 1516	Administrative claims/encounters in the MDHHS data warehouse
	3. Adolescent Well-Care Visits	National Committee for Quality Assurance	Administrative claims/encounters in the MDHHS data warehouse
H1.2: A greater proportion of enrollees will receive age-appropriate developmental screening/assessments compared to others with similar lead exposures	1. Developmental Screening in the First Three Years of Life	Oregon Health & Science University /NQR 1448	Administrative claims/encounters in the MDHHS data warehouse
	2. Socio-emotional/ Behavioral Screening for Children 4-17 years of age	n/a	Administrative claims/encounters in the MDHHS data warehouse
H1.3: A greater proportion of enrollees will receive age appropriate lead testing compared to others with similar lead exposures	1. Lead Screening in Children	National Committee for Quality Assurance	Administrative claims/encounters in the MDHHS data warehouse
H1.4: A greater proportion of enrollees with high blood lead levels will receive re-testing at the appropriate intervals compared to others with similar lead exposures	1. Follow-up of elevated blood lead level	Early and Periodic Screening, Diagnostic, and Treatment (EPSDT)- CMS/American Academy of Pediatrics	Administrative claims/encounters in the MDHHS data warehouse linked to lead screening and TCM monitoring data
H1.5: Enrollees who are pregnant will have more timely prenatal and postpartum care compared to others with similar lead exposures.	1. Timeliness of Prenatal Care	National Committee for Quality Assurance/NQF 1517	Administrative claims/encounters in the MDHHS data warehouse linked to Vital Records
	2. Postpartum Care	National Committee for Quality Assurance/NQF 1517	Administrative claims/encounters in the MDHHS data warehouse linked to Vital Records

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
H1.6: A greater proportion of enrollees who are pregnant will have recommended lead testing compared to others with similar lead exposures	1. Lead screening in pregnancy	American Congress of Obstetricians and Gynecologists	Administrative claims/encounters in the MDHHS data warehouse linked to Vital Records data
H1.7: A greater proportion of enrollees will participate with home visiting services compared to others with similar lead levels.	1. Maternal Infant Health Program Participation	MI defined measure	Administrative claims/encounters in the MDHHS data warehouse linked to MIHP visit and TCM monitoring data
H1.8: Enrollees will attest to improved access to health care as a result of the expanded coverage.	1. Enrollee Attestation for Improved Access to Care	Agency for Healthcare Research and Quality – Consumer Assessment of Healthcare Providers and Systems (AHRQ-CAHPS) Question Modification	Beneficiary survey responses
H1.9: Enrollees will report satisfaction with their ability to access health care as a result of the expanded coverage.	1. Enrollee satisfaction with Medicaid expansion coverage	Agency for Healthcare Research and Quality – Consumer Assessment of Healthcare Providers and Systems (AHRQ-CAHPS) Question Modification	Beneficiary survey responses
DOMAIN 2: Access to Targeted Case Management			
H2.1: Referral source and participation levels with TCM will be tracked among enrollees	1. Referral Source for TCM	MI defined measure	TCM documentation visit data
	2. TCM Participation	MI defined measure	Administrative claims/encounters in the MDHHS data warehouse linked to TCM billing/documentation
H2.2: All TCM participants will have an annual assessment conducted.	1. Annual TCM assessment	MI defined measure	Administrative claims/encounters in the MDHHS data warehouse linked to TCM billing/documentation

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
H2.3: A greater proportion of TCM participants will have age-appropriate well child exams compared to TCM non-participants	1. A greater proportion of TCM participants will have age-appropriate well child exams compared to TCM non-participants	National Committee for Quality Assurance /NQF 1392	TCM Program documentation linked to Administrative claims/encounter data available through the MDHHS data warehouse.
H2.4: A greater proportion of TCM participants will have completed age-appropriate developmental screening compared to TCM non-participants	1. Impact of TCM in assuring enrollees obtain age-appropriate developmental screenings.	Oregon Health & Science University/NQF 1448 and new evaluation measure (socio-emotional/behavioral screening)	Administrative claims/encounters in the MDHHS data warehouse linked to TCM billing/documentation visit data
DOMAIN 3: Improved Health Outcomes			
H3.1: Enrollees will have higher completed age-appropriate immunization statuses compared to others with similar lead exposures	1. Childhood Immunization Status	National Committee for Quality Assurance/NQF 0038	Administrative claims/encounters in the MDHHS data warehouse
	2. Immunizations for Adolescents	National Committee for Quality Assurance/NQF 1407	Administrative claims/encounters in the MDHHS data warehouse
H3.2: Enrollees who are pregnant will deliver infants with higher birth weights compared to others with similar lead exposures	1. Low Birth Weight Rate	Agency for Healthcare Research & Quality/NQF 0278	Administrative claims/encounters in the MDHHS data warehouse linked to Vital Records
H3.3: Enrollees report an increase in their self-reported health status over the duration of their enrollment.	1. Enrollee Self-Reported Health Status	AHRQ/CAHPS Question Modification	Beneficiary survey responses
	2. Enrollee Self-Reported Efficacy of Chronic Condition Management	Adult and Pediatric Condition Management Self-Efficacy (ex. Asthma Control Test)	Beneficiary survey responses
<i>PROVISIONAL</i> H3.4: Descriptive analysis of the proportion of children diagnosed with severe emotional disturbance and	1. Proportion of enrollees having diagnosis code(s) of interest	MI defined measure	Administrative claims/encounters in the MDHHS data warehouse

Hypotheses	Measures	Steward/NQF #	Targeted Data Source(s)
other developmental/learning disabilities including comparing rates to others with similar lead exposures.			
<i>PROVISIONAL</i> H3.5: Descriptive analysis of behavioral health conditions and supportive care among enrolled children.	<ol style="list-style-type: none"> 1. Prevalence of behavioral health conditions among enrolled children 2. Count of children enrolled in Early Childhood Programs 3. Proportion of students in Kindergarten who participated in Early Childhood Programs 	MI defined measure	Beneficiary survey responses MDE Data
<i>PROVISIONAL</i> H3.6: Descriptive analysis of educational delays among enrolled children.	<ol style="list-style-type: none"> 1. Prevalence of educational delays among enrolled children 2. Counts of children remaining in same grade 3. Educational Progress Standardized Testing (M-STEP, MI-Access) 	MI defined measure	Beneficiary survey responses MDE Data
DOMAIN 4: Lead Hazard Investigation			
H4.1: Enrollees without elevated blood lead levels and participating with TCM services will access lead hazard investigation services to the same degree as beneficiaries with elevated blood lead levels.	<ol style="list-style-type: none"> 1. Prevalence of Lead Hazard Assessment/Investigation 	MI defined measure	Administrative claims/encounters in the MDHHS data warehouse linked to Blood lead levels
H4.2: Beneficiaries found to be at risk for ongoing lead exposure will be referred for additional environmental investigation	<ol style="list-style-type: none"> 2. Prevalence of Lead Hazard Follow-up Investigation 	MI defined measure	Administrative claims/encounters in the MDHHS data warehouse linked to Blood lead levels

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Flint, Michigan Section 1115 Demonstration

#11W 00302/5

March 3, 2016 – September 14, 2021

**FME Enrollee Survey
Summary Report**

Submitted: 10/31/22

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Executive Summary

This document serves as a detailed report of the Enrollee Survey (ES) component administered as part of the Flint Medicaid Expansion (FME) Waiver Evaluation. As a supplement to the enrollee health care claims/encounter data, ES data represented rich qualitative data to augment the administrative data in order to inform the full evaluation. The survey included self-reported data pertaining to the four domains of the FME Waiver; 1) Domain 1: access to services; 2) Domain 2: access to Targeted Case Management (TCM); 3) Domain 3: improved health outcomes; and 4) Domain 4: lead hazard investigation. These domains guided the structure of the survey questionnaires. The enrollee surveys were leveraged to collect data to fill gaps in administrative data including water use, pipe replacement, and child development. Due to the Covid-19 pandemic, additional questions were added to the 2020 and 2021 surveys to understand the pandemic's impact on the residents of Flint. This report is organized by the four domains and the additional part.

The sampling frame, i.e., the target population, for the survey was based on FME enrollees in the first six months of 2018, as identified through the Medicaid enrollment monthly files. The target population was stratified by age and residence status. Survey participation methods included online through the internet, call in by telephone and mailed hard copies. All survey modes were coordinated and managed by Michigan State University's Institute for Public Policy and Social Research, Office for Survey Research (IPSSR-OSR). Adults (age greater than or equal to 18) and children used separate questionnaires although the structures of questions were similar. Identified individuals were kept in their originating assignment of adult vs. child, even if they aged from child to adult during the four years. This decision was made to have consistent information over the full survey timeframe.

The surveys were administered in a total of four waves: 1) Wave 1 in 2018 and three follow-up waves, 2) Wave 2 (2019-2020), 3) Wave 3 (2020-2021), and 4) Wave 4 (2021-2022). The initial response rate to Wave 1 approached 30%, which is generally felt to be low. However, considering this was a hard-to-reach population that had been surveyed extensively due to the water crisis and were reported as having survey fatigue, the evaluation team was pleased with this rate. Additionally, we had excellent follow-up rates of over 65% in Wave 2 of the Wave 1 survey respondents although the rates decreased in Waves 3 and 4.

Overall, more than 80% of child survey participants said FME helped them access care for their child and were generally satisfied with the FME experience although no significant changes were noted over time. A significant increase in the proportion of child survey responses agreed that providers were working in their child's best interest. While the overall numeric ranking of FME satisfaction statistically decreased from 7.4 at Wave 1 to 7.3 at Wave 4, this small variation may be unlikely to be impacted by adjustments in waiver operations. Low utilization, approximately 10% of respondents, of TCM was reported confirming the pattern identified in health care administrative data. However, out of those who were engaged, they utilized services in a consistent manner and had confidence and trust in their TCM coordinator.

Children's reported health status scores improved significantly over time for overall health and well as for physical and behavioral health individually. We also saw that for those having children with chronic conditions, a significant increase in the proportion of those reporting increased access to resources and confidence to manage these conditions was noted from Wave 1 to Wave 4. Significant decreases were reported in the proportion of participants who reported being told their child should be evaluated for learning problems or behavioral or emotional problems. Regarding lead exposure, a statistically significant decline in the proportion of respondents who identified having a child with a high blood lead level was observed despite the apparent increased use of the tap water.

Recommendations to address enrollee engagement include emphasizing timelines associated with program development and implementation. Particularly, the period from the water crisis start to the availability of services was two years. When timeframes are prolonged, additional investments regarding communication and dissemination may be needed for all audiences on a continual basis. Expediting identification and delivery of services may be facilitated through planning and design of *ready response teams* who would have the authority to implement changes in an expedited fashion. The ongoing collaboration of trusted community partners in designing the features of any program intended to mitigate a public health emergency such as the Flint Water Crisis is critical to promote individual participation.

Introduction

As part of the total evaluation for the Flint Medicaid Expansion (FME) Waiver, this report provides the in-depth information collected during the four waves of the FME enrollee survey process. An abbreviated version of these findings is included in the final report. Qualitative surveys were conducted for adult and child enrollees of the waiver to capture contextual information regarding enrollee experience with the waiver including utilization, satisfaction, and engagement. Qualitative information was utilized to augment administrative health care data reported in the summative evaluation report. Due to the timeframe required to finalize the evaluation plan, establish the contract for the work, and receive approvals on survey related documents and processes, the first survey was not implemented until 2018.

The survey questions were aligned with FME Waiver Domains and Hypotheses (See Appendix 1 in the summative Final Report). The four survey waves were given approximately one year apart. Additionally, questions were added to the latter waves to explore how the COVID-19 pandemic affected enrollee needs for resources and services available through the waiver. This report examines Wave 1-4 survey findings and considers public health implications regarding the utilization of targeted case management (TCM) services. Feedback from the community identified the term “targeted case management” was not well received. The preferred terminology was Family Supports Coordination (FSC). This language was preferred as it reflected a more collaborative approach including enrollee input and engagement with identifying needs rather than being labeled as an item that needed to be managed by an outside body. Thus, the surveys were written to include the term Family Supports Coordination (FSC) when seeking data regarding the Targeted Case Management (TCM) benefit. For this report, the TCM notation is used to coincide with the summative FME evaluation and existing domain and hypotheses language. Questionnaires are attached in Appendix 1 for children and Appendix 2 for adults.

Survey Design

Sampling Frame

The target population were beneficiaries enrolled in the FME Waiver program during the first six months from 1/1/2018 to 6/30/2018 (N=24,082). A stratified sampling method was used for selecting beneficiaries (Table 1).

First, because many former Flint residents had moved out of Genesee County after the water crisis in 2014, we stratified the target population to three groups according to the beneficiary's addresses during the six months, including "Always in Genesee" referring to Genesee County as the only residence; "In and Out of Genesee" referring to residency in Genesee at some point and other counties at some point in the six months, and "Never in Genesee" referring to never living in Genesee in the six months. Second, because the Waiver program targeted children and pregnant women, we stratified the target population based on enrollees' age (0 to 6, 7 to 17, 18 to 22, 23 and above).

Because the number of beneficiaries in the "In and Out of Genesee" group and the number of beneficiaries who were older than 22 years was small, we used 100% sampling for these strata. For the rest of the strata, we used a 50% random sampling. The final selected sample size was N=11,453 (Table 1).

Table 1. Number of beneficiaries in the target population and selected for survey

Age Category	Residence Category			Total
	Always in Genesee (row %)	In and out of Genesee (row %)	Never in Genesee (row %)	
Target population				
Total Target	21,584 (89.6)	384 (1.6)	2,114 (8.8)	24,082
Age 0-6	7,657 (88.3)	163 (1.9)	855 (9.9)	8,675
Age 7-17	11,791 (90.6)	181 (1.4)	1,051 (8.1)	13,023
Age 18-22	2,068 (90.1)	36 (1.6)	193 (8.4)	2,297
Age 23-64	68 (78.2)	* (4.6)	15 (17.2)	87
Selected Sample				
Total Selected	10,068 (87.9)	384 (3.4)	1,001 (8.7)	11,453
Age 0-6	3,559 (86.3)	163 (4.0)	404 (9.8)	4,126
Age 7-17	5,480 (80.0)	181 (2.9)	497 (8.1)	6,158
Age 18-22	961 (88.2)	36 (3.3)	92 (8.4)	1,089
Age 23-64	68 (85.0)	* (5.0)	8 (10.0)	80

* Cells less than or equal to 5 suppressed.

Survey Administration

The surveys were administered by the Michigan State University's Institute for Public Policy and Social Research, Office for Survey Research (IPSSR-OSR). Methods for survey participation were expanded from the original design based on feedback from Flint community members. The original survey design called for a paper or phone-in survey. Due to community feedback, a web-based component was added in time for Wave 1 dissemination. Over the years, Flint community residents have been inundated with academic and non-academic projects and programs operating in the area; therefore, the evaluation team was concerned that survey fatigue could adversely affect participation. The evaluation team requested and received approval to offer small monetary incentives to encourage survey completion. The incentive structure offered \$10.00 per completed survey and a \$20.00 bonus payment if the initial three waves were completed. The fourth wave was added later due to the state receiving an extension period of the original demonstration period through September 14, 2021. Enrollees were offered an additional \$10 for completing this final survey wave. The IPSSR-OSR processed the incentive payments and sent them to the participants.

The sampled beneficiaries in Wave 1 were randomly divided into four batches on a rolling schedule to track and manage the mailing process. All survey materials were only available in English; the survey included a question asking whether the participant received assistance interpreting and completing the survey. The preliminary notification letter included instructions on how to access the website address or to call-in to the survey center at IPSSR-OSR to complete the survey. For child participants, their notification letter and surveys were sent to their parent/caregiver of record as identified through the Medicaid Data Warehouse. Participants were informed they would receive a paper version after four weeks if no response was received through either telephone or internet. All paper surveys were processed through double blind data entry with verification processes such as duplicate data entry. Surveys completed by telephone were subject to real-time monitoring by supervisory staff.

In the case of no response, a second mailing with a paper copy of the survey was sent using the same batch assignment. The cover letter accompanying the survey referred the beneficiary to alternative participation options via telephone or web-based survey. A third letter was sent in the event of no response to the paper copy after three weeks. This letter reminded individuals of the telephone and web options and invited individuals to request another paper version if they had misplaced the one originally sent. To ensure correct contact information, check-in postcards were sent between survey waves asking respondents to update their contact information. The survey process for Waves 2-4 included sending participants who gave their email or telephone number with permission to text electronic reminders with embedded survey links. If no response to the electronic notification occurred, these individuals received a paper mailing invitation following the same protocol as for Wave 1.

The web-based option was programmed into Qualtrics. Qualtrics is an online survey platform that organizes data intended for statistical analyses (Qualtrics, Inc. Provo, UT). A shortened web address was created to reduce the keystrokes required of participants to reach the survey page.



Access to the survey was controlled using the study ID and each study ID could be used one time to prevent participants from completing the survey more than once. The online survey was further protected from non-FME enrollee participation by restrictions imposed on the ability of internet search engines to locate the survey. Web-based responses to the survey were directly entered by the respondent and captured by Qualtrics software in a database readily accessible to spreadsheet and statistical software.

Analytic Methods

Because the target population was fixed (N=24,082), all analyses were performed following the survey design, sampling weights, post-stratification weights, and finite population correction. The design-based sampling weight (bw_i) for individual i was the inverse of the probability of being sampled, which was generated by dividing the number of target population by the number of selected samples in each stratum in **Table 1**. The finite sample correction was used to derive the target population in each sampling stratum. We also used post-stratification to ensure the race/ethnicity and adult/child distributions were the same as those in the target population. Weighted descriptive statistics for each wave were presented separately.

Non-response Adjusted Weights

Non-response and loss-to-follow-up in longitudinal surveys were inevitable. The non-response adjusted weight for individual i in Wave 1 was the product of bw_i and the inverse of the probability of responding at Wave 1. This weight, denoted by aw_i was the individual-level (level 2) weight in longitudinal analyses. In the follow-up waves, the inverse of the conditional probability of response at each wave conditional on being in Wave 1 was multiplied by aw_i to generate the final wave-specific weight fw_{it} . Dividing fw_{it} by aw_i produced the level 1 weight for individual i at Wave t , denoted by $cw_{t|i}$, as it was the conditional weight of being a responder in Wave t given individual i who responded in Wave 1. We used Medicaid enrollment data to find the demographic information (e.g., gender, race, program enrollments, poverty level) that were predictive of non-response in each wave. Longitudinal analyses of linear trends over time were carried out with cluster robust standard errors accounting for nesting of observations within the same beneficiary.

Analytic Models

To assess changes of outcomes of interest we had two inferential choices: design-based approach (Heeringa et al., 2010) and multi-level model-based approach (Rabe-Hesketh & Skrondal, 2006). The former is like a marginal modeling approach using the generalized estimating equations technique and the latter is a subject-specific modeling approach using random effects models. Since there is not one gold standard modeling choice (Carle, 2009), we compared 1) unweighted analysis, 2) marginal models, 3) multi-level models with three scaling methods of the level 1 weights. The first scaling method led to $sw1_{t|i} = cw_{t|i} \frac{\sum_{t=1}^{n_i} cw_{t|i}}{\sum_{t=1}^{n_i} cw_{t|i}^2}$; the second scaling method led to $sw2_{t|i} = cw_{t|i} \frac{n_i}{\sum_{t=1}^{n_i} cw_{t|i}}$; and the third scaling method changes the level 1 weight to $sw3_{t|i} = 1$ but scales the level 2 weight to $\sum_{t=1}^{n_i} cw_{t|i} \times aw_i$. We estimated three sets of models: unadjusted, adjusted by person-level covariates (age, race/ethnicity, residence county, poverty), and adjusted by person-level as well as census tract-level covariates (Social Vulnerability Indices in 2016 [SVI] and Childhood Opportunity Indices in 2015 [COI]) (Centers for Disease Control and Prevention, 2021; Heller School for Social Policy

and Management, Brandeis University, 2021). Higher SVI scores indicate more disadvantaged neighborhoods; but higher COI scores indicate more opportunities.

Survey Questions

As a supplement to enrollee administrative health care claims/encounter data, enrollee survey data represented another major data source to inform the FME Waiver Evaluation. The first part of the survey collected self-reported data regarding several domains of the demonstration evaluation: 1) Domain 1: Access to services; 2) Domain 2: Access to Targeted Case Management (TCM); 3) Domain 3: Improved health outcomes; and 4) Domain 4: Lead hazard investigation. These domains guided the structure of the survey questionnaires. The survey also collected qualitative data to address gaps noted in administrative data, including tap water use and pipe replacement, child development, and self-reported health status. Copies of the child survey tools are available in Appendix 1 while the adult survey tools are available in Appendix 2.

For Domain 1, at Wave 1, we asked for the reasons beneficiaries enrolled in the FME. Additionally, for Waves 1-4, we asked whether the FME waiver made it easier to get needed medical care as well as if they believed their healthcare providers worked in their best interest. In conjunction with questions about the quality of FME services, enrollees were asked to give an overall rating of the FME experience (0 worst to 10 best).

For Domain 2, throughout all survey waves, we asked whether the beneficiaries used any Targeted Case Management (TCM), the number of times the services were used, satisfaction toward TCM, as well as how and where beneficiaries met with their coordinators. To reiterate, references to TCM were replaced with the community preferred language of Family Supports Coordination in the surveys that were distributed. In Waves 3 and 4, due to low TCM utilization, questions were added to inquire about low utilization rates. In Wave 4, we asked those who had not used or did not know about TCM services whether they would like to receive information about TCM. If they responded “yes,” they were provided supplemental information as requested.

Domain 3 focused on improved health outcomes. To inform this, we asked whether beneficiaries had chronic health conditions such as asthma, diabetes, ADHD, autism, arthritis etc. For those who answered in the affirmative, we asked whether they had access to more resources to help with management of these chronic conditions and whether they felt more confident in managing these conditions. We also asked enrollees to rate their health status through their participation with the waiver. This domain also included the provisional topics regarding child education and development. They were deemed provisional at the time of the evaluation design since no reliable administrative data source was identifiable. Also, a request to waive Department of Education prohibitions on sharing identifiable student data to permit linking to health care records was denied. Thus, questions were added to provide a secondary source of these types of information. The evaluation team included several questions on the child version of the survey inquiring about school progression and parent/guardian reported learning problems and/or behavioral/emotional problems. The goal of these questions was to provide data regarding the possible relationship of child lead exposure and educational performance.

For Domain 4, we asked whether beneficiaries were exposed to lead through other sources (e.g., paint, dust or soil) and whether a child had been told by a doctor or nurse that they had an elevated blood lead level (EBLL). Since the administrative claims data contained no data on water sources and pipe replacement, we added questions regarding water supply in the enrollee households. These questions asked about utilization of tap water supplied by the City of Flint for drinking, cooking, brushing teeth, washing dishes, bathing/showering or washing clothes. Furthermore, we asked whether the beneficiary used a water filter and the types of filters used. Questions also inquired about enrollee knowledge about pipe replacement.

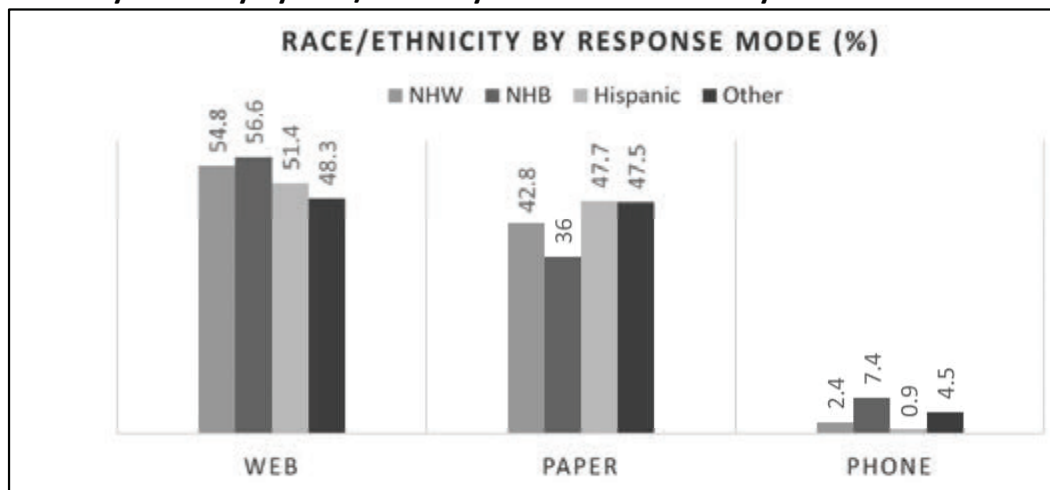
Wave 3 and 4 surveys occurred during the COVID-19 pandemic. As a result, we added relevant questions such as: “How has COVID-19 impacted you and your family?”, “How has COVID-19 impacted your access to healthcare services?”, and “How has COVID-19 pandemic impacted your access to mental health services?” to both the child and adult surveys.

Results

Among the 24,082 individuals in the target population, two individuals were not in the updated enrollment files. Therefore, they were excluded from analyses because no demographic, poverty or census tract level data were available. Results presented in this report reflect findings based on the 11,452 selected enrollees in this modified target population.

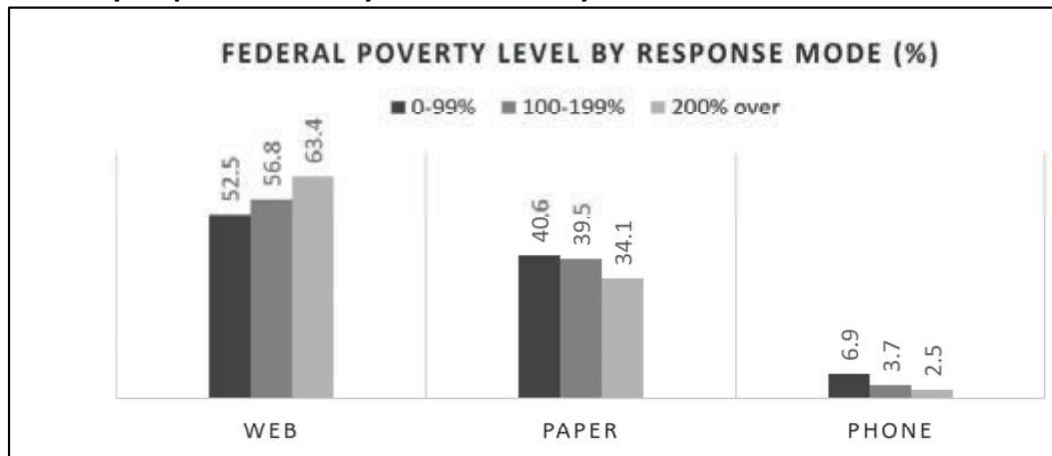
Web-based (Qualtrics) survey completion was the preferred response mode compared to telephone or paper survey response (Ford et al., 2022). During the initial planning, the evaluation team believed that paper and telephone surveys would be the preferred modality to collect data from the enrollees, due to the preconception about vulnerable populations having low internet access. However, community members indicated the internet would be the preferred response mode. To accommodate the community suggestions, the online modality was added along with paper and telephone options. As a result, over 50% of enrollees responded via internet and approximately 70% of all Wave 1 participants provided an email address for Wave 2. Figure 1 shows among non-Hispanic White (NHW), 55% completed the internet-based survey, 43% participated with a paper form, and 2.4% participated through telephone survey mode. Those identifying as non-Hispanic Blacks (NHB) had the same overall patterns of participation method with 57% web based, 36% paper, and 7.4% telephone.

Figure 1: Survey modality by race/ethnicity at the Wave 1 survey:



The presumption regarding the correlation between income level and web-based participation was evident among the survey participants. A positive correlation was observed between those at higher income thresholds and web-based survey participation. Thus, while the anticipated relationship was still documented among a more uniformly disadvantaged population, the experience with these enrollees suggest internet access can be accommodated at lower income thresholds. Figure 2 presents federal poverty levels against response mode.

Figure 2: Survey response mode by Federal Poverty Level.



Enrollee Survey Response Rates

Response rates did not include enrollees whose mailing address was incorrect or whose mail was returned without forwarding services. Out of the 11,452 randomly selected beneficiaries, 1,668 (15%) either had an incorrect address or returned mail. The new denominators (totals) are shown in **Table 2** (column 1). Among Wave 1 responders, at the time of Wave 2 survey, 169 beneficiaries had undeliverable mail. Column 3 shows the corrected denominators and response rates at Wave 2. Similar corrections were carried out for Wave 3 and Wave 4. Wave 3 denominators were higher than those of Wave 2 because some non-respondents of Wave 2 survey responded in Wave 3.

A total of 2,611 responded in Wave 1 (**Table 2**), with 2,386 children (27% response rate) and 225 adults (22% response rate). In Waves 2 through 4 we followed those who responded to the Wave 1 survey. The response rates for the three follow-up waves were 72%, 56%, and 32%, respectively. Because the Wave 4 survey was added in addition to the original designed surveys, beneficiaries were not expecting to receive the last survey, which might explain the lower response rate in Wave 4.

Table 2: Response rates by survey wave

Respondent Pool with (N)	Wave 1 Response N (%)	Wave 2 Response N/Wave 1 Responders with correct address (%)	Wave 3 Response N/Wave 1 Responders with correct address (%)	Wave 4 Response N/Wave 1 Responders with correct address (%)
Child (8,760)	2386 (27.2)	1625/2232 (72.8)	1311/2315 (56.6)	774/2320 (33.4)
Adult (1,024)	225 (22.0)	139/210 (66.2)	103/220 (46.8)	32/216 (14.8)
Total (9,784)	2611 (26.7)	1764/2442 (72.2)	1414/2535 (55.8)	806/2536 (31.8)

Table 3 shows the longitudinal response patterns among the 2611 responders in Wave 1. A total of 680 beneficiaries responded to all waves of the survey; 667 and 378 beneficiaries responded in the first three waves and first two waves of the survey, respectively. 708 beneficiaries responded only once in Wave 1.

Table 3: Longitudinal response patterns among the 2611 beneficiaries who responded in Wave 1

Wave 1	Wave 2	Wave 3	Wave 4	N
Yes	Yes	Yes	Yes	680
Yes	Yes	Yes	No	667
Yes	Yes	No	No	378
Yes	No	No	No	708
Yes	Yes	No	Yes	39
Yes	No	Yes	No	52
Yes	No	No	Yes	72
Yes	No	Yes	Yes	15

Non-response Adjusted Weights

Because the responders and non-responders to the Wave 1 survey differed systematically in age, gender, race, enrollment in Children’s Special Health Care Services (MI-Child), any month with evidence of buy-in benefit based on the Modified Adjusted Gross Income codes, and poverty levels (**Table 4** columns 1 and 2), we used these variables to generate the inverse probability weights for response and adjusted the design-based sampling weights to correct for potential non-response bias. Additionally, we used post-stratification for age and race to ensure the weighted sample had the same age and race distribution as the target population. **Table 4** (columns 3 and 4) shows the weighted distributions were all similar to those of the target population, indicating the general validity of the weights.

Table 4: Comparison between responders and non-responders in Wave 1 survey and weighted Wave 1 responders compared with the target population

Demographics	Unweighted Wave 1 Non-responders (N=8841) n (%)	Unweighted Wave 1 Responders (N=2611) n (%)	Wave 1 Responders Unweighted n (weighted %) (N=2611)	Target Population (N=24,080) n (%)
Age*				
0-6	3187 (36.0%)	939 (36.0%)	939 (35.8%)	8675 (36.0%)
7-17	4710 (53.3%)	1447 (55.4%)	1447 (54.3%)	13022 (54.1%)
18-22	882 (10.0%)	207 (7.9%)	207 (9.5%)	2296 (9.5%)
23-64	62 (0.7%)	18 (0.7%)	18 (0.4%)	87 (0.4%)
Sex*				
Female	4264 (48.2%)	1331 (51.0%)	1331 (48.4%)	11851 (49.2%)
Race*				
non-Hispanic white	2715 (30.7%)	919 (35.2%)	919 (32.9%)	7922 (32.9%)
non-Hispanic black	5247 (59.3%)	1447 (55.4%)	1447 (59.6%)	14351 (59.6%)
Hispanic/Other	405 (4.6%)	127 (4.9%)	127 (4.0%)	960 (4.0%)
Unknown	474 (5.4%)	118 (4.5%)	118 (3.5%)	847 (3.5%)
Residence county				
always in Genesee	7656 (86.6%)	2290 (87.7%)	2290 (90.4%)	21584 (89.6%)
in & out Genesee	464 (5.2%)	105 (4.0%)	105 (1.4%)	384 (1.6%)
never in Genesee	721 (8.2%)	216 (8.3%)	216 (8.2%)	2112 (8.8%)
Any month with CSHCS/MICHILD*	605 (6.8%)	231 (8.8%)	231 (7.4%)	1720 (7.1%)
Any month with MA/MAHMP	388 (4.4%)	93 (3.6%)	93 (4.3%)	1025 (4.3%)
Any month with other insurance	29 (0.3%)	** (0.2%)	** (0.1%)	75 (0.3%)
Any month with Flint Zip codes	7408 (83.8%)	2163 (82.8%)	2163 (83.6%)	20132 (83.6%)
Any month with buy-in (Modified Adjusted Gross Income)*	195 (2.2%)	95 (3.6%)	95 (2.6%)	636 (2.6%)
Poverty level*				
FPL 0~99%	6774 (76.6%)	1904 (72.9%)	1904 (75.7%)	18232 (75.7%)
FPL 100~195%	1707 (19.3%)	564 (21.6%)	564 (19.8%)	4750 (19.7%)
FPL 196~212%	79 (0.9%)	28 (1.1%)	28 (1.0%)	240 (1.0%)
FPL 213%+	281 (3.2%)	115 (4.4%)	115 (3.5%)	858 (3.6%)

* p-value <0.05 between responders and non-responders in the first two columns using chi-square tests.

** Cells less than or equal to 5 suppressed.

Child Surveys

The three approaches of testing for the linear trend of each outcome produced similar results. We presented the p-value based on the multi-level models with the first scaling method. This method is generally found to be preferred (Carle, 2009).

Domain 1: Access to Services

In Wave 1 of the enrollee survey, 85% of respondents to the child survey indicated that they were already enrolled in Medicaid. However, a small portion of survey participants reported the FME as a new form of coverage. Reasons for enrollment included accessing extra TCM services (11%), to have someone help with their children’s behavioral or emotional problems (10%), or to lower healthcare costs (7%) (**Table 5**).

Table 5. What were the reasons you enrolled your child in the Flint Medicaid Waiver?

		Unweighted n (weighted %)
To get the extra Family Supports Coordination/Targeted Case Management services from Genesee Health System or Genesee CHAP not usually paid for by Medicaid.	No	2135 (89.1%)
	Yes	251 (10.9%)
To get someone to help my child with behavioral or emotional services.	No	2148 (89.9%)
	Yes	238 (10.1%)
To lower the amount of money we pay for health care.	No	2220 (93.4%)
	Yes	166 (6.6%)

When asked about the ease of getting health care since enrolling in the FME waiver program, caregivers’ responses revealed that over 80% of them, collectively, thought it was easy or fairly easy to access care. There was no statistically significant decrease (p-value=0.17) in the proportions of those who had difficulties accessing care (**Table 6**).

In all waves, more than half of the respondents to the child’s questionnaire strongly agreed or agreed with the statement that the FME waiver made it easier to get the health care their child needed. There was no statistically significant decrease (p-value=0.24) in the proportions of respondents who disagreed or strongly disagreed with the statement.

When asked about whether the healthcare providers were working in their children’s best interest, the proportions strongly agreed or agreed with the statement increased significantly over time from a combined 64% to 69% (p-value<0.01).

When asked to rate their child’s overall FME waiver experience from 0 to 10 (0 is the worst and 10 the best), the average rating was above 7 in the four waves and the weighted linear mixed model indicated a significant decline in the rating from 7.4 to 7.3 (p-value=0.04). However, the weighted mixed ordinal logistic regression did not show a significant trend (p-value=0.14) possibly because the number of categories was too large for an ordinal model.

Table 6. Ease of access to care and ratings of the FME experience for children.

Children		Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	p-value*
Since enrolling in the Flint Medicaid waiver (or since the last survey date), how easy was it to get the medical care, tests, or treatment your child needed? For example, to see a doctor or a nurse, get vaccinations, etc.?	Easy	1285 (54.3%)	866 (53.7%)	693 (52.5%)	401 (52.3%)	0.17
	Fairly easy	683 (28.5%)	482 (29.3%)	440 (33.8%)	254 (33.0%)	
	Not easy, not difficult	308 (12.8%)	176 (10.9%)	120 (9.2%)	78 (9.7%)	
	Difficult	69 (2.9%)	69 (4.1%)	40 (3.0%)	31 (3.8%)	
	Very difficult	15 (0.6%)	15 (0.9%)	10 (0.8%)	7 (0.6%)	
	.	26 (1.0%)	17 (1.1%)	8 (0.6%)	5 (0.6%)	
Since the last survey date, being in the Flint Medicaid waiver made it easier to get the health care that my child needed.	Strongly agree	554 (23.6%)	369 (23.1%)	308 (23.6%)	178 (23.2%)	0.24
	Agree	796 (33.6%)	548 (34.3%)	493 (38.5%)	249 (32.6%)	
	Neutral	865 (35.8%)	569 (34.1%)	440 (32.6%)	286 (36.5%)	
	Disagree	108 (4.5%)	84 (5.0%)	46 (3.5%)	33 (3.8%)	
	Strongly disagree	44 (1.7%)	41 (2.6%)	15 (1.1%)	16 (2.0%)	
	.	19 (0.8%)	14 (0.9%)	9 (0.7%)	14 (1.9%)	
Since enrolling in the Flint Medicaid waiver (or since the last survey date), I feel that the health care providers are working in my child's best interest.	Strongly agree	596 (25.4%)	565 (35.0%)	458 (34.5%)	253 (32.5%)	<0.01
	Agree	926 (38.9%)	652 (40.0%)	571 (44.1%)	288 (37.3%)	
	Neutral	711 (29.3%)	326 (19.9%)	232 (17.3%)	179 (23.0%)	
	Disagree	99 (4.1%)	50 (3.1%)	34 (2.8%)	23 (2.8%)	
	Strongly disagree	31 (1.3%)	19 (1.2%)	9 (0.7%)	18 (2.4%)	
	.	23 (1.0%)	13 (0.9%)	7 (0.6%)	15 (2.0%)	
Choose a number from 0 to 10, where 0 is the worst and 10 the best, what number would you use to rate your child's overall Flint Medicaid waiver experience?	0	46 (1.9%)	33 (1.9%)	33 (2.6%)	16 (2.0%)	0.14
	1	18 (0.7%)	14 (0.9%)	10 (0.7%)	11 (1.5%)	
	2	25 (1.0%)	17 (1.0%)	18 (1.4%)	9 (1.1%)	
	3	40 (1.7%)	40 (2.5%)	44 (3.4%)	16 (2.1%)	
	4	69 (2.8%)	66 (4.1%)	73 (5.5%)	31 (4.0%)	
	5	361 (15.1%)	238 (14.5%)	152 (11.5%)	129 (16.4%)	
	6	176 (7.4%)	113 (6.6%)	101 (7.6%)	47 (6.1%)	
	7	279 (11.4%)	193 (11.9%)	113 (8.6%)	83 (10.9%)	
	8	440 (18.5%)	267 (16.2%)	203 (15.6%)	123 (15.6%)	
	9	283 (11.8%)	193 (12.0%)	171 (12.9%)	82 (10.5)	
	10	593 (25.3)	429 (27.0%)	344 (26.3%)	207 (27.1%)	
	.	56 (2.3%)	22 (1.4%)	49 (3.9%)	22 (2.8%)	
	Weighted Average score (standard error)	7.4 (0.04)	7.4 (0.04)	7.3 (0.05)	7.3 (0.07)	0.04**

* p-value based on multi-level ordinal logistic regression models with linear trend adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

** p-value based on linear mixed regression models with linear time trend adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

Domain 2: Access to TCM

Approximately 9-12% of caregivers reported utilization of TCM services at any point during the surveys. However, with a p-value of 0.22, there was no statistically significant change over time (Waves 1-4.) Of those who reported using TCM, the majority reported they were contacted by a coordinator 1-5 times throughout each wave and approximately 50% stated that they were very satisfied with their coordinator. These results suggest that there was a core group of enrollees who were actively engaged and satisfied with their coordinator, and this was stable over time.

Table 7. Utilization and satisfaction of the Family Supports Coordination/Targeted Case Management for children.

Children		Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	p-value*
1) Have you ever used any Family Supports Coordination/Targeted Case Management services for your child since enrolling in the Flint Medicaid waiver?	No	2111 (88.3%)	1395 (85.5%)	1157 (88.0%)	701 (89.8%)	0.22
	Yes	239 (10.2%)	191 (12.0%)	132 (10.3%)	66 (9.1%)	
	.	36 (1.5%)	39 (2.5%)	22 (1.7%)	9 (1.1%)	
2) Since the date you completed the last survey, have you used any Family Supports Coordination/Targeted Case Management services?	No	n.a.	1407 (86.3%)	1174 (89.4%)	689 (87.9%)	n.a.
	Yes	n.a.	174 (10.9%)	125 (9.7%)	74 (10.3%)	
	.	n.a.	44 (2.8%)	12 (0.9%)	13 (1.7%)	
How many times has your Supports Coordinator contacted you about your child in the last 6 months?***†	None	53 (23.0%)	35 (20.1%)	22 (19.1%)	21 (31.5%)	0.60
	1-5 times	110 (46.4%)	79 (45.9%)	61 (48.1%)	33 (46.3%)	
	6-12 times	30 (12.3%)	30 (16.7%)	13 (10.3%)	*** (1.1%)	
	13 or more	19 (8.3%)	11 (6.1%)	9 (8.2%)	7 (8.9%)	
	Don't know	24 (10%)	19 (11.2%)	19 (14.4%)	9 (12.3%)	
	.	2150	1451	1187	705	
Over the last 6 months how satisfied have you been with your child's Supports Coordinator? †	Very satisfied	120 (51.7%)	87 (50.5%)	53 (43.2%)	33 (45.3%)	0.50
	Somewhat satisfied	78 (32.6%)	55 (32.2%)	49 (39.4%)	22 (32.9%)	
	Somewhat dissatisfied	23 (10.0%)	20 (12.3%)	12 (9.9%)	8 (12.5%)	
	Very dissatisfied	14 (5.8%)	9 (4.9%)	10 (7.5%)	*** (.4%)	
	.	2151	1454	1187	709	

* p-value based on multi-level logistic or ordinal logistic regression models with linear trend adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

** The number of times in Wave 4 was categorized to None, 1-2 times, 3-5 times, 6-12 times, 13 or more times, Don't know. The 1-2 times and 3-5 times are combined to be consistent with earlier waves.

*** Cells less than or equal to 5 suppressed.

† The percentage was among those who had some FSC/TCM services.

Domain 3: Improved Health Outcomes

Health status ratings were subdivided by physical and behavioral/emotional health aspects. The experience of the individuals affected by the Flint Water Crisis has been shown to have significant impacts on emotional well-being (Smith et al., 2019). Survey estimates reinforce this observation with generally higher rankings for physical health compared to behavioral/emotional health (**Table 8**). There was a significant increase in children with better physical as well as behavioral/emotional health over time. Although less than 50% of children had excellent or very good behavioral/emotional health, the trend was favorable during the waiver period.

Reported health rankings improved (**Table 8**). In each wave, approximately 80% of the survey respondents classified their health in the top three rating categories. The majority of caregivers reported their children as having excellent or very good physical and overall health. Observed improvements were significant ($p < 0.01$) adjusting for age, race, residence county and poverty level at the person-level as well as census tract-level SVI and COI scores using a multi-level ordered logistic regression models with a random intercept for respondents. Thus, for these respondents, reported health status improved.

Table 8. General health status for children

Children		Wave 1	Wave 2	Wave 3	Wave 4	p-value*
Overall Health		Unweighted n (weighted %)	Unweighted n (weighted %)	Unweighted n (weighted %)	Unweighted n (weighted %)	<0.01
In general, how would you rate your child's overall health (both physical and behavioral/emotional) since enrolling in the Flint Medicaid Waiver?	Excellent	546 (23.1%)	432 (26.9%)	350 (26.6%)	204 (26.1%)	
	Very good	670 (27.8%)	482 (29.5%)	409 (31.5%)	213 (27.5%)	
	Good	706 (29.7%)	437 (26.8%)	374 (28.5%)	248 (32.1%)	
	Fair	378 (15.9%)	227 (13.8%)	148 (11.2%)	89 (11.6%)	
	Poor	74 (3.1%)	35 (2.2%)	28 (2.1%)	18 (2.3%)	
	.	12 (0.5%)	12 (0.8%)	** (0.1%)	** (0.4%)	
Physical health						<0.01
In general, how would you rate your child's physical health since enrolling in the Flint Medicaid Waiver? Physical health includes how much your child is growing, if they have their vaccinations, if they have any problems like colds or ear infections or things like asthma.	Excellent	622 (26.3%)	512 (31.9%)	452 (34.5%)	248 (31.6%)	
	Very good	704 (29.3%)	512 (31.2%)	422 (32.1%)	234 (30.1%)	
	Good	666 (28.0%)	411 (25.1%)	329 (25.5%)	212 (27.6%)	
	Fair	320 (13.3%)	162 (10.1%)	91 (6.7%)	66 (8.9%)	
	Poor	57 (2.4%)	14 (0.8%)	14 (1.0%)	9 (1.0%)	
	.	17 (0.7%)	14 (0.9%)	** (0.2%)	7 (0.8%)	
Behavioral Health						<0.01
In general, how would you rate your child's behavioral or emotional health since enrolling in the Flint Medicaid Waiver? Children might show stress with behavioral or emotional health problems such as depression, anxiety, by frequent temper tantrums, too much crying, too much anger or not paying attention.	Excellent	419 (17.5%)	299 (18.1%)	252 (19.0%)	155 (20.1%)	
	Very good	463 (19.1%)	379 (23.2%)	319 (24.3%)	179 (22.7%)	
	Good	660 (27.8%)	381 (23.7%)	335 (25.5%)	198 (26.0%)	
	Fair	548 (23.0%)	391 (23.9%)	287 (22.3%)	167 (21.3%)	
	Poor	276 (11.7%)	154 (9.7%)	111 (8.4%)	67 (8.8%)	
	.	20 (0.8%)	21 (1.4%)	7 (0.5%)	10 (1.2%)	

* p-value based on multi-level ordinal logistic regression models with linear trend adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

** Cells less than or equal to 5 suppressed.

There was a decreasing trend in the proportion (30% to 24%) of respondents reporting chronic health conditions (**Table 9**). However, among those with children who had a chronic health condition, respondents felt (strongly agreed or agreed) they had access to more resources that helped with management of their children's health conditions (p-value=0.01). Again, these results suggest that those enrollees who had a child with a chronic condition were increasingly satisfied with the services. Possible interpretations include that there was a greater utilization of services for those having ill children and/or an increasing bias for those enrollees who continued to answer the survey for all four waves.

Table 9. Chronic conditions, access to resources for and confidence in chronic disease management for children.

Children		Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	p-value*
Does your child have a chronic health condition such as asthma, diabetes, ADHD, autism, arthritis, etc.?	No	1446 (60.4%)	1178 (72.5%)	969 (74.0%)	563 (72.3%)	<0.01
	Yes	708 (29.7%)	361 (22.2%)	297 (22.5%)	181 (23.5%)	
	Not sure	203 (8.6%)	63 (3.8%)	35 (2.6%)	21 (2.8%)	
	.	29 (1.3%)	23 (1.4%)	10 (0.9%)	11 (1.4%)	
Since enrolling in the Flint Medicaid waiver, I have access to more resources that help with management of my child's chronic health condition(s). †	Strongly agree	108 (15.8%)	76 (22.2%)	60 (20.7%)	42 (24.5%)	0.01
	Agree	231 (32.5%)	125 (34.4%)	110 (37.1%)	50 (28.5%)	
	Neutral	242 (34.0%)	103 (28.3%)	88 (30.4%)	59 (32.7%)	
	Disagree	86 (12.2%)	41 (10.8%)	28 (9.0%)	15 (8.7%)	
	Strongly disagree	37 (5.5%)	16 (4.4%)	10 (2.9%)	12 (5.6%)	
	.	1682	1264	1015	598	
Since enrolling in the Flint Medicaid waiver, I am more confident that I can manage my child's chronic condition(s). †	Strongly agree	132 (19.4%)	91 (26.0%)	82 (27.3%)	49 (28.2%)	<0.01
	Agree	242 (34.5%)	130 (35.8%)	100 (35.0%)	66 (36.0%)	
	Neutral	249 (35.0%)	93 (26.0%)	83 (27.2%)	41 (23.3%)	
	Disagree	53 (7.7%)	34 (8.9%)	21 (7.6%)	14 (8.5%)	
	Strongly disagree	23 (3.5%)	11 (3.3%)	9 (2.8%)	9 (4.0%)	
	.	1687	1266	1016	597	

* p-value based on multi-level logistic or ordinal logistic regression models with linear trend adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

† The percentage was among those whose children had some chronic conditions.

Provisional Educational Achievement & Behavioral/Emotional Problems

While there was an increasing proportion of respondents who reported that their children were attending their expected school grade, the trend was not significant (**Table 10**, $p=0.43$).

Although this variable was not found to be significant, this increase was expected as children who were born around the time of the water switch began entering grade school. Additional positive findings are suggested in the parent/guardian reporting of their child having learning problems or behavioral/emotional problems during the waiver period. Reports of learning problems decreased from 23% in Wave 1 to 13% in Wave 2 ($p<0.01$). Likewise, identification of behavioral/emotional problems diagnosed by a health care provider decreased from 23% to 18% ($p<0.01$) or mentioned by a school employee decreased from 25% to 16% ($p<0.01$). While these are positive trends to report, there may be bias due to those who consistently responded to the survey and reported receiving healthier results of child behavioral health status.

Table 10. Expected grade level achievement, learning problem, or behavioral problems.

Children		Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	p-value*
Is your child in the grade level expected for his or her age?	No	371 (15.7%)	242 (15.0%)	181 (14.2%)	99 (12.8%)	0.43
	Yes	1625 (68.0%)	1196 (73.7%)	1015 (77.3%)	619 (79.1%)	
	Don't know	35 (1.5%)	18 (1.2%)	25 (2.0%)	12 (1.6%)	
	Not school aged	344 (14.4%)	152 (9.0%)	87 (6.4%)	31 (4.0%)	
	.	11 (0.4%)	17 (1.1%)	** (0.2%)	15 (2.5%)	
Has anyone told you that your child should be tested for learning problems?	No	1756 (73.5%)	1307 (80.2%)	1088 (82.8%)	640 (82.0%)	<0.01
	Yes	547 (23.0%)	261 (16.1%)	193 (14.9%)	102 (13.2%)	
	Don't know	63 (2.7%)	37 (2.4%)	25 (2.0%)	22 (2.7%)	
	.	20 (0.8%)	20 (1.3%)	** (0.4%)	12 (2.1%)	
Have you ever been told by a doctor or nurse that your child has a behavioral or emotional problem?	No	1773 (74.2%)	1257 (77.1%)	1043 (79.3%)	610 (78.1%)	<0.01
	Yes	541 (22.8%)	314 (19.4%)	235 (18.2%)	139 (17.7%)	
	Don't know	57 (2.4%)	30 (2.0%)	27 (2.1%)	15 (2.0%)	
	.	15 (0.6%)	24 (1.5%)	6 (0.5%)	12 (2.1%)	
Has a daycare or school teacher or school nurse ever told you that your child has a behavioral or emotional problem?	No	1528 (63.7%)	1148 (70.6%)	997 (75.7%)	596 (76.0%)	<0.01
	Yes	601 (25.6%)	345 (21.7%)	214 (17.1%)	123 (15.7%)	
	Don't know	47 (2.0%)	23 (1.5%)	26 (2.0%)	12 (1.7%)	
	Not school aged	194 (8.1%)	89 (5.4%)	71 (5.0%)	35 (4.8%)	
	.	16 (0.6%)	20 (1.3%)	** (0.2%)	10 (1.8%)	

* p-value based on multi-level logistic or ordinal logistic regression models with linear trend adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

** Cells less than or equal to 5 suppressed.

Domain 4: Lead Exposure

Due to a small sample size, the multi-level logistic regression models for lead exposure through other sources did not converge (**Table 11**). However, the proportion of parents being told that their child had a high blood lead level significantly decreased from Waves 1 through Wave 4.

Table 11. Lead exposure through other sources and high blood lead level in children

Children		Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	p-value*
Other than through the Flint Water System, has your child been exposed to lead through other sources (example: paint, dust or soil)?	No	1907 (79.7%)	1224 (74.7%)	1046 (79.2%)	559 (70.9%)	**
	Yes	131 (5.5%)	84 (5.4%)	49 (4.1%)	33 (4.5%)	
	Not sure	336 (14.3%)	289 (18.1%)	207 (16.1%)	167 (22.5%)	
	.	12 (0.5%)	28 (1.8%)	9 (0.7%)	17 (2.1%)	
Has a doctor or nurse ever told you that your child had a high blood lead level?	No	1963 (82.2%)	1429 (87.5%)	1158 (88.3%)	669 (85.6%)	<0.01
	Yes	200 (8.4%)	56 (3.5%)	47 (3.7%)	31 (3.8%)	
	Not sure	204 (8.6%)	108 (6.9%)	99 (7.5%)	57 (7.6%)	
	.	19 (0.8%)	32 (2.1%)	7 (0.5%)	19 (3.0%)	

* p-value based on multi-level logistic regression models with linear trend adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

** model did not converge.

As a qualitative examination to potential ongoing lead exposure in the water, questions were added to understand continued use of Flint tap water as it had not yet been deemed safe at the time of those survey waves. The results showed that, throughout each survey, a significant portion of respondents still used the tap water in Flint and the trend was increasing (**Table 12**, p-value=0.01) and the responses to the pipe replacement question remained relatively constant (p-value=0.83).

Table 12. Tap/faucet water use and water pipe replacement in child surveys

Children		Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)	p-value*
Does your child use water supplied by the City of Flint, also known as tap or faucet water right now?	No	1159 (47.5%)	785 (46.9%)	629 (46.2%)	361 (44.0%)	0.01
	Yes	1203 (51.5%)	815 (51.6%)	670 (52.9%)	401 (54.2%)	
	Not sure	15 (0.6%)	9 (0.5%)	9 (0.7%)	** (0.5%)	
	.	9 (0.4%)	16 (1.0%)	3 (0.2%)	10 (1.2%)	
Have the water pipes to your home or residence been replaced as of today?	No	1092 (45.5%)	786 (47.7%)	679 (51.1%)	416 (52.7%)	0.83
	Yes	577 (24.8%)	420 (26.5%)	374 (29.1%)	181 (24.1%)	
	Not sure	648 (26.8%)	390 (23.9%)	253 (19.4%)	165 (21.5%)	
	.	69 (2.9%)	29 (1.9%)	** (0.4%)	14 (1.7%)	

* p-value based on multi-level logistic or ordinal logistic regression models with linear trend adjusting for age, race, residence county and poverty at person-level as well as census tract-level SVI and COI scores.

** Cells less than or equal to 5 suppressed.

Adult Surveys

Below are the descriptive results from the Adult Survey Questionnaires. Due to the low number of respondents, we could not carry out trend tests for adjusting for covariates. Thus, the tables here are displayed to show general information using frequencies and weighted proportions of the adult participants' responses to the survey questions across all four Waves.

Domain 1: Access to Services

Adult reporting of general satisfaction with aspects of accessing care and the FME experience are presented in **Table 14**. The impacts appear to be muted over time with a greater proportion selecting "neutral" response options for FME making it easier to access care or providers working in the respondent's best interest. However, overall ratings did improve over time. None of these trends could be tested for significance due to small cell sizes.

Table 14. East of access to care and ratings of the FME experience for adults

Adults		Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)
Since enrolling in the Flint Medicaid waiver, how easy was it to get the medical care, tests, or treatment you needed? For example, to see a doctor or a nurse, get medications etc.?	Easy	94 (43.0%)	43 (32.4%)	33 (34.1%)	5 (24.7%)
	Fairly easy	80 (34.4%)	55 (40.0%)	40 (38.2%)	9 (30.5%)
	Not easy, not difficult	38 (16.6%)	16 (10.8%)	11 (10.3%)	6 (16.2%)
	Difficult	6 (2.8%)	18 (12.0%)	17 (16.3%)	5 (18.3%)
	Very difficult	3 (1.3%)	5 (3.3%)	2 (1.1%)	0
	.	4 (1.9%)	2 (1.6%)	0	5(10.4%)
Being in the Flint Medicaid waiver made it easier to get the health care that I needed.	Strongly agree	52 (23.2%)	24 (18.7%)	27 (30.6%)	2 (10.1%)
	Agree	81 (36.0%)	41 (29.2%)	35 (33.1%)	12 (39.7%)
	Neutral	74 (32.3%)	60 (43.4%)	33 (31.7%)	13 (39.0%)
	Disagree	10 (4.9%)	7 (5.4%)	3 (2.6%)	3 (11.2%)
	Strongly disagree	5 (2.2%)	6 (3.5%)	4 (1.8%)	0
	.	3 (1.5%)	1 (0.7%)	1 (0.2%)	0
Since enrolling in the Flint Medicaid waiver, I feel that the health care providers are working in my best interest.	Strongly agree	49 (22.1%)	33 (24.3%)	30 (33.2%)	4 (19.1%)
	Agree	89 (39.4%)	56 (42.5%)	41 (38.2%)	11 (33.9%)
	Neutral	67 (29.0%)	33 (21.1%)	23 (23.6%)	12 (39.1%)
	Disagree	11 (5.4%)	8 (6.1%)	7 (4.7%)	2 (5.6%)
	Strongly disagree	6 (2.7%)	7 (4.4%)	1 (0.2%)	1 (2.2%)
	.	3 (1.5%)	2 (1.5%)	1 (0.2%)	0
Choosing a number from 0 to 10, where 0 is the worst and 10 the best, what number would you use to rate your overall Flint Medicaid waiver experience?	Average score (standard error)	7.0 (0.1)	6.7 (0.1)	7.5 (0.2)	7.9 (0.1)

* Cells less than or equal to 5 suppressed.

Domain 2: Access to TCM

Few adults reported participating with TCM services. Only one individual reported ongoing participation at Wave 4 and they were satisfied with their coordinator experience.

Table 15. Utilization and satisfaction of the Family Supports Coordination/Targeted Case Management for adults.

Adults		Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)
Have you ever used any Family Supports Coordination/Targeted Case Management services since enrolling in the Flint Medicaid waiver?	No	195 (86.3%)	121 (85.3%)	92 (88.0%)	23 (83.7%)
	Yes	26 (11.9%)	15 (12.2%)	11 (12.0%)	2 (5.9%)
	.	4 (1.9%)	3 (2.6%)	0	5 (10.4%)
How many times has your Supports Coordinator contacted you in the last 6 months?*†	None	4 (13.6%)	4 (26.6%)	4 (35.5%)	0
	1-5 times	13 (48.6%)	6 (42.4%)	3 (21.0%)	1 (100.0%)
	6-12 times	4 (14.8%)	1 (5.2%)	2 (20.0%)	0
	13 or more	1 (7.0%)	1 (5.2%)	0	0
	Not sure	4 (16.0%)	4 (20.6%)	2 (23.5%)	0
	.	199	123	92	29
Over the last 6 months how satisfied have you been with your Supports Coordinator?†	Very satisfied	14 (48.5%)	10 (61.6%)	5 (49.5%)	1 (100.0%)
	Somewhat satisfied	7 (32.1%)	2 (22.3%)	5 (41.0%)	0
	Somewhat dissatisfied	4 (16.0%)	2 (10.9%)	1 (9.5%)	0
	Very dissatisfied	1 (3.3%)	1 (5.2%)	0	0
	.	199	124	92	29

*The number of times in Wave 4 was categorized to None, 1-2 times, 3-5 times, 6-12 times, 13 or more times, Don't know. The 1-2 times and 3-5 times are combined to be consistent with earlier waves.

† The percentage was among those who used some FSC/TCM services.

Domain 3: Improved Health Outcomes

Table 16 examined patterns in overall health outcomes which revealed no change except for improved reporting of “Excellent” from Waves 1 to 3 and “Good” from Wave 1 to 4. This improvement appears to be derived from a decrease in the proportion reporting Fair/Poor health status over the four years. However, due to the lack of responses, statistical testing was not appropriate. Reporting was similar in improvement for Physical and Behavioral outcomes. Due to the problem with small numbers, no discernable differences were observed among the adult participants over the four waves.

Table 16. General health status for adults

	Adults	Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)
Overall health					
In general, how would you rate your overall health (both physical and behavioral/emotional) since enrolling in the Flint Medicaid Waiver?	Excellent	29 (13.9%)	28 (22.7%)	20 (22.1%)	* (12.6%)
	Very good	53 (22.2%)	31 (22.0%)	24 (22.0%)	* (20.1%)
	Good	84 (37.6%)	43 (30.4%)	34 (34.7%)	17 (52.1%)
	Fair	45 (19.6%)	29 (19.2%)	18 (14.2%)	* (13.0%)
	Poor	12 (5.3%)	6 (4.1%)	7 (7.0%)	* (2.2%)
	.	* (1.0%)	* (1.6%)	0	0
Physical health					
In general, how would you rate your physical health since enrolling in the Flint Medicaid Waiver? Physical health refers to things like your weight, if you had any blood pressure problems or blood sugar problems.	Excellent	36 (17.2%)	30 (23.7%)	19 (21.0%)	* (7.5%)
	Very good	54 (22.4%)	40 (29.3%)	30 (26.4%)	8 (33.3%)
	Good	75 (33.0%)	39 (26.4%)	30 (31.0%)	13 (35.5%)
	Fair	40 (18.3%)	22 (14.2%)	15 (12.9%)	* (19.6%)
	Poor	18 (8.1%)	6 (4.7%)	9 (8.7%)	* (4.1%)
	.	* (1.0%)	* (1.6%)	0	0
Behavioral Health					
In general, how would you rate your behavioral or emotional health since enrolling in the Flint Medicaid Waiver? Emotional problems may include stress, depression, anxiety, not being able to pay attention, etc.	Excellent	30 (14.5%)	24 (19.8%)	16 (18.5%)	* (10.6%)
	Very good	41 (17.9%)	17 (11.6%)	22 (22.0%)	7 (22.6%)
	Good	49 (21.2%)	38 (28.2%)	25 (21.3%)	6 (22.8%)
	Fair	69 (30.1%)	34 (23.3%)	24 (23.8%)	8 (27.1%)
	Poor	33 (14.8%)	24 (15.6%)	16 (14.3%)	* (6.4%)
	.	* (1.5%)	* (1.6%)	0	* (10.4%)

* Cells less than or equal to 5 suppressed.

Table 17 displays the reporting of adult respondents regarding chronic conditions and aspects regarding self-management. Again, the small numbers prevented any meaningful analyses for trends over the FME period.

Table 17. Chronic conditions, access to resources for and confidence in chronic disease management for adults.

Adults		Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)
Do you currently have a chronic health condition such as asthma, diabetes, high blood pressure, arthritis, etc.?	No	139 (61.3%)	105 (75.2%)	77 (73.6%)	20 (69.9%)
	Yes	47 (20.8%)	19 (13.7%)	15 (15.9%)	7 (20.6%)
	Not sure	37 (16.9%)	11 (7.8%)	10 (9.7%)	3 (9.5%)
	.	2 (1.0%)	4 (3.3%)	1 (0.9%)	0
Since enrolling in the Flint Medicaid waiver, I have access to more resources that help with management of my chronic health condition(s).†	Strongly agree	8 (17.9%)	3 (13.7%)	5 (39.6%)	0
	Agree	12 (26.8%)	4 (22.4%)	6 (40.5%)	2 (30.0%)
	Neutral	15 (31.5%)	8 (43.2%)	4 (19.8%)	4 (64.5%)
	Disagree	5 (11.2%)	2 (11.7%)	0	1 (5.4%)
	Strongly disagree	7 (12.7%)	2 (9.1%)	0	0
	.	178	120	88	23
Since enrolling in the Flint Medicaid waiver, I am more confident that I can manage my chronic conditions.†	Strongly agree	5 (10.5%)	3 (12.8%)	6 (44.8%)	1 (7.0%)
	Agree	13 (31.3%)	7 (39.8%)	5 (29.7%)	0
	Neutral	18 (30.6%)	5 (26.7%)	3 (18.3%)	4 (85.2%)
	Disagree	6 (13.0%)	3 (17.3%)	1 (7.2%)	2 (7.8%)
	Strongly disagree	5 (9.2%)	1 (3.4%)	0	0
	.	178	120	88	23

† The percentage was calculated among those who had some chronic conditions.

Domain 4: Lead Exposure

Table 18. Lead exposure through other sources, tap water use and pipe replacement for adults

Adults		Wave 1 unweighted n (weighted %)	Wave 2 unweighted n (weighted %)	Wave 3 unweighted n (weighted %)	Wave 4 unweighted n (weighted %)
Other than through the Flint Water System, have you been exposed to lead through other sources (example: paint, dust or soil)?	No	148 (65.2%)	82 (59.9%)	61 (61.0%)	14 (44.4%)
	Yes	16 (7.3%)	11 (8.0%)	6 (5.6%)	3 (11.8%)
	Not sure	59 (26.4%)	42 (28.9%)	35 (33.1%)	11 (40.5%)
	.	2 (1.0%)	4 (3.2%)	1 (0.2%)	2 (3.3%)
Do you use water supplied by the City of Flint, also known as tap or faucet water right now?	No	82 (35.7%)	56 (39.0%)	36 (31.8%)	15 (53.1%)
	Yes	142 (63.9%)	77 (56.2%)	65 (67.0%)	15 (46.9%)
	Not sure	n.a.	1 (0.7%)	2 (1.2%)	n.a.
	.	1 (0.5%)	5 (4.1%)	n.a.	n.a.
What do you use tap water for? Drinking/cooking/brushing teeth/washing dishes	No	21 (10.5%)	n.a.	43 (45.6%)	8 (28.5%)
	Yes	99 (43.7%)	61 (44.0%)	22 (21.3%)	7 (18.4%)
	.	105 (45.8%)	78 (56.0%)	38 (33.0%)	15 (53.1%)
	Have the water pipes to your home or residence been replaced as of today?	No	88 (38.5%)	65 (46.0%)	45 (42.6%)
Yes	63 (28.2%)	30 (21.7%)	32 (32.2%)	6 (18.7%)	
Known	73 (32.8%)	40 (29.1%)	26 (25.3%)	6 (26.6%)	
.	1 (0.5%)	4 (3.2%)	n.a.	2 (3.3%)	

COVID-19 Supplemental Questions

Supplementary Questions were added to Waves 3 and 4 of the Enrollee Survey because of the COVID-19 pandemic. Wave 3 was given earlier in the pandemic with Wave 4 being an additional survey wave that had not been publicized in advance. This last wave was permitted due to an extension approved for the FME Waiver through September 14, 2021. The lack of advance notice to participants regarding Wave 4 possibly affected response rates. Because the pandemic exacerbated needs for many health and other resources, particularly for Flint Medicaid Residents, the evaluation added four questions to identify possible increases in health needs. **Table 19** shows the COVID-19 questions and response rates. Here, we highlight the most prevalent issues reported by the respondents. These questions were “select all that apply” options so reporting exceeds 100%.

The biggest impacts of the pandemic according to respondents included fewer available child related services and the inability to go to work although these had improved by Wave 4. However more than half (58%) stated they had received a stimulus check and approximately 30% reported they had received unemployment for both Waves 3 and 4. Relatively few, less than 5%, reported increased stress or anxiety or identified concerns regarding virtual learning and social isolation.

Regarding health care access specifically, the second question elicited that largest proportion reported having to move doctor appointments to virtual options, 45% for Wave 3 and 39% for Wave 4 instead of having traditional in-person visits. Approximately one third, 37% (Wave 3) and 32% of Wave 4 respondents stated they experienced appointment cancellations or experienced delays in obtaining prescription medications. Another 36% and 42% for Wave 3 and Wave 4 respectively, reported the pandemic had no impact on their access to health care. Unfortunately, 10% said they were not able to access physical health care they needed at the time of the Wave 3 survey which coincided with state shutdowns. This proportion decreased somewhat to 8% at Wave 4 when services reopened.

Although a significant body of literature is being developed cataloguing the impacts of the pandemic on behavioral/mental health status, most (53% Wave 3, 60.3% Wave 4) respondents reported that mental health services were not affected. This may reflect a larger proportion of individuals who did not seek out this type of care compared to physical health. Similar to physical health, approximately one-quarter stated mental health services had been moved to telehealth delivery. Fewer individuals, 15% for both Waves reported delays or cancellations, but less than 10% reported that they were not able to access mental health.

Less than 10% reported confirmed or suspected COVID-19 infections in their household at Wave 3. This number significantly increased at the Wave 4 timeframe to 48%. This increase is likely due to increased COVID-19 infections between the time frames and increased access to testing. This was confirmed by 82.5% reporting *no one* in their home became sick with COVID-19 at Wave 3 which decreased to 38% in Wave 4.

Table 19. Unweighted descriptive statistics for COVID related questions

Children	Wave 3	Wave 4
How has COVID-19 impacted you and your family?		
Less access to services through schools (such as meals, childcare, etc.)	593 (45.2%)	232 (29.9%)
Unable to go to work, laid off, or furloughed	593 (45.2%)	287 (37.0%)
Working more hours as an essential worker	230 (17.5%)	116 (14.9%)
Lost childcare	181 (13.8%)	83 (10.7%)
Received federal stimulus check	766 (58.4%)	446 (57.5%)
Received unemployment money from the state and/or federal government	417 (31.8%)	222 (28.6%)
Other	31 (2.4%)	21 (2.7%)
not affected me and my family	69 (5.3%)	81 (10.4%)
Had COVID or Lost family members	5 (0.4%)	9 (1.2%)
Increased stress and anxiety	30 (2.3%)	18 (2.3%)
Virtual learning had negative impact	31 (2.4%)	12 (1.5%)
Social isolation had negative impact	18 (1.4%)	9 (1.2%)
Struggling financially	28 (2.1%)	27 (3.5%)
Contracted COVID/recovering from COVID	n.a.	14 (1.8%)
How has COVID-19 impacted your access to healthcare services?		
Doctor's appointments moved to telephone or telehealth (computer face-to-face)	593 (45.2%)	301 (38.8%)
Delays or cancellations of doctor's appointments and/or getting prescriptions	480 (36.6%)	246 (31.7%)
Not able to access physical healthcare needed	136 (10.4%)	65 (8.4%)
Other	18 (1.4%)	19 (2.4%)
My access to healthcare has not been affected	479 (36.5%)	327 (42.1%)
How has COVID-19 pandemic impacted your access to mental health services?		
Mental health appointments moved to telephone or telehealth (computer face-to-face)	357 (27.2%)	166 (21.4%)
Delays or cancellations of mental health appointments and/or getting medication	214 (16.3%)	115 (14.8%)
Not able to access mental health	108 (8.2%)	57 (7.3%)
Other	33 (2.5%)	14 (1.8%)
My access to mental health services has not been affected	705 (53.8%)	468 (60.3%)
Has anyone in your household been sick with COVID-19		
Yes and was confirmed by testing	59 (4.5%)	322 (41.5%)
Yes, but did not get tested	55 (4.2%)	52 (6.7%)
No and was confirmed by testing	144 (11.0%)	108 (13.9%)
No, no one got sick	1081 (82.5%)	297 (38.3%)

Summary

The enrollee survey responses, for both children and adults, offered valuable information regarding the FME waiver; specifically, regarding characteristics of Targeted Case Management services as well as satisfaction and reported health status rankings from waiver participation. Unfortunately, in the case of the adult survey data, the respondent sample size was too small to conduct statistical analyses and thus, only potential trends from increases or decreases in the frequencies can be appropriately extrapolated.

The evaluation randomly selected a subset of Flint Medicaid Expansion Waiver enrollees to form a representative cross-section of the target population by geographic locale and age stratification. The overall response rate at Wave 1 (baseline) was nearly 30% and there was over a 70% response rate of the Wave 1 respondents at Wave 2. Respondents predominantly identified as non-Hispanic Black, age 7-17 years, lived in Genesee County, and were well below poverty level.

Respondents listed a variety of reasons for enrolling in the waiver. The primary reason for enrolling was to receive “extra services” not normally paid for by Medicaid, particularly for children in need of behavioral health services. Over time, most enrollees noted that their child was age appropriate for their grade and fewer reported that their child had received recommendations for testing or special services. However, due to schools and providers being closed during the height of the pandemic, as well as heightened recommendations to practice social distancing, observed decreases in the need for child behavioral services in Wave 3-4 could be attributed to lower rates of interaction with providers and school staff during the pandemic.

Participants said FME helped them access care for their child and were generally satisfied although no significant changes were noted over time. Statistical improvement was documented for the proportion of child survey responses feeling providers were working in their child’s best interest.

Few survey participants utilized TCM services. However, it is possible that the enrollees who took advantage of TCM services were the most in need of these services. The underutilization may have been related to the late roll-out of benefits coming two years after the water crises was identified. In the years between exposure and FME implementation, residents may have left Flint or received services from other sources, such as churches or community-based organizations. For those who utilized the TCM benefit, they reported satisfaction with the services and felt providers were working in their child’s best interest.

There was a slight yet significant improvement in the physical, behavioral, and overall health status of children across all waves and moderately for adults in Waves 1-2. A similar pattern was observed for children with chronic conditions where caregivers reported increased access

to resources and more confidence in managing the conditions. Fewer individuals reported concerns regarding their child's learning problems or behavioral or emotional problems.

Survey responses confirmed fewer children being identified with high blood lead levels even in the face of increased usage of city water. The evaluation team included questions to examine the continued use of Flint water and whether water pipelines to their homes had been replaced. There was a slight increase in the use of tap water, but no change in those who said their water lines had been replaced.

Recommendations

Like many programs designed to benefit medically underserved, vulnerable populations', success is dependent on those who are served being engaged, trusting, and satisfied with the services (Khan et al., 2018). This Section 1115 Medicaid waiver was intended to offer expanded eligibility and services for those in need of specialized health services because of the public health emergency in Flint. Optimal impact to mitigate the health impacts of the lead exposure from the water would be expected from services being available in a timeframe more connected with the exposure. This would likely enhance enrollee engagement with services.

Unfortunately, the FME waiver and its services were not available at the height of the crisis potentially prolonging health consequences. This may have resulted in affected persons trying to piece together services and supports being offered in real-time from an array of local services providers. This type of care, while seemingly addressing immediate needs, may have been less comprehensive and integrated than that which could be offered by trained professionals who could create and implement a full care plan. The two-year delay in water contamination and FME implementation may have contributed to the underutilization of TCM services. In the face of significant delays, extra resources should be directed to ongoing communication and dissemination of waiver benefits and eligibility. Notably, at the Wave 4 survey data collection, respondents continued to request more information on FME and TCM.

Methods to improve reach and utilization of expanded Medicaid services as well as a timely rollout and implementation during a public health emergency are needed to avoid low enrollment. This could be facilitated through formation of a *ready response team*. Staff from various units that comprise this team would have the authority needed to ensure essential services needed to mitigate health crises and improve health outcomes are deployed in a timely manner. The survey responses identify beneficial services areas that were most associated with improvements to the lives and health of the residents experiencing environmental crises.

The survey respondents provided valuable qualitative information during the evaluation period. On the heels of the lead crisis, the respondents were dealt another blow because of the COVID-19 pandemic. Both of these public health emergencies were beyond their control and presented extreme challenges to children's physical and mental health well-being. Those who responded to all four waves of the survey provided a longitudinal glimpse into how they coped with these crises and the impact they had on their children's health and education. In summary, recommendations include:

- A need for more timely governmental implementation of services, like Targeted Case Management, that can be offered via the Section 1115 or other Medicaid Waivers. This becomes critical as other city and state governmental agencies are overburdened with managing the declared emergency. The more prolonged the implementation, the more resources should be dedicated to ongoing, persistent, community messaging.



- Consider establishing a *ready response team* having the necessary authority to put services in place with all deliberate speed. Federal and state agencies could have protocols in place that could be used by the *ready response team*.
- Recognizing the importance of trust between individuals and the communities with which they engage. Opportunity to maximize uptake of services for special circumstances will exist when those affected can work with local organizations and providers they already know and trust.

Additional work is needed to better understand what specific services are required and whether or how they are related to the environmental crisis. As with many populations in low-income areas, some children have behavioral symptoms related to low resources and early childhood experiences (e.g., poor nutrition, neighborhood violence, etc.) (Cree et al., 2016). The ongoing dedication of federal, state, and local agencies to serving the affected individuals through the FME waiver renewal for another five years will provide opportunities to identify and address changing needs.



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Appendix 1: Child Survey Questionnaires



Child-FLINT-WAVE1.pdf



Child - Flint -
WAVE2.pdf



CHILD-WAVE3_FINAL.
pdf



CHILD-WAVE4.pdf



Appendix 2: Adult Survey Questionnaires



Adult-FLINT-WAVE1.pdf



Adult - Flint -
WAVE2.pdf



ADULT-WAVE3_FINAL
.pdf



ADULT-FLINT-WAVE4.
pdf

Appendix 3: Unweighted descriptive statistics of each survey (Child)

For statistical reference we have included unweighted results for the survey.

Table A3-1. Unweighted descriptive statistics of health status

Children		Wave 1	Wave 2	Wave 3	Wave 4
Overall health					
In general, how would you rate your child's overall health (both physical and behavioral/emotional) since enrolling in the Flint Medicaid Waiver?	Excellent	546 (22.9%)	432 (26.6%)	350 (26.7%)	204 (26.3%)
	Very good	670 (28.1%)	482 (29.7%)	409 (31.2%)	213 (27.4%)
	Good	706 (29.6%)	437 (26.9%)	374 (28.5%)	248 (32.0%)
	Fair	378 (15.8%)	227 (14.0%)	148 (11.3%)	89 (11.5%)
	Poor	74 (3.1%)	35 (2.2%)	28 (2.1%)	18 (2.3%)
	.	12 (0.5%)	12 (0.7%)	2 (0.2%)	4 (0.5%)
Physical health					
In general, how would you rate your child's physical health since enrolling in the Flint Medicaid Waiver? Physical health includes how much your child is growing, if they have their vaccinations, if they have any problems like colds or ear infections or things like asthma.	Excellent	622 (26.1%)	512 (31.5%)	452 (34.5%)	248 (32.0%)
	Very good	704 (29.5%)	512 (31.5%)	422 (32.2%)	234 (30.2%)
	Good	666 (27.9%)	411 (25.3%)	329 (25.1%)	212 (27.3%)
	Fair	320 (13.4%)	162 (10.0%)	91 (6.9%)	66 (8.5%)
	Poor	57 (2.4%)	14 (0.9%)	14 (1.1%)	9 (1.2%)
	.	17 (0.7%)	14 (0.9%)	3 (0.2%)	7 (0.9%)
Behavioral Health					
In general, how would you rate your child's behavioral or emotional health since enrolling in the Flint Medicaid Waiver? Children might show stress with behavioral or emotional health problems such as depression, anxiety, by frequent temper tantrums, too much crying, too much anger or not paying attention.	Excellent	419 (17.6%)	299 (18.4%)	252 (19.2%)	155 (20.0%)
	Very good	463 (19.4%)	379 (23.3%)	319 (24.3%)	179 (23.1%)
	Good	660 (27.7%)	381 (23.4%)	335 (25.6%)	198 (25.5%)
	Fair	548 (23.0%)	391 (24.1%)	287 (21.9%)	167 (21.5%)
	Poor	276 (11.6%)	154 (9.5%)	111 (8.5%)	67 (8.6%)
	.	20 (0.8%)	21 (1.3%)	7 (0.5%)	10 (1.3%)

Table A3-2a. Unweighted descriptive statistics of reasons enrolling children in Flint Medicaid Waiver

I was already enrolled in Medicaid	2020 (84.7%)
To get doctor visits, dental visits, vision care, nutrition counseling, etc.	581 (24.4%)
To get the extra Family Supports Coordination/Targeted Case Management services from Genesee Health System or Genesee CHAP not usually paid for by Medicaid.	251 (10.5%)
To get someone to help my child with behavioral or emotional services.	238 (10.0%)
To lower the amount of money we pay for health care.	166 (7.0%)
Other	118 (4.9%)

Table A3-2b. Unweighted descriptive statistics of FME access

		Wave 1	Wave 2	Wave 3	Wave 4
Since enrolling in the Flint Medicaid waiver, how easy was it to get the medical care, tests, or treatment your child needed? For example, to see a doctor or a nurse, get vaccinations, etc.?	Easy	1285 (53.9%)	866 (53.3%)	693 (52.9%)	401 (51.7%)
	Fairly easy	683 (28.6%)	482 (29.7%)	440 (33.6%)	254 (32.7%)
	Not easy, not difficult	308 (12.9%)	176 (10.8%)	120 (9.2%)	78 (10.1%)
	Difficult	69 (2.9%)	69 (4.2%)	40 (3.1%)	31 (4.0%)
	Very difficult	15 (0.6%)	15 (0.9%)	10 (0.8%)	7 (0.9%)
	.	26 (1.1%)	17 (1.0%)	8 (0.6%)	5 (0.6%)
Being in the Flint Medicaid waiver made it easier to get the health care that my child needed.	Strongly agree	554 (23.2%)	369 (22.7%)	308 (23.5%)	178 (22.9%)
	Agree	796 (33.4%)	548 (33.7%)	493 (37.6%)	249 (32.1%)
	Neutral	865 (36.3%)	569 (35.0%)	440 (33.6%)	286 (36.9%)
	Disagree	108 (4.5%)	84 (5.2%)	46 (3.5%)	33 (4.3%)
	Strongly disagree	44 (1.8%)	41 (2.5%)	15 (1.1%)	16 (2.1%)
	.	19 (0.8%)	14 (0.9%)	9 (0.7%)	
Since enrolling in the Flint Medicaid waiver, I feel that the health care providers are working in my child's best interest.	Strongly agree	596 (25.0%)	565 (34.8%)	458 (34.9%)	253 (32.6%)
	Agree	926 (38.8%)	652 (40.1%)	571 (43.6%)	288 (37.1%)
	Neutral	711 (29.8%)	326 (20.1%)	232 (17.7%)	179 (23.1%)
	Disagree	99 (4.1%)	50 (3.1%)	34 (2.6%)	23 (3.0%)
	Strongly disagree	31 (1.3%)	19 (1.2%)	9 (0.7%)	18 (2.3%)
	.	23 (1.0%)	13 (0.8%)	7 (0.5%)	15 (1.9%)
Choose a number from 0 to 10, where 0 is the worst and 10 the best, what number would you use to rate your child's overall Flint Medicaid waiver experience?	0	46 (1.93%)	33 (2.03)	33 (2.52)	16 (2.06)
	1	18 (0.75%)	14 (0.86)	10 (0.76)	11 (1.42)
	2	25 (1.05%)	17 (1.05)	18 (1.37)	9 (1.16)
	3	40 (1.68%)	40 (2.46)	44 (3.36)	16 (2.06)
	4	69 (2.89%)	66 (4.06)	73 (5.57)	31 (3.99)
	5	361 (15.13%)	238 (14.65)	152 (11.59)	129 (16.62)
	6	176 (7.38%)	113 (6.95)	101 (7.70)	47 (6.06)
	7	279 (11.69%)	193 (1.88)	113 (8.62)	83 (10.70)
	8	440 (18.44%)	267 (16.43)	203 (15.48)	123 (15.87)
	9	283 (11.86%)	193 (11.88)	171 (13.04)	82 (10.57)
	10	593 (24.85%)	429 (26.40)	344 (26.24)	207 (26.68)
	.	56 (2.35%)	22 (1.35)	49 (3.74)	22 (2.84)
	Average score (standard error)		7.4 (0.05)	7.4 (0.06)	7.3 (0.07)

Table A3-3. Unweighted descriptive statistics of TCM support coordinator access

Children		Wave 1	Wave 2	Wave 3	Wave 4
Has your child ever been referred to the Neurodevelopmental Center of Excellence as part of Genesee Health System?	Yes	n.a.	n.a.	n.a.	38 (4.9%)
	No				639 (82.3%)
	Not heard of NCE				94 (12.1%)
	.				5 (0.6%)
Have you ever used any Family Supports Coordination/Targeted Case Management services for your child since enrolling in the Flint Medicaid waiver	Yes	239 (10.0%)	191 (11.8%)	132 (10.1%)	66 (8.5%)
	No	2111 (88.5%)	1395 (85.8%)	1157 (88.3%)	701 (90.3%)
	.	36 (1.5%)	39 (2.4%)	22 (1.7%)	9 (1.2%)

Since the date you completed the last survey, have you used any Family Supports Coordination/Targeted Case Management services?	Yes	n.a.	174 (10.7%)	125 (9.5%)	74 (9.5%)
	No		1407 (86.6%)	1174 (89.5%)	689 (88.8%)
	.		44 (2.7%)	12 (0.9%)	13 (1.7%)
How many times has your Supports Coordinator contacted you about your child in the last 6 months?†	None	53 (22.5%)	35 (20.1%)	22 (17.7%)	21 (29.6%)
	1-5 times	110 (46.6%)	79 (45.4%)	61 (49.2%)	33 (46.5)
	6-12 times	30 (12.7%)	30 (17.2%)	13 (10.5%)	1 (1.4)
	13 or more	19 (8.1%)	11 (6.3%)	9 (7.3%)	7 (9.9%)
	Don't know	24 (10.2%)	19 (10.9%)	19 (15.3%)	9 (12.7%)
.	2150	1451	1187	705	
Over the last 6 months how satisfied have you been with your child's Supports Coordinator?†	Very satisfied	120 (51.1%)	87 (50.9%)	53 (42.7%)	33 (49.3%)
	Somewhat satisfied	78 (33.2%)	55 (32.2%)	49 (39.5%)	22 (32.8%)
	Somewhat dissatisfied	23 (9.8%)	20 (11.7%)	12 (9.7%)	8 (11.9%)
	Very dissatisfied	14 (6.0%)	9 (5.3%)	10 (8.1%)	4 (6.0%)
.	2151	1454	1187	709	
How have you met with the Supports Coordinator in the last 6 months? †					
In person meeting at a public location	No	189 (79.1%)	45 (100%)	104 (83.2%)	66 (89.2%)
	Yes	50 (20.9%)	0	21 (16.8%)	8 (10.8%)
	.	2147	1580	1186	702
In person meeting at my home/residence	No	141 (59.0%)	71 (100%)	103 (82.4%)	61 (82.4%)
	Yes	98 (41.0%)	0	22 (17.6%)	13 (17.6%)
	.	2147	1554	1186	702
On a phone call	No	149 (62.3%)	67 (100%)	38 (30.4%)	46 (62.2%)
	Yes	90 (37.7%)	0	87 (69.6%)	28 (37.8%)
	.	2147	1558	1186	702
Zoom	No	n.a.	n.a.	n.a.	52 (70.3%)
	Yes				22 (29.7%)
	.				702
Other	No	204 (85.4%)	0	118 (94.4%)	64 (86.5%)
	Yes	35 (14.6%)	23 (100%)	7 (5.6%)	10 (13.5%)
	.	2147	1602	1186	702
Don't remember	No	85 (72.6%)	0	107 (85.6%)	60 (81.1%)
	Yes	32 (27.4%)	23 (100%)	18 (14.4%)	14 (18.9%)
	.	2269	1602	1186	702
What are some of the reasons you have used Family Supports Coordination/Targeted Case Management?†					
Physical health concerns	No	n.a.	n.a.	98 (78.4%)	37 (56.1%)
	Yes			27 (21.6%)	29 (43.9%)
	.			1186	710
Testing for behavioral or emotional concerns	No	n.a.	n.a.	65 (52.0%)	23 (34.8%)
	Yes			60 (48.0%)	43 (65.2%)
	.			1186	710
Behavior or emotional concerns, other than testing	No	n.a.	n.a.	58 (46.4%)	n.a.
	Yes			67 (53.6%)	
	.			1186	
Other	No	n.a.	n.a.	110 (88.0%)	56 (84.8%)
	Yes			15 (12.0%)	10 (15.2%)
	.			1186	710
What are some of the reasons you have not used Family Supports Coordination/Targeted Case Management?††					



My needs were met before I enrolled in the waiver/TCM	No	n.a.	n.a.	812 (70.2%)	493 (70.3%)
	Yes			345 (29.8%)	208 (29.7%)
	.			154	75
My needs were met somewhere else	No	n.a.	n.a.	846 (73.1%)	532 (75.9%)
	Yes			311 (26.9%)	169 (24.1%)
	.			154	75
TCM did not have the services I needed	No	n.a.	n.a.	1063 (91.9%)	632 (90.2%)
	Yes			94 (8.1%)	69 (9.8%)
	.			154	75
Other	No	n.a.	n.a.	1069 (92.4%)	647 (92.3%)
	Yes			88 (7.6%)	54 (9.8%)
	.			154	75
No need	No	n.a.	n.a.	827 (83.6%)	624 (89.0%)
	Yes			162 (16.4%)	77 (11.0%)
	.			322	75
Unaware TCM/not connected	No	n.a.	n.a.	852 (87.0%)	629 (89.7%)
	Yes			127 (13.0%)	72 (10.3%)
	.			332	75
COVID pandemic prevented	No	n.a.	n.a.	953 (98.6%)	700 (99.1%)
	Yes			14 (1.4%)	1 (1%)
	.			344	75
Ineligible/moved from area	No	n.a.	n.a.	952 (99.0%)	685 (97.7%)
	Yes			10 (1.0%)	16 (2.3%)
	.			349	75
Too busy	No	n.a.	n.a.	956 (99.4%)	699 (99.7%)
	Yes			6 (0.6%)	2 (0.3%)
	.			349	75
Have you ever received information about Family Supports Coordination/Targeted Case Management (TCM)?	Yes	n.a.	n.a.	n.a.	123 (15.9%)
	No				506 (65.2%)
	Don't know				132 (17.0%)
	.				15 (1.9%)
Would you like to receive information about Family Supports Coordination/Targeted Case Management (TCM)?	Yes	n.a.	n.a.	n.a.	260 (33.5%)
	No				339 (43.7%)
	.				177 (22.8%)
Have you received services from other sources in the community?	Yes	n.a.	n.a.	n.a.	191 (24.6%)
	No				531 (68.4%)
	Don't know				41 (5.3%)
	.				13 (1.7%)
Where have you received services from?	County health department	n.a.	n.a.	n.a.	44 (5.7%)
	Faith-based/religious organization/church	n.a.	n.a.	n.a.	55 (7.1%)
	Community-based organization (Food bank, etc)	n.a.	n.a.	n.a.	76 (9.8%)

	Health Provider/Health System				15 (1.9%)
	School				8 (1.0%)
	Other	n.a.	n.a.	n.a.	14 (1.8%)
What type of services did you use?	Food assistance	n.a.	n.a.	n.a.	134 (17.3%)
	Health care	n.a.	n.a.	n.a.	107 (13.8%)
	Financial assistance	n.a.	n.a.	n.a.	24 (3.1%)
	Educational assistance	n.a.	n.a.	n.a.	38 (4.9%)
	Mental health	n.a.	n.a.	n.a.	13 (1.7%)
	Clothing, diapers	n.a.	n.a.	n.a.	6 (0.8%)

† The percentage was calculated among those who used some FCS/TCM services.

†† The percentage was calculated among those who did not use any FCS/TCM services.

Table A3-4. Unweighted descriptive statistics of chronic disease management

Children		Wave 1	Wave 2	Wave 3	Wave 4
Does your child have a chronic health condition such as asthma, diabetes, ADHD, autism, arthritis, etc.?	Yes	708 (29.7%)	361 (22.2%)	297 (22.7%)	181 (23.3%)
	No	1446 (60.6%)	1178 (72.5%)	969 (73.9%)	563 (72.6%)
	Unsure	203 (8.5%)	63 (3.9%)	35 (2.7%)	21 (2.7%)
	.	29 (1.2%)	23 (1.4%)	10 (0.8%)	11 (1.4%)
Since enrolling in the Flint Medicaid waiver, I have access to more resources that help with management of my child's chronic health condition(s).†	Strongly agree	108 (15.1%)	76 (21.1%)	60 (20.3%)	42 (23.6%)
	Agree	231 (32.8%)	125 (34.6%)	110 (37.2%)	50 (28.1%)
	Neutral	242 (34.4%)	103 (28.5%)	88 (29.7%)	59 (33.1%)
	Disagree	86 (12.2%)	41 (11.4%)	28 (9.5%)	15 (8.4%)
	Strongly disagree	37 (5.3%)	16 (4.4%)	10 (3.4%)	12 (6.7%)
	.	1682	1264	1015	598
Since enrolling in the Flint Medicaid waiver, I am more confident that I can manage my child's chronic condition(s).†	Strongly agree	132 (18.9%)	91 (25.3%)	82 (27.8%)	49 (27.4%)
	Agree	242 (34.6%)	130 (36.2%)	100 (33.9%)	66 (36.9%)
	Neutral	249 (35.6%)	93 (25.9%)	83 (28.1%)	41 (22.9%)
	Disagree	53 (7.6%)	34 (9.5%)	21 (7.1%)	14 (7.8%)
	Strongly disagree	23 (3.3%)	11 (3.1%)	9 (3.1%)	9 (5.0%)
	.	1687	1266	1016	597

† The percentage was calculated among those whose children had some chronic conditions.

Table A3-5. Unweighted descriptive statistics of lead exposure and high blood lead level

Children		Wave 1	Wave 2	Wave 3	Wave 4
Other than through the Flint Water System, has your child been exposed to lead through other sources (example: paint, dust or soil)?	Yes	131 (5.5%)	84 (5.2%)	49 (3.7%)	33 (4.3%)
	No	1907 (79.9%)	1224 (75.3%)	1046 (79.8%)	559 (72.0%)
	Unsure	336 (14.1%)	289 (17.8%)	207 (15.8%)	167 (21.5%)
	.	12 (0.5%)	28 (1.7%)	9 (0.7%)	17 (2.2%)
Has a doctor or nurse ever told you that your child had a high blood lead level?	Yes	200 (8.4%)	56 (3.4%)	47 (3.6%)	31 (4.0%)
	No	1963 (82.3%)	1429 (87.9%)	1158 (88.3%)	669 (86.2%)
	Unsure	204 (8.5%)	108 (6.6%)	99 (7.6%)	57 (7.3%)
	.	19 (0.8%)	32 (2.0%)	7 (0.5%)	19 (2.4%)

Table A3-6 Unweighted descriptive statistics of water/filter use and pipe replacement

Children		Wave 1	Wave 2	Wave 3	Wave 4
Does your child use water supplied by the City of Flint, also known as tap or faucet water right now?	Yes	1203 (50.4%)	815 (50.2%)	670 (51.1%)	401 (51.7%)
	No	1159 (48.6%)	785 (48.3%)	629 (48.0%)	361 (46.5%)
	Unsure	15 (0.6%)	9 (0.6%)	9 (0.7%)	4 (0.5%)
	.	9 (0.4%)	16 (1.0%)	3 (0.2%)	10 (1.3%)
What do you use tap water for? Drinking/cooking/brushing teeth/washing dishes (Wave 1 & 2) Drinking (Wave 3 & 4) †	No	186 (18.6%)		470 (70.1%)	262 (65.3%)
	Yes	812 (81.4%)	584 (100%)	200 (29.9%)	139 (34.7%)
	.	1388	1041	641	375
Cooking	No	n.a	n.a	281 (41.9%)	146 (36.4%)
	Yes			389 (58.1%)	255 (63.6%)
	.			641	375
Washing dishes/brushing teeth	No	n.a	n.a	45 (6.7%)	27 (6.7%)
	Yes			625 (93.3%)	374 (93.3%)
	.			641	375
Bathing/showering/washing clothes	No	31 (2.6%)	0	21 (3.1%)	9 (2.2%)
	Yes	1148 (97.4%)	790 (100%)	649 (96.9%)	392 (97.8%)
	.	1207	835	641	375
Watering garden/pools/sprinklers	No	368 (47.18%)		351 (52.4%)	219 (54.6%)
	Yes	412 (52.82%)	263 (100%)	319 (47.6%)	182 (45.4%)
	.	1606	1362	641	375
Other	No	548 (87.0%)		657 (98.1%)	391 (97.5%)
	Yes	82 (13.0%)	79 (100%)	13 (1.9%)	10 (2.5%)
	.	1756	1546	641	375
Have you used a water filter at your home since April 2014?	Yes	1720 (72.1%)	1085 (66.8%)	869 (66.3%)	458 (59.0%)
	No	600 (25.1%)	514 (31.6%)	438 (33.4%)	306 (39.4%)
	.	66 (2.8%)	26 (1.6%)	4 (0.3%)	12 (1.5%)
Are you currently using a water filter in your home?	Yes	1268 (53.1%)	952 (58.6%)	758 (57.8%)	374 (48.2%)
	No	415 (17.4%)	643 (39.6%)	547 (41.7%)	386 (49.7%)
	.	703 (29.5%)	30 (1.8%)	6 (0.5%)	16 (2.1%)
What kind of filter(s) do you have now? Filter attached to the faucet.	No	153 (6.4%)		164 (12.5%)	109 (14.0%)
	Yes	1115 (46.7%)	775 (47.7%)	594 (45.3%)	265 (34.1%)
	.	1118 (46.9%)	850 (52.3%)	553 (42.2%)	402 (51.8%)
Whole house filter (connected near your water heater.)	No	1200 (50.3%)		678 (51.7%)	314 (40.5%)

	Yes	68 (2.8%)	74 (4.6%)	80 (6.1%)	60 (7.7%)
	.	1118 (46.9%)	1551 (95.4%)	553 (42.2%)	402 (51.8%)
Water pitcher filter; like Brita or PUR	No	944 (39.6%)		592 (45.2%)	287 (37.0%)
	Yes	324 (13.6%)	222 (13.7%)	166 (12.7%)	87 (11.2%)
	.	1118 (46.9%)	1403 (86.3%)	553 (42.2%)	402 (51.8%)
Refrigerator	No	n.a.	n.a.	838 (63.9%)	360 (46.4%)
	Yes			23 (1.8%)	14 (1.8%)
	.			450 (34.3%)	402 (51.8%)
Shower	No	n.a.	n.a.	857 (65.4%)	369 (47.6%)
	Yes			4 (0.3%)	5 (0.6%)
	.			450 (34.3%)	402 (51.8%)
Other	No	1182 (49.5%)		751 (57.3%)	362 (46.6%)
	Yes	86 (3.6%)	75 (4.6%)	7 (0.5%)	12 (1.5%)
	.	1118 (46.9%)	1550 (95.4%)	553 (42.2%)	402 (51.8%)
Have the water pipes to your home or residence been replaced as of today?	Yes	577 (24.2%)	420 (25.8%)	374 (28.5%)	181 (23.3%)
	No	1092 (45.8%)	786 (48.4%)	679 (51.8%)	416 (53.6%)
	Unsure	648 (27.2%)	390 (24.0%)	253 (19.3%)	165 (21.3%)
	.	69 (2.9%)	29 (1.8%)	5 (0.4%)	14 (1.8%)

† The percentage was calculated among those who used tap water.

Table A3-7. Unweighted descriptive statistics of education achievements

Children		Wave 1	Wave 2	Wave 3	Wave 4
Is your child in the grade level expected for his or her age?	Yes	1625 (68.1%)	1196 (73.6%)	1015 (77.4%)	619 (79.8%)
	No	371 (15.5%)	242 (14.9%)	181 (13.8%)	99 (12.8%)
	Don't know	35 (1.5%)	18 (1.1%)	25 (1.9%)	12 (1.5%)
	Not school aged	344 (14.4%)	152 (9.4%)	87 (6.6%)	31 (4.0%)
	.	11 (0.5%)	17 (1.0%)	3 (0.2%)	15 (1.9%)
Has anyone told you that your child should be tested for learning problems?	Yes	547 (22.9%)	261 (16.1%)	193 (14.7%)	102 (13.1%)
	No	1756 (73.6%)	1307 (80.4%)	1088 (83.0%)	640 (82.5%)
	Don't know	63 (2.6%)	37 (2.3%)	25 (1.9%)	22 (2.8%)
	.	20 (0.8%)	20 (1.2%)	5 (0.4%)	12 (1.5%)
Have you ever been told by a doctor or nurse that your child has a behavioral or emotional problem?	Yes	541 (22.7%)	314 (19.3%)	235 (17.9%)	139 (17.9%)
	No	1773 (74.3%)	1257 (77.4%)	1043 (79.6%)	610 (78.6%)
	Don't know	57 (2.4%)	30 (1.8%)	27 (2.1%)	15 (1.9%)
	.	15 (0.6%)	24 (1.5%)	6 (0.5%)	12 (1.5%)
Has a daycare or schoolteacher or school nurse ever told you that your child has a behavioral or emotional problem?	Yes	601 (25.2%)	345 (21.2%)	214 (16.3%)	123 (15.9%)
	No	1528 (64.0%)	1148 (70.6%)	997 (76.0%)	596 (76.8%)
	Don't know	47 (2.0%)	23 (1.4%)	26 (2.0%)	12 (1.5%)
	Not school aged	194 (8.1%)	89 (5.5%)	71 (5.4%)	35 (4.5%)
	.	16 (0.7%)	20 (1.2%)	3 (0.2%)	10 (1.3%)

Appendix 4: Unweighted descriptive statistics of each survey (Adult)

Table A4-1. Unweighted descriptive statistics of general health status

Adults	Wave 1	Wave 2	Wave 3	Wave 4
Excellent	29 (12.9%)	28 (20.1%)	20 (19.4%)	3 (10.0%)
Very good	53 (23.6%)	31 (22.3%)	24 (23.3%)	5 (16.7%)
Good	84 (37.3%)	43 (30.9%)	34 (33.0%)	17 (56.7%)
Fair	45 (20.0%)	29 (20.9%)	18 (17.5%)	4 (13.3%)
Poor	12 (5.3%)	6 (4.3%)	7 (6.8%)	1 (3.3%)
.	2 (0.9%)	2 (1.4%)		
Physical health				
Excellent	36 (16.0%)	30 (21.6%)	19 (18.4%)	2 (6.7%)
Very good	54 (24.0%)	40 (28.8%)	30 (29.1%)	8 (26.7%)
Good	75 (33.3%)	39 (28.1%)	30 (29.1%)	13 (43.3%)
Fair	40 (17.8%)	22 (15.8%)	15 (14.6%)	5 (16.7%)
Poor	18 (8.0%)	6 (4.3%)	9 (8.7%)	2 (6.7%)
.	2 (0.9%)	2 (1.4%)		
Behavioral Health				
Excellent	30 (13.3%)	24 (17.3%)	16 (15.5%)	2 (6.7%)
Very good	41 (18.2%)	17 (12.2%)	22 (21.4%)	7 (23.3%)
Good	49 (21.8%)	38 (27.3%)	25 (24.3%)	6 (20.0%)
Fair	69 (30.7%)	34 (24.5%)	24 (23.3%)	8 (26.7%)
Poor	33 (14.7%)	24 (17.3%)	16 (15.5%)	2 (6.7%)
.	3 (1.3%)	2 (1.4%)		5 (16.7%)

Table A4-2a. Unweighted descriptive statistics for enrolling in Flint Medicaid Waiver

I was already enrolled in Medicaid	179 (79.6%)
To get doctor visits, dental visits, vision care, nutrition counseling, etc.	70 (31.1%)
To get the extra Family Supports Coordination/Targeted Case Management services from Genesee Health System or Genesee CHAP not usually paid for by Medicaid.	20 (8.9%)
To get someone to help me with behavioral or emotional services.	25 (11.1%)
To lower the amount of money I pay for health care.	16 (7.1%)
Other	8 (3.6%)

Table A4-2b. Unweighted descriptive statistics for access to FME

Adults		Wave 1	Wave 2	Wave 3	Wave 4
Since enrolling in the Flint Medicaid waiver, how easy was it to get the medical care, tests, or treatment you needed? For example, to see a doctor or a nurse, get medications etc.?	Easy	94 (41.8%)	43 (30.9%)	33 (32.0%)	5 (16.7%)
	Fairly easy	80 (35.6%)	55 (39.6%)	40 (38.8%)	9 (30.0%)
	Not easy, not difficult	38 (16.9%)	16 (11.5%)	11 (10.7%)	6 (20.0%)
	Difficult	6 (2.7%)	18 (12.9%)	17 (16.5%)	5 (16.7%)
	Very difficult	3 (1.3%)	5 (3.6%)	2 (1.9%)	5 (16.7%)
	.	4 (1.8%)	2 (1.4%)		5 (16.7%)
Being in the Flint Medicaid waiver made it easier to get the health care that I needed.	Strongly agree	52 (23.1%)	24 (17.3%)	27 (26.2%)	2 (6.7%)
	Agree	81 (36.0%)	41 (29.5%)	35 (34.0%)	12 (40.0%)
	Neutral	74 (32.9%)	60 (43.2%)	33 (32.0%)	13 (43.3%)
	Disagree	10 (4.4%)	7 (5.0%)	3 (2.9%)	3 (10.0%)
	Strongly disagree	5 (2.2%)	6 (4.3%)	4 (3.9%)	2 (6.7%)
	.	3 (1.3%)	1 (0.7%)	1 (1.0%)	
Since enrolling in the Flint Medicaid waiver, I feel that the health care providers are working in my best interest.	Strongly agree	49 (21.8%)	33 (23.7%)	30 (29.1%)	4 (13.3%)
	Agree	89 (39.6%)	56 (40.3%)	41 (39.8%)	11 (36.7%)
	Neutral	67 (29.8%)	33 (23.7%)	23 (22.3%)	12 (40.0%)
	Disagree	11 (4.9%)	8 (5.8%)	7 (6.8%)	2 (6.7%)
	Strongly disagree	6 (2.7%)	7 (5.0%)	1 (1.0%)	1 (3.3%)
	.	3 (1.3%)	2 (1.4%)	1 (1.0%)	
Choosing a number from 0 to 10, where 0 is the worst and 10 the best, what number would you use to rate your overall Flint Medicaid waiver experience?	0	6 (2.67%)	5 (3.60)	4 (2)	1 (3.33)
	1	3 (1.33%)	2 (1.44)	2 (1.94)	
	2	1 (0.44%)	2 (1.44)	2 (1.94)	
	3	5 (2.22%)	4 (2.88)	2 (1.94)	1 (3.33)
	4	8 (3.56%)	3 (2.16)	2 (1.94)	1 (3.33)
	5	38 (16.89%)	33 (23.74)	11 (10.68)	7 (23.33)
	6	19 (8.44%)	16 (11.51)	8 (7.77)	1 (3.33)
	7	34 (15.11%)	17 (12.23)	13 (12.62)	4 (13.33)
	8	52 (23.11%)	22 (15.83)	22 (21.36)	7 (23.33)
	9	31 (13.78%)	9 (6.47)	15 (14.56)	3 (10.00)
	10	26 (11.56%)	24 (17.27)	19 (18.45)	5 (16.67)
	.	2 (%)	2 (1.44)	3 (2.91)	
		Average score (standard error)	6.9 (0.2)	6.6 (0.2)	7.2 (0.3)

Table A4-3. Unweighted descriptive statistics for TCM support coordinator access

Adults		Wave 1	Wave 2	Wave 3	Wave 4
Have you ever been referred to the Neurodevelopmental Center of Excellence as part of Genesee Health System?	Yes	n.a.	n.a.	n.a.	
	No				13 (43.3%)
	Not heard of NCE				12 (40.0%)
.					5 (16.7%)
Have you ever used any Family Supports Coordination/Targeted Case Management services since enrolling in the Flint Medicaid waiver?	Yes	26 (11.6%)	15 (10.8%)	11 (10.7%)	2 (6.7%)
	No	195 (86.7%)	121 (87.1%)	92 (89.3%)	23 (76.7%)
	.	4 (1.8%)	3 (2.2%)		5 (16.7%)
Since the date you completed the last survey, have you used any Family Supports Coordination/Targeted Case Management services?	Yes	n.a.	16 (11.5%)	11 (10.7%)	1 (3.3%)
	No		116 (83.5%)	90 (87.4%)	24 (80.0%)
	.		7 (5.0%)	2 (1.9%)	5 (16.7%)
How many times has your Supports Coordinator contacted you in the last 6 months?†	None	4 (15.4%)	4 (25.0%)	4 (36.4%)	
	1-5 times	13 (50.0%)	6 (37.5%)	3 (27.3%)	1 (100%)
	6-12 times	4 (15.4%)	1 (6.3%)	2 (18.2%)	
	13 or more	1 (3.8%)	1 (6.3%)		
	Not sure	4 (15.4%)	4 (25.0%)	2 (18.2%)	
	.	199	123	92	29
How have you met with the Supports Coordinator in the last 6 months? †					
In person meeting at a public location	No	21 (80.8%)		9 (81.8%)	
	Yes	5 (19.2%)	4 (100%)	2 (18.2%)	1 (100%)
	.	199	135	92	29
In person meeting at my home/residence	No	17 (65.4%)	3 (100%)	11 (100%)	1 (100%)
	Yes	9 (34.6%)			
	.	199	136	92	29
On a phone call	No	17 (65.4%)		6 (54.5%)	1 (100%)
	Yes	9 (34.6%)	3 (100%)	5 (45.5%)	
	.	199	136	92	29
Other	No	25 (96.2%)		10 (90.9%)	1 (100%)
	Yes	1 (3.8%)		1 (9.1%)	
	.	199	139	92	29
Don't remember	No	3 (30%)		6 (54.5%)	1 (100%)
	Yes	7 (70%)	8 (100%)	5 (45.5%)	
	.	215	131	92	29
Over the last 6 months how satisfied have you been with your Supports Coordinator?†	Very satisfied	14 (53.8%)	10 (66.7%)	5 (45.5%)	1 (100%)
	Somewhat satisfied	7 (26.9%)	2 (13.3%)	5 (45.5%)	
	Somewhat dissatisfied	4 (15.4%)	2 (13.3%)	1 (9.1%)	
	Very dissatisfied	1 (3.8%)	1 (6.7%)		
	.	199	124	92	29
What are some of the reasons you have used Family Supports Coordination/Targeted Case Management? †					
Physical health concerns	No	n.a.	n.a.	6 (60%)	1 (50%)
	Yes			4 (40%)	1 (50%)

	.			93	28
Testing for behavioral or emotional concerns	No	n.a.	n.a.	7 (70%)	1 (3.3%)
	Yes			3 (30%)	1 (3.3%)
	.			93	28
Behavior or emotional concerns, other than testing	No	n.a.	n.a.	6 (60%)	n.a.
	Yes			4 (40%)	
	.			93	
Other	No	n.a.	n.a.	10 (100%)	2 (100%)
	Yes				
	.			93	28
What are some of the reasons you have not used Family Supports Coordination/Targeted Case Management?††					
My needs were met before I enrolled in the waiver/TCM	No	n.a.	n.a.	57 (62.0%)	18 (78.3%)
	Yes			35 (40%)	5 (21.7%)
	.			11	7
My needs were met somewhere else	No	n.a.	n.a.	62 (67.4%)	18 (78.3%)
	Yes			30 (32.6%)	5 (21.7%)
	.			11	7
TCM did not have the services I needed	No	n.a.	n.a.	82 (89.1%)	18 (78.3%)
	Yes			10 (10.9%)	5 (21.7%)
	.			11	7
Other	No	n.a.	n.a.	87 (94.6%)	21 (91.3%)
	Yes			5 (5.4%)	2 (8.7%)
	.			11	7
No need	No	n.a.	n.a.	68 (91.9%)	21 (91.3%)
	Yes			6 (8.1%)	2 (8.7%)
	.			29	7
Unaware TCM/not connected	No	n.a.	n.a.	69 (90.8%)	20 (87.0%)
	Yes			7 (9.2%)	3 (13.0%)
	.			27	7
COVID pandemic prevented	No	n.a.	n.a.	72 (98.6%)	23 (100%)
	Yes			1 (1.4%)	
	.			30	7
Ineligible/moved from area	No	n.a.	n.a.	72 (100%)	23 (100%)
	Yes				
	.			31	7
Too busy	No	n.a.	n.a.	71 (98.6%)	23 (100%)
	Yes			1 (1.4%)	
	.			31	7
Have you ever received information about Family Supports Coordination/Targeted Case Management (TCM)?	Yes	n.a.	n.a.	n.a.	5 (16.7%)
	No				18 (60.0%)
	.				7 (23.3%)
Would you like to receive information about Family Supports Coordination/Targeted Case Management (TCM)?	Yes	n.a.	n.a.	n.a.	9 (30.0%)
	No				14 (46.7%)
	.				7 (23.3%)
Have you received services from other sources in the community?	Yes	n.a.	n.a.	n.a.	3 (10.0%)
	No				20 (66.7%)
	Don't know				5 (16.7%)



	.				2 (6.7%)
Where have you received services from?	County health department	n.a.	n.a.	n.a.	1 (3.3%)
	Faith-based/religious organization/church	n.a.	n.a.	n.a.	0
	Community-based organization (Food bank, etc)	n.a.	n.a.	n.a.	1 (3.3%)
	Other	n.a.	n.a.	n.a.	3 (10.0%)
What type of services did you use?	Food assistance	n.a.	n.a.	n.a.	3 (10.0%)
	Health care	n.a.	n.a.	n.a.	1 (3.3%)
	Financial assistance	n.a.	n.a.	n.a.	1 (3.3%)
	Educational assistance	n.a.	n.a.	n.a.	0
	Other	n.a.	n.a.	n.a.	

† The percentage was calculated among those who used some FCS/TCM services.

†† The percentage was calculated among those who did not use any FCS/TCM services.

Table A4-4. Unweighted descriptive statistics for chronic disease management

Adults		Wave 1	Wave 2	Wave 3	Wave 4
Do you currently have a chronic health condition such as asthma, diabetes, high blood pressure, arthritis, etc.?	Yes	47 (20.9%)	19 (13.7%)	15 (14.6%)	7 (23.3%)
	No	139 (61.8%)	105 (75.5%)	77 (74.8%)	20 (66.7%)
	Unsure	37 (16.4%)	11 (7.9%)	10 (9.7%)	3 (10.0%)
	.	2 (0.9%)	4 (2.9%)	1 (1.0%)	
Since enrolling in the Flint Medicaid waiver, I have access to more resources that help with management of my chronic health condition(s). †	Strongly agree	8 (17.0%)	3 (15.8%)	5 (33.3%)	
	Agree	12 (25.5%)	4 (21.1%)	6 (40.0%)	2 (28.6%)
	Neutral	15 (31.9%)	8 (42.1%)	4 (26.7%)	4 (57.1%)
	Disagree	5 (10.6%)	2 (10.5%)		1 (14.3%)
	Strongly disagree	7 (14.9%)	2 (10.5%)		
.	178	120	88	23	
Since enrolling in the Flint Medicaid waiver, I am more confident that I can manage my chronic conditions. †	Strongly agree	5 (10.6%)	3 (15.8%)	6 (40.0%)	1 (14.3%)
	Agree	13 (27.7%)	7 (36.8%)	5 (33.3%)	
	Neutral	18 (38.3%)	5 (26.3%)	3 (20.0%)	4 (57.1%)
	Disagree	6 (12.8%)	3 (15.8%)	1 (6.7%)	2 (28.6%)
	Strongly disagree	5 (10.6%)	1 (5.3%)		
.	178	120	88	23	

† The percentage was calculated among those who had some chronic conditions.

Table A4-5. Unweighted descriptive statistics for lead exposure

Adults		Wave 1	Wave 2	Wave 3	Wave 4
Other than through the Flint Water System, have you been exposed to lead through other sources (example: paint, dust or soil)?	Yes	16 (7.1%)	11 (7.9%)	6 (5.8%)	3 (10.0%)
	No	148 (65.8%)	82 (59.0%)	61 (59.2%)	14 (46.7%)
	Unknown	59 (26.2%)	42 (30.2%)	35 (34.0%)	11 (36.7%)
	.	2 (0.9%)	4 (2.9%)	1 (1.0%)	2 (6.7%)

Table A4-6. Unweighted descriptive statistics of water/filter usage and pipe replacement

Adults		Wave 1	Wave 2	Wave 3	Wave 4
Do you use water supplied by the City of Flint, also known as tap or faucet water right now?	Yes	142 (63.1%)	77 (55.4%)	65 (63.1%)	15 (50.0%)
	No	82 (36.4%)	56 (40.3%)	36 (35.0%)	15 (50.0%)
	.	1 (0.4%)	5 (3.6%)	2 (1.9%)	
What do you use tap water for? Drinking/cooking/brushing teeth/washing dishes (Wave 1 & 2) Drinking (Wave 3 & 4)†	No	21 (17.5%)		43 (66.2%)	8 (53.3%)
	Yes	99 (82.5%)	61 (100%)	22 (33.8%)	7 (46.7%)
	.	105	78	38	15
Cooking	No	n.a.	n.a.	25 (38.5%)	3 (20.0%)
	Yes			40 (61.5%)	12 (80.0%)
	.			38	15
Washing dishes/brushing teeth	No	n.a.	n.a.	4 (6.2%)	1 (6.7%)
	Yes			61 (93.8%)	14 (93.3%)
	.			38	15
Bathing/showering/washing clothes	No	10 (7.4%)		2 (3.1%)	1 (6.7%)
	Yes	125 (92.6%)	73 (100%)	63 (96.9%)	14 (93.3%)
	.	90	66	38	15
Watering garden/pools/sprinklers	No	48 (53.3%)		33 (50.8%)	6 (60.0%)
	Yes	42 (46.7%)	26 (100%)	32 (49.2%)	9 (40.0%)
	.	135	113	38	15
Other	No	64 (83.1%)		62 (95.4%)	14 (93.3%)
	Yes	13 (16.9%)	5 (100%)	3 (4.6%)	1 (6.7%)
	.	148	134	38	15
Have you used a water filter at your home since April 2014?	Yes	165 (73.3%)	102 (73.4%)	71 (68.9%)	13 (43.3%)
	No	57 (25.3%)	33 (23.7%)	32 (31.1%)	15 (50.0%)
	.	3 (1.3%)	4 (2.9%)		2 (6.7%)
Are you currently using a water filter in your home?	Yes	130 (57.8%)	90 (64.7%)	64 (62.1%)	13 (43.3%)
	No	35 (15.6%)	43 (30.9%)	38 (36.9%)	15 (50.0%)
	.	60 (26.7%)	6 (4.3%)	1 (1.0%)	2 (6.7%)
What kind of filter(s) do you have now? Filter attached to the faucet.	No	20 (8.9%)		16 (15.5%)	5 (16.7%)
	Yes	110 (48.9%)	73 (52.5%)	48 (46.6%)	8 (26.7%)
	.	95 (42.2%)	66 (47.5%)	39 (37.9%)	17 (56.7%)
Whole house filter (connected near your water heater.)	No	123 (54.7%)		55 (53.4%)	12 (40.0%)
	Yes	7 (3.1%)	6 (4.3%)	9 (8.7%)	1 (3.3%)
	.	95 (42.2%)	133 (95.7%)	39 (37.9%)	17 (56.7%)
Water pitcher filter; like Brita or PUR	No	85 (37.8%)		47 (45.6%)	8 (26.7%)
	Yes	45 (20.0%)	25 (18.0%)	17 (16.5%)	5 (16.7%)
	.	95 (42.2%)	114 (82.0%)	39 (37.9%)	17 (56.7%)
Other filter	No	120 (53.3%)		62 (60.2%)	13 (43.3%)
	Yes	10 (4.4%)	9 (6.5%)	2 (1.9%)	
	.	95 (42.2%)	130 (93.5%)	39 (37.9%)	17 (56.7%)
Have the water pipes to your home or residence been replaced as of today?	Yes	63 (28.0%)	30 (21.6%)	32 (31.1%)	6 (20.0%)
	No	88 (39.1%)	65 (46.8%)	45 (43.7%)	16 (53.3%)
	Unknown	73 (32.4%)	40 (28.8%)	26 (25.2%)	6 (20.0%)
	.	1 (0.4%)	4 (2.9%)		2 (6.7%)

† The percentage was calculated among those who used tap water.

Appendix 5: Unweighted descriptive statistics COVID questions (Child)

Table A5-1. Unweighted descriptive statistics of COVID related questions

Children	Wave 3	Wave 4
How has COVID-19 impacted you and your family?		
Less access to services through schools (such as meals, childcare, etc.)	593 (45.2%)	232 (29.9%)
Unable to go to work, laid off, or furloughed	593 (45.2%)	287 (37.0%)
Working more hours as an essential worker	230 (17.5%)	116 (14.9%)
Lost childcare	181 (13.8%)	83 (10.7%)
Received federal stimulus check	766 (58.4%)	446 (57.5%)
Received unemployment money from the state and/or federal government	417 (31.8%)	222 (28.6%)
Other	31 (2.4%)	21 (2.7%)
not affected me and my family	69 (5.3%)	81 (10.4%)
Had COVID or Lost family members	5 (0.4%)	9 (1.2%)
Increased stress and anxiety	30 (2.3%)	18 (2.3%)
Virtual learning had negative impact	31 (2.4%)	12 (1.5%)
Social isolation had negative impact	18 (1.4%)	9 (1.2%)
Struggling financially	28 (2.1%)	27 (3.5%)
Contracted COVID/recovering from COVID	n.a.	14 (1.8%)
How has COVID-19 impacted your access to healthcare services?		
Doctor's appointments moved to telephone or telehealth (computer face-to-face)	593 (45.2%)	301 (38.8%)
Delays or cancellations of doctor's appointments and/or getting prescriptions	480 (36.6%)	246 (31.7%)
Not able to access physical healthcare needed	136 (10.4%)	65 (8.4%)
Other	18 (1.4%)	19 (2.4%)
My access to healthcare has not been affected	479 (36.5%)	327 (42.1%)
How has COVID-19 pandemic impacted your access to mental health services?		
Mental health appointments moved to telephone or telehealth (computer face-to-face)	357 (27.2%)	166 (21.4%)
Delays or cancellations of mental health appointments and/or getting medication	214 (16.3%)	115 (14.8%)
Not able to access mental health	108 (8.2%)	57 (7.3%)
Other	33 (2.5%)	14 (1.8%)
My access to mental health services has not been affected	705 (53.8%)	468 (60.3%)
Has anyone in your household been sick with COVID-19		
Yes and was confirmed by testing	59 (4.5%)	322 (41.5%)
Yes, but did not get tested	55 (4.2%)	52 (6.7%)
No and was confirmed by testing	144 (11.0%)	108 (13.9%)
No, no one got sick	1081 (82.5%)	297 (38.3%)

Appendix 6: Unweighted descriptive statistics COVID questions (Adult)

Table A6-1. Unweighted descriptive statistics of COVID related questions

Adults	Wave 3	Wave 4
How has COVID-19 impacted you and your family?		
Less access to services through schools (such as meals, childcare, etc.)	22 (21.4%)	4 (13.3%)
Unable to go to work, laid off, or furloughed	63 (61.2%)	14 (46.7%)
Working more hours as an essential worker	13 (12.6%)	4 (13.3%)
Lost childcare	6 (5.8%)	0
Received federal stimulus check	43 (41.7%)	10 (33.3%)
Received unemployment money from the state and/or federal government	37 (35.9%)	5 (16.7%)
Other	3 (2.9%)	1 (3.3%)
not affected me and my family	6 (5.8%)	3 (10.0%)
Had COVID or Lost family members	2 (1.9%)	1 (3.3%)
Increased stress and anxiety	2 (1.9%)	0
Virtual learning had negative impact	0	0
Social isolation had negative impact	1 (1.0%)	1 (3.3%)
Struggling financially	0	2 (6.7%)
Contracted COVID/recovering from COVID	n.a.	1 (3.3%)
How has COVID-19 impacted your access to healthcare services?		
Doctor's appointments moved to telephone or telehealth (computer face-to-face)	44 (42.7%)	13 (43.3%)
Delays or cancellations of doctor's appointments and/or getting prescriptions	45 (43.7%)	13 (43.3%)
Not able to access physical healthcare needed	20 (19.4%)	5 (16.7%)
Other	5 (4.9%)	0
My access to healthcare has not been affected	22 (21.4%)	6 (20.0%)
How has COVID-19 pandemic impacted your access to mental health services?		
Mental health appointments moved to telephone or telehealth (computer face-to-face)	29 (28.2%)	8 (26.7%)
Delays or cancellations of mental health appointments and/or getting medication	26 (25.2%)	4 (13.3%)
Not able to access mental health	11 (10.7%)	1 (3.3%)
Other	4 (3.9%)	0
My access to mental health services has not been affected	37 (35.9%)	16 (53.3%)
Has anyone in your household been sick with COVID-19?		
Yes and was confirmed by testing	9 (8.7%)	11 (36.7%)
Yes, but did not get tested	5 (4.9%)	3 (10.0%)
No and was confirmed by testing	9 (8.7%)	6 (20.0%)
No, no one got sick	81 (78.6%)	9 (30.0%)

MICHIGAN STATE
UNIVERSITY

DATE

SURVEY ID: xxxxxxxx

«FirstName» «LastName»
«Address1» «Address2»
«City», «State» «Zip»

To the Parent/Guardian of <<First Name>> <<Last Name>>]:

Michigan State University is surveying people who are covered by the Flint Medicaid Expansion Waiver because of the water crisis. This program offers extra health services for children and pregnant women who were exposed to lead in the Flint water. The program started in May, 2016. We will call it the "Flint Medicaid Waiver" in the survey but you might know it by other names like:

- Medicaid
- Flint Medicaid Expansion Waiver
- Flint Water Health Care
- Medicaid Expansion
- Medicaid Waiver
- Flint Health Care Coverage

You do not need to still live in Flint to have this insurance. Our records show <<First Name>> may be enrolled in this through [ICO NAME]. We are interested in what you think. We would also like to know about your child's water use.



We are asking you to complete a survey about <<First Name>> overall health and health care services used since [APRIL 2016 OR FIRST ENROLLMENT DATE IF AFTER THAT]. Any questions you answer on the survey will not affect your family's Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on all survey responses will be made public.

**Institute for
Public Policy and
Social Research**

This will be the first of 3 surveys you will receive over the next 2 years. You will receive \$10 for each survey that you do. If you complete all 3 surveys for <<First Name>>, you will receive a bonus of \$20 after the last survey.

**Office for
Survey Research**

**College of
Social Science**

You can complete the first survey now either:

- Online: at www.osr.msu.edu/flint. You will need to enter this Survey ID: xxxxxxxx OR
- Phone: call (877) 403-2076. Please give them this Survey ID: xxxxxxxx. The survey should take about 5-10 minutes.

1407 S. Harrison Rd
Suite 343
Nisbet Building
East Lansing, MI
48823-1111

If we do not hear from you now, we will mail out a paper survey in about 4 weeks. Your feedback is very important. The answers you give will be used to help improve this program. Thank you for taking the time to answer the survey. If you have any questions about the survey, please call Debra Rusz at (517) 353-1766. If you have any questions about the web survey, please call Karen Clark at (517) 353-1764.

517/355-6672
Fax: 517/884-7557
ippsr.msu.edu

Sincerely,

A handwritten signature in cursive script that reads "Debra Rusz".

Debra L. Rusz, Senior Project Manager/Analyst

MICHIGAN STATE
UNIVERSITY

DATE

SURVEY ID: xxxxxxxxx

«FirstName» «LastName»
«Address1» «Address2»
«City», «State» «Zip»

To the Parent/Guardian of <<First Name>> <<Last Name>>]:

Michigan State University is surveying people who are covered by the Flint Medicaid Expansion Waiver because of the water crisis. This program offers extra health services for children and pregnant women who were exposed to lead in the Flint water. The program started in May, 2016. We will call it the "Flint Medicaid Waiver" in the survey but you might know it by other names like:

- Medicaid
- Flint Medicaid Expansion Waiver
- Flint Water Health Care
- Medicaid Expansion
- Medicaid Waiver
- Flint Health Care Coverage

You do not need to still live in Flint to have this insurance. Our records show your child may be enrolled in this through [ICO NAME]. We are interested in what you think. We would also like to know about your child's water use.

We ask that you complete the enclosed survey about overall health and health care services your child has used since [APRIL 2016 OR FIRST ENROLLMENT DATE IF AFTER THAT]. Any questions you answer on the survey will not affect Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on all survey responses will be made public.

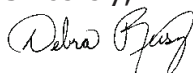
This is the first of 3 surveys you will receive over the next 2 years. You will receive \$10 for each survey that you do. If you complete all 3 surveys, you will receive a bonus of \$20 after the last survey.

There are several ways you can complete the first survey:

- Fill out all 6 pages and return it in the postage-paid envelope provided within 2 weeks.
- Online: _____. You will need to enter this Survey ID: xxxxxxx.
- Phone: call (877) 403-2076. Please give them the name and the address on this letter. The survey should take about **15 minutes**.

Your feedback is very important. The answers you give will be used to help improve this program. Thank you for taking the time to answer the survey. If you have any questions about this survey, please call Debra Ruz at (517) 353-1766.

Sincerely,



Debra L. Ruz

Senior Project Manager / Analyst



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**Office for
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**College of
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**MICHIGAN STATE
UNIVERSITY**

December 19, 2018

SURVEY ID: «caseid»

Dear «FirstName» «LastName» «jr_sr»:

Michigan State University is surveying people who are covered by the Flint Medicaid Expansion Waiver because of the water crisis. This program offers extra health services for children and pregnant women who were exposed to lead in the Flint water. The program started in May, 2016. We will call it the "Flint Medicaid Waiver" in the survey but you might know it by other names like:

- Medicaid
- Flint Medicaid Expansion Waiver
- Flint Water Health Care
- Medicaid Expansion
- Medicaid Waiver
- Flint Health Care Coverage

You do not need to still live in Flint to have this insurance. Our records show you may be enrolled in this through «ProviderGeneral». We are interested in what you think. We would also like to know about your water use.

We are asking you to complete a survey about your overall health and health care services you used since «enroll_word», «enroll_year». Any questions you answer on the survey will not affect your family's Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on all survey responses will be made public.

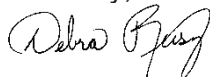
This will be the first of 3 surveys you will receive over the next 2 years. You will receive \$10 for each survey that you do. If you complete all 3 of your surveys, you will receive a bonus of \$20 after the last survey.

You can complete the first survey now either:

- Online: www.osr.msu.edu/flint. You will need to enter this **Survey ID: «caseid»** OR
- Phone: call (877) 403-2076. Please give them this **Survey ID: «caseid»**. The survey should take about 5-10.

If we do not hear from you now, we will mail out a paper survey in about 4 weeks. Your feedback is very important. The answers you give will be used to help improve this program. Thank you for taking the time to answer the survey. If you have any questions about the survey, please call Debra Rusz at (517) 353-1766. If you have any questions about the web survey, please call Karen Clark at (517) 353-1764.

Sincerely,



Debra L. Rusz
Senior Project Manager/Analyst



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Fax: 517/884-7557
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MICHIGAN STATE
UNIVERSITY

DATE

SURVEY ID: xxxxxxxxx

«FirstName» «LastName»
«Address1» «Address2»
«City», «State» «Zip»

Dear <<First Name>> <<Last Name>>]:

Michigan State University is surveying people who are covered by the Flint Medicaid Expansion Waiver because of the water crisis. This program offers extra health services for children and pregnant women who were exposed to lead in the Flint water. The program started in May, 2016. We will call it the "Flint Medicaid Waiver" in the survey but you might know it by other names like:

- Medicaid
- Flint Medicaid Expansion Waiver
- Flint Water Health Care
- Medicaid Expansion
- Medicaid Waiver
- Flint Health Care Coverage

You do not need to still live in Flint to have this insurance. Our records show you may be enrolled in this through [ICO NAME]. We are interested in what you think. We would also like to know about your water use.



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517/355-6672
Fax: 517/884-7557
ippsr.msu.edu

We ask that you complete the enclosed survey about overall health and health care services you used since [APRIL 2016 OR FIRST ENROLLMENT DATE IF AFTER THAT]. Any questions you answer on the survey will not affect Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on all survey responses will be made public.

This is the first of 3 surveys you will receive over the next 2 years. You will receive \$10 for each survey that you do. If you complete all 3 surveys, you will receive a bonus of \$20 after the last survey.

There are several ways you can complete the first survey:

- Fill out all 6 pages and return it in the postage-paid envelope provided within 2 weeks.
- Online: _____. You will need to enter this Survey ID: xxxxxxx.
- Phone: call (877) 403-2076. Please give them the name and the address on this letter. The survey should take about **15 minutes**.

Your feedback is very important. The answers you give will be used to help improve this program. Thank you for taking the time to answer the survey. If you have any questions about this survey, please call Debra Ruz at (517) 353-1766.

Sincerely,

A handwritten signature in black ink that reads "Debra Ruz".

Debra L. Ruz

February 8, 2019

SURVEY ID: «ID»

To the Parent/Guardian of «FirstName» «LastName»:

About a month ago, we sent you a letter asking you to take a survey for people covered by the Flint Medicaid Waiver because of the Flint water crisis. «FirstName» does not need to still live in Flint to have this coverage or for you to do the survey. Our records show «FirstName» may be enrolled in this through «ProviderGeneral». This program offers extra health services for children and pregnant women who were exposed to lead in the Flint water. The program started in May 2016. We will call it the "Flint Medicaid Waiver" in the survey but you might know it by other names like:

- Medicaid
- Flint Medicaid Expansion Waiver
- Flint Water Health Care
- Medicaid Expansion
- Medicaid Waiver
- Flint Health Care Coverage

We have not received a survey back from you for «FirstName». Michigan State University is conducting the survey for Michigan Medicaid. Your feedback is important to help Medicaid understand how the Flint Medicaid Expansion Waiver is working.

We know that not everyone has access to the internet. Some people might not feel comfortable doing a survey on-line or over the phone. To make sure that you have a chance to do the survey, we are giving you a paper copy with a postage paid envelope.

The survey has questions about «FirstName»'s overall health and health care services used since «Month_word», «Year». Your answers on the survey will not affect your family's Medicaid benefits. All answers are private to the extent allowed by law. Only a summary report will be made public.

This will be the first of 3 surveys you receive over the next 2 years. You will receive \$10 for each survey you do. If you complete all 3 surveys, you will receive a bonus of \$20 after the last survey.

You can still complete the survey on-line or by phone. The survey can be accessed at: www.osr.msu.edu/flint. You will need to enter your **Survey ID: «ID»** and **«LastName»** to access the survey. You may also call **(877) 403-2076** to complete the survey. Please give the person answering the phone your Survey ID number and your child's name.

Thank you for taking the time to answer the survey. If you have any questions about the survey, please call Debra Ruz at (517) 353-1766.

Sincerely,



Debra L. Ruz
Senior Project Manager



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Social Research

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MICHIGAN STATE
UNIVERSITY

March 1, 2019

SURVEY ID: ID

To the Parent/Guardian of CHILD:

We are following up with you about a survey we sent. The survey asks about your experiences with the Flint Medicaid Waiver for CHILD. CHILD does **not** need to still live in Flint to have this coverage or for you to take the survey. Our records show CHILD may be enrolled in the Flint Medicaid Waiver through MOLINA HEALTHCARE.

The survey has questions about CHILD'S overall health and health care services used since 6/1/2016. Your answers on the survey will not change your family's Medicaid benefits. All answers are as private as allowed by law. Only a summary report will be made public.

Would you take 10 minutes **today** to fill out the survey? You will receive **\$10** for completing it.

**The fastest way to receive the \$10 payment is to access the survey on-line at:
www.osr.msu.edu/Flint**

Use **this number ID NUMBER** and your **LAST NAME** to enter the online survey

-OR-

You can **call (877) 403-2076** to complete the survey. Please give the person answering the phone this number **ID NUMBER**.

If you can't take the survey online or by phone today, please fill out the paper survey and send it back in the next couple of days.



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This will be the first of 3 surveys you receive over the next 2 years. You will receive \$10 for each survey you do. You will receive a bonus of \$20 after you complete all 3 surveys.

Thank you for taking time to complete the survey. If you have any questions about it, please call Debra Rusz at (517) 353-1766.

Sincerely,

A handwritten signature in black ink that reads "Debra Rusz".

Debra L. Rusz
Senior Project Manager

Flint Medicaid Expansion Child Survey

Conducted on behalf of

The Michigan Department of Health and Human Services

The Flint Medicaid Expansion Waiver offers health insurance in response to the Flint Water Crisis. We would like to hear about your experience with this health care insurance for your child. Michigan State University is working with Michigan Medicaid to understand the use of services provided by the **Flint Medicaid Expansion Waiver**.

Any questions you answer on this survey will not affect you or your child's Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on all survey responses will be made public.

You will receive \$10 for completing and returning your survey.

You can have someone help you fill out the survey. If you have questions about this survey, please contact Debra Rusz at the Office for Survey Research at Michigan State University at 517.353.1766 or by email, ruszdebr@msu.edu.

Instructions for Completing the Survey

- ▶ Some questions are answered by marking a choice from a list. You would answer the question by marking the box like this:

 Yes
 No
- ▶ Sometimes you will skip one or more questions. For example, if you choose 'Yes' here, you would skip to question A16. If your choice is "No", you continue to the next question:

 Yes - **please go to A16**
 No
- ▶ Only give one answer unless the directions for the question says "**check all that apply**"
- ▶ Sometimes you will be asked to answer another question by following an arrow

IMPORTANT: When completing this survey, answer only about:

When completing this survey, remember to only answer about the child whose name is listed on the cover.

Q1. In general, how would you rate your child's **overall health (both physical and behavioral/emotional)** since enrolling in the Flint Medicaid Waiver?

Excellent Very Good Good Fair Poor
¹ ² ³ ⁴ ⁵

Q2. In general, how would you rate your child's **physical health** since enrolling in the Flint Medicaid Waiver? *Physical health includes how much your child is growing, if they have their vaccinations, if they have any problems like colds or ear infections or things like asthma.*

Excellent Very Good Good Fair Poor
¹ ² ³ ⁴ ⁵

Q3. In general, how would you rate your child's **behavioral or emotional health** since enrolling in the Flint Medicaid Waiver? *Children might show stress with behavioral or emotional health problems such as depression, anxiety, by frequent temper tantrums, too much crying, too much anger or not paying attention.*

Excellent Very Good Good Fair Poor
¹ ² ³ ⁴ ⁵

Q4. Is your child in the grade level expected for his or her age?

- ¹ Yes
- ² No
- ⁷ Don't know
- ⁸ Child is not school aged/not in school

Q5. Has anyone told you that your child should be tested for learning problems?

- ¹ Yes
- ² No
- ⁷ Don't know

Q6. Have you ever been told by a **doctor or nurse** that your child has a behavioral or emotional problem?

- ¹ Yes
- ² No
- ⁷ Don't know

Q7. Has a **daycare or school teacher or school nurse** ever told you that your child has a behavioral or emotional problem?

- ¹ Yes
- ² No
- ⁷ Don't know
- ⁸ Child is not school aged/not in school

Q8. What were the reasons you enrolled your child in the Flint Medicaid Waiver? **Check all that apply**

- ¹ My child was already enrolled in Medicaid.
- ¹ To get doctor visits, dental visits, vision care, nutrition counseling, etc.
- ¹ To get the extra Family Supports Coordination/Targeted Case Management services from Genesee Health System or Genesee CHAP not usually paid for by Medicaid.
- ¹ To get someone to help my child with behavioral or emotional services.
- ¹ To lower the amount of money we pay for health care.
- ¹ Other, **please specify** _____

Q9. Since enrolling in the Flint Medicaid waiver, how easy was it to get the medical care, tests, or treatment your child needed? For example, to see a doctor or a nurse, get vaccinations, etc.?

- | | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Easy | Fairly Easy | Not Easy, Not
Difficult | Difficult | Very Difficult |
| <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ | <input type="checkbox"/> ⁵ |

By being enrolled in the Flint Medicaid Waiver program, your child can get extra services such as Family Supports Coordination, sometimes called Targeted Case Management. A Supports Coordinator is a person like a nurse or social worker. This person helps you make a plan based on your family's needs. They answer your questions, help make appointments, arrange transportation, connect your family to educational resources, or provide nutrition support.

Q10. Have you ever used any Family Supports Coordination/Targeted Case Management services for your child since enrolling in the Flint Medicaid waiver?

- ¹ Yes - **Please answer Q11, Q12, Q13 in the box below** ↴
- ² No - **Please go to Q14 on the next page** →

Q11. How many times has your Supports Coordinator contacted you about your child in the *last 6 months*?

- ¹ None - I've never been contacted
- ² 1-5 times
- ³ 6-12 times
- ⁴ 13 or more times
- ⁵ Don't know/Unsure

Q12. How have you met with the Supports Coordinator *in the last 6 months*? **Check all that apply**

- ¹ In person meeting at a public location
- ¹ In person meeting at my home/residence
- ¹ On a phone call
- ¹ Other, **please describe** _____
- ¹ Don't remember/don't know

Q13. Over the *last 6 months* how satisfied have you been with your child's Supports Coordinator?

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Very
Satisfied | Somewhat
Satisfied | Somewhat
Dissatisfied | Very
Dissatisfied |
| <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |

Now we want to get your thoughts about your overall Flint Medicaid Waiver experience. Please read each statement and then indicate whether you agree or disagree with the statement. Remember to only answer about the child whose name is listed on the cover.

Q14. Being in the Flint Medicaid waiver made it easier to get the health care that my child needed.

Strongly Agree ¹ Agree ² Neutral ³ Disagree ⁴ Strongly Disagree ⁵

Q15. Since enrolling in the Flint Medicaid waiver, I feel that the health care providers are working in my child's best interest.

Strongly Agree ¹ Agree ² Neutral ³ Disagree ⁴ Strongly Disagree ⁵

Q16. Does your child have a chronic health condition such as asthma, diabetes, ADHD, autism, arthritis, etc.?

- ¹ Yes - Please answer Q17 and Q18 in the box below
- ² No - Please go to Q19
- ³ Don't know/Unsure - Please go to Q19

Q17. Since enrolling in the Flint Medicaid waiver, I have access to **more resources** that help with management of my child's chronic health condition(s).

Strongly Agree ¹ Agree ² Neutral ³ Disagree ⁴ Strongly Disagree ⁵

Q18. Since enrolling in the Flint Medicaid waiver, I am more confident that I can manage my child's chronic condition(s).

Strongly Agree ¹ Agree ² Neutral ³ Disagree ⁴ Strongly Disagree ⁵

Q19. Choose a number from 0 to 10, where 0 is the **worst** and 10 the **best**, what number would you use to rate your child's overall Flint Medicaid waiver experience?

Worst 0 1 2 3 4 5 6 7 8 9 10 Best

The next questions are about the water you use in your home since the Flint Water Crisis started in April 2014.

Q20. Does your child use water supplied by the City of Flint, also known as tap or faucet water right now?

- ¹ Yes - Please answer Q21 in the box below
- ² No - Please go to Q22
- ⁷ Don't know/Unsure - Please go to Q22

Q21. What do they use tap water for? *Check all that apply*

- ¹ Drinking/cooking/brushing teeth/washing dishes
- ¹ Bathing/showering/washing clothes
- ¹ Watering garden/pools/sprinklers
- ¹ Other, please describe _____

Water filters were distributed during the Flint Water Crisis or you may have bought your own. We would like to ask some questions about how you use the filter.

Q22. Have you used a water filter at your home since April 2014?

- ¹ Yes - Please answer the questions in the box below beginning with Q23
- ² No - Please go to Q26
- ⁷ Don't know/Unsure - Please go to Q26

Q23. What month/year did you get your first filter?

Month: Year:

Q24. Are you currently using a water filter in your home?

- ¹ Yes - Please answer Q25 in the box below
- ² No - Please go to Q26

Q25. What kind of filter do you have now? *Check all that apply*

- ¹ Filter attached to the faucet.
- ¹ Whole house filter (connected near your water heater.)
- ¹ Water pitcher filter; like Brita or Pur
- ¹ Other, please describe _____
- ¹ Don't know/Don't remember

Q26. Have the water pipes to your home or residence been replaced as of today?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q27. Other than through the Flint Water System, has your child been exposed to lead through other sources (example: paint, dust or soil)?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember


Q28. Has a doctor or nurse ever told you that your child had a high blood lead level?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q29. How are you related to the child?

- ¹ Parent
- ² Grandparent
- ³ Foster parent or guardian
- ⁴ Sibling
- ⁵ Other relative
- ⁶ Not related in any way

Q30. Did someone help you complete this survey on behalf of your child?

- ¹ Yes - **Please answer Q31 in the box below**
- ² No - **Please go to Q32 on the next page** → 

Q31. How did that person help you? **Check all that apply**

- ¹ Read the questions to me
- ¹ Wrote the answers I gave
- ¹ Answered the questions for me
- ¹ Translated the questions into my language
- ¹ Helped in some other way, **please explain** _____

Q32. As promised, we would like to send you **\$10** for completing this survey. We will send the payment in cash by U.S. Mail. We will make every effort to process payments within five (5) business days of receiving your completed survey. Please provide your contact information below.

Name: _____	
(First)	(Last)
Street address: _____	
Apartment Number: _____	
City: _____	
State: _____	Zip Code: _____

Q33. We would like to survey you again in about nine (9) months – please let us know the best way to contact you about your child. If you prefer to be contacted by telephone (including text message) or by email, please provide that information below.

Telephone Number: () _____ - _____
Email Address: _____

Q34. You may also provide the contact information for someone that knows how to get in touch with you in case your information changes before the next survey.

Their Name: _____	
(First)	(Last)
Street address: _____	
Apartment Number: _____	
City: _____	
State: _____	Zip Code: _____

Thank you for taking the time to answer these questions.

Please return your completed survey in the envelope that was included with this survey.

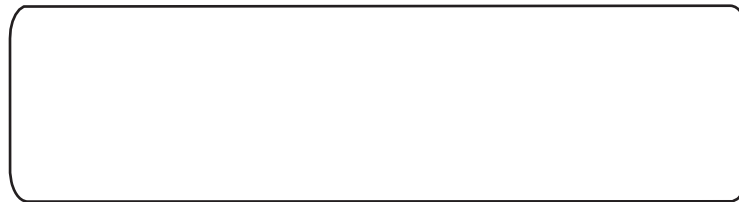
Flint Medicaid Expansion Child Survey – Wave II

Conducted on behalf of

The Michigan Department of Health and Human Services

The Flint Medicaid Expansion Waiver offers health insurance in response to the Flint Water Crisis. Thank you for doing the first survey. We would like to hear about your experience with this health care insurance for your child since you last completed a survey.

When completing this survey, please only answer about the child named below and only for the time period between the date listed below and today.



Any questions you answer on this survey will not affect you or your child's Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on all survey responses will be made public. **You will receive another \$10 for completing and returning your second survey.**

Instructions for Completing the Survey

- ▶ Some questions are answered by marking a choice from a list. You would answer the question by marking the box like this:
 - Yes
 - No

- ▶ Sometimes you will skip one or more questions. For example, if you choose 'Yes' here, you would skip to question Q16. If your choice is "No", you continue to the next question:
 - Yes - please go to Q16
 - No

- ▶ Only give one answer **unless** the directions for the question says "**check all that apply**"

- ▶ Sometimes you will be asked to answer another question by following an arrow

Remember, only answer about the child whose name is on the front cover and only for the time period between the date listed on the front cover and today.

Q1. Since the **date you completed the last survey**, how would you rate your child's **overall** health (both physical and behavioral/emotional)?

Excellent Very Good Good Fair Poor
 ¹ ² ³ ⁴ ⁵

Q2. Since the **date you completed the last survey**, how would you rate your child's **physical** health? *Physical health includes how much your child is growing, if they have their vaccinations, if they have any problems like colds or ear infections or things like asthma.*

Excellent Very Good Good Fair Poor
 ¹ ² ³ ⁴ ⁵

Q3. Since the **date you completed the last survey**, how would you rate your child's **behavioral or emotional** health? *Children might show stress with behavioral or emotional health problems such as depression, anxiety, by frequent temper tantrums, too much crying, too much anger or not paying attention.*

Excellent Very Good Good Fair Poor
 ¹ ² ³ ⁴ ⁵

Q4. Is your child in the grade level expected for his or her age?

- ¹ Yes
- ² No
- ⁷ Don't know
- ⁸ Child is not school aged/not in school

Q5. Since the **date you completed the last survey**, has anyone told you that your child should be tested for learning problems?

- ¹ Yes
- ² No
- ⁷ Don't know

Q6. Since the **date you completed the last survey**, have you been told by a doctor or nurse that your child has a behavioral or emotional problem?

- ¹ Yes
- ² No
- ⁷ Don't know

Q7. Since the **date you completed the last survey**, has a **daycare or school teacher or school nurse** told you that your child has a behavioral or emotional problem?

- ¹ Yes
- ² No
- ⁷ Don't know
- ⁸ Child is not school aged/not in school

Q8. Since the **date you completed the last survey**, how easy is it to get the medical care, tests, or treatment your child needs? *For example, to see a doctor or a nurse, get vaccinations, etc.?*

Very Easy

Easy

Neither

Difficult

Very
Difficult

 ¹ ² ³ ⁴ ⁵

By being enrolled in the Flint Medicaid Waiver program, your child can get extra services such as Family Supports Coordination, sometimes called Targeted Case Management. A Supports Coordinator is a person like a nurse or social worker. This person helps you make a plan based on your family's needs. They answer your questions, help make appointments, arrange transportation, connect your family to educational resources, or provide nutrition support.

Q9. Since the **date you completed the last survey**, have you used any Family Supports Coordination/Targeted Case Management services for your child?

¹ Yes - Please answer Q10, Q11, and Q12 in the box below

² No - Please go to Q13 at the top of the next page



Q10. Since the **date you completed the last survey**, how many times has your Supports Coordinator contacted you about your child?

¹ None - I've never been contacted

² 1-5 times

³ 6-12 times

⁴ 13 or more times

⁵ Don't know/Unsure

Q11. Since the **date you completed the last survey**, how have you met with you Supports Coordinator? **Check all that apply.**

¹ In person meeting at a public location

¹ In person meeting at my home/residence

¹ On a phone call

¹ Other, please describe _____

¹ Don't remember/don't know

Q12. Since the **date you completed the last survey**, how satisfied are you with your child's Supports Coordinator?

Very
Satisfied

Somewhat
Satisfied

Somewhat
Dissatisfied

Very
Dissatisfied

 ¹ ² ³ ⁴

Q13. Have you **ever used** any **Family Supports Coordination/Targeted Case Management** services for **your child since enrolling** in the Flint Medicaid Wavier?

¹ Yes - Please answer Q14 in the box below

² No - Please go to Q15



Q14. What are some of the reasons why you have not used Family Supports Coordination/Targeted Case Management **since the date you completed** the last survey?

We want to get your thoughts about your Flint Medicaid Waiver experience. Please read each statement and then indicate whether you agree or disagree with the statement

Remember, only answer about the child whose name is on the front cover and only for the time period between the date listed on the front cover and today.

Q15. Since the **date you completed the last survey**, the Flint Medicaid waiver has made it easier to get the health care that my child needs.

Strongly Agree

¹

Agree

²

Neutral

³

Disagree

⁴

Strongly Disagree

⁵

Q16. Since **date you completed the last survey**, I feel that the health care providers are working in my child's best interest.

Strongly Agree

¹

Agree

²

Neutral

³


Disagree

⁴

Strongly Disagree

⁵

Q17. Since the **date you completed the last survey**, has a doctor or nurse told you that your child has any chronic health condition(s) such as asthma, diabetes, ADHD, autism, arthritis, etc.?

- ¹ Yes - Please answer Q18 and Q19 in the box below
 - ² No - Please go to Q20
 - ⁷ Don't know/Unsure - Please go to Q20
- 

Thinking about your child's chronic health condition that you learned about since the date you completed the last survey, to what extent do you agree or disagree with the following statements?

Q18. Since the **date you completed the last survey**, I have access to **more resources** that help with management of my child's chronic health condition(s).

Strongly Agree Agree Neutral Disagree Strongly Disagree

¹ ² ³ ⁴ ⁵

Q19. Since the **date you completed the last survey**, I am more confident that I can manage my child's chronic condition(s).

Strongly Agree Agree Neutral Disagree Strongly Disagree


¹ ² ³ ⁴ ⁵

Q20. Choose a number from 0 to 10, where 0 is the **worst** and 10 the **best**, what number would you use to rate your child's overall Flint Medicaid waiver experience since the **date you completed the last survey**.

Worst 0 1 2 3 4 5 6 7 8 9 10 Best

The next questions are about the water you use in your home since the date you completed the last survey.

Q21. Does your child use water supplied by the City of Flint, also known as tap or faucet water right now?

- ¹ Yes - Please answer Q22 in the box below
 - ² No - Please go to Q23 on the next page
 - ⁷ Don't know/Unsure - Please go to Q23 on the next page
- 

Q22. What do they use tap water for? Check all that apply

- ¹ Drinking/cooking/brushing teeth/washing dishes
- ¹ Bathing/showering/washing clothes
- ¹ Watering garden/pools/sprinklers
- ¹ Other, please describe _____

Water filters were distributed during the Flint Water Crisis or you may have bought your own. We would like to ask some questions about how you use the filter.

Q23. Since the date you completed the last survey, have you used a water filter in your home?

- ¹ Yes
- ² No

Q24. Are you currently using a water filter in your home?

- ¹ Yes – Please answer Q25 in the box below
- ² No – Please go to Q26



<p>Q25. What kind of filter do you have now? Check all that apply</p> <ul style="list-style-type: none"><input type="checkbox"/>¹ Filter attached to the faucet.<input type="checkbox"/>¹ Whole house filter (connected near your water heater.)<input type="checkbox"/>¹ Water pitcher filter; like Brita, Pur, ZeroWater, etc.<input type="checkbox"/>¹ Other, please describe _____<input type="checkbox"/>¹ Don't know/Don't remember
--

Q26. Since the **date you completed the last survey**, have the water pipes to your home or residence been replaced?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q27. Since the **date you completed the last survey**, has your child been exposed to lead through other sources? (example: paint, dust or soil)?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q28. Since the **date you completed the last survey**, has a doctor or nurse told you that your child has a high blood lead level?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q29. How are you related to the child?

- ¹ Parent
- ² Grandparent
- ³ Foster parent or guardian
- ⁴ Sibling
- ⁵ Other relative
- ⁶ Not related

Q30. If there anything else you would like to tell us about your experiences overall or with services available through the **Flint Medicaid Waiver** including your experiences with Family Supports Coordination or Targeted Case Management, please do so in the box below.

Finally, we just need to get some information so that we can follow-up with you and send you \$10 for completing the survey.

Q31. Did someone help you complete this survey on behalf of your child?

¹ Yes – Please answer Q31 in the box below

² No – Please go to Q32 on the next page



Q32. How did that person help you? **Check all that apply**

¹ Read the questions to me

¹ Wrote the answers I gave

¹ Answered the questions for me

¹ Translated the questions into my language

¹ Helped in some other way, please explain _____

Please Continue on the Back Page:

Q32. As promised, we would like to send you \$10 for completing this survey. We will send the payment in cash by U.S. Mail. We will make every effort to process payments within five (5) business days of receiving your completed survey. Please provide your contact information below.

Name: _____	
(First)	(Last)
Street address: _____	
Apartment Number: _____	
City: _____	
State: _____	Zip Code: _____

Q33. We would like to send you one more survey in about nine (9) months – please let us know the best way to contact you about your child. If you prefer to be contacted by telephone (including text message) or by email, please provide that information below.

Telephone Number: () _____ - _____
Email Address: _____

Q34. You may also provide the contact information for someone **who does not currently live** with you that knows how to get in touch with you in case your information changes before the next survey.

Their Name: _____	
(First)	(Last)
Street address: _____	
Apartment Number: _____	
City: _____	
State: _____	Zip Code: _____

Thank you for taking the time to answer these questions.

Please return your completed survey in the envelope that was included with this survey.

Flint Medicaid Expansion Child Survey – Wave III

Conducted on behalf of

The Michigan Department of Health and Human Services

The Flint Medicaid Expansion Waiver offers health insurance in response to the Flint Water Crisis. Thank you for doing the last survey. We would like to hear about your experiences with this health care insurance for your child since the last time filled out a survey.

When completing this survey, please only answer about the child named below and only for the time period between the date listed below and today.

Any questions you answer on this survey will not affect you or your child's Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on everyone's survey responses will be made public. **You will receive payment for completing this survey.**

Instructions for Completing the Survey

- ▶ Some questions are answered by marking a choice from a list. You would answer the question by marking the box like this:

 Yes
 No

- ▶ Sometimes you will skip one or more questions. For example, if you choose "Yes" here, you would skip to question Q16. If your choice is "No," you continue to the next question:

 Yes - please go to Q16
 No

- ▶ Only give one answer **unless** the directions for the question says "**check all that apply**"

- ▶ Sometimes you will be asked to answer another question by following an arrow

Start Here

Remember, only answer about the child whose name is on the front cover and only for the time period between the date listed on the front cover and today.

Q1. Since the **date you completed the last survey**, how would you rate your child's **overall** health (both physical and behavioral/emotional)?

Excellent Very Good Good Fair Poor
¹ ² ³ ⁴ ⁵

Q2. Since the **date you completed the last survey**, how would you rate your child's **physical** health? *Physical health includes how much your child is growing, if they have their vaccinations, if they have any problems like colds or ear infections or things like asthma.*

Excellent Very Good Good Fair Poor
¹ ² ³ ⁴ ⁵

Q3. Since the **date you completed the last survey**, how would you rate your child's **behavioral or emotional** health? *Children might show stress with behavioral or emotional health problems such as depression, anxiety, by frequent temper tantrums, too much crying, too much anger or not paying attention.*

Excellent Very Good Good Fair Poor
¹ ² ³ ⁴ ⁵

Q4. Is your child in the grade level expected for his or her age?

¹ Yes
² No
⁷ Don't know
⁸ Child is not school aged/not in school

} Please answer Q4a in the box below

Q4a. Does your child have an Individual Education Program (IEP) plan?
¹ Yes
² No
⁷ Don't know
⁸ Child is not school aged/not in school

Q5. Since the **date you completed the last survey**, has anyone told you that your child should be tested for learning problems?

¹ Yes
² No
⁷ Don't know

Q6. Since the **date you completed the last survey**, have you been told by a doctor or nurse that your child has a behavioral or emotional problem?

¹ Yes
² No
⁷ Don't know

Q7. Since the **date you completed the last survey**, has a **daycare or school teacher or school nurse** told you that your child has a behavioral or emotional problem?

- ¹ Yes
- ² No
- ⁷ Don't know
- ⁸ Child is not school aged/not in school

Q8. Since the **date you completed the last survey**, how easy is it to get the medical care, tests, or treatment your child needs? *For example, to see a doctor or a nurse, get vaccinations, etc.?*

- | | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Very Easy | Easy | Neither | Difficult | Very Difficult |
| <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ | <input type="checkbox"/> ⁵ |

By being enrolled in the Flint Medicaid Waiver program, your child can get extra services such as Family Supports Coordination, sometimes called Targeted Case Management. A Supports Coordinator is a person like a nurse or social worker. This person helps you make a plan based on your family's needs. They answer your questions, help make appointments, arrange transportation, connect your family to educational resources, or provide nutrition support.

Q9. Since the **date you completed the last survey**, have you used any Family Supports Coordination/Targeted Case Management services for your child?

- ¹ Yes - Please answer Q10, Q11, and Q12 in the box below
- ² No - Please go to Q13 at the top of the next page



Q10. Since the **date you completed the last survey**, how many times has your Supports Coordinator contacted you about your child?

None, Never Been Contacted	1-5 Times	6-12 Times	13 or more Times	Don't Know/Unsure
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q11. Since the **date you completed the last survey**, how have you met with you Supports Coordinator? **Check all that apply.**

- ¹ In person meeting at a public location
- ¹ In person meeting at my home/residence
- ¹ On a phone call
- ¹ Other, please describe _____
- ¹ Don't remember/don't know

Q12. Since the **date you completed the last survey**, how satisfied are you with your child's Supports Coordinator?

Very Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	Very Dissatisfied
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴

Q13. Have you **ever used** any **Family Supports Coordination/Targeted Case Management (TCM)** services for **your child since enrolling** in the Flint Medicaid Waiver?

Yes - Please answer Q14a →

Q14a. What are some of the reasons you have used Family Supports Coordination/Targeted Case Management? **Check all that apply**

- Physical health concerns
- Testing for behavioral or emotional concerns
- Behavioral or emotional concerns, other than testing
- Other, please describe _____

No - Please answer Q14b →

Q14b. What are some of the reasons you have **not** used Family Supports Coordination/Targeted Case Management? **Check all that apply**

- My child's needs were met before enrolling in the waiver/TCM
- My child's needs were met somewhere else
- TCM did not have the services my child needed
- Other _____

We want to get your thoughts about your Flint Medicaid Waiver experience. Please read each statement and then indicate whether you agree or disagree with the statement.

Remember, only answer about the child whose name is on the front cover and only for the time period between the date listed on the front cover and today.

Q15. Since the **date you completed the last survey**, the Flint Medicaid Waiver has made it easier to get the health care that my child needs.

Strongly Agree

₁

Agree

₂

Neutral

₃

Disagree

₄

Strongly Disagree

₅

Q16. Since the **date you completed the last survey**, I feel that the health care providers are working in my child's best interest.

Strongly Agree

₁

Agree

₂

Neutral

₃

Disagree

₄

Strongly Disagree

₅

Q17. Since the **date you completed the last survey**, has a doctor or nurse told you that your child has any chronic health condition(s) such as asthma, diabetes, ADHD, autism, arthritis, etc.?

Yes - Please answer Q18 and Q19 at the top of Page 5

- ² No - Please go to Q20 on page 5
- ⁷ Don't know/Unsure - Please go to Q20 on page 5

Thinking about your child’s chronic health condition that you learned about since the date you completed the last survey, to what extent do you agree or disagree with the following statements?

Q18. Since the **date you completed the last survey**, I have access to **more resources** that help with management of my child’s chronic health condition(s).

Strongly Agree Agree Neutral Disagree Strongly Disagree

¹ ² ³ ⁴ ⁵

Q19. Since the **date you completed the last survey**, I am more confident that I can manage my child’s chronic condition(s).

Strongly Agree Agree Neutral Disagree Strongly Disagree

¹ ² ³ ⁴ ⁵

Q20. Choose a number from 0 to 10, where 0 is the **worst** and 10 the **best**, what number would you use to rate your child’s overall Flint Medicaid Wavier experience since the **date you completed the last survey**.

Worst 0 1 2 3 4 5 6 7 8 9 10 Best

The next questions are about the water you use in your home since the date you completed the last survey.

Q21. Does your child use water supplied by the City of Flint, also known as tap or faucet water right now?

- ¹ Yes – Please answer Q22 in the box below
- ² No – Please go to Q23 on the next page
- ⁷ Don't know/Unsure – Please go to Q23 on the next page

Q22. What do they use tap water for? **Check all that apply**

- ¹ Drinking
- ¹ Cooking
- ¹ Washing dishes/brushing teeth
- ¹ Bathing/showering/washing clothes
- ¹ Watering garden/pools/sprinklers
- ¹ Other, please describe _____

Water filters were distributed during the Flint Water Crisis or you may have bought your own. We would like to ask some questions about how you use the filter.

Q23. Since the date you completed the last survey, have you used a water filter in your home?

- ¹ Yes
- ² No

Q24. Are you currently using a water filter in your home?

- ¹ Yes – Please answer Q25 in the box below
- ² No – Please go to Q26



Q25. What kind of filter do you have now? **Check all that apply**

- ¹ Filter attached to the faucet.
- ¹ Whole house filter (connected near your water heater.)
- ¹ Water pitcher filter; like Brita, Pur, ZeroWater, etc.
- ¹ Other, please describe _____
- ¹ Don't know/Don't remember

Q26. Since the **date you completed the last survey**, have you been told that the pipes to your home or residence have been replaced?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q27. Since the **date you completed the last survey**, has your child been exposed to lead through other sources? (example: paint, dust or soil)?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q28. Since the **date you completed the last survey**, has a doctor or nurse told you that your child has a high blood lead level?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q29. How are you related to the child?

- ¹ Parent
- ² Grandparent
- ³ Foster parent or guardian
- ⁴ Sibling
- ⁵ Other relative
- ⁶ Not related

Q30. If there anything else you would like to tell us about your experiences overall or with services available through the **Flint Medicaid Waiver** including your experiences with Family Supports Coordination or Targeted Case Management, please do so in the box below.

We would like to ask you about ways the COVID-19 pandemic affected you and your family.

Q31. How has COVID-19 impacted you and your family? **Check all that apply**

- Less access to services through schools (such as meals, childcare, etc.)
- Unable to go to work, laid off, or furloughed
- Working more hours as an essential worker
- Lost childcare
- Received federal stimulus check
- Received unemployment money from the state and/or federal government
- Other, please explain _____

Q32. How has COVID-19 impacted your access to healthcare services? **Check all that apply**

- Doctor's appointments moved to telephone or telehealth (computer face-to-face) for my child.
- Delays or cancellations of doctor's appointments and/or getting prescriptions for my child.
- Not able to access physical healthcare needed care for my child.
- Other, please explain _____
- My child's access to health care has not been affected.

Q33. How has COVID-19 pandemic impacted your access to mental health services? **Check all that apply**

- Mental health appointments moved to telephone or telehealth (computer face-to-face) for my child.
- Delays or cancellations of mental health appointments and/or getting medication for my child.
- Not able to access mental health care for my child.
- Other, please explain _____
- My child's access to mental health services has not been affected

Q34. Has anyone in your household been sick with COVID-19?

- Yes and was confirmed by testing
- Yes, but did not get tested
- No, and was confirmed by testing
- No, no one got sick



Q35. As promised, we would like to send you payment for completing this survey. We will send the payment in cash by U.S. Mail. Please provide your contact information below.

Name: _____ (First) (Last)
Street address: _____
Apartment Number: _____
City: _____ State _____ Zip Code: _____

Q36. This is the final survey planned for the Flint Medicaid Waiver. If you would be willing to be contacted for future studies that may come up, please provide your contact information below.

Telephone Number: () _____ - _____
Email Address: _____

Please return your completed survey in the envelope provided.

Flint Medicaid Expansion Child Survey – Wave IV

Conducted on behalf of

The Michigan Department of Health and Human Services

Thank you completing the previous surveys. The Flint Medicaid Expansion Waiver is offering another opportunity to give feedback about your child’s experience with this health care insurance.

As a reminder, the Flint Medicaid Expansion Waiver offers health insurance in response to the Flint Water Crisis.

When completing this survey, please only answer about the child named below and only for the time period between the date listed below and today.

Any questions you answer on this survey will not affect your or your child’s Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on everyone’s survey responses will be made public. **You will receive \$10 for completing this survey.**

Start Here



Remember, only answer about the child whose name is on the front cover and only for the time period between the date listed on the front cover and today.

Q1. Since the **date you completed the last survey**, how would you rate your child’s **overall** health (both physical and behavioral/emotional)?

Excellent	Very Good	Good	Fair	Poor
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q2. Since the **date you completed the last survey**, how would you rate your child’s **physical** health?
Physical health includes how much your child is growing, if they have their vaccinations, if they have any problems like colds or ear infections or things like asthma.

Excellent	Very Good	Good	Fair	Poor
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q3. Since the **date you completed the last survey**, how would you rate your child's **behavioral or emotional** health? *Children might show stress with behavioral or emotional health problems such as depression, anxiety, by frequent temper tantrums, too much crying, too much anger or not paying attention.*

Excellent

 ¹

Very Good

 ²

Good

 ³

Fair

 ⁴

Poor

 ⁵

Q4. Is your child in the grade level expected for his or her age?

- ¹ Yes
- ² No
- ⁷ Don't know
- ⁸ Child not school aged

Q4a. Does your child have an individual Education (IEP) Plan?

- ¹ Yes
- ² No
- ⁷ Don't know/Unsure

Q5. Since the **date you completed the last survey**, has anyone told you that your child should be tested for learning problems?

- ¹ Yes
- ² No
- ⁷ Don't know

Q6. Since the **date you completed the last survey**, have you been told by a doctor or nurse that your child has a behavioral or emotional problem?

- ¹ Yes
- ² No
- ⁷ Don't know

Q7. Since the **date you completed the last survey**, has a **daycare or school teacher or school nurse** told you that your child has a behavioral or emotional problem?

- ¹ Yes
- ² No
- ⁷ Don't know
- ⁸ Child is not school aged/not in school

Q8. Has your child ever been referred to the **Neurodevelopmental Center of Excellence** as part of Genesee Health System?

- ¹ Yes
- ² No
- ⁷ I have not heard of the Neurodevelopmental Center of Excellence

Q9. Since the **date you completed the last survey**, how easy is it to get the medical care, tests, or treatment your child needs? *For example, to see a doctor or a nurse, get vaccinations, etc.?*

Very Easy

 ¹

Easy

 ²

Neither

 ³

Difficult

 ⁴

Very Difficult

 ⁵

By being enrolled in the Flint Medicaid Waiver program, your child can get extra services such as Family Supports Coordination, sometimes called Targeted Case Management. A Supports Coordinator is a person like a nurse or social worker. This person helps you make a plan based on your family's needs. They answer your questions, help make appointments, arrange transportation, connect your family to educational resources, or provide nutrition support.

Q10. Since the **date you completed the last survey**, have you used any Family Supports Coordination/Targeted Case Management (TCM) services for your child?

¹Yes →

²No ↓

Q10a. Since the **date you completed the last survey**, how many times has your Supports Coordinator contacted you about your child?

None, never been contacted	1-2 Times	3-5 Times	6-12 Times	13 or More Times	Don't know/ Unsure
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵	<input type="checkbox"/> ⁷

Q10b. Since the **date you completed the last survey**, how have you met with your Supports Coordinator? **Check all that apply.**

¹ In person meeting at a public location

² In person meeting at my home/residence

³ On a phone call

⁴ Other, please describe _____

⁵ Don't remember/don't know

Q10c. Since the **date you completed the last survey**, how satisfied are you with your child's Supports Coordinator?

Very Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	Very Dissatisfied
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴

Q11. Have you ever used any **Family Supports Coordination/Targeted Case Management (TCM)** services for your child since enrolling in the Flint Medicaid Wavier?

¹Yes →

²No →

Q11a. What are some of the reasons why you have **used** Family Supports Coordination/Targeted Case Management? **Check all that apply.**

Physical health concerns

Testing for behavioral or emotional concerns

Other, please describe _____

Q11b. What are some of the reasons why you have **not used** Family Supports Coordination/Targeted Case Management? **Check all that apply.**

My child's needs were met before I enrolled in the wavier/TCM

My child's needs were met somewhere else

TCM did not have the services my child needed

Other, please describe _____

Q12. Have you **ever** received information about Family Supports Coordination/Targeted Case Management (TCM)?

- ¹ Yes
- ² No
- ³ Don't know

Q13. Would you like to receive information about Family Supports Coordination/Targeted Case Management (TCM)?

- ¹ Yes
- ² No
- ³ Don't know

Q14. Have you received services from other sources in the community?

- ¹ Yes
- ² No
- ³ Don't know

Q14a. Where have you received services from?

- ¹ County health department
- ¹ Faith-based/religious organization/church
- ¹ Community-based organization
- ¹ Other, please describe _____

Q14b. What type of services did you use?

- ¹ Food assistance
- ¹ Health care
- ¹ Financial assistance
- ¹ Educational assistance
- ¹ Other, please describe _____

We want to get your thoughts about your Flint Medicaid Waiver experience. Please read each statement and then indicate whether you agree or disagree with the statement.

Remember, only answer about the child whose name is on the front cover and only for the time period between the date listed on the front cover and today.

Q15. Since the **date you completed the last survey**, the Flint Medicaid waiver has made it easier to get the health care that my child needs.

- | | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ | <input type="checkbox"/> ⁵ |

Q16. Since **date you completed the last survey**, I feel that the health care providers are working in my child's best interest.

- | | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ | <input type="checkbox"/> ⁵ |

Q17. Since the **date you completed the last survey**, has a doctor or nurse told you that your child has any chronic health condition(s) such as asthma, diabetes, ADHD, autism, arthritis, etc.?

¹ Yes
 ² No
 ⁷ Don't know/Unsure

Thinking about your child's chronic health condition that you learned about since the date you completed the last survey, to what extent do you agree or disagree with the following statements?

Q17a. Since the **date you completed the last survey**, I have access to **more resources** that help with management of my child's chronic health condition(s).

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q17b. Since the **date you completed the last survey**, I am more confident that I can manage my child's chronic condition(s).

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q18. Choose a number from 0 to 10, where 0 is the **worst** and 10 the **best**, what number would you use to rate your child's overall Flint Medicaid waiver experience since the **date you completed the last survey**.

	0	1	2	3	4	5	6	7	8	9	10	
Worst	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Best

The next questions are about the water you use in your home since the date you completed the last survey.

Q19. Does your child use water supplied by the City of Flint, also known as tap or faucet water right now?

¹ Yes
 ² No
 ⁷ Don't Know/Unsure

Q19a. What do they use tap water for? **Check all that apply**

- ¹ Drinking
- ² Cooking
- ³ Washing dishes/brushing teeth
- ⁴ Bathing/showering/washing clothes
- ⁵ Watering garden/pools/sprinklers
- ⁶ Other, please describe _____

Water filters were distributed during the Flint Water Crisis, or you may have bought your own. We would like to ask some questions about how you use the filter.

Q20. Since the date you completed the last survey, have you used a water filter in your home?

¹ Yes
 ² No

Q21. Are you currently using a water filter in your home?

- ¹ Yes →
- ² No
- ⁷ Don't know/Unsure

Q21a. What kind of filter do you have now? **Check all that apply**

- ¹ Filter attached to the faucet.
- ¹ Whole house filter (connected near your water heater.)
- ¹ Water pitcher filter; like Brita, Pur, ZeroWater, etc.
- ¹ Other, please describe _____
- ¹ Don't know/Don't remember

Q22. Since the **date you completed the last survey**, have you been told that the pipes to your home or residence have been replaced?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q23. Since the **date you completed the last survey**, has your child been exposed to lead through other sources? (*Example: paint, dust or soil*)?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q24. Since the **date you completed the last survey**, has a doctor or nurse told you that your child has a high blood lead level?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q25. How are you related to the child?

- ¹ Parent
- ² Grandparent
- ³ Foster parent or guardian
- ⁴ Sibling
- ⁵ Other relative
- ⁶ Not related

Q26. If there anything else you would like to tell us about your experiences overall or with services available through the **Flint Medicaid Waiver** including your experiences with Family Supports Coordination or Targeted Case Management, please do so in the box below.

We would like to ask you about ways the COVID-19 pandemic impacted you and your family.

Q27. How COVID-19 affected you and your family? **Check all that apply**

- Less access to services through schools (such as meals, childcare, etc.)
- Unable to go to work, laid off, or furloughed
- Working more hours as an essential worker
- Lost childcare
- Received federal stimulus check
- Received unemployment money from the state and/or federal government
- Other, please explain _____
- COVID-19 has not impacted me or my family

Q28. How has COVID-19 affected your access to **healthcare services** for your child? **Check all that apply**

- Doctor's appointments moved to telephone or telehealth (computer face-to-face) for my child.
- Delays or cancellations of doctor's appointments and/or getting prescriptions for my child.
- Not able to access physical healthcare needed care for my child.
- Other, please explain _____
- COVID-19 did not affect my child's access to health care.

Q29. How has COVID-19 affected your access to **mental health services** for your child? **Check all that apply**

- Mental health appointments moved to telephone or telehealth (computer face-to-face) for my child.
- Delays or cancellations of mental health appointments and/or getting medication for my child.
- Not able to access mental health care for my child.
- Other, please explain _____
- COVID-19 order did not affect my child's mental health services

Please Continue on the Back

Q30. Has any one in your household been sick with COVID-19? **Check all that apply**

- Yes and confirmed by testing
- Yes, but did not get tested
- No, and was confirmed by testing
- No, no one has been sick
- Don't know

Thanking you for completing the survey. We will send the payment in cash by U.S. Mail. We will make every effort to process payments within one week of submitting your survey. Please understand that due to COVID-19, mail delivery may be delayed, and payments may take longer to be delivered.

Name: _____ (First) (Last)
Street address: _____
Apartment Number: _____
City: _____ State _____ Zip Code: _____

If you would be willing to be contacted for future studies that may come up, please provide your contact information below.

Telephone Number: () _____ - _____
Email Address: _____

Please return your completed survey in the envelope provided.

Flint Medicaid Expansion Adult Survey

Conducted on behalf of

The Michigan Department of Health and Human Services

The Flint Medicaid Expansion Waiver offers health insurance in response to the Flint Water Crisis. We would like to hear about your experience with this health care insurance. Michigan State University is working with Michigan Medicaid to understand the use of services provided by the **Flint Medicaid Expansion Waiver**.

Any questions you answer on this survey will not affect your Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on all survey responses will be made public.

You will receive \$10 for completing and returning your survey.

You can have someone help you fill out the survey. If you have questions about this survey, please contact Debra Rusz at the Office for Survey Research at Michigan State University at 517.353.1766 or by email, ruszdebr@msu.edu.

Instructions for Completing the Survey

- ✦ Some questions are answered by marking a choice from a list. You would answer the question by marking the box like this:

 Yes
 No
- ✦ Sometimes you will skip one or more questions. For example, if you choose 'Yes' here, you would skip to question A16. If your choice is "No", you continue to the next question:

 Yes - **please go to A16**
 No
- ✦ Only give one answer unless the directions for the question says "**check all that apply**"
- ✦ Sometimes you will be asked to answer another question by following an arrow

By being enrolled in the Flint Medicaid Waiver program, you can get extra services such as Family Supports Coordination, sometimes called Targeted Case Management. A Supports Coordinator is a person like a nurse or social worker. This person helps you make a plan based on your family’s needs. They answer your questions, help make appointments, arrange transportation, connect your family to educational resources, or provide nutrition support.

Q6. Have you ever used any Family Supports Coordination/Targeted Case Management services since enrolling in the Flint Medicaid waiver?

- ¹ Yes – Please answer Q7, Q8, Q9 in the box below
- ² No - Please go to Q10

Q7. How many times has your Supports Coordinator contacted you in the *last 6 months*?

- ¹ None – I’ve never been contacted
- ² 1-5 times
- ³ 6-12 times
- ⁴ 13 or more times
- ⁵ Don’t know/Unsure

Q8. How have you met with the Supports Coordinator *in the last 6 months*? **Check all that apply**

- ¹ In person meeting at a public location
- ¹ In person meeting at my home/residence
- ¹ On a phone call
- ¹ Other, **please describe** _____
- ¹ Don’t remember/Don’t know

Q9. Over the *last 6 months* how satisfied have you been with your Supports Coordinator?

Very Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	Very Dissatisfied
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴

Now we want to get your thoughts about your overall Flint Medicaid Waiver experience. Please read each statement and then indicate whether you agree or disagree with the statement

Q10. Being in the Flint Medicaid waiver made it easier to get the health care that I needed.

- | | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ | <input type="checkbox"/> ⁵ |

Q11. Since enrolling in the Flint Medicaid waiver, I feel that the health care providers are working in my best interest.

- | | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ | <input type="checkbox"/> ⁵ |

Q12. Do you currently have a chronic health condition such as asthma, diabetes, high blood pressure, arthritis, etc.?

¹ Yes - **Please answer Q13 and Q14 in the box below**

² No - **Please go to Q15**

³ Don't know/Unsure - **Please go to Q15**

Q13. Since enrolling in the Flint Medicaid waiver, I have access to more resources that help with management of my chronic health condition(s).				
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵
Q14. Since enrolling in the Flint Medicaid waiver, I am more confident that I can manage my chronic conditions.				
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q15. Choosing a number from 0 to 10, where 0 is the **worst** and 10 the **best**, what number would you use to rate your overall Flint Medicaid waiver experience?

Worst	0	1	2	3	4	5	6	7	8	9	10	Best
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

The next questions are about the water you use in your home since the Flint Water Crisis started in April 2014.

Q16. Do you use water supplied by the City of Flint, also known as tap or faucet water right now?

- ¹ Yes - Please answer Q17 in the box below
- ² No - Please go to Q18
- ⁷ Don't know/Unsure - Please go to Q18

Q17. What do you use tap water for? *Check all that apply*

- ¹ Drinking/cooking/brushing teeth/washing dishes
- ¹ Bathing/showering/washing clothes
- ¹ Watering garden/pools/sprinklers
- ¹ Other, please describe _____

Water filters were distributed during the Flint Water Crisis or you may have bought your own. We would like to ask some questions about how you use the filter.

Q18. Have you used a water filter at your home since April 2014?

- ¹ Yes - Please answer the questions in the box below beginning with Q19
- ² No - Please go to Q22 on the next page →
- ⁷ Don't know/Unsure - Please go to Q22 on the next page →

Q19. What month/year did you get your first filter?

Month: Year:

Q20. Are you currently using a water filter in your home?

- ¹ Yes - Please answer Q21 in the box below
- ² No - Please go to Q22 on the next page →

Q21. What kind of filter(s) do you have now? *Check all that apply*

- ¹ Filter attached to the faucet.
- ¹ Whole house filter (connected near your water heater.)
- ¹ Water pitcher filter; like Brita or Pur
- ¹ Other, please describe _____
- ¹ Don't know/Don't remember



Q22. Have the water pipes to your home or residence been replaced as of today?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q23. Other than through the Flint Water System, have you been exposed to lead through other sources (example: paint, dust or soil)?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q24. Did someone help you complete this survey on your behalf?

- ¹ Yes - **Please answer Q25 in the box below** 
- ² No - **Please go to Q26 on the next page** 

Q25. How did that person help you? **Check all that apply**

- ¹ Read the questions to me
- ¹ Wrote the answers I gave
- ¹ Answered the questions for me
- ¹ Translated the questions into my language
- ¹ Helped in some other way, **please explain** _____

Q26. As promised, we would like to send you **\$10** for completing this survey. We will send the payment in cash by U.S. Mail. We will make every effort to process payments within five (5) business days of receiving your completed survey. Please provide your contact information below.

Name: _____	
(First)	(Last)
Street address: _____	
Apartment Number: _____	
City: _____	
State: _____	Zip Code: _____

Q27. We would like to survey you again in about nine (9) months – please let us know the best way to contact you. If you prefer to be contacted by telephone (including text message) or by email, please provide that information below.

Telephone Number: () _____ - _____
Email Address: _____

Q28. You may also provide the contact information for someone that knows how to get in touch with you in case your information changes before the next survey.

Their Name: _____	
(First)	(Last)
Street address: _____	
Apartment Number: _____	
City: _____	
State: _____	Zip Code: _____

Thank you for taking the time to answer these questions.

Please return your completed survey in the envelope that was included with this survey.

Flint Medicaid Expansion Adult Survey – Wave II

Conducted on behalf of

The Michigan Department of Health and Human Services

The Flint Medicaid Expansion Waiver offers health insurance in response to the Flint Water Crisis. Thank you for doing the first survey. We would like to hear about your experience with this health care insurance since you last completed a survey.

**When completing this survey, please answer
only for the time period between the date listed below and today.**

Any questions you answer on this survey will not affect your Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on all survey responses will be made public. **You will receive another \$10 for completing and returning your second survey.**

Instructions for Completing the Survey

- ▶ Some questions are answered by marking a choice from a list. You would answer the question by marking the box like this:

 Yes
 No
- ▶ Sometimes you will skip one or more questions. For example, if you choose ‘Yes’ here, you would skip to question Q16. If your choice is “No”, you continue to the next question:

 Yes - please go to Q16
 No
- ▶ Only give one answer **unless** the directions for the question says “**check all that apply**”
- ▶ Sometimes you will be asked to answer another question by following an arrow

Remember, only answer for the time period between the date listed on the front cover and today.

Q1. Since the **date you completed the last survey**, how would you rate your overall health (both physical and behavioral/emotional)?

Excellent	Very Good	Good	Fair	Poor
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q2. Since the **date you completed the last survey**, how would you rate your **physical** health?

Physical health refers to things like your weight, if you have any blood pressure problems or blood sugar problems.

Excellent	Very Good	Good	Fair	Poor
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q3. Since the **date you completed the last survey**, how would you rate your **behavioral or emotional** health?

Emotional problems may include stress, depression, anxiety, not being able to pay attention, etc..

Excellent	Very Good	Good	Fair	Poor
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q4. Since the **date you completed the last survey**, how easy is it to get the medical care, tests, or treatment you need? *For example, to see a doctor or a nurse, get vaccinations, etc.?*

Very Easy	Easy	Neither	Difficult	Very Difficult
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

By being enrolled in the Flint Medicaid Waiver program, you can get extra services such as Family Supports Coordination, sometimes called Targeted Case Management. A Supports Coordinator is a person like a nurse or social worker. This person helps you make a plan based on your needs. They answer your questions, help make appointments, arrange transportation, connect your family to educational resources, or provide nutrition support.

Q5. Since the **date you completed the last survey**, have you used any Family Supports Coordination/Targeted Case Management services?

- ¹ Yes - Please answer Q6, Q7, and Q8 in the box below
- ² No - Please go to Q9 at the top of the next page



Q6. Since the **date you completed the last survey**, how many times has your Supports Coordinator contacted you?

- ¹ None - I've never been contacted
- ² 1-5 times
- ³ 6-12 times
- ⁴ 13 or more times
- ⁵ Don't know/Unsure

Q7. Since the **date you completed the last survey**, how have you met with you Supports Coordinator? **Check all that apply.**

- ² In person meeting at a public location
- ¹ In person meeting at my home/residence
- ¹ On a phone call
- ¹ Other, please describe _____
- ¹ Don't remember/don't know

Q8. Since the **date you completed the last survey**, how satisfied are you with your Supports Coordinator?

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Very Satisfied | Somewhat Satisfied | Somewhat Dissatisfied | Very Dissatisfied |
| <input type="checkbox"/> ¹ | <input type="checkbox"/> ² | <input type="checkbox"/> ³ | <input type="checkbox"/> ⁴ |

Q9. Have you **ever used** any **Family Supports Coordination/Targeted Case Management** services **since enrolling** in the Flint Medicaid Wavier?

¹ Yes - Please answer Q10 in the box below

² No - Please go to Q11 below



Q10. What are some of the reasons why you have not used Family Supports Coordination/Targeted Case Management **since the date you completed** the last survey?

We want to get your thoughts about your Flint Medicaid Waiver experience. Please read each statement and then indicate whether you agree or disagree with the statement

Remember, only answer for the time period between the date listed on the front cover and today.

Q11. Since the **date you completed the last survey**, the Flint Medicaid waiver has made it easier to get the health care I need.

Strongly Agree

₁

Agree

₂

Neutral

₃

Disagree

₄

Strongly Disagree

₅

Q12. Since **date you completed the last survey**, I feel that the health care providers are working in my best interest.

Strongly Agree

₁

Agree

₂

Neutral

₃


Disagree

₄

Strongly Disagree

₅

Q13. Since the **date you completed the last survey**, has a doctor or nurse told you that you have any chronic health condition(s) such as asthma, diabetes, high blood pressure, arthritis, COPD, etc..?

- ¹ Yes - Please answer Q14 and Q15 in the box below
 - ² No - Please go to Q16 below
 - ⁷ Don't know/Unsure - Please go to Q16 below
- 

Thinking about your chronic health condition that you learned about since the date you completed the last survey, to what extent do you agree or disagree with the following statements?

Q14. Since the **date you completed the last survey**, I have access to **more resources** that help with management of my chronic health condition(s).

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q15. Since the **date you completed the last survey**, I am more confident that I can manage my chronic condition(s).

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q16. Choose a number from 0 to 10, where 0 is the **worst** and 10 the **best**, what number would you use to rate your overall Flint Medicaid waiver experience since the **date you completed the last survey**.

	0	1	2	3	4	5	6	7	8	9	10	
Worst	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Best

The next questions are about the water you use in your home since the date you completed the last survey.

Q17. Do you use water supplied by the City of Flint, also known as tap or faucet water right now?

- ¹ Yes – Please answer Q18 in the box below
- ² No – Please go to Q19 below
- ⁷ Don't know/Unsure – Please go to Q19 below



Q18. What do they use tap water for? Check all that apply

- ³ Drinking/cooking/brushing teeth/washing dishes
- ¹ Bathing/showering/washing clothes
- ¹ Watering garden/pools/sprinklers
- ¹ Other, please describe _____

Water filters were distributed during the Flint Water Crisis or you may have bought your own. We would like to ask some questions about how you use the filter.

Q19. Since the date you completed the last survey, have you used a water filter in your home?

- ¹ Yes
- ² No

Q20. Are you currently using a water filter in your home?

- ¹ Yes – Please answer Q21 in the box below
- ² No – Please go to Q22 below



Q21. What kind of filter do you have now? Check all that apply

- ² Filter attached to the faucet.
- ¹ Whole house filter (connected near your water heater.)
- ¹ Water pitcher filter; like Brita, Pur, ZeroWater, etc.
- ¹ Other, **please describe** _____
- ¹ Don't know/Don't remember

Q22. Since the **date you completed the last survey**, have the water pipes to your home or residence been replaced?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q23. Since the **date you completed the last survey**, have you been exposed to lead through other sources? (example: paint, dust or soil)?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q24. If there anything else you would like to tell us about your experiences overall or with services available through the **Flint Medicaid Waiver** including your experiences with Family Supports Coordination or Targeted Case Management, please do so in the box below.

Finally, we just need to get some information so that we can follow-up with you and send you \$10 for completing the survey.

Q25. Did someone help you complete this survey on your behalf?

- ¹ Yes – Please answer Q26 in the box below
- ² No – Please go to Q27 on the next page



Q26. How did that person help you? **Check all that apply**

- ³ Read the questions to me
- ¹ Wrote the answers I gave
- ¹ Answered the questions for me
- ¹ Translated the questions into my language
- ¹ Helped in some other way, please explain _____

Please Continue on the Back Page:

Q27. As promised, we would like to send you \$10 for completing this survey. We will send the payment in cash by U.S. Mail. We will make every effort to process payments within five (5) business days of receiving your completed survey. Please provide your contact information below.

Name: _____ (First) (Last)
Street address: _____
Apartment Number: _____
City: _____
State: _____ Zip Code: _____

Q28. We would like to send you one more survey in about nine (9) months – please let us know the best way to contact you. If you prefer to be contacted by telephone (including text message) or by email, please provide that information below.

Telephone Number: () _____ - _____
Email Address: _____

Q29. You may also provide the contact information for someone **who does not currently live** with you that knows how to get in touch with you in case your information changes before the next survey.

Their Name: _____ (First) (Last)
Street address: _____
Apartment Number: _____
City: _____
State: _____ Zip Code: _____

Thank you for taking the time to answer these questions. Please return your completed survey in the envelope that was included with the survey.

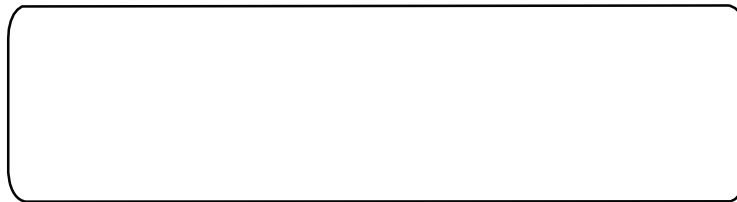
Flint Medicaid Expansion Adult Survey – Wave III

Conducted on behalf of

The Michigan Department of Health and Human Services

The Flint Medicaid Expansion Waiver offers health insurance in response to the Flint Water Crisis. Thank you for doing the last survey. We would like to hear about your experience with this health care insurance since the last time filled out the survey.

When completing this survey, please only for the time period between the date listed below and today.



Any questions you answer on this survey will not affect your Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on everyone's survey responses will be made public. **You will receive payment for completing this survey.**

Instructions for Completing the Survey

- ▶ Some questions are answered by marking a choice from a list. You would answer the question by marking the box like this:
 - Yes
 - No
- ▶ Sometimes you will skip one or more questions. For example, if you choose 'Yes' here, you will skip to question Q16. If your choice is "No", you continue to the next question:
 - Yes - please go to Q16
 - No
- ▶ Only give one answer **unless** the directions for the question says "**check all that apply**"
- ▶ Sometimes you will be asked to answer another question by following an arrow

Start Here



Remember, answer only for the time period between the date listed on the front cover and today.

Q1. Since the **date you completed the last survey**, how would you rate your **overall** health (both physical and behavioral/emotional)?

Excellent

 ¹

Very Good

 ²

Good

 ³

Fair

 ⁴

Poor

 ⁵

Q2. Since the **date you completed the last survey**, how would you rate your **physical** health?

Physical health refers to things like your weight, if you have any blood pressure problems or blood sugar problems.

Excellent

 ¹

Very Good

 ²

Good

 ³

Fair

 ⁴

Poor

 ⁵

Q3. Since the **date you completed the last survey**, how would you rate your **behavioral or emotional** health?

Emotional problems may include stress, depression, anxiety, not being able to pay attention, etc.

Excellent

 ¹

Very Good

 ²

Good

 ³

Fair

 ⁴

Poor

 ⁵

Q4. Since the **date you completed the last survey**, how easy is it to get the medical care, tests, or treatment you need. *For example, to see a doctor or a nurse, get vaccinations, etc.?*

Very Easy

 ¹

Easy

 ²

Neither

 ³

Difficult

 ⁴

Very Difficult

 ⁵

By being enrolled in the Flint Medicaid Waiver program, you can get extra services such as Family Supports Coordination, sometimes called Targeted Case Management. A Supports Coordinator is a person like a nurse or social worker. This person helps you make a plan based on your family's needs. They answer your questions, help make appointments, arrange transportation, connect your family to educational resources, or provide nutrition support.

Q5. Since the **date you completed the last survey**, have you used any Family Supports Coordination/Targeted Case Management services?

¹ Yes - Please answer Q6, Q7, and Q8 below

² No - Please go to Q9 on page 4



Q6. Since the **date you completed the last survey**, how many times has your Supports Coordinator contacted you?

None, Never
Been Contacted

 ¹

1-5
Times

 ²

6-12
Times

 ³

13 or more
Times

 ⁴

Don't
Know/Unsure

 ⁵

Q7. Since the **date you completed the last survey**, how have you met with you Supports Coordinator? **Check all that apply.**

¹ In person meeting at a public location

¹ In person meeting at my home/residence

¹ On a phone call

¹ Other, please describe _____

¹ Don't remember/don't know

Q8. Since the **date you completed the last survey**, how satisfied are you with your Supports Coordinator?

Very
Satisfied

 ¹

Somewhat
Satisfied

 ²

Somewhat
Dissatisfied

 ³

Very
Dissatisfied

 ⁴

Q9. Have you **ever used** any **Family Supports Coordination/Targeted Case Management (TCM)** services **since enrolling** in the Flint Medicaid Waiver?

Yes - Please answer Q10a →

Q10a. What are some of the reasons you have used Family Supports Coordination/Targeted Case Management? **Check all that apply**

- Physical health concerns
 - Testing for behavioral or emotional concerns
 - Behavior or emotional concerns, other than testing
 - Other, please describe _____
- _____

No - Please answer Q10b →

Q10b. What are some of the reasons you have **not** used Family Supports Coordination/Targeted Case Management? **Check all that apply**

- My needs were met before I enrolled in the waiver/TCM
 - My needs were met somewhere else
 - TCM did not have the services I needed
 - Other, please describe _____
- _____

We want to get your thoughts about your Flint Medicaid Waiver experience. Please read each statement and then indicate whether you agree or disagree with the statement.

Remember, only for the time period between the date listed on the front cover and today.

Q11. Since the **date I completed the last survey**, the Flint Medicaid Waiver has made it easier to get the health care that I need.

- | | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| <input type="checkbox"/> ₁ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₄ | <input type="checkbox"/> ₅ |

Q12. Since the **date I completed the last survey**, I feel that the health care providers are working in my best interest.

- | | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| <input type="checkbox"/> ₁ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₄ | <input type="checkbox"/> ₅ |

Q13. Since the **date you completed the last survey**, has a doctor or nurse told you that you have any chronic health condition(s) such as asthma, diabetes, high blood pressure, arthritis, COPD, etc.?

- ¹ Yes - Please answer Q14 and Q15 below
- ² No - Please go to Q16
- ⁷ Don't know/Unsure - Please go to Q16



Thinking about your chronic health condition that you learned about since the date you completed the last survey, to what extent do you agree or disagree with the following statements?

Q14. Since the **date I completed the last survey**, I have access to **more resources** that help with management of my chronic health condition(s).

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q15. Since the **date I completed the last survey**, I am more confident that I can manage my chronic condition(s).

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q16. Choose a number from 0 to 10, where 0 is the **worst** and 10 the **best**, what number would you use to rate your overall Flint Medicaid Wavier experience since the **date you completed the last survey**.

	0	1	2	3	4	5	6	7	8	9	10	
Worst	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Best

The next questions are about the water you use in your home since the date you completed the last survey.

Q17. Do you use water supplied by the City of Flint, also known as tap or faucet water right now?

- ¹ Yes – Please answer Q18 in the box below
- ² No – Please go to Q19
- ⁷ Don't know/Unsure – Please go to Q19

Q18. What do you use tap water for? **Check all that apply**

- ¹ Drinking
- ¹ Cooking
- ¹ Washing dishes/brushing teeth
- ¹ Bathing/showering/washing clothes
- ¹ Watering garden/pools/sprinklers
- ¹ Other, please describe _____

Water filters were distributed during the Flint Water Crisis or you may have bought your own. We would like to ask some questions about how you use the filter.

Q19. Since the date you completed the last survey, have you used a water filter in your home?

- ¹ Yes
- ² No

Q20. Are you currently using a water filter in your home?

- ¹ Yes – Please answer Q21 in the box below
- ² No – Please go to Q22

Q21. What kind of filter do you have now? **Check all that apply**

- ¹ Filter attached to the faucet.
- ¹ Whole house filter (connected near your water heater.)
- ¹ Water pitcher filter; like Brita, Pur, ZeroWater, etc.
- ¹ Other, please describe _____
- ¹ Don't know/Don't remember

Q22. Since the **date you completed the last survey**, have you been told that the pipes to your home or residence have been replaced?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q23. Since the **date you completed the last survey**, have you been exposed to lead through other sources? (example: paint, dust or soil)?

- Yes
- No
- Don't know/Don't remember

Q24. If there anything else you would like to tell us about your experiences overall or with services available through the **Flint Medicaid Waiver** including your experiences with Family Supports Coordination or Targeted Case Management, please do so in the box below.

We would like to ask you about ways the COVID-19 pandemic affected you and your family.

Q25. How has COVID-19 impacted you and your family? **Check all that apply**

- Less access to services through schools (such as meals, childcare, etc.)
- Unable to go to work, laid off, or furloughed
- Working more hours as an essential worker
- Lost childcare
- Received federal stimulus check
- Received unemployment money from the state and/or federal government
- Other, please explain _____
- COVID-19 has not affected me and my family

Q26. How has COVID-19 impacted your access to healthcare services? **Check all that apply**

- Doctor's appointments moved to telephone or telehealth (computer face-to-face).
- Delays or cancellations of doctor's appointments and/or getting prescriptions.
- Not able to access physical healthcare needed.
- Other, please explain _____
- My access to healthcare has not been affected.

Q27. How has COVID-19 pandemic impacted your access to mental health services? **Check all that apply**

- Mental health appointments moved to telephone or telehealth (computer face-to-face).
- Delays or cancellations of mental health appointments and/or getting medication.
- Not able to access mental health.
- Other, please explain _____
- My access to mental health services has not been affected

Q28. Has anyone in your household been sick with COVID-19? **Check all that apply**

- Yes and was confirmed by testing
- Yes, but did not get tested
- No and was confirmed by testing
- No, no one got sick

Q29. As promised, we would like to send you payment for completing this survey. We will send the payment in cash by U.S. Mail. Please provide your contact information below.

Name: _____ (First) (Last)
Street address: _____
Apartment Number: _____
City: _____ State _____ Zip Code: _____

Q30. This is the final survey planned for the Flint Medicaid Waiver. If you would be willing to be contacted for future studies that may come up, please provide your contact information below.

Telephone Number: () _____ - _____
Email Address: _____

Please return your completed survey in the envelope provided.

Flint Medicaid Expansion Adult Survey – Wave IV

Conducted on behalf of

The Michigan Department of Health and Human Services

Thank you completing the previous surveys. The Flint Medicaid Expansion Waiver is offering another opportunity to give feedback about your child’s experience with this health care insurance.

As a reminder, the Flint Medicaid Expansion Waiver offers health insurance in response to the Flint Water Crisis.

When completing this survey, please only answer for the time period between the date listed below and today.

Any questions you answer on this survey will not affect your Medicaid benefits. All answers will remain private to the extent allowed by law. Only a summary report based on everyone’s survey responses will be made public. **You will receive \$10 for completing this survey.**

Start Here



Remember, only answer for the time period between the date listed above and today.

Q1. Since the **date you completed the last survey**, how would you rate your **overall** health (both physical and behavioral/emotional)?

Excellent Very Good Good Fair Poor
¹ ² ³ ⁴ ⁵

Q2. Since the **date you completed the last survey**, how would you rate your **physical** health?

Physical health refers to things like your weight, if you have any blood pressure problems or blood sugar problems.

Excellent Very Good Good Fair Poor
¹ ² ³ ⁴ ⁵

Q3. Since the **date you completed the last survey**, how would you rate your **behavioral or emotional** health?

Emotional problems may include stress, depression, anxiety, not being able to pay attention, etc.

- Excellent Very Good Good Fair Poor
- ¹ ² ³ ⁴ ⁵

Q4. Have you ever been referred to the **Neurodevelopmental Center of Excellence** as part of Genesee Health System?

- ¹ Yes
² No
³ I have not heard of the Neurodevelopmental Center of Excellence

Q5. Since the **date you completed the last survey**, how easy is it to get the medical care, tests, or treatment you need? *For example, to see a doctor or a nurse, get medicine, etc.?*

- Very Easy Easy Neither Difficult Very Difficult
- ¹ ² ³ ⁴ ⁵

By being enrolled in the Flint Medicaid Waiver program, you can get extra services such as Family Supports Coordination, sometimes called Targeted Case Management. A Supports Coordinator is a person like a nurse or social worker. This person helps you make a plan based on your needs. They answer your questions, help make appointments, arrange transportation, connect you to educational resources, or provide nutrition support.

Q6. Have you **ever used** any **Family Supports Coordination/Targeted Case Management (TCM)** services **since enrolling** in the Flint Medicaid Waiver?

¹ Yes →

Q6a. What are some of the reasons why you have **used** Family Supports Coordination/Targeted Case Management? **Check all that apply.**

- ¹ Physical health concerns
¹ Testing for behavioral or emotional concerns
¹ Other, please describe _____

¹ No →

Q6b. What are some of the reasons why you have **not used** Family Supports Coordination/Targeted Case Management? **Check all that apply.**

- ¹ My needs were met before I enrolled in the waiver/TCM
¹ My needs were met somewhere else
¹ TCM did not have the services I needed
¹ Other, please describe _____

Q7. Since the **date you completed the last survey**, have you used any Family Supports Coordination/Targeted Case Management (TCM) services?

¹ Yes →
 ² No
 ⁷ Don't know

Q7a. Since the **date you completed the last survey**, how many times has your Supports Coordinator contacted you?

None, never been contacted	1-2 Times	3-5 Times	6-12 Times	13 or More Times	Don't know/ Unsure
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵	<input type="checkbox"/> ⁷

Q7b. Since the **date you completed the last survey**, how have you met with your Supports Coordinator? **Check all that apply.**

¹ In person meeting at a public location
 ¹ In person meeting at my home/residence
 ¹ Video (Zoom, Teams)
 ¹ On a phone call
 ¹ Other, please describe _____
 ¹ Don't remember/don't know

Q7c. Since the **date you completed the last survey**, how satisfied are you with your Supports Coordinator?

Very Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	Very Dissatisfied
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴

Q8. Have you **ever** received information about Family Supports Coordination/Targeted Case Management (TCM)?

¹ Yes
 ² No →
 ⁷ Don't know →

Q8a. Would you like to receive information about Family Supports Coordination/Targeted Case Management (TCM)?

¹ Yes
 ² No

Q9. Have you received services from other sources in the community?

¹ Yes →
 ² No
 ⁷ Don't know

Q9a. Where have you received services from? **Check all that apply**

¹ County health department
 ¹ Faith-based/religious organization/church
 ¹ Community-based organization (Food bank, etc)
 ¹ Other, please describe _____

Q9b. What type of services did you use? **Check all that apply**

¹ Food assistance
 ¹ Health care
 ¹ Financial assistance
 ¹ Educational assistance
 ¹ Other, please describe _____

Continue on the next page

about your Flint Medicaid Waiver experience. Please read each statement and then indicate whether you agree or disagree with the statement.

Remember, only answer for the time period between the date listed on the front cover and today.

Q10. Since the **date you completed the last survey**, the Flint Medicaid Waiver has made it easier to get the health care I need.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q11. Since **date you completed the last survey**, I feel that the health care providers are working my best interest.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q12. Since the **date you completed the last survey**, has a doctor or nurse told you that you have any chronic health condition(s) such as such as asthma, diabetes, high blood pressure, arthritis, COPD, etc.?

- ¹ Yes
- ² No
- ³ Don't know/Unsure

Thinking about your chronic health condition that you learned about since the date you completed the last survey, to what extent do you agree or disagree with the following statements?

Q12a. Since the **date you completed the last survey**, I have access to **more resources** that help with management of my chronic health condition(s).

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q12b. Since the **date you completed the last survey**, I am more confident that I can manage my chronic condition(s).

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
<input type="checkbox"/> ¹	<input type="checkbox"/> ²	<input type="checkbox"/> ³	<input type="checkbox"/> ⁴	<input type="checkbox"/> ⁵

Q13. Choose a number from 0 to 10, where 0 is the **worst** and 10 the **best**, what number would you use to rate your overall Flint Medicaid Waiver experience since the **date you completed the last survey**.

	0	1	2	3	4	5	6	7	8	9	10	
Worst	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Best

The next questions are about the water you use in your home since the date you completed the last survey.

Q14. Do you use water supplied by the City of Flint, also known as tap or faucet water right now?

- ¹ Yes →
 - ² No
 - ⁷ Don't Know/Unsure
- ↓

Q14a. What do use tap water for? **Check all that apply**

- ¹ Drinking
- ¹ Cooking
- ¹ Washing dishes/brushing teeth
- ¹ Bathing/showering/washing clothes
- ¹ Watering garden/pools/sprinklers
- ¹ Other, please describe _____

Water filters were distributed during the Flint Water Crisis, or you may have bought your own. We would like to ask some questions about how you use the filter.

Q15. Since the date you completed the last survey, have you used a water filter in your home?

- ¹ Yes
- ² No

Q16. Are you currently using a water filter in your home?

- ¹ Yes →
 - ² No
 - ⁷ Don't know/Unsure
- ↓

Q16a. What kind of filter do you have now? **Check all that apply**

- ¹ Filter attached to the faucet.
- ¹ Whole house filter (connected near your water heater.)
- ¹ Water pitcher filter; like Brita, Pur, ZeroWater, etc.
- ¹ Other, please describe _____
- ¹ Don't know/Don't remember

Q17. Since the date you completed the last survey, have you been told that the pipes to your home or residence have been replaced?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q18. Since the date you completed the last survey, have you been exposed to lead through other sources? (Example: paint, dust or soil)?

- ¹ Yes
- ² No
- ⁷ Don't know/Don't remember

Q19. If there anything else you would like to tell us about your experiences overall or with services available through the **Flint Medicaid Waiver** including your experiences with Family Supports Coordination or Targeted Case Management, please do so in the box below.

We would like to ask you about ways the COVID-19 pandemic impacted you and your family.

Q20. How has COVID-19 affected you and your family? **Check all that apply**

- Less access to services through schools (such as meals, childcare, etc.)
- Unable to go to work, laid off, or furloughed
- Working more hours as an essential worker
- Lost childcare
- Received federal stimulus check
- Received unemployment money from the state and/or federal government
- Other, please explain _____
- COVID-19 has not impacted me or my family

Q21. How has COVID-19 affected your access to **healthcare services**? **Check all that apply**

- Doctor's appointments moved to telephone or telehealth (computer face-to-face)
- Delays or cancellations of doctor's appointments and/or getting prescriptions
- Not able to access physical healthcare I needed.
- Other, please explain _____
- COVID-19 did not affect my access to health care.

Q22. How has COVID-19 affected your access to **mental health services**? **Check all that apply**

- Mental health appointments moved to telephone or telehealth (computer face-to-face)
- Delays or cancellations of mental health appointments and/or getting medication
- Not able to access mental health care
- Other, please explain _____
- COVID-19 order did not affect my mental health services

Q23. Has anyone in your household been sick with COVID-19? **Check all that apply**

- Yes and confirmed by testing
- Yes, but did not get tested
- No, and was confirmed by testing
- No, no one has been sick

' Don't know

Thanking you for completing the survey. We will send the payment in cash by U.S. Mail. We will make every effort to process payments within one week of submitting your survey. Please understand that due to COVID-19, mail delivery may be delayed, and payments may take longer to be delivered.

Name: _____ (First) (Last)
Street address: _____
Apartment Number: _____
City: _____ State _____ Zip Code: _____

If you would be willing to be contacted for future studies that may come up, please provide your contact information below.

Telephone Number: () _____ - _____
Email Address: _____

Please return your completed survey in the envelope provided.



Flint, Michigan Section 1115 Demonstration

#11W 00302/5

March 3, 2016 – September 14, 2021

**Targeted Case Management Provider
Key Informant Interview
Summary Report**

Submitted: 10/31/22

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Executive Summary

In 2016, the federal government declared the Flint Water Crisis an emergency. This leveraged federal funds to assist residents who were exposed to lead contaminated water. Lead is a known neurotoxin and exposure could result in physical and mental health disorders. The Centers for Medicare and Medicaid Services (CMS) approved a Medicaid waiver application submitted by the State of Michigan Department of Health and Human Services (MDHHS) to address the sustained public health crisis. This waiver expanded eligibility for pregnant women as well as children less than 21 years of age. The waiver known as the Flint Medicaid Expansion (FME), was approved for the timeframe 3/3/2016 - 9/14/21. FME expanded eligibility and services in two ways: 1) increased income eligibility from a maximum of 212% FPL to 400% FPL, and 2) added Targeted Case Management (TCM) of specialized health services. A formal evaluation plan was submitted and approved by CMS to monitor the impact of FME. The evaluation plan addressed four domains: 1) access to services; 2) access to TCM; 3) improved health outcomes; and 4) lead hazard investigation. This report summarizes information obtained through structured Key Informant Interviews (KII) of TCM personnel conducted in 2018, 2020, and 2021.

These interviews were designed to document aspects of TCM benefit quality, consistency, and fidelity from the provider perspective. The uptake in TCM services was less than anticipated throughout the duration of the waiver period. Even with additional challenges related to the COVID-19 pandemic, TCM utilization did not significantly vary. While there was sufficient TCM provider capacity to accommodate enrollees, resource and access issues remained. Specifically, TCM professionals noted the continued lack of clean tap water, limited access to behavioral health services, and limited transportation to appointments. These barriers were consistently reported over the course of the three interviews. The COVID-19 pandemic and associated shutdowns resulted in additional needs beyond those associated with the water exposure. One example given was increasing food insecurity due to school shutdowns and the interruption of free/reduced lunch programs. Enrollee engagement with TCM may have provided more resources to address these new pandemic related gaps. Unfortunately, overall TCM use remained low. For those who engaged with the TCM benefit, the providers reported trust and connection with their clients. These providers continued to work with their clients through televisits in the face of mandated shutdowns and the inability to conduct home visits as required by policy. The provider dedication to continuing this outreach and support despite the inability to be reimbursed through the established policy provides evidence of the strong relationships that can evolve. The TCM providers identified several opportunities to improve the TCM process. These included evaluating the administrative referral processes to improve convenience and expedite service delivery to the enrollees, considering additional allowable methods of assessment and number of visits, delivering ongoing training and education sessions for Case Workers regarding the FME waiver and availability of TCM services, and increasing community messaging to improve public awareness of TCM services.

Introduction

In April 2014, Flint residents were exposed to lead in the water caused by a switch from the Huron and Detroit Rivers to the Flint River. The difference in environmental characteristics between the water sources caused lead to leach from the city's aging water pipes delivering it to Flint citizens' homes via the tap water. Lead is a neurotoxin that has the potential to affect cognitive and behavioral development in infants and children including those exposed to lead in utero¹. In turn, the environmental crisis was declared a Federal Emergency. Thus, the State of Michigan applied for a Medicaid Section 1115 Waiver to mitigate potential health consequences for individuals exposed to the lead contaminated water. In response, the Centers for Medicare & Medicaid Services (CMS) granted the waiver application, effective March 2016, to support access to care and targeted case management for persons affected by the contaminated water. The waiver duration extended through September 14, 2021.

The services available for affected, eligible pregnant women and children 21 or younger included screenings and related health care and social services visits. Since navigating the health care systems can be complex, the Targeted Case Management benefit expanded the Medicaid benefit to support enrollee access to and navigation of available health and social services and supports. This report summarizes qualitative information provided by the TCM Providers through Key Informant Interviews (KII) to gain their perspectives of the benefit and how it was implemented.

The approved demonstration supported an overarching goal to *"identify and address any physical or behavioral health issues associated with actual or potential exposure to lead hazards"*. The specified benefits as part of the waiver application included:

1. Expand eligibility of all Medicaid benefits for low-income children (up to age 21 and including children born to eligible pregnant women) and pregnant women (through two months post-delivery) served by the Flint water system from 4/1/2014 until the water lines are declared safe. Specific criteria for expansion include:
 - a. Increase income threshold to offer coverage to children in households with incomes from 212% FPL up to and including 400% FPL.
 - b. Increase income threshold to offer coverage to pregnant women in households with incomes from 195% FPL up to and including 400% FPL.
 - c. Eliminate cost-sharing and Medicaid premiums for eligible children and pregnant women served by the Flint water system.
 - d. Permit eligible children and pregnant women above the 400% FPL and served by the Flint water system to buy into Medicaid benefits by paying premiums.
2. Add a Targeted Case Management (TCM) benefit to all low-income children (up to age 21 years including children born to eligible pregnant women) and pregnant women (through two months post-delivery) served by the Flint water system from



4/1/2014 until the water lines are deemed safe. As of October, 2022, the water system has not yet been deemed safe since all the lines have not yet been replaced.

Methods

Evaluation Domains

The waiver application referred to four domains in which the expanded Medicaid offerings would support attainment of the overall waiver goal (for a full description of the domains and supporting hypotheses, refer to the FME Waiver Summative Evaluation report). The domains were:

- Domain 1: Access to Services
- Domain 2: Access to Targeted Case Management
- Domain 3: Improved Health Outcomes
- Domain 4: Lead Hazard Investigation

The hypotheses and sub-hypotheses contained in Domain 2 were largely framed by administrative data sources including Michigan Medicaid utilization data and Genesee Health System (GHS) electronic medical record data. However, qualitative data from enrollees and TCM providers were desired to provide context to utilization patterns documented in administrative health care data and contract with enrollee survey data.

Domain 2: Access to Targeted Case Management

“Enrollees who access TCM services will access needed medical, social, educational, and other services at a rate higher than enrollees with similar individual and neighborhood characteristics but do not utilize TCM services.”

The comprehensive TCM benefit was designed to facilitate needed medical, behavioral, and other related services to the eligible cohort of individuals exposed to the water and therefore at risk for physical or behavioral health consequences. Required elements of TCM described in MDHHS policy included health assessments, planning, linkage and referral, advocacy, coordination and monitoring of care, follow-up activities, etc. (Refer to Appendix 1 for the TCM Policy).

The TCM framework prioritized assessing enrollee health needs and developing an individualized plan of care to address identified needs. This process was collaborative between the enrollee and TCM providers who served in positions generally named case managers or coordinators. Access to resources and services was optimized through TCM assessment resulting in referrals to community organizations. Genesee Health System (GHS) was the designated provider for TCM and expanded to include the Greater Flint Health Coalition (GFHC). Enrollees could access TCM services in several ways. Enrollees could contact these TCM provider organizations directly. Enrollees could also engage with TCM providers through referrals processed by their physician(s) or health plan. The CDC-funded Flint Registry was also instrumental in screening and referring potentially eligible individuals for FME enrollment and associated TCM services.

Data collection

The list of potential key informants was based on MSU-IHP's knowledge of GHS and GFHC staff involved in delivering TCM services. A structured interview was designed by the evaluation team to capture data in alignment with policy defined services. These qualitative data allowed contextualized information specific to TCM provider perspective to inform the FME evaluation. The KII incorporated key areas including: 1) TCM Provider Characteristics, 2) Assessment, 3) Covered Client Services, and 4) Service Capacity and Delivery. The second and third interviews were administered during the COVID-19 pandemic. Therefore, an additional key area was integrated to understand how the pandemic impacted TCM service delivery. The interviews were administered in three waves approximately 18 months apart. The first interview was administered in 2018, the second interview in 2020, and the third interview in 2021. IHP quality improvement staff, having structured interview experience, conducted the first two interviews by telephone using a discussion guide to ensure consistency and completeness (Refer to Appendix 2 for the Discussion Guide). The method for data collection for the third interview was changed to an online survey with the opportunity for telephone follow-up when clarification was needed.

Results

Summaries of each key area are presented below and detailed statements from the TCM coordinators are displayed in Appendix 3. TCM services and the two provider organizations remained consistent throughout the three interview timeframes. TCM was required to be delivered in a face-to-face format (primarily via home visits), until the State government imposed a shutdown in response to the COVID-19 pandemic. TCM providers shifted in-person visits to televisit delivery to maintain client connections. Unfortunately, the policy was not revised to modify the allowable method of TCM delivery. Therefore, reimbursement for these services was not adjusted to permit billing for telehealth. This resulted in a lack of administrative claims data for this service after March 2020 increasing the importance and contribution of these interviews to the overall FME waiver evaluation.

TCM Provider Characteristics

State policy required eligible TCM providers to hold state licenses as either a Registered Nurse or Social Worker. Four participants were involved in providing data over the three interview waves. All four participants employed in this capacity by the two organizations were licensed social workers. The same three participants from both organizations contributed to the 2018 and 2020 interview periods. Between 2020 and 2021, the two women affiliated with GFHC were no longer employed and a new individual participated with the 2021 interview cycle. Initial training specific to the FME waiver was provided prior to the 2018 interview to these TCM coordinators to support provision of TCM services and supports to enrollees. Specific training topics included: MI Lead Safe, consumer approaches to minimize lead exposure, infant and child mental health, and Adverse Childhood Events (ACEs) tool training. This training was only provided at the beginning of the FME implementation. The TCM provider who joined effective 2021 received less formal training on the FME waiver but did receive specific ACEs training.

All coordinators had job titles that referenced responsibility for TCM duties such as Family Supports Coordinator, TCM provider, or Manager of Quality and Outcomes. For the first (2018) and second (2020) interviews, all three participants were female with two identifying as African American and one as non-Hispanic White. At the third interview, both GFHC TCM providers had left the organization, one non-Hispanic White and one African American. One individual replaced both these positions. She was also a licensed social worker who identified as African American.

Regarding personal exposure to contaminated water in Flint, all three women stated their residences, outside of Flint, were not affected. Likewise, the new TCM provider from GFHC lived outside of the City of Flint without exposure to contaminated water. Uniformly, work locations were impacted as they were housed within the City of Flint and serviced by the water. Both employers mitigated the exposure through provision of bottled water and faucet filters.

TCM Assessment

Originally, GHS reported that initial client contact occurred via a medical clerk who scheduled intake interviews with the TCM provider. At the time of the second interview, initial contact with an enrollee shifted from the medical clerk to a family navigator who was a part of the organization's care team structure. This change was made because the family navigator had more flexibility to make calls and conduct scheduling for enrollees with the TCM provider. This streamlined the scheduling process.

Both organizations primarily utilized mail, telephone, and email to contact enrollees. There was concern about texting to cell/mobile phones due to data limits and enrollee permission was required to use this contact method. Therefore, texting as a communication technique was not used as often as other contact methods. Once the enrollee was scheduled for the assessment, they were seen in-person by the TCM provider as required by the waiver policy. However, during the pandemic, TCM providers were prohibited from conducting in-person visits with enrollees and pivoted to telehealth visits. Table 1 provides selected TCM provider comments regarding how the pandemic affected their work. Between the second and third interviews, TCM providers at both organizations reported a decline in referrals and client caseloads.

Table 1. How has COVID-19 affected your work with FSC?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	N/A	Clients have more needs now. Clients are cooperative and the resources are cooperative. She has been busier now. The number of referrals seems steady; increase time to find a resource / way to help the client. No services have been unable to offer. Tele-visits, fewer in person contacts. Video chat and facetime help.	There has been a decrease in the number of referrals.
Greater Flint Health Coalition	N/A	Telephone voice, not using video or facetime. Able to provide full scope of services with exception of home visiting. Telephonic, text, still conducting assessment, making plans of care and referrals. If we believe a home visit is needed, we put them on the list for a home visit, there is a wait list and review every 21 days and place another call at or before 21 day so we don't lose track of the client. Staff are notified of follow up through APRICOT. staff get notified.	Uses telehealth. There is less/fewer contact with clinics.

For the first and second interviews, both agencies reported the duration between receiving a client referral from a health care provider, self-referral, or health plan for TCM Services to conducting the intake assessment was less than two weeks. Referrals for TCM Services occurred for individuals who were identified to have water-related health needs and this was the flag to conduct a TCM Intake Assessment. The TCM providers noted they supported both existing clients known to them through other programs and new clients referred in response to the water crisis. Existing clients from other programs were evaluated for FME waiver eligibility and able to access TCM for increased needs if they qualified. Scheduling the intake assessment appointment with the TCM provider was more often restricted by the family's availability rather than the TCM organization's capacity. By the third interview, the wait time had decreased to one week or less. This may reflect a decline in the number of client referrals being processed or the ability to more quickly schedule televisit appointments. Both TCM organizations reported the ability to accommodate all interested enrollees in a timely manner, so neither required developing and implementing a triage or risk stratification process as part of the TCM assessment process.

GHS reported a steady number of referrals for TCM since 2016 with an initial caseload of 86 clients. The client caseload increased to approximately 100 enrollees at any one time by the second interview. Most of the identified client needs were able to be managed by the TCM provider and their networks. However, when intake assessments identified severely impaired enrollee cases, they provided referrals to higher levels of care (e.g., specialized case managers, psychiatrists, psychologists).

Both agencies used formal assessment tools to facilitate comprehensive assessments related to the water crisis. GHS developed their own Water Psychosocial Assessment tool in-house. Other

validated tools as listed were available to the TCM providers but were not uniformly incorporated into the assessment process. GFHC used their existing standardized Social Determinants of Health and Family Supports Coordination tools for the TCM assessment. Over time, GFHC TCM providers explored integration of the ACEs questionnaire and the Patient Health Questionnaire (PHQ-9) for depression screening. Table 2 identifies the initial assessment tools used by the TCM provider organizations.

Table 2. Assessment Tools for each TCM Provider Organization.

GHS Assessment Tools	GFHC Assessment Tools
<ul style="list-style-type: none"> • Water Psychosocial Assessment Tool • Ages & Stages Questionnaire (ASQ) • Autism Brief • Trauma Screening Tool • Depression Screening • ADHD Screening • Trauma Screening Checklist • ACEs Questionnaire 	<ul style="list-style-type: none"> • Social Determinants of Health (SDOH) Screening Tool • Family Supports Coordination Assessment Tool

These TCM assessments were necessary for the providers to work with enrollees to identify health needs. The information collected during the assessment process was used to guide the development of individualized plans of care to address the needs. Both agencies described the care plan process incorporated enrollees’ health care priorities identified during the assessments. These plans were reviewed on a routine basis and updated collaboratively with the client as necessary.

Both TCM provider organizations utilized web-based data management systems to store data collected from assessments and related information. Data systems varied by organization with GHS using a commercially available electronic health record called *Clinical Health Information Program* (CHIP) and GFHC using a system called *Apricot*. This data was then used to write reports for tracking and/or grant-writing purposes. No changes to the electronic systems were reported over the three reporting timeframes.

Covered Client Services

The TCM benefit covered six appointments annually consisting of one intake assessment, and up to five follow-up targeted case management visits. GHS described the TCM program as low intensity due to the limited number of visits allowed. At times, services addressed needs beyond lead-related goals and supported clients in pursuing assistance for additional non-lead related needs. If an enrollee needed more services, they were referred to a more intensive program that included as many as 20 visits per month. The TCM provider would phase the enrollee out of their caseload once they were successfully linked with the appropriate referral provider(s) to address identified need(s). However, enrollees who had multiple health issues were retained in the TCM provider caseload for monitoring.

In the second interview, the GHS TCM provider suggested that additional visits be considered as part of the benefit. The rationale for this was that there were fewer individuals than expected receiving services so that the increase would be able to be accommodated. Also, among the enrollees served, they were identified to have multiple issues related to the water exposure. During the first two interview periods, mental/behavioral health services, safe water, and housing represented the most prevalent needs of clients. Housing and nutrition needs received referrals for School District Nutrition, WIC, general food assistance, and housing. At the time of the third interview, educational topics were identified among the top needs. Increased needs were noted particularly for child learning and developmental services. These needs were thought to be more prevalent by the third interview due to children aging from preschool to grade school age during these years. Educational needs resulted in referrals for Head Start, Early On, and Great Start Readiness Program. The pandemic also affected the enrollee needs reported by the TCM providers. The COVID-19 school closings resulted in decreased access to free and reduced-price meal programs resulting in increased needs for food assistance in the third interview.

Service Capacity and Delivery

Regarding internal resources, both organizations reported adequate internal resources and the ability to accommodate all existing enrollee needs. During the first (2018) interview, based on GFHS reporting, providers saw approximately 10-15 enrollees per week. Based on the second (2020) interview, providers reported seeing, on average, 15-25 clients per week. This increase may be related to the COVID-19 pandemic, in conjunction with the water crisis, indicating greater awareness of need in the community. At the time of the third interview (2021), client load had decreased to a lower number of enrollees seen per week. This does not mean that community needs were low, but perhaps was the result of fatigue due to competing priorities during COVID-19 such as: increased need for childcare due to school closings, food insecurity, and continued need for bottled water. Table 3 provides the responses regarding the average number of clients seen on a weekly basis.

Table 3. On average, how many FME clients do you see per week? Has this increased or decreased since the last interview?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	N/A	It varies. Approx 15-18 contacts per week. This includes an entire family or household approach for many of the contact points.	8-10
Greater Flint Health Coalition	The TCM Provider sees 2 or three clients per day, on average 10-15 per week. Family navigators visit or interact with 10-15 clients per week. FSC services 5-6 clients per week. Total seen since program began is 37. If client requires FSC and is <6 years old, then GHS is supposed to refer them to GFHC also CHAP to address social determinants of health. Also receive client referrals from EBLI Management Program when EBLI services are completed. Then referred to this program for FSC.	About 20-25 per week.	Work with about 15 household enrolled in FSC per week.

When considering availability of community resources to address the identified needs, TCM providers identified additional difficulty or time needed to implement plans. Both organizations stated they had sufficient internal TCM capacity to receive referrals and work with enrollees to develop individualized care plans through the assessment process. When needs were related to health services, the organizations generally reported sufficient resources to connect enrollees. However, on occasion connection to non-health services was more challenging as these often were provided by external entities. The TCM providers commented they were not always informed about client follow-up with referrals and arranged services. Communications with the service providers were not standardized with a goal of closing the loop on outstanding referrals. At GHS, clients took advantage of TCM referrals 85 – 90% of the time, while GFHC reported that approximately 65% of clients followed up with TCM referrals. The case managers identified several reasons for the apparent lack of follow-through by clients. Among these were the administrative timeframes required to process some services, such as housing, and transportation.

Environmental barriers that hindered enrollees' access to and continuity of services were identified that were outside the scope of TCM provider influence. The TCM providers mentioned the lack of reliable contact information contributed to difficulty in assisting enrollees to secure needed services. Follow-up and ongoing advocacy with clients was difficult when telephone numbers or addresses changed without notification to the organization. This

also compromised the ability of the service providers charged to address a need to be able to work with the client to ensure service delivery. Lack of transportation was identified as a persistent issue across all three interview periods. This barrier is not unique to the FME waiver and has been identified in other programs per MDHHS. One of the TCM providers identified an altruistic reason for lack of follow-up with service referrals. Some enrollees specifically cited concerns about taking advantage of referrals when they believed there were other individuals with greater needs.

An opportunity to improve administrative and referral TCM processes was identified. Benefit renewals were one area where inadvertent lapses in coverage would occur. This was particularly problematic when members of the same family were covered through different forms of Medicaid. The GHS TCM provider observed occasional confusion among case workers having responsibilities to ensure FME waiver eligibility and enrollment which introduced delays. Staff turnover after initial waiver education sessions resulted in knowledge deficits regarding eligibility criteria. In the first interview, GFHC had similarly identified opportunities to improve access to FME waiver benefits such as expanding and reinforcing communications regarding the eligibility and availability of TCM services. This suggestion was for community members and health care professionals.

Impacts of COVID-19

The TCM providers stated they had identified new clients as a result of needs arising from the pandemic although the number of incoming referrals had declined. COVID-19 did not affect the range of services offered through TCM. However, TCM providers transitioned to televisit methods to complete assessments due to state mandated closures. Televisits were not covered according to the approved TCM policy and the policy was not revised during the pandemic. Nevertheless, TCM providers continued to provide much needed services for enrollees. The TCM respondents noted that in-home services were similarly compromised by the stay home orders. However, a benefit related to the government shutdown was realized in that the televisit model was felt to allow for more timely connection with enrollees. Also, these methods of client interaction supported more frequent contact and monitoring compared to the in-home visit model.

Summary

Administrative health care data showed enrollee participation with TCM was less than anticipated, approximately 10% (refer to Summative FME Evaluation). The impact of the COVID-19 pandemic shutdowns prohibiting in-home visits combined with the lack of TCM policy adjustment to permit billing for telehealth services caused significant reporting issues available from billing data. However, qualitative sources including the FME Enrollee Surveys along with these TCM Provider Interviews were able to provide some critical information regarding the scope of TCM services, the prevalent needs of enrollees and evaluation of the administrative processes to implement this specific benefit. Despite the low penetration of TCM participation among all FME enrollees, the FME Enrollee Survey provides data suggesting those participated with TCM were satisfied and felt confident with the services.

The TCM Provider interviews from the two organizations reported consistent impressions regarding prevalent water related needs identified by their clients and the organizational ability to work with other providers to address these needs. Both TCM organizations had sufficient internal capacity to accommodate the referrals received such that no triage or risk stratification systems were necessary. Standardized tools were used to support the assessment process and the results of these assessments were used to generate individualized plans of care in collaboration with the affected client. Both organizations indicated clean water, behavioral health needs, and lack of reliable transportation were the greatest priorities for clients in the first few years. Education supports became more important at the time of the last interview, presumably due to the aging of children into school. The type of services requested did change due to the pandemic. One such service was more nutrition supports thought to be associated with school closures and interruption of reduced/free school-sponsored breakfast and lunch programs. Programs relying on in-person visits were modified in format to use other forms of monitoring such as telephone or video calling. This was reported to not necessarily be an adverse impact as timeliness and frequency of these contacts exceeded what would be associated with traditional in-home services. When asked to consider the administration of the TCM benefit, the providers identified several areas for possible improvement opportunities such as providing continuing education regarding FME eligibility criteria, increasing communication of FME benefits to community members and health care providers, and evaluating processes such as redetermination and reenrollment for Medicaid programs.

Recommendations

Enrollment in TCM was lower than expected. Thus, improving outreach and education methods about the FME waiver and associated benefits is necessary to accomplish optimal uptake early in the program. It is recommended that additional outreach be implemented targeting not just potentially affected community members but also to health care providers. Caseworkers and others who have a role in working with individuals to determine eligibility for Medicaid programs, including FME specific qualifications, would benefit from continuing education due to high turnover in these positions.

TCM coordinators suggested that visit limits on the TCM benefit could be increased without compromising access to the benefit. Overall, lower numbers were found to engage with the service and existing TCM provider caseloads were managed without requiring triage or risk-stratification. Further, the TCM policy could be adjusted to permit televisit methods of assessment and follow-up visits. These types of visits were implemented during the COVID-19 pandemic despite an inability to bill for them. This change resulted in documented improvements in the time needed to connect with clients to complete the assessments and the ability to more frequently check in with clients and support them in securing services. Another area for improvement would be enhanced communication between the referring TCM providers and the service providers, perhaps using a feedback form or other standardized communication.



References

1. Rocha A, Trujillo KA. Neurotoxicity of low-level lead exposure: History, mechanisms of action, and behavioral effects in humans and preclinical models. *NeuroToxicology*. 2019;73:58-80. doi:10.1016/j.neuro.2019.02.021
2. Federal Poverty Level (FPL). HealthCare.gov. Accessed September 6, 2022. <https://www.healthcare.gov/glossary/federal-poverty-level-fpl>

Appendix 1: MI Medicaid Provider Manual – TCM Policy



TCM
policy_7_2019.pdf

Appendix 2: TCM Provider Key Informant Interview Guide



FSCSurvey_phone.pdf
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Appendix 3: TCM Provider Responses (2018-2021)



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FAMILY SUPPORTS COORDINATION (FSC) Provider SURVEY
 (Otherwise known as Targeted Case Management)

#	Question	Answer	Notes/Comments
Relevant demographic info added here:			
1.	Do you live in Genesee County?	Yes	
		No	
2.	Do you currently live in the City of Flint?	Yes	
		No	
3.	As you know the Flint Water Crisis occurred in April 2014. Was the water at your personal residence affected?	Yes	
		No	
4.	Was the water at your workplace or another place you visited affected?	Yes	We are looking for prolonged and daily exposure to toxins/lead in the water.
		No	
Coordinator Characteristics			
5.	What is the highest academic degree you have earned?	Bachelors	Other, please describe.
		Masters	
		Doctorate	
		Other	
6.	Do you have a professional license or certificate?	Yes	
		No	

7.	If yes, What is your licensure level?	RN	If other, please describe.
		NP	
		LCSW/LBSW/LMSW	
		PA	
		Other	
8.	How long have you been employed with (fill with GHS/GFHC) GHS?	Years ____ Mos ____	
9.	What is your job title?	Open Ended	We are looking for FSC or TCM, but do not prompt.
10.	When did you start providing Targeted Case Management/Family Supports Coordination services for the Flint Medicaid Expansion Waiver? (Enter date.)	Month _____ Year _____	
11.	Did you receive training specific to the Family Supports Coordination benefit associated with the Flint Medicaid Expansion Waiver?	Yes	If other, please describe.
		No	
		Other	
Assessment			
12.	Do you use a checklist or assessment tool to assess health risk?	Yes	If other, describe. "Home grown"?
		No	
		Other	

13.	If yes, what is the name of the tool you use?	Risk Assessment Screening tools	Name
14.	Are you able to share a hard copy of the assessment tool with us?	Yes No	
15.	Are there any risk assessment tools that you would find helpful, but are not currently using.	Open ended	
16.	What other tools do you use to interact with your clients?	Open Ended e.g. Individual Care Plan, Family Care Plan, Other	Formal surveys or tools? What are they called? Please describe.
17.	What kind of data entry (?) system (electronic medical records) do you use?	Open Ended	Name of the EMR, e.g. Care Connect 360, MeDecision, OTHER (name) Web based; hard copy only
Service Capacity			
18.	When need a referral for FSC, do you feel there sufficient FSC resources with capacity to accommodate referrals?	Yes No	

19.	How long does it take from the time you receive a referral for the intake process to occur?	One week or less	If other, please describe.
		1-2 weeks	
		3-4 weeks	
		1 month or more	
		Other	
20.	How long after completion of the intake process are client services initiated?	One week or less	If other, please describe.
		1-2 weeks	
		3-4 weeks	
		1 month or more	
		Other	
21.	What methods do you use to initiate contact with a client?	In person	If other, please describe.
		Telephone	
		Email	
		All of the above	
		Other	
22.	On average, how many FME clients do you see per week?	#	
Service Delivery			
23.	Are the beneficiaries referred for FSC prioritized, triaged or risk stratified for follow-up?	Open ended.	

24.	If yes – describe the stratification criteria.	Open ended.																			
25.	What are the top three services or referrals you help facilitate.	<table border="1"> <tr> <td>Scheduling appointments</td> <td></td> </tr> <tr> <td>Transportation Assistance</td> <td></td> </tr> <tr> <td>Lead Screening</td> <td></td> </tr> <tr> <td>Mental/Behavioral Health</td> <td></td> </tr> <tr> <td>Home Visiting: e.g. MIHP, NFP, Parents as Teachers, etc.</td> <td></td> </tr> <tr> <td>Education: Head start, Early On, GSRP</td> <td></td> </tr> <tr> <td>Nutrition: WIC, Food Assistance, Food Pantries,</td> <td></td> </tr> <tr> <td>Housing</td> <td></td> </tr> <tr> <td>Other Services: Please name (open answer)</td> <td></td> </tr> </table>	Scheduling appointments		Transportation Assistance		Lead Screening		Mental/Behavioral Health		Home Visiting: e.g. MIHP, NFP, Parents as Teachers, etc.		Education: Head start, Early On, GSRP		Nutrition: WIC, Food Assistance, Food Pantries,		Housing		Other Services: Please name (open answer)		Read each on to the service provider and check Top Three.
Scheduling appointments																					
Transportation Assistance																					
Lead Screening																					
Mental/Behavioral Health																					
Home Visiting: e.g. MIHP, NFP, Parents as Teachers, etc.																					
Education: Head start, Early On, GSRP																					
Nutrition: WIC, Food Assistance, Food Pantries,																					
Housing																					
Other Services: Please name (open answer)																					
26.	In your experience, the number of referrals for FSC services since May 2016 is:	<table border="1"> <tr> <td>Decreasing</td> </tr> <tr> <td>Steady</td> </tr> <tr> <td>Increasing</td> </tr> </table>	Decreasing	Steady	Increasing																
Decreasing																					
Steady																					
Increasing																					
27.	If yes – describe the stratification criteria.	Open ended.																			

Client Services			
28.	Do you feel that the scope of FSC services adequately meet the needs of your clients?	Yes No	
29.	What are the barriers you face when working with FME beneficiaries on the FSC/TCM benefit? <ul style="list-style-type: none"> ○ Cannot reach client ○ Client resists participation/referral ○ Relevant (or prevalent) needs not covered by coverage ○ Client cannot access referral provider because of: <ul style="list-style-type: none"> ○ Transportation ○ Childcare ○ Disabled ○ Non-traditional hours ○ Other reason not listed here. 	Check all that apply.	
29a.	Which barrier is the most common from the list above?	List Barrier.	
30.	What percentage of time do you think your clients follow-up with a referral?	Sliding scale 0%-100%	By 10% increments, e.g., 10%, 20%, 30%....Drop down box might be a good format for this question.

31.	How satisfied do you think FME clients are with FSC?	Very Satisfied	Check one
		Satisfied	
		Neutral	
		Dissatisfied	
		Very Dissatisfied	
32.	What is going well with? In your capacity as a coordinator, what is going well with the process you use?	Open ended.	
33.	What is not going well? In your capacity as a coordinator, what is not going well with the process you use?	Open ended.	
34.	Is there anything else you would like to share about Family Services Coordination regarding the coordination of care process you use?	Open ended.	
35.	Is there anything else you would like to share about your experiences as a coordinator for Family Services Coordination?	Open ended.	
36.	Do you have any suggestions that you think could improve the process of FSC/TCM?	Open ended.	



SECTION 7 - FLINT FAMILY SUPPORTS COORDINATION SERVICES

Family Supports Coordination services are part of a comprehensive health benefit available to pregnant women and children who were served by the Flint water system who meet the Medicaid eligibility requirements.

Family Supports Coordination services assist individuals in gaining access to appropriate medical, educational, social, and/or other services. Family Supports Coordination services include assessments, planning, linkage, advocacy, care coordination, referral, monitoring, and follow-up activities.

In addition to Family Supports Coordination services, eligible beneficiaries will receive the full array of Medicaid-covered benefits. This includes the provision of Early and Periodic Screening, Diagnosis and Treatment (EPSDT) services for children up to age 21, Non-Emergency Medical Transportation (NEMT), and Maternal Infant Health Program (MIHP) services.

7.1 ELIGIBILITY

Providers may verify beneficiary eligibility for Family Supports Coordination services through a Community Health Automated Medicaid Processing System (CHAMPS) online eligibility inquiry or via a Health Insurance Portability and Accountability Act (HIPAA) 270 transaction. The CHAMPS or 271 eligibility response for beneficiaries eligible for Family Supports Coordination services will show:

- a current MAGI category beginning with "F"; and
- a current benefit plan of "TCMF" in addition to their assigned Medicaid or Children's Health Insurance Program (CHIP)-related benefit plans.

7.2 CORE ELEMENTS OF FAMILY SUPPORTS COORDINATION

The purpose of Family Supports Coordination services is to provide a comprehensive array of services that are appropriate to the conditions of the individual. At a minimum, Family Supports Coordination services must include:

- a face-to-face comprehensive assessment, history, re-assessments, and identification of a course of action to determine the specific needs of the beneficiary and to develop an individual Plan of Care;
- planning, linking, coordinating, follow-up, and monitoring to assist the beneficiary in gaining access to services;
- coordination with the beneficiary's primary care provider (PCP), other providers, and Medicaid Health Plan (MHP), as applicable; and
- any other service approved by MDHHS.

7.2.A. INITIAL/ ANNUAL COMPREHENSIVE ASSESSMENT VISIT

All comprehensive assessment visits, including the initial face-to-face comprehensive assessment visit, must be conducted by a qualified licensed nurse or social worker with the beneficiary in the beneficiary's home or primary place of residence. The purpose of the comprehensive assessment visit is to gather sufficient information to develop an



individualized Plan of Care for the beneficiary and to ensure that all other eligible individuals in the household are identified for further screening.

It is expected that face-to-face assessments are performed annually; however, the frequency should be based on the needs and circumstances of the beneficiary and/or family. Active participation by the beneficiary and/or parent(s)/legal guardian(s) is necessary. Comprehensive assessment activities include:

- obtaining client history;
- identifying the beneficiary's needs and completing related documentation; and
- gathering information from other sources, such as family members, medical providers, social workers, and educators (if necessary), to form a complete assessment of the beneficiary.

At a minimum, the comprehensive assessment visit shall assess:

- the growth and development of beneficiaries up to age 21;
- the behavioral profile of beneficiaries up to the age of 21, including the notation of aggressive or hyperactive behavior;
- the beneficiary's access to a PCP and other health care providers;
- whether the beneficiary's PCP has conducted a developmental and social-emotional screen(s) utilizing a standardized and validated tool, such as the Ages & Stages Questionnaire: Social-Emotional (ASQ:SE) or the Pediatric Symptom Checklist (PSC) as indicated by the American Academy of Pediatrics (AAP) Periodicity Schedule, and documenting the results of any screenings performed;
- whether the beneficiary's PCP has assessed the beneficiary for sources of toxic stress and for sources of strength using nationally recognized tools, such as the Adverse Childhood Experiences (ACEs) and Resiliency questionnaires, and documenting the results of any screenings performed;
- the beneficiary's access to prenatal care, potential for pregnancy complications, pica activities, and intent to breastfeed (pregnant beneficiaries);
- the beneficiary's educational and nutritional needs, including participation in the Women, Infants and Children (WIC) program and/or the Food Assistance Program (FAP);
- the beneficiary's environment and typical family practices that may pose a lead risk;
- lead hazards within the family's dwelling; and
- access to NEMT.

7.2.B. DEVELOPMENT OF THE PLAN OF CARE AND DOCUMENTATION

During or immediately following the face-to-face initial comprehensive assessment visit, a Plan of Care must be developed for beneficiaries who agree to participate in Family Supports Coordination services, with the active participation of the parent(s)/legal guardian(s) when applicable. The development (and periodic revision) of a specific Plan of Care that is based on the information collected through the comprehensive



assessment must specify the goals and actions to address the medical, educational, social, and/or other services needed by the beneficiary. The supports coordinator must ensure the active participation of the beneficiary, and work with the beneficiary (or the beneficiary's parent[s]/legal guardian[s]) and others to develop those goals, and to identify a course of action to respond to the assessed needs of the beneficiary. The Plan of Care is to be shared with the beneficiary's MHP and PCP, if applicable. Beneficiaries must consent to share the Plan of Care with the MHP and other providers identified in the Plan of Care. At a minimum, the Plan of Care must:

- identify a course of action to respond to the assessed needs of the beneficiary (e.g., plan for the testing of family members at risk for lead hazard exposure);
- provide education and information regarding lead hazards, including the impact of lead exposure on the developing fetus of pregnant beneficiaries; and
- facilitate blood lead testing and follow-up testing and treatment as recommended by the PCP.

Family Supports Coordination providers are required to document the following information for all beneficiaries receiving Family Supports Coordination services:

- the name of the beneficiary;
- the dates of the supports coordination services;
- the name of the Family Supports Coordination provider and the qualified professional (i.e., licensed nurse or social worker) providing the supports coordination services;
- the nature and content of the supports coordination visits received, and whether goals specified in the Plan of Care have been achieved;
- whether the beneficiary has declined services within the Plan of Care;
- the need for, and occurrences of, coordination with other providers;
- a timeline for obtaining needed services;
- a timeline for re-evaluation of the Plan of Care; and
- the beneficiary's consent to share information.

7.2.C. REFERRALS AND RELATED ACTIVITIES

In collaboration with the PCP and the MHP, it is expected that the supports coordinator will facilitate and coordinate referral and related activities to assist the beneficiary in obtaining needed services. Activities such as scheduling appointments or linking the beneficiary with medical, educational, social, and/or other programs and services to address identified needs and achieve goals specified in the Plan of Care are primary components of Family Supports Coordination services. Referral activities include, but are not limited to, the coordination of age-appropriate services such as:

- health care related services, including physical and specialty behavioral health services;
- nutritional services, such as coordinating referrals to the Special Supplemental Nutrition Program, WIC program, or FAP;



- educational services, such as age-appropriate referrals to Early On, Great Start Readiness Programs, Head Start, and school-based services;
- additional social supports (including home visiting programs) to assist the beneficiary in obtaining other assistance, such as financial, housing, and transportation assistance, and lead assessment and abatement resources; and
- blood lead testing and re-testing for family members at risk for lead exposure, and education regarding lead hazards including the impact of lead exposure on young children and the developing fetus.

7.2.D. MONITORING AND FOLLOW-UP ACTIVITIES

Monitoring and follow-up activities include activities and contacts that are necessary to ensure the Plan of Care is implemented and adequately addresses the eligible beneficiary's needs, and which may be conducted with the beneficiary, family members, service providers, or other entities or individuals. Monitoring and follow-up activities are conducted as frequently as necessary by the supports coordinator.

A maximum of five (5) face-to-face monitoring visits are billable per year for each eligible beneficiary. To be reimbursed, the visit must be face-to-face. Additional monitoring and follow-up activities are likely between face-to-face visits but are not reimbursable. At least one annual face-to-face monitoring visit should be conducted to determine whether the following conditions are met:

- services are being furnished in accordance with the beneficiary's Plan of Care;
- services in the Plan of Care are adequate; and
- changes in the needs or status of the beneficiary are reflected in the Plan of Care.

Monitoring and follow-up activities include making necessary adjustments in the Plan of Care and service arrangements with providers.

7.3 ACCESSING SERVICES

Accessing Family Supports Coordination services may occur a number of ways. If the beneficiary is an MHP member, the MHP may initiate the initial contact with the beneficiary and identify those beneficiaries that may benefit from Family Supports Coordination services. Fee-for-Service (FFS) and MHP beneficiaries may also access Family Supports Coordination services either through a referral from their PCP or through a self-referral.

7.4 COVERED SUPPORTS AND SERVICES

A maximum of six (6) face-to-face visits per year will be reimbursed for each eligible beneficiary as follows:

- one (1) visit for the initial/annual comprehensive assessment.
- a maximum of five (5) visits for monitoring and follow-up.



For additional visits, MDHHS requires the provider to obtain prior authorization before the service is rendered. (Refer to the Directory Appendix for contact information regarding prior authorizations.)

Reimbursement for assessment and monitoring visits is inclusive of all related care coordination and monitoring activities. MDHHS does not reimburse for missed appointments/visits. A beneficiary may not be billed for a missed appointment/visit.

Medicaid reimbursement for Family Supports Coordination services may not duplicate payments made to public agencies or private entities under other program authorities for the same purpose.

Supports coordination includes contacts with non-eligible beneficiaries when the contact is:

- directly related to identifying the eligible beneficiary's needs and care for the purpose of assisting the beneficiary in accessing services;
- identifying needs and supports to assist the beneficiary in obtaining services;
- providing supports coordinators with useful feedback; and
- alerting supports coordinators to changes in the beneficiary's needs.

Family supports coordination does not include activities that constitute the direct delivery of underlying medical, educational, social, and/or other services to which an eligible beneficiary has been referred, including foster care programs and services such as, but not limited to, the following:

- research gathering and completion of documentation required by the foster care program;
- assessing adoption placements;
- recruiting or interviewing potential foster care parents;
- serving legal papers;
- home investigations;
- providing transportation;
- administering foster care subsidies; and
- making placement arrangements.

7.5 TRANSFER OF CARE/ RECORDS

During the course of care, the beneficiary may require services from a different supports coordinator due to relocation of the beneficiary's primary residence or due to a request of the beneficiary to change supports coordinators. When there is a planned change of the supports coordinator, information about the new supports coordinator (e.g., contact information) should be provided to the beneficiary. The referring supports coordinator must consult with the new supports coordinator about the case and transfer all applicable information and records, including all completed assessment visits and the updated Plan of Care, to the new supports coordinator in compliance with the privacy and security requirements of federal and state laws and regulations including, but not limited to, the HIPAA and the Michigan Mental Health Code.



7.6 FAMILY SUPPORTS COORDINATION CLOSURE

Family Supports Coordination services are available to all eligible beneficiaries up to age 21, or for pregnant women up to and through 60 days post-delivery. Family Supports Coordination services will be discontinued:

- if the beneficiary is no longer eligible;
- when the beneficiary parent(s) or guardian(s) refuses the service; or
- if CMS does not extend the Flint, Michigan Section 1115 Demonstration Waiver.

When services are refused, Family Supports Coordination services may be resumed at any point during the defined period of eligibility. A discharge summary, including the services provided, outcomes, current status, and ongoing needs of the beneficiary, must be completed and provided to the PCP when the Family Supports Coordination case is closed.

7.7 PROVIDER QUALIFICATIONS

Genesee Health System, the local community mental health (CMH) serving Genesee County, serves as the Designated Provider Organization (DPO) for Family Supports Coordination services. The DPO:

- has a sufficient number of qualified staff to meet the service needs of the target population and has the administrative capacity to ensure the provision of quality services in accordance with state and federal requirements;
- has experience in the coordination and linkage of community services;
- has the willingness and capabilities to coordinate with the beneficiary's PCP and MHP as applicable; and
- must seek approval by MDHHS of all subcontractors for the provision of Family Supports Coordination services.

The DPO will provide Family Supports Coordination services primarily through the use of a supports coordinator. The supports coordinator must meet one of the following professional qualifications:

- licensure as a registered nurse by the Michigan Department of Licensing and Regulatory Affairs (LARA), and at least one year of experience providing community health, pediatric or maternal infant health nursing services; or
- licensure as a social worker by LARA, and at least one year of experience providing social work services to families.

7.8 CLAIMS SUBMISSION AND PAYMENT

All claims submitted and accepted are processed through CHAMPS. Claims must be submitted on the ASC X12N 837 5010 professional format when submitting electronic claims or on the CMS 1500 claim form for paper claims. (Refer to the Billing & Reimbursement for Professionals Chapter for additional billing information.)



7.8.A. INITIAL/ANNUAL ASSESSMENTS

Face-to-face assessment visits are to be billed using HCPCS code T2024 for an individual or family. This includes reimbursement for the development of a Plan of Care for one individual. HCPCS code T2024 with modifier TT (additional patient) should be billed for each additional individual Plan of Care that is developed from the assessment visit. For informational/reporting purposes, use modifier UN (two patients served), UP (three patients served), UQ (four patients served), UR (five patients served), or US (six or more patients served).

Assessment visits must be in the home or "home-like" environment. One face-to face initial/annual assessment visit per year per family/household is allowed. Additional assessment visits beyond one per year per family/household require prior authorization.

7.8.B. FOLLOW-UP/MONITORING

Face-to-face follow-up/monitoring visits are to be billed using HCPCS code T1017 for an individual or family. For informational/reporting purposes, use modifier UN (two patients served), UP (three patients served), UQ (four patients served), UR (five patients served), or US (six or more patients served), and enter the Medicaid beneficiary ID numbers of the family members served during the follow-up visit in the claim notes.

Follow-up visits must last at least 30 minutes and ideally take place in the home or "home-like" environment but may be performed in the office. A maximum of five face-to face follow-up/monitoring visits per year per family/household is allowed. Additional follow-up visits beyond five per year per beneficiary require prior authorization.

2018-2021 Targeted Case Management Interview Responses

DEMOGRAPHIC INFORMATION

Do you live in Genesee County?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	No – Volunteered that she lives in Shiawassee County	No – Lives in Shiawassee	No
Greater Flint Health Coalition	Yes	Yes	N/A
	No	No	N/A
	N/A	N/A	No

Do you currently live in the City of Flint? Is that still true?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	No	No – Lives near Owosso	No
Greater Flint Health Coalition	No	No	N/A
	No	No	N/A
	N/A	N/A	No

Is the water considered safe to use at your current residence?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Yes. Although, the situation in Flint did cause Shiawassee County to check its water for high lead levels. None were found.	Yes	N/A
Greater Flint Health Coalition	Yes	Yes	N/A
	Yes	Yes	N/A
	N/A	N/A	N/A

Is the water considered safe to use at your workplace? Why or why not?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	No – Water in the workplace was tested and lead was found. Faucets were off limits for drinking or dishwashing. GHS installed special filtration system, provided refillable water bottles. They did their best to ensure employees had safe water.	No – Signs are posted near the faucets; may use sinks in bathrooms to wash but Culligan filtering system in the break room. Some staff contribute to a “water club;” others bring in their own bottled water. GHS is still going through the process to make water safe. Some water fountains are okay to use but there are very few. People still have apprehensions about that [the safety of water fountain supply] so they drink other water.	No – “I currently work in the City of Flint and due to previous lead contamination, the water is not safe”.
Greater Flint Health Coalition	No	No – City of Flint water is still not safe to drink. The GFHC building recommends not using water for drinking or cooking.	Yes

COORDINATOR CHARACTERISTICS

How long have you been employed with GFHC/GHS?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	~2 years	4 years	N/A
Greater Flint Health Coalition	3 years, 2 months	4 years, 2 months	N/A
	4 years	5 years	N/A
	N/A	N/A	N/A

What is your job title?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Family Services Clinical Therapist. Was a contracted therapist until she completed her Master of Social Work. Now title is FSC Clinician.	Clinical Coordinator (received a promotion.)	N/A
Greater Flint Health Coalition	Manager of Quality and Outcomes.	Manager of Operations for the Community Health Access Program.	N/A
	Senior Project Director Genesee CHAP Program and TCM Provider for Genesee Health System.	Senior Director for the Community Health Access Program	N/A
	N/A	N/A	Senior Director of the Community Health Access Program (CHAP)

Have you received any additional training, other than the initial training since the beginning of the waiver? What about since the last time we talked?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Yes – “Extensive training” is provided by Genesee Health System; 3 days, 8 hours each and ongoing. Curriculum included Lead Free Home, filtration systems and consumer education strategies and approaches.	Yes – Went to an infant mental health conference; annual CHM conference where many psychologists were on hand to field questions on behavioral health concerns related to lead exposure or other BH diagnosis.	No
Greater Flint Health Coalition	Yes	No additional formal training but have access to leadership at the state level for directing questions to and from and as a subcontractor to GHS.	Yes – ACES training and ongoing training

ASSESSMENT

Do you use a checklist or assessment tool to assess health risk? Are you still using this assessment tool?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Yes – “Water Psychosocial Assessment Tool” created by Elizabeth Birch (GHS director). Domains include mental health, medical, family history, education, safe water practices, nutrition. Following survey, goal setting and prioritization. Client sets personal goals, and the team helps client achieve them.	Still using the Water Psychosocial Assessment tool.	Uses the same tools.
Greater Flint Health Coalition	Yes – Application was developed and modified for this program to guide TCM delivery.	Social Determinants of Health (SDOH) screening tool, standardized. Family Supports Coordination assessment tool.	Uses the same tools.

Are there any risk assessment tools that you would find helpful, but are not currently using? Are you still using these methods? Have you added any new tools?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Uses: – Ages and States (ASQ) – Autism Brief – Trauma Screening Tool – Depression screening – ADHD – CTAC for <18 years of age – ACES for >18 years of age	Still using these. No others.	N/A
Greater Flint Health Coalition	What we have is meeting current needs. Looking into using ACES.	Yes. Possibly the ACES questionnaire and maybe PHQ-9 depression screening.	N/A

What other tools do you use to interact with your clients?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	None specified, but they do document interactions in case notes format.	Still making case notes (progress notes) to summarize the interaction with the beneficiary and resource needs and referrals.	N/A
Greater Flint Health Coalition	A plan of care is written for all; this is continually updated.	A plan of care is written for all; it is continually updated.	N/A

What kind of data entry system (electronic medical records) do you use? Are you still using this?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Uses an electronic record called CHIP. Does not know what the acronym stands for but knows that GHS purchased it and features of it are used throughout the organization in different ways.	Still using CHIP 2.0.	Still uses the same tools.
Greater Flint Health Coalition	APRICOT	Still using APRICOT.	Still using the APRICOT client management system

How is your assessment information entered into the computer system? Who enters the data? Who uses the entered data? Can a report be generated? Who uses the report?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	N/A	Information is entered into CHIP. The TCM Provider enters the data into CHIP, and she is a clinician. Reports can be generated by data analysis staff but she does not. Reports are used for tracking and grant-writing support purposes, among others she does not know.	“The medical clerk and data specialist”.
Greater Flint Health Coalition	N/A	Daily by the case manager shortly after the interview; within same day. Within 8-12 hours of the interview depending on when during the day it’s received.	The FSC Case Manager enters the assessment information directly into Apricot shortly after or while the interview is taking place over the phone. A report can be generated and is used by CHAP Staff.

When you need to offer a referral for eligible services, do you feel that there are sufficient resources with capacity to accommodate these referrals?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Yes, for now. But if an influx of them come in we may need another therapist. Her caseload right now is 86 clients and she is steadily busy.	Yes – Caseload is now estimated to be 97, some are sustaining from the original 86. Some get referred to a higher level of care such as to BH services for severely impaired or affected to case mgrs., psychiatrists, psychologists, not only due to lead exposure but sometimes for other BH concerns. This program is a low intensity program, 6 visits per year, so if need longer services these get referred on to higher level needing as many of 20 visits per month. Once successfully linked with another provider, she phases them out of her caseload. However, if there is a client who has multiple barriers, not necessarily all BH, she keeps them in her caseload for monitoring and support.	
Greater Flint Health Coalition	Sufficient resources for most things, but housing resources are deficient; clean water is a challenge. If <6 years old they cannot drink the tap water despite a filter.	Both state: Yes in general, however there is an inadequate number of housing resources within the community to accommodate the needs. Clients wait for affordable housing to become available.	N/A

How long does it take from the time you receive a referral for the TCM assessment to be administered?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	1-2 weeks. Most often this depends on family availability and convenience than for agency's appointment availability. Most are scheduled in 1 week or less. Intake evaluation appointment takes approximately 1-1 1/2	Service referrals are made immediately after the plan of care is formulated. Plan of care is formulated during the assessment process, so it is ready at the time the assessment process is completed.	One week or less
Greater Flint Health Coalition	Within 1-2 weeks of contact	Referrals to services are processed within 24-48 hours. On average about 2 weeks until referrals are enacted due to difficulty contacting the client.	One week or less

What methods do you use to initiate contact with a client?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Initial contact occurs with a medical clerk who schedules the interview with the TCM provider. Follow up appointment reminders and schedule changes are managed telephonically by the assigned "Family Navigator." This staff person helps the family navigate/obtain/remove barriers to scheduling and receiving services to which they have been referred by the TCM Provider. Typically, each child receives a total of 6 appointments for TCM: 1 intake assessment, and up to 5 targeted case management visits.	In person, telephone, and email. They ask and adhere to client preference. Shifted from the medical clerk scheduling to the family navigator doing the scheduling with the TCM Provider. Change was made because of their ability to repeat attempts is better given how busy the clerk is. Family Navigators do the outreach. Clerks receive the inbound calls and transfer to the family navigators for scheduling.	Uses in person, telephone, and email methods to initiate contact.
Greater Flint Health Coalition	In person, telephone, and email. Home visits are made by case managers, RN, SW, CHW.	In person, telephone, email, and texting. Emails to process things, but email and text require permissions. Facilitate referral communications.	Currently, contact through telephone and email but not in person.

On average, how many FME clients do you see per week? Has this increased or decreased since the last interview?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	N/A	It varies. Approx 15-18 contacts per week. This includes an entire family or household approach for many of the contact points.	8-10
Greater Flint Health Coalition	The TCM Provider sees 2 or three clients per day, on average 10-15 per week. Family navigators visit or interact with 10-15 clients per week. FSC services 5-6 clients per week. Total seen since program began is 37. If client requires FSC and is <6 years old, then GHS is supposed to refer them to GFHC also CHAP to address social determinants of health. Also receive client referrals from EBLL Management Program when EBLL services are completed. Then referred to this program for FSC.	About 20-25 per week.	Work with about 15 household enrolled in FSC per week.

SERVICE DELIVERY

Are the beneficiaries referred for TCM prioritized, triaged, or risk stratified for follow-up? Has this process changed since the last interview?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	A “motivational interviewing” approach is used during the initial assessment appointment to involve the patient in goal setting and provide prioritization guidance.	This is still true.	“They are triaged according to their needs/risks”.
Greater Flint Health Coalition	No formal triage or risk stratification. Program can accommodate all quickly.	At the TCM case manager’s discretion. Depends on urgency/need.	All clients referred for FSC are contacted within 48 hours of the referral. The TCM Case Manager uses her discretion to prioritize clients based on need and urgency. Urgent cases are addressed immediately.

Follow up to previous question. Describe the criteria/ how do you think of prioritization vs. stratification?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	States “as above”. Water supply safety is the first priority then individual BH health / learning needs follow. If situations like homelessness present, then these cases take priority.	Same as before.	N/A
Greater Flint Health Coalition	This is based on the number of referrals but no problem accommodating up to this point.	Within the database, there is urgency stratification. Stratification includes CPS, emergency shelter, food resource, safe water, other basic needs.	N/A

What are the top three services or referrals you help facilitate?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	N/A	#1 – Mental/ Behavioral Health These are also important and frequent: Scheduling appointments, Transportation Assistance, Lead Screening	Mental/Behavioral Health, Education, Housing
Greater Flint Health Coalition	N/A	#1 – Home Visiting: e.g. MIHP, NFP, Parents as Teachers, etc. Other: Now making many lead pipe replacement referrals/lead abatement referrals. Top 3 SDOH are food, transportation, childcare supplies e.g., diapers, formula, pack ‘n plays	
	N/A	– Lead Pipe assessment – Supply of filtered water – Mental/Behavioral Health Other: Education – Head start, Early On, GSRP Nutrition – WIC, Food Assistance, Food Pantries Housing	
			Education, nutrition, and housing

In your experience, the number of referrals for TCM services has been decreasing, steady, or increasing? Since the last interview, has this changed?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Steady	Increasing – Neuro developmental Center of Excellence is making a lot of referrals as a result of the battery of tests they administer to the clients and then refer to GHS. Flint registry makes a lot of referrals too.	Decreasing
Greater Flint Health Coalition	Decreasing	Increasing	Steady

Do you have a tracking tool or graph that shows the number of referrals since you started screening and referral services?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	N/A	No – but a data staff member probably has. Routine reports include track activities referral specifics and productivity/accountability reports.	N/A
Greater Flint Health Coalition	N/A	Yes – from the database.	N/A

CLIENT SERVICES

Do you feel that the scope of TCM services adequately meet the needs of your clients? Are there things you would like to change?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Yes – interviewee was emphatic on this point.	“I do!” Wishes GHS could have more than 5 per year after the additional assessment. Some with multiple needs could use far more sessions per months.	Would like “additional case management sessions added to the waiver”.
Greater Flint Health Coalition	Able to provide the services/community resources their clients need.	Yes	“We would love to serve more clients in need of TCM services. If children and families were automatically enrolled and referred to us, we could help more families in need”.

What are the barriers you face when working with FME enrollees to meet their needs?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	<p>Cannot reach client due to frequent phone # changes or transience.</p> <p>Usual reason given for refusing services is client perception that others are more in need and they don't want to take the resources needed by someone else.</p> <p>Access issues are addressed by meeting clients at locations where they are, e.g., their child's school or a local coffee shop or at client's home.</p> <p>Arrangements can be made to hold TCM intake assessments or do family support visits outside of usual office hours, but this flexibility is limited. This has needed to be done on rare occasions.</p>	No change	N/A
Greater Flint Health Coalition	<ul style="list-style-type: none"> - Cannot reach client - Client resists participation/referral - Relevant (or prevalent) needs not covered by coverage - Client cannot access referral provider because of: transportation, childcare, non-traditional hours <p>Sometimes the resource is not available or the client is put on a waiting list therefore not able to "follow through."</p>	If they can't reach the client (most common); if the client resists attempts to assist; if client cannot access due to transportation challenges. Staff say most commonly due to phone # changes so frequently.	Cannot reach clients.

Follow up question: Which barrier is the most common?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Inability to reach the client by telephone	Most common is inability to reach client by phone; either change phones (prepaid phones change frequently) or don't have one. Prepaid minutes are used up can be another problem.	N/A
Greater Flint Health Coalition	Transportation	Transportation	Cannot reach clients.

What percentage of time do you think your clients follow up with referral? (Sliding scale 0%-100%)

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	85-90%	90%	N/A
Greater Flint Health Coalition	65%. The remaining 35% have no documented outcome as of yet; still in process of obtaining the service.	50%	N/A

How satisfied do you think FME clients are with TCM?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Very Satisfied	Very satisfied – many favorable statements from service recipients. Clients refer friends and family. No formal satisfaction survey is done but just a conversation assurance for clinical purposes.	Very Satisfied
Greater Flint Health Coalition	Satisfied – no formal survey has been done	Staff say clients are very satisfied.	Satisfied

In your capacity as a TCM coordinator, what is going well with the process you use?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Most of all the best part is the client interaction. The fact that clients let us come into their lives and their homes.	Meeting people “where they’re at” and figuring out how to build on that. Working toward client goals. Client goals are the starting place to uplift the parents and help in any way they can to help them achieve. Not always limited to lead-specific goals. Also, there for the child through the parent. Pull the parent into the goals on the plan of care.	“Completing the assessment and identifying the client needs”.
Greater Flint Health Coalition	Infrastructure is in place; contract is in place; collaboration with State of Michigan Medicaid; clients accept services.	Comfortable with the process; staff flow is going well; struggle with the time and effort spent in trying to complete contact; plan of care process is smooth. Best example is by phone not face to face during COVID – phone contacts are more comfortable, efficient.	We have been successful creating internal referrals to TCM

In your capacity as a TCM coordinator, what is not going well with the process you use?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	<p>Client perception about time to put the plan into action. Delays are dependent on factors external to our own services so if this happens, we have very little impact on them. They do advocate to get the client needs met sooner if there is a need to do so.</p>	<p>Everything is finally the way we desired with the process. Gets frustrated when clients are complacent not wanting employment, wanting to keep social services such as Bridge Card forever. I want people to improve their financial / social situation.</p> <p>Staff frustration / self-determination are sometimes a problem. Intergenerational poverty.</p>	<p>“The referrals have slowed down and this is a bit concerning”.</p>
Greater Flint Health Coalition	<p>Very few referrals from GHS; cannot duplicate Medicaid services prior to referring to us. Authorization process is slow, and even if authorized, client is not referred.</p>	<p>Inconvenience for the client. Authorization process is 2 part. Part one is to determine if they are enrolled in the FME waiver, and Part 2 is if they are receiving other services from GHS. If GHS services are in place it prevents their ability to provide services. Cumbersome, and takes longer to get assistance for the client. Suggests making a phone contact for initial intake completion as an option.</p>	<p>N/A</p>

Is there anything else you would like to share about TCM regarding the coordination of care process you use?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	No	No	No
Greater Flint Health Coalition	Our program is consistent with our contract with MSA and successfully addresses patient needs. It is complex but successful.	There are two ways to make referrals; the other is to teach them self-sufficiency. Lots of effort goes into making the referrals but clients are not always open to learn how to refer themselves or seek services on their own.	Our process seems to be working well with our clients. We work with them as long as it takes to meet their needs if authorized to do so.

Is there anything else you would like to share about your experiences as a coordinator for TCM?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	Overall, it is a great experience. Honored to work with these families. Supervisor is great. Recommends and locates current, specific evaluation tools and referral resources.	No change	"I enjoy working with the clients and connecting them with necessary resources. This program has positively impacted families in the City of Flint."
Greater Flint Health Coalition	No	No	"It would be great if the authorization process for us to work with clients was more seamless. It would also be good if CHAP could verify enrollment in the Flint Waiver for clients on a larger scale".

Do you have any suggestions that you think could improve the process of FSC/TCM?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	<p>“Genesee County MDHHS case workers don’t seem familiar with this (waiver) benefit. DHS workers don’t seem to know that every child in the household can receive it. When they talk to a parent/guardian about one child that has the waiver, they don’t ask if there are others who also should be getting it in the household. During the intake interview for our services, parent/guardians sometimes say that when they asked their DHS Medicaid case worker about the benefit, they are told they don’t qualify. They seem surprised when they call us and find out that they do qualify. The MDHHS caseworkers need to be trained on this. There are a lot of them and maybe its just a problem with some. But I think MDHHS needs to look into it so that everybody is on the same page.”</p>	<p>This problem persists. She has been working with a contact at MDHHS to help with this problem. There has been some improvement but it is a constant problem. Most of the referrals do have the FME waiver.</p>	<p>No</p>
Greater Flint Health Coalition	<p>Community is not very assertive in making people aware that TCM services are available; Referral process has not worked out as envisioned or expected as far as GHS is concerned. Supposed to refer all children <6 years of age. FME authorization , community education processes are not very effective at this time. Effort in the beginning to automatically refer FME clients but as they renew the benefit, they might not be referred. Not all members in one family or household are receiving the waiver benefit. If Medicaid is renewed, the FME waiver is not always renewed.</p>	<p>Make telephonic outreach a standard rather than in person. More manageable, efficient.</p>	<p>No suggestions for improvement.</p>

COVID-19 QUESTIONS

Have you had any new clients screen positive for receipt of TCM services since April 2020 (beginning of Covid-19)?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	N/A	N/A	Yes
Greater Flint Health Coalition	N/A	N/A	Yes

Follow up: How many new clients have screened positive since then?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	N/A	N/A	"I am not sure".
Greater Flint Health Coalition	N/A	N/A	38

How has COVID-19 affected your work with TCM?

Participants	2018 Interview	2020 Interview	2021 Interview
Genesee Health System	N/A	<p>Clients have more needs now. Clients are cooperative and the resources are cooperative. She has been busier now.</p> <p>The number of referrals seems steady; increase time to find a resource / way to help the client. No services have been unable to offer.</p> <p>Tele-visits, fewer in person contacts. Video chat and facetime help.</p>	There has been a decrease in the number of referrals.
Greater Flint Health Coalition	N/A	<p>Telephone voice, not using video or facetime.</p> <p>Able to provide full scope of services with exception of home visiting. Telephonic, text, still conducting assessment, making plans of care and referrals. If we believe a home visit is needed, we put them on the list for a home visit, there is a wait list and review every 21 days and place another call at or before 21 day so we don't lose track of the client. Staff are notified of follow up through APRICOT. staff get notified.</p>	Uses telehealth. There is less/fewer contact with clinics.

MICHIGAN STATE UNIVERSITY

DETERMINED NOT "RESEARCH"

January 22, 2018

To: Kathleen Oberst

Re: **MSU Study ID:** STUDY00000227
Principal Investigator: Kathleen Oberst
Determination Date: 1/22/2018

Title: Flint Michigan Section 1115 Demonstration Program Evaluation

The activity described in this submission was determined not to meet the definition of "research" as defined by the U.S. Department of Health and Human Services (DHHS) regulations for the protection of human research subjects.

Definition of Research

For DHHS, "research" means "a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge. Activities which meet this definition constitute research for purposes of this policy, whether or not they are conducted or supported under a program which is considered research for other purposes. For example, some demonstration and service programs may include research activities." [45 CFR 46.102(d)]



**Office of
Regulatory
Affairs
Human Research
Protection Program**

4000 Collins Road
Suite 136
Lansing, MI 48910

517-355-2180
Fax: 517-432-4503
Email: irb@msu.edu
www.hrpp.msu.edu

Determination

This project is to conduct a program evaluation on the Medicaid Waiver that was authorized in response to the Flint water crisis. MDHHS requires an external program evaluation. The results will not be generalized beyond the target population in Flint.

Hence, the activity does not involve research.

Therefore, the federal regulations for the protection of human subjects would not apply to this project and Michigan State University (MSU) IRB approval is not needed to proceed. However, please note that while MSU IRB approval is not required, other federal, state, or local regulations or requirements or ethical or professional standards may still be applicable based on the activity.

Modifications: If any of the activities described in this submission change, please contact the IRB office as the activity may involve human subject research and require IRB approval. For example, this determination is not applicable to activities that may be regulated by U.S. Food & Drug Administration (FDA), such as those involving drugs, medical devices, human food additives, color additives, electronic products, or any other test articles regulated by the FDA.

Modifications to Project Funding: Changes in project funding may alter this determination. For example, MSU IRB review and approval is required if MSU receives an award through a grant, contract, or cooperative agreement directly from a federal agency, even where all non-exempt research involving human subjects are carried out by employees or agents of another institution.

For More Information: See HRPP Manual Section 4-3, Determination of Human Subject Research (available at <https://hrpp.msu.edu/msu-hrpp-manual-table-contents-expanded>).

Contact Information: If we can be of further assistance or if you have questions, please contact us at 517-355-2180 or via email at IRB@ora.msu.edu. Please visit hrpp.msu.edu to access the HRPP Manual, templates, etc.



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FLINT LEAD FREE

2017 REPORT

FLINT, MICHIGAN



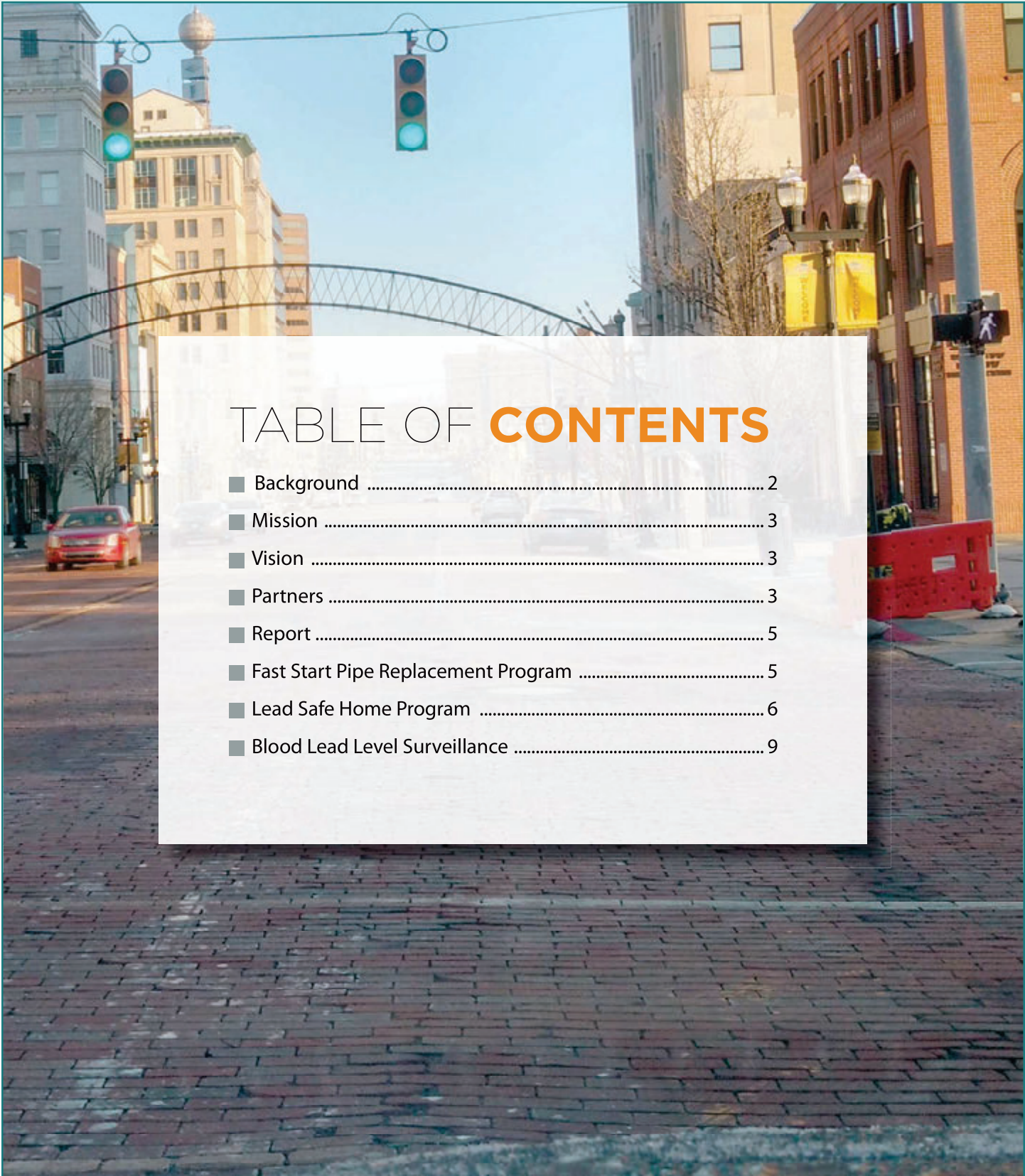


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Photo by Ebony Stith

BACKGROUND ON **FLINT LEAD FREE**

Originally known as the Lead Elimination Workgroup of the Flint Registry, Flint Lead Free is comprised of a diverse group of public, private, and non-profit members, stakeholders, and partners including residents, property managers, housing organizations, legal services, community organizations, foundations, and city/county/state government with the mission to eliminate lead exposure in Flint by 2022. Flint Lead Free serves as a clearinghouse of lead-related programming, education, and training for a variety of audiences such as residents, outreach workers, home visitors, construction workers, and Flint Registry staff. The program's primary prevention and data-driven focus seeks to identify lead risks and service gaps, strategically align resources, and determine cost-effectiveness, return on investment, and translatability of local lead elimination.

Flint is uniquely positioned to eliminate lead exposure because of a confluence of new programs that include lead service line removal, lead fixture replacement, primary prevention and enhanced elevated blood lead level home investigation and abatement, water testing, as well as

community-wide engagement and lead awareness.

With grant support to Michigan State University from the Centers for Disease Control and Prevention's (CDC) National Center for Environmental Health (NCEH) and Lead Poisoning Prevention and Environmental Health Tracking Branch, the Flint Registry contributes to lead elimination efforts by enrolling individuals exposed to the lead-contaminated Flint water, screening for ongoing environmental lead exposure via a survey of environmental risks, and connecting individuals to lead-mitigating services.

This annual report will highlight lead-related trends emphasizing primary prevention efforts currently underway in the City of Flint. Primary prevention refers to the elimination of lead exposure before a child is poisoned. Because there is no safe level of lead exposure and no available treatment, primary prevention is recommended as the intervention most beneficial to children and contributes most significantly to lifetime savings on healthcare and education costs.

Mission

To eliminate lead exposure in Flint, MI by 2022.

Vision

Through tracking and reporting on environmental lead risks, blood lead levels, environmental assessments, and interventions and by providing a clearinghouse of lead-related programming and education/training, Flint, MI will be a model lead-free city through the collaboration of community, agencies, and nonprofit groups.

Flint Lead Free Members

Flint Lead Free is a multidisciplinary group of partners from local, state, and national organizations. This diverse group of partners convenes regularly for strategic conversations related to efforts to eliminate lead exposure in Flint, share best practices, develop new partnerships and initiatives, and provide feedback to the Flint Registry.

- Altarum
- Black Millennials for Flint
- Center for Community Progress
- City of Flint
- Community Foundation of Greater Flint
- Flint Registry
- Flint resident/parent
- Gebrael Management
- Genesee County Community Action Resource Department
- Genesee County Habitat for Humanity
- Genesee County Health Department
- Genesee Health Systems
- Genesee Land Bank
- Greater Flint Health Coalition
- Legal Services of Eastern Michigan
- Local Initiatives Support Corporation
- Michigan Department of Health and Human Services, Lead Safe Homes Program & Child Lead Poisoning Prevention Program
- Michigan State University Extension
- Michigan State University Institute for Health Policy
- Michigan State University and Hurley Children's Hospital Pediatric Public Health Initiative
- University of Michigan, Child Health Evaluation and Research (CHEAR)

Leadership

A workgroup of the Flint Registry, Flint Lead Free is co-



Photo by Ebony Stith

chaired by Jenny LaChance, associate director of MSU-Hurley Pediatric Public Health Initiative, and Lydia Starrs, health systems navigator at Community Foundation of Greater Flint.

Flint Lead Free Annual Report

As Flint grows local capacity to increase primary prevention efforts, Flint Lead Free will continue to track, monitor, and report data from programs and services to reflect both progress and challenges and to drive programming.

The lead-related data below represent efforts from:

- Michigan Department of Environmental Quality City of Flint residential water sampling
- City of Flint FAST Start program.
- Michigan Department of Health and Human Services (MDHHS) Lead Safe Home Program
- MDHHS Childhood Lead Poisoning Prevention Program

This report is not inclusive of all lead-related activities currently taking place in Flint. Flint Lead Free will continue to engage partners working in primary prevention to obtain supplemental data for future reports – such as home demolitions, fixture replacements, soil testing, etc. The primary challenge to obtaining additional data is sharing with local organizations and partners how their work is or can be categorized as primary prevention. However, by continually engaging partners, Flint Lead Free is making intentional connections to strengthen collaboration, generate greater transparency, and increase access to services and information. Future reports also hope to include mapping to better visualize and target lead elimination effort.

Flint Residential Water Lead Testing Results: ≥10 ppb (parts per billion)

The data below reflects the total number of residential water tests with lead results equal to or above (≥)10 parts per billion. The results are from resident sampling kits distributed by Community Outreach Resident Education Program (CORE) and the City of Flint. Residents can request a sampling kit or pick up a kit at city hall. All results are posted online by the Michigan Department of Environmental Quality.¹

Flint water testing performed by the Virginia Tech Flint Water Study team can be found on flintwaterstudy.org.

Calendar Year	2013	2014	2015	2016	2017
Number tested			672	25,604	4,482
Number ≥10 ppb			77	2,948	267
Percent ≥10 ppb			11.5	11.5	6.0

Flint Lead Service Line Replacements

The mission of the Flint Action & Sustainability Team (FAST) Start program is to remove and replace lead and galvanized steel service lines leading to homes all over Flint. The City of Flint began the project in effort to replace services lines damaged during the Flint Water Crisis. Following the switch to the Flint River water was not treated with proper corrosion control, causing the protective lining in pipes to corrode and leach lead into the water. Phase I of FAST Start began in March 2016. FAST Start activity is reported by the City of Flint in phases as crews steadily work across the city to identify, remove, and replace lead and galvanized service lines. Service line replacement data below is reported by calendar year, with some overlap in lines replaced during phases I and II occurring over 2016 and 2017.



Photo by Ebony Stith

Calendar Year	2013	2014	2015	2016	2017
Number of Service Lines Replaced				644	5365

¹ Flint Water Results-Residential Sampling. (n.d.). Retrieved August 27, 2018, from https://www.michigan.gov/flintwater/0,6092,7-345-76292_76294_76297---,00.html

Lead Safe Home Program Overview

Deteriorated lead-based paint, lead in soil, lead in dust and lead in water can present lead hazards and a source of lead exposure. The Michigan Department of Health and Human Services (MDHHS) Lead Safe Home Program (LSHP) aids owner occupants and rental property owners in identifying lead-based paint, lead in soil or dust, and lead in water hazards within their home and provides resources to remediate the identified hazards. In 2016, the Centers for Medicare & Medicaid Services approved a five-year Michigan State Plan Amendment (SPA) for a Title XXI state-designed Health Services Initiative for expanded lead abatement activities in Flint. The SPA allows the MDHHS LSHP to expand eligibility and coverage for pregnant women and children, and focuses on abatement of all lead hazards in homes of Medicaid children and pregnant women.

Purpose of Tables

This set of tables provides information about activities conducted by the MDHHS-LSHP in the city of Flint by calendar year regardless of funding source. This data represents lead identification and abatement activities conducted on city of Flint homes in a historical manner. LSHP cases are completed over a period of 12-18 months and these data points represent the activities that occurred during this snapshot in time.



Photo courtesy of iStockphotos

Interpretation of Tables

The LSHP process is lengthy given its complexity and the period from application to completed abatement may span one or more years. Depending on factors including when it was received, applications may not move forward to environmental investigation or abatement until the following or subsequent years. Therefore, these tables should not be used to demonstrate the progress of a case over one calendar year. Data users should take caution when associating one variable with another. Summation of the count across years provides the reader with a total number of activities provided for the period. Summation of the count within a year does not provide conclusive data as one household can receive multiple services in a given year.

Environmental Investigations

The purpose of an Environmental Investigation (EI) is to determine the existence of a lead hazard at the subject property and to determine the location, type, and severity of existing or potential health hazards associated with exposures to lead. A lead-based paint hazard is any condition that causes exposure to lead from dust-lead hazards, soil-lead hazards, lead-paint or lead in water.

Between 2016-2017, the LSHP was completing EIs on residential properties without an application for the LSHP. Therefore, during this time, there were more EIs than applications received. Beginning in 2017, a completed and approved LSHP application is required for the EI service.

The data below represents the number of EIs conducted in the city of Flint, the number of these EIs completed on a home housing a child with a blood lead level ≥ 5 micrograms per deciliter ($\mu\text{g}/\text{dL}$), the number EIs completed identifying any type of lead hazard and the type of lead hazard identified. The types of hazard identified provide a breakdown of the number of homes identified with the specific lead hazard.

Calendar Year	2013	2014	2015	2016	2017
1. Environmental Investigations completed	0	0	15	141	259
1a. Environmental Investigation completed on homes with Child with blood lead level (BLL) ≥ 5µg/dL	0	0	13	117	62
2. Environmental Investigations identifying any type of lead hazard	0	0	15	116	206
2a. Paint Hazard¹	0	0	14	111	199
2b. Soil Hazard²	0	0	5	33	33
2c. Dust Hazard³	0	0	14	100	180
2d. Water Hazard⁴	0	0	2	19	97

¹ A lead-based paint hazard is defined as any housing component identified by approved lead paint analysis as containing lead paint in deteriorated condition or designated as friction/impact surfaces.

² A soil hazard is defined by Housing and Urban Development (HUD) as any bare soil area accessible to and frequented by children that test above standard protocol measures (below), including foundation drip line and child play areas: Dripline 1,200 ppm, Child Play Area 400 ppm

³ A dust hazard is defined a measurable sample of lead in house dust above the standard protocol measures: Floors ≥ 10 µg/ft² Window Sills ≥ 100 µg/ft² and Window Troughs ≥ 100 µg/ft²

⁴ A lead in water hazard is defined as a measurable sample of lead present in water from the faucets, plumbing materials or service lines within a home, above the standard protocol measure of 15 ppb.

LSHP Applications for City of Flint Households

Except for the years 2016-2017, prior to providing abatement services on a home, a property owner and/or occupant must first submit a LSHP application and that application must be received by the LSHP. This application collects data necessary to determine eligibility of a household for the LSHP. The LSHP then aids owner occupants and rental property owners in identifying lead hazards within their home and provides resources to remediate the identified hazards.

The data below represents the number of LSHP applications received, the number of LSHP applications approved and the number of LSHP applications ineligible. In some instances, the LSHP application could be received in a previous year and approved in the following year.



Photo courtesy of iStockphotos

An application may be ineligible for services if that the household did not meet eligibility requirements as outlined in LSHP policy. A household is eligible for re-application if the ineligibility factor is resolved or changed. Reasons for ineligibility may include the household being over income or not enrolled in Medicaid, failure to complete application or provide necessary documentation after several attempts by LSHP staff, home in a condition which reflects inhabitability or being structurally unsound or failure of applicant to return contact to LSHP staff for scheduling.

Calendar Year	2013	2014	2015	2016	2017
1. Applications received for city of Flint Homes	2	17	16	95	360
2. Applications approved for city of Flint Homes	0	11	14	82	283
3. Applications ineligible for city of Flint Homes	2	6	2	13	77

The data below represents the number of applications received from homes occupied by a child with a BLL > 5µg/dL as well as individuals residing in a city of flint home where a LSHP has been submitted including number of children under 6 years of age, number of children under 6 years of age with a BLL > 5 µg/dL and number of pregnant women.

Calendar Year	2013	2014	2015	2016	2017
1. Applications received for city of Flint Homes occupied by at least one child with BLL > 5u/dL	2	3	8	26	14
2. Number of children under 6 years of age residing in city of Flint homes with submitted LSHP application	2	15	21	114	179
3. Number of children 6 years to 17 years of age residing in city of Flint homes with submitted LSHP application	1	9	12	84	341
4. Number of children under 6 years of age with BLL > 5µg/dL residing in city of Flint homes with submitted LSHP application	2	4	11	32	19
5. Number of pregnant women residing in city of Flint homes with submitted LSHP application	0	3	3	6	4

LSHP Abatements

The LSHP provides lead abatement activities on households in the city of Flint. These abatement activities are completed to properly encapsulate, enclose, remove and/or replace identified lead hazards. An approved LSHP application is required before abatement work can take place.

The data below represents the number of LSHP abatements complete and the number of LSHP abatements in progress during the referenced year. LSHP abatements in progress is defined as those units where lead hazards have been identified, a LSHP application received and approved, the project bid and awarded to a lead contractor, but work has not yet been completed. In many instances, the LSHP application could be received in a previous year and abatement not completed until the following year.

Calendar Year	2013	2014	2015	2016	2017
1. Abatements completed	0	5	7	43	51
2. Abatements in progress	0	0	0	3	57



Photo courtesy of iStockphotos

Blood Lead Levels for Children Under 6 Years of Age residing in Flint - 2013-2017

Child blood lead testing in the State of Michigan is reported to the MDHHS Children’s Lead Poisoning Prevention Program (CLPPPP). They are responsible for providing:

- Blood lead surveillance, data, and reports
- Lead poisoning education and outreach
- Health services for children with elevated blood lead levels
- Health services for children at risk of lead poisoning
- Funding to local health departments for Elevated Blood Lead Level (EBLL) nurse case management

Since May 1, 2016, children in Genesee County with a Blood Lead Level (BLL) at or greater than 5 µg/dL have been referred to the Children’s Healthcare Access Program EBLL Nurse Case Management program managed by the Greater Flint Health Coalition. The goal of EBLL Nurse Case Management Services is to bring every child’s venous blood lead level below 5 µg/dL and prevent future EBLLs by overseeing the reduction or elimination of sources of lead (or potential sources of lead) in the child’s environment. Nurse Case Management services support the child’s continued health and safety, connects them with environmental, social, and medical services, and ensures coordination with their medical home and Medicaid Health Plan (as applicable).

Interpretation of Blood Lead Level Testing

Blood lead testing of children has been traditionally used as a detector of environmental contamination. High risk children are routinely tested at 1 and 2 years of age during well-child doctor visits. These are the ages when children developmentally have strong hand to mouth behaviors and are most at risk for household lead exposure (paint, dust, etc). High risk is designated by the CDC and American Academy of Pediatrics and includes risk factors such as age of home, Medicaid status, parental hobbies/occupation, etc. Since the recommendation for blood testing is not universal and must be determined by an algorithm of risk factors, blood lead testing rates are low and only capture a small segment of the population.

Blood lead testing only reflects recent and/or ongoing exposure to lead. With a short detection window in blood (half life approx. 28 days), blood lead testing does not capture historic and/or cumulative lead exposure. In addition, blood lead surveillance programs (performed at the routine ages of 1 and 2 years) do not adequately reflect lead in water exposure which burdens a younger and more developmentally vulnerable population.

Of note, following the widespread recognition of the Flint Water Crisis, there was expanded testing for blood lead levels (see increase in number of children tested in 2016). Although more children were noted to have BLLs >5 and >10 µg/dL, the percent decreased because of the increased denominator.

Calendar Year	2013	2014	2015	2016	2017
Number tested	3504	3500	3802	7397	3486
Number ≥5 µg/dL	103	129	113	178	95
Percent ≥5 µg/dL	2.94	3.69	2.97	2.41	2.73
Number ≥10 µg/dL	17	20	22	40	21
Percent ≥10 µg/dL	0.49	0.57	0.58	0.54	0.60



Photo by Ebony Stith

Next Steps

Over the next year, Flint Lead Free will continue to identify and engage relevant stakeholders to ensure all the appropriate voices are included in strategic conversations. Flint Lead Free will also continue to track and update primary prevention programs and services, lead elimination data, and lead training opportunities. Future reports will include new lead elimination data sources, and in partnership with Altarum, Flint Lead Free will publish an analysis of the impact of primary prevention in Flint including a cost benefit analysis related to primary prevention efforts underway, including impact on workforce development. It is our hope this annual report will reflect the widespread community efforts to reduce lead exposure, share progress made from new investments and strategic partnerships, demonstrate the positive impact on the health of Flint kids and families, and highlight the amazing work of partners.



Photo by Mike Naddeo

ACKNOWLEDGMENTS

The Flint Registry extends our appreciation to the members of Flint Lead Free and the Annual Report Subcommittee for their feedback and support in the development of this report.

Annual Report Subcommittee Members

- **Dr. Mona Hanna-Attisha**, associate professor of pediatrics at Michigan State University College of Human Medicine and director of MSU-Hurley Children's Hospital Pediatric Public Health Initiative
- **Kristine Judd-Tuinier**, Michigan Department of Health and Human Services
- **Jenny LaChance**, MSU-Hurley Children's Hospital Pediatric Public Health Initiative
- **Susan Schenberger**, Greater Flint Health Coalition
- **Heather Shurter**, Greater Flint Health Coalition
- **Lydia Starrs**, Community Foundation of Greater Flint

Primary Authors

- **Dr. Mona Hanna-Attisha**, associate professor of pediatrics at Michigan State University College of Human Medicine and director of MSU-Hurley Children's Hospital Pediatric Public Health Initiative
- **Jenny LaChance**, MSU-Hurley Children's Hospital Pediatric Public Health Initiative
- **Lydia Starrs**, Community Foundation of Greater Flint

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Special thank you

- **Ebony Stith** for report graphic design, photography and production.
- **Carin Speidel** for coordinating information and data explanations from Michigan Department of Health and Human Services

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FLINT LEAD FREE

DATA TRENDS & MULTI-SECTOR COLLABORATION

2021 REPORT



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INTRODUCTION

BACKGROUND ON **FLINT LEAD FREE**

Founded in 2017, **Flint Lead Free** is comprised of a diverse group of public, private, and non-profit members, stakeholders, and partners including residents, property managers, housing organizations, legal services, community organizations, foundations, and city/county/state government with the mission to eliminate lead exposure in Flint by 2022. **Flint Lead Free** serves as a clearinghouse of lead-related programming, education, and training for a variety of audiences such as residents, outreach workers, home visitors, construction workers, and Flint Registry staff. The program's primary prevention and data-driven focus seeks to identify lead risks and service gaps, strategically align resources, and determine cost-effectiveness, return on investment, and translatability of local lead elimination.

Primary prevention refers to the elimination of lead exposure before a child is poisoned. Because there is no safe level of lead exposure and no available treatment, primary prevention is the recommended intervention and contributes most significantly to lifetime savings on societal, healthcare, and education costs.

Flint is uniquely positioned to eliminate lead exposure because of a confluence of programs that include lead service line removal, lead fixture replacement, primary prevention and enhanced elevated blood lead level home investigation and abatement, water testing, as well as community-wide engagement and lead awareness.

Mission

To eliminate lead exposure in Flint, MI by 2022.

Vision

Through tracking and reporting on environmental lead risks, blood lead levels, environmental assessments, and interventions and by providing a clearinghouse of lead-related programming and education/training, Flint, MI will be a *model lead-free city* through the collaboration of community, agencies, and nonprofit groups.

Leadership & Flint Registry

A workgroup of the Flint Registry, Flint Lead Free is co-chaired by Jenny LaChance, associate director of MSU-Hurley Pediatric Public Health Initiative, and Lydia Starrs, Program Offer at the Community Foundation of Greater Flint.

With grant support to Michigan State University from the Centers for Disease Control and Prevention's (CDC) National Center for Environmental Health (NCEH) and Lead Poisoning Prevention and Environmental Health Tracking Branch, the Flint Registry contributes to lead elimination efforts by enrolling individuals exposed to the lead-contaminated Flint water, screening for ongoing environmental lead exposure via a survey of environmental risks, and connecting individuals to lead-mitigating services.

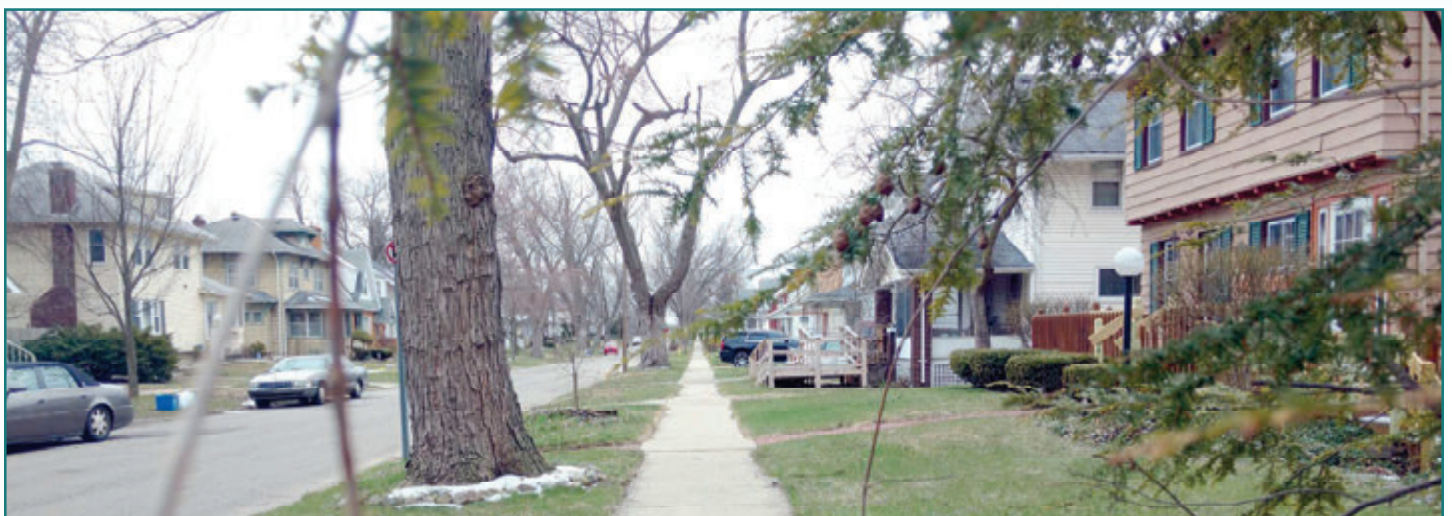


Photo by Ebony Stith/ Michigan State University



Photo by Ebony Stith / Michigan State University

Flint Lead Free Members

Flint Lead Free is a multidisciplinary group of partners from local, state, and national organizations. This diverse group of partners convenes regularly for strategic conversations related to efforts to eliminate lead exposure in Flint, share best practices, develop new partnerships and initiatives, and provide feedback to the Flint Registry.

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- Center for Community Progress
- City of Flint
- Community Foundation of Greater Flint
- Flint Registry
- Flint residents/parents
- Genesee County Habitat for Humanity
- Genesee County Health Department
- Genesee County Land Bank
- Genesee Health System
- Greater Flint Health Coalition, Elevated Blood Lead Level Nurse Case Management Program
- Legal Services of Eastern Michigan
- Local Initiatives Support Corporation
- Michigan Department of Health and Human Services, Lead Safe Homes Program & Child Lead Poisoning Prevention Program
- Michigan State University Institute for Health Policy
- Michigan State University and Hurley Children's Hospital Pediatric Public Health Initiative

Flint Lead Free Report

Flint Lead Free creates a periodic report that highlights lead-related trends emphasizing primary prevention efforts currently underway in the City of Flint. As Flint grows local capacity to increase primary prevention efforts, **Flint Lead Free** tracks, monitors, and reports data from programs and services to reflect both progress and challenges and to drive programming.

It is our hope that this 2021 report will build on the last Flint Lead Free [report released](https://www.flintregistry.org/flint-lead-free/) in 2018 (<https://www.flintregistry.org/flint-lead-free/>) and reflect the widespread community efforts to reduce lead exposure, share progress made from new investments and strategic partnerships, demonstrate the positive impact of lead elimination, and highlight the amazing work of partners.

This report is not inclusive of all lead-related activities currently taking place in Flint, and due to the time lag of collecting complete data, predominantly reflects trended information up to the end of 2019.

By continually engaging partners, **Flint Lead Free** is making intentional connections to strengthen collaboration, generate greater transparency, and increase access to services and information.

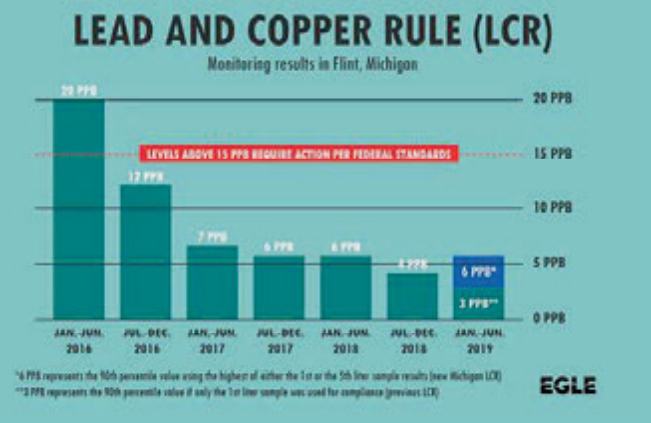


LEAD IN THE ENVIRONMENT: IDENTIFICATION & REMOVAL

Flint Lead in Water Levels

Recognizing no safe level of lead, the Environmental Protection Agency’s Maximum Contaminant Level Goal for lead in water is set at a non-enforceable 0 ppb. The non-health-based action level for a water system is 15 ppb, and the action level for bottled water as set by the Food and Drug Administration is 5 ppb.

Flint undergoes Lead and Copper Rule (LCR) compliance testing during six-month intervals. Below figure from Michigan Department of Environment, Great Lakes, and Energy notes Flint’s LCR monitoring results from 2016 to 2019. Beginning in 2019, LCR monitoring was performed under the strengthened Michigan LCR rule which requires a 5th liter sample to better detect the potential contribution of lead release from lead service lines. More information at www.michigan.gov/flintwater and current LCR results at www.michigan.gov/mileadsafe.



The data below reflect the total number of residential water tests with lead results equal to or above 10 parts per billion, consistent with the previous Flint Lead Free report. The results are from resident sampling kits distributed by the City of Flint. With a dramatic reduction of resources dedicated to water test

kit distribution, reduction in locations for test kit pick-up, and no ongoing communication campaign to encourage testing water, the overall number of residential water tests have steadily dropped. All results are posted online by the Michigan Department of Environment, Great Lakes, and Energy.

Calendar Year	2013	2014	2015	2016	2017	2018	2019
Number tested			672	25,604	4,482	1,337	431
Number ≥10 ppb			77	2,948	267	33	13
Percent ≥10 ppb			11.5	11.5	6.0	2.4	3.0

Flint Lead Service Line Replacements

As a result of a 2017 settlement agreement, Flint began an effort to replace service lines damaged during the Flint water crisis. The mission of the program is to remove and replace lead and galvanized steel service lines. Per the settlement agreement, the pipe replacement program was to be completed by early 2020. Flint residents must opt-in to the service line replacement program by completing a form and providing consent for contractors to inspect the line entering their home. Activity is reported by the City of Flint in phases as crews steadily work across the city to identify, remove, and replace lead and galvanized service lines. Recent data reporting from the City of Flint (as of August 13, 2020) shows a total of approximately 25,935

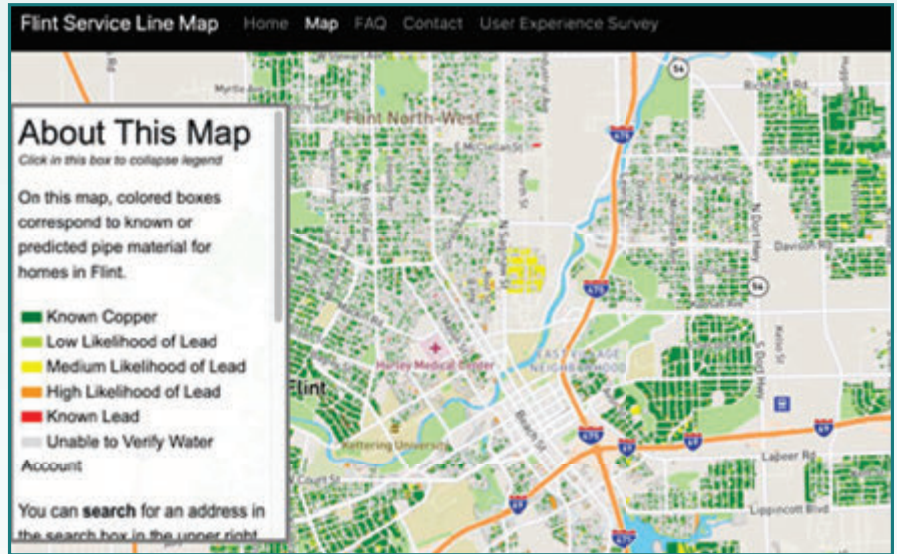
excavations at replacement eligible homes and approximately 9,695 lead or galvanized steel service lines replaced. According to the city, 172 residents have expressly declined to have their service lines inspected or replaced, and 780 residents have not responded to the City’s request for permission to conduct a service line inspection or replacement. The City estimates that about 4,400 service lines at replacement eligible homes remain to be excavated. As the residential pipe replacement concludes, the City of Flint and local crews are gearing up for the next phase which will assess approximately 1,500 commercial properties for lead or galvanized pipes, for replacement by 2024. Service line replacement data below are reported by calendar year, with some overlap in lines replaced during phases I and II occurring over 2016 and 2017.

Calendar Year	2013	2014	2015	2016	2017	2018	2019
Number of Service Lines Replaced				644	5365	1615	1637

Lead Service Line Data Sharing: Flint Service Line Map

As the City of Flint works to complete the pipe replacement project by the end of 2020, [BlueConduit](#) and the [Natural Resources Defense Council](#) (NRDC) released the [Flint Service Line Map](#), an interactive tool that allows residents to examine residential water service line materials and predictions across Flint.

The information represented on the map came from the City of Flint’s inspection of thousands of water pipes since 2016 and is updated as the City reports new data. For homes where the City has not verified the pipe material, the map displays the results of BlueConduit’s home-by-home predictive model, a mathematical model used in decision-making by legal teams, the City Council, and the City’s pipe replacement program to target homes at highest risk for lead service lines. The publication of the map makes the model predictions for the risk of lead pipes at each home with a verified water account available to the general public for the first time.



The map is about more than just communicating water pipe material information to the people of Flint; it is about making sure that that information is actionable. To that end, community feedback was integrated throughout the development of the map to ensure that the map reflected the needs of Flint residents. The map was built to be user-friendly and accessible to people with diverse abilities and needs. Ongoing collection of [feedback](#) and updates to the map website ensures data is transparent and useful. As pipe replacement continues, the City of Flint is checking service line information against the map and providing additional details to BlueConduit to update the map with the newest data.

The Flint Service Line Map empowers residents with information about the status of the pipe replacement project at their address, what they can do to get their line material confirmed and/or replaced, and steps they can take to reduce lead exposure. The Flint Water Service Line map clearly communicates the water pipe materials to Flint residents, giving the people of Flint a powerful tool to help them advocate for safer drinking water infrastructure.

Genesee County Land Bank Authority Demolition Data

In 2014 the Genesee County Land Bank Authority received Hardest Hit Funding to demolish more than 4,700 blighted or abandoned properties in Flint and Genesee County. Flint housing stock is predominantly pre-1978 and while not a requirement under the Lead Renovation, Repair, and Painting Rule, the Land Bank follows the recommended guidelines for Flint homes identified for demolition to be removed using lead safe demo practices that mitigate lead exposure to workers, surrounding properties, and residents. The following table details, by fiscal year, the number of houses demolished in Flint.

Fiscal Year (October 1 thru September 30)	2013	2014	2015	2016	2017	2018	2019
Number Demolished	496	296	132	352	546	556	1030

Genesee County Habitat for Humanity Home Repair Lead Interventions

Since 2015 Genesee County Habitat for Humanity (Habitat) has been helping Flint families address dangerous conditions in their homes via their Home Repair Program, ensuring stability and health through housing interventions. Repairs eligible include roof repair/replacement, structural damage, porch repair, electric, plumbing, HVAC, handicap accessibility, siding, exterior paint, weatherization, or energy efficiency. Depending on the needs of the household, numerous repair program interventions can potentially bring about the identification of lead hazards internally or externally. Lead safe work practices require Habitat to complete repair projects in a way that protects the health of residents and Habitat is committed to resolving the lead risk exposure through mitigation and abatement. A strong partner of the Lead Safe Home Program (further described in this report), Habitat partners with them to identify opportunities to leverage funding resources

when lead mitigation and abatement is required. When a resident applies for the Home Repair Program, Habitat reviews the applicant circumstances and makes recommendations for other programs they may qualify for, including the Lead Safe Home Program. Once the lead inspection has been completed, Habitat fills gaps by addressing housing issues that cannot be corrected through Lead Safe Home Program and writes specifications around these components—allowing Habitat to stretch available repair funding further, while offering homeowners’ families the health and safety benefit of lead remediation services. In partnership with United Way, Habitat began distributing point of use (faucet), pitcher, and shower filters and cartridges in response to the water crisis in Flint. These filter distributions are part of a wider community distribution of filter resources for Flint families to help protect them from lead exposure in their water. The data table below reflects lead mitigation interventions across a variety of housing programs provided by Habitat between 2015 and 2019.

Calendar Year	2015	2016	2017	2018	2019
Homes Repaired in Partnership with MDHHS Lead Safe Home Program	0	0	4	9	3
Reverse Osmoses System	5	35	18	18	0
3M Filter	0	0	157	0	0
Faucets	1	3	165	32	0
Faucet Filters	0	0	29	29	463
Faucet Cartridges	0	0	0	0	964
Pitcher Filter	0	0	1198	0	51
Pitcher Cartridge	0	0	0	0	102
Shower Head	0	0	52	5	0
Shower Filter	0	0	4211	1927	0
Shower Filter Cartridge	0	0	2145	9146	6216
Water Heater (new)	1	9	59	18	0
Water Heater (flush)	0	0	10	0	0
Boiler (new)	0	0	1	0	0
Porch Repair	4	10	8	8	3
Windows Replacement	16	240	20	103	45
Doors Replacement	0	13	7	10	0
Siding Repair/Replacement	0	7	0	3	2
Fascia Repair/Replacement	0	6	2	3	2
Soffit Repair/Replacement	0	4	2	3	1

Lead Safe Home Program Overview

The Michigan Department of Health and Human Services (MDHHS) Lead Safe Home Program (LSHP) aids owner occupants and rental property owners in identifying lead-based paint, lead in soil or dust, and lead in water hazards within their home and provides resources to remediate the identified hazards. In 2016, the Centers for Medicare & Medicaid Services approved a five-year Michigan State Plan Amendment (SPA) for a Title XXI state-designed Health Services Initiative for expanded lead abatement activities in Flint. The SPA allows the MDHHS LSHP to expand eligibility and coverage for pregnant women and children and focuses on abatement of all lead hazards in homes of Medicaid children and pregnant women.

Community Education & Outreach

Lead Safe Home Program Engagement through Genesee Health System Community Health Worker Project

The Genesee Health System (GHS) is contracted through the MDHHS Healthy Homes Section to provide outreach services through a network of Community Health Workers following a documented engagement protocol to Medicaid households in Flint, Michigan, eligible for Lead Safe Home Program (LSHP) Services through the Michigan Child Health Insurance Program Health Services Initiative. The purpose of this project is to maximize the number of children less than nineteen years of age and pregnant women and their unborn babies protected from lead poisoning, and the number of housing units where lead hazards are controlled through increased enrollment in the LSHP. The LSHP, through the Medical Services Administration, provides a list monthly of Medicaid enrolled individuals residing in the city of Flint to GHS for outreach and engagement.

GHS LSHP Outreach and Application Support

The following data represents the number of households referred to Genesee Health System (GHS) for engagement into to the Lead Safe Home Program (LSHP) and number of LSHP applications generated by GHS for enrollment. For these applications, GHS had a direct hand in every step of the submission process, which drastically increased the completion success rate.

	2017	2018	2019
Number of Individuals Successfully Contacted	2	1,299	645
Number of Applications Provided by GHS ¹	2	729	557
Number of Applications Received by LSHP ²	2	469	182
Number of Medicaid households referred to GHS for engagement in LSHP	*	1,891	1,340
Application Completion Rate	100%	36%	28%

¹GHS total applications provided to residents which may or may not result in a completed and submitted application to LSHP

²Applications Received by LSHP refers to total applications received by all means of submission and referral

*Data not collected.

Purpose of Tables

This set of tables provides information about activities conducted by the MDHHS-LSHP in the city of Flint by calendar year, through 2019, regardless of funding source. These data represent lead identification and abatement activities conducted on city of Flint homes in a historical manner. LSHP cases are completed over a period of 12-18 months and these data points represent the activities that occurred during this snapshot in time.

Interpretation of Tables

The LSHP process is lengthy given its complexity and the period from application to completed abatement may span one or more years. Depending on factors including when it was received, applications may not move forward to environmental investigation or abatement until the following or subsequent years. Therefore, these tables should not be used to demonstrate the progress of a case over one calendar year. Data users should take caution when associating

one variable with another. Summation of the count across years provides the reader with a total number of activities provided for the period. Summation of the count within a year does not provide conclusive data as one household can receive multiple services in a given year.

Environmental Investigations

The purpose of an Environmental Investigation (EI) is to determine the existence of a lead hazard at the subject property and to determine the location, type, and severity of existing or potential health hazards associated with exposures to lead. A lead-based paint hazard is any condition that causes exposure to lead from dust-lead hazards, soil-lead hazards, lead-paint or lead in water.

Between 2016-2017, the LSHP was completing EIs on residential properties without an application for the LSHP. Therefore, during this time, there were more EIs than applications received. Beginning in 2017, a completed and approved LSHP application is required for the EI service.

The data in the following table represent the number of EIs conducted in the city of Flint, the number of these EIs completed on a home housing a child with a blood lead level \geq



Photo courtesy of iStockphotos

5 μ g/dL, the number EIs completed identifying any type of lead hazard and the type of lead hazard identified. The types of hazard identified provide a breakdown of the number of homes identified with the specific lead hazard.

In some cases, specific to homes occupied or visited by children with elevated blood lead levels, the environmental investigator will identify additional hazards not specifically linked to the home structure itself. These hazards could include jewelry, cosmetics, spices, toys, furniture and hobbies or jobs, and these data are not collected in aggregate form.

Calendar Year	2013	2014	2015	2016	2017	2018	2019
1. Environmental Investigations completed	0	0	15	141	259	340	194
1a. Environmental Investigation completed on homes with Child with BLL \geq 5 μ g/dL	0	0	13	117	62	8	6
2. Environmental Investigations identifying any type of lead hazard	0	0	15 (100%)	116 (82%)	206 (80%)	321 (94%)	189 (97%)
2a. Paint Hazard ¹	0	0	14	111	199	294	176
2b. Soil Hazard ²	0	0	5	33	33	44	14
2c. Dust Hazard ³	0	0	14	100	180	261	156
2d. Water Hazard ⁴	0	0	2	19	97	102	40

¹ A lead-based paint hazard is defined as any housing component identified by approved lead paint analysis as containing lead paint in deteriorated condition or designated as friction/impact surfaces.

² A soil hazard is defined by Housing and Urban Development (HUD) as any bare soil area accessible to and frequented by children that test above standard protocol measures (below), including foundation drip line and child play areas: Dripline 1,200 ppm, Child Play Area 400 ppm

³ A dust hazard is defined a measurable sample of lead in house dust above the standard protocol measures: Floors \geq 10 μ g/ft² Window Sills \geq 100 μ g/ft² and Window Troughs \geq 100 μ g/ft²

⁴ A lead in water hazard is defined as a measurable sample of lead present in water from the faucets, plumbing materials or service lines within a home, above the standard protocol measure of 15 ppb.

LSHP Applications for City of Flint Households

Except for the years 2016-2017, prior to providing abatement services on a home, a property owner and/or occupant must first submit a LSHP application and that application must be received by the LSHP. This application collects data necessary to determine eligibility of a household for the LSHP. If eligible, the LSHP then aids owner occupants and rental property owners in identifying lead hazards within their home and provides resources to remediate the identified hazards.

The data in the following table represent the number of LSHP applications received, the number of LSHP applications approved and the number of LSHP applications ineligible. In some instances, the LSHP application could be received in a previous year and approved in the following year.

An application may be ineligible for services if that the household did not meet eligibility requirements as outlined in LSHP policy. A household is eligible for re-application if the ineligibility factor is resolved or changed. Reasons for ineligibility may include the household being over income or not enrolled in Medicaid, failure to complete application or provide necessary documentation after several attempts by LSHP staff, home in a condition which reflects inhabitability or being structurally unsound or failure of applicant to return contact to LSHP staff for scheduling.

Calendar Year	2013	2014	2015	2016	2017	2018	2019
1. Applications received for city of Flint Homes	2	17	16	95	360	726	441
2. Applications approved for city of Flint Homes	0	11	14	82	283	350	287
3. Applications ineligible for city of Flint Homes	2	6	2	13	77	376	154

The data below represent the number of applications received from homes occupied by a child with a blood lead level $\geq 5\mu\text{g}/\text{dL}$ as well as individuals residing in a city of Flint home where a LSHP has been submitted including number of children under 6 years of age, number of children under 6 years of age with a blood lead level $\geq 5\mu\text{g}/\text{dL}$ and number of pregnant women.

Calendar Year	2013	2014	2015	2016	2017	2018	2019
1. Applications received for city of Flint Homes occupied by at least one child with BLL $\geq 5\mu\text{g}/\text{dL}$	2	3	8	26	14	13	16
2. Number of children under 6 years of age residing in city of Flint homes with submitted LSHP application	2	15	21	114	179	361	277
3. Number of children 6 years to 17 years of age residing in city of Flint homes with submitted LSHP application	1	9	12	84	341	574	450
4. Number of children under 6 years of age with BLL $\geq 5\mu\text{g}/\text{dL}$ residing in city of Flint homes with submitted LSHP application	2	4	11	32	19	18	20
5. Number of pregnant women residing in city of Flint homes with submitted LSHP application	0	3	3	6	4	6	10

LSHP Abatements

The LSHP provides lead abatement activities on households in the city of Flint. These abatement activities are completed to properly encapsulate, enclose, remove and/or replace identified lead hazards. An approved LSHP application is required before abatement work can take place.

The data below represent the number of LSHP abatements complete and the number of LSHP abatements in progress during the referenced year. LSHP abatements in progress is defined as those units where lead hazards have been identified, a LSHP application received and approved, the project bid and awarded to a lead contractor, but work has not yet been completed. In many instances, the LSHP application could be received in a previous year and abatement not completed until the following year.

Calendar Year	2013	2014	2015	2016	2017	2018	2019
1. Abatements completed	0	5	7	43	51	112	153
2. Abatements in progress	0	0	0	3	57	47	44

Lead Workforce Development Data

Lead Training, Accreditation and Workforce Development

The Michigan Department of Health and Human Services (MDHHS), Healthy Homes Section is the EPA-authorized entity for the state of Michigan to administer lead training, accreditation and enforcement for lead training providers, lead professionals and firms. Additionally, the Healthy Homes Section identifies gaps in lead and construction workforce and develops initiatives to build capacity of workforce.

The data below represents the number of individuals, state-wide, receiving accreditation in a lead discipline between January 1 and December 31 of the referenced calendar year, the number of individuals receiving training through the MDHHS lead training scholarship program between January 1 and December 31 of the referenced calendar year and the number of firms receiving lead abatement accreditation between January 1 and December 31 of the referenced calendar year.

Calendar Year	2018	2019
1. Total individuals certified state-wide	1,724	1,775
2. Individuals trained through MDHHS lead training scholarship program statewide	127	70
3. Lead Abatement firms certified statewide	221	160

*Note: Data are not available prior to 2018.



Photo courtesy of iStockphotos



LEAD RISK SCREENING

The Flint Registry

In January 2019, the Flint Registry launched widespread public enrollment. The Flint Registry is a project that connects people to services and programs to promote health and wellness and helps understand how the Flint water crisis has affected the Flint community. The Flint Registry is for those who were exposed to lead-contaminated water. The Flint Registry screens enrollees for ongoing environmental lead exposure via a survey of environmental risks. Based on enrollee responses, the Flint Registry may refer individuals to Lead Safe Home Program and/or the City of Flint pipe replacement program. In 2019, the Flint Registry referred 440 participants to the Lead Safe Home Program and 836 participants to the City of Flint pipe replacement program. The Flint Registry continues to enroll and refer to these and many other public health promoting services and programs.



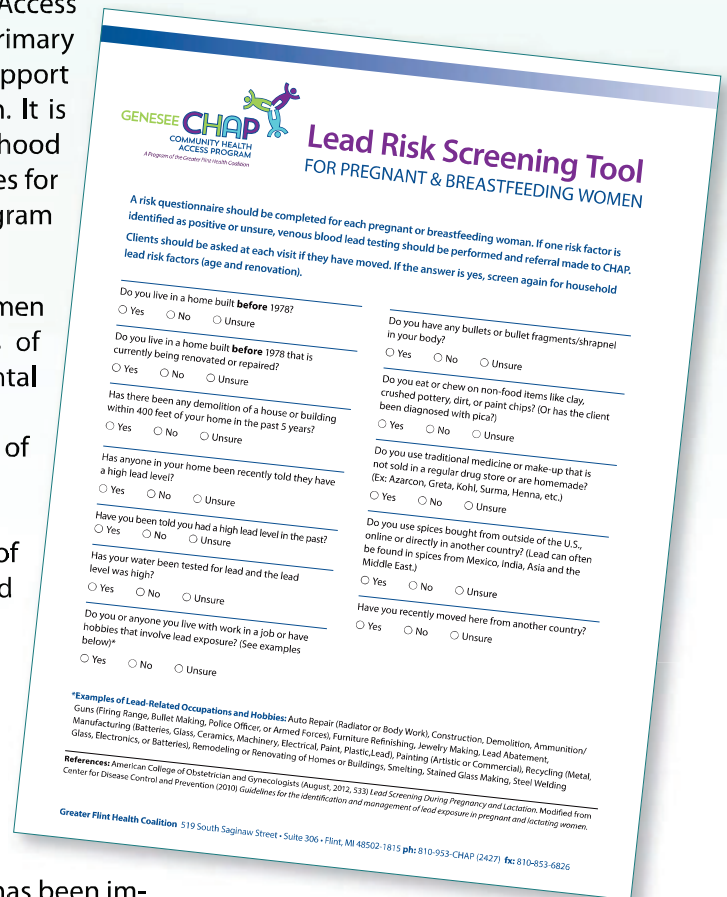
Photo by Mike Naddeo

Greater Flint Health Coalition – Genesee CHAP OB/GYN Primary Prevention Lead Risk Screening Program

The Greater Flint Health Coalition’s Genesee Community Health Access Program (CHAP) has developed and implemented an OB/GYN Primary Prevention Lead Risk Screening intervention, with a goal to support the creation of a lead safe environment before a baby is born. It is anticipated this intervention will result in reduced rates of childhood lead poisoning and improve maternal and child health outcomes for participating mothers and families. Additional goals of the program are to:

- Increase awareness regarding lead risks for pregnant women
- Increase identification and venous lead testing rates of pregnant woman identified with a positive environmental risk factor
- Provide early education, intervention and remediation of lead hazards
- Ensure connection to a medical home
- Provide needed Genesee CHAP social determinant of health (SDOH) services for pregnant women identified through the program
- Create a standardized, replicable lead assessment tool

Genesee CHAP developed a locally relevant, evidence-based Lead Risk Screening Tool for use in Flint/Genesee County prenatal care settings. CHAP educated and built partnerships with hospital and physician group partners, areas OB-GYN specialists, and the Maternal and Infant Health Program. Together, these partners adopted the screening tool and intervention as has been implemented.



When screened using the Lead Risk Screening Tool (see Appendix A), if a pregnant woman answers “yes” or “unsure” to any question, this then triggers a healthcare provider referral to Genesee CHAP for lead education, connection to possible environmental lead remediation services, and other CHAP services, including those that address the social determinants of health. CHAP community-based nurses engage the referred pregnant women, refer to Michigan’s Lead Safe Home Program as appropriate, and work to address any family SDOH needs. CHAP also provides feedback to referring providers regarding the outcome of services delivered by CHAP nurses.

Based on specific concerns or hazards identified, interventions facilitated include the following:

- Lead risk education
- Medical home connection
- Referral to MDHHS Lead Safe Home Program as appropriate,
- Addressing SDOH needs (e.g. food, transportation, car seats, safe sleep, pack and plays, insurance, WIC, MIHP services, and community resources) that can help the expecting mother maintain a healthy pregnancy and ensure a safe environment for their soon-to-be delivered newborn.

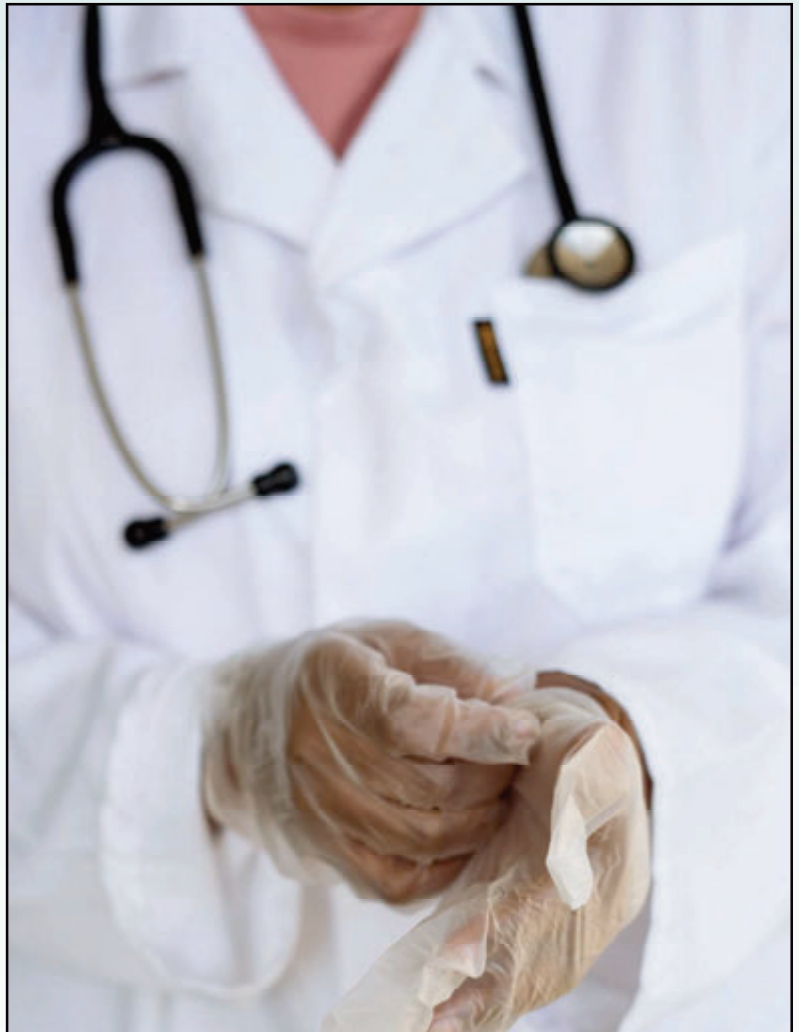


Photo credit: www.pexels.com

2019 Flint Outcomes

From the start of the pilot program on July 1, 2019 through December 31, 2019, there were 166 total OB Lead Risk Screening Referrals from Flint, of which 138 (83%) were for expecting mothers covered by Medicaid insurance. 86% of referral reasons were fully resolved (i.e., reached and provided with lead education), while 13% were unable to be reached, and only 1% declined services. The top reasons for referral were a “Yes” or “Unsure” response to questions about living in a home built before 1978, living in a home built before 1978 that is currently being renovated or repaired, or water has been tested for lead and the lead level was high. Note: An additional 73 referrals were received for women who lived or received their OB care in Genesee County, but who did not live in the city of Flint.

Community Education

Genesee Health System conducted trainings in August and October 2018. Each five-hour training day had two parts: the first was open to the community and focused on how to use filters correctly, how to communicate about filter use, information about sources of lead and the Lead Safe Home Program, and other environmental hazards; the second served as a train-the-trainer session to instruct Community Health Workers (CHWs) and other participants how to effectively communicate gained knowledge and skills. Between the two trainings, 150 people were trained, 135 of whom were CHWs working directly with Flint families, and several were from the Flint Registry.

Blood Lead Testing & Results for those residing in Flint – 2013-2019

Child blood lead testing in the State of Michigan is reported to the MDHHS Childhood Lead Poisoning Prevention Program (CLPPP). They are responsible for providing:

- Blood lead surveillance, data, and reports
- Lead poisoning education and outreach
- Support to local health departments to provide
 - * Health services for children with elevated blood lead levels
 - * Health services for children at risk of lead poisoning
- Funding to local health departments and/or alternatives for Elevated Blood Lead Level (EBLL) nurse case management

Since May 1, 2016, children in Genesee County with a Blood Lead Level (BLL) at or greater than 4.5 µg/dL have been referred to the Children's Healthcare Access Program EBLL Nurse Case Management program managed by the Greater Flint Health Coalition. The goal of EBLL Nurse Case Management Services is to bring every child's venous blood lead level below 4.5 micrograms per deciliter (mg/dL) and prevent future EBLLs by overseeing the reduction or elimination of sources of lead (or potential sources of lead) in the child's environment. Nurse Case Management services support the child's continued health and safety, connects them with environmental, social, and medical services, and ensure coordination with their medical home and Medicaid Health Plan (as applicable).

For adults, the Michigan Adult Blood Lead Epidemiology Surveillance (ABLES) program works with MDHHS by collecting the results of blood lead testing, confirming diagnoses, and investigating exposure circumstances. The ABLES program is housed in the Occupational and Environmental Medicine Division of Michigan State University's College of Human Medicine.

Interpretation of Blood Lead Level Testing

Blood lead testing of children has been traditionally used as a detector of environmental contamination. High risk children

should be tested at 1 and 2 years of age during well-child doctor visits. These are the ages when children developmentally have strong hand to mouth behaviors and are most at risk for household lead exposure (paint, dust, etc.). High risk is designated by the CDC and American Academy of Pediatrics and includes risk factors such as age of home, Medicaid status, parental hobbies/occupation, etc. Blood lead testing for adults is done: 1) required by Michigan OSHA regulations (1910.1025(j)(1)(i) The employer shall institute a medical surveillance program for all employees who are or may be exposed at or above airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period. for more than 30 days per year. for individuals with; 2) patient or health care provider are concerned about possible exposure (i.e. hobby involving firearms); or 3) health care provider concerned that patient's symptoms indicate possible lead toxicity. Since the recommendation for blood testing is not universal and must be determined by an algorithm of risk factors or known/suspected exposure, blood lead testing rates are low and only capture a small segment of the population.

Blood lead testing only reflects recent and/or ongoing exposure to lead. With a short detection window in blood (half-life approx. 28 days), blood lead testing does not capture historic and/or cumulative lead exposure. In addition, blood lead surveillance programs (performed at the routine ages of 1 and 2 years) do not adequately reflect lead in water exposure which burdens a younger and more developmentally vulnerable population.

Of note, following the widespread recognition of the Flint water crisis, there was expanded testing for blood lead levels (see increase in number of children tested in 2016). Although more children were noted to have BLLs >4.5 and >10 µg/dL, the percent decreased because of the increased denominator.

For the following three tables examining blood lead levels, Flint residence is defined as "Flint" when it is listed as the residence from the collected address. Each person is included only once per year in annual counts. If a person had multiple tests in the year, the highest BLL from a venous test was counted. If no venous test was performed, the highest BLL from a capillary blood draw was counted. If the type of test was unknown, the highest BLL obtained from an unknown sample type was counted. These data were obtained from MDHHS Health Data warehouse, current as of 2020.

Children who are less than 6 years residing in Flint, MI

Calendar Year	2013	2014	2015	2016	2017	2018	2019**
Estimated number of children*	9558	9119	9020	8784	8549	8543	8543
Number tested	3504	3500	3803	7394	3487	3340	3137
Percent tested	36.7%	38.4%	42.2%	84.2%	40.8%	39.1%	36.7%
Number ≥ 4.5 $\mu\text{g}/\text{dL}$	103	129	113	176	95	78	77
Percent ≥ 4.5 $\mu\text{g}/\text{dL}$	2.9	3.7	3.0	2.4	2.7	2.3	2.5
Number ≥ 10 $\mu\text{g}/\text{dL}$	17	20	22	40	21	15	12
Percent ≥ 10 $\mu\text{g}/\text{dL}$	0.5	0.6	0.6	0.5	0.6	0.4	0.4

*Based on Annual Community Survey estimates from the US Census Bureau shared by MDHHS. **2019 estimates are not available so 2018 estimate used.

Children who are 6-17 years residing in Flint

Calendar Year	2013	2014	2015	2016	2017	2018	2019
Number tested	583	429	1168	7947	1802	1253	929
Number ≥ 4.5 $\mu\text{g}/\text{dL}$	*	6	7	44	15	7	6
Percent ≥ 4.5 $\mu\text{g}/\text{dL}$	*	1.4	0.6	0.6	0.8	0.6	0.6
Number ≥ 10 $\mu\text{g}/\text{dL}$	*	*	*	8	*	*	*
Percent ≥ 10 $\mu\text{g}/\text{dL}$	*	*	*	0.1	*	*	*

Adults residing in Flint

Calendar Year	2013	2014	2015	2016	2017	2018	2019
Number tested	153	128	854	16902	3494	2827	2180
Number ≥ 5 $\mu\text{g}/\text{dL}$	17	13	23	262	60	26	18
Percent ≥ 5 $\mu\text{g}/\text{dL}$	11.1	10.2	2.7	1.6	1.7	0.9	0.8
Number ≥ 10 $\mu\text{g}/\text{dL}$	7	*	*	48	12	7	*
Percent ≥ 10 $\mu\text{g}/\text{dL}$	4.6	*	*	0.3	0.3	0.2	*

* Counts between one (1) and five (5) are not reported (replaced with * in the table above). Other counts are also not reported if they can be used to calculate the suppressed counts. This is done to protect the privacy of people who had a blood lead test.

For additional information on Flint adult blood lead results from 2010-2017, please see this report: https://oem.msu.edu/images/annual_reports/2020/Flint_ABLES_Report.pdf.



ECONOMICS AND NEXT STEPS

Preliminary Economic Analysis

From decreased economic productivity to added health care, education, and criminal justice expenses, the societal costs of preventable lead exposure are great. A [report](#) by Pew and Robert Wood Johnson Foundation noted an estimated cost benefit of \$84 billion annually from eliminating lead exposure in the United States. Preliminary economic analysis of Flint's lead elimination efforts, using Altarum's Value Prevention Tool and incorporating data from Flint, estimates the **lead prevention activities will generate \$53.3 million dollars** in future economic benefits for children when considering the number of pipes replaced and homes abated from 2016-2019.

These benefits include the impacts of reduced lead exposure for Flint children, and the resulted long-term impacts on health, lifetime earnings, and longevity. The benefits are estimated conservatively, measuring the impacts for children currently under the age of six and benefits expected for future kids born into remediated homes over the next 10 years.

Challenges & New Opportunities

While there is significant primary prevention activity taking place in Flint, there have been recent partnerships and opportunities which continue to grow these efforts. This is critical during a time when the worldwide COVID pandemic has resulted in a decrease in BLL screening, a pause in many home inspections and abatements, and a delay in lead pipe replacements.

In 2018 the City of Flint received its first Housing and Urban Development Lead-Based Paint Hazard and Healthy Housing Grant. The \$2.2 million award will help build the City's capacity to address lead exposure in Flint homes, incorporate healthy housing practices into city planning and development efforts, and provide lead inspection training and certification to city staff. In 2020, after changes in City of Flint administration, the Lead-Based Paint Hazard Control project launched in partnership with Flint Local Initiatives Support, Corporation and the Greater Flint Health Coalition. During the last two years of the grant period the program is planning to address lead exposure in 70 homes, investing up to \$15,000 per home, in the City of Flint. Mitigation and abatement efforts will support lead removal in windows, doors, porch flooring, etc.

In 2018, the City of Flint and Flint Lead Free co-chair, participated in an interview conducted by the National Center for Healthy Housing (NCHH) as part of their local research for a state-funded grant project called the Technical Assistance for Code Transformation and Innovation Collaborative (TACTIC). The project involved a thorough review of local housing codes and provided recommendations on how lead poisoning prevention activities can be integrated into existing housing codes. In 2019, NCHH received funding from the state to assist municipalities from the first TACTIC report as they explore ways to prevent lead exposure through code transformation. NCHH and the City of Flint are actively planning next steps and will develop a process for implementing recommendations in the report with technical assistance from NCHH.

In 2019, **Flint Lead Free** member, Local Initiatives Support Corporation received a two-year grant to plan and implement Flint Healthy Homes, an intersectional partnership that works to address health and well-being upstream by addressing the social determinants of health at a systems level, concerning housing, to achieve health equity and eliminate health disparities. With lead prevention and mitigation identified as an area of focus for the collaborative, Flint Healthy Homes will coordinate efforts to build community and partner knowledge and awareness, develop and implement a uniform citywide approach to healthy housing through policy and practice change, and develop a competent, multi-disciplinary workforce to achieve healthy environments for all Flint families. **Flint Lead Free** will be an active partner in the healthy housing efforts, ensuring data driven goals and strategies are incorporated in all lead primary prevention activities and programs.

Over the next year, **Flint Lead Free** will continue to identify and engage relevant stakeholders to ensure all the appropriate voices are included in strategic conversations. **Flint Lead Free** will continue to track and update primary prevention programs and services, lead elimination data, and lead-related training opportunities. Future reports also hope to include mapping to better visualize and target lead elimination effort, as well as the updated economic benefits of lead elimination. **Flint Lead Free** recognizes and will continue to work to overcome ongoing challenges to achieve lead elimination such as workforce development and competitive compensation, awareness of and trust in programs, wait time for abatement, sustainability of resources, and the creation and enforcement of stronger codes and regulations.



CONCLUSION



Conclusion

This **Flint Lead Free** report attempts to quantify lead-related activity in Flint over time. Although data challenges exist, including a time lag for obtaining the numbers, the yearly trends reveal an unprecedented, coordinated and growing multi-sector effort to decrease children's lead exposure burden. With an emphasis on primary prevention, sources of lead are being identified and eliminated before children are unnecessarily exposed. And as such, there is a quantifiable societal economic benefit.

Despite these positive trends, the legacy of lead lingers disproportionately in the environments of our most vulnerable children. Contrary to the science of lead's neurotoxicity, but in deference to the bottom line of industries, the use of lead in paint, plumbing, gasoline and other applications was widespread and continued for decades. Resources need to be sustained and increased to continue to advance **Flint Lead Free's** efforts and to share best practices with similarly impacted communities. We look forward to continuing this positive and proactive work with our many partners.

The Flint Registry extends our appreciation to the members of Flint Lead Free and the Report Subcommittee for their feedback and support in the development of this report.

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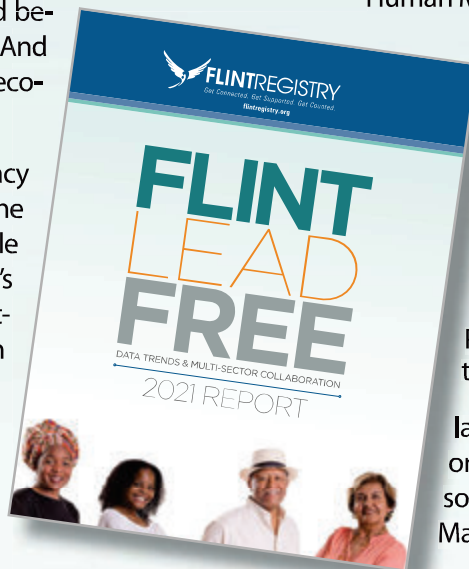
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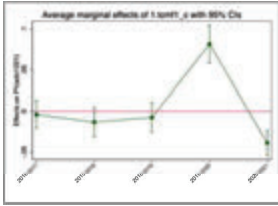
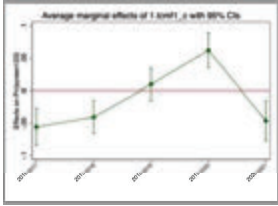
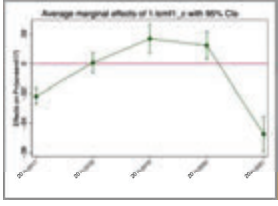


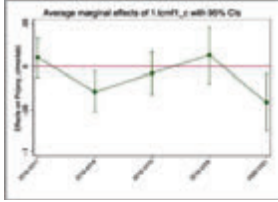
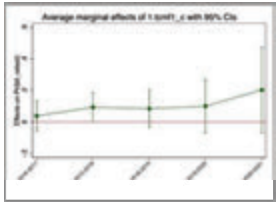
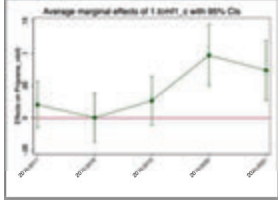
Appendix 7. Comparison Testing Summary Information

This appendix is provided as a quick reference for the multiple individual tests of significance conducted to support the evaluation. The hypotheses presented reflect the *modified* versions that are detailed in the body of the report. In some years, due to data quality issues, the tests need to be interpreted with caution. Interpretation text is color coded with **green** indicating the FME group performed better than the Comparison group, **orange** indicating no statistically significant difference was noted between the FME and Comparison groups and **red** indicating the FME group performed less well than the Comparison group.

Domain 1: Access to Care - *Enrollees will access services to identify and address physical or behavioral health issues associated with lead exposure at a rate higher than non-enrollees with similar individual and neighborhood characteristics, a.k.a., the comparison.*

Hypotheses	Specific Measures	Test performed	Marginal effects	Interpretation
DOMAIN 1: Access to Care				
H1.1: A greater proportion of enrollees will obtain any age-appropriate well-child exams <i>than the comparison.</i>	1. HEDIS Well Child Visits in the First 15 months of Life (any visit) measures “the percentage of children who had between one and six or more well-child visits by the time they turned 15 months of age.”	Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had p=0.061 using propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables.		FME and Comparison did not have jointly significantly different rates across the 5 years. The two groups had statistically similar rates in five years.
	2. HEDIS Well Child visits in the Third, Fourth, Fifth and Sixth Years of Life measures “The percentage of members 3–6 years of age who had one or more well-child visits with a PCP during the measurement year.”	Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had p<0.01 using propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables.		FME and Comparison had jointly significantly different rates across the five years. Although both groups had a decrease in well child visits, the FME group had statistically higher rates in year 4 and lower rate in year 5. These differences were likely the influence of COVID.

Hypotheses	Specific Measures	Test performed	Marginal effects	Interpretation
	3. HEDIS Adolescent Well-Care Visits measures “The percentage of enrolled members 12–21 years of age who had at least one comprehensive well-care visit with a PCP or an OB/GYN practitioner during the measurement year.”	Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had $p < 0.01$ using propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables.		FME and Comparison had jointly significantly different rates across the five years. Although both groups had a decrease in well child visits, the FME group had statistically higher rates in year 4 and lower rate in year 5. These differences were likely the influence of COVID.
H1.2: A greater proportion of enrollees will receive age-appropriate developmental screening/assessments <i>than the comparison.</i>	1. Developmental Screening in the First Three Years of Life (percentage of children screened for risk of developmental, behavioral and social delays using a standardized screening tool (CPT 96110) in the first three years of life.)	Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had $p < 0.01$ using propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables.		FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in year 4 and lower rates in years 1, 2, and 5.
	2. Socio-emotional/ Behavioral Screening for Children 4-17 years of age (percentage of children/adolescents 4-17 years of age who had at least one socio-emotional/behavioral screen (CPT 96127) with a primary care provider or an OB/GYN practitioner during the measurement year.)	Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had $p < 0.01$ using propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables.		FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in year 3, 4 and lower rate in year 1, 2, 5. Difference in year was likely due to data issues.

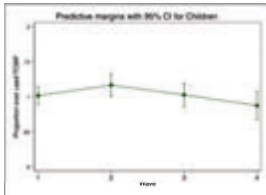
Hypotheses	Specific Measures	Test performed	Marginal effects	Interpretation
H1.3: A greater proportion of enrollees will receive age appropriate lead testing <i>than the comparison</i> .	1. Modified HEDIS Lead Screening in Children (The percentage of children 2 years of age who had 1 or more capillary or venous lead blood test for lead poisoning by their second birthday.)	Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had $p < 0.01$ using propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables.		FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically lower rates in years 2, 5 but the data quality in year 5 is questionable.
H1.4: A greater proportion of enrollees with high blood lead levels will receive re-testing at the appropriate intervals <i>than the comparison</i> .	1. Follow-up of elevated blood lead level (greater proportion of enrollees with high blood lead levels will receive re-testing at the appropriate intervals). We followed the CDC guideline for recommended time frame for follow up. https://www.cdc.gov/nceh/lead/ACCLPP/Final_Document_030712.pdf	Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had $p = 0.759$ using propensity score weighted logistic regression adjusting for race, FPL, and census tract variables.		FME and Comparison had statistically similar rates across the 5 years. Although the FME group had higher rates in years 1-5, the difference was not statistically significant.
H1.5: Enrollees who are pregnant will have timelier prenatal and postpartum care <i>than the comparison</i> .	1. HEDIS Timeliness of Prenatal Care	Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had $p = 0.051$ using propensity score weighted logistic regression adjusting for race, FPL, other insurance, and census tract variables.		FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in years 4 and 5.

Hypotheses	Specific Measures	Test performed	Marginal effects	Interpretation
	2. HEDIS Postpartum Care	Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had p=0.161 using propensity score weighted logistic regression adjusting for race, FPL, other insurance, and census tract variables.		FME and Comparison did not have jointly significantly different rates across the five years. The FME group had a statistically lower rate in postpartum care in years 3 and 5.
H1.6: A greater proportion of enrollees who are pregnant will have recommended lead testing <i>than the comparison</i> .	1. Lead screening in pregnancy	Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had p<0.01 using propensity score weighted logistic regression adjusting for race, FPL, other insurance, and census tract variables.		FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in all years.
H1.7: A greater proportion of enrollees will participate with Maternal Infant Home Program services <i>than the comparison</i> .	1. Maternal Infant Health Program Participation	Wald test for differential yearly effect between FME and Comparison using data from 5/2016-9/2021 had p=0.187 using propensity score weighted logistic regression adjusting for race, FPL, other insurance, and census tract variables.		FME and Comparison did not have jointly significantly different rates across the five years. The FME group had statistically similar rates in years 1-3 and 5.

Hypotheses	Specific Measures	Test performed	Marginal effects	Interpretation
H1.8: Majority of enrollees will attest to improved access to health care as a result of the expanded coverage.	<p>1. Enrollee Attestation for Improved Access to Care (Child Survey data)</p> <p>*Adult Survey data did not have sufficient numbers to conduct statistical testing.</p>	Wald tests for Wave dummies (p=0.569 for children) in mixed ordered logistic regression models with a random intercept for respondents, adjusted by age, residence, race, FPL, census tract variables and weighted by sampling weights.		Child Survey: Not significant between all waves.
H1.9: Majority of enrollees will report satisfaction with their ability to access health care as a result of the expanded coverage.	<p>1. Enrollee satisfaction score with Medicaid expansion coverage (Child Survey data)</p> <p>*Adult Survey data did not have sufficient numbers to conduct statistical testing.</p>	Wald tests for Wave dummies (p=0.495 for children) in mixed ordered logistic regression models with a random intercept for respondents, adjusted by age, residence, race, FPL, census tract variables and weighted by sampling weights.		Child Survey: Not significant between all waves.
	<p>2. Enrollee satisfaction with providers working in their interest (Child Survey data)</p> <p>*Adult Survey data did not have sufficient numbers to conduct statistical testing.</p>	Wald tests for Wave dummies (p<0.01 for children;) in mixed ordered logistic regression models with a random intercept for respondents, adjusted by age, residence, race, FPL, census tract variables and weighted by sampling weights.		Child Survey: Significant increase in the strongly agree category between W1 and W2, leveled off in W3, and slight decrease in W4.

Domain 2: Access to TCM - Enrollees who access TCM services will access needed medical, social, educational, and other services at a rate higher than enrollees who do not access TCM services. Enrollees are those with any FME flag in the eligibility data.

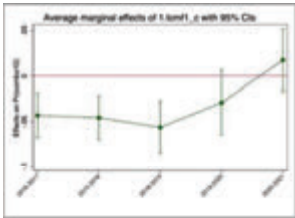
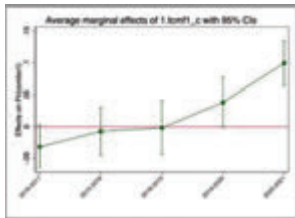
Because the numbers of beneficiaries in the denominators of all measure in the TCM group are very small, we only present the raw descriptive statistics and do not proceed with matched analyses.

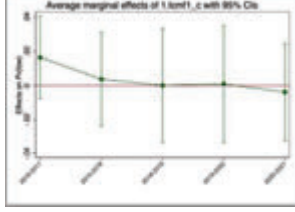
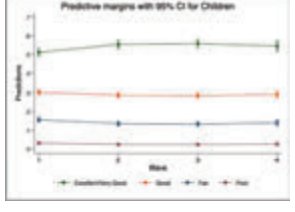
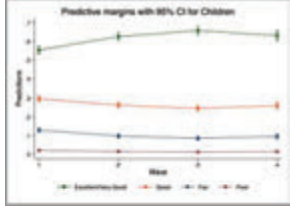
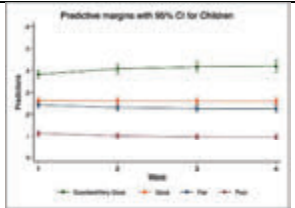
Hypotheses	Specific Measures	Test performed	Marginal effects	Findings
DOMAIN 2: Access to Targeted Case Management				
H2.1: Referral source and participation levels with TCM will be tracked among enrollees	1. Referral Source for TCM	N.A.	N.A.	Referrals Increased in 2019; but there was no data in 2020.
	2. TCM Participation	N.A.	N.A.	Admin Data: No claims with CPT and NPI codes in 2020 for TCM participation.
	3. Have you ever used any Family Supports Coordination/Targeted Case Management services for you (your child) since enrolling in the Flint Medicaid waiver? (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Wald tests for Wave dummies (p=0.112 for children) in mixed logistic regression models with a random intercept for respondents, adjusted by age, residence, race, FPL, census tract variables and weighted by sampling weights.		Child Survey: a slight non-significant increase in those who reported ever using FSC/TCM from W1 to W2, but decrease in W3-W4.
H2.2: All TCM participants will have at least one re-assessment	1. Annual TCM assessment (at least one reassessment within one year of original assessment).	N.A.	N.A.	Number of observations are small in years 1-4 and zero in year 5 based on claims data.

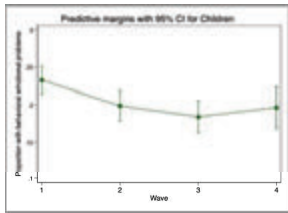
Hypotheses	Specific Measures	Test performed	Marginal effects	Findings
DOMAIN 2: Access to Targeted Case Management				
within one year of the original assessment.	<p>2. Have you ever used any Family Supports Coordination/Targeted Case Management services for you (your child) last Survey Date? (Child Survey data)</p> <p>*Adult Survey data did not have sufficient numbers to conduct statistical testing.</p>	Wald tests for Wave dummies (p=0.725 for children) in mixed logistic regression models with a random intercept for respondents, adjusted by residence, race, FPL (children only), census tract variables and weighted by sampling weights.		Child Survey: no notable changes in proportions from W2 to W4.
H2.3: A greater proportion of TCM participants will have age-appropriate well child exams compared to enrollees who do not access TCM services.	1. HEDIS well child visits in the first 15 months of life (W15) measures “the percentage of children who had between one and six or more well-child visits by the time they turned 15 months of age.”	N.A.	N.A.	Number of observations are small in years 1-4 and zero in year 5 claims data.
	2. HEDIS well child visits in the third, fourth, fifth and sixth years of life (W34) measures “The percentage of members 3–6 years of age who had one or more well-child visits with a PCP during the measurement year.”	N.A.	N.A.	Number of observations are small in years 1-4 and zero in year 5 claims data.
	3. HEDIS adolescent well-care visits measures “The percentage of enrolled members 12–21 years of age who had at least one	N.A.	N.A.	Number of observations are small in years 1-4 and zero in year 5 claims data.

Hypotheses	Specific Measures	Test performed	Marginal effects	Findings
DOMAIN 2: Access to Targeted Case Management				
	comprehensive well-care visit with a PCP or an OB/GYN practitioner during the measurement year.”			
H2.4: A greater proportion of TCM participants will have completed age-appropriate developmental screening compared to enrollees who do not access TCM services.	1. Percentage of children screened for risk of developmental, behavioral and social delays using a standardized screening tool (CPT 96110) in the first three years of life.	N.A.	N.A.	Zero observation in claims data in all years.
	2. Percentage of children/adolescents 4-17 years of age who had at least one socio-emotional/behavioral screen (CPT 96127) with a primary care provider or an OB/GYN practitioner during the measurement year.	N.A.	N.A.	Number of observations are small in years 2-4 and zero in years 1 and 5 claims data.

Domain 3: Improved Health Outcomes - Enrollees will have improved health outcomes compared to non-enrollees with similar individual and neighborhood characteristics, a.k.a., the comparison.

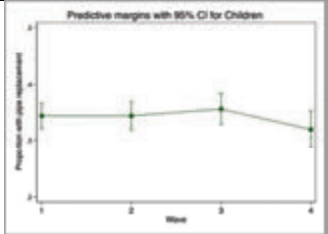
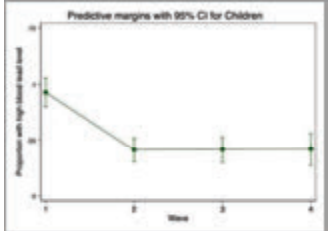
Hypotheses	Specific Measures	Test performed	Marginal effects	Interpretation
DOMAIN 3: Improved Health Outcomes				
H3.1: Enrollees will have higher completed age-appropriate immunization statuses <i>than the comparison.</i>	1. HEDIS Childhood Immunization Status (percentage of children 2 years of age who had four diphtheria, tetanus and acellular pertussis (DTaP); three polio (IPV); one measles, mumps and rubella (MMR); three haemophilus influenza type B (HiB); three hepatitis B (HepB), one chicken pox (VZV); four pneumococcal conjugate (PCV); one hepatitis A (HepA); two or three rotavirus (RV); and two influenza (flu) vaccines by their second birthday)	Wald test for differential yearly effect between FME and Comparison using data from 5/2016-9/2021 had p=0.021 using propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables.		FME and Comparison had significantly different rates in the five years. The FME group lower rates in the first 3 years.
	2. HEDIS Immunizations for Adolescents (percentage of adolescents 13 years of age who had one dose of meningococcal conjugate vaccine, one tetanus, diphtheria toxoids and acellular pertussis (Tdap) vaccine, and have completed the human papillomavirus (HPV) vaccine series by their 13th birthday)	Wald test for differential yearly effects between FME and Comparison using data from 5/2016-9/2021 had p<0.01 using propensity score weighted logistic regression adjusting for sex, race, FPL, other insurance, and census tract variables.		FME and Comparison had jointly significantly different rates across the five years. The FME group had statistically higher rates in years 4 and 5.

Hypotheses	Specific Measures	Test performed	Marginal effects	Interpretation
H3.2: Enrollees who are pregnant will deliver infants with higher birth weights <i>than the comparison</i> .	1. Low Birth Weight Rate (live births with birthweight < 2500 grams)	Wald test for differential linear trends between FME and Comparison using data from 5/2016-9/2021 had p=0.749 using propensity score weighted logistic regression adjusting for race, FPL, and census tract variables..		FME and Comparison did not have significantly different linear trends across the five years.
H3.3: Enrollees report an increase in their self-reported health status over the duration of their enrollment.	1. Enrollee Self-Reported Health Status (overall health) (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Wald tests for Wave dummies (p<0.01 for children) in mixed ordered logistic regression models with a random intercept for respondents, adjusted by residence, race, FPL, census tract variables and weighted by sampling weights.		Child Survey: a statistically significant, although small increase in those who reported having excellent or very good health.
	2. Enrollee Self-Reported Health Status (physical health) (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Wald tests for Wave dummies (p<0.01 for children) in mixed ordered logistic regression models with a random intercept for respondents, adjusted by residence, race, FPL, census tract variables and weighted by sampling weights.		Child Survey: a statistically significant increase in those who reported having excellent or very good physical health.
	3. Enrollee Self-Reported Health Status (emotional/behavioral health) (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Wald tests for Wave dummies (p<0.01 for children) in mixed ordered logistic regression models with a random intercept for respondents, adjusted by residence, race,		Child Survey: a statistically significant increase in those who reported having excellent or very good mental health.

Hypotheses	Specific Measures	Test performed	Marginal effects	Interpretation
		FPL, census tract variables and weighted by sampling weights.		
<i>PROVISIONAL</i> H3.4: Descriptive analysis of the proportion of children diagnosed with severe emotional disturbance and other developmental/learning disabilities.	1. Proportion of enrollees having diagnosis code(s) of interest	N.A.	N.A.	Data not available.
<i>PROVISIONAL</i> H3.5: Descriptive analysis of behavioral health conditions and supportive care among enrolled children.	1. Prevalence of behavioral health conditions among enrolled children	See #4 below.		See #4 below.
	2. Count of children enrolled in Early Childhood Programs	N.A.	N.A.	Data not available.
	3. Proportion of students in kindergarten who participated in Early Childhood Programs	N.A.	N.A.	Data not available.
	4. Enrollee survey – has your child been diagnosed with behavioral/emotional problem (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Wald tests for Wave dummies ($p < 0.01$) in mixed logistic regression models with a random intercept for respondents, adjusted by residence, race, FPL, census tract variables and weighted by sampling weights.		Child Survey: a statistically significant decrease in those who reported their children being diagnosed with behavioral/emotional health.

Hypotheses	Specific Measures	Test performed	Marginal effects	Interpretation
	<p>5. Enrollee survey - Since enrolling in the Flint Medicaid waiver, I have access to more resources that help with management of my child's chronic health condition(s). (Child Survey data)</p> <p>*Adult Survey data did not have sufficient numbers to conduct statistical testing.</p>	<p>Wald tests for Wave dummies ($p=0.01$) in mixed ordinal logistic regression models with a random intercept for respondents whose child had a chronic health condition, adjusted by residence, race, FPL, census tract variables and weighted by sampling weights.</p>		<p>Child Survey: a statistically significant increase in those who strongly agreed with the statement.</p>
PROVISIONAL H3.6: Descriptive analysis of educational delays among enrolled children	1. Prevalence of educational delays among enrolled children	N.A.	N.A.	Data not available.
	2. Counts of children remaining in same grade	N.A.	N.A.	Data not available.
	3. Educational Progress Standardized Testing (M-STEP, MI-Access)	N.A.	N.A.	Data not available.
	<p>4. Enrollee survey - Has anyone told you that your child should be tested for learning problems? (Child Survey data)</p> <p>*Adult Survey data did not have sufficient numbers to conduct statistical testing.</p>	<p>Wald tests for Wave dummies ($p<0.01$) in mixed logistic regression models with a random intercept for respondents, adjusted by residence, race, FPL, census tract variables and weighted by sampling weights.</p>		<p>Child Survey: a statistically significant decrease in those who identified their child needed to be tested for a learning problem.</p>

Domain 4: Lead Hazard Investigation - The lead hazard investigation program will reduce expected ongoing or re-exposure to lead hazards in the absence of this program.

Hypotheses	Specific Measures	Test performed	Marginal effects	Interpretation
DOMAIN 4: Lead Hazard Investigation				
H4.1: Enrollees without participating with TCM services will access lead hazard investigation services to the same degree as beneficiaries without TCM services.	1. Prevalence of Lead Hazard Assessment/Investigation	N.A.	N.A.	Flint Lead Free: increase in proportion of investigations without EBLL 13% to 97% Data not available.
H4.2: Beneficiaries found to be at risk for ongoing lead exposure will be referred for additional environmental investigation	1. Prevalence of Lead Hazard Follow-up Investigation	N.A.	N.A.	Data not available.
	2. Have pipes been replaced? (Child Survey data) *Adult Survey data did not have sufficient numbers to conduct statistical testing.	Wald tests for Wave dummies (p=0.183 for children) in mixed ordered logistic regression models with a random intercept for respondents, adjusted by residence, race, FPL, census tract variables and weighted by sampling weights.		Children Survey: no statistically significant difference in trend.
	3. Does your child have high blood lead level? (Child Survey data)	Wald tests for Wave dummies (p<0.01) in mixed logistic regression models with a random intercept for respondents, adjusted by residence, race, FPL, census tract variables and weighted by sampling weights.		Child Survey: a statistically significant decrease in those who reported their children having high blood lead level.

Appendix 8: Comparison Community Selection

The evaluation team considered two main approaches in the selection of Comparison Group 5.

K-means approach

The first approach is a cluster analysis. It is called data segmentation that groups or segments a collection of objects (counties in our context) into subgroups or clusters such that those within the same cluster are more alike to each other than objects assigned to different clusters. Counties are described by a set of characteristics (features, measurements) that are pre-selected based on the purpose of clustering. Counties in the same cluster still have different degrees of similarity (or dissimilarity) to each other and to a specific county (Genesee in our context), which can be described by certain distance measures that can be thought of as inaccuracy associated with clustering. A commonly used clustering method is the *K*-means (or median) clustering for which the within-cluster variation is as small as possible. The evaluation team used the *K*-means method¹ in a similar evaluation project. The idea is to find a lower-peninsula county like Genesee County in health outcomes, health behavior, clinical care, social economic environment, and physical environment. These vital health factors are used by the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute to rank counties in the US.² We chose these confounding characteristics (a total of 48 variables) under the assumption that counties with similar characteristics affecting lead exposures would have similar levels of lead exposures (**Table 1**). These variables are also available in 2013 and 2015, two critical pre-periods, one before the water switching event and one before the waiver expansion. We used the 2015 County Health Ranking (CHR) data in Michigan for clustering.

The *K*-means algorithm is as follows: 1) Randomly assign a number from 1 to *K* to each county where *K* is the assumed number of clusters; 2) compute the cluster centroid (defined by the feature means in each cluster) and assign each county to the cluster whose centroid is closest using, say, the Euclidean distance to it; and 3) iterate until the cluster assignments stop changing. One issue of the *K*-means clustering method is that the resulting assignments depend on the random starting point. The *K*-means algorithm gives local minima and does not guarantee to give the global minimum, so the starting points should be varied to examine the end partitioning. Another issue of the *K*-means algorithm is that sometimes a variable with high variability would dominate the cluster analysis. A common solution is to standardize variables, but there are multiple ways of standardizing variables³ and standardization could also hide the true groupings in the data.⁴ This is a case-by-case decision depending on the type of data and the nature of the groups. We compared the unstandardized and standardized variables using various distance metrics, which is described later.

The number of clusters *K* is the tuning parameter for the *K*-means method that can be chosen by cross-validation if there is large number of i.i.d. observations. However, in our context this is not possible. We considered two procedures to choose an optimal clustering.

The first procedure is visual. We plotted the scree plot⁵ and searched for a kink in the curve generated from the within sum of squares (WSS) or its logarithm ($\log[\text{WSS}]$) for a range of cluster solutions, say from 1 to 10 clusters. The WSS can be thought of as the error sum of squares in regression analysis where the total sum of square is defined when all objects are in one cluster. Another criterion is the η^2 coefficient, $\eta^2(k) = 1 - \frac{\text{WSS}(k)}{\text{WSS}(1)}$, which is between 0 and 1 with higher values indicating better clustering. We can also transform WSS to get the proportional reduction of error (PRE) as well to identify the number of clusters that leads to the largest reduction in PRE.

Second procedure is a formal statistical test⁶ based on the Gap statistic, a comparison of log of within cluster variation ($\log[W_k]$) with a null reference distribution which has no obvious clustering. The steps of choosing K using Gap statistics is as follows: Step 1: use K means method to calculate within-cluster variant W_k from a range of clusters $k = 1, 2, \dots, K$; Step 2: generate a reference feature uniformly over the range of the observed values for that feature; Step 3: generate B reference data sets, using the uniformly distributed features in Step 2, and cluster each data set to calculate the within-dispersion measures W_{kb}^* , for $b = 1, 2, \dots, B$ and $k = 1, 2, \dots, K$. Compute the Gap statistic $\text{Gap}(k) = \left(\frac{1}{B}\right) \sum_b \log(W_{kb}^*) - \log(W_k)$. Step 4: let $\bar{l} = \frac{1}{B} \sum_b \log(W_{kb}^*)$, compute the standard deviation $sd_k = \left[\frac{1}{B} \sum_b \{\log(W_{kb}^*) - \bar{l}\}^2\right]^{\frac{1}{2}}$ and find the standard error $s_k = sd_k \sqrt{1 + \frac{1}{B}}$. Finally choose the number of clusters K^* which is the smallest k such that $\text{Gap}(k) - [\text{Gap}(k + 1) - s_{k+1}] \geq 0$.

If two procedures of choosing the optimal number of clusters give the same result, it is straightforward to use the result to proceed. If the visual scree plot does not produce any obvious kink point, or if the kink point suggested by the scree plot does not agree with the optimal solution based on the Gap statistic, we will use the number of clusters K^* that passes the Gap statistic test. We then generate a large number S of random starting values to run the K -means algorithm for K^* clusters. Next, we count how many times a county is assigned to the same cluster as Genesee County out of the S clustering results. The county that is most often clustered together with Genesee County will be chosen as the comparison county.

Figure 1 shows the scree plot based on the z-score standardized features. We can see no clear kink point in the WSS, $\log[\text{WSS}]$ or the PRE metrics. **Table 2** shows the Gap statistics based on the z-score standardized features for $k = 1$ to 10 clusters. The result indicated the 68 lower-peninsula counties were best grouped in 9 clusters. Using the 9-cluster solution, we ran the K -means algorithm with 5,000 random starting values. **Table 3** shows that out of the 5,000 groupings, the Saginaw County was clustered within the same group as the Genesee County 4,405 times, followed by Muskegon and Calhoun with 4,183 and 4,124 times respectively. Thus, Saginaw County was the chosen county. **Table 4** displays the unstandardized values of the 48 features used for clustering for Genesee, Saginaw, Muskegon, and Calhoun counties. For some features, it may seem that the other two counties are closer to Genesee County, e.g., average

number of physically unhealthy days in the past 30 days; however, on the whole Saginaw County is closer to Genesee in more features.

Using various standardization methods in addition to z-score, we also calculated a single distance measure based on these features. The standardization methods are $x/\max(x)$, min-max, $x/\text{sum}(x)$, $\text{rank}(x)$ and $\text{abs}(x-\text{mean})$; and the distance metrics are Euclidean distance, L1 distance, Canberra distance, and $1 - \text{correlation distance}$. **Table 5** shows the single nearest county to Genesee County using these standardized scores and distance metrics. The results indicated Saginaw and Wayne counties as the two closest counties to Genesee. Combining with the evidence in the K-means analyses, Saginaw County was chosen to be the comparison county.

Synthetic Control Approach

The second approach the evaluation team considered was the synthetic control (SC) method.⁷ Since no single county was as like Genesee County in all characteristics under consideration, we explored using a weighted combination of counties as controls. The SC idea is to impute a counterfactual outcome of Genesee as a weighted average of other counties (not including UP counties). The weights are computed by minimizing a vector distance between Genesee and other counties over a set of pre-treatment covariates that are predictive of the outcome.

The evaluation has numerous outcomes and the SC method, unlike the K-means method, needs to be conducted separately for each outcome to estimate the weights specific to that outcome. Here we use elevated blood lead levels (EBLL) for illustration. Even though this is not an outcome for the renewal evaluation, it may be informative as to what this approach can and cannot achieve and the required data elements and assumptions for the method to be valid. First, we extracted county-level and ZIP code-level data for the proportion of children < 6 years of age who were tested and had EBLL from 2010 to 2020, using the Michigan Childhood Lead Poisoning Prevention Program (MCLPPP) annual reports and data portal. **Figure 2** shows the EBLL of children in the 11 ZIP code approved by the Flint waiver demonstration (red solid line), Genesee County (blue dashed line), and the rest of the 67 counties in the Lower Peninsula (light gray dashed lines, excluding the city of Detroit). Ideally for the SC approach to work well, we would need clear distinction in trends before and after the key event (water switch or waiver expansion). From Figure 2 we can see a more pronounced uptick of the trend in Flint than that in Genesee County in 2014. Thus, we proceed to impute the counterfactual EBLL for Genesee after 2016 using a set of covariates.

The covariates we considered are again from the CHR data. We used 2010-2019 in Table 1 to construct an SC county for Flint (Genesee County is removed in this analysis and the county covariates are used for the 11 ZIP codes) using parametric and non-parametric SC analyses.⁸ The results of the three cases are shown in **Figure 3** and **Table 6**. The specifications in the top row and first column of the figure (unstandardized covariates and non-parametric model) tracks the Flint data the best prior to 2016; and all other specifications fall short in some aspect. The selected top counties in the best case are St. Clair, Saginaw, Jackson, and Monroe (row 2 of

Table 6). In 12 of the specifications of predictors and models, Saginaw was selected 10 times as one of the top 4 counties with the largest weights in the synthetic controls, followed by Wayne (6 times), Jackson (5 times) and St. Clair (5 times), Muskegon (4 times) and Monroe (4 times). Overall, the unstandardized predictors and non-parametric models had smaller biases and smaller root mean-squared prediction error (RMSPE).

A limitation of the SC method is that it requires re-calibration of weights for each hypothesis because different counterfactual weights may be required to construct a synthetic control that is similar in the respective hypothesis to be tested. Summary measures of the outcomes and time-varying covariates that are predictive of each outcome at the county level (and Flint) for each hypothesis many years prior to the waiver expansion will be required. Extracting all the required data from the HSDW will be time-consuming and the predictive power of the covariates in the CHR&R may be weak. This is the main reason for which we prefer to use the K-means method or the nearest neighbors method to find comparison counties in the first step of the evaluation.

Consideration of Cities as Comparisons

Comparisons would have been ideal at the city level as Flint was the main geographic area under evaluation. The cities of Pontiac and Saginaw were considered as they were similar in size, racial composition, socioeconomic distress, initial development, economic trajectory, and current housing landscape as Flint. Thus, risk factors for lead exposure may also be similar across all three communities. Pontiac was additionally suitable as a comparison community because, like Flint, it has been served by the Great Lakes Water Authority (formerly the Detroit Water & Sewerage Department). These communities further share the existence of a spread of wealthier suburbs surrounding them which may offer comparison opportunities. Additional potentially suitable communities included the smaller metropolitan areas of Jackson, Muskegon, and Kalamazoo. However, city-level data were difficult to obtain which made it difficult to quantify the similarities. Thus, we restricted our choice of geographic comparison group to the county level.

The K-means analysis confirmed that Saginaw County would be a suitable option for Comparison Group 5. Upon identification of the comparison community, the MDHHS Data Warehouse was accessed for claims/encounter data for all Medicaid enrollees residing in Saginaw County from May 2013 through April 2021. History of comorbidity and/or census-tract level social/economic background were adjusted when appropriate in regression models.

Table 1 County Health Ranking measures and source data years *

Health Outcomes		
Measure	Description	Source
Poor or fair health	Percentage of adults reporting fair or poor health (age-adjusted)	Behavioral Risk Factor Surveillance System
Poor physical health days	Average number of physically unhealthy days reported in past 30 days (age-adjusted)	Behavioral Risk Factor Surveillance System
Poor mental health days	Average number of mentally unhealthy days reported in past 30 days (age-adjusted)	Behavioral Risk Factor Surveillance System
Low birthweight	Percentage of live births with low birthweight (< 2500 grams)	National Center for Health Statistics - Natality files
Infant mortality	Average infant death per 10,000 live births	Health Indicators Warehouse
Frequent physical distress	Percent population experiencing frequent physical distress	Behavioral Risk Factor Surveillance System
Frequent mental distress	Percent population experiencing frequent mental distress	Behavioral Risk Factor Surveillance System
Health Behaviors		
Measure	Description	Source
Food environment index	Index of factors that contribute to a healthy food environment, 0 (worst) to 10 (best)	USDA Food Environment Atlas, Map the Meal Gap
Teen births	Teen birth rate per 1,000 female population, ages 15-19	National Center for Health Statistics - Natality files
Food insecurity	Percent population with food insecurity	Map the Meal Gap
Access to healthy foods	Percent population with limited access to healthy foods	USDA Food Environment Atlas
Drug induced deaths	Number of deaths induced by drug overdose	Michigan Health Statistics
Insufficient sleep	Percent population with reported insufficient sleep	Behavioral Risk Factor Surveillance System
Clinical Care		
Measure	Description	Source
Uninsured	Percentage of population under age 65 without health insurance	Small Area Health Insurance Estimates
Primary care physicians	Ratio of population to primary care physicians	Area Health Resource File/American Medical Association
Dentists	Ratio of population to dentists	Area Health Resource File/National Provider Identification file
Uninsured adults	Percentage of population age 18 and above without health insurance	Small Area Health Insurance Estimates
Uninsured children	Percentage of population under age 18 without health insurance	Small Area Health Insurance Estimates
Health care costs	Average health care costs	Dartmouth Atlas of Health Care
Other primary care providers	Ratio of primary care physicians to per 10,000 population	CMS, National Provider Identification file
Social and Economic Environment		
Measure	Description	Source

High school graduation	Percentage of ninth-grade cohort that graduates in four years	EDFacts
Some college	Percentage of adults ages 25-44 years with some post-secondary education	American Community Survey
Unemployment	Percentage of population ages 16 and older unemployed but seeking work	Bureau of Labor Statistics
Children in poverty	Percentage of children under age 18 in poverty	Small Area Income and Poverty Estimates
Income	Median household income	Small Area Income and Poverty Estimates
Income inequality	Ratio of household income at the 80th percentile to income at the 20th percentile	American Community Survey
Children in single-parent households	Percentage of children that live in a household headed by single parent	American Community Survey
Children eligible for free lunch	Percent of children that are eligible for free lunch or lunch at the reduced price	National Center for Education Statistics
Violent crime	Number of reported violent crime offenses per 100,000 population	Uniform Crime Reporting – FBI and Michigan State Police
Homicide	Number of reported homicides per 100,000 population	CDC WONDER mortality data
Property crime	Number of reported property-related crimes per 100,000 population	Uniform Crime Reporting – FBI and Michigan State Police
Physical Environment		
Measure	Description	Source
Air pollution - particulate matter ¹	Average daily density of fine particulate matter in micrograms per cubic meter (PM2.5)	Environmental Public Health Tracking Network
Drinking water violations	Indicator of the presence of health-related drinking water violations. 1 - indicates the presence of a violation, 0 - indicates no violation	Safe Drinking Water Information System
Severe housing problems	Percentage of households with at least 1 of 4 housing problems: overcrowding, high housing costs, or lack of kitchen or plumbing facilities	Comprehensive Housing Affordability Strategy (CHAS) data
Demographics		
Measure	Description	Source
Population	Population Sizes	Census Population Estimates
Children	Percent population below 18 years of age	Census Population Estimates
Elderly	Percent population 65 and older	Census Population Estimates
Race-ethnicity	Percent population Non-Hispanic African American	Census Population Estimates
Race-ethnicity	Percent population American Indian and Alaskan Native	Census Population Estimates
Race-ethnicity	Percent population Asian	Census Population Estimates
Race-ethnicity	Percent population Native Hawaiian/Other Pacific Islander	Census Population Estimates
Race-ethnicity	Percent population Hispanic	Census Population Estimates

Race-ethnicity	Percent population non-Hispanic white	Census Population Estimates
Proficient in English	Percent population not proficient in English	American Community Survey
Female	Percent population females	Census Population Estimates
Rural	Percent population in rural areas	Census Population Estimates

* Information taken from County Health Ranking reports <https://www.countyhealthrankings.org>

Table 2. Gap statistics using z-score standardized features for $k = 1$ to 10 clusters.

k	$Gap(k)$	sd_k	s_k	$Gap(k) - [Gap(k + 1) - s_{k+1}]$	Optimal K^*
1	0.802019	0.017407	0.017408	-0.13264	no
2	0.953252	0.018592	0.018593	-0.1272129	no
3	1.099774	0.019309	0.01931	-0.0410312	no
4	1.1605	0.019694	0.019695	-0.0230073	no
5	1.203549	0.020041	0.020042	-0.0144393	no
6	1.238397	0.020408	0.020409	-0.0080538	no
7	1.267004	0.020553	0.020554	-0.0045311	no
8	1.292483	0.020946	0.020947	-0.0025607	no
9	1.31613	0.021086	0.021087	0.0011321	Yes
10	1.336292	0.021293	0.021294	n.a.	n.a.

Table 3. Number of a times a county was clustered together with Genesee County in 5,000 iterations with random initial assignments, based on z-score standardized features and 9-cluster optimal solution

County	Number of times grouped in the same cluster as Genesee County
Saginaw	4,405
Muskegon	4,183
Calhoun	4,124

Table 4. Vital health features in 2015 of Genesee, Saginaw, Muskegon, and Calhoun counties

Variable	Genesee	Saginaw	Muskegon	Calhoun
% of adults reporting fair or poor health	16.54	15.83	15.05	15.54
Average # of physically unhealthy days reported in past 30 days	4.13	3.78	3.91	3.93
Average # of mentally unhealthy days reported in past 30 days	4.25	3.86	3.91	3.82
% of live births with low birthweight (< 2500 grams)	10.27	9.51	9.26	8.15
Index of factors that contribute to a healthy food environment	6.70	7.10	6.50	7.40
Teen birth rate per 1,000 female population, ages 15-19	40.94	36.11	42.75	43.44
% of population under age 65 without health insurance	6.76	6.93	7.14	7.37

Ratio of population to primary care physicians	1096.00	1193.00	1600.00	1679.00
Ratio of population to dentists	1437.00	1476.00	1678.00	1509.00
% of high school graduate ages 25 years and older	32.80	34.20	34.80	35.70
% of adults ages 25-44 years with some post-secondary education	63.92	64.06	58.36	58.77
% of population ages 16 and older unemployed but seeking work	5.82	5.46	5.55	4.88
% of children under age 18 in poverty	30.20	27.70	23.40	24.00
Ratio of household income at the 80th percentile to income at the 20th percentile	4.77	4.61	4.48	4.39
% of children that live in a household headed by single parent	44.99	42.45	39.84	41.63
# of reported violent crime offenses per 100,000 population	765.40	745.01	480.35	577.35
Average daily density of fine particulate matter in micrograms per cubic meter	10.20	10.00	10.30	11.50
Indicator of the presence of health-related drinking water violations	1.00	1.00	0.00	0.00
% of households with at least 1 of 4 housing problems: overcrowding, high housing costs, or lack of kitchen or plumbing facilities	17.53	15.39	15.48	14.47
Average infant death	40.40	17.80	17.00	11.80
% of frequent physical distress	12.28	11.72	12.02	11.63
% of frequent mental distress	12.61	11.84	11.99	11.79
% of food insecure	16.90	14.70	14.70	14.30
% of limited access	10.98	10.39	16.96	8.25
# of death due to drug-induced	134.00	34.00	42.00	46.00
% of insufficient sleep	35.00	36.30	34.30	36.50
% of uninsured adults	8.38	8.34	8.84	8.93
% of uninsured children	2.59	3.17	2.95	3.47
Health care costs	11817.97	10652.36	9303.26	9872.02
Ratio of primary care physicians	1852.00	1032.00	1164.00	1163.00
% disconnected youth	9.69	7.92	9.26	8.38
Household income	44181.00	43344.00	46709.00	43864.00
% of free or reduced lunch	53.69	50.21	59.53	50.87
# of violent crime /1000	5.80	6.00	4.20	5.70
# of property crime/1000	24.70	19.90	33.00	29.10
Index of segregation none-white and white	60.57	55.94	62.83	46.58
# of population	410849.00	193307.00	172790.00	134314.00
% of ages under 18	23.24	21.75	23.56	23.18
% of ages over 65	16.06	17.82	15.51	16.80
% of African American	20.34	18.54	14.13	10.86
% of American Indian Alaskan Native	0.57	0.57	0.98	0.78
% of Asian	1.07	1.36	0.68	2.17
% of Native Hawaiian Other Pacific Islander	0.03	0.05	0.04	0.06
% of Hispanic	3.31	8.24	5.42	4.84
% of none-Hispanic	72.47	69.75	76.58	78.62
% of not professional English	0.41	0.70	0.34	1.00
% of female population	51.83	51.49	50.27	51.13
% of rural population	16.76	31.12	23.31	30.98

Table 5. Single nearest county to Genesee County using different standardized scores and distance measures

Distance measures	Standardized scores					
	z-score	x/max(x)	min-max	x/sum(x)	rank(x)	abs(x-mean)
Euclidean	Saginaw	Saginaw	Saginaw	Ingham	Wayne	Washtenaw
L1	Wayne	Saginaw	Wayne	Saginaw	Wayne	Gladwin
Canberra	Wayne	Wayne	Wayne	Wayne	Wayne	Wayne
1-correlation	Saginaw	Saginaw	Saginaw	Wayne	Wayne	n.a.

Table 6. The parametric and non-parametric* synthetic control models' root mean-squared prediction error (RMSPE), 4 counties with the highest weights, and average bias in the pre-treatment period. (Note: Wayne does not include the City of Detroit.)

Predictors***	Model	RMSPE	4 Highest weight counties	Bias in years prior to 2016
\$unstd	Parametric	0.745	Saginaw, Wayne, Muskegon, St. Clair	-0.218
	Non-parametric	0.581	St. Clair, Saginaw, Jackson, Monroe	0.005
\$std	Parametric	0.851	Saginaw, Muskegon, Wayne**	-0.385
	Non-parametric	0.581	Jackson, Monroe, St. Clair, Saginaw	-0.009
\$unstd+\$std	Parametric	0.668	Wayne, Muskegon, Cass**	0.135
	Non-parametric	0.548	Ottawa, Livingston, Oakland, Washtenaw	0.128
\$unstd-pc10	Parametric	0.709	Wayne, Saginaw, Calhoun, St. Joseph	0.452
	Non-parametric	0.586	Saginaw, Monroe, Calhoun, Jackson	-0.025
\$std-pc10	Parametric	1.032	Saginaw, Muskegon, Wayne, Lenawee	-0.724
	Non-parametric	0.581	Jackson, Monroe, St. Clair, Saginaw	-0.009
\$unstd+\$std-pc10	Parametric	0.828	Saginaw, St. Clair, St. Joseph, Wayne	-0.281
	Non-parametric	0.590	Jackson, Saginaw, Bay, Calhoun	-0.024

*Almost all counties have equal weights.

** Only 3 counties have non-zero weights

*** The list of variables in the unstandardized and standardized covariates are not the same.

Figure 1. Scree plots of within sum of squares (WSS), log[WSS] or the proportional reduction of error (PRE) metrics using the z-score standardized features for 1 to 10 clusters.

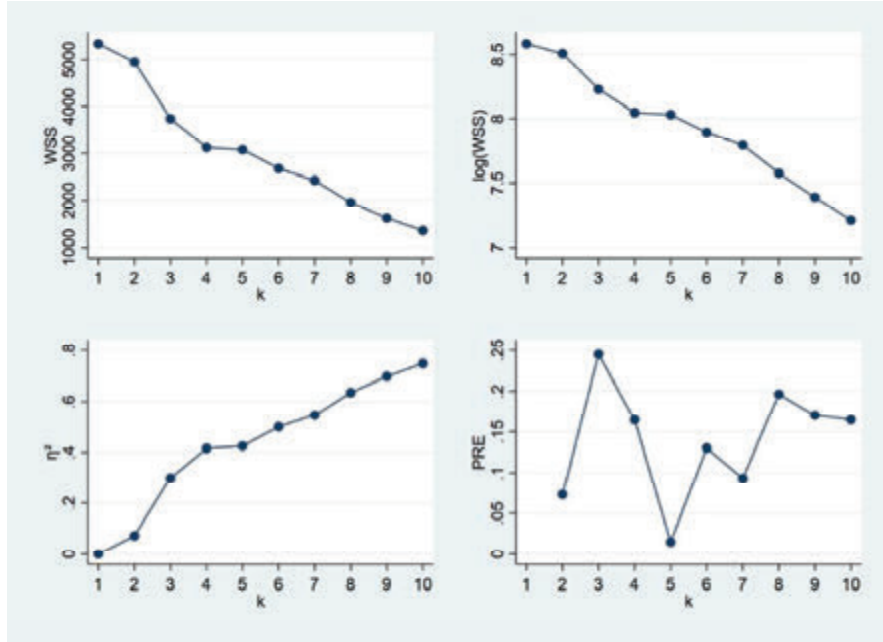


Figure 2. Percent children under age 6 with elevated blood lead level (EBLL) using either capillary or venous test. The red line is for children in Flint and blue dashed line is for children in Genesee County. (Note: The City of Detroit is excluded from the Wayne County data.)

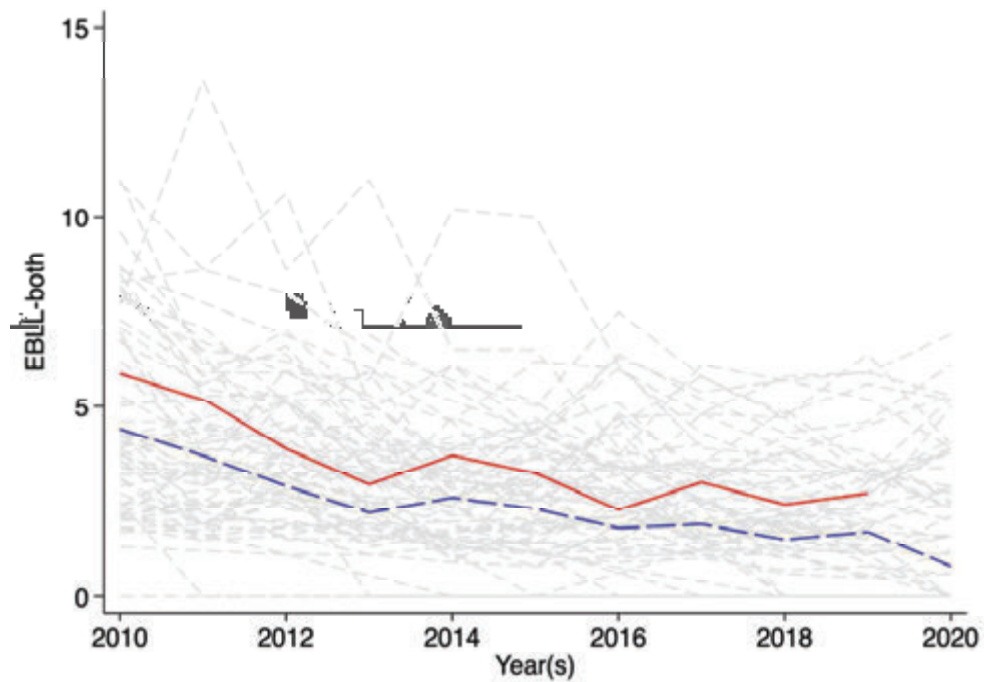
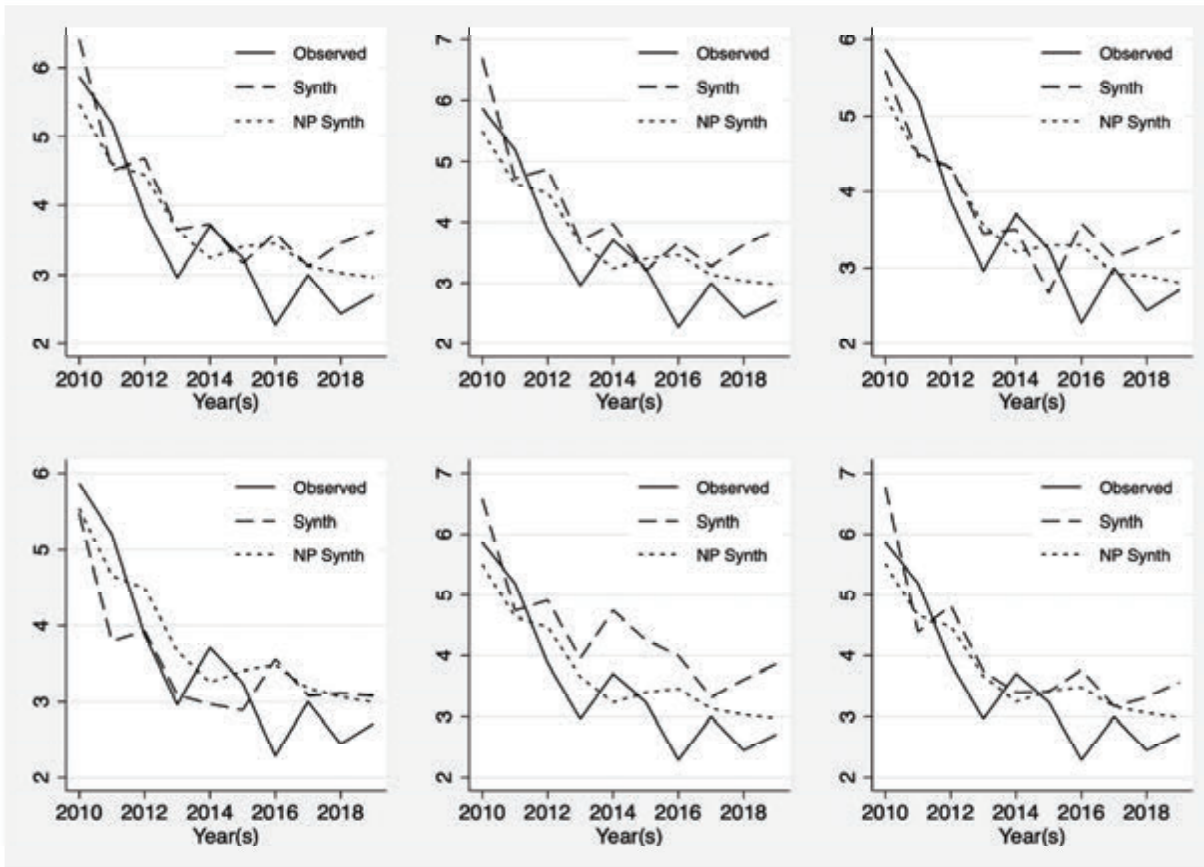


Figure 3. The parametric and non-parametric synthetic controls compared with the observed trends in Flint. The 6 panels from left to right and top to bottom are based on the following formats: 1) unstandardized variables, 2) standardized variables, 3) all variables, 4) first 10 principal components (PCs) of the unstandardized variables, 5) first 10 PCs of the standardized variables, 6) first 10 PCs of all variables.



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Flint, Michigan Section 1115 Demonstration

#11W 00302/5

March 3, 2016 – September 14, 2021

Administrative Operations Key Informant Interview Summary Report

Submitted: 10/31/22

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Executive Summary

In 2016, the federal government declared the Flint Water Crisis an environmental and health emergency. Thus, federal funds were leveraged to mitigate potential health risks for residents who had been exposed to the lead-contaminated water. To address the sustained public health crisis, the Centers for Medicare and Medicaid Services (CMS) approved a Medicaid waiver application submitted by the State of Michigan Department of Health and Human Services (MDHHS) to expand eligibility for pregnant women as well as children less than 21 years.

The approved application, the Flint Medicaid Expansion 1115 Waiver (FME), was approved effective March 3, 2016, with enrollment commencing May 9, 2016. The waiver expanded eligibility and services in two ways: 1) increased income eligibility from a maximum of 212% FPL to 400% FPL, and 2) added Targeted Case Management (TCM) of specialized health services. The evaluation plan assessed the degree to which the four domains identified in the application met the stated goals. The four domains were: 1) access to services; 2) access to TCM; 3) improved health outcomes; and 4) lead hazard investigation.

This administrative operations report summarizes information collected through interviews, adapted from Mathematica Policy Research's Express Lane Eligibility (ELE) evaluation and conducted by the Michigan State University Institute for Health Policy (IHP) evaluation team. MDHHS personnel were interviewed in July 2019 to describe the administrative components of designing and implementing the approved waiver. Interview questions focused on planning activities, staff time, contractor costs, implementation costs, technical changes, and outreach costs (Appendix 1). The purpose of this report is to consider the time, costs, and related activities needed to implement an 1115 Waiver for an environmental crisis. Due to the unfolding emergency, state staff prioritized securing and disseminating resources over tracking specific costs. Therefore, the report is unable to document specific dollar amounts. However, it does include references to personnel and technical time considerations needed to write the application, allow enrollment for affected citizens, and technical/information system modifications to record administrative data needed for waiver tracking and management.

Effort spent securing the waiver was generally considered budget neutral as these efforts were incorporated into existing MDHHS staffing capacity. Specifically, no new personnel were hired to support the waiver. Instead, existing staff prioritized the Flint Waiver ahead of other projects and programs allowing for timely submission of the application, approval, and implementation. Preparing the application and data system changes to the eligibility and enrollment systems were the most time intensive activities for MDHHS staff. For example, negotiations between CMS and MDHHS to develop the evaluation design lasted approximately 18 months. Ongoing monitoring of activities required limited staff time once implementation of the waiver was completed. This summary of administrative cost categories for preparation and implementation of a Section 1115 Demonstration Waiver offers guidance for other state entities planning similar programming.

Introduction

This report details findings from interviews with key staff members in the Medical Services Administration (MSA) at the Michigan Department of Health and Human Services (MDHHS). MSA is responsible for managing Michigan's Medicaid program. Interviews were conducted to describe the initial administrative costs associated with the Section 1115 Demonstration Waiver. The interviews, facilitated by evaluation staff at the Michigan State University Institute for Health Policy (MSU-IHP), used guided questions designed in accordance with the 1115 Demonstration evaluation guidelines provided by the Centers for Medicaid and Medicare Services (CMS).¹

Michigan's Section 1115 Demonstration Waiver, Flint Medicaid Expansion (FME) was officially approved on March 3, 2016. The primary function of the waiver was to expand Medicaid eligibility to vulnerable populations exposed to lead-contaminated water in the City of Flint in April 2014. The waiver also expanded services provided through the addition of specialized services referred to as Targeted Case Management (TCM) also called Family Supports Coordination (FSC). This report will use TCM terminology for clarity.

FME administration was categorized into three distinct phases of expenditures. The first phase described early administrative costs related to activities necessary to plan, draft and submit the waiver application. This early phase, referred to as *Application*, predominantly incurred expenses related to staff time. The second phase, *Implementation*, included expenses associated with the FME execution activities. These were primarily related to data systems changes and associated Information Technology contractor considerations. The third phase, *Maintenance*, included activities associated with the ongoing operations and reporting required for the waiver. Expenses incurred by MSU-IHP related to designing and obtaining CMS approval for the required evaluation extended through the *Application* and *Implementation* periods. These efforts were not compensated.

Purpose

The purpose of the interviews was to collect qualitative information about FME's administrative costs from application through implementation and maintenance. The Express Lane Eligibility (ELE)² evaluation completed by Mathematica Policy Research was selected as the primary resource to guide this report in the absence of formal published guidelines available to conduct administrative cost evaluations. The ELE report described a comprehensive methodology for estimating the administrative costs and is cited in the general Section 1115 Demonstration evaluation guidelines provided by CMS. MSU-IHP utilized these guidelines to focus on major groups of administrative costs including MDHHS staff and contractor time as well as communication, dissemination and outreach.

Interview Methods/Procedures

Interview questions were adapted from Mathematica Policy Research's ELE evaluation. In their document, they provided a discussion guide to elicit estimates of administrative costs. This guide provided a baseline and structural outline for the MSU-IHP interview process. MSU-IHP modified the guide to fit the unique characteristics of the FME. Additional questions were created to understand time tracking and management of the full scope of approved FME activities. The scope included elements of the application process, report writing, staff training, and outreach efforts. The final tool resulted from an iterative multi-key informant review process. Key informants included MSA staff members involved with the planning, implementation, and maintenance of the waiver. Refer to Appendix 1 for the Discussion Guide.

Two interview sessions were held in-person at the MDHHS Capitol Commons office building in downtown Lansing, Michigan. Eight key informants/staff members from MSA were invited to participate. Of these, seven staff members were available and attended one of the interview sessions. The first session was held on July 26, 2019, with five attendees. The second was held on July 31, 2019, with two attendees.

The list of potential key informants was based on MSU-IHP's knowledge of MSA staff involved in FME activities. These individuals were invited to identify others who would be able to contribute information to this assessment. Most participants represented staff employed since the original drafting of the FME application although several were hired after waiver approval. During the interviews, the activities described naturally fell into three phases:

- *FME Application*: The period described as approximately two in advance of and including the waiver application submission to CMS.
- *Implementation*: The six months after CMS approval when the waiver still required focused attention.
- *Maintenance*: The time after the first six months post-approval that was devoted to ongoing maintenance and operations of the waiver.

Note: The Section 1115 Waiver specific to the Flint Water Crisis was unique and an assessment like this had not been performed before. As a result, key informants were unable to fully respond to all the questions in the structured interview. Nevertheless, we have described the reporting of key informants as fully as possible.

FME Application

Activities

The team at MSA had two weeks to prepare the application. The expedited timeframe was facilitated with CMS permission to bypass certain application requirements such as tribal notices and other transparency processes. These authorizations were permitted due to the unusual nature of the waiver request arising from the unfolding public health emergency and

federal emergency declaration. Several times during the interviews, informants described the application period as “all hands-on deck.” MDHHS was operating in emergency mode.

CMS denied certain components of the original application. The submitted application requested Medicaid coverage for everyone in Flint who was exposed to the water. CMS limited the coverage to pregnant women and children through age 21 with expanded income eligibility levels from 212% of the federal poverty level up to 400%³. Initially, MSA evaluated options to reapply for the more comprehensive coverage package versus moving forward with the CMS designated subpopulations. Ultimately, time was of the essence and, to expedite the approval, the decision was made to move forward with the designated subpopulations.

The federal review process had a timeframe like the submission process. CMS completed their review and determination much more quickly compared to review timeframes for other 1115 Demonstration applications. The Flint Waiver application was submitted to CMS on February 13, 2016, and approved on March 3, 2016, with expedited processing being attributed to the federal emergency declaration. In response, MSA team members were able to draft and submit the FME application with supporting materials in a timely and efficient manner.

Due to the need for a short turnaround time, the application requests were limited. The main components requested in the application were expanding eligibility requirements and adding a Targeted Case Management (TCM) benefit. The intent of TCM was to identify and provide services that could mitigate potential health impacts for those affected by the lead-contaminated water. Due to the emergency circumstances, the required cost-benefit analyses, which typically is submitted with a 1115 Waiver application, was limited to budget neutrality. Per CMS language, budget neutrality is defined as “*federal spending under the demonstration cannot exceed projected costs in the absence of the demonstration.*”⁴

During the application period, the staff prioritized most of their effort on activities associated with preparing the 1115 Demonstration document compared to other duties. Informants reported they often worked extra hours, more than 40 hours per week, to complete the necessary work. However, this period was acknowledged to be relatively short and the MSA staff reported they were not aware of any major disruption that caused backlogs in other MSA units.

Estimated Cost Categories

MSA staff described working “night and day for two weeks” to prepare the application. None of the primary staff involved with drafting the waiver application documents were hourly employees. Thus, extra hours dedicated to this work were not directly reimbursed. Despite the attention directed to the application, key informants reported that normal Medicaid operations remained intact. None of the key informants recalled delays in planned activities due to staff being redirected.

Implementation

Activities

During the implementation phase, MSA reported frequent internal meetings in addition to weekly calls with CMS. Two members of MSA leadership were involved with these activities and this heightened level of communication continued for approximately six months. MDHHS staff reported that most of the waiver benefit administration was handled by the Medicaid contracted health plans.

To support FME operations, MDHHS required data system changes to the Medicaid eligibility and enrollment systems. The data system changes were made by CNSI and Deloitte; contractors who managed those systems. The changes required were initially thought to solely support the unique requirements of the waiver. Upon reflection, informants suggested the programming changes benefited other operations that relied on these systems. One example described updated eligibility algorithms, computer programming changes, and updates made to more accurately capture those eligible for other health and human service programs. This capture facilitated more comprehensive support for Medicaid enrollees beyond those enrolled in the FME waiver. Information regarding additional costs incurred to reimburse for these administrative system programming was not available.

MDHHS announced to key stakeholders in the Flint community that it was looking to partner with agencies to deliver the TCM services. This invitation to partners was met with minimal response. Due to the lack of initial interest, MDHHS was able to expedite the contracting process by working with one designated provider organization.

MDHHS staff stated they did not develop specific training materials for colleagues that would be involved with operating the waiver thus no additional effort or material costs were incurred. However, MDHHS staff did develop and conduct training regarding FME eligibility for the organization responsible to implement the TCM benefit. This organization was also involved with assisting potentially eligible individuals to enroll in the waiver. This training was presented at the initiation of the waiver. Subsequent or additional training was not conducted in the latter years of the FME authorized timeframe through September 14, 2021.

Estimated Cost Categories

Generally, implementation activities did not inhibit other tasks at the state. MDHHS participants reported there were only minor delays to co-occurring projects and no deadlines for major projects were pushed back. The amount of time MDHHS staff spent working on FME declined over the six-month implementation period. IT contractor time required to implement eligibility and enrollment system changes occurred as part of normal daily duties without the requirement for overtime or extra hours. This represented reprioritization of existing scopes of works rather than supplemental work. Thus, specific additional costs associated with this work were not available from MDHHS informants. Additionally, costs associated with FME outreach,

communication and related materials were not available and could not be included in this report.

Maintenance

Activities

MDHHS leadership continued to present information about the waiver availability to community partners and key stakeholders for an additional six months beyond the *Implementation* phase. As the operations became routinized, the need for extra staff time decreased. Quarterly reporting requirements specific to FME continued to require discrete attention of five staff members. Throughout the maintenance phase, staff spent time acquiring and collating relevant data using standardized queries to populate reports.

Estimated Cost Categories

Monitoring of the waiver operations required approximately five hours per week of staff time. This time was included in existing workloads and efforts. Since the staff completed these activities as part of their regular daily duties, no additional administrative costs were incurred.

Evaluation Plan Development and Approval

Activities

A major component of the 1115 Demonstration application was the requirement for a formal, independent evaluation conducted by an external party. Conditional approval of the Flint Waiver was dependent on the evaluation plan being drafted and approved by CMS. MSU-IHP developed and implemented the approved evaluation plan. The evaluation plan was designed after the CMS preliminary approval granted March 2016. A significant amount of effort was contributed by MSU-IHP to draft, revise and resubmit the evaluation plan. This work included active engagement with MSA and CMS representatives.

In addition to researching and drafting the evaluation plan document, several conference calls were held to discuss the progression of the plan. Separate meetings were held with the federal Department of Education (DoE) representatives and the Michigan Department of Education (MDE) to discuss data availability and the authorizations that would be necessary to use these data under the Family Educational Rights and Privacy Act (FERPA). MDE representatives required a waiver from the DOE to release education data at the individual level. The DoE declined to provide this authorization. Thus, the evaluation plan was modified to reflect use of summary and publicly available data. This negotiation period took approximately ten months and involved MDHHS, MSU-IHP and CMS representatives.

Estimated Cost Categories

MSU-IHP were contracted to provide quarterly reporting on evaluation activities for MDHHS and CMS. Additionally, annual reports were provided to MDHHS to summarize evaluation progress over the years. The evaluation plan that was submitted and approved included a comprehensive budget that encompassed all evaluation activities. Costs associated with contractual evaluation activities are not included in this report as those budgets were approved in advance.

Conclusion

This report documents the categories of administrative and operational activities that MDHHS was responsible for executing associated with the FME 1115 Demonstration as reported by MDHHS staff. The report is limited in that information on specific cost amounts was not available from informants. This was due, in large part, to waiver activities being folded into existing activities and workflow of the existing MDHHS staff. The amount of time contributed to the application and implementation work occurred over a relatively short timeframe, approximately six months, coinciding with a state public health emergency resulting in a federal disaster declaration. At that time, the state was determined to assist those who were exposed and activities that would have been required to accurately track costs were of secondary importance. Thus, amounts were not able to be accurately quantified retrospectively. A cost monitoring template for the *Implementation* phase of a similar 1115 waiver may be a useful tool to consider to detail and quantify demonstration waiver expenses. At a minimum, major categories that warrant inclusion would be staff time, contractual costs, IT system modifications, communication development, and dissemination and outreach. Cues to identify where duties were additional tasks versus a reprioritization of existing scopes of work would also facilitate tracking costs for administrators.

The MDHHS goal was to minimize administrative costs associated with the waiver application and implementation process. They were successful in this regard by relying on existing resources and incorporating other new initiatives. Thus, a portion of costs did not represent new expenditures because existing salaried staff worked extra hours and on weekends. No estimates of expenses affecting specific budget(s) were calculated. Costs associated with the waiver may have been less than other states might experience due to the reach and engagement of managed care in Michigan Medicaid. The benefits were available through the approved FME waiver secured by the state. However, the health plans retained responsibility for providing care to enrollees. Specific costs regarding the delivery of health care to enrollees are not included in this report. MDHHS did not perform separate rate calculations for the Flint Waiver enrollees.

Data regarding expenses for print and media communications and dissemination conducted by MDHHS and the health plans were not available. Most likely, plans used existing membership

communication modalities of newsletters, website, and social media to incorporate waiver messaging.

Section 1115 Demonstrations require states to arrange for a formal independent evaluation that restricts the State from conducting the evaluation work. Thus, a third party must be contracted to perform the evaluation proposal and negotiate with CMS for plan and budget approval. The evaluation proposals require inclusion of budget estimates to do the work but are unable to cover the efforts to design and negotiate a final plan with CMS. These efforts can be significant and time-consuming. The lack of funding may adversely affect the ability of the state to secure willing partners to absorb these expenses.

Ultimately, the nature of a demonstration project such as the FME that is implemented in response to an emergency declaration can experience greater barriers to accurately tracking costs. Unlike a demonstration that is proposed to test changes to an existing benefit or enrollee population in a prospective manner, emergency response appropriately requires re-evaluation of priorities. Individuals affected by an emergency will have different needs and the responsibilities of the state necessarily focus on addressing urgent needs over administrative tasks. As mentioned by one of the informants contributing to this report, “all hands-on deck” are needed to fill gaps and provide needed resources to those affected. Information regarding categories of costs that might come into play may be useful to share with other states experiencing emergency driven demonstrations. This report highlights major categories that were identified during a demonstration cycle. A reporting template as described earlier may be a useful tool to promote more real-time collection of expense categories.

References

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Appendix 1: Key Informant Discussion Guide



Flint 1115 MDHHS
Key Informant Interview

Flint 1115 Key Informant Interview Form Implementation/Administrative Costs

The purpose of this interview is to collect qualitative information on the administrative costs associated with the Flint 1115 Waiver to assist with the greater waiver evaluation. The goal of this process is to collect information on both implementation and ongoing costs of the Flint Waiver focusing specifically on understanding the staff time required to establish and maintain the waiver demonstration. This interview was based on the evaluation guidelines provided by Center for Medicare and Medicaid Services (CMS) and the evaluation of Express Lane Eligibility conducted by Mathematica Policy Research¹.

Date: _____ Start Time: _____ End Time: _____

Informant(s): _____

Title(s): _____

Phone: _____ Email: _____ Interview Type: _____

A. State Planning

1. What planning activities occurred in your department before deciding to implement the Flint 1115 Waiver?
 - a. What decision criteria were used to determine what services were needed in Flint?
 - b. How did Michigan determine the agencies with which you would partner?
 - c. Did Michigan complete any cost-benefit analyses before implementing the Waiver?
2. How much time do you estimate was spent on the Waiver application process and other areas such as waiver negotiations and evaluation drafting?
 - a. How much time was spent waiting for information or approvals before work could proceed?
3. Did the Flint 1115 Waiver application process take resources away from other activities? If so, what types of resources were diverted, and which activities were postponed or deprioritized?
 - a. Did the waiver application process create backlogs in other MSA units?



4. Thinking back on the process, do you have suggestions to make the next waiver request process more efficient?

B. Marginal Impacts on Contracted Costs and Staff Time

1. How many staff members spend part of their time managing the Flint Waiver?
 - a. Can you estimate the number of FTEs assigned to managing the waiver?
 - b. Were any staff members hired specifically to support the Flint Waiver? If so, is the Flint Waiver 100% of their assigned work?
2. How much time is spent by staff writing quarterly and yearly reports?
 - a. Please explain how these reports are created. For example, does the report process require regular programming or is the process simplified and automated?
 - b. How many staff members contribute time to writing the report?
 - c. What are the estimated costs (if any) associated with this report generation process?
 - d. How does the annual report writing process differ from the quarterly reports?
3. Are there any new ongoing direct expenses associated with the Flint waiver? Some potential examples include new mailing expenses or printing.

C. Implementation Costs

1. Thinking back to when the Flint Waiver was first implemented, what data system changes, if any, were needed to implement it?
 - a. About how many staff days (or what contractor costs) were required to make those changes?
 - b. What is the salary range for a staff member responsible for data systems management?
 - c. Are there any other reasons for these systems changes to be made, or were they solely to support the Flint Waiver?
2. Please describe any training for the Flint Waiver that occurred at implementation that you are aware of.
 - a. How many people were trained? What types of staff?
 - b. Have you had to retrain or refresh certain staff?



- c. How long did the training take to complete? What is your best estimate of the number of hours required to complete staff training?
3. Aside from staff training and data system enhancements, did any other major activities or processes occur to implement the Waiver?
4. Please describe other eligibility or enrollment process initiatives (if any) that were implemented concurrently with or around the same time as the Flint Waiver.
5. Did the Flint Waiver implementation take resources away from other activities? If so, what types of resources were diverted, and which activities were postponed or deprioritized?
 - a. What were the consequences of the diversion on the other activities? (backlogs, required overtime)

D. Outreach Costs

1. What is your annual budget for all enrollment activities for the current year? What is the size of that budget in comparison to the last two years?
2. What is the plan for outreach efforts for the Flint Waiver? Will they be at the same level of effort?
3. Please tell us about your major outreach strategies to enroll children who would qualify primarily on the basis of income.
4. What is your annual budget for these activities for the current year? What is the size of that budget in comparison to the last two years?
 - a. What portion of the outreach budget is dedicated to advertising materials such as handouts, flyers, and/or forms?
5. Has there been an assessment on the impact of outreach efforts? Do you feel it was money well spent? Was it different than assessments for other programs?

E. Concluding Thoughts

1. Are there other aspects of the Flint 1115 Waiver that we should know about to understand how financial and staff time costs differ under the Waiver?
2. Do you anticipate any changes to the cost of the Flint Waiver in the next year? For example, because fixed-price contracts will be renegotiated to accommodate changes in work flow, because new staff will need to be hired, or because some aspects of the Waiver will become newly automated?



3. Are there additional staff members within your agency with whom we should follow up for additional detail on any of the topics we have discussed?
4. Is there anything else that you would like to share with us concerning this period?