CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES

Data and Methodology: T-MSIS-based State Per Capita Expenditures for the 2020 Medicaid and CHIP Scorecard

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Contents

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I. Summary of State Medicaid Per Capita Expenditures Analysis

This document describes the construction of state-level Medicaid per capita expenditures for the Medicaid and Children's Health Insurance Program (CHIP) Scorecard. Our approach to this analysis draws on the methodology used by the CMS Office of the Actuary (OACT) to estimate national-level Medicaid per capita spending.[1] The data sources for the analysis are the Transformed Medicaid Statistical Information System (T-MSIS) Analytic Files (TAF) for calendar year 2018 and CMS-64 expenditure data. The TAF are the research optimized version of state T-MSIS submissions. We also used the methodology to update results previously shared with states for calendar year 2017.[2]

The analysis has three parts: (1) obtaining, preparing, and analyzing TAF and CMS-64 data; (2) estimating state per capita expenditures for five eligibility groups; and (3) assessing the quality of the TAF data.

A. Data sources

We use four primary data sources for the analysis.

1. **TAF data.** The TAF are the research-ready versions of state T-MSIS data. They are the only data at the national level that provide information at the beneficiary and service levels, thereby supporting an assessment of per capita expenditures across five key eligibility groups. The analysis was based on the TAF for calendar year 2018 that reflects state T-MSIS submissions as of March 31, 2020. The following information from TAF was used in the analysis:
    - Counts of beneficiaries and months of enrollment by eligibility group from the TAF Annual Demographic and Eligibility (DE) file.
    - Expenditures from the TAF claims files, which include inpatient hospital (IP), other services (OT), long-term care (LT), and pharmacy (RX) claims. Claims data in the TAF are organized by service dates on the claims. For example, a claim for a service that took place on December 15, 2018, but was paid in January of 2019 would appear in the December 2018 claims file, and not the January 2019 file. Appendix A contains an explanation of how TAF claims files are constructed from T-MSIS files.

[1] We deviated from OACT's methodology in certain cases where it made sense for purposes of this analysis.

[2] The methodology in this document focuses on calendar year 2018 data, however we also applied the same methodology described to calendar year 2017 data. The only deviation in how the methodology was applied to 2017 was in the enrollment data quality assessment. We only used Performance Indicator (PI) enrollment data for June-December 2017 as a benchmark because PI data for January-May 2017 had some anomalies which made its use problematic for those months.

2. **CMS-64 data.** We used state aggregate expenditure information for calendar year 2018 extracted from the Medicaid Budget and Expenditure System (MBES). The MBES is the financial reporting system for the federal Medicaid matching payments to states. We used this expenditure information to calculate total expenditures at the state level. Expenditures in the MBES are organized by payment date. In certain circumstances, we also used the enrollment counts that states report to the MBES.
3. **Performance Indicator (PI) data.** We used the enrollment data that states report monthly to the Medicaid & CHIP Application, Eligibility Determination, and Enrollment data system for all months of calendar year 2018.
4. **Master Beneficiary Summary file.** We used this Medicare file[3] on the Virtual Resource Data center to determine the percent of Medicare-Medicaid dually-eligible beneficiaries who are aged or disabled and used that percentage to allocate CMS-64 Medicare premiums to the aged and disabled populations.

B. Overview of methodology

This chapter summarizes our three-step methodology, which is described in detail in Chapter II.

1. Preparing and summarizing TAF and CMS-64 data

- Using the 2018 TAF data, for each state, we first determined how the total number of months in which Medicaid beneficiaries were enrolled during calendar year 2018 was distributed across the five key eligibility groups. This step required us to map 75 eligibility categories reported by states in the T-MSIS data to the five groups listed below:

  - Children[4]
  - Adult non-VIII Group (under age 65, not disabled, and not part of a Medicaid expansion for adults)
  - Aged
  - People with disabilities
  - Adults covered under section 1902(a)(10)(A)(i)(VIII) of the Social Security Act (also known as the VIII group adults or Medicaid expansion adults)[5]

[3] This file is documented here: https://www.resdac.org/cms-data/files/mbsf-base

[4] We excluded all CHIP beneficiaries, including those in S-CHIP and M-CHIP, from all calculations. Although M-CHIP beneficiaries may be considered Medicaid beneficiaries, we excluded them from the per capita spending calculations because we benchmarked TAF spending to state spending reported in the CMS-64, whereas all CHIP spending is reported in the Children's Budget and Expenditure System (CBES). This approach is consistent with the OACT methodology.

[5] In future releases of per capita expenditures, we will attempt to break out the VIII group into two subgroups: the *(continued)*

- Once the total number of enrollment months were distributed across the five eligibility groups, the enrollment counts for each eligibility group and state were divided by 12 to produce an annualized measure of enrollment.

- For each beneficiary identified in the TAF data, we used the payment information from the TAF claims records to estimate total expenditures for the year and then summed the payments for everyone in a given eligibility group to get a total expenditure amount for that group. We then summed across the five eligibility groups to determine total expenditures for each state.

- To calculate CMS-64 expenditures for each state, we summed total (federal and state share) net Medicaid assistance payments that each state reported to CMS in MBES for all quarters in calendar year 2018 (quarters 2, 3, and 4 of federal fiscal year 2018 and quarter 1 of federal fiscal year 2019). We excluded spending in service categories not linked to individual beneficiaries, such as administrative expenses and disproportionate share hospital (DSH) payments, consistent with OACT's methodology.

2. Estimating state per capita expenditures for five eligibility groups

- We used the TAF annualized enrollment counts for each state and eligibility group obtained in step 1 as the denominators for the per capita expenditures estimates.

- We used CMS-64 total expenditures obtained in step 1 as the basis of the numerators for the per capita expenditures estimates. The CMS-64 total expenditures were allocated across eligibility groups (within each state) based on the distribution of TAF expenditures across eligibility groups obtained in step 1.

- Finally, we calculated per capita expenditures for each eligibility group within each state by dividing each numerator (expenditures) by the corresponding denominator (enrollment).

3. Assessing the usability of the TAF data

We conducted four analyses[6] to assess the quality and completeness of each state's 2018 TAF data for use in estimating per capita expenditures for each state. The thresholds used in the previous (2019) Scorecard to determine if a state passed

(continued)
newly eligible VIII group and the Other VIII group. To date, states have not been submitting accurate information about these sub-groups to T-MSIS, the source data for TAF, to warrant using such a breakout in the current analysis.

[6] In future versions of the Scorecard, CMS has additional data quality assessments under consideration. In addition, CMS will be investigating the sensitivity of the estimates to the definitions and data sources used in the analysis (e.g. comparing how the per capita expenditure estimates vary when different data sources and methodology are used to determine the denominators and numerators).

each DQ assessment are listed below for reference. The thresholds for Scorecard 2020 are still under review by CMS and may change.

- **Enrollment.** To ensure that we have a reasonably accurate number of beneficiaries, we assess the difference between TAF enrollment and each state's PI enrollment and CMS-64 enrollment, averaged across all months of 2018. We also benchmark enrollment to the CMS-64 enrollment numbers. The threshold for last year was a 5% or less difference in either comparison.

- **Eligibility group code.** To link expenditures in claims to the appropriate eligibility group, we assess missing eligibility information in the TAF data. The threshold for last year was 5% or less missing eligibility information.

- **Claims volume**. To ensure that spending estimates are based on a reasonably complete set of claims, we compare each state's volume of claims per 1,000 member months with the national median of claims per 1,000 member months for each TAF claims file type. The threshold for last year for each claims file was that a state's volume of claims had to be at least 20 percent of the national median for that claim file.

- **Expenditures: fee-for-service and monthly payments**. Since fee-for-service (FFS) and monthly beneficiary payments (MBP)[7] make up a large share of spending in many states, we compare the sum of these amounts captured in the TAF to the amounts reported by states in the CMS-64 forms. The threshold for last year was that a state's TAF capitation payments be within 5% of CMS-64 capitation payments. This year, in addition to comparing the sum of FFS plus MBP to CMS-64 payments, we separately compare FFS and MBP to assist states with identifying data quality issues and because CMS may assess FFS and MBP separately in the future.

  The next chapter provides more detail on the methodology we used to construct per capita expenditures and to assess the quality and completeness of each state's TAF data.

[7] Monthly beneficiary payments are all monthly payments reported in the TAF Other claims file (OT) which would be claims with claim type = 2: Medicaid or Medicaid-Expansion Capitated Payment. They include: capitated payments to HMOs, HIOs, or PACE plans; capitated payments for primary care case management (PCCM); premium payments for private health insurance; and capitated payments to prepaid health plans (PHPs).

II. Data and Methods in Detail

A. Data sources and analysis

Four data sources formed the basis of our analysis. The first is the TAF, composed of five files: Annual DE file of enrollment and eligibility information as well as the IP, OT, LT, and RX claims files, which include records for services provided during calendar year 2018. The second source is the Medicaid quarterly expenditure data and enrollment data that we downloaded from the MBES system. In addition, we downloaded monthly Medicaid PI enrollment data from the Medicaid website: Medicaid & CHIP Application, Eligibility Determination, and Enrollment data system. The last data source was the Medicare Master Beneficiary file. All files represent calendar year 2018 data. All calculations were performed separately for each state and eligibility group within each state. Appendix B shows a list of the TAF data fields and the corresponding T-MSIS data fields used in this analysis.

1. Constructed Medicaid member months and eligibility groups from the TAF DE file for each state

The first step was to determine how the total number of member months covered by each state was distributed across the five key eligibility groups. This information was needed to create the denominator for the per capita metric. Because we used the TAF data for this component of the analysis, we built this information from the beneficiary level up to each eligibility group. Specifically, we:

- Calculated the number of total number of months in which each Medicaid beneficiary was enrolled at any point in 2018, summing the number of months on Medicaid for each beneficiary[8]

- Grouped the beneficiaries into the five eligibility groups:

    - Children[9]
    - Adult non-VIII Group (under age 65, not disabled, and not part of a Medicaid expansion for adults)
    - Aged

[8] We removed the separate CHIP (S-CHIP) and Medicaid expansion CHIP (M-CHIP) beneficiaries from the analysis, restricting the estimates to only those Medicaid beneficiaries whose services were financed as Title XIX services. To exclude the S-CHIP and M-CHIP beneficiaries, we used the CHIP code in the TAF enrollment records and excluded all beneficiaries reported to be only in CHIP during the year (CHIP code = 2 or 3 or Eligibility group = 61-68 when the CHIP code was missing).

[9] In 2014, three states: California, North Dakota, and Utah established an agreement with CMS that allows them to calculate a percentage of their Medicaid Child population and report them as M-CHIP. This agreement was reached due to the implementation of MAGI rules under the ACA and the elimination of asset questions that moved these beneficiaries from M-CHIP to Medicaid. In T-MSIS this Child population is identified as Medicaid Child, not M-CHIP. We have adjusted our calculations for this re-apportionment, which ranges from 6-8%, depending on the state.

- People with disabilities
- Adults covered under section 1902(a)(10)(A)(i)(VIII) of the Social Security Act (also known as the VIII group adults or Medicaid expansion adults)

We used eligibility code information (the most recent non-missing value for a person in the calendar year) and age in the TAF enrollment records[10] to categorize beneficiaries into the five eligibility groups. For full details on this categorization, please see Appendix C. If a state had not expanded Medicaid by the end of 2018, but their eligibility data showed beneficiaries in the VIII group, we removed those beneficiaries from the analysis.

2. Calculated expenditures for each beneficiary by using the TAF 2018 claims data

For each beneficiary, we used payment information from the TAF IP, OT, LT, and RX claims files to calculate total payments at the individual level.[11] For a detailed explanation of how claims are compiled from T-MSIS and organized into TAF monthly files, please see Appendix A. We aggregated the claims payments as follows:

- From the IP, LT, OT, and RX files, we used all FFS claims records, all capitated payment and monthly payment records, and Medicaid supplemental payments that are linked to an individual beneficiary (claim types 1 - Medicaid FFS claims, 2 - Medicaid capitated claims, and 5 - Medicaid Supplemental payments). We did not use Medicaid encounter claims.

- We did not include any claims that represented a lump-sum payment or that could not be assigned to a beneficiary. That is, we excluded claims from the IP file that were Medicaid DSH payments; any service tracking claims from the IP, LT, OT, or RX files; and any claim that had a positive service tracking payment amount.[12]

- We removed any fee-for service claim where at least one claim line had a type of service indicating supplemental payments (type of service=132, 133, 134) or electronic health record payments (type of service=135). We also removed any OT or RX claims where at least one claim line had a type of service code indicating drug rebates (type of service=131). [13]

[10] The MASBOE field was used in the few cases in which the eligibility group code was missing, but the state had provided a value for MASBOE.

[11] We used the total payment amount from the header record, which summarizes the claim.

[12] Service tracking records represent lump-sum payments to a service provider that are not linked to specific individuals. An example is monthly billing from a transportation provider.

[13] Before removing any header claims based on the content of the claim lines, we dropped any denied claim lines because TAF includes denied claim lines. Denied claim lines are identified as Claim line status code=26, 87, 542, 585, 654.

- We then summed the total Medicaid paid amount from each of the remaining IP, LT, OT, and RX records for each beneficiary[14]. At the end of this step, the file consisted of four payment variables (totaled over all 12 months) for each Medicaid beneficiary. The four variables were then summed to produce the total payment for each beneficiary. If a beneficiary did not have any claims in 2018, then the total payment amount was $0 for that beneficiary.

3. Extracted CMS-64 expenditure and enrollment data from the MBES

We used the MBES system to obtain quarterly Medical Assistance payments reported by each state to obtain federal matching funds. [15] We extracted and aggregated the CMS-64 expenditure data as follows:

- We first downloaded the data for the four calendar quarters of 2018.[16] Table II.1 shows all of the medical assistance payment categories in the CMS-64 and how they were used in this analysis.

- We obtained the CMS-64 payment data from the FMR Category of Service report of the MBES system. This report includes all expenditures for Medical Assistance Payments (MAP) within the MBES system

    - Tab 50 is the total of all MAP categories of service and includes all of the 64.9 series of forms (64.9 Base, 64.9 Waiver, 64.9 VIII, 64.9E, 64.9 PE, and the prior period expenditures adjustment forms which have a P behind them. It includes expenditures from waivers and non-waivers.
    - The 64.10 is ADMIN and 64.21 is M-CHIP. These forms are not included in the FMR Category of Service report and are not included in the expenditures for this analysis.
    - For Uncompensated care waivers: All waiver information entered on a 64.9 series expenditure waiver form in MBES is included. This includes 1115, 1915(b), and 1915(c) waivers.

- Once we downloaded the data for the four calendar quarters of 2018, we calculated net expenditures by subtracting DSH payments: (Net expenditures [column G] from the Total expenditures tab [category 50] − Net expenditures from Inpatient DSH [category 1B] – Net expenditures from Mental Health DSH [category 2B]). We then

[14] We adjusted expenditures for California, North Dakota, and Utah because these states have an established agreement with CMS that allows them to calculate a percentage of their Medicaid Child population and report them as M-CHIP. See footnote 9.

[15] We used the total payments that consists of both the state and the federal share.

[16] Specifically, we obtained data from the CMS-64/Financial Management Reports (FMR) for the Category of Service, Nation, and four quarters for calendar year 2018. This included the second through fourth quarters for federal fiscal year 2018 and the first quarter of federal fiscal year 2019, which corresponded to TAF calendar year 2018. We limited the expenditures to the category known as Medical Assistance Payments, Total Computable.

summed the total payments across the four calendar quarters to calculate the total CMS-64 payments for the year for each state.

- Using CMS-64 categories 18A to 22, we calculated capitated payments separately by summing the capitated payments across the four calendar quarters to obtain an annual capitated payment amount for each state.

Table II.1. Categories from CMS-64 quarterly spreadsheets

CMS-64 Service Category	CMS-64 Category Code	Expenditure category
Inpatient Hospital - Reg. Payments	1A	FFS
Inpatient Hospital - DSH	1B	OTHER
Inpatient Hospital - Sup. Payments	1C	OTHER
Inpatient Hospital - GME Payments	1D	OTHER
Mental Health Facility Services - Reg. Payments	2A	FFS
Mental Health Facility - DSH	2B	OTHER
Certified Community Behavior Health Clinic Payments	2C	FFS
Nursing Facility Services - Reg. Payments	3A	FFS
Nursing Facility Services - Sup. Payments	3B	OTHER
Intermediate Care Facility - Public	4A	FFS
Intermediate Care - Private	4B	FFS
Intermediate Care Facility - Individuals with Intellectual Disabilities (ICF/IID): Supplemental Payments	4C	OTHER
Physician & Surgical Services - Reg. Payments	5A	FFS
Physician & Surgical Services - Sup. Payments	5B	OTHER
Physician & Surgical Services - Evaluation and Management	5C	FFS
Physician & Surgical Services - Vaccine codes	5D	FFS
Outpatient Hospital Services - Reg. Payments	6A	FFS
Outpatient Hospital Services - Sup. Payments	6B	OTHER
Prescribed Drugs	7	FFS
Drug Rebate Offset - National	7A1	DRUGREBATE
Drug Rebate Offset - State Sidebar Agreement	7A2	DRUGREBATE
MCO - National Agreement	7A3	DRUGREBATE
MCO - State Sidebar Agreement	7A4	DRUGREBATE
Increased ACA OFFSET - Fee for Service	7A5	DRUGREBATE
Increased ACA OFFSET - MCO	7A6	DRUGREBATE
Dental Services	8	FFS
Other Practitioners Services - Reg. Payments	9A	FFS
Other Practitioners Services - Sup. Payments	9B	OTHER
Clinic Services	10	FFS
Laboratory/Radiological	11	FFS
Home Health Services	12	FFS
Sterilizations	13	FFS

II. Data and Methods in Detail

CMS-64 Service Category	CMS-64 Category Code	Expenditure category
Abortions	14	FFS
EPSDT Screening	15	FFS
Rural Health	16	FFS
Medicare - Part A	17A	OTHER
Medicare - Part B	17B	OTHER
120% - 134% Of Poverty	17C1	OTHER
Coinsurance	17D	FFS
Medicaid - MCO	18A	MBP
Medicaid MCO - Evaluation and Management	18A1	MBP
Medicaid MCO - Vaccine codes	18A2	MBP
Medicaid MCO - Community First Choice	18A3	MBP
Medicaid MCO - Preventive Services Grade A OR B, ACIP Vaccines and their Admin	18A4	MBP
Medicaid MCO - Certified Community Behavior Health Clinic Payments	18A5	MBP
Prepaid Ambulatory Health Plan	18B1	MBP
MCO PAHP - Evaluation and Management	18B1a	MBP
MCO PAHP - Vaccine codes	18B1b	MBP
MCO PAHP - Community First Choice	18B1c	MBP
MCO PAHP - Preventive Services Grade A OR B, ACIP Vaccines and their Admin	18B1d	MBP
Medicaid PAHP - Certified Community Behavior Health Clinic Payments	18B1e	MBP
Prepaid Inpatient Health Plan	18B2	MBP
MCO PIHP - Evaluation and Management	18B2a	MBP
MCO PIHP - Vaccine codes	18B2b	MBP
MCO PIHP - Community First Choice	18B2c	MBP
MCO PIHP - Preventive Services Grade A OR B, ACIP Vaccines and their Admin	18B2d	MBP
Medicaid PIHP - Certified Community Behavior Health Clinic Payments	18B2e	MBP
Medicaid - Group Health	18C	MBP
Medicaid - Coinsurance	18D	MBP
Medicaid - Other	18E	MBP
Home & Community-Based Services - Reg. Pay. (Waiv)	19A	FFS
Home & Community-Based Services - St. Plan 1915(i) Only Pay.	19B	FFS
Home & Community-Based Services - St. Plan 1915(j) Only Pay.	19C	FFS
Home & Community Based Services State Plan 1915(k) Community First Choice	19D	FFS
All-Inclusive Care Elderly	22	MBP
Personal Care Services - Reg. Payments	23A	FFS

CMS-64 Service Category	CMS-64 Category Code	Expenditure category
Personal Care Services - SDS 1915(j)	23B	FFS
Targeted Case Management Services - Com. Case-Man.	24A	FFS
Case Management - State Wide	24B	FFS
Primary Care Case Management	25	MBP
Hospice Benefits	26	FFS
Emergency Services for Undocumented Aliens	27	FFS
Federally-Qualified Health Center	28	FFS
Non-Emergency Medical Transportation	29	FFS
Physical Therapy	30	FFS
Occupational Therapy	31	FFS
Services for Speech, Hearing & Language	32	FFS
Prosthetic Devices, Dentures, Eyeglasses	33	FFS
Diagnostic Screening & Preventive Services	34	FFS
Preventive Services Grade A OR B, ACIP Vaccines and their Admin	34A	FFS
Nurse Mid-Wife	35	FFS
Emergency Hospital Services	36	FFS
Critical Access Hospitals	37	FFS
Nurse Practitioner Services	38	FFS
School Based Services	39	FFS
Rehabilitative Services (non-school-based)	40	FFS
Private Duty Nursing	41	FFS
Freestanding Birth Center	42	FFS
Health Home w Chronic Conditions	43	FFS
Tobacco Cessation for Preg Women	44	FFS
Other Care Services	49	FFS
Total Net Expenditures	50	

4. Obtained benchmark enrollment data for all months of 2018

We used the monthly PI data, as well as CMS-64 monthly enrollment, as benchmarks for the quality of the TAF enrollment counts. We chose the PI data primarily because they are reviewed and validated with the states. However, a subset of Medicaid enrollees are reported to PI and states may define the subset differently and in a way that makes it challenging to compare TAF to PI in a consistent way for all states. For this reason, we also benchmarked TAF enrollment counts to the CMS-64 enrollment counts, which represent all Medicaid enrollees.[17] CMS-64 enrollment, however, currently is not validated with states, unlike PI enrollment. Given the limitations of both benchmark data sources, we include both comparisons in the analysis and only required states to benchmark well to one of them.

[17] We downloaded CMS-64 enrollment numbers from the MBES system.

We downloaded the monthly PI enrollment data from the Medicaid.gov website: https://www.medicaid.gov/medicaid/program-information/medicaid-and-chip-enrollment-data/report-highlights/index.html. For the CMS-64 data, we obtained the fourth calendar quarter of CMS-64 Medicaid enrollment data for 2018 from the 64.ENROLL report and used the tab "Basis of Eligibility = 8-Total eligibles" to find the total Medicaid enrollment for each month of 2018.

B. Calculation of per capita expenditures

Using the total Medicaid payments for each beneficiary from TAF described previously, we first summed up payments across all beneficiaries within an eligibility group and then summed across eligibility groups for total state expenditures. Using the total state expenditure estimate, we then calculated the percentage of total aggregate state payments accounted for by each of the five eligibility groups. We used this distribution to allocate the CMS-64 total expenditures to each of the five eligibility groups within each state. Finally, we divided the CMS-64 expenditures allocated each eligibility group by the number of TAF Medicaid member years in that eligibility group, giving us the final estimate of per capita expenditures for each eligibility group within each state. This process is illustrated below.

- **We used the summarized claims payment information (calculated in the previous step) from TAF for each beneficiary with any Medicaid member months in 2018 to obtain total Medicaid payments for each beneficiary with Medicaid enrollment.** We calculated the total payment for each of the five eligibility groups by summing total payments from the TAF for Medicaid beneficiaries in each group. A grand total spending amount for the state was calculated as the summation of the total spending amounts for each eligibility group. We calculated the proportion of the total payments across all of the groups and then calculated the total number of member months for each of the five groups. Table II.2 illustrates this calculation for one state using hypothetical data. In that table, the percentages in Column C are equal to the TAF expenditures for each eligibility group divided by the total TAF expenditures for that state. For children (Table II.2, Row 1), the value in Column C is equal to $125,500,000 divided by $664,500,000 = 19 percent.

- **Calculated the share of total state expenditures allocated to each eligibility group within each state by using the net total annual state expenditures from the CMS-64.** This step is illustrated in Table II.2 with hypothetical data. For children, Column C (19 percent) is multiplied by total state CMS-64 medical spending (Column F, $800,000,000) to produce $152,000,000.

- **Calculated per capita expenditures for each eligibility group by allocating the CMS-64 net annual spending across the number of member years for each eligibility group and dividing the number of member months from each eligibility group by 12.** We then divided the CMS-64 Medical spending for each eligibility group by the number of member years to get per capita spending per

member/year. In the example, per capita spending for children would be $152,000,000 (Column F) divided by the number of member years (80,000, Column E) to produce $1,900.

- **Calculated total per capita expenditures for each state as the total CMS-64 medical spending for the state divided by the number of Medicaid member years.** In our example, this would be $800,000,000/(2,208,000/12) = $4,348.

In Scorecard 2020, we implemented a modification to this algorithm to account for the fact that most states are not submitting T-MSIS expenditure data for drug rebates and Medicare premiums. We still included CMS-64 expenditures for drug rebates and Medicare premiums in the numerators of the per capita estimates, but the distribution of these expenditures into eligibility categories was handled as follows:

1. Using the Medicare Master Beneficiary Summary file, calculated the number of Medicare-Medicaid dually eligible beneficiaries in each state.
2. Using the Medicare Master Beneficiary Summary file, calculated the percent of duals eligible for Medicare on the basis of being disabled and the percent eligible on the basis of being aged.
3. Applied the distribution calculated in step 2 to the CMS-64 Medicare premium expenditures for each state.
4. Determined the distribution of TAF prescription drug (RX) expenditures across the 5 eligibility categories.
5. Allocated the drug rebates from CMS-64 to each eligibility group using the TAF RX expenditure distribution.[18]
6. Added the Medicare premium payment and drug rebate expenditure estimates to all other expenditures for the grand total of expenditures by eligibility group and by state.

[18] For states with only managed care TAF RX claims (i.e. no fee-for-service TAF RX claims) we used the total TAF expenditures distribution to apply drug rebates

Table II.2. Illustrative example of one state's data for calculating per capita expenditures by eligibility group (data are hypothetical)

State x	A	B	C	D	E	F	G
Eligibility group	Number of beneficiaries in TAF	TAF total expenditures	TAF share of expenditures	Number of member months from TAF	Number of member years from TAF	CMS-64 medical spending	Per capita spending per member/ year
Children	82,000	$125,500,000	19%	960,000	80,000	$152,000,000	$1,900
Adults	44,200	$98,400,000	15%	504,000	42,000	$120,000,000	$2,857
Aged	16,000	$125,000,000	19%	180,000	15,000	$152,000,000	$10,133
Disabled	27,200	$232,600,000	35%	300,000	25,000	$280,000,000	$11,200
VIII Group	23,000	$83,000,000	12%	264,000	22,000	$96,000,000	$4,364
Total	**192,400**	**$664,500,000**	**100%**	**2,208,000**	**184,000**	**$800,000,000**	**$4,348**

Note: The total row for CMS-64 spending for each state consists of total Medical Assistance payments (minus DSH payments) and how that total CMS-64 spending amount is distributed across the eligibility groups in column F is determined by the percentage reported in column C.

C. Data usability assessments for including and excluding states

To assess the quality and completeness of the TAF data for this analysis, we compared the data to other state-reported Medicaid data on enrollment and spending.

To assist states in understanding how their T-MSIS enrollment and claims data was converted to TAF, we provide an explanation of this process in Appendix A. In short, T-MSIS claims are excluded from TAF if claims do not have a service date, and they are denied, void, duplicate, or not final action. Table II.3 shows a list of T-MSIS data elements and in which data quality assessment(s) they are used.

Table II.3 T-MSIS data elements used in the data usability assessments

Claims Data Element	Enrollment Benchmarking	Missing Eligibility	Low Claims Volume	Expenditure Benchmarking
MSIS-IDENTIFICATION-NUM			✓	✓
ADJUSTMENT-IND			✓	✓
ICN-ORIG			✓	✓
ICN-ADJ			✓	✓
Relevant Service Date[1]			✓	✓
ADJUDICATION-DATE			✓	✓
LINE-ADJUSTMENT-IND			✓	✓
TYPE-OF-CLAIM			✓	✓
TOT-MEDICAID-PAID-AMT				✓
TYPE-OF-SERVICE				✓
MEDICAID-AMOUNT-PAID-DSH				✓

Claims Data Element	Enrollment Benchmarking	Missing Eligibility	Low Claims Volume	Expenditure Benchmarking
SERVICE-TRACKING-PAYMENT-AMT				✓
CLAIM-LINE-STATUS				✓
CROSSOVER-INDICATOR			✓	
Eligibility Data Element				
ELIGIBILITY-GROUP	✓	✓	✓	✓
PRIMARY-ELIGIBILITY-GROUP-IND	✓	✓	✓	✓
SUBMITTING-STATE	✓	✓	✓	✓
MSIS-IDENTIFICATION-NUM	✓	✓	✓	✓
DATE-OF-BIRTH		✓		
DATE-OF-DEATH		✓		
RESTRICTED-BENEFITS-CODE	✓			
CHIP-CODE	✓	✓	✓	✓
DUAL-ELIGIBLE-CODE			✓	

Notes: [1] IP: ADMISSION-DATE, LT: BEGINNING-DATE-OF-SERVICE, OT: BEGINNING-DATE-OF-SERVICE, RX: PRESCRIPTION-FILL-DATE.

1. Benchmarking enrollment

We benchmarked enrollment counts in the TAF to enrollment reported in two data sources: PI and CMS-64. The TAF enrollment counts used in each of the comparisons differ because enrollment reported to PI and CMS-64 differ from one another in who is or is not included in the count of Medicaid enrollees. States are only required to have TAF enrollment counts that benchmark well in one of the two comparisons to pass the assessment.

The PI data contain enrollment counts only for beneficiaries with comprehensive Medicaid benefits, and therefore in this comparison we removed limited-benefit beneficiaries from the TAF and then compared the TAF enrollment count to the PI data. In the TAF, we identified Medicaid beneficiaries in each month by first using the CHIP code (or the eligibility group code if the CHIP code was missing) and then used the restricted benefits code to identify beneficiaries with comprehensive benefits. Specifically, we used CHIP_CD = 1 to identify the Medicaid population. If the CHIP code was missing, we counted beneficiaries with an eligibility group code that indicates that they were eligible for Medicaid benefits (ELGBLTY_GRP_CD = 01–60 or 69–75). We then used the restricted benefits code (RSTRCTD_BNFTS_CD = 1, 4, 5, 7, A, B, or D) to identify beneficiaries with comprehensive benefits. We excluded beneficiaries in the restricted benefits code 4 group in the three states that do not extend comprehensive benefits to women in the pregnancy group (Arkansas, Idaho, and North Dakota). In addition, because there is some uncertainty about whether states consider a restricted

benefits code of 5[19] as comprehensive benefits, we also ran the comparison excluding restricted benefit code 5. If excluding restricted benefit code 5 made a difference in whether a state benchmarked well, we used this version of the comparison for that state.

The CMS-64 enrollment numbers represent all Medicaid enrollees regardless of the type of benefits. For this comparison, we used CHIP_CD = 1 to identify the Medicaid population. If the CHIP code was missing, we counted beneficiaries with an eligibility group code that indicates that they were eligible for Medicaid benefits (ELGBLTY_GRP_CD = 01–60 or 69–75).

For both comparisons, we calculated the percent difference between the count of TAF enrollment defined above and the benchmark for each month of the year. Because the benchmark data can be viewed as a baseline and the TAF-based calculations as the comparison, the percent difference was calculated as a percent error or change: $\frac{(TAF - Benchmark)}{(Benchmark)} * 100$. We then averaged the percent differences across the 12 months of 2018 and calculated the absolute value of the average of the percent differences. This average number is the overall percent difference between the TAF and the PI data, and between the TAF and the MBES data.

2. Missing eligibility group code data

We estimated the percentage of beneficiaries that could be assigned to one of the eligibility groups because of non-missing values in the TAF eligibility group code data element. If too many beneficiaries cannot be assigned to an eligibility group and have to be excluded from the analysis, it increases the risk that the per capita expenditure estimates will be mis-estimated and skewed upwards. The eligibility group code in TAF consists of 75 different categories and the data include at least one value for each month someone is enrolled. Because eligibility group can change over time as a beneficiary's status changes, we used the last best value of this field in the TAF DE file to determine each person's eligibility group.

3. Low claims volume

When using data from T-MSIS, we examined the claims information for completeness. To check this issue, we calculated the average volume of claims per enrollee in TAF for each of the four claims file types (IP, OT, LT, and RX) to identify states with enough claims volume. For this analysis a threshold of at least 20 percent of the national median state claims volume within each claim type (TAF IP, OT, LT, and RX) was considered sufficient. A low claims volume indicates that the TAF claims may not be capturing enough of the state's claims and therefore expenditures, to include the state in the analysis.

[19] Restricted benefits code 5 means: Individual is eligible for Medicaid or Medicaid-Expansion CHIP but, for reasons other than alien, dual-eligibility or pregnancy-related status, is only entitled to restricted benefits (e.g., restricted benefits based upon substance abuse, medically needy or other criteria).

We used the 12 months of the TAF IP, LT, OT, and RX header claims to measure the total volume of claims submitted by each state. We included FFS claims and managed care encounter records in the analysis (CLM_TYPE_CD = 1, A, 3, C). We excluded capitated payment claims, supplemental claims, service tracking claims, and "other" claims.

To adjust for the size of the Medicaid program, we used the DE file to measure the number of months of the year in which non-dual beneficiaries were enrolled in Medicaid. We limited the analysis to non-duals because most medical claims for duals are paid for by Medicare, so claims for the dual population might bias the overall volume of claims downward.[20] We calculated the number of member months for non-duals in each state. For each claims file, we then calculated the total claims volume as the number of Medicaid and FFS claims, as well as encounter records per 1,000 member months. We did not examine whether the claims for service use linked to an enrollment record (i.e., we calculated the numerator and the denominator independently). We used the total number of months of Medicaid enrollment in the year as our denominator for examining claims volume.

4. Benchmarking expenditures

We benchmarked TAF-based estimates of annual FFS and monthly beneficiary payments to CMS-64 payment totals to identify states that had sufficient payment information in the TAF data.

To develop the TAF-based estimates of payments, we first identified Medicaid beneficiaries in each month. We did this using the CHIP code to identify Medicaid beneficiaries. Specifically, we used CHIP_CD = 1 to identify the Medicaid population. If the CHIP code was missing, we counted beneficiaries with an eligibility group code that indicated they were eligible for Medicaid benefits (ELGBLTY_GRP_CD = 01–60 or 69–75). After we identified Medicaid beneficiaries, we pulled FFS payment records and monthly beneficiary payment records[21] for these beneficiaries in every month of 2018 and added up the total Medicaid payments on these specific records[22]. In addition to

[20] We assessed claims volume both by including and excluding duals. The number of states that met the minimum claims volume threshold remained the same regardless of how duals were treated.

[21] FFS payment records are found on all file types (IP, OT, LT, RX) and are identified by using a claim type code of 1. Monthly beneficiary payment records are found only in the OT file and the claim type code for these records take a value of 2. In addition, we included supplemental and service tracking claims (claim type code of 4 or 5) in the OT monthly beneficiary payment records when the claim lines on these claims had a type of service code indicating that it was a capitation payment or monthly payment (type of service code = 119, 120, 121, 122).

[22] We excluded both FFS and monthly beneficiary payment claims where at least one claim line had a type of service that indicated that the claim was for supplemental payments (type of service=132,133,134), electronic health record payments to providers (type of service code=135) or drug rebates (type of service=131). We did this after removing denied claim lines. In addition, we subtracted DSH payments on IP FFS claims from the total Medicaid paid amount when we were able to determine that the state was including DSH payments in the total Medicaid paid amount.

capitation payments, we include primary care case management payments (PCCM) and private health insurance payments (HIP) in the monthly beneficiary payment records.

We adjusted expenditures for California, North Dakota, and Utah because these states have an established agreement with CMS that allows them to calculate a percentage of their Medicaid Child population and report them as M-CHIP. See footnote 9.

We benchmarked the sum of FFS and monthly beneficiary payments with CMS-64 FFS and monthly payments. Table II.1 shows how we classified each of the CMS-64 medical assistance payment categories.

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Appendix A:

Construction of the TAF Files

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A. Transformed Medicaid Statistical Information System

Since 1999, states have been required to submit electronic Medicaid claims and eligibility data files through the Medicaid Statistical Information System, or MSIS. These files have been the only national, uniform, and comprehensive data collection system for Medicaid and Children's Health Insurance Program (CHIP), including both Medicaid Expansion CHIP (M-CHIP) and Separate CHIP (S-CHIP), person-level enrollment and service-level claims records. During 2017, the Transformed Medicaid Statistical Information System (T-MSIS) replaced the retired MSIS system.

T-MSIS represents the next generation of national data for Medicaid and CHIP beneficiaries and the services they use. T-MSIS data enhance and expand on MSIS in the following ways:

- Files are monthly rather than quarterly.
- Files contain variable length relational records rather than fixed-length flat records, resulting in more nuanced, granular data.
- T-MSIS data can be accurate to the day based on effective and end dates of record segments within the relational structure.
- T-MSIS contains more than four times as many data elements as MSIS.
- In addition to four claims files (Inpatient, Long-Term Care, Pharmacy, and Other Services) and a person-level eligibility file, T-MSIS contains three new file types: Provider, Managed Care Plan, and Third-Party Liability.

B. Relational Structure of T-MSIS

Each T-MSIS file submission contains sets of data organized into record segments, which are converted into a series of tables that are collectively referred to as the T-MSIS relational database. The design of T-MSIS is complex. The eligibility files states submit include 19 person-specific record segments. Each segment captures different pieces of information about each individual eligible for Medicaid or CHIP, that when related to one another by shared record keys, represent a full record of information for each eligible. For claims file types, a relational record segment is either a claim header or a claim line. A full claim record may have one claim header and many claim lines.

C. Need for the TAF

To maximize the ability of end-users to analyze beneficiary health outcomes using T-MSIS, the Division of Business and Data Analytics (DBDA) within the Centers for Medicare & Medicaid Services (CMS) recognized the need to create a series of analytic-optimized data sets, or the T-MSIS Analytic Files (TAF). Data users are eager to take advantage of the benefits of T-MSIS including new variables that were not collected in MSIS or derived for the Medicaid Analytic eXtract (MAX), the predecessor

to the TAF. These new TAF data sets exist alongside T-MSIS and serve as an alternate data source tailored to meet the broad research needs of the Medicaid and CHIP data user community. This community includes not only the Center for Medicaid and CHIP Services (CMCS), but also a wide-range of users across other CMS components, such as the Center for Medicare and Medicaid Innovation (CMMI), and external researchers, such as universities or research hospitals.

Three issues make working with the source T-MSIS data challenging for researchers.

- The first is that the size of the database and the relational structure of T-MSIS does not lend itself to an intuitive approach to data selection and analysis without a relatively sophisticated understanding of its structure and contents. The relational structure means that there are parent and child records that must be linked to perform a review or complete an analysis of the data. The need to link parent and child records is particularly true for the person/entity-level files, i.e., the Eligibility, files. Each of these files has at least eight constituent record segments and multiple keys for linking them. Additionally, the size of the T-MSIS database is so large that the data are stored in a special database environment, requiring specialized knowledge in data extraction and transformation procedures. A simple record selection query, if done improperly, can potentially overload the data processing environment.

- The second issue is similarly a function of the rich data that T-MSIS provides. Because states submit files monthly and each segment comes with effective and end dates to which their data apply, seemingly straightforward questions can be quite complex to answer. For example, whether or not a beneficiary can be identified as enrolled in Medicaid in January 2018 may depend both on which state data submission is being used, as well as the specific day the data were extracted, and whether the research question references a specific point in time or the entire month. The TAF addresses these issues as uniformly as possible across the states to create a well-vetted standard approach for use by the research community. In doing so, it reduces the burden on researchers during the initial data processing phase of a research project.

- The third issue is that errors in state submissions to T-MSIS can occur. This issue manifests itself at both the data-element and structural levels. At the data-element level, states may submit data that do not conform to T-MSIS coding requirements, such as submitting values not on the list of valid codes in the T-MSIS data dictionary. The TAF recodes some invalid values to a standard NULL value. At the structural level, states may submit contradictory data within the same file. For example, a beneficiary may show as both enrolled and not enrolled in an 1115 demonstration in the month.

D. Summary of Annual and Monthly TAF

Each TAF, based on enrollment/eligibility, claims, provider and/or managed care plan data, provides T-MSIS source data as well as constructed variables designed to support research and analysis such as outcomes measurement, public reporting, quality improvement initiatives, and quality monitoring, among other items. The monthly files are created first and then the annual files are created from the corresponding monthly files. For the per capita expenditure calculations, we use five sets of TAF files:

Eligibility

The per capita expenditure analysis uses the annual DE file. We provide some background information about the monthly Beneficiary Summary File (BSF) here because the DE file builds on the monthly BSFs.

- **Annual Demographic and Eligibility (DE) TAF.** The annual DE TAF contain demographic, eligibility, and enrollment information for all Medicaid and CHIP beneficiaries who were enrolled for at least one day during each calendar year. The content of the annual DE file is largely based on the monthly Beneficiary Summary File (BSF). The monthly BSF TAF include any beneficiary in the source T-MSIS data who was enrolled in Medicaid or CHIP for at least one day in the month represented in the file being constructed. Specifically, the BSF contain one record for each MSIS ID per state that has an active[23] enrollment time span as defined by the following logic:

  - An active record for that MSIS ID as indicated by the T-MSIS active indicator AND
  - Enrollment effective date occurring before or equal to the last day of the month; AND
  - Enrollment end date occurring on or after the first day of the month OR enrollment end date = NULL.

  Both the enrollment effective date and the enrollment end date variables originate from the ENROLLMENT-TIME-SPAN-SEGMENT (ELG000021) of the file being constructed. Records are excluded if they have a DEATH-DATE (ELG000002) that is before the start of the TAF month.

  In most cases, this selection criteria results in one record per MSIS ID in the ENROLLMENT-TIME-SPAN-SEGMENT (ELG000021). However, there are two special cases. First, there can be records with active enrollment during the month,

[23] The term active refers to the most recent record submitted by the state for a particular eligibility or claims transaction. The record segment key, which is a row in a state file submission, makes a record segment distinct in the T-MSIS database. If the state submits two record segments with the same record segment key then the record segment that was submitted in the most recent reporting period's file submission with the highest file submission sequence number (only applicable when the state has submitted a Create file and then either a Replacement or Update file for the same reporting period) is marked as "active". .

but are missing an MSIS ID in the source data; those records are excluded from the BSF. Second, there are cases where multiple records are active for the same MSIS ID in a given month; this might be because a beneficiary stopped and then re-started Medicaid enrollment during the month, or it might be a data quality issue in the state's file submission. When there is more than one enrollment period, the monthly BSF captures the effective and end dates associated with each Medicaid and CHIP enrollment episode in that month.

For other data elements in the monthly BSF, the most recent active information submitted by the state is selected from the corresponding T-MSIS source record. When there are multiple records that are active in the most recent segment of the month, the source data are sorted according to a predetermined order and then the value on the first T-MSIS record in the sort order is used to populate the variable in the BSF. The BSF uses the following general sort order for most source variables (sort type in parentheses):

- T-MSIS reporting period of the record segment to which the source variable belongs (descending)
- Effective date of the record segment to which the source variable belongs (descending)
- End date of the record segment to which the source variable belongs (descending)
- Record number (descending)

When there are no active records in the T-MSIS source data segment during the month for a given beneficiary, the value for that BSF data element is set to NULL.

The variables in the annual DE files are populated from the monthly BSF. Most of the monthly data elements are taken directly from the monthly BSFs. The TAF also uses the 'last-best' method to select the value in the most recent month in which a non-missing value exists. For example, the per capita expenditures calculations use the 'last-best' value for eligibility (eligibility-group-code) to assign an individual to an eligibility group.

Claims

The four sets of monthly claims files that are used in the per capita expenditures analysis are described below.

- **Monthly Inpatient Hospital (IP) Claims TAF.** The IP TAF contain inpatient hospital claims. The claims in TAF include FFS claims, managed care encounter claims, service tracking claims, capitated payments and monthly beneficiary payments, and supplemental payments for Medicaid, Medicaid-expansion CHIP, and Separate CHIP. Inclusion in the IP TAF is based on the month/year of the discharge date or, when the discharge date is unavailable, the most recent service end date associated with the claim. Each IP TAF is comprised of two files – a Claim Header file and a Claim Line file. The claims included in these files are active, non-voided, non-denied (at the header level), non-duplicate final action claims. Only claim header records

meeting these inclusion criteria, along with their associated claim line records, are incorporated. Both files can be linked together using unique keys that are constructed based on various claim header and claim line data elements. The two IP TAF are generated for each calendar month for which data are reported.

- **Monthly Long-Term Care (LT) Claims TAF.** The LT TAF contain long-term care institution claims, including nursing facilities, intermediate care facility services for individuals with intellectual disabilities, mental health facility services, and independent (free-standing) psychiatric wings of acute care hospitals. The claims in TAF include FFS claims, managed care encounter claims, service tracking claims, and supplemental payments for Medicaid, Medicaid-expansion CHIP, and Separate CHIP. Inclusion in the LT TAF is based on the month/year of the ending date of service. Each LT TAF is comprised of two files – a Claim-Header file and a Claim-Line file. The claims included in these files are active, non-voided, non-denied (at the header level), non-duplicate final action claims. Only claim header records meeting these inclusion criteria, along with their associated claim line records, are incorporated. Both files can be linked together using unique keys that are constructed based on various claim header and claim line data elements. The two LT TAF are generated for each calendar month in which the data are reported.

- **Monthly Other Services (OT) Claims TAF.** The OT TAF contain claims for services other than those provided by an inpatient hospital, long-term care facility, or pharmacy. Services in the OT TAF include but are not limited to: physician services, outpatient hospital services, dental services, other physician services (i.e. chiropractors, podiatrists, psychologists, optometrists, etc.), clinic services, laboratory services, X-ray services, sterilizations, home health services and personal support services. The claims in TAF include FFS claims, managed care encounter claims, service tracking claims, capitated payments, and supplemental payments for Medicaid, Medicaid-expansion CHIP, and Separate CHIP. Inclusion in the OT TAF is based on the month/year of the ending date of service or, when the ending date of service is unavailable, the service beginning date is used or, when the service beginning and ending date on the claim header are missing, the most recent service ending date on the claim line is used. Each OT TAF is comprised of two files – a Claim-Header file and a Claim-Line file. The claims included in these files are active, non-voided, non-denied (at the header level) and non-duplicate final action claims. Only claim header records meeting these inclusion criteria, along with their associated claim line records, are incorporated. Both files can be linked together using unique keys that are constructed based on various claim header and claim line data elements. The two OT TAF are generated for each calendar month in which the data are reported.

- **Monthly Pharmacy (RX) Claims TAF.** The RX TAF contain claims for drugs or other services provided by a pharmacy. The claims in TAF include FFS claims, managed care encounter claims, service tracking claims, and supplemental payments for Medicaid, Medicaid-expansion CHIP, and Separate CHIP. Inclusion in

the RX TAF is based on the month/year of the prescription fill date. The RX TAF are comprised of two files – a Claim Header file and a Claim Line file. The claims included in these files are active, non-voided, non-denied (at the header level), non-duplicate final action claims. Only claim header records meeting these inclusion criteria, along with their associated claim line records, are incorporated. Both files can be linked together using unique keys that are constructed based on various claim header and claim line data elements. The two RX TAF are generated for each calendar month for which data are reported.

E. Record inclusion in TAF claims

The per capita expenditures analysis uses the header claims. All TAF header claims must meet the following criteria. The claims must be:

- Active

  Active claims have a unique segment key across all reporting periods. The segment key is defined at the claim header level by the following T-MSIS fields: SUBMITTING-STATE, ICN-ORIG, ICN-ADJ, ADJUDICATION-DATE, and ADJUSTMENT-IND. When a state resubmits a claim file to T-MSIS for one reporting period, the claim that was submitted in the previous version of the file becomes inactive, and the newly submitted claim becomes active.

- Non-denied

  The claim denied indicator (CLAIM-DENIED-INDICATOR) is equal to 1 (not denied) or the claim type (TYPE-OF-CLAIM) does not have a value of denied (Z) or the claim status category (CLAIM-STATUS-CATEGORY-CODE) does not have a value of ‘F2’ or the claim status code (CLAIM-STATUS-CODE) is not equal to one of the following values : ‘026’, ‘087’, ‘542’, ‘585’, ‘654’.

- Non-void

  The adjustment indicator (ADJUSTMENT-IND) is not equal to 1.

- Final action

  A final action claim is the claim in a claim family that represents the final version of a claim. See the next section for a full description of the final action algorithm.

- Non-duplicate

  All header claims with duplicate information on the following fields will be excluded from the TAF: TMSIS-RUN-ID, SUBMITTING-STATE-CODE, ICN-ORIGINAL, ICN-ADJUSTMENT, ADJUDICATION-DATE, ADJUSTMENT-IND.

F. Description of the Final Action Algorithm

At a high level, the final action algorithm links together the original claim and all related adjustment claims into a "claim family" that is assigned a common claim family ID. Next, the algorithm determines the "final action claim" within the family.

1. Identifying Claim Families

A "claim family" is a set of paid, denied, or void claims that have been adjudicated and have a related internal control number (ICN). This grouping of the original claim and all of its subsequent void and adjustment claims shows the progression of changes that have occurred since the claim was first submitted. Claims are first organized by source file type and then by MSIS ID. Then the ICNs on claims from the same source file type with the same MSIS ID are compared to create claim families.

There are two ways to link original claims and their subsequent adjustments into a claim family:

- All the claims in the family have the same original ICN while the adjustments each have a different adjustment ICN. This is known as the "Original ICN approach."
- Each subsequent adjustment links back to only the prior claim in the family. The original and the first adjustment have either a common original ICN or adjustment ICN. Then if there was a second adjustment it would have an original ICN or adjustment ICN in common with the first adjustment but not with the original claim. Then if there was a third adjustment it would have an original ICN or adjustment ICN in common with the second adjustment but not the first adjustment or original. This is known as the "Daisy Chain ICN approach."

2. Example of the original ICN approach

Under this approach, a state assigns an ICN to the initial adjudicated version of the claim or encounter and records this identifier in the original claim number. If adjustment claims are subsequently created, the ICN assigned to the initial adjudicated version of the claim or the encounter is carried forward on every subsequent adjustment claim. Table A.1 illustrates how the original claim number and the adjustment claim number on the members of a claim family are populated when the original ICN approach is used. Adjudication date is then used to sort claims within a family to determine the sequence in which each adjustment occurred, and which claim is the final action. Medicaid paid date or check effective date are used if adjudication date is missing or the same across claims.

Table A.1. Relationship of the original claim number and the adjustment claim number under the original ICN approach

Event	ADJUDICATION-DATE	ICN-ORIG	ICN-ADJ	ADJUSTMENT-IND
On 5/1/2014, the state completes the adjudication process on the initial version of the claim	5/1/2014	1	-	0
On 7/15/2014, the state completes a claim re-adjudication / adjustment	7/15/2014	1	2	4
On 8/12/2014, the state completes a 2nd claim re-adjudication / adjustment	8/12/2014	1	3	4
On 9/5/2014, the state completes a 3rd claim re-adjudication / adjustment	9/5/2014	1	4	4

3. Example of the daisy chain ICN Approach

Under this approach, the state records the ICN of the previous final adjudicated version of the claim/encounter in the ICN-ORIG field of the adjustment claim record. If additional adjustment claims are subsequently created, the ICN-ORIG on the new adjustment claim only points back one generation. Table A.2 illustrates how the ICN-ORIG and ICN-ADJ values on the members of a claim family are populated when the DAISY-CHAIN ICN approach is used.

Table A.2. Relationship of the original claim number and the adjustment claim number under the daisy chain approach

Event	ADJUDICATION-DATE	ICN-ORIG	ICN-ADJ	ADJUSTMENT-IND
On 6/1/2014, the state completes the adjudication process on the initial version of the claim	6/1/2014	11	-	0
On 8/15/2014, the state completes a claim re-adjudication/adjustment	8/15/2014	11	12	4
On 9/12/2014, the state completes a 2nd claim re-adjudication/adjustment	9/12/2014	12	13	4
On 10/5/2014, the state completes a 3rd claim re-adjudication/adjustment	10/5/2014	13	14	4

4. Flagging final action claims

In broad terms, the final action algorithm operates as follows:

- Link all the related claims, including the original and adjustments, into a claim family and assign a claim family ID. Identifying the set of related claims that represent a claim family will use different logic depending on whether the state uses the Original ICN approach or the Daisy Chain approach.
- Sequence the claims within a claim family either based on adjudication date (or Medicaid paid date or check effective date if adjudication date is missing or the

same across claims) if the family uses the Original ICN approach or the order implied by the relationship between the original claim number and the adjustment claim number across claims in the family if the family uses the Daisy Chain approach.

- In all states other than those using marginal adjustments (only Illinois as of November 2019), flag the final action claim as the latest-sequenced claim in a claim family. This includes all claims regardless of status, including paid, denied, and voided claims.
- If there is ambiguity in the order of the final two claims in the claim family then the algorithm uses the information available to make a best guess at the most appropriate final action claim. If the information available is not sufficient then the claim family will not be sequenced or assigned a final action status.
- In states using marginal adjustments (only Illinois as of November 2019), flag all claims in a claim family as final action claims if the last claim in the claim family is something other than a void or denied claim.

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Appendix B:

TAF and T-MSIS Data Fields Used in Per Capita Expenditures Calculations

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Appendix B: TAF and T-MSIS Data Fields Used in Per Capita Expenditures Calculations

The table below shows the list of both TAF and T-MSIS data fields from the enrollment and eligibility data files that were used to construct per capita expenditures and to perform data quality assessments.

TAF Variables from the Annual DE file	Corresponding T-MSIS data fields
SUBMTG_STATE_CD	ELG249: SUBMITTING-STATE
MSIS_IDENT_NUM	ELG251: MSIS-IDENTIFICATION-NUM
AGE_NUM	ELG024: DATE-OF-BIRTH
	ELG025: DATE-OF-DEATH
ELGBLTY_GRP_CD_01-12	ELG087: ELIGIBILITY-GROUP
ELGBLTY_GRP_LTST	ELG087: ELIGIBILITY-GROUP
MASBOE_CD_LTST	ELG084: MEDICAID-BASIS-OF-ELIGIBILITY
	ELG096: MAINTENANCE-ASSISTANCE-STATUS
RSTRCTD_BNFTS_CD_01-12	ELG097: RESTRICTED-BENEFITS-CODE
RSTRCTD_BNFTS_CD_LTST	ELG097: RESTRICTED-BENEFITS-CODE
CHIP_CD_01-12	ELG054: CHIP-CODE

Appendix B: TAF and T-MSIS Data Fields Used in Per Capita Expenditures Calculations

The table below shows the list of both TAF and T-MSIS data fields from the claims files that were used to construct per capita expenditures and to perform data quality assessments.

TAF Variables from the Claims files (IP,LT,OT,RX)	Corresponding T-MSIS data fields
SUBMTG_STATE_CD	CIP017: SUBMITTING-STATE
	CLT017: SUBMITTING-STATE
	COT017: SUBMITTING-STATE
	CRX017: SUBMITTING-STATE
MSIS_IDENT_NUM	CIP022: MSIS-IDENTIFICATION-NUM
	CLT022: MSIS-IDENTIFICATION-NUM
	COT022: MSIS-IDENTIFICATION-NUM
	CRX022: MSIS-IDENTIFICATION-NUM
CLM_TYPE_CD	CIP100: TYPE-OF-CLAIM
	CLT052: TYPE-OF-CLAIM
	COT037: TYPE-OF-CLAIM
	CRX029: TYPE-OF-CLAIM
TOT_MDCD_PD_AMT	CIP114: TOT-MEDICAID-PAID-AMT
	CLT065: TOT-MEDICAID-PAID-AMT
	COT050: TOT-MEDICAID-PAID-AMT
	CRX041: TOT-MEDICAID-PAID-AMT
TOS_CD	CIP257: TYPE-OF-SERVICE
	CLT211: TYPE-OF-SERVICE
	COT186: TYPE-OF-SERVICE
	CRX134: TYPE-OF-SERVICE
MDCD_DSH_PD_AMT (IP only)	CIP220: MEDICAID-AMOUNT-PAID-DSH
SRVC_TRKNG_TYPE_CD	CIP123: SERVICE-TRACKING-TYPE
	CLT073: SERVICE-TRACKING-TYPE
	COT059: SERVICE-TRACKING-TYPE
	CRX050: SERVICE-TRACKING-TYPE
SRVC_TRKNG_PYMT_AMT	CIP124: SERVICE-TRACKING-PAYMENT-AMT
	CLT074: SERVICE-TRACKING-PAYMENT-AMT
	COT060: SERVICE-TRACKING-PAYMENT-AMT
	CRX051: SERVICE-TRACKING-PAYMENT-AMT

Appendix C:

Assignment of Eligibility Groups

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Appendix C: Assignment of Eligibility Groups

If the eligibility code variable (ELGBLTY_GRP_CD_LTST) is not null (not missing), we used it and the beneficiary's age (AGE_NUM) to assign the eligibility group for the per capita expenditure analysis (ELIG_MACBIS) as follows:

ELGBLTY_GRP_CD_LTST	AGE_NUM	Group	ELIG_MACBIS
1, 2, 3, 4, 5, 9, 32, 33, 34, 35, 36, 53, 56, 70, 71	AGE_NUM < 21	Children	1
67,68	AGE_NUM < 21	CHIP[a]	1
1, 2, 3, 4, 5, 9, 14, 27, 32, 33, 34, 35, 36, 53, 56, 67, 68, 70, 71	21 <= AGE_NUM <65	Adults	2
11, 12, 13, 15, 16, 17, 18, 19, 20, 22, 23, 25, 26, 37, 38, 39, 40, 41, 42, 43, 44, 46, 51, 52, 59, 60	AGE_NUM < 65	Disabled	4
1, 2, 4, 5, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 25, 26, 27, 32, 33, 37, 38, 39, 40, 41, 42, 43, 44, 46, 51, 52, 53,56, 59, 60, 71	AGE_NUM >= 65	Aged	5
72, 73, 74, 75	Any AGE_NUM (including null)	VIII Group	3
6, 7, 8, 28, 29, 30, 31, 54, 55	Any AGE_NUM (including null)	Children	1
21, 24, 45, 47, 48, 49, 50, 69	Any AGE_NUM (including null)	Disabled	4
61,62,63,64,65,66	Any AGE_NUM	CHIP[a]	1

[a]Note: We removed CHIP beneficiaries for this analysis, but if a beneficiary was in both CHIP and Medicaid during the year, we counted their Medicaid months and Medicaid expenditures only.

If the eligibility group variable is null (missing), but a MASBOE code (MASBOE_CD_LTST) was reported and indicated the beneficiary was eligible on the basis of being in a 1115 demonstration expansion (first character of MASBOE_CD_LTST is a 5), then the beneficiary was assigned to an eligibility group in the following way:

AGE_NUM	Group	ELIG_MACBIS
AGE_NUM< 21	Children	1
AGE_NUM >= 21	Adults	2

If the eligibility group variable is still null (missing), but some other MASBOE code (MASBOE not equal to 5) was reported, then the beneficiary was assigned to an eligibility group in the following way:

MASBOE_CD_LTST (2nd and 3rd digit)	AGE_NUM	Group	ELIG_MACBIS
5, 7, 10	AGE_NUM < 21	Children	1
5, 7, 10	AGE_NUM >= 21	Adults	2
1	Any AGE_NUM (including null)	Aged	5
2	Any AGE_NUM (including null)	Disabled	4
4, 6, 8	Any AGE_NUM (including null)	Children	1
11	Any AGE_NUM (including null)	Adults	2

Appendix C: Assignment of Eligibility Groups

If the beneficiary was still not assigned an eligibility group, then the following eligibility group/age combinations were used to create an assignment:

ELGBLTY_GRP_CD_LTST	AGE_NUM	Group	ELIG_MACBIS
1,5	AGE_NUM=NULL	Adults	2
3,34,35,36	AGE_NUM >= 65	Aged	5
14, 27	AGE_NUM< 21	Child	1
11,12,13,41,59	AGE_NUM=NULL	Disabled	4

If the beneficiary was still not assigned an eligibility group, then the following age combinations were used to create an assignment:

AGE_NUM	Group	ELIG_MACBIS
21 <= AGE_NUM < 65	Adults	2
AGE_NUM >= 65	Aged	5
AGE_NUM< 21	Child	1

If after all these steps a beneficiary still could not be assigned to one of the five eligibility groups used in the analysis, they were assigned to the missing eligibility group.

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