FASI 2017 Field Test Final Report

March 30, 2018

Trudy Mallinson[1], C. Noelle Dietrich[1], Ken Harwood[1], Joyce Maring[1], Laurie Lyons[1], Sharon Gaskin[1], Alex Gorsky[1], Jennifer Weaver[1], Pat Rivard[2], Rebecca Woodward[2], Teja Stokes[2], Lisa Gold[2]

[1] The George Washington University
[2] Truven Health Analytics, an IBM Company

This document was made possible under Contract HHSM-500-2010-0025I-T006 from the Centers for Medicare & Medicaid Services. The contents of this document are solely the responsibility of the author(s) and do not necessarily represent the official views of the Centers for Medicare & Medicaid Services or any of its affiliates.

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

- Project Summary 1
- Background 1
- Development of the FASI Set 3
- FASI Field Test 4
- Findings and Conclusions 6

CHAPTER 1. INTRODUCTION 8

- TEFT Background 8
- Development of the FASI Set 13

CHAPTER 2. DATA COLLECTION APPROACH AND METHODS 15

- IRB and OMB Approval Processes 15
- Sample Identification 16
- Recruitment and Enrollment 19
- Data Collection and Analysis 22
- Study Termination 23

CHAPTER 3. FIELD TEST PARTICIPANT AND ENTITIES 24

- Description of Entities 24
- Field Test Participants 24

CHAPTER 4. ASSESSOR TRAINING AND SUPPORT 28

- Kickoff Webinar and CITI Training 28
- FASI Training for CB-LTSS Assessors 28
- Research-Based Learning Methods 29
- Assessor Support During Data Collection 31
- Training Results 35

CHAPTER 5. DATA PREPARATION AND TESTING APPROACH 39

- Data Preparation 39
- Evaluation of the FASI Assessment 41
- Technical Expert Panel Evaluation of the FASI Set 48

CHAPTER 6. SELF-CARE ITEMS 49

- Introduction 49

- Description of the Self-Care Items 49
- Description of the Rating Scale 51
- Assessment Reference Period 52
- Analytic Objectives and Approach 52
- Results 53
- Observations and Changes to the FASI Self-Care Items 68

CHAPTER 7. FUNCTIONAL MOBILITY ITEMS 70

- Introduction 70
- Description of the Items 70
- Description of the Rating Scale 72
- Assessment Reference Period 72
- Analytic Objectives and Approach 72
- Results 73
- Observations and Changes to the FASI Functional Mobility Items 88

CHAPTER 8. AMBULATION MOBILITY ITEMS 90

- Introduction 90
- Description of the Items 90
- Description of the Rating Scale 92
- Assessment Reference Period 92
- Analytic Objectives and Approach 92
- Results 93
- Observations and Changes to the FASI Ambulation Mobility Items 112

CHAPTER 9. WHEELCHAIR MOBILITY ITEMS 114

- Introduction 114
- Description of the Items 114
- Description of the Rating Scale 115
- Assessment Reference Period 116
- Analytic Objectives and Approach 116
- Results 117
- Observations and Changes to the FASI Wheelchair Mobility Items 132

CHAPTER 10. INSTRUMENTAL ACTIVITIES OF DAILY LIVING ITEMS 134

- Introduction 134
- Description of the Items 134
- Description of the Rating Scale 136

- Assessment Reference Period 136
- Analytic Objectives and Approach 136
- Results 137
- IADL Priorities 158
- Observations and Changes to the FASI IADL Items 159

CHAPTER 11. ASSISTIVE DEVICE ITEMS 162

- Introduction 162
- Description of the Items 163
- Description of the Rating Scale 164
- Assessment Reference Period 165
- Analytic Objectives and Approach 165
- Results 165
- Observations and Changes to the FASI Assistive Device Items 168

CHAPTER 12. LIVING ARRANGEMENTS, AVAILABILITY OF ASSISTANCE, AND CAREGIVER ASSISTANCE ITEMS 170

- Introduction 170
- Description of the Items 170
- Description of the Rating Scale 173
- Analytic Objectives and Approach 174
- Results 175
- Observations and Changes to the FASI Arrangements, Caregiver Assistance and Availability Items 199

CHAPTER 13. CONCLUSIONS 200

- Field Test Results 200
- Field Test Limitations 201
- Summary 203

ACKNOWLEDGEMENTS 204

EXECUTIVE SUMMARY

Project Summary

The Centers for Medicare & Medicaid Services (CMS), as a part of the Testing Experience and Functional Tools (TEFT) demonstration, tested the use of the Functional Assessment Standardized Items (FASI) set among individuals receiving community-based long-term services and supports (CB-LTSS[1]). TEFT built on national efforts to create exchangeable data across Medicare and Medicaid programs. A goal of CB-LTSS programs is to enable individuals who otherwise would need nursing facility or other institutional level of care to live in the least restrictive community setting of their choice. CB-LTSS programs support individuals to choose where they live, with whom they live, and the supports and services they need to engage in the community, earn a living, and maintain health, wellness, and quality of life.

The FASI work aligns with other CMS initiatives to standardize commonly used assessment items so they can be exchanged electronically and reduce the burden on individuals receiving CB-LTSS by collecting the information once for multiple purposes. Many of the items in the FASI set have been tested with individuals in the Medicare program but have not been tested for reliability and validity in individuals receiving CB-LTSS. The purpose of the FASI field test was to assess the reliability, validity, and usability of standardized functional items across populations receiving CB-LTSS reimbursed by Medicaid.

Background

Funded by Section 2701 of the Affordable Care Act, TEFT was a 4-year funding opportunity for states to evaluate assessment items, quality measures, and electronic health records in CB-LTSS. The TEFT demonstration had four components:

1. Field test the cross-population Experience of Care (EoC) survey[2]
2. Develop personal health records for CB-LTSS programs

[1] CB-LTSS was used in developmental documents for FASI. This term is consistent with Home and Community Based Services (HCBS) as defined in the National Quality Forum final report: *Quality in Home and Community-Based Services to Support Community Living: Addressing Gaps in Performance Measurement, September 2016*.

[2] This survey now is referred to as the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Home and Community-Based Services Survey (HCBS CAHPS for short), which forms the basis for National Quality Forum-endorsed performance measures.

3. Develop an electronic long-term services and supports (eLTSS) service plan standard with the Office of the National Coordinator for Health Information Technology (ONC)
4. Field test FASI, which builds on these interoperability efforts to align functional assessment items in CB-LTSS programs with CMS's larger data standardization efforts.

The FASI field test builds on more than a decade of work that CMS undertook to develop standardized, interoperable assessment items. Beginning in 2000, legislation required CMS to report to Congress on standardized assessments across post-acute care settings. Later, the Continuity Assessment Record Evaluation (CARE), a set of standardized items evaluated across post-acute care settings, was developed and used in the Post-Acute Care Payment Reform Demonstration. That demonstration also required CMS to develop electronic interoperability standards known as Health Information Technology (HIT) standards for CARE items, allowing the items to be included in electronic health records and to be exchanged across providers.

Currently, standardized items are being integrated into the CMS Data Element Library (DEL) which contains information on each item. This information includes the content domain to which it belongs (e.g., quality performance measure or assessment category), the setting-specific assessments in which it is used and HIT content and exchange standards. Data standardization is important in CB-LTSS for facilitating communication through a personal health record and for coordinating care across services. If states use standardized data elements, they will be better able to exchange information electronically across programs. Standardized items are a basic requirement for having electronically exchangeable information to allow the data to follow the individual, regardless of where he or she receives services.

The FASI field test represents an important step in developing standardized items in CB-LTSS. If states include standardized interoperable data elements in their assessments, this information will facilitate communication between and among the individual receiving services and the service providers. An important role of CB-LTSS is to enable individuals who otherwise would need institutional care to transition to living in the community. Uniform items in CB-LTSS assessments that are shared with the Minimum Data Set (MDS) 3.0 in nursing homes would enable states to evaluate the effectiveness of programs that aim to help individuals receive supports in their home communities. Finally, CMS has been developing and testing quality performance measures based on the standardized uniform items in the DEL. Performance measures based on uniform items enable comparisons of the quality of care across settings.

Development of the FASI Set

Selection of FASI items. The FASI items originated from three sources. The self-care items and the majority of the mobility items came from CMS assessment tools and have been standardized across the Medicare program assessment tools, including the Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI), MDS 3.0, Long-Term Care Hospital Continuity Assessment Record and Evaluation (LTCH-CARE), and Outcome and Assessment Information Set (OASIS). The second set of items was adapted from existing state assessment tools to reflect the needs of people living in the community and receiving CB-LTSS. Instrumental activities of daily living (IADLs), living arrangements, and caregiver availability were adapted from items in the home health-based assessment and the OASIS. Assistive devices were adapted from state CB-LTSS assessment tools. The final group of items contained additional mobility items developed specifically for inclusion in the FASI set and were designed to reflect a broader range of functional community mobility tasks for which a person receiving CB-LTSS may need supports or services.

Preliminary evaluation of FASI items. Prior to field testing, the FASI set was reviewed by a Technical Expert Panel (TEP)[3] and a small pilot test was conducted, referred to as the *alpha test.* In October 2015, a TEP, which comprised subject matter experts, advocates, and state representatives, provided input on the proposed functional status items. This TEP built on the extensive research and established standardized items that CMS requires post-acute care settings to report. The panel members identified additional items and rating scale modifications that were needed to adequately capture the unique needs of individuals receiving CB-LTSS.[4]

The FASI set underwent an alpha test in Connecticut in December 2015. The focus of the FASI alpha test was to gather feedback from assessors in the field about the process of collecting FASI data and the training material. Connecticut asked five case managers (state staff and staff from subcontracted entities) who volunteered to conduct nine assessments to test the FASI

[3] There were three TEPs specific to FASI. One occurred prior to the alpha test and then another after the alpha test but before the field test. There was an additional TEP conducted in November 2017 after the field test was completed. The input of the later TEP is discussed in subsequent chapters.

[4] Gage B, Constantine R, Aggarwal J, et al. The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set. Vol 1. RTI Project Number 0209853.004, CMS Contract No. HHSM-500-2005-00291. Baltimore, MD: Centers for Medicare & Medicaid Services, Office of Clinical Standards and Quality; 2012.

data collection process. The FASI team gathered verbal feedback from the five assessors during an on-site meeting in Connecticut on December 17, 2015. Assessors completed nine FASI assessments.

The alpha test provided valuable input on the proposed FASI set and data collection form. As a result of the alpha test, a second reference period (most dependent in the past month) was added, codes 09 and 88 (which are used when an activity was not done during the assessment reference period) were clarified, and the scoring of availability of caregiver assistance items was revised to score separately for paid and unpaid assistance. The assessors reported that all items and response codes were clear. They particularly liked the inclusion of items asking participants about their personal priorities and having those items embedded in each subsection so that individuals could focus responses on each area of activity (i.e., mobility, self-care, IADLs).

On the basis of TEP recommendations and alpha testing, the FASI item set was modified to enter Round 1 field testing. During 2016, Office of Management and Budget (OMB) approval was obtained for the FASI field test and significant effort was expended to develop a novel, self-paced, online training program that integrated video vignettes and competency testing.

FASI Field Test

As addressed in Chapter 2 of this report, of the nine states awarded TEFT demonstration funding in 2014, Arizona, Colorado, Connecticut, Georgia, Kentucky, and Minnesota participated in the FASI component of the demonstration. The FASI component of TEFT tested the reliability, validity, and usefulness of items to capture an individual's need for assistance with daily activities and to serve as a basis for quality performance measures. One of the goals of the TEFT demonstration is to advance the development and use of standardized assessments in CB-LTSS programs and promote eHealth through adoption of information technology strategies across these programs. CMS contractor, Truven Health Analytics, an IBM company, and subcontractor, The George Washington University, jointly referred to in this report as the FASI team, worked to

develop and standardize the FASI set to use across CB-LTSS populations and to add these items to the CMS DEL.[5]

This report details the analytic approach to and findings of the field test, which was conducted between March 2017 and September 2017. In November 2017, field test results were presented to TEP members. On the basis of the field test results and TEP feedback, the FASI team provided a revised version of the FASI set to the grantee states in December 2017 (Appendix B). These revisions included clarifying instructions to assessors for completing personal priorities sections, enhancing examples of simple financial management, revising the list of assistive devices, and removing two duplicative items from the caregiver assistance section.

Detailed in Chapter 2, each of the six TEFT states collaborated with the FASI team to generate a recruitment sample from the waiver programs that would be included in the field test. Individuals from five population groups—individuals who are frail elderly, individuals with a physical disability, individuals with an intellectual or developmental disability, individuals with a brain injury, and individuals with serious mental illness—were included in the field test. Each state provided a recruitment sample from two or three of these populations. As addressed in Chapter 3, states provided a total recruitment sample of 4,080, from which 1,360 individuals participated in the field test. Of these, 110 individuals also participated in interrater reliability (IRR) testing.

As described in Chapter 4 of this report, assessors were trained to complete the FASI following a standardized, online training developed by the FASI team. The online FASI training program was monitored in real time to address problematic items. Once the training program was completed by assessors, vignette pass thresholds were developed for competency prior to field test initiation. All assessors (n = 98) passed the online FASI training program prior to field testing. After the individual and/or guardian provided consent (or assent), assessors conducted the FASI assessment with the individual (and his or her caregiver[s] when appropriate) to complete the items in the FASI tool. Assessors used interviews with the individual receiving CB-LTSS, observations, interviews with caregivers, and record review, when appropriate. Responses were recorded on either paper forms or fillable PDF forms

[5] Harvell J, Garber L. The IMPACT Act and the Data Element Library. Centers for Medicare & Medicaid Services, Medicare Learning Network. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/Downloads/April-14-2016-MLN-Connects-NPC-IMPACT-Act-and-Data-Element-Library.pdf

provided to assessors by the FASI team. Data were transferred securely to the FASI team and entered and cleaned in preparation for analysis. Chapter 5 details how the FASI team then conducted data analyses designed to determine the validity and reliability of the FASI items and their effectiveness in capturing the needs of individuals in each of the CB-LTSS programs.

Findings and Conclusions

As detailed in the results section of Chapters 6–12, the field test indicated that the FASI set is reliable, valid, and feasible for assessing the need for assistance with daily life activities among individuals receiving CB-LTSS. This conclusion provides insight on the findings of the FASI field test specific to the FASI set reference periods, personal priorities of the individuals receiving CB-LTSS, IRR, and next steps.

The FASI set includes three core factors of function: Self-Care, such as eating, dressing, and bathing; Mobility, which includes ambulation as well as manual and motorized wheelchair use; and IADLs, which include making meals and shopping. These items are coded with regard to individuals' usual need for assistance in the past 3 days and the level of most dependent assistance needed during the past month. Results of the field test indicated that most individuals were coded similarly for both assessment reference periods. However, because accurately capturing fluctuating needs for assistance is critical for ensuring appropriate service plans and access to support for individuals whose needs change over time, TEP members strongly recommended keeping both assessment reference periods.

A series of open-ended text responses in which individuals could indicate personal priorities related to self-care, mobility, IADLs, and living arrangements in the next 6 months were incorporated into the FASI set following the 2015 TEP. These items were examined qualitatively during the FASI field test. About half of individuals reported one personal priority in at least one area; about one-quarter indicated two personal priorities in at least one area. Because of the field test design, it was not clear whether individuals who did not provide a personal priority did not have priorities in a particular area or whether additional prompting by assessors was needed to elicit this information. How to best ensure that an individual's priorities are elicited and recorded should be explored in future development of these standardized items.

Overall, assessors achieved excellent interrater reliability (IRR) on the FASI set. Assessors reported that they found the online competency-based training useful and effective. The high levels of IRR (>.80) achieved in the field test suggested that online competency-based training was a dependable method for delivering training in standardized functional assessments.

The FASI set is best suited to evaluating needs for assistance with actual task completion, either through physical assistance or verbal prompting and cueing, and it captures assistance with activities once the task is initiated. A possible area for future development of the standardized item set will be developing and testing items that address an individual's support needs for planning, coordinating, and sustaining daily activities routinely over time.

This FASI field test represented a significant first step in developing standardized, interoperable data elements for use across CB-LTSS programs. The FASI set is just one component of a comprehensive, standardized assessment that informs an individual's CB-LTSS service plan and supports necessary for successful community living. Throughout testing, the FASI team heard from individuals, assessors, caregivers, and program managers that FASI was a good place to start in conducting a comprehensive, standardized, person-centered assessment, but it did not provide all information needed to determine an individual's service plan (e.g., behavioral health needs). These comments highlight the importance of future development of a complete, standardized assessment tool for CB-LTSS.

CHAPTER 1. INTRODUCTION

In this chapter, the Functional Assessment Standardized Items (FASI) team presents an overview of the Testing Experience and Functional Tools (TEFT) demonstration and the FASI component, as well as a summary of the development and testing that occurred before the focus of this report—the FASI field test.

TEFT Background

As a part of the TEFT demonstration, the Centers for Medicare & Medicaid Services (CMS) tested the use of the FASI among individuals receiving community-based long-term services and supports (CB-LTSS).

TEFT built on national efforts to create electronically exchangeable data across providers and the caregiving team to develop person-centered services under the Medicare and Medicaid programs. The TEFT demonstration had four components[6]:

1. Field test the cross-population Experience of Care (EoC) survey[7]
2. Develop personal health records for CB-LTSS programs
3. Develop an electronic long-term services and supports (eLTSS) service plan standard with the Office of the National Coordinator for Health Information Technology (ONC)[8]
4. Field test FASI, which builds on these interoperability efforts to align functional assessment items in CB-LTSS programs with CMS's larger data standardization efforts

Progress in standardization of CMS items. The FASI field test builds on more than a decade of work that CMS undertook to develop standardized, interoperable assessment items. In 2000, the Benefits Improvement and Protection Act (BIPA) required CMS to report to Congress on standardized assessments across post-acute care settings. In 2005, the Deficit Reduction Act required standardized assessment be used at discharge from acute care hospitals and on admission to post-acute care facilities. This resulted in the development and testing of the Continuity Assessment Record Evaluation (CARE), a set of standardized items that were

[6] Medicaid.gov. Testing Experience & Functional Tools. https://www.medicaid.gov/medicaid/ltss/teft-program/index.html

[7] This survey now is referred to as the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Home and Community-Based Services Survey (HCBS CAHPS for short), which forms the basis for National Quality Forum-endorsed performance measures.

[8] HealthIT.gov. About ONC. Updated November 27, 2017. https://www.healthit.gov/newsroom/about-onc

evaluated for reliability and validity across post-acute care settings. In 2006, as part of the Post-Acute Care Payment Reform Demonstration, CMS was required to develop electronic interoperability standards, known as Health Information Technology (HIT) standards for CARE items, allowing the items to be included in electronic health records and to be exchanged across providers.

Role of standardization in data sharing. Data standardization is important in CB-LTSS for facilitating communication through a personal health record and for coordinating care across services. If states use standardized data elements, they will be better able to exchange information electronically across programs. Standardized items are a basic requirement for having electronically exchangeable information to allow the data to follow the individual, regardless of where he or she receives services.

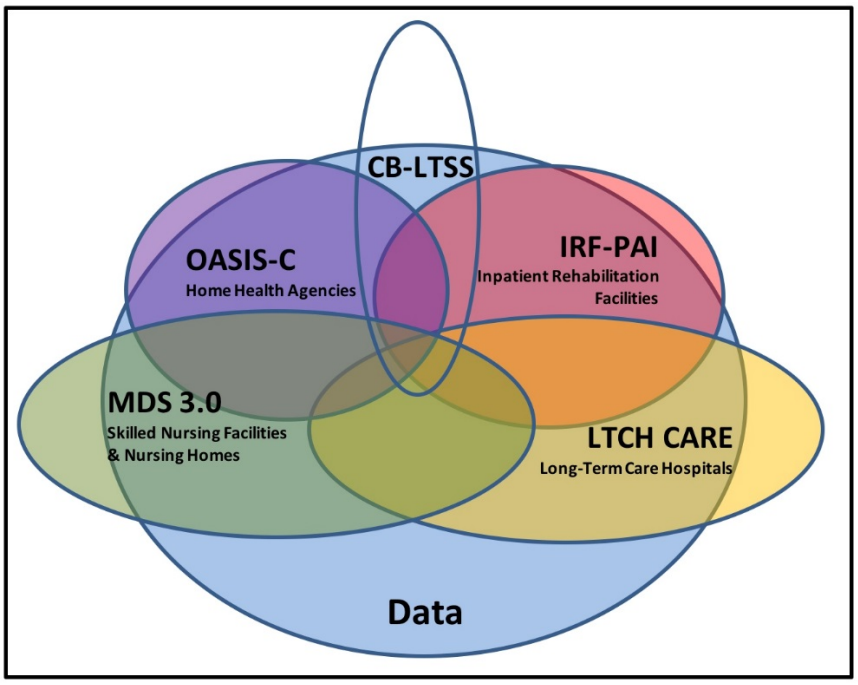
Figure 1.1 illustrates how uniform data elements act to create linkages across assessment tools in different CMS programs. The Outcome and Assessment Information Set (OASIS) is the data collection tool that Medicare uses to ensure that home health agencies are providing standard quality care. Data are collected at various points during an episode of care such as admission, recertification, or discharge. The Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI) is used by Medicare for payment determination and quality measure calculation; assessments are generally completed at admission and discharge for Medicare fee-for-service beneficiaries. The Long-Term Care Hospital Continuity Assessment Record and Evaluation (LTCH-CARE) is the assessment instrument that LTCH providers use to collect patient assessment data for quality measure calculation and payment determination. Patient assessment data are collected on admission, at discharge (planned and unplanned), and for deceased patients. Finally, the Minimum Data Set (MDS) 3.0 is part of the process for clinical assessment of all residents in Medicare and Medicaid certified nursing homes. This process provides a comprehensive assessment of each resident's functional capabilities and helps staff identify health problems. MDS assessments are completed for all residents in certified nursing homes, regardless of source of payment for the individual resident. MDS assessments are required for residents on admission to the nursing facility, periodically, and upon discharge.

Each setting has a set of items (i.e., data elements) that constitute the assessment tool used in that setting. Across settings, some items are shared or common; these items have the same language and the same rating scale, and they are administered in the same way. These are standardized items, or data elements. The more shared or standardized the items are, the more

providers are able to share information electronically with each other, thereby reducing burden on individuals and providers. Data collected once then can be used for multiple purposes including service planning and quality improvement. Figure 1.1 also illustrates some items in the setting-specific assessments that are unique to their populations and not standardized across the other tools.

Currently, all items from the FASI set are being integrated into the CMS Data Element Library (DEL) which serves as a repository for all standardized items used in CMS assessments. The DEL includes information on each item including the content domain to which it belongs (e.g., quality performance measure or assessment category), the setting-specific assessments in which it is used, and HIT content and exchange standards. The DEL, which will be available publicly in 2018, will be updated over time. It will be a searchable public resource enabling providers, technology developers, and others to facilitate the electronic exchange of health information, ensuring that individuals have secure access to timely, transparent, comprehensive information. This information can support shared decision-making and person-centered service planning.

Figure 1.1. Uniformity of Assessment Across CMS Service and Care Settings



Abbreviations: CB-LTSS, community-based long-term services and supports; LTCG CARE, Long-Term Care Hospitals Community Assessment Record and Evaluation; IRS-PAI, Inpatient Rehabilitation Facility Patient Assessment Instrument; OASIS-C, Outcome and Assessment Information Set-C; MDS, Minimum Data Set.

The FASI field test represents an important step in developing standardized items across settings. If states include standardized interoperable data elements in their assessments, this information will facilitate communication between and among the individual receiving services and providers. Further, because individuals receiving CB-LTSS frequently have health concerns that require use of inpatient and post-acute care services, standardized uniform items will enable more effective communication across systems. An important role of CB-LTSS is to enable individuals who otherwise would need institutional care to transition to living in the community. Uniform items in CB-LTSS assessments that are shared with the MDS 3.0 in nursing homes would enable states to evaluate the effectiveness of programs that aim to help individuals transition to living in the community. Finally, CMS has been developing and testing quality performance measures based on the standardized uniform items in the DEL. Performance measures based on uniform items enable comparisons of the quality of care across settings.

Selection of FASI items. The FASI items originated from three sources. The self-care items and the majority of the mobility items came from Section GG of the federal assessment tools, which are being standardized across the Medicare program assessment tools. The second set of items were adapted from existing assessments to reflect the needs of people living in the community and receiving LTSS. Instrumental activities of daily living (IADLs), living arrangements, and caregiver availability were adapted from items in the OASIS; assistive devices were adapted from state CB-LTSS assessments. The final group of items were additional mobility items that were developed specifically for inclusion in FASI and were designed to reflect a broader range of functional community mobility tasks for which a person receiving CB-LTSS may need supports or services.

The FASI set includes three core factors of function: Self-Care; Mobility, which includes ambulation as well as manual and motorized wheelchair use; and IADLs. Additionally, the FASI set includes items to evaluate contextual and environmental factors including assistive devices, living arrangements, and caregiver assistance and availability.

Overview of the FASI field test. This report summarizes the results of the FASI field test conducted March 2017 through September 2017 to test the reliability, validity, and usability of the FASI set among individuals in CB-LTSS programs. The FASI set is intended to capture an individual's need for assistance with daily activities and to serve as a basis for quality performance measures.

The TEFT demonstration awarded grants to nine states in March 2014. Arizona, Colorado, Connecticut, Georgia, Kentucky, and Minnesota participated in the FASI component of TEFT to test the reliability, validity, and usefulness of functional assessment items.

Truven Health Analytics, an IBM company (Truven Health), and its subcontractor, The George Washington University (GW), collectively referred to as the FASI team, collaborated on the development and standardization of the FASI set to use across CB-LTSS populations and prepared the FASI set for inclusion in CMS DEL. Including items in the DEL is a multistep process that requires ensuring that new items are reliable and valid, coordinating with DEL staff to ensure that new data elements are standardized, and working with the Library Management Workgroup (LMWG) and CMS Assessment Library Data Council (CALDC) where items are reviewed and consensus on data elements is achieved. At the conclusion of the current work, review of the alignment between the FASI items and the standardized data elements has been completed along with guidance for consideration in revising items that are not fully aligned. CMS developed the DEL to standardize an approach for measuring health and functional complexity by including standardized items found to be reliable across populations for medical conditions, cognitive status, other individual factors tested in the earlier CARE Item Set,[9] and other historical items.

The FASI set provides standardized items for monitoring and improving CB-LTSS quality in combination with other types of quality data. These standardized items will support reliable and valid measures of CB-LTSS recipients' functioning. Further, their cross-population application will allow comparisons between CB-LTSS programs and eventually a more comprehensive profile of Medicaid CB-LTSS quality. At the same time, demonstration of a personal health record and creation of an electronic standard will facilitate collation and dissemination of quality information to end users including recipients and service providers. Together, the TEFT demonstration speaks to CMS's vision of integrated, reliable, and standardized data to inform quality improvement.

The results of the FASI field test will provide states with reliable and standardized items for measuring function that can be used for multiple purposes:

---

[9] Centers for Medicare & Medicaid Services. CARE Item Set and B-CARE. Updated January 13, 2015. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/CARE-Item-Set-and-B-CARE.html

- Standardizing commonly collected items across programs within the state will ease the data collection burden for both the program and participants.
- Uniform data can be used across states to evaluate the complexity of the populations covered under different state policies and to consider the impact of these variations on access to care.
- Standardizing the state elements with those in the federal assessment tools used in nursing facilities will allow comparison of the institutional and community-based populations to examine the quality outcomes of the Medicaid CB-LTSS programs.
- FASI results will assist state efforts in developing exchangeable electronic data to follow the person across services and to measure functional status across time.

Development of the FASI Set

In October 2015, a Technical Expert Panel (TEP) that comprised subject matter experts, advocates, and state representatives provided input on the proposed functional status items. The FASI TEP built on the extensive research and established standardized items that CMS requires post-acute care settings to report and that will be included in the CMS DEL. The TEP identified additional items and rating scale modifications that were needed to adequately capture the unique needs of individuals receiving CB-LTSS.[10]

The FASI set underwent an alpha test with one state, Connecticut, in December 2015. The focus of the FASI alpha test was to gather feedback from assessors in the field about the process of collecting FASI data and the training material. Connecticut asked five case managers (state staff and staff from subcontracted entities) to volunteer to conduct nine assessments in December to test the FASI data collection process. The FASI team gathered verbal feedback from the five assessors during an on-site meeting in Connecticut on December 17, 2015. Assessors completed nine FASI assessments.

The alpha test provided valuable input on the proposed FASI set and data collection process. As a result of the alpha test, a second reference period (most dependent in the past month) was added, codes 09 and 88 (which are used when an activity was not done during the assessment reference period) were clarified, and the scoring of availability of caregiver assistance items was

[10] Gage B, Constantine R, Aggarwal J, et al. The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set. Vol 1. RTI Project Number 0209853.004, CMS Contract No. HHSM-500-2005-00291. Baltimore, MD: Centers for Medicare & Medicaid Services, Office of Clinical Standards and Quality; 2012.

revised to score separately for paid and unpaid assistance. The assessors reported that all items and response codes were clear. They particularly liked the inclusion of items asking participants about their personal priorities and having those items embedded in each subsection so that individuals could focus responses on each area of activity (i.e., mobility, self-care, IADLs). They also commented that the proposed items were easy to use. They proposed capturing whether the individual's status had changed in the past month, in addition to asking about the individual's usual performance over the past 3 days. These proposed recommendations were incorporated into the version of the FASI set used in the field test. The TEFT FASI Alpha Test Report provides in-depth detail on the development of the FASI set, design and implementation of data collection procedures, and modifications made prior to the larger field test.[11]

In summary, the FASI set was not intended to provide all information needed to develop a comprehensive, universal, or uniform assessment—only information related to function. However, as states build their respective universal/uniform assessment tools, the FASI can provide reliable, valid, standardized items to assess function across various CB-LTSS populations that can inform the person-centered planning process. Building stakeholder and service recipients' perspective into performance assessment is an important component of the National Quality Strategy.[12]

[11] Gage B, Mallinson T, Lyons L, et al. TEFT FASI Alpha Test Report. CMS Contract No. HHSM-500-2010-00251-T006. 2017. https://www.medicaid.gov/medicaid/ltss/downloads/teft-program/fasi-alpha-test.pdf

[12] Agency for Healthcare Research and Quality. About the National Quality Strategy. March 2017. https://www.ahrq.gov/workingforquality/about/index.html

CHAPTER 2. DATA COLLECTION APPROACH AND METHODS

This chapter provides an overview of the approach taken to conduct the FASI field test. Specifically, this chapter addresses receiving approvals from the George Washington University (GW) Institutional Review Board (IRB) and the Office of Management and Budget (OMB), identifying the sample, recruiting and enrolling participants, and data collection procedures. Identifying the sample involved determining the number of participants who would need to be approached in each of the populations (i.e., individuals who are frail elderly, individuals with a physical disability, individuals with an intellectual or development disability, individuals with a brain injury, and individuals with serious mental illness). This chapter also describes the sample plan for the reliability and validity testing and the subsample of individuals recruited for the IRR testing. The chapter presents the process used for obtaining informed consent and assent, in the cases in which individuals had a guardian, and the procedures used for ensuring the security of the data at all points of the study.

IRB and OMB Approval Processes

The FASI field test was subject to IRB and OMB approval as standard practice in any study-related activities.

IRB Review and Approval Process

On August 3, 2015, the GW IRB approved the FASI team's study-related activities. Minnesota and Connecticut also sought and received local IRB approval, per state-level human-subject study requirements.

OMB Review and Approval Process

In preparation for the FASI field test, the FASI team submitted a Paperwork Reduction Act (PRA) application to OMB on March 23, 2016.[13] Approval to proceed with the study was received on December 23, 2016.

[13] Controlling paperwork burdens on the public; regulatory changes reflecting recodification of the paperwork reduction act. Federal Register. 1995;60(167):44978-44996. To be codified at 5 CFR Part 1320. https://www.gpo.gov/fdsys/pkg/FR-1995-08-29/pdf/95-21235.pdf

Sample Identification

Recruitment sample. The FASI team worked with each of the six TEFT states (Arizona, Colorado, Connecticut, Georgia, Kentucky, and Minnesota) to obtain a convenience sample for the five populations—individuals who are frail elderly, individuals with a physical disability, individuals with an intellectual or developmental disability, individuals with a brain injury, and individuals with serious mental illness. States identified which CB-LTSS populations could be included in the field test, aiming to capture a broad range of participants' functional abilities. Some states were unable to generate a sample for the brain injury and serious mental illness populations because they did not operate CB-LTSS programs that served only these populations. These individuals were enrolled in programs that serve multiple populations. In other states, the fact that the assessment entities did not serve all five populations also factored into the final sampling plan.

From state enrollment files, states first used year of birth to obtain a subset of records for individuals aged 18 years and older. States then assigned a random number to each record, sorted on this random number, and then selected the required number of records from this subset (see Table 2.1). Each state followed the same process, adapting to local circumstances as necessary. For example, in Georgia, the Community Care Services Program includes both individuals with a physical disability and those who are frail elderly. In this case, the sample was first sorted into two subsets, individuals aged 65 years and older (frail elderly) and individuals aged 18–64 years (individuals with a physical disability). The random number assignment, sorting, and selection were repeated on each of these subsamples to create a recruitment sample for each population.

Each state provided the FASI team with contact information for individuals who currently were receiving CB-LTSS services and had been enrolled in a program for at least 3 months. To safeguard individuals' protected health information (PHI), the grantee states generated the sample under the guidance of the FASI team. Only the minimum required information needed for contacting and verifying eligibility was uploaded using a highly secure Citrix ShareFile® transfer process. The FASI team ensured that all information was appropriate and removed PHI prior to assigning unique study identification numbers. Assessment entities accessed the contact information of the potential participants through the secure Citrix ShareFile. In Connecticut, the state delegated field test sample identification to the University of Connecticut's (UConn) Health Center on Aging. UConn then forwarded the sample information directly to the Connecticut Medicaid agency, which transferred it to the FASI team via secure Citrix ShareFile.

Based on experience of recruitment efforts in similar studies,[14,15] the FASI team anticipated that approximately 33 percent of eligible individuals would decline, not be reached, or not participate for some other reason. Therefore, the number of contacts requested from each state was established to ensure a sufficient list of beneficiaries from which to recruit. Table 2.1 provides information on the recruitment sample requested from each state by population.

Table 2.1. Proposed Recruitment Sample by State and CB-LTSS Population

Recruitment Sample	Individuals Who Are Frail Elderly	Individuals With a Physical Disability	Individuals With an Intellectual or Developmental Disability	Individuals With a Brain Injury	Individuals With Serious Mental Illness	Recruitment Sample Targets Total
Arizona	164	417	–	–	–	581
Colorado	–	–	600	256	246	1,102
Connecticut	215	74	–	–	278	567
Georgia	164	28	–	256	–	448
Kentucky	227	251	–	–	–	478
Minnesota	–	–	400	258	246	904
Total	770	770	1,000	770	770	4,080

Abbreviation: CB-LTSS, community-based long-term services and supports.

Note: En dash (–) indicates that the population was not used for the state.

Target number of individuals. On the basis of principles of psychometric testing, which indicate that standard errors around the item calibrations are very small with samples over 100,[16,17] the FASI team established a sample size of 272 individuals per population, or a total of 1,360 individuals across all five populations, as recruitment targets. After ensuring that sample sizes were large enough to minimize standard errors around the item calibrations, the FASI team focused on a sampling strategy that would capture a broad range of functional needs (Table 2.2).

[14] Lennox N, Taylor M, Rey-Conde T, et al. Beating the barriers: recruitment of people with intellectual disability to participate in research. Journal of Intellectual Disability Research. 2005;49(Pt 4):296-305.

[15] Cleaver S, Ouellette-Kuntz H, et al. Participation in intellectual disability research: a review of 20 years of studies. Journal of Intellectual Disability Research. 2010;54(3):187-93.

[16] Linacre JM. Sample size and item calibration stability. Rasch Measurement Transactions. 1994;7(4):328.

[17] Gwet KL. 2010. Sample Size Determination. Inter-Rater Reliability Discussion Corner. Posted June 28, 2010. http://agreestat.com/blog_irr/sample_size_determination.html

Table 2.2. Proposed Study Enrollment of Individuals by State and CB-LTSS Population

Enrollment Target Sample	Individuals Who Are Frail Elderly	Individuals With a Physical Disability	Individuals With an Intellectual or Developmental Disability	Individuals With a Brain Injury	Individuals With Serious Mental Illness	Enrollment Targets Total
Arizona	58	147	–	–	–	205
Colorado	–	–	164	90	87	341
Connecticut	76	26	–	–	98	200
Georgia	58	10	–	90	–	158
Kentucky	80	89	–	–	–	169
Minnesota	–	–	108	92	87	287
Total	272	272	272	272	272	1,360

Abbreviation: CB-LTSS, community-based long-term services and supports.

Note: En dash (–) indicates that the population was not used for the state.

Target number of assessment forms. In order to assess IRR—the extent to which assessors assign similar codes to the same individual—two assessors completed 15 percent of assessments at the same time. The targeted sample size for IRR was 110 individuals, 22 in each population. The IRR sample brought the targeted number of completed assessment forms to 1,570 (Tables 2.3 and 2.4).

Table 2.3. Proposed Study Completed Assessment Forms by State and CB-LTSS Population

Enrollment Target Sample	Individuals Who Are Frail Elderly	Individuals With a Physical Disability	Individuals With an Intellectual or Developmental Disability	Individuals With a Brain Injury	Individuals With Serious Mental Illness	Enrollment Targets Total
Arizona	67	171	–	–	–	238
Colorado	–	–	189	104	100	393
Connecticut	88	29	–	–	113	230
Georgia	67	12	–	104	–	183
Kentucky	92	102	–	–	–	194
Minnesota	–	–	125	106	101	332
Total	314	314	314	314	314	1,570

Abbreviation: CB-LTSS, community-based long-term services and supports.

Note: En dash (–) indicates that the population was not used for the state.

Table 2.4. Target Number of Interrater Assessment Forms by State and CB-LTSS Population

Enrollment Target Sample	Individuals Who Are Frail Elderly	Individuals With a Physical Disability	Individuals With an Intellectual or Developmental Disability	Individuals With a Brain Injury	Individuals With Serious Mental Illness	Enrollment Targets Total
Arizona	10	24	–	–	–	205
Colorado	–	–	26	14	14	341
Connecticut	12	4	–	–	16	200
Georgia	10	2	–	14	–	158
Kentucky	12	14	–	–	–	169
Minnesota	–	–	18	16	14	287
Total	44	44	44	44	44	220

Abbreviation: CB-LTSS, community-based long-term services and supports.

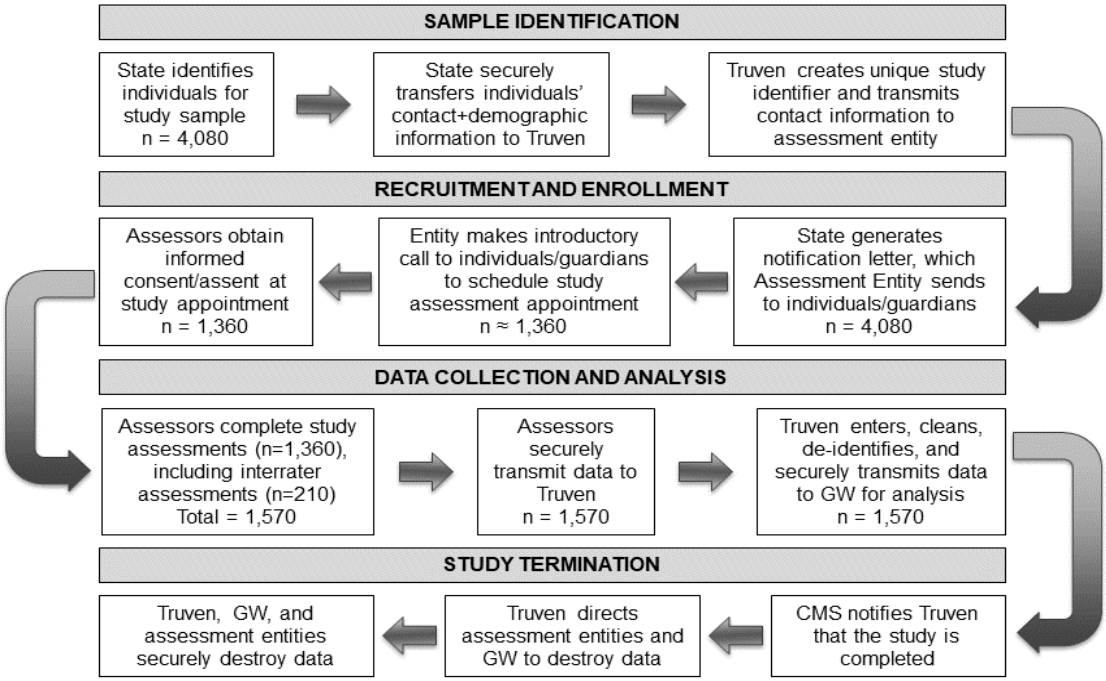
Notes: En dash (–) indicates that the population was not used for the state. Target of 22 individuals per population.

Recruitment and Enrollment

All assessors participating in data collection needed to successfully complete required FASI trainings prior to being provided access to the unique assessor identification number and study materials needed for data collection. (Please refer to Chapter 4 for a more detailed discussion regarding the FASI assessor training process.)

Approximately 1 week prior to commencing scheduling of FASI assessments, entities mailed IRB-approved notification letters to individuals or their legally authorized representatives (LARs). The notification letters gave a brief introduction to the objectives and voluntary nature of the FASI study. This letter was followed by a telephone call, for which the caller used an IRB-approved telephone script. The telephone call provided an opportunity to discuss the study in more detail, including what the individual would experience during the assessment visit and the type of questions that would be asked. The individual or guardian was given the opportunity to ask questions about the study. When an individual agreed to participate, the assessor set up an appointment and then agreed to call the day prior to confirm availability (Figure 2.1).

Figure 2.1. Flow of Data for the FASI Field Test



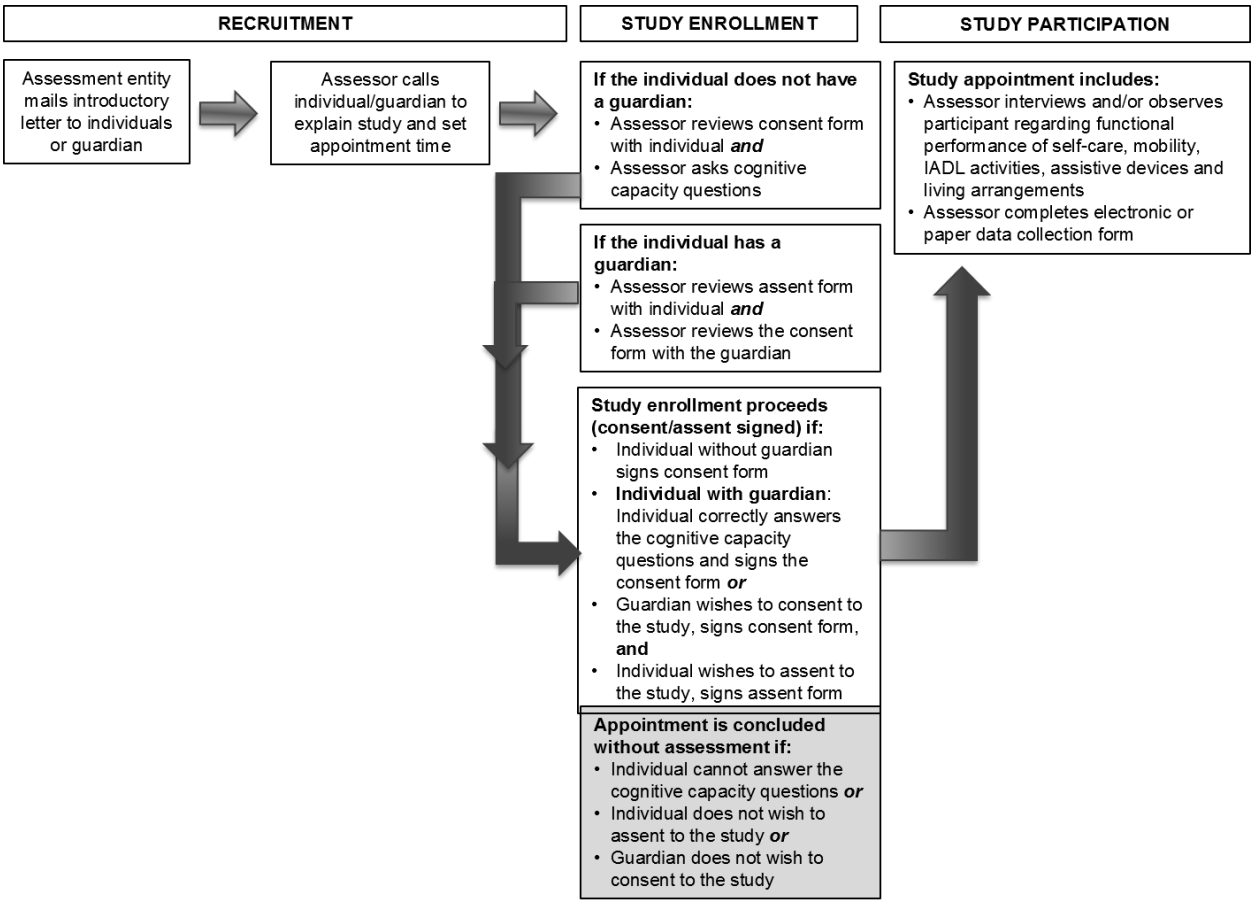
Abbreviations: CMS, Centers for Medicare & Medicaid Services; FASI, Functional Assessment Standardized Items; GW, The George Washington University.

Obtaining informed consent and assent. Consent (and assent where required) was obtained from all participants prior to any initiation of study assessment procedures. TEFT grantee states identified the guardianship status of potential participants. Assessors were instructed not to conduct FASI assessments without the consent or assent from the individual being assessed. Entities were instructed to store consent forms separately from assessment forms in a locked cabinet within their facility.

For individuals who did not have a guardian, the assessor described the study and reviewed the informed consent form with the individual. To ensure that individuals without a guardian understood the study and were able to give informed consent, the assessor asked each individual a series of six questions. The individual communicated answers using his or her usual and customary method—for example, verbally, in writing, or using some other form of communication, such as a device. If an individual could not answer each question correctly, the person was thanked for his or her time and the appointment concluded without conducting the assessment.

If the individual had a guardian, the assessment entity sent a notification letter to the guardian and then called the guardian to explain the study further and set an appointment date. At the study appointment, the assessor reviewed the assent form with the individual to confirm his or her preference regarding participating in the study. If the guardian was present at the study assessment appointment, the consent form was reviewed with the guardian, who signed the consent form. If the guardian was not able to be at the study visit, the consent form was sent to the guardian; the assessor called and reviewed the form, provided the guardian an opportunity to ask questions, and had the guardian sign the consent form if he or she was agreeable. The signed form was returned to the assessment entity prior to conducting the study visit. An overview of the recruitment, enrollment, and consent process is outlined (Figure 2.2).

Figure 2.2 Overview of Recruitment, Enrollment, and Consent Process



Abbreviation: IADLs, instrumental activities of daily living.

Data Collection and Analysis

Data collection. As part of the study training sequence, assessors were required to attend a kickoff training webinar in order to gain a comprehensive understanding of the project aims. Several kickoff orientation webinars were held live in September 2016, attended by approximately 70 assessors. A live training was recorded for assessors who could not make any of the September 2016 webinar sessions or who came on board after data collection was initiated. Next, assessors were provided a username and password to access the FASI website, which they used to access both the FASI online, competency-based training and research ethics training. A full description of the training is provided in Chapter 4.

On completion of the training, assessors scheduled assessments with participants (following consent/assent procedures described in the previous section) and conducted the FASI assessment in the individual's residence. For individuals who had agreed to participate in the IRR study, two assessors attended the appointment at the same time. Data were collected using either a pencil-and-paper version of the form (see Appendix A) or a fillable PDF version of the form that could be completed via tablet or laptop. On completion of the assessment, PDF versions of the assessment were uploaded securely to a SharePoint file. Paper assessments were copied; the originals were retained securely at the data collection entity, and the copies were securely transmitted to GW for data entry.

Cleaning, preparation of the data, and creating the demographics files are described in detail in Chapter 5. Data collection began in March 2017 and was completed in October 2017. Assessors were provided support throughout the training via the website, weekly roundtable calls, and by phone. These activities are described in detail in Chapter 4. In addition to the direct support provided to the assessors throughout the field test, the FASI team hosted bimonthly calls with the managers of the assessment entities to monitor progress and to address any data collection issues in a timely manner.

Data security. Careful attention was paid to protecting PHI. For the recruitment sample, each state transmitted the least number of demographic data elements required using a highly secure process to successfully follow the data security plan. The FASI team assigned each individual a unique identification code that comprised numbers and letters to be used on all study data forms (Figure 3.1).

The data collection forms were intentionally designed to exclude PHI. States generated a notification letter to the assessment entities, which then was sent to their beneficiaries. The FASI assessors obtained consent or assent, completed the assessment, and securely transmitted data to the FASI team. The FASI team conducting data analysis did not have access to any participant PHI. During data analysis, forms were identifiable only by a unique assessor and/or participant identification number.

For assessors using a laptop or device in the participant's home to record FASI data, completed PDFs were uploaded immediately to the Citrix ShareFile. A copy was printed and securely stored at the data collection entity, separate from consent forms, and the PDF form was deleted from the laptop or device. For assessors using the paper form to record FASI data, a copy was made and stored securely, separate from the consent form, and completed assessments were sent to the FASI team via secure U.S. Postal Service or FedEx® envelopes.

Data analysis. This material is covered in detail in Chapter 5, Data Preparation and Testing Approach. Briefly, data were cleaned to check values that were missing or were out of an expected range and for appropriate skip pattern usage. Using the evaluation framework described in Chapter 5, the FASI set was evaluated for substantive, content, structural, external, and generalizability validity, IRR, and usability. Validity and IRR were evaluated via quantitative data analyses. Usability was evaluated via feedback from assessors.

Study Termination

Upon completion of the study, the FASI team will direct the entities to destroy the data. All data accumulated by GW will be securely destroyed in accordance with procedures outlined in the contract with Truven Health.[18]

[18] FASI data will be retained for the additional field test work on FASI-based performance measures through September 2018 under contract HHSM-500-2010-00025i/HHSM-500-T0006.

CHAPTER 3. FIELD TEST PARTICIPANT AND ENTITIES

In this chapter, the FASI team presents a description of the entities that participated in the field test, as well as descriptive statistics about the field test participants.

Six TEFT grantee states that provide Medicaid community-based long-term services and supports (CB-LTSS) to individuals who are frail elderly and those with an intellectual or developmental disability, with a physical disability, with a brain injury, or with serious mental illness participated in the FASI field test. Those states were Arizona, Colorado, Connecticut, Georgia, Kentucky, and Minnesota. Truven Health contracted with assessment entities in each state to complete data collection.

Description of Entities

Truven Health contracted with 13 assessment entities to conduct the FASI assessments. In five states (Arizona, Colorado, Connecticut, Georgia, and Kentucky), these entities routinely conduct assessments for CB-LTSS populations. In Minnesota, an organization with appropriate experience was contracted to conduct FASI assessments. Truven Health contracted with one entity each in Arizona, Connecticut, and Minnesota. In Georgia and Kentucky, Truven Health contracted with two entities. Six entities in Colorado were contracted FASI assessors.

Ninety-eight trained assessors from the 13 entities participated in the field test. All assessors who conducted FASI assessments completed two mandatory training requirements: (1) an online training on the protection of human subjects provided by the Collaborative Institutional Training Initiative (CITI) Program and (2) a self-paced assessor training on the FASI set. Proof of training completion was required prior to assignment of a unique assessor identification number and access to field test materials.

FASI assessment data collection forms were available in both electronic PDF and paper formats. Approximately one-third (37 percent) of assessments were completed using the paper version (Appendix D, Table D2.a.1).

Field Test Participants

Inclusion and Exclusion Criteria

Inclusion criteria required participants to be at least 18 years old, living in the community, and receiving CB-LTSS services for at least 3 months. The recruitment sample was drawn to ensure

sufficient representation of both men and women. The goal was for the recruitment sample to be relatively similar to the population from which the sample was drawn. Because Medicaid program types and services vary by state, each entity worked with the FASI team to develop systematic methods of identifying individuals within the following five target populations:

- Individuals who are frail elderly, defined as individuals aged 65 years and older
- Individuals with a physical disability who are aged 18 years and older
- Individuals with an intellectual or developmental disability who are aged 18 years and older
- Individuals with a brain injury who are aged 18 years and older
- Individuals with serious mental illness who are aged 18 years and older

There were no exclusion criteria.

Consent and Assent

A total of 1,167 individuals consented or provided assent, with consent of a legally authorized representative (LAR) (Appendix D, Table D1.b). Across populations, approximately 86 percent of individuals provided consent and approximately 14 percent of individuals provided assent with consent from an LAR. Individuals who are frail elderly had the highest percentage to assent (approximately 28 percent), followed by individuals with an intellectual or developmental disability (approximately 18 percent).

Participant Characteristics

Of the 1,167 total individuals assessed, 170 individuals received an assessment completed by two assessors as part of establishing interrater reliability (Appendix D, Table D1.b). The FASI team received a total of 1,337 FASI assessment forms.

A total of 272 individuals from each CB-LTSS population were targeted for participation in the field test (Appendix D, Table D1.a). Project targets were met or exceeded for individuals who are frail elderly and individuals with a physical disability or an intellectual or developmental disability. Half of the projected number of individuals with a brain injury and almost two-thirds of the projected number of individuals with serious mental illness participated in the FASI field test.

Overall, about one-quarter of individuals (26 percent) who participated in the field test were 55–64 years old (Table 3.1). Just under one-fifth of individuals were 45–54 years (19 percent) or 65–74 years old (17 percent). Fewer individuals were 75 years or older (15 percent), 35–44 years (12 percent), or younger than 25 years (11 percent) (Appendix D, Table D2.a.1). This pattern differed across populations: individuals with an intellectual or developmental disability tended to be younger, as did individuals with a brain injury. Individuals with serious mental illness or a physical disability tended to be middle aged (45 to 64 years old).

Over half the individuals in the field test were White (58 percent). Less than half of those with serious mental illness were White (49 percent). More individuals with a physical disability or with a brain injury were African American than was the case in other disability populations that were part of the field test—25 and 22 percent, respectively. One-third of individuals with serious mental illness reported race as "Other" (33 percent). Individuals with a physical disability reported the highest percentage of Hispanic ethnicity (9 percent) (Appendix D, Table D2.a.1).

Just over half of individuals in the field test were female (54 percent), as were individuals with a physical disability (53 percent). Two-thirds of individuals who are frail elderly were female (67 percent), as were those with serious mental illness (62 percent). Less than half of individuals with a brain injury or an intellectual or developmental disability were female—42 and 43 percent, respectively (Appendix D, Table D2.a.1).

Table 3.1 Characteristics for All Participants

Participant Characteristics	n	%
Age, years		
18 to 24	22	1.89
25 to 34	111	9.51
35 to 44	134	11.48
45 to 54	224	19.19
55 to 64	308	26.39
65 to 74	199	17.05
75 or older	169	14.48
Total	1,167	
Sex (female)	633	54.24
Race		
White	674	57.85
Black or African American	188	16.14
Asian	34	2.92
American Indian or Alaska Native	14	1.20
Other	167	14.33
Unknown	88	7.55
Total	1,165	
Ethnicity (Hispanic)	70	6.01

CHAPTER 4. ASSESSOR TRAINING AND SUPPORT

Extensive preparations were made and supports developed to equip assessors with the necessary tools and information to conduct assessments. Between February and June 2017, 98 assessors successfully completed the FASI assessor training. Numerous supports also were implemented to provide ongoing resources and points of contact with the FASI team to answer questions as they arose. This chapter details the training requirements assessors were required to complete, as well as the multiple supports available to assessors during data collection.

Kickoff Webinar and CITI Training

Kickoff Webinar

The kickoff webinar served as an introduction to the FASI field test for assessors, managers, and states. The webinar introduced the purpose of the FASI, reviewed the FASI data collection tool, outlined the assessors' role in the data collection, and covered the process, timeline, and other resources for the assessors. Attendees had the opportunity to ask questions. The kickoff webinar was held twice, on September 14 and 21, 2016. If assessors could not attend either of those dates, they could access a video recording of the presentation or a PDF of the webinar slides. Assessors were required to attend or view the webinar before proceeding to the training.

Collaborative Institutional Training Initiative (CITI) Training

All FASI assessors were required to demonstrate sufficient knowledge of ethical principles and regulatory requirements for protecting human subjects through the completion of the web-based human subject protection training offered by the FASI team. This CITI training covered obtaining consent, recruiting, handling identifiable research data, and other topics related to the protection of human subjects as part of a research project. Assessors were required to provide a Certificate of Completion to the FASI team in order to access the FASI Training.

FASI Training for CB-LTSS Assessors

The FASI field test required a training approach to effectively train both experienced and novice assessors from six states within a short time span. The consistency of training was important to support the interrater reliability testing of the FASI. The FASI team developed a unique self-paced, competency-based, online assessor training for the field test.

Online training is an increasingly popular method to educate adult learners. A recent review of meta-analyses on the topic found that elearning is as effective as in-person instruction when the learning methods are held constant and tends to be more effective than in-person instruction when no special efforts are made to hold the learning methods constant.[19] This affirms the idea that learning methods are more important to learning effectiveness than the modality.[20]

In this chapter, the term *trainee* is used to refer to people who completed the FASI Assessor Training. This primarily includes assessors who used the FASI to assess individuals in community-based long-term services and supports (CB-LTSS) programs, but it also includes managers and others working on the project who completed the training but who may not have conducted assessments for the study.

Research-Based Learning Methods

The FASI team incorporated research-based learning methods in the design of the FASI Assessor Training. Goal-directed practice with targeted feedback is critical to learning.[21] *Practice* is defined as any activity in which learners engage their knowledge or skills; *feedback* is defined as information given to students about their performance that guides future behavior. More frequent feedback leads to more efficient learning. This self-paced, online format allows learners to practice and receive consistent feedback. The practice questions embedded in the lessons and the sets of integrated vignettes that included a representative sample of all FASI items provided all trainees with numerous opportunities for practice and feedback.

Multimedia practice interactions mirroring the job performance provide feedback to improve learning. In addition, realistic decision-making, real-world contexts, and feedback are among the methods that "produce better learning than straight information presentation."[22]

---

[19] Thalheimer, W. Does eLearning Work? What the Scientific Research Says! 2017. http://willthalheimer.typepad.com/files/does-elearning-work-full-research-report-final.pdf

[20] Clark RC, Mayer RE. e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning. 4th ed. Hoboken, NJ: Wiley; 2016.

[21] Ambrose SA, Lovett M, Bridges MW, et al. How Learning Works: Seven Research-Based Principles for Smart Teaching. San Francisco, CA: Jossey-Bass; 2010.

[22] Thalheimer, W. Does eLearning Work? What the Scientific Research Says! 2017; p. 25. http://willthalheimer.typepad.com/files/does-elearning-work-full-research-report-final.pdf

Video Vignettes of Real People for Assessment and Learning

Video scenarios of an assessor using the FASI to assess individuals with different levels of need and disabilities living in the community were used to evaluate coding skills. Assessors were provided with examples of interactions with individuals, examples of when to involve a caregiver in the assessment, and examples of how to use probing questions to gather accurate information.

Integrated Vignettes and Item Sampling

The FASI training included a series of three integrated video vignettes that enabled assessors to code the FASI in the course of completing the vignettes. This exposed assessors to a wide range of individuals and coding situations. Integrated vignettes are an edited series of short scenes that detail a trained assessor observing an individual, asking questions about everyday activities, or both. An integrated vignette may include three or four different individuals and covered each FASI domain, that is, self-care, mobility, instrumental activities of daily living (IADLs), assistive devices, and living arrangements. Items were sampled across the three vignettes so that successfully completing an integrated vignette meant that the assessor had demonstrated competency on all FASI items but did not have to code the same item multiple times.

The videos of individuals in the community provided a realistic representation of individuals receiving CB-LTSS. The videos included men and women of different ethnicities with varying types of abilities. The videos included individuals with cerebral palsy, stroke, a traumatic brain injury, serious mental illness, or an intellectual or developmental disability who were living on their own, with family members, or in supervised group settings.

Incorporating videos of real people in their own settings allowed the training to demonstrate interview strategies using natural language.

Immediate Feedback

Throughout the FASI training, trainees were provided with immediate feedback for every code selected. The feedback included the correct answer with the rationale for the correct code choice. When appropriate, trainees also were given the rationale for why a code was incorrect. This helped the trainees develop coding skills as they completed the training, continually improve, and learn from any errors.

Individualized Access and Real-Time Updates

The elearning modules were built using the Shared Content Object Reference Model (SCORM) technical standard, allowing for the lessons or courses to be "plug and play" in any learning management system (LMS) that uses the standard. An LMS enables detailed data collection about user performance that is used to individualize the training experience by providing context-specific feedback, as well as detailed analytics about user performance for enhancing the development of the training.

Trainees logged on to the LMS wherever and whenever they had Internet access. The LMS enabled the FASI team to (1) ensure the sequencing of the training lessons so that learners had to demonstrate competency at one level before proceeding, (2) track the assessors' status and completion of the training, and (3) analyze trainee responses to each coding question, to improve the training in real-time.

An additional benefit of self-paced online training is that it is standardized and replicable. All new assessors received the same training and achieved the same minimum levels of competence. The FASI training required trainees to code at least 85 percent of the items accurately to demonstrate competency in coding. Assessors who did not code accurately at least 85 percent of the first integrated vignette were required to complete a second set of integrated vignettes. If the trainee did not code at least 85 percent of the items accurately on the second set, he or she was required to complete a third set.

Assessor Support During Data Collection

Assessors could obtain support through the AskFASI website, a recording of the kickoff webinar, the FASI Manual, the AskFASI Helpdesk, and Weekly Assessor Roundtables.

AskFASI Website

The AskFASI website was available to assessors throughout training and field testing at any time to answer questions on protocols and procedures. The website provided a central hub for the assessors to access everything needed during the field test. The website had six main sections: Training, Frequently Asked Questions (FAQs), Study Resources, Submit Forms, Weekly Assessor Roundtable, and Ask a Question. The Training section provided links to the kickoff webinar, CITI training, and the FASI assessor training.

The FAQ section provided links to the different types of questions that the Help Desk team received during the field test and their answers. The Study Resources page contained links to the FASI Manual, the paper and PDF assessment forms, and resources to help the assessor. This included information on the consent process, the telephone script, and the PDF form upload instructions. The Submit Forms page contained instructions on how to upload completed FASI assessment forms and how to properly store copies of the assessment and the original consent and assent forms until the field test was completed. The Weekly Assessor Roundtable page contained the date, time, links, and topics for the Roundtable Meetings. The Ask a Question page provided a contact form that an assessor could use to contact the Help Desk with questions. This form was to provide another option for asking questions in addition to phone or email.

FASI Manual

The FASI Manual was created to provide assessors and managers with a reference document for more detailed information about the FASI. The manual was available on the AskFASI website. It contained background information about the FASI project, common terminology, general instructions on how to conduct the assessment, and details and descriptions of the items and coding scale on the assessment.

AskFASI Help Desk

The FASI team staffed a FASI Help Desk to assist assessors during the FASI training and data collection periods. The Help Desk team responded to questions within 1–2 business days. During the training and field test, the Help Desk answered 187 questions from assessors and managers. Each week, the FASI team would update the FAQ section with answers to questions that would be relevant to other assessors.

Weekly Assessor Roundtables

From March to June 2017, the FASI team conducted weekly 30-minute assessor roundtables via conference call, with the assessors. These assessor roundtables provided a forum for assessors to ask questions and for the team to clarify guidance about conducting assessments. Prior to each roundtable, the FASI team would review assessor questions received in the previous week to identify the most common questions and issues. The FASI team used this information to select and post a topic prior to each roundtable. A FASI team member began each roundtable

with a review of the topic and then opened the discussion up to any questions from the assessors. Assessors also were encouraged to share their experience and strategies using FASI in the field test.

The following are the weekly roundtable topics:

- Week 1: Section B: FASI Rating Scale
- Week 2: Person-Centered Approaches and Priorities
- Week 3: Verbal Cues Versus Physical Assistance
- Week 4: FASI Form Completion
- Week 5: Living Arrangements and Caregiver Assistance
- Week 6: Section B: Mobility and Quality Checks
- Week 7: Section B: IADLs
- Week 8: Section C: Assistive Devices
- Week 9: Standardized Assessment
- Week 10: Frequently Asked Questions Review
- Week 11: Section D: FASI Rating Scale and Frequently Asked Questions Review
- Week 12: Frequently Asked Questions Update: Standardized Assessment
- Week 13: Section B: FASI Rating Scale
- Week 14: Bring Your Own Questions and Share Your Experiences

Help Desk FASI Report Tracking Log

The Help Desk recorded the Roundtable and Help Desk questions and categorized these questions by topic. Roundtable discussions were shared with the FASI team and were used to inform recommendations for revisions to the FASI training and the FASI form. Assessors joined these weekly calls as needed. On average, 8–10 assessors joined the roundtable in the first few months of the calls; 2–4 assessors joined calls in the last month of the calls (June 2017).

Questions fell into eight different categories:

1. Assessment Form—assessors sought clarification on specific parts of the FASI form and questions on the items used to assess the CB-LTSS participants.
2. CITI Training—assessors needed information on how to access the training and obtain the correct certificates of completion.

3. Consent/Assent—assessors sought guidance on how to determine whether a person was able to consent, assent, or participate.
4. FASI Training—assessors primarily inquired about the FASI Training (46 percent of all help desk questions), including training access, passwords, and procedures when a trainee failed the assessment vignettes at the end of the training.
5. FASI Website—assessors required assistance with website access if they forgot their username or password.
6. Prior to Conducting a FASI Assessment—assessors asked about the recommended number of contact attempts before removing someone as a potential participant and questions about where to obtain the recruitment scripts.
7. After Conducting a FASI Assessment—assessors sought advice on how to return assessments to the field test team and about coding questions that had arisen during a particular assessment.
8. Other—assessor sought advice that did not fit into the previously listed categories and generally related to the conduct of the field test rather than the FASI assessment.

Table 4.1 provides details of questions received by the FASI Help Desk.

Table 4.1. Help Desk Question Submission Type

Submission Type	n	%
Postassessment	5	2.67
Assessment form	7	3.74
Preassessment	8	4.28
Unique question	8	4.28
Consent	9	4.81
FASI website	17	9.09
Other	18	9.63
CITI training	29	15.51
FASI training	86	45.99
Total	187	100

Training Results

Time Spent

The LMS recorded the amount of time each trainee spent on each lesson (Table 4.2). Overall, the mode and median provided the best indication of the time spent in training. A trainee spending the median time on each lesson and demonstrating competency on the first vignette completed the training in 2.5 hours. The median time spent on the lessons was 65 minutes, and the remainder was spent scoring the integrated vignettes.

Table 4.2. Time Spent on Each Lesson

Lesson	Minutes of Audio and Video	Mean	Mode	Median	Min	Max
Lesson 1: Introduction	4:33	15:51	5:56	7:44	0:59	7:32:46
Lesson 2: FASI Basics	7:00	20:21	13:28	13:04	1:17	4:51:06
Lesson 3: Section A of the FASI	0:57	2:22	2:16	2:14	0:13	16:40
Lesson 4: Section B of the FASI	13:19	39:41	21:51	25:55	3:06	5:15:07
Lesson 5: Section C of the FASI	3:10	8:11	4:18	4:37	0:081	1:09:12
Lesson 6: Section D of the FASI	6:05	17:29	22:27	15:08	2:23	1:22:28
Integrated Vignettes 1 (required for all)	39:53	2:06:42	n/a	1:28:29	11:54	19:44:19
Integrated Vignettes 2	31:32	2:09:45	n/a	1:23:05	10:40	23:34:46
Integrated Vignettes 3	19:44	58:05	n/a	48:36	30:26	3:19:57
Recruitment and Consent	6:46	35:48	11:40	13:10	2:57	3:40:40

Abbreviation: FASI, Functional Assessment Standardized Items.

Assessor Trainee Results

After discussion, the training development team established an 85 percent threshold to demonstrate competency. One factor that influenced the decision was the use of 85 percent as a standard by the Quality Matters organization for quality assurance in course design.[23] However, there are no standards for assessment training, and the FASI team proactively monitored pass rates in real time, adjusting as necessary to maintain standards and avoid trainee frustration.

After completing the lessons, trainees attempted the first set of vignettes (n = 98) (Table 4.3). The Evaluation section of the FASI training comprised three sets of vignettes. Less than half of trainees (42 percent) successfully passed the first vignette.

Some trainees who successfully completed the first vignettes chose to complete the second and third ones, although they were not required to do so. Two trainees failed both the first and second attempts of all three sets of vignettes. Six trainees failed the first attempt but were marked as complete after a phone discussion with an assessment expert from the FASI team. These trainees received individual remediation by an assessment expert and were allowed to

[23] Quality Matters. QM Rubrics and Standards. https://www.qualitymatters.org/qa-resources/rubric-standards

enter the study. One trainee failed on the first attempt and did not complete a second attempt. This person was a manager who did not conduct assessments for the study. A total of 97 trainees successfully completed the FASI training.

Table 4.3 Assessor Trainee Results by Vignette

Result	Number of Attempts	Passed	
		n	%
Passed on 1st set of vignettes, first attempt	98	41	42
Passed on 2nd set of vignettes, first attempt	67	30	45
Passed on 3rd set of vignettes, first attempt	49	23	47
Passed on 1st set of vignettes, second attempt	12	6	50
Passed on 2nd set of vignettes, second attempt	7	4	57
Passed on 3rd set of vignettes, second attempt	5	3	60

By monitoring trainees' performance in real time, the FASI team was able to remove problematic items from the scoring calculation for each set of vignettes. Subsequent trainees continued to code the full set of vignettes, but fail rates decreased once five problem items were removed from the scoring (Table 4.4). In addition, a short video clarifying the use of certain codes was added to the training based on common coding issues. The team's ability to modify the training improved the trainees' experience.

Table 4.4 Assessor Performance on Vignettes by First and Second Attempts

Set of Vignettes	Average Score	Median Score	Minimum Score	Maximum Score
First Attempt				
1st set	82.07	81.25	45.83	100
2nd set	83.12	84.31	66.07	100
3rd set	85.35	85.55	70.27	100
Second Attempt				
1st set	85.59	83.32	72.54	100
2nd set	85.48	84.73	73.21	100
3rd set	88.84	86.48	83.78	97.43

Assessors' Experience

An anonymous online survey (Appendix C) was sent to the assessors after they had completed 4–6 assessments in the field test to gain insight into how they felt about the format of the training and whether they felt the training adequately prepared them to conduct assessments using the FASI. About one-third of the assessors (n = 33) completed the eight-question survey. Those who completed the survey were relatively experienced, with 60 percent of respondents having 7 or more years of experience working with individuals receiving CB-LTSS. The following is the distribution of responses among those who completed the survey:

- 97 percent agreed or strongly agreed that it was helpful that the training included a variety of people with different types of needs.
- 94 percent agreed or strongly agreed that the integrated vignettes helped their learning.
- 76 percent agreed or strongly agreed that the training prepared them well to conduct assessments using the FASI.
- 58 percent agreed or strongly agreed that this self-paced online training was better than other online workplace trainings they had completed.
- 51 percent agreed or strongly agreed that this self-paced online training was better than other in-person workplace trainings they had completed.

Assessors appreciated the variety of individuals interviewed throughout the training and liked the use of the integrated vignettes. The survey also highlighted differences in individual preferences for online versus in-person training. Written comments indicated a preference for the self-paced nature of the training (11 out of 33 comments) and a preference for face-to-face training (9 of 33 comments). Overall, the assessors felt adequately prepared by the training.

CHAPTER 5. DATA PREPARATION AND TESTING APPROACH

In this chapter, the FASI team presents the detailed analytic approach it used to prepare the FASI data for analysis and to test the validity, reliability, and usability of the items. A brief summary of the analytic approach also is presented in each of the results chapters, Chapters 6–12.

Field testing was designed to evaluate how well the FASI set assesses functional status and need for assistance with daily activities. This included evaluating how well items reflect the everyday needs of individuals and how well the rating scales (response options) distinguish between individuals with different levels of need for assistance and across populations. The field test also sought to examine the extent to which different assessors could reliably code items on the same individuals. Although the focus of this report is on the field testing, earlier testing is sometimes mentioned if it contributed substantially to an important psychometric property of the FASI items.

Data Preparation

Data Cleaning

Prior to analysis, the data were cleaned to check values that were missing, values that were out of an expected range, and for appropriate skip pattern usage. For example, an "appropriate skip pattern" would be a case in which the person did not use a manual wheelchair and questions related to wheelchair use were not asked. Data cleaning and analysis programs were created and run in Stata® version 14.2.[24]

The most common data cleaning procedure applied was to confirm that absent data imported from the electronic PDF (ePDF) assessment forms was due to skip pattern usage. This occurred in the Mobility Ambulation, Mobility Manual Wheelchair, Mobility Motorized Wheelchair/Scooter, Assistive Devices, and Availability of Assistance sections of the FASI (n =

[24] StataCorp. Stata Statistical Software: Release 14. College Station, TX: StataCorp, LP; 2015.

7,056, n = 7,408, n = 8,664, n = 1,072, n = 32, respectively). This represented a very small percentage of the data points in the FASI set. [25]

The most common coding error in Section D: Living Arrangements and Caregiver Assistance and Availability was use of the code "09-Not applicable: Person does not do this activity item" in either the paid or unpaid column when, for the same item, the assessor also indicated that the person received assistance with the item in the other column. This likely indicated a lack of clarity in the instructions related to the use of the 09 code, which should be revised in the future. Regardless, the correct code should have been "05-Assistance not needed" (n = 755).

Data Editing

A code 99 was generated to indicate when data were missing. This occurred most frequently for the Assistive Device section (n = 1,296) and the personal priority open-response text boxes (n = 859). When the code for the most dependent (past month) was coded higher (more independent) than the code for usual performance (past 3 days) for the same item, both codes were edited to code 97 (n = 370). When codes on paper forms were not legible, the appropriate code was confirmed with the assessor when possible and replaced (n = 152). The FASI team also contacted the assessor, if possible, and corrected the code if data were unexpectedly missing or an incorrect code was identified. Table 5.1 presents all data edits that the FASI team made to the initial FASI data.

[25] In this case, n refers to the number of data points changed, not the number of individuals. Overall, there were more than 180,000 individual data points in the FASI set; thus, these numbers represent a very small proportion of the total data.

Table 5.1. Description and Total Number of Edits Made to the Initial Functional Assessment Standardized Items (FASI) Set That Were Not Due to Skip Patterns

Scope/Problem	Description of Change	No. of Data Points Edited
Assistive device items blank	Custom code 99 was inserted to describe the data as missing	1,296
Priority text box is blank	Custom code 99 was inserted to describe the data as missing	859
Participant code receiving paid (or unpaid) assistance for an item (Section D) and 09 in the other column	Replaced code 09 Not applicable with Code 05 No assistance received	755
Performance level coded for Most Dependent was more independent than Usual performance	Recoded to 97	370
Missing code, illegible, or incorrect code on paper form	Contacted assessors and inserted correct code	152
Total changes		3,432

Evaluation of the FASI Assessment

Table 5.2 presents the FASI team's testing plan, a framework based on a combination of psychometric approaches of Messick[26] and COSMIN,[27] to test validity, generalizability, and reliability of the FASI items. Following Table 5.2, the FASI team presents these approaches in more detail. Additionally, as discussed in the results chapters of this report, the FASI team determined qualitatively the strength of the evidence for each aspect of validity and reliability as strong, good, or mixed. The adjective *strong* was assigned when all or almost all results met or exceeded specified criteria. The adjective *good* was assigned when most results met or exceeded specified criteria. The adjective *mixed* was assigned when some results met criteria and others did not.

[26] Messick S. Validity of Psychological Assessment: Validation of Inferences From Persons' Responses and Performances as Scientific Inquiry Into Score Meaning. Princeton, NJ: Educational Testing Service; 1994. https://files.eric.ed.gov/fulltext/ED380496.pdf

[27] Mokkink LB, Terwee CB, Knol DL, et al. The COSMIN checklist for evaluating the methodological quality of studies on measurement properties: a clarification of its content. BMC Medical Research Methodology. 2010;10:22.

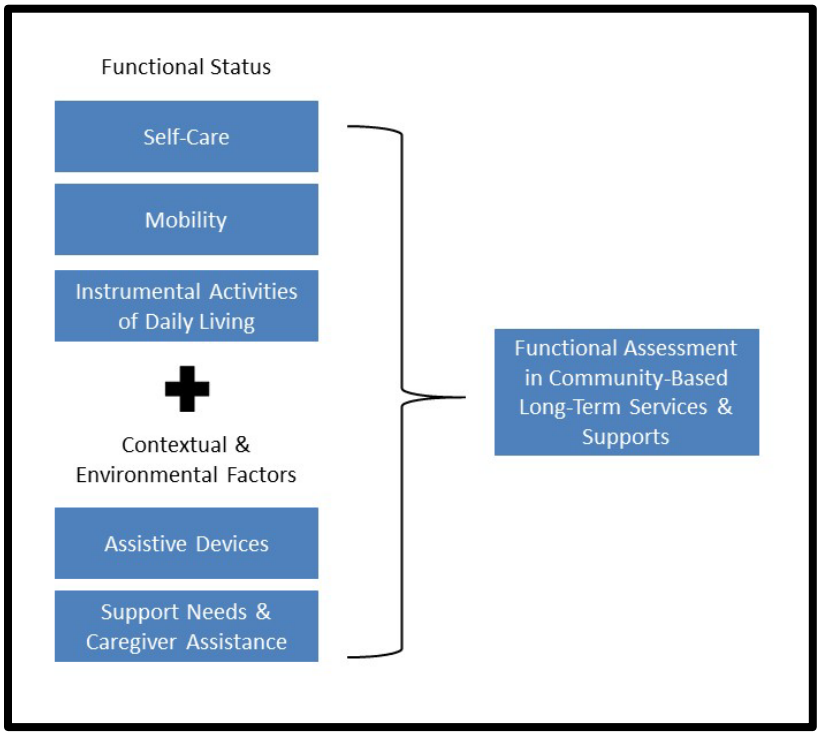
Table 5.2. Analytic Testing Framework

Measure	Question Addressed	Analytic Approach
VALIDITY		
Substantive Validity		
Extent to which items represent the construct of interest	Is the model underlying the construct sound?	• Mapping items to domains and concepts • Technical Expert Panels
Content Validity		
Extent to which items are relevant to and representative of the domain	Do the items cover the concept of interest?	• Technical Expert Panels • Cognitive interviews • Pilot testing
Structural Validity		
Considers the (uni)dimensionality of the items	What is the internal structure of the items and the rating scale?	• Rating scale structure (Rasch) • Hierarchical order (Rasch) • Unidimensionality (Rasch) • Item Fit (Rasch)
External Aspects of Validity		
Relationship of the items to factors external to the test is consistent with expectations	Does the scale compare with known scales of similar or different concepts?	• Concurrent: distinguish between groups (chi-square) • Concurrent: K-sample equality of medians test to examine the difference in the median scores for each population • Convergent: compare usual and most dependent codes (Kendall's tau-b)
Generalizability		
Performance on the test relates to skill/knowledge in the target domain	How well does the score translate to real life, across groups and settings?	• Differential item function
RELIABILITY		
Interrater Reliability		
Evaluates error due to rater variability	To what extent do raters give consistent ratings of the same phenomenon?	• Interrater reliability (Krippendorff's alpha)

Validity

Substantive validity. The conceptual framework for the FASI set defines the concepts measures in the instrument (Figure 5.1).[28] As evidence is gathered to support items within a concept, the instrument and conceptual framework will evolve and improve. The development of the FASI set was supported by input from CB-LTSS stakeholders such as state agencies, assessors, caregivers, advocates, and individuals receiving services. In 2014, a Technical Expert Panel (TEP) held by RTI and Truven Health concluded that the proposed standardized items were appropriate for inclusion in the FASI set. In 2015, a TEP furthered this work by clarifying concepts and items and building on alignment of functional measurement in CB-LTSS programs

Figure 5.1. Proposed Conceptual Framework for Functional Assessment in Community-Based Services and Supports



[28] U.S. Department of Health and Human Services Food and Drug Administration, Center for Drug Evaluation and Research, Center for Biologics Evaluation and Research, Center for Devices and Radiological Health. (2009). Guidance for Industry Patient-Reported Outcome Measures: Use in Medical Product Development to Support Labeling Claims. https://www.fda.gov/downloads/drugs/guidances/ucm193282.pdf

with CMS's larger data standardization efforts. Domains of the FASI set outlined in Figure 5.1 demonstrate concepts that need to be measured to assess a person's functional status in the community.

Content validity. TEPs, cognitive interviewing, and assessor comments provided opportunities for content validity feedback on the FASI items, data collection methods, recall period, and response options. The purpose was to ensure each item's relevance and comprehensiveness to the construct of a functional assessment in CB-LTSS.[29] For example, during the 2015 TEP, members recognized that it was important to ask individuals in the community about caregivers. Caregiver support brings up broader environmental issues and is a central component that might complicate the person's ability to remain in the community. Therefore, the FASI team kept these items during the instrument development phase.

The cognitive interview focused on the FASI, assessment flow, approaches to data gathering, 3-day reference period, and rating scale use. *Cognitive interviewing* is a strategy in which test developers review the items with potential users in order to identify issues with an assessment such as clarity, interpretation, and flow. Data collection methods included direct observation, assessor evaluation after individual interview, and assessor evaluation after caregiver interview. The cognitive interviewers requested that a past month reference period be included in addition to the 3-day reference period. There was some confusion on assessors' coding of caregiver supports and services. It was recognized that two columns were needed to code paid and unpaid caregiver assistance. The cognitive interview process, as well as the pilot test, were instrumental in developing and modifying the FASI.

Structural validity. To assess structural validity, the FASI team conducted a series of Rasch analyses of the self-care, mobility, and instrumental activity of daily living items (Appendix E). A one-parameter Rasch model was used to evaluate all items within a domain as a coherent scale. The Rasch analysis determined the structure of the rating scale steps, the hierarchical order of items (from easiest to hardest), the extent to which the items represent the same construct

[29] Mokkink LB, Prinsen CAC, Patrick DL, et al. COSMIN Methodology for Systematic Reviews of Patient-Reported Outcome Measures (PROMs): User Manual. Version 1.0. February 2018. http://www.cosmin.nl/images/upload/files/COSMIN%20syst%20review%20for%20PROMs%20manual_version%201_feb%202018.pdf

(unidimensionality), and whether the hierarchical order of the items differed across CB-LTSS populations (differential item functioning [DIF]).

The rating scale step structure, item calibrations, item-level infit and outfit mean squares, and point biserial correlations are reported in each results chapter. Appendix E addresses the mean, standard deviation, root mean square error, standard deviation, person separation index, and person separation reliability for the Rasch analyses reported. For Rasch analysis, it is recommended that each rating scale step of each item have at least 10 ratings. The FASI data in this report meet this requirement. The process of Rasch analysis generally proceeds as a series of iterative steps with the goal of improving measurement precision at each step. Because FASI items are aligned with those in the Data Element Library (DEL), the FASI team reports the results from the initial Rasch analysis with all items and rating scale steps in this section. Results of subsequent iterations can be found in Appendix E.

The Thurstone thresholds were reported for the transitions between the rating scale steps, which should be monotonic. When they were not, the impact of combining adjacent categories on measurement precision were examined. This is not described in each chapter because it goes beyond the scope of this work, but the FASI team recognizes its value in instrument development and reports the Rasch analysis iterations in Appendix E.

The calibrations of each item and infit mean square and standardized z-scores were reported. Values between 0.7 and 1.3 were evidence of fit to the measurement model. Misfitting items were removed iteratively, and the impact on measurement precision is reported in Appendix E. The FASI team conducted principal component analysis and considered variance explained less than 10 percent and an eigenvalue less than 2 to demonstrate insufficient evidence of dimensionality. Rasch analyses were conducted iteratively in an attempt to maximize measurement precision.

Adjacent rating scales were combined to demonstrate that enhanced precision was achievable, but adjusting the rating scales is not recommended. Misfit items were moved, which demonstrably improved measurement precision and reduced the impact on individual measures (Appendix E). If groups of individuals misfit (based on infit mean square and standardized z-scores) and removing them demonstrably improved measurement precision, these individuals were removed from the analysis to establish item calibrations but reinserted in further analyses, anchoring rating scale step and item calibrations to earlier locations.

Differential item functioning (DIF) values are reported by population. Sample size recommendations for Rasch-based DIF were 200 for the target group and 1,000 for the reference group. Because of sample size, the FASI team was cautious in interpreting any identified DIF in the case of the brain injury and serious mental illness populations. The pragmatic test of the impact of DIF is whether removal of DIF items significantly changes person measures. To evaluate, the FASI team examined whether person measures, with and without DIF items, were within 95% confidence intervals. In this report, the presence of DIF is noted, but no actions were taken to account for it because items are part of the CMS DEL. Point biserial correlations, person separation index, and person separation reliability are reported in subsequent chapters and Appendix E. When data appeared skewed because of maximum or minimum scores, the FASI team used Wright's sample independent method for strata and calculated levels of functional ability, which equates to person separation reliability coefficients.[30,31]

External validity. The FASI team assessed concurrent, and convergent validity.

Concurrent validity. Contingency tables report the frequency and percentage for each response option by item. Overall contingency tables are provided within each results chapter. Results by population are reported in Appendix D. The FASI team tested for differences in the proportion of individuals assigned different codes across populations by item using chi-square statistics and reported significance and evaluated the use of the rating scale for each item across populations for both the usual (3-day) and most dependent (past month) performances. The FASI team reported the median score for each item overall and by population, testing for differences across populations with a nonparametric K-sample equality of medians test and p-values.

Convergent validity. The FASI team evaluated the extent to which individuals differ in the scores assigned for usual (3-day) and most dependent (past month) performance reporting Kendall's rank correlation coefficient (tau-b) and 95% confidence intervals. A significant difference would indicate that individuals required more assistance in the past 30-days than is reflected in the past 3 days. To the extent that this is the case, the most usual performance in

[30] Wright BD. Separation, Reliability and skewed distributions: statistically different sample-independent levels of performance. Rasch Measurement Transactions. 2001;14(4):786. https://www.rasch.org/rmt/rmt144k.htm

[31] Fisher W. Reliability, separation, strata statistics. Rasch Measurement Transactions. 1992;6(3):238. https://www.rasch.org/rmt/rmt63i.htm

the past 3 days may not be sufficient to determine the full need for supports and services for these individuals.

Generalizability. The FASI team conducted analyses to evaluate the extent to which scores can reasonably be expected to translate across groups and settings. The extent to which items operated together to provide adequate measurement precision and sufficient person fit to the measurement model were examined. A DIF analysis was conducted by population to determine whether the ordering of the items from easiest to hardest remained sufficiently constant across populations indicating that the operational definition of function is the same for individuals across populations. The practical test of the impact of DIF is whether removal of DIF items significantly changes the person measures when items showing DIF are removed (Appendix E).

Reliability

Interrater reliability. For each item, the number of assessors who scored the item, the number of individuals scored, and the resulting Krippendorff's alpha are reported. Krippendorff's alpha is a correlation coefficient that indicates the level of interrater agreement. It makes no assumptions about sample size, number of ratings, or missing data, making it ideal for the ecologically robust interrater reliability (IRR) methods used in this field test. IRR coefficients range from .00 to 1.00. Krippendorff recommends the following guidelines for interpretation: below .67 suggests insufficient evidence of IRR; .67 to .80 suggests tentative evidence for IRR; and above .80 suggests strong evidence for IRR.

Many studies often calculate the intraclass correlation coefficients (ICCs) when examining interrater agreement; however, a key assumption needed for accuracy of ICC calculation is to have all individuals rated by all assessors.[32] Because of the pragmatic data collection strategy used in this study, conducting the ICC calculation was not feasible. Furthermore, at least two observations and two raters are required for a Krippendorff calculation. Therefore, any items containing observations of only one individual were not included in the analysis (Appendix D, Section 15).

[32] Krippendorff K. Agreement and information in the reliability of coding. Communication Methods and Measures. 2011;5(2):93-112.

Technical Expert Panel Evaluation of the FASI Set

A TEP was convened in November 2017 to review the FASI field test results. The FASI team reviewed the evidence on the reliability and validity of the FASI set, elicited feedback from key stakeholders regarding revisions to the FASI and considered next steps in proposing quality performance measures based on the FASI set.

The FASI team summarized relevant TEP feedback in the results chapters (Chapters 6 through 12). For the entire FASI set, the TEP recommended that responses over the past 3 days, as well as those over the past month, should be retained. Although most individuals did not experience fluctuations in their need for assistance between the past 3 days and the past month, TEP members believed that it was important to retain scoring items relative to this assessment reference period when it occurred. The TEP also recommended updating several instrumental activities of daily living items to better reflect the use of current technology in completing everyday activities.

CHAPTER 6. SELF-CARE ITEMS

Introduction

This chapter describes the results of field testing the FASI related to self-care activities. Self-care activities are important to assess individuals applying for and/or enrolled in community-based long-term services and supports (CB-LTSS) programs because they provide key information about activities with which the person needs assistance, relate to the type and amount of services needed, and inform development of the person's service plan. Difficulty managing self-care items can put an individual at risk for serious health conditions and decrease quality of life.[33] Therefore, understanding how much support a person needs with self-care is critical to ensuring that the person is safe within his or her home environment.

Most CB-LTSS programs evaluate the type and level of support that an individual needs to complete self-care activities independently as a key factor in determining eligibility for services. In addition, support with self-care activities is a major determinant in the continued need for services. Documenting the need for support and/or services with self-care activities is an important aspect in developing the individual service plan.

As part of preparing for Balancing Incentive Program,[34] Kako et al. conducted a review of assessments that states use for eligibility and enrollment services. The results indicated that most assessments included activities of daily living and, specifically, most evaluated bathing, personal hygiene, dressing, toileting, and eating. In this section, the FASI team describes the items and the rating scale used to score each of the self-care items, briefly presents the results of the field testing, reviews feedback from assessors, and concludes with a summary and recommendations.

Description of the Self-Care Items

The full text for each of the self-care items can be found in Appendix A. The Self-Care section of the FASI consists of eight items related to daily self-care activities. The assessor gathers

[33] Low LF, Yap M, Brodaty H. A systematic review of different models of home and community care services for older persons. BMC Health Services Research. 2011;11:93.

[34] Kako E, Sweetland R, Melda K, et al. The Balancing Incentive Program: Implementation Manual. San Francisco, CA: Mission Analytics Group; 2013. http://www.balancingincentiveprogram.org/sites/default/files/Balancing_Incentive_Program_Manual_2.0.pdf

information for coding items in this section from multiple sources including discussion with, or observation of, the person applying for or receiving supports and services, the individual's family and/or caregivers, and written records where necessary. There are no skip patterns in the self-care items; assessors code all items in this section. Each item is based on the standardized items in the CMS Data Element Library (DEL). To the extent possible, items follow the standard. Exceptions or modifications to the standard are noted in this section, including rationale for the modification.

The **eating item** considers the support that a person needs to get food from the plate to his or her mouth using suitable utensils. The item considers the person's ability to chew and swallow the food, although the food may be modified in consistency to assist with swallowing. Only a very small number of individuals receiving CB-LTSS get nutrition through tube feeding. The FASI team therefore anticipated that most individuals would be coded on this item.

The **oral hygiene** item considers how much support the individual needs to clean his or her teeth or dentures. Oral hygiene is critical to overall health, so it is important to ensure that the individual is able to maintain an adequate level of oral care.

The **toileting hygiene** item reflects the amount of support that an individual needs to complete toileting, such as lowering and raising underwear and maintaining appropriate cleanliness. In response to feedback from the first Technical Expert Panel (TEP), the FASI team modified the standard item (GG0130D) to include feminine hygiene to reflect the needs of women receiving CB-LTSS.

The **wash upper body** item considers how much support a person needs to wash without taking a shower or bath. This item recognizes that (1) some individuals choose to wash their upper bodies on days that they do not shower and (2) others might simply prefer the upper body mode of washing. The **showering and bathing** item reflects the assistance needed to take either a shower or a bath, whichever is the individual's preferred or usual mode. This item does not include transfers in and out of the shower or tub, because this is captured in the Mobility section.

The **upper body dressing** item considers the support needed to dress and undress above the waist, including managing any fasteners. The **lower body dressing** item considers support needed with underwear, trousers, or sweatshirts. For both upper and lower body dressing, the

manner of fastening clothes is not specified; the assessor is instructed to assess whatever is usual and customary for the individual.

The **footwear** item reflects support needed to put on and take off footwear, regardless of how the footwear is fastened. This item includes putting on or taking off assistive devices such as an ankle-foot orthosis.

Description of the Rating Scale

The ratings for the FASI set used one of six numeric codes that best describes the individual's need for assistance with the task described.[35]

- Code 06: The **person is independent** and requires no assistance with this task.
- Code 05: The **person needs assistance** with setup or cleanup assistance but does not need assistance during the task.
- Code 04: The **person needs supervision or touching assistance** during the task. Any amount of light touch or verbal/visual cueing is scored as 04. If the person needs verbal cueing throughout the task, the score is 04.
- Code 03: The **person provides most of the effort** required to complete the task but **requires partial or moderate** assistance from a helper.
- Code 02: The **helper provides most of the effort** to complete the task, although the person is able to provide some effort during the task.
- Code 01: The **person is unable to contribute any effort** to complete the task or **requires two persons** to assist with the task.

There are also three codes used to indicate why a self-care activity was not performed during the assessment reference period or a score was not provided.

- Code 07: The **person refused** to provide information about his or her performance on that item.

[35] These codes and definitions align with the standardized items in the DEL (for self-care items and all other items in this report), but some modifications have been made to reflect the needs and perspective of individuals receiving CB-LTSS. For example, the FASI refers to *individuals,* whereas the Minimum Data Set (MDS) version of the item uses the term *resident* and the inpatient version uses the term *patient*.

- Code 09: The **person did not perform the item during the reference period** because he or she preferred not to do so. This code does not indicate that the person lacks the ability to perform the task.
- Code 88: The **person usually performs the activity but did not do so during the assessment reference period** because of a short-term medical or mental health condition. This latter code differs slightly from the DEL format to better clarify that this code is used when the medical or safety condition is expected to resolve.

Assessment Reference Period

Each of the self-care items is scored twice: once with regard to **usual performance in the past 3 days** and again to reflect the **most dependent performance in the past month**. This approach recognizes that an individual's need for assistance may fluctuate over time. The FASI team scored both assessment reference periods to ensure that this variability was appropriately documented. The standardized items within the DEL are scored only as usual performance during the past 3 days. One objective of this field test was to evaluate the extent to which the individual's most dependent performance on the item in the past month provides important additional information for service planning.

Analytic Objectives and Approach

The data analyses were designed to determine the validity and reliability of the FASI items and their effectiveness in capturing the needs of individuals in each of the CB-LTSS populations. Chapter 5, Data Preparation and Testing Approach, presents in detail the FASI team's approach to testing all FASI items. For easy reference, a summary of the analytic methodology is included in Table 6.1 as well.

Table 6.1. Summary of the Analytic Methodology Used to Test the FASI

Type of Validity or Reliability	Purpose	Test Used
Concurrent validity	To evaluate the use of the rating scale for each item within a given section (e.g., self-care) across populations for both the 3-day usual performance and the 30-day most dependent performance	Chi-square analyses
Concurrent validity	To examine the extent to which FASI items detected differences in needs across populations	K-sample equality of medians test to examine the difference in the median scores for each population
Convergent validity	To look at the relationship between 3-day (usual) and past month (most dependent) responses	Rank order association (Kendall's tau-b)
Structural validity	To examine the structure of the rating scale steps, the hierarchical order of items (from easiest to hardest), the extent to which the items represent the same self-care construct (unidimensionality), and whether the hierarchical order of the items differed across CB-LTSS populations (differential item functioning [DIF])	Rasch analysis
Interrater reliability	To evaluate how much homogeneity, or consensus, there was in the ratings given by assessors	Krippendorff's alpha

Abbreviations: CB-LTSS, community-based long-term services and supports; FASI, Functional Assessment Standardized Items.

Results

Tables presenting descriptive analyses of self-care items by population are presented in Appendix D (Section 3); tables for the total sample are presented in this chapter. Tables presenting Rasch analyses are presented in Appendix E (Table E1). Overall item calibrations, fit statistics, and a figure of the hierarchical order of items are presented in this chapter.

Self-Care Item Results

Eating. Overall, 74 percent of individuals were independent with eating (Table 6.2). Eating is the only self-care item on which the majority of individuals in each population were independent in performing the item. Almost a quarter of individuals who are frail elderly required assistance with setup/cleanup with eating. Overall, 6 percent of individuals were fully dependent with eating; those with a physical disability had the highest percentage of

individuals needing full assistance with eating (11 percent). Overall, differences were found among populations in how the rating scale was used for this item. For instance, individuals with serious mental illness or a brain injury were less likely to be scored dependent or maximum assistance (Appendix D, Table D3.a.1).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 133.14, df_{20}, $p < .0001$) and most dependent (past month) (χ^2 = 143.82, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D3.b.1). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .92 to 1.00, indicating little variation in need for assistance with eating between assessment periods (Appendix D, Table D3.c.1).

Table 6.2. Descriptive Statistics of Rating Scale Use for All Participants for Item 6a. Eating

6a. Eating	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	862	74.3	842	72.5
05. Setup or cleanup	132	11.4	139	12.0
04. Supervision/touching	32	2.8	33	2.8
03. Partial/moderate	33	2.8	38	3.3
02. Substantial/maximal	25	2.2	28	2.4
01. Dependent	71	6.1	74	6.4
Total scored respondents	1,155	99.5	1,154	99.4
07. Person refused	0	0.0	0	0.0
09. Not applicable	6	0.5	6	0.5
88. Not attempted	0	0.0	1	0.1
Total respondents	1,161	100	1,161	100

Oral hygiene. Overall, 61 percent of individuals were independent with oral hygiene (Table 6.3). Individuals with serious mental illness had the highest percentage of individuals who were independent (82 percent), whereas individuals who are frail elderly had the lowest (45 percent). Just over half of individuals with a physical disability were independent (56 percent), and about two-thirds of individuals with an intellectual or developmental disability or brain injury were independent—67 and 70 percent, respectively. Across populations, the highest percentage of individuals needing supervision-level assistance with this task (12 percent) were

in the intellectual or developmental disability population Overall, 10 percent of individuals were fully dependent with oral hygiene; the highest percentages of individuals needing full assistance with oral hygiene were in the frail elderly and physical disability populations, both at 13 percent (Appendix D, Table D3.a.2).

Overall, there were differences among populations in how they used the rating scale for this item such that individuals in the serious mental illness population were less likely than those in the other four population groups to be scored dependent or maximum assistance. Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 131.34, df_{20}, $p < .0001$) and most dependent (past month) (χ^2 = 138.46, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D3.b.2). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .90 to .98, indicating little variation in need for assistance with eating between assessment periods (Appendix D, Table D3.c.2).

Table 6.3. Descriptive Statistics of Rating Scale Use for All Participants for Item 6b. Oral Hygiene

6b. Oral Hygiene	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	710	61.0	690	59.3
05. Setup or cleanup	153	13.1	161	13.8
04. Supervision/touching	78	6.7	87	7.5
03. Partial/moderate	34	2.9	37	3.2
02. Substantial/maximal	46	4.0	46	4.0
01. Dependent	111	9.5	112	9.6
Total scored respondents	1,132	97.3	1,133	97.3
07. Person refused	1	0.1	1	0.1
09. Not applicable	31	2.7	30	2.6
88. Not attempted	0	0.0	0	0.0
Total respondents	1,164	100	1,164	100

Toileting hygiene. Overall, 60 percent of individuals were independent with toileting hygiene (Table 6.4). Individuals with serious mental illness had the highest percentage who were independent (93 percent), and individuals who are frail elderly had the lowest (38 percent). Less than half of individuals with a physical disability were independent (44 percent), and about

three-quarters of individuals with an intellectual or developmental disability or a brain injury were independent—74 and 70 percent, respectively. Overall, 15 percent of individuals were fully dependent with toileting hygiene; the highest percentages of individuals needing full assistance with toileting hygiene were in the frail elderly and physical disability populations—19 percent and 24 percent, respectively (Appendix D, Table D3.a.3).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 221.86$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 227.47$, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations. Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .88 to .98, indicating little variation in need for assistance with eating between assessment periods (Appendix D, Table D3.c.3).

Table 6.4. Descriptive Statistics of Rating Scale Use for All Participants for Item 6c. Toileting Hygiene

6c. Toileting Hygiene	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	691	59.6	654	56.4
05. Setup or cleanup	49	4.2	50	4.3
04. Supervision/touching	60	5.2	65	5.6
03. Partial/moderate	87	7.5	105	9.1
02. Substantial/maximal	93	8.0	102	8.8
01. Dependent	169	14.6	173	14.9
Total scored respondents	1,149	99.1	1,149	99.1
07. Person refused	0	0.0	0	0.0
09. Not applicable	10	0.9	10	0.9
88. Not attempted	0	0.0	0	0.0
Total respondents	1,159	100	1,159	100

Wash upper body. Overall, 51 percent of individuals were independent with washing their upper body (Table 6.5). Individuals with serious mental illness and those with an intellectual or developmental disability had the highest percentages who were independent—77 and 68 percent, respectively. Individuals who are frail elderly had the lowest at 28 percent. Over half of individuals with a brain injury were independent (56 percent). Almost half of individuals with a physical disability (42 percent) were independent. Overall, 15 percent of individuals were

fully dependent with washing upper body; the highest percentages of individuals needing full assistance with washing upper body were individuals who are frail elderly and those with a physical disability, at 18 and 23 percent, respectively. Of note was the relatively high response rate to this item for usual performance in the past 3 days across populations: 100 percent for individuals who are frail elderly and those with a physical disability, 96 percent for individuals with a brain injury or serious mental illness, and 92 percent for individuals with an intellectual or developmental disability, suggesting that this is a commonly used mode of bathing for most individuals in these populations (Appendix D, Table D3.a.4).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 206.70$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 220.94$, df_{20}, $p < .0001$), periods indicating that this item distinguished performance and needs across CB-LTSS populations. Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .95 to .98, indicating little variation in need for assistance with eating between assessment periods (Appendix D, Table D3.c.4).

Table 6.5. Descriptive Statistics of Rating Scale Use for all Participants for Item 6d. Wash Upper Body

6d. Wash Upper Body	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	596	51.2	576	49.4
05. Setup or cleanup	54	4.6	54	4.6
04. Supervision/touching	64	5.5	68	5.8
03. Partial/moderate	118	10.1	128	11.0
02. Substantial/maximal	126	10.8	131	11.2
01. Dependent	172	14.8	175	15.0
Total scored respondents	1,130	97.0	1,132	97.2
07. Person refused	0	0.0	0	0.0
09. Not applicable	35	3.0	33	2.8
88. Not attempted	0	0.0	0	0.0
Total respondents	1,165	100	1,165	100

Shower/bathe self. Overall, 42 percent of individuals were independent with showering/bathing (Table 6.6). Individuals with serious mental illness and those with an intellectual or developmental disability had the highest percentages who were independent—

65 percent and 67 percent, respectively. Individuals who are frail elderly had the lowest at 14 percent, and over one-fourth of individuals with a physical disability (27 percent) were independent. Overall, 15 percent of individuals were fully dependent with showering/bathing; the highest percentages of individuals needing full assistance with showering/bathing were populations who are frail elderly and those with a physical disability—at 20 and 22 percent, respectively, followed by individuals with a brain injury (16 percent). Individuals who are frail elderly and those with a physical disability had the lowest response rates to this question at 95 and 88 percent, respectively, compared with a 98–99 percent response for individuals in the other three disability populations represented in the field test. These findings suggest that this item may be challenging and potentially is being substituted with washing upper body, particularly for individuals who are frail elderly (Appendix D, Table D3.a.5).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 241.46$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 248.83$, df_{20}, $p < .0001$) periods indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D3.b.5). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .95 to .97, indicating little variation in need for assistance with eating between assessment periods (Appendix D, Table D3.c.5).

Table 6.6. Descriptive Statistics of Rating Scale Use for All Participants for Item 6e. Shower/Bathe Self

6e. Shower/Bathe Self	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	483	41.5	463	39.8
05. Setup or cleanup	39	3.4	38	3.3
04. Supervision/touching	111	9.5	114	9.8
03. Partial/moderate	135	11.6	146	12.5
02. Substantial/maximal	165	14.2	174	15.0
01. Dependent	175	15.0	179	15.4
Total scored respondents	1,108	95.2	1,114	95.7
07. Person refused	0	0.0	0	0.0
09. Not applicable	53	4.6	48	4.1
88. Not attempted	3	0.3	2	0.2
Total respondents	1,164	100	1,164	100

Upper body dressing. Overall, about half of individuals (54 percent) were independent with upper body dressing (Table 6.7). Individuals with serious mental illness or with an intellectual or developmental disability had the highest percentages of individuals who were independent—81 and 80 percent, respectively, whereas individuals who are frail elderly had the lowest (27 percent). Almost 40 percent individuals with a physical disability were independent. Overall, 13 percent of individuals were fully dependent with upper body dressing, with the highest percentages being reported for individuals with a physical disability (21 percent), individuals with a brain injury (19 percent), and individuals who are frail elderly (16 percent). In addition, 25 percent of study participants required partial or substantial assistance with upper body dressing. These data suggest that many individuals with a physical disability or a brain injury or who are frail elderly require a good deal of assistance with this activity (Appendix D, Table D3.a.6).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 276.69$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 282.38$, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D3.b.6). Rank-order correlations were high across populations, with Kendall's tau-b (τ_b) ranging from .94 to .96, indicating little variation in need for assistance with eating between assessment periods (Appendix D, Table D3.c.6).

Table 6.7. Descriptive Statistics of Rating Scale Use for All Participants for Item 6f. Upper Body Dressing

6f. Upper Body Dressing	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	620	53.5	589	50.8
05. Setup or cleanup	49	4.2	47	4.1
04. Supervision/touching	48	4.1	56	4.8
03. Partial/moderate	140	12.1	157	13.6
02. Substantial/maximal	150	12.9	153	13.2
01. Dependent	151	13.0	156	13.5
Total scored respondents	1,158	99.9	1,158	99.9
07. Person refused	0	0.0	0	0.0
09. Not applicable	1	0.1	1	0.1
88. Not attempted	0	0.0	0	0.0
Total respondents	1,159	100	1,159	100

Lower body dressing. Overall, 51 percent of individuals were independent with lower body dressing (Table 6.8). Individuals with an intellectual or developmental disability or with serious mental illness had the highest percentage who were independent, 81 and 77 percent, respectively. Most individuals who are frail elderly and individuals with a physical disability needed assistance with this activity, with 27 and 30 percent being independent, respectively. Just over half of individuals with brain injury (56 percent) were independent. Overall, 17 percent of individuals were fully dependent with lower body dressing, and a further 15 percent needed substantial assistance. The highest percentages of individuals needing full assistance with lower body dressing were individuals who are frail elderly, individuals with a physical disability, and individuals with a brain injury, at 20, 29, and 20 percent, respectively (Appendix D, Table D3.a.7).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 308.94$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 313.54$, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D3.b.7). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .95 to .98, indicating little variation in need for assistance with eating between assessment periods (Appendix D, Table D3.c.7).

Table 6.8. Descriptive Statistics of Rating Scale Use for All Participants for Item 6g. Lower Body Dressing

6g. Lower Body Dressing	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	590	50.7	568	48.8
05. Setup or cleanup	38	3.3	30	2.6
04. Supervision/touching	40	3.4	46	4.0
03. Partial/moderate	124	10.7	134	11.5
02. Substantial/maximal	172	14.8	182	15.7
01. Dependent	198	17.0	202	17.4
Total scored respondents	1,162	99.9	1,162	99.9
07. Person refused	0	0.0	0	0.0
09. Not applicable	1	0.1	1	0.1
88. Not attempted	0	0.0	0	0.0
Total respondents	1,163	100	1,163	100

Putting on and taking off footwear. Overall, 51 percent of individuals were independent with footwear (Table 6.9). Individuals with serious mental illness and individuals with an intellectual or developmental disability had the highest percentage of those who were independent at 80 and 79 percent, respectively. Almost two-thirds of individuals with a brain injury (64 percent) were independent with footwear, whereas almost one-third (30 percent) of individuals with a physical disability and less than a quarter (23 percent) of those who are frail elderly were independent on this item. Overall, about one-quarter (24 percent) of individuals were fully dependent with footwear; the highest percentages of individuals needing full assistance with this item were individuals who are frail elderly or have a physical disability—33 and 39 percent, respectively. For individuals who are frail elderly or have a physical disability, almost half—52 and 49 percent respectively—were dependent or needed substantial assistance with footwear (Appendix D, Table D3.a.8).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 308.41$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 321.90$, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D3.b.8). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .94 to .96, indicating little variation in need for assistance with eating between assessment periods (Appendix D, Table D3.c.8).

Table 6.9. Descriptive Statistics of Rating Scale Use for All Participants for Item 6h. Putting on/Taking off Footwear

6h. Putting on/Taking off Footwear	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	589	50.6	568	48.8
05. Setup or cleanup	28	2.4	20	1.7
04. Supervision/touching	25	2.2	29	2.5
03. Partial/moderate	108	9.3	118	10.2
02. Substantial/maximal	117	10.1	122	10.5
01. Dependent	282	24.3	296	25.5
Total scored respondents	1,149	98.8	1,153	99.1
07. Person refused	0	0.0	0	0.0
09. Not applicable	12	1.0	10	0.9
88. Not attempted	2	0.2	0	0.0
Total respondents	1,163	100	1,163	100

Rasch analysis. Rasch analysis indicated that the rating scale steps proceeded monotonically (i.e., in order from 01 to 06) with exception of one step for **oral hygiene.** In preliminary analyses, comparisons of the medians for each self-care item, across populations, indicated that the majority of individuals with serious mental illness, with a brain injury, or with an intellectual or developmental disability were independent or needed only setup/cleanup assistance (see Appendix D, Table D3.d.1). Individuals who are frail elderly or have a physical disability scored more widely on the rating scale.

A nonparametric comparison of medians (K-sample test) was of little value for self-care items because there was little variation in medians and interquartile ranges for three of the five populations. Sufficient variation in rating scale use across populations existed for the showering/bathing items and indicated that the medians were different across populations.

The hierarchical order of items (from easiest to hardest) was reasonable, with eating being the least challenging item and showering/bathing being the most challenging (Table 6.10). This

finding is generally consistent with findings in other populations,[36] although these results indicate that putting on/taking off footwear maybe an easier item for individuals in this study. All items fit the measurement model, and the principal component analysis (eigenvalue = 2.36, 9.8 percent variance explained by the first contrast) indicates that the self-care items are sufficiently unidimensional. The hierarchical order of the items was consistent across CB-LTSS populations (no differential item functioning [DIF] detected). **toileting hygiene** showed DIF for individuals with serious mental illness (DIF size = –.61 logits, p = .005), indicating that this item was easier for these individuals. **oral hygiene** (DIF size = .78 logits, p < .001) and l**ower body dressing** (DIF size = –.51, p < .001) showed DIF for individuals with an intellectual or developmental disability. Given the midrange calibrations and few items affected, these are unlikely to have a meaningful impact on person measures).[37]

The person separation reliability, an indication of measurement precision, was good (.82) although values above .90 are preferred when making individual-level decisions. The distribution of response was skewed; many individuals reported little need for assistance on these items, and 32 percent received maximum scores, which likely contributed to the lower person separation reliability. Using Wright's sample independent method for strata,[38] the FASI team calculated that the self-care items in fact distinguish four levels of functional ability, which equates to a person separation reliability coefficient of .94.[39]

---

[36] Gage B, Constantine R, Aggarwal J, et al. The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set. Vol 1. (RTI Project Number 0209853.004, CMS Contract No. HHSM-500-2005-00291). Baltimore, MD: Centers for Medicare & Medicaid Services, Office of Clinical Standards and Quality; 2012.

[37] Rouquette A, Hardouin JB, Coste J. Differential item functioning (DIF) and subsequent bias in group comparisons using a composite measurement scale: a simulation study. Journal of Applied Measurement. 2016;17(3):312-34.

[38] Wright BD. Separation, reliability and skewed distributions: statistically different sample-independent levels of performance. Rasch Measurement Transactions. 2001;14(4):786. https://www.rasch.org/rmt/rmt144k.htm

[39] Fisher W. Reliability, separation, strata statistics. Rasch Measurement Transactions. 1992;6(3):238. https://www.rasch.org/rmt/rmt63i.htm

Table 6.10. Item Calibrations and Fit Statistics for Self-Care in Difficulty Order

Item	Calibration	SE	Infit		Outfit		Point Biserial Correlation
			MnSq	Zstd	MnSq	Zstd	
Showering/bathing	0.79	.03	0.8	–4.1	0.8	–3.7	.85
Lower body dressing	0.71	.03	1.3	4.5	1.2	2.3	.80
Wash upper body	0.36	.03	0.8	–3.2	0.8	–3.0	.83
Upper body dressing	0.36	.03	0.9	–2.2	1.0	–0.1	.82
Toilet hygiene	0.14	.03	0.9	–1.8	0.8	–2.1	.80
Oral hygiene	–0.41	.04	1.3	4.1	2.2	8.4	.76
Footwear	–0.93	.04	1.0	0.1	1.4	2.9	.75
Eating	–1.03	.04	0.9	–1.1	1.2	1.3	.76

Abbreviations: MnSq, mean square; SE, standard error; Zstd, z-standardized.

The FASI team used Wright maps to ascertain the items' construct validity by checking how well the constructs were represented by empirical results. The left side of the Wright map shows individuals; the right side shows FASI items. The left side of the map shows the distribution of the measured level of functional ability of individuals from highest level of independence at the top to lowest level of independence at the bottom. The items on the right side of the map are distributed from the most difficult items at the top to the least difficult at the bottom. Looking at the results of these maps, the FASI team determined whether more difficult FASI items aligned with identifying the needs of more independent individuals. Figure 6.1 indicates that self-care items were aligned with individuals' needs.

Figure 6.1. Wright Map Results for Self-Care Items

```
Person Measures                                          Item Calibrations
<more able> -------------- Persons -+- Items --------- <more challenging>
3    .############################  +                                   3
                                    |
                                    |
                                    |
                                    |
                                   T|
                              .#    |
                              .     |
                                    |
                                    |
2                             .     +                                   2
                            .###    |
                              .     |
                             .##    |
                              .     |
                             .## S  |
                              .     |
                              .#    |
                            .###    |
                              .#    |
1                            .##    +                                   1
                           .####    |
                             .##    | Showering
                              ##    | Lower Body Dressing
                            .###    |
                              .# M  |
                              .#    | Upper Body Dressing/Wash Upper Body
                             .##    |
                              .#    |
                              .#    | Toileting
0                             .#    +M                                  0
                             .##    |
                              .#    |
                              .#    |
                               #    | Oral Hygiene
                              .# S  |
                               .    |
                               .    |
                               .    |
                               .    | Footwear
-1                             .    + Eating                          -1
                               .    |
                               .    |
                               .    |
                               .    |
                                   T|
                               .    |
                                    |
                               .    |
                               .    |
-2                                  +                                  -2
                                    |
                               .    |
                               .    |
                                    |
                                    |
                                    |
                                    |
                                    |
-3                           .####  +                                  -3
<less able> -------------- Persons -+- Items --------- <less challenging>
Person Measures                                          Item Calibrations
```

Interrater reliability. Interrater reliabilities (IRRs) are reported for each self-care item by entity (13 entities) (see Appendix D, Table D15.a.1). For entity 7, there were two subsets of raters and items, so the FASI team separated IRR coefficients for these two subsets (7A and 7B). Entity 4 was small, and only one individual was submitted to the IRR data set. There were only three instances across all self-care items (n = 8) and entities (n = 13) in which IRR coefficients were below .67. Two instances occurred in the same entity (entity 2), and two instances occurred for the same item, eating (entity 2). There were nine instances of tentative evidence for IRR—three instances for **eating,** two for **oral hygiene,** three for **toileting hygiene,** and one for **lower body dressing.** Three instances occurred for the same entity (7B), and two instances for entity 13. The remaining 92 coefficients were all above .80, indicating strong evidence of IRR for the self-care items.

Items were considered items to have achieved good IRR if 11 of the 13 entities achieved coefficients above .80. Using these criteria, all items except eating and toileting hygiene demonstrated good IRR. Eating historically has been a challenging item to score reliably.[40] It is unclear why toileting hygiene was challenging.

Assessor Feedback on Self-Care Items

Assessors reported few problems with the Self-Care section of the FASI. In general, they found the list of items comprehensive and the tool easy to code. However, two issues were identified for consideration in round two of the FASI development.

1. One assessor recommended the inclusion of a grooming item to include shaving, cutting/filing fingernails and toenails. Other assessors agreed.
2. Several assessors reported difficulty determining whether a person's self-report was accurate when cognitive deficits were present and a helper was not available for the assessment. This concern was raised for all sections of the FASI.

[40] Gage B, Constantine R, Aggarwal J, et al. The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set. Volume 2. RTI Project Number 0209853.004, CMS Contract No. HHSM-500-2005-00291. Baltimore, MD: Centers for Medicare & Medicaid Services, Office of Clinical Standards and Quality; 2012.

Self-Care Priorities

At the conclusion of the Self-Care section, assessors asked individuals to indicate their top two priorities for the next 6 months in the area of self-care. After reviewing all self-care priorities, the FASI team established four codes by which to categorize the individual's responses:

1. The individual indicated a priority to improve independence in self-care in an activity addressed by the self-care set.
2. The individual indicated a priority to maintain independence in self-care in an activity addressed by the self-care set.
3. The individual indicated a priority that was not addressed by the self-care set.
4. The individual did not indicate a priority or did not respond.

This coding approach allowed the FASI team to determine how well the self-care set in the FASI represented activities deemed priorities by individuals being assessed and had potential for identifying areas of importance to individuals served by the CB-LTSS programs that are not captured by the items or set. Two members of the team completed the coding. Both members conducted confirmation of data fit by sampling all data until consensus was reached. Frequencies and percentages of coded responses subsequently were summarized for all respondents as well as by population.

For self-care, 55.5 percent (n = 648) of individuals identified at least one priority, and 26.8 percent (n = 313) indicated a second priority. For the first priority noted, 26.6 percent (n = 311) indicated a priority to improve self-care related to a FASI item, 7.4 percent (n = 86) indicated a priority to maintain independence in a self-care activity related to FASI item, and 21.5 percent (n = 251) indicated a priority that was not related to any of the items in the FASI self-care set. Responses in this last category were broad, but some common themes included (1) independence in shaving, (2) a desire to improve a facet of health and wellness (e.g., nutrition and exercise), and (3) a need for adaptive equipment. There were a number of responses that the FASI team could not interpret without follow-up questions to the individual. These responses were coded as *unrelated to the domain of self-care.* Examples included comments such as a description of a medical condition, pain level, or a desire to look nice.

The frequency of responses of individuals who indicated at least one self-care priority was similar across populations. Fifty percent of individuals with brain injury, 54.4 percent of individuals who are frail elderly, 59.8 percent of individuals with a physical disability, and 52.6

percent of individuals with an intellectual or developmental disability indicated a priority in response to the assessor's question at the conclusion of the self-care set.

Observations and Changes to the FASI Self-Care Items

On the basis of these findings, the FASI team presented results and recommendations to the TEP for changes to the FASI set. The following section outlines the TEP feedback and the changes made to finalize the FASI.

Summary of Self-Care Testing

The overall reliability and validity results for the self-care items were generally good to strong. Therefore, the FASI team did not make any recommendations to the TEP for changes to the self-care items.

Content validity. There was good evidence for content validity, that is, the extent which items cover the concept of interest. Items generally reflect the same underlying construct, and assessors generally reported that the content was appropriate.

Concurrent validity. There was mixed evidence for concurrent validity, that is, the extent to which items were distinguished among groups.

- The use of rating scale steps was wider among individuals with a physical disability and individuals who are frail elderly.
- Individuals with serious mental illness, a brain injury, or an intellectual or developmental disability scored most frequently on rating scale steps 5 and 6.
- There were significant differences across populations in the use of rating scale steps (chi-square test) and small differences in medians for the intellectual or developmental disability, brain injury, and serious mental illness groups (K-sample test).

Structural validity. There was good evidence for structural validity, that is, the extent to which the ordering of steps and items was logical.

- The ordering of items makes sense, although the footwear item was easier than expected.
- Item fit (except eating and footwear) and principal component analysis were within acceptable ranges.

- 32 percent of individuals received the maximum score.
- Measurement precision was moderate—person separation reliability was .82.

Convergent validity. There was strong evidence for convergent validity, which is the extent of alignment of usual and most dependent scores. Correlations were high between usual (3 day) and most dependent (past month) scores for all items in the Self-Care section.

Interrater reliability. Evidence for IRR (the extent to which raters agree on assessment decisions) was strong. Results indicate that assessors are able to achieve good IRR on the FASI self-care items. Eating and toileting hygiene may be challenging for assessors to rate consistently.

Reference Period Decision

Despite the high level of agreement between usual (3 days) and most dependent (past month) reference periods, TEP members felt strongly that capturing changing needs was critical for individuals in these populations for whom it was a concern. Therefore, the FASI team maintained the most dependent (past month) reference period in the FASI set.

CHAPTER 7. FUNCTIONAL MOBILITY ITEMS

Introduction

This chapter describes the results of field testing of the items related to functional mobility. *Functional mobility* is the ability of a person to move around his or her environment. Difficulty managing functional mobility can put an individual at risk for serious health conditions and decrease quality of life. Functional mobility limitations have been associated with increased risk of falls, hospitalizations, and mortality in elderly individuals in community-based long-term services and supports (CB-LTSS).[41]

Difficulty completing functional mobility activities independently is a key factor in determining eligibility for CB-LTSS. Functional mobility items (1) provide key information in determining functional activities with which the person requires assistance and the type and amount of services needed and (2) inform development of the person's individual service plan. Understanding how much support a person needs with mobility activities is critical to ensuring that he or she is able to negotiate his or her environment both at home and in the community in order to safely participate in his or her chosen life activities. Documenting the need for support with the functional mobility items represents an important component in developing a person-centered service and support plan.

Description of the Items

The Functional Mobility section of the FASI consists of seven items that capture the assistance needed to perform a variety of common transfers that are required in daily life to safely move around one's environment (Appendix A). The assessor gathers information for coding items in this section from multiple sources, including discussion with, or observation of, the person applying for or receiving supports and services, the person's family and/or caregivers, and written records, if needed. There are no skip patterns in the functional mobility items; assessors code all items in this section. Each item in this section is based on the standardized items in the CMS Data Element Library. To the extent possible, items follow this standard.

[41] Danilovich MK, Corcos DM, Marquez DX, et al. Performance measures, hours of caregiving assistance, and risk of adverse care outcomes among older adult users of Medicaid home and community-based services. Sage Open Medicine. 2015;2:3.

Exceptions and modifications to the standard are noted below, including rationale for the modification.

The **roll left to right** item considers the supports a person needs to roll from lying on the back to the left and right side and return to lying on the back. To move freely in bed and prevent the occurrence of skin breakdown, rolling left to right is important to assess in individuals in CB-LTSS programs.

The **sit to lying** item considers the support needed to move from sitting on the side of the bed to lying flat on the bed. This commonly performed activity is important to measure to ensure a person's ability to safely get into bed.

The **lying to sitting on the side of the bed** item considers the support needed to safely move from lying on the back to sitting on the side of the bed with feet flat on the floor and with no back support. This commonly performed activity is an important measurement to ensure a person's ability to safely get out of bed.

The **sit to stand** item considers the support necessary to safely come to a standing position from sitting in a chair or on the bed. The sit to stand maneuver is a common component of many daily tasks in the home and community.

The **chair/bed-to-chair transfer** item assesses the assistance needed to safely transfer to and from a support while moving from one surface to another, such as the support needed to safely transfer from a bed to a chair or from the bed to a wheelchair.

The **toilet transfer** item assesses the assistance needed to safely get on and off a toilet or commode. This commonly occurring transfer involves greater balance and mobility than transfers such as sit to stand or moving to and from a chair.

The **car transfer** item considers the assistance needed to transfer in and out of a car or van on the passenger side. This item does not include the ability to open or close the car or van door or to fasten the seat belt. Being able to get in and out of a car can be an important consideration in moving about in one's community and supports active participation in personally meaningful activities.

Description of the Rating Scale

The functional mobility items each are scored using one of six codes to describe the need for assistance with the task described in the item.[42] For easy reference, the following is a summary of the rating scale and reference period detailed in Chapter 6:

- Code 06: **Independent and requires no assistance with this task**
- Code 05: **Setup or cleanup assistance**
- Code 04: **Supervision or touching assistance**
- Code 03: **Partial/moderate assistance**
- Code 02: **Substantial maximal assistance**
- Code 01: **Dependent**

The following codes applied if the activity was not completed:

- Code 07: **The person refused**
- Code 09: **Not applicable**
- Code 88: **Not attempted**

Assessment Reference Period

Each of the functional mobility items is scored twice: once with regard to usual performance in the past 3 days and again to reflect the most dependent performance in the past month.

Analytic Objectives and Approach

The data analyses were designed to determine the validity and reliability of the FASI items and their effectiveness in capturing the needs of individuals in each of the CB-LTSS populations. Chapter 5, Data Preparation and Testing Approach, presents in detail the FASI team's approach to testing all FASI items. For easy reference, a brief summary of the analytic methodology is included in Table 7.1 as well.

[42] These codes and definitions align with the standardized items in the DEL (for self-care items and all other items in this report), but some modifications have been made to reflect the needs and perspective of individuals receiving CB-LTSS. For example, the FASI refers to *individuals,* whereas the Minimum Data Set (MDS) version of the item uses the term Code *resident* and the inpatient version uses the term *patient*.

Table 7.1. Summary of the Analytic Methodology Used to Test the FASI

Type of Validity or Reliability	Purpose	Test Used
Concurrent validity	To evaluate the use of the rating scale for each item within a given section (e.g., self-care) across populations for both the 3-day usual performance and the 30-day most dependent performance	Chi-square analyses
Concurrent validity	To examine the extent to which FASI items detected differences in needs across populations	K-sample equality of medians test to examine the difference in the median scores for each population
Convergent validity	To look at the relationship between 3-day (usual) and past month (most dependent) responses	Rank order association (Kendall's tau-b)
Structural validity	To examine the structure of the rating scale steps, the hierarchical order of items (from easiest to hardest), the extent to which the items represent the same self-care construct (unidimensionality), and whether the hierarchical order of the items differed across CB-LTSS populations (differential item functioning [DIF])	Rasch analysis
Interrater reliability	To evaluate how much homogeneity, or consensus, there was in the ratings given by assessors	Krippendorff's alpha

Abbreviations: CB-LTSS, community-based long-term services and supports; FASI, Functional Assessment Standardized Items.

Results

Tables presenting descriptive analyses of functional mobility items by population are presented in Appendix D (Section 4); tables for the total sample are presented in this chapter. Tables presenting Rasch Analyses are presented in Appendix E (Table E2). Overall item calibrations, fit statistics, and a figure of the hierarchical order of items are presented in this chapter.

Functional Mobility Item Results

Roll left and right. Overall, the majority of individuals (76 percent) across all populations were independent with rolling left and right for their usual (3-day) performance score (Table 7.2). Individuals with an intellectual or developmental disability, serious mental illness, or a brain injury had the highest percentages of independent individuals, at 92, 90, and 84 percent, respectively. The lowest percentages of independent individuals were those with a physical

disability or who are frail elderly—63 and 64 percent, respectively. Overall, 9 percent of individuals were fully dependent with rolling left and right. The highest percentage of individuals needing full assistance with this item were individuals with a physical disability (20 percent), followed by individuals who are frail elderly (9 percent) and individuals with a brain injury (8 percent). Individuals who are frail elderly or with serious mental illness had the lowest response rates to this question at 96 and 95 percent, respectively, compared with 97–99 percent response for individuals in the other three populations (Appendix D, Table D4.a.1). It is not clear why eight individuals with serious mental illness were scored as not applicable on this item.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 155.77 df_{20}, $p < .0001$) and most dependent (30-days) (χ^2 = 180.68, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D4.b.1). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .93 to .94, indicating little variation in need for assistance with roll left to right between assessment periods (Appendix D, Table D4.c.1).

Table 7.2. Descriptive statistics of Rating Scale Use for All Participants for Item 7a. Roll Left and Right

7a. Roll Left and Right	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	885	76.3	858	74.0
05. Setup or cleanup	14	1.2	17	1.5
04. Supervision/touching	29	2.5	31	2.7
03. Partial/moderate	41	3.5	52	4.5
02. Substantial/maximal	52	4.5	55	4.7
01. Dependent	107	9.2	114	9.8
Total scored respondents	1,128	97.2	1,127	97.2
07. Person refused	0	0.0	0	0.0
09. Not applicable	30	2.6	30	2.6
88. Not attempted	2	0.2	3	0.3
Total respondents	1,160	100	1,160	100

Sit to lying. Overall, the majority of individuals across all populations (73 percent) were independent with sitting to lying for their usual (3-day) performance score (Table 7.3). More than 90 percent of individuals with an intellectual or developmental disability or with serious

mental illness were independent, at 90 and 94 percent, respectively. Over three-quarters of individuals with a brain injury were independent (79 percent) (Appendix D, Table D4.a.2). The lowest percentages of independent individuals were those with a physical disability and individuals who are frail elderly—53 and 61 percent, respectively (Appendix D, Table D4.a.2).

Overall, 10 percent of individuals were fully dependent with sitting to lying; the highest percentage of individuals needing full assistance with this item were individuals with a physical disability at 20 percent, followed by individuals who are frail elderly or individuals with a brain injury, both at 11 percent (Appendix D, Table D4.a.2). All populations had a high response rate on this item. "In addition, the range of scores used differed for individuals who are frail elderly from the other populations. For all populations but individuals who are frail elderly, if they didn't score 06 (independent) they tended to score as 01 (dependent). However, for frail elderly, if they didn't score 06 (independent, they had an approximately and equal distribution of scores between 04 and 01. (Appendix D, Table D4.a.2).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 209.59$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 218.23$, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D4.b.2). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .93 to .97, indicating little variation in need for assistance with sit to lying between assessment periods (Appendix D, Table D4.c.2).

Table 7.3. Descriptive Statistics of Rating Scale Use for All Participants for Item 7b. Sitting to Lying

7b. Sitting to Lying	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	846	72.7	825	70.9
05. Setup or cleanup	15	1.3	14	1.2
04. Supervision/touching	46	4.0	46	4.0
03. Partial/moderate	59	5.1	74	6.4
02. Substantial/maximal	62	5.3	63	5.4
01. Dependent	119	10.2	125	10.7
Total scored respondents	1,147	98.5	1,147	98.5
07. Person refused	0	0.0	0	0.0
09. Not applicable	17	1.5	17	1.5
88. Not attempted	0	0.0	0	0.0
Total respondents	1,164	100	1,164	100

Lying to sitting on the side of bed. Overall, the majority of individuals (68 percent) were independent with lying to sitting for their usual (3-day) performance score (Table 7.4). Individuals with serious mental illness or an intellectual or developmental disability had the highest percentages who were independent, at 88 percent each, and more than three-quarters of individuals with a brain injury were independent (77 percent) (Appendix D, Table D4.a.3). The lowest percentages of independent individuals were those with a physical disability or who are frail elderly—53 and 49 percent, respectively (Appendix D, Table D4.a.3).

Overall, 11 percent of individuals were fully dependent with rolling left and right; the highest percentage of individuals needing full assistance with this item were individuals with a physical disability at 21 percent, followed by individuals who are frail elderly or with a brain injury at 12 and 13 percent, respectively. Individuals with a physical disability had the lowest response rates to this question at 96 percent, compared with a 97–99 percent response for individuals in the other four populations. About 11–13 percent of individuals who are frail elderly were scored with codes 04 through 01. About 14 percent of individuals with a physical disability were scored with code 03, and 6 percent were scored with code 02. This pattern is different from that for individuals in the other three populations who were predominantly scored with codes 06 and 01 (Appendix D, Table D4.a.3).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 220.44, df_{20}, $p < .0001$) and most dependent (past month) (χ^2 = 245.66, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D4.b.3). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .92 to 1.00, indicating little variation in need for assistance with **lying to sitting on the side of bed** between assessment periods (Appendix D, Table D4.c.3).

Table 7.4. Descriptive Statistics of Rating Scale Use for All Participants for Item 7c. Lying to Sitting

7c. Lying to Sitting	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	787	67.8	755	65.0
05. Setup or cleanup	9	0.8	10	0.9
04. Supervision/touching	44	3.8	49	4.2
03. Partial/moderate	95	8.2	110	9.5
02. Substantial/maximal	67	5.8	74	6.4
01. Dependent	132	11.4	137	11.8
Total scored respondents	1,134	97.7	1,135	97.8
07. Person refused	1	0.1	1	0.1
09. Not applicable	26	2.2	25	2.2
88. Not attempted	0	0.0	0	0.0
Total respondents	1,161	100	1,161	100

Sit to stand. Overall, the majority of individuals (63 percent) were independent with sit to stand for their usual (3-day) performance score (Table 7.5). Individuals with serious mental illness or an intellectual or developmental disability had the highest percentages who were independent, at 92 and 87 percent respectively, and about two-thirds of individuals with a brain injury were independent (65 percent) (Appendix D, Table D4.a.4). The lowest percentages of independent individuals were individuals with a physical disability or who are frail elderly—43 percent and 44 percent, respectively.

Overall, 8 percent of individuals were fully dependent with sit to stand; the highest percentage of individuals needing full assistance with this item were individuals with a physical disability at 15 percent, followed by individuals who are frail elderly or with a brain injury, at 9 and 8

percent, respectively. Individuals with a physical disability had the lowest response rates to this question at 81 percent, followed by those with a brain injury (87 percent) and individuals who are frail elderly (92 percent), compared with a 98–99 percent response for individuals in the other two populations. About 9 percent of individuals with a physical disability were scored with code 03, and 8 percent were scored with code 02. This pattern is different from that for individuals in the other three populations who were predominantly scored with codes 06 and 01 (Appendix D, Table D4.a.4).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2= 226.23, df_{20}, $p < .0001$) and most dependent (past month) (χ^2 = 236.85, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D4.b.4). Rank-order correlations across populations were strong, with Kendall's tau-b (t_b) ranging from .82 to .94, indicating small variation in need for assistance with sit to stand between assessment periods (Appendix D, Table D4.c.4).

Table 7.5. Descriptive Statistics of Rating Scale Use for All Participants for Item 7d. Sit to Stand

7d. Sit to Stand	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	732	63.1	690	59.4
05. Setup or cleanup	12	1.0	17	1.5
04. Supervision/touching	65	5.6	72	6.2
03. Partial/moderate	80	6.9	95	8.2
02. Substantial/maximal	70	6.0	79	6.8
01. Dependent	95	8.2	101	8.7
Total scored respondents	1,054	90.8	1,054	90.8
07. Person refused	0	0.0	0	0.0
09. Not applicable	105	9.0	104	9.0
88. Not attempted	2	0.2	3	0.3
Total respondents	1,161	100	1,161	100

Chair/bed-to-chair transfer. Overall, the majority of individuals (60 percent) were independent with sit to stand for their usual (3 day) performance score (Table 7.6). Just over three-quarters of individuals with serious mental illness or an intellectual or developmental disability were independent, at 77 and 79 percent, respectively, and about two-thirds of individuals with a

brain injury were independent (65 percent) (Appendix D, Table D4.a.5). Less than half of individuals with a physical disability or who are frail elderly were independent on this item at 43 and 48 percent, respectively.

Overall, 13 percent of individuals were fully dependent with this transfer; individuals with a physical disability had the highest percentage of individuals needing full assistance with this item (24 percent), followed by individuals who are frail elderly or with a brain injury—at 14 and 15 percent, respectively. Individuals with serious mental illness had the lowest response rates to this question at 86 percent—followed by individuals with an intellectual or developmental disability (88 percent) compared with 97–98 percent for individuals in the other three populations. About 11–15 percent of individuals who are frail elderly were scored on codes 04 through 02. About 8 percent of individuals with a physical disability were scored with code 03, and 11 percent were scored with code 02. This pattern is different from that for individuals in the other three populations who were predominantly scored with codes 06 and 01 (Appendix D, Table D4.a.5).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 233.90$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 256.96$, df_{20}, $p < .0001$) periods indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table 4.b.5). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .92 to 1.00, indicating small variation in need for assistance with sit to stand between assessment periods (Appendix D, Table D4.c.5).

Table 7.6. Descriptive Statistics of Rating Scale Use for All Participants for Item 7e. Chair/Bed to Chair Transfer

7e. Chair/Bed to Chair Transfer	Usual 3-Day		Most Dependent Past Month	
	N	%	n	%
06. Independent	696	59.9	670	57.7
05. Setup or cleanup	13	1.1	16	1.4
04. Supervision/touching	67	5.8	69	5.9
03. Partial/moderate	83	7.1	91	7.8
02. Substantial/maximal	75	6.5	83	7.1
01. Dependent	151	13.0	157	13.5
Total scored respondents	1,085	93.4	1,086	93.5
07. Person refused	0	0.0	0	0.0
09. Not applicable	77	6.6	75	6.5
88. Not attempted	0	0.0	1	0.1
Total respondents	1,162	100	1,162	100

Toilet transfer. Overall, the majority of individuals (63 percent) were independent with sit to stand for their usual (3-day) performance score (Table 7.7). Individuals with serious mental illness or an intellectual or developmental disability had the highest percentages who were independent, at 88 percent each, and about two-thirds of individuals with a brain injury were independent (69 percent) (Appendix D, Table D4.a.6). Less than half of individuals with a physical disability or who are frail elderly were independent on this item at 47 and 41 percent, respectively.

Overall, 9 percent of individuals were fully dependent with this item; individuals with a physical disability had the highest percentage of individuals needing full assistance with this item (15 percent), followed by individuals who are frail elderly and individuals with a brain injury at 11 and 7 percent, respectively. Individuals with a physical disability had the lowest response rates to this question at 85 percent, followed by individuals with a brain injury (91 percent) or who are frail elderly (95 percent), compared with 99 percent for individuals in the other two populations. About 11–14 percent of individuals who are frail elderly were scored with codes 04 through 01. About 6–8 percent of individuals with a physical disability were scored with codes 04 through 02. This pattern is different from individuals in the other three populations who were predominantly scored with codes 06 and 01 (Appendix D, Table D4.a.6).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 229.41, df_{20}, $p < .0001$) and most dependent (past month) (χ^2 = 253.44, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D4.b.6). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .90 to 1.00, indicating small variation in need for assistance with the toilet transfer item between assessment periods (Appendix D, Table D4.c.6).

Table 7.7. Descriptive Statistics of Rating Scale Use for All Participants for Item 7f. Toilet Transfer

7f. Toilet Transfer	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	737	63.4	706	60.8
05. Setup or cleanup	15	1.3	15	1.3
04. Supervision/touching	80	6.9	76	6.5
03. Partial/moderate	76	6.5	96	8.3
02. Substantial/maximal	73	6.3	83	7.1
01. Dependent	102	8.8	109	9.4
Total scored respondents	1,083	93.2	1,085	93.4
07. Person refused	0	0.0	0	0.0
09. Not applicable	79	6.8	77	6.6
88. Not attempted	0	0.0	0	0.0
Total respondents	1,162	100	1,162	100

Car transfer. Half of individuals were independent with car transfer for their usual (3 day) performance score (Table 7.8). Individuals with an intellectual or developmental disability had the highest percentage who were independent (80 percent); about three-quarters of individuals with serious mental illness (73 percent) and two-thirds of individuals with a brain injury (59 percent) were independent (Appendix D, Table D4.a.7). Only 37 percent of individuals with a physical disability and 16 percent of individuals who are frail elderly were independent on this item.

Overall, 10 percent of individuals were fully dependent with this transfer; the highest percentage of individuals needing full assistance with this item were individuals with a physical disability at 16 percent, followed by individuals who are frail elderly or with a brain injury at 14 and 12 percent, respectively. Individuals with a physical disability and those who are frail

elderly had the lowest response rates to this question (both 89 percent), followed by individuals with a brain injury (95 percent), compared with 97–98 percent for individuals in the other two populations. About 16–20 percent of individuals who are frail elderly were scored on codes 04 through 02. About 13–16 percent of individuals with a physical disability were scored with codes 04 through 02. More individuals with serious mental illness or a brain injury were scored with codes 04 through 02 on this item than on other items in this domain (Appendix D, Table D4.a.7).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2= 305.94, df_{20}, $p < .0001$) and most dependent (past month) (χ^2= 309.70, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D4.b.7). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from 0.91 to 0.98 indicating small variation in need for assistance with sit to stand between assessment periods (Appendix D, Table D4.c.7).

Table 7.8. Descriptive Statistics of Rating Scale Use for All Participants for Item 7g. Car Transfer

7g. Car Transfer	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	580	49.9	559	48.1
05. Setup or cleanup	17	1.5	18	1.6
04. Supervision/touching	113	9.7	118	10.2
03. Partial/moderate	136	11.7	150	12.9
02. Substantial/maximal	113	9.7	124	10.7
01. Dependent	120	10.3	127	10.9
Total scored respondents	1,079	92.8	1,096	94.2
07. Person refused	0	0.0	0	0.0
09. Not applicable	80	6.9	64	5.5
88. Not attempted	4	0.3	3	0.3
Total respondents	1,163	100	1,163	100

Rasch analysis. The analysis indicated that most of the rating scale steps proceeded monotonically (i.e., in order from 01 to 06), with one discrepancy for **roll left and right.** In preliminary analyses, comparisons of the medians for each functional mobility item, across populations, indicated that the majority of individuals with an intellectual or developmental

disability, a brain injury, or serious mental illness were independent (see Appendix D, Table D4.d.1). Individuals who are frail elderly and individuals with a physical disability scored more widely on the rating scale. A nonparametric comparison of medians (K-sample test) was of little value for functional mobility items, because there was minimal variation in medians and interquartile ranges for three of the five populations. Sufficient variation in rating scale use across populations was found for individuals with a brain injury, individuals who are frail elderly, and individuals with a physical disability.

The hierarchical order of items (from easiest to hardest) was reasonable, with **roll left and right** being the least challenging item and **car transfer** being the most challenging (Figure 7.1). This finding is generally consistent with findings in other populations.[43] Three items—**sit to stand, bed-to-chair transfer,** and **toilet transfer**—shared similar item calibrations, suggesting these items may not represent distinctly different challenges for individuals with intellectual or developmental disability, individuals with serious mental illness, and most individuals with a brain injury (Table 7.9). The distribution of response categories suggest that these tasks may be more distinct for individuals who are frail elderly and individuals with a physical disability. Three items—**roll left and right, car transfer,** and **chair/bed transfer**—misfit, suggesting that a few more able individuals found the first two items unexpectedly challenging and the last item unexpectedly easy.

The principal component analysis (eigenvalue = 1.8, 8.0 percent variance explained by the first contrast) and the acceptable item fit indicates that the functional mobility items were sufficiently unidimensional. **Rolling right and left** was easier for individuals with a brain injury and an intellectual or developmental disability compared with individuals with serious mental illness or a physical disability (DIF size = –.52 logits, p = .006).

The person separation reliability, an indication of measurement precision, was good (.82), although values above .90 are preferred. The distribution of response was skewed; many individuals report little need for assistance on these items, and 46 percent received maximum

[43] Gage B, Constantine R, Aggarwal J, et al. The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set. Vol 2. RTI Project Number 0209853.004, CMS Contract No. HHSM-500-2005-00291. Baltimore, MD: Centers for Medicare & Medicaid Services, Office of Clinical Standards and Quality; 2012.

scores, which likely contributed to the lower person separation reliability. Using Wright's sample independent method for strata,[44] the calculated functional mobility items distinguished four levels of functional ability, which equates to a person separation reliability coefficient of .94.[45]

Table 7.9. Item Calibrations and Fit Statistics for Functional Mobility in Difficulty Order

Item	Calibration	SE	Infit		Outfit		Point Biserial Correlation
			MnSq	Zstd	MnSq	Zstd	
Car transfer	.87	.04	1.39	5.9	2.61	9.9	.84
Toilet transfer	.16	.04	0.73	–4.4	0.65	–4.7	.88
Sit to stand	.14	.04	0.80	–3.0	0.76	–2.9	.88
Chair to bed	.14	.04	0.59	–7.1	0.51	–7.1	.90
Lying to sitting	–.05	.04	0.85	–2.2	0.76	–2.7	.88
Sitting to lying	–.44	.04	0.88	–1.7	0.75	–2.0	.88
Roll Left and right	–.83	.05	1.93	8.9	2.39	5.5	.83

Abbreviations: MnSq, mean square; SE, standard error; Zstd, z-standardized.

The FASI team used Wright maps to ascertain the items' construct validity by checking how well the constructs were represented by empirical results. The left side of the Wright map shows individuals; the right side shows FASI items. The left side of the map shows the distribution of the measured level of functional ability of individuals from highest level of independence at the top to lowest level of independence at the bottom. The items on the right side of the map are distributed from the most difficult items at the top to the least difficult at the bottom. Looking at the results of these maps, the FASI team determined whether more difficult FASI items aligned with identifying the needs of more independent individuals. The results shown in Figure 7.1 indicate that functional mobility items were aligned with individuals' needs.

[44] Wright BD. Separation, reliability and skewed distributions: statistically different sample-independent levels of performance. Rasch Measurement Transactions. 2001;14(4):786.

[45] Fisher W. Reliability, separation, strata statistics. Rasch Measurement Transactions. 1992;6(3):238.

Figure 7.1. Wright Map Results for the Functional Mobility Items

```
Person Measures                                                Item Calibrations
<more able> ---------------- Persons -+- Items   --------<more challenging>
  3     .##########################  +                                    3
                                   T|
                                    |
                                    |
                                    |
                                    |
                                  . |
                                    |
  2                                 +                                    2
                                .##  |
                                  . S|
                                .##  |
                                .##  |
                                  #  |
                                 .#  |
                                  .  |
  1                               .  +                                    1
                                 .#  |  Car Transfer
                                  .  |
                                 .#  |
                                  . M|
                                 .#  |
                                  .  |
                                 .#  |  Chair Bed, Sit Stand, Toilet Transfer
  0                               .  +M Lying to Sitting                  0
                                  .  |
                                  .  |
                                  .  |
                                  .  | Sitting to Lying
                                  .  |
                                  . S|
                                  .  | Roll Left and Right
 -1                               .  +                                   -1
                                  .  |
                                  .  |
                                  .  |
                                  .  |
                                  .  |
                                  .  |
                                  .  |
 -2                               . T+                                   -2
                                  .  |
                                  .  |
                                  .  |
                                  .  |
                                     |
                                  .  |
                                  .  |
 -3                               .  +                                   -3
                                  .  |
                                  .  |
                                     |
                                     |
                                     |
                                     |
                                     |
 -4                             .###  +                                   -4
<less able> ---------------- Persons -+- Items   -------- <less challenging>
Person Measures                                                Item Calibrations
```

Interrater reliability. Interrater reliability (IRR) coefficients are reported for each functional mobility item by assessment entity (13 entities) (Appendix D, Table D15.a.2). For entity 7, there were two subsets of raters and items, so separate IRR coefficients are reported for these two subsets (7A and 7B). Entity 4 was small, and only one individual was submitted to the IRR data set.

There were only four instances across all functional mobility items (n = 8) and entities (n = 13) in which IRR coefficients were below .67. Two instances occurred for the same entity (entity 10). Two instances occurred for the same item—**toilet transfer** and **car transfer.** There were 11 instances of tentative evidence for IRR—three instances each for items **bed to chair transfer** and **car transfer,** three instances for same entity (7b), and three instances for entity 13. The remaining 75 coefficients all were above .80, indicating strong evidence of IRR for the mobility items.

Items were considered to have achieved good IRR if 11 of the 13 entities achieved coefficients above .80. Using these criteria, all items demonstrated good IRR except items **bed-to-chair transfer, toilet transfer,** and **car transfer.** Only **car transfer** would continue to be below standard without entities 7B and 13. Each of the three transfer items that were more challenging to score reliably are ones in which the task challenge can vary considerably on the basis of differences in environmental factors such as tight turning spaces or narrow access, or differences in seat height.

Assessor Feedback on Functional Mobility Items

The majority of assessor questions for the functional mobility items concerned two issues: (1) how to code when the person used an assistive device for the item and (2) how to code when the assessor suspects inaccurate reporting.

Correct coding when an assistive device is used. Assessors requested clarification for coding items **lying to sitting on the side of the bed** and **car transfer.** In both situations, the person used equipment to perform the activity. For example, an assessor asked how to code **lying to sitting** at the side of the bed when the person uses an electric bed. A similar question concerned coding item **car transfer** for a person in a motorized wheelchair. Often, these individuals use vans with wheelchair lifts and do not transfer to a car. The number of questions in this area, across the three Mobility sections, suggests the need to improve the user manual and training to clarify how to properly code when a person uses an assistive device.

Mobility Priorities

At the conclusion of the entire Mobility section (Functional Mobility, Ambulation, and Wheelchair Mobility), assessors asked individuals to indicate their top two priorities for the next 6 months in the area of mobility. After reviewing the data, four codes were developed to categorize the individual's responses:

1. The individual indicated a priority to improve independence in mobility in an activity addressed by the Mobility section.
2. The individual indicated a priority to maintain independence in mobility in an activity addressed by the Mobility section.
3. The individual indicated a priority that was not addressed by the Mobility section.
4. The individual did not indicate a priority or did not respond.

This coding approach helped to determine how well the Mobility section in the FASI represented activities deemed priorities by individuals being assessed and had potential for identifying areas of importance to individuals served by the CB-LTSS programs that are not captured by FASI. Two members of the FASI team completed the coding. Both members conducted confirmation of data fit by sampling all data until consensus was reached. Frequencies and percentage of coded responses subsequently were summarized for all respondents, as well as by population.

For mobility, 45.8 percent (n = 535) of individuals identified at least one priority, and 24.5 percent (n = 286) indicated a second priority. For the first priority noted, 21.1 percent (n = 246) indicated a priority to improve an item in the FASI functional mobility set, such as walking; 5.5 percent (n = 64) indicated a priority to maintain independence in a mobility activity related to any item in the FASI mobility set, and 19.3 percent (n = 225) indicated a priority that was not related to any of the items in the mobility set. Responses in this last category were broad, but some common themes included health and wellness priorities such as nutrition and exercise and a need to repair or acquire adaptive equipment. A number of responses could not be interpreted without follow-up questions to the individual. These responses were coded as unrelated to the mobility domain. Examples included comments such as a description of a medical condition, pain level, or a comment regarding current or desired physical therapy.

The frequency of responses of individuals who indicated at least one mobility priority varied across populations: 45.3 percent of individuals with a brain injury, 42.0 percent of individuals

who are frail elderly, 41.9 percent of individuals with an intellectual or developmental disability, 47.2 percent of individuals with a physical disability, and 56.4 percent of individuals with serious mental illness reported at least one priority in response to the assessor's question at the conclusion of the mobility set.

Observations and Changes to the FASI Functional Mobility Items

On the basis of these findings, the FASI team presented results and recommendations to the Technical Expert Panel (TEP) for changes to the FASI set. The following section outlines TEP feedback and the changes made to finalize the FASI.

Summary of Functional Mobility Testing

The overall reliability and validity results for the functional mobility items were generally good to strong. Therefore, the FASI team did not make any recommendations to the TEP for changes to the functional mobility items.

Content validity. There was good evidence for content validity, that is, items covered the concept of interest. Items generally reflected the same underlying construct, and assessors generally reported the content was appropriate.

Concurrent validity. Evidence for concurrent validity—the extent that items distinguish among groups—was mixed:

- Use of rating scale steps was wider among individuals in the physical disability and frail elderly populations.
- Individuals with serious mental illness, with a brain injury, or with an intellectual or developmental disability scored most frequently on rating scale steps 5 and 6.
- There were significant differences across populations in use of rating scale steps (chi-square test) and small differences in medians for intellectual or developmental disability, brain injury, and serious mental illness populations (K-sample test).

Structural validity. There was good evidence for structural validity, that is, extent to which the ordering of steps and items is logical:

- The ordering of items makes sense, items fit the model (except rolling left and right), and the principal component analysis was within acceptable ranges.
- 46 percent of individuals received maximum score.
- Measurement precision was moderate (person separation reliability = .82).

Convergent validity. Evidence was strong for convergent validity, that is, the alignment of usual and most dependent scores. There was a high correlation between usual (3-day) and most dependent (past month) scores for all items in the Functional Mobility section.

Interrater reliability. There was strong evidence for IRR (the extent to which raters agree on assessment decisions). Results indicate that assessors were able to achieve good IRR on the FASI functional mobility items. **Car transfer** may be challenging for assessors to rate consistently.

Reference Period Decision

Despite the high level of agreement between usual (3 days) and most dependent (past month) reference periods, TEP members felt strongly that capturing changing needs was critical for those individuals in these populations for whom it was a concern. Therefore, the FASI team maintained the most dependent (past month) reference period in the FASI set.

CHAPTER 8. AMBULATION MOBILITY ITEMS

Introduction

This chapter describes the results of field testing of items related to ambulation mobility. Ambulation mobility activities are important to assess in individuals applying for and/or enrolled in community-based long-term services and supports (CB-LTSS) programs because they provide information related to the person's potential need for assistance in order to navigate the home and community environment. Ambulation is critically important to a person's ability to engage meaningfully and safely in all home and community contexts.

Difficulty completing ambulation mobility activities independently is a key factor in determining eligibility for CB-LTSS in most populations. In addition, support in ambulation mobility activities is a determinant in the continued need for services. Documenting the need for support with mobility activities represents an important aspect of the service plan.

Description of the Items

The full text for each of the items can be found in Appendix A. The Ambulation Mobility section of the FASI consists of 12 items related to daily ambulation mobility activities. The assessor gathers information for coding items in this section from multiple sources including discussion with, or observation of, individuals applying for or receiving supports and services, their family, and/or caregivers, as well as written records where necessary. The Ambulation Mobility section contains one skip question. Question 8 asks the assessor to indicate whether the person can walk. If the person does not walk, the assessor moves to question 9, the first question in the Wheelchair Mobility section. Most items in the Ambulation Mobility section are based on the standardized items in the CMS Data Element Library (DEL). To the extent possible, items follow the standard. Exceptions or modifications to the standard are noted below, including rationale for the modification.

The **walks 10 feet item** considers the support a person needs to walk at least 10 feet in an indoor space such as a room, corridor, or similar space. The item is assessed once the person is standing because assessment of the support required to transfer to standing is covered in the Functional Mobility section. The next two items, **walks 50 feet with two turns** and **walks 150 feet,** assess the person's need for support in an indoor space but over longer distances and

with the requirement to change directions or complete turns within the space. Use of an assistive device during ambulation does not affect the code choice.

The ability to safely navigate uneven surfaces is frequently important for an individual to fully access his or her home or community. The item, **walks 10 feet on uneven surfaces**, indicates the person's ability to walk on sloping or uneven surfaces such as grass or gravel. The next item, **1 step (curb**), considers the support that an individual needs to navigate a single step or a curb. The next two items increase in level of difficulty as the individual is assessed regarding the amount of assistance needed to go up and down **4 steps** and then **12 steps**.

The item, **walks indoors** from room to room and around obstacles, assesses an individual's need for assistance navigating a typical home environment using appropriate motor planning and executive function skills. **Carries something in both hands** while walking is a task that requires a higher level of motor planning for someone to successfully complete. It is well documented that risk for falls increases when an individual is performing a dual task such as carrying an item while simultaneously walking.[46] **Picking up an object** is a task commonly performed in the home setting. The individual must maintain balance while picking up an object from the floor from an initial standing position. Being able to **walk for 15 minutes** without stopping is a functional measure of the individual's endurance, which may be important for the individual to access community activities such as shopping.[47] **Walks across a street** before the light turns red is a functional measure of an individual's walking speed. Adequate gait speed is an independent predictor of functional ability and health status.[48] Crossing the street within the time it takes for the light to turn is a community-oriented task, as well as a functional measure of gait speed.[49]

---

[46] Al-Yahya E, Dawes H, Smith L, et al. Cognitive motor interference while walking: a systematic review and meta-analysis. Neuroscience and Biobehavioral Reviews. 2011;35(3):715-28.

[47] Andrews AW, Chinworth SA, Bourassa M, et al. Update on distance and velocity requirements for community ambulation. Journal of Geriatric Physical Therapy. 2010;33:128-34.

[48] Fritz S, Lusardi M. White paper: "Walking speed: the sixth vital sign." Journal of Geriatric Physical Therapy. 2009;32(2):2-5.

[49] Andrews et al., 2010. Op cit.

The items, **carries something in both hands**, **walks for 15 minutes**, and **walks across a street,** are specifically developed for the FASI. As noted above, the items represent functional ambulation tasks that may be important indicators of community access and independence.

Description of the Rating Scale

The Ambulation Mobility items each are coded using one of six numeric codes that best described the individual's need for assistance with the task described.[50] For easy reference, the following is a summary of the rating scale and reference period, detailed in Chapter 6.

- Code 06: **Independent and requires no assistance with this task**
- Code 05: **Setup or cleanup assistance**
- Code 04: **Supervision or touching assistance**
- Code 03: **Partial/moderate assistance**
- Code 02: **Substantial maximal assistance**
- Code 01: **Dependent**

The following codes were used if the activity was not completed:

- Code 07: **Person refused**
- Code 09: **Not applicable**
- Code 88: **Not attempted**

Assessment Reference Period

Each of the ambulation mobility items is scored twice: once with regard to usual performance in the past 3 days and again to reflect the most dependent performance in the past month.

Analytic Objectives and Approach

The data analyses were designed to determine the validity and reliability of the FASI items and their effectiveness in capturing the needs of individuals in each of the CB-LTSS populations. Chapter 5, Data Preparation and Testing Approach, presents in detail the FASI Team's approach

[50] These codes and definitions align with the standardized items in the DEL (for self-care items and all other items in this report), but some modifications have been made to reflect the needs and perspective of individuals receiving CB-LTSS. For example, the FASI refers to *individuals,* whereas the Minimum Data Set (MDS) version of the item uses the term *resident* and the inpatient version uses the term *patient*.

to testing all FASI items. For easy reference, a brief summary of the analytic methodology is included in Table 8.1 as well.

Table 8.1. Summary of the Analytic Methodology Used to Test the FASI

Type of Validity or Reliability	Purpose	Test Used
Concurrent validity	To evaluate the use of the rating scale for each item within a given section (e.g., self-care) across populations for both the 3-day usual performance and the 30-day most dependent performance	Chi-square analyses
Concurrent validity	To examine the extent to which FASI items detected differences in needs across populations	K-sample equality of medians test to examine the difference in the median scores for each population
Convergent validity	To look at the relationship between 3-day (usual) and past month (most dependent) responses	Rank order association (Kendall's tau-b)
Structural validity	To examine the structure of the rating scale steps, the hierarchical order of items (from easiest to hardest), the extent to which the items represent the same self-care construct (unidimensionality), and whether the hierarchical order of the items differed across CB-LTSS populations (differential item functioning [DIF])	Rasch analysis
Interrater reliability	To evaluate how much homogeneity, or consensus, there was in the ratings given by assessors	Krippendorff's alpha

Abbreviations: CB-LTSS, community-based long-term services and supports; FASI, Functional Assessment Standardized Items.

Results

Tables presenting descriptive analyses of ambulation mobility items by population are presented in Appendix D (Section 5); tables for the total sample are presented in this chapter. Tables presenting Rasch analyses are presented in Appendix E (Table 3). Overall item calibrations, fit statistics, and a figure of the hierarchical order of items are presented within this chapter.

Ambulation Mobility Item Results

Does the person walk. Overall, 77 percent responded "yes" indicating that the person walks. An additional 4 percent identified that walking was anticipated in the future. Therefore, approximately 80 percent of individuals assessed went on to complete the Ambulation Mobility FASI set (Table 8.2).

Table 8.2. Descriptive Statistics of Rating Scale Use for All Participants for Item 8. Does the Person Walk?

8. Does the Person Walk	n	%
0. Yes	899	77.0
1. No, but walking is indicated in future	42	3.6
2. No, and walking is not indicated	226	19.4
Total respondents	1,167	100

Walks 10 feet. Overall, 85 percent of individuals were independent with walking 10 feet (Table 8.3). Individuals who are frail elderly had the lowest number of those independent in ambulation over 10 feet (66 percent). In comparison, 96 percent of individuals with serious mental illness or with an intellectual or developmental disability, 89 percent of those with a brain injury, and 79 percent of individuals with a physical disability walked independently. The most frequently reported level of assistance was supervision/touching assistance. Overall, less than 1 percent of the individuals who indicated walking were fully dependent with walking 10 feet in a room, corridor, or space. There were differences in ratings on this item across populations, in that individuals with SMI and individuals with IDD were less likely to be scored dependent (Appendix D, Table 5.a.1).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 112.22$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 127.72$, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table 5.b.1). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .88 to .99, indicating little variation in need for assistance with walking 10 feet on even surfaces between assessment periods (Appendix D, Table 5.c.1).

Table 8.3. Descriptive Statistics of Rating Scale Use for All Participants for Item 8a. Walks 10 Feet

8a. Walks 10 Feet	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	758	84.7	743	83.0
05. Setup or cleanup	11	1.2	11	1.2
04. Supervision/touching	75	8.4	81	9.1
03. Partial/moderate	25	2.8	27	3.0
02. Substantial/maximal	18	2.0	21	2.4
01. Dependent	6	0.7	9	1.0
Total scored respondents	893	99.8	892	99.7
07. Person refused	0	0.0	0	0.0
09. Not applicable	2	0.2	2	0.2
88. Not attempted	0	0.0	1	0.1
Total respondents	895	100	895	100

Walks 50 feet with two turns. Overall, 71 percent of individuals were independent with walking 50 feet incorporating two turns (Table 8.4). Less than half of individuals who are frail and elderly ambulated independently in this task (40 percent). The majority of individuals with an intellectual or developmental disability (92 percent), serious mental illness (86 percent), a brain injury (80 percent), or a physical disability (61 percent) completed this task independently. The most frequent level of assistance required was supervision/touching assistance. Overall, 5 percent of individuals were fully dependent with walking 50 feet with two turns (Appendix D, Table D5.a.2).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 181.99$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 196.63$, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D5.b.2). Rank-order correlations across populations were high with Kendall's tau-b (t_b) ranging from .86 to .96, indicating little variation in need for assistance with walking 50 feet with two turns between assessment periods (Appendix D, Table D5.c.2).

Table 8.4. Descriptive Statistics of Rating Scale Use for All Participants for Item 8b. Walks 50 Feet With Two Turns

8b. Walks 50 Feet With Two Turns	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	637	71.2	616	68.8
05. Setup or cleanup	6	0.7	8	0.9
04. Supervision/touching	89	9.9	97	10.8
03. Partial/moderate	41	4.6	44	4.9
02. Substantial/maximal	26	2.9	30	3.4
01. Dependent	41	4.6	45	5.0
Total scored respondents	840	93.9	840	93.9
07. Person refused	1	0.1	1	0.1
09. Not applicable	47	5.3	46	5.1
88. Not attempted	7	0.8	8	0.9
Total respondents	895	100	895	100

Walks 150 feet. Overall, 59 percent of individuals were independent with walking 150 feet (Table 8.5). Less than one-quarter (23 percent) of individuals who are frail elderly ambulated independently over the distance of 150 feet. Individuals with an intellectual or developmental disability were most likely to independently ambulate over this distance (88 percent), followed by individuals with serious mental illness (72 percent), then individuals with a brain injury (69 percent), and then individuals with a physical disability (46 percent). The most frequent level of assistance required was supervision/touching assistance. Overall, 10 percent of individuals were fully dependent with walking 150 feet (Appendix D, Table D5.a.3).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 =200.40, df_{20}, $p < .0001$) and most dependent (past month) (χ^2 =196.45, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D5.b.3). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .88 to .97, indicating little variation in need for assistance with walking 50 feet with two turns between assessment periods (Appendix D, Table D5.c.3).

Table 8.5. Descriptive Statistics of Rating Scale Use for All Participants for Item 8c. Walks 150 Feet

8c. Walks 150 Feet	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	529	59.1	513	57.3
05. Setup or cleanup	2	0.2	2	0.2
04. Supervision/touching	69	7.7	80	8.9
03. Partial/moderate	34	3.8	39	4.4
02. Substantial/maximal	26	2.9	28	3.1
01. Dependent	85	9.5	88	9.8
Total scored respondents	745	83.2	750	83.8
07. Person refused	0	0.0	1	0.1
09. Not applicable	124	13.9	119	13.3
88. Not attempted	26	2.9	25	2.8
Total respondents	895	100	895	100

Walks 10 feet on uneven surfaces. Overall, approximately half (52 percent) of individuals were independent with walking 10 feet on uneven surfaces (Table 8.6). Approximately one-fifth of individuals who are frail elderly were able to independently ambulate over the distance of 10 feet on uneven surfaces (20 percent), whereas 76 percent of individuals with an intellectual or developmental disability, 64 percent of those with a brain injury, 63 percent of individuals with serious mental illness, and 40 percent of those with a physical disability were independent. The most frequent level of assistance required was supervision/touching assistance, with 15 percent of individuals requiring this level of assistance. Overall 7 percent of individuals were fully dependent with walking 10 feet over uneven surfaces (Appendix D, Table 5.a.4).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 175.60$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 180.24$, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table 5.b.4). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .89 to .97, indicating little variation in need for assistance with walking 10 feet on uneven surfaces between assessment periods (Appendix D, Table 5.c.4).

Table 8.6. Descriptive Statistics of Rating Scale Use for All Participants for Item 8d. Walks 10 Feet on Uneven Surfaces

8d. Walks 10 Feet on Uneven Surfaces	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	464	52.0	448	50.2
05. Setup or cleanup	1	0.1	3	0.3
04. Supervision/touching	137	15.3	144	16.1
03. Partial/moderate	53	5.9	55	6.2
02. Substantial/maximal	32	3.6	35	3.9
01. Dependent	66	7.4	73	8.2
Total scored respondents	753	84.3	758	84.9
07. Person refused	1	0.1	1	0.1
09. Not applicable	121	13.6	115	12.9
88. Not attempted	18	2.0	19	2.1
Total respondents	893	100	893	100

1 step (curb). Overall, more than half (60 percent) of individuals were independent with stepping over a curb or up and down one step (Table 8.7). Just over one-quarter (28 percent) of individuals who are frail elderly were able to manage this task independently, whereas 82 percent of individuals with an intellectual or developmental disability, 76 percent of those with serious mental illness, 73 percent of individuals with a brain injury, and 48 percent of individuals with a physical disability independently navigated curbs or ascended/descended one step. The most frequent level of assistance required was supervision/touching assistance, with 15 percent of individuals requiring this level of assistance. Overall 5.5 percent of individuals were fully dependent with stepping over a curb (Appendix D, Table D5.a.5).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 176.63$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 194.01$, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D5.b.5). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .84 to .98, indicating little variation in need for assistance with stepping over a curb between assessment periods (Appendix D, Table D5.c.5).

Table 8.7. Descriptive Statistics of Rating Scale Use for All Participants for Item 8e. 1 Step (Curb)

8e. 1 Step (Curb)	Usual 3-Day		Most Dependent Past Month	
	N	%	N	%
06. Independent	541	60.4	520	58.0
05. Setup or cleanup	7	0.8	7	0.8
04. Supervision/touching	133	14.8	143	16.0
03. Partial/moderate	63	7.0	72	8.0
02. Substantial/maximal	44	4.9	47	5.3
01. Dependent	49	5.5	57	6.4
Total scored respondents	837	93.4	846	94.4
07. Person refused	0	0.0	0	0.0
09. Not applicable	51	5.7	44	4.9
88. Not attempted	8	0.9	6	0.7
Total respondents	896	100	896	100

4 Steps. Overall, 56 percent of individuals were independent with the ability to go up and down four steps with or without a rail (Table 8.8). Almost one-quarter (24 percent) of individuals who are frail elderly were able to manage this task independently, and less than half of individuals with a physical disability (39 percent) also ascended and descended stairs independently. Individuals with an intellectual or developmental disability were most likely to be independent (85 percent), followed by those with serious mental illness (69 percent), and individuals with a brain injury (66 percent). The most frequent level of assistance required was supervision/touching assistance, with 12 percent of individuals requiring this level of assistance. Overall 7 percent of individuals were fully dependent with going up and down four steps (Appendix D, Table D5.a.6).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 188.74$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 215.62$, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D5.b.6). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .90 to .95, indicating little variation in need for assistance with going up and down four steps between assessment periods (Appendix D, Table D5.c.6).

Table 8.8. Descriptive Statistics of Rating Scale Use for All Participants for Item 8f. 4 Steps

8f. 4 Steps	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	504	56.3	479	53.5
05. Setup or cleanup	3	0.3	5	0.6
04. Supervision/touching	104	11.6	117	13.1
03. Partial/moderate	47	5.3	53	5.9
02. Substantial/maximal	37	4.1	43	4.8
01. Dependent	61	6.8	68	7.6
Total scored respondents	756	84.4	765	85.4
07. Person refused	0	0.0	0	0.0
09. Not applicable	129	14.4	120	13.4
88. Not attempted	11	1.2	11	1.2
Total respondents	896	100	896	100

12 steps. Overall, about half (49 percent) of individuals were independent with the ability to go up and down 12 steps with or without a rail (Table 8.9). Individuals who are frail elderly were least likely to manage this task independently (14 percent), and a little over a quarter of those with a physical disability (28 percent) ascended and descended 12 stairs independently. Individuals with an intellectual or developmental disability were most likely to be independent (81 percent), followed by individuals with a brain injury (64 percent) and then those with serious mental illness (59 percent). The most frequent level of assistance required was supervision/touching assistance, with 10 percent of individuals requiring this level of assistance. Overall, 8 percent of individuals were fully dependent with going up and down 12 steps (Appendix D, Table D5.a.7).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 170.96, df_{20}, $p < .0001$) and most dependent (past month) (χ^2= 214.15, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D5.b.7). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .89 to .96, indicating little variation in need for assistance with going up and down 12 steps between assessment periods (Appendix D, Table D5.c.7).

Table 8.9. Descriptive Statistics of Rating Scale Use for All Participants for Item 8g. 12 Steps

8g. 12 Steps	Usual		Most Dependent	
	n	%	n	%
06. Independent	438	48.8	415	46.2
05. Setup or cleanup	2	0.2	3	0.3
04. Supervision/touching	85	9.5	99	11.0
03. Partial/moderate	25	2.8	27	3.0
02. Substantial/maximal	19	2.1	24	2.7
01. Dependent	75	8.4	82	9.1
Total scored respondents	644	71.7	650	72.4
07. Person refused	0	0.0	0	0.0
09. Not applicable	241	26.8	236	26.3
88. Not attempted	13	1.5	12	1.3
Total respondents	898	100	898	100

Walks indoors. Overall, 81 percent of individuals were independent with the ability to walk from room to room around furniture and other obstacles (Table 8.10). A little more than half (57 percent) of individuals who are frail elderly managed this item independently, but more than three-quarters of individuals in the other populations went up and down 12 steps independently. Individuals with an intellectual or developmental disability were the most likely to be independent (95 percent). The most frequent level of assistance required was supervision/touching assistance, with 8 percent of individuals requiring this level of assistance. Overall, only 2 percent of individuals were fully dependent with going from room to room around obstacles (Appendix D, Table D5.a.8).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 160.38$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 182.49$, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D5.b.8). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .88 to .92, indicating little variation in need for assistance with going from room to room between assessment periods (Appendix D, Table D5.c.8).

Table 8.10. Descriptive Statistics of Rating Scale Use for All Participants for Item 8h. Walks Indoors

8h. Walks Indoors	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	732	81.4	708	78.8
05. Setup or cleanup	10	1.1	11	1.2
04. Supervision/touching	72	8.0	85	9.5
03. Partial/moderate	31	3.5	32	3.6
02. Substantial/maximal	17	1.9	21	2.3
01. Dependent	14	1.6	18	2.0
Total scored respondents	876	97.4	875	97.3
07. Person refused	0	0.0	0	0.0
09. Not applicable	20	2.2	20	2.2
88. Not attempted	3	0.3	4	0.4
Total respondents	899	100	899	100

Carries something in both hands. Overall, just over half (52 percent) of individuals were independent with the ability to carry something in both hands while walking indoors (Table 8.11). Individuals who are frail elderly were least likely to manage this task independently (15 percent). Individuals with an intellectual or developmental disability were most likely to be independent (83 percent), followed by those with serious mental illness (71 percent), then individuals with a brain injury (51 percent), and those with a physical disability (37 percent). Overall, 23 percent of individuals were fully dependent with carrying an object with both hands. Individuals were primarily classified as independent or fully dependent for this item; very few managed the task with supervisory, partial, or substantial assistance, and 16 percent indicated that this item was not applicable (Appendix D, Table 5.a.9).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 236.27$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 238.94$, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table 5.b.9). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .93 to .98, indicating little variation in need for assistance with carrying and object in both hands while walking indoors between assessment periods (Appendix D, Table 5.c.9).

Table 8.11. Descriptive Statistics of Rating Scale Use for All Participants for Item 8i. Carries Something in Both Hands

8i. Carries Something in Both Hands	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	467	52.1	455	50.8
05. Setup or cleanup	3	0.3	4	0.5
04. Supervision/touching	23	2.6	25	2.8
03. Partial/moderate	17	1.9	19	2.1
02. Substantial/maximal	14	1.6	15	1.7
01. Dependent	207	23.1	212	23.7
Total scored respondents	731	81.6	730	81.5
07. Person refused	0	0.0	0	0.0
09. Not applicable	146	16.3	146	16.3
88. Not attempted	19	2.1	20	2.2
Total respondents	896	100	896	100

Picking up object. Overall, almost two-thirds (60 percent) of individuals were independent with the ability to pick up an object from the floor (Table 8.12). Approximately one-quarter (26 percent) of individuals who are frail elderly managed this task independently. Individuals with an intellectual or developmental disability were most likely to be independent (87 percent), followed by those with serious mental illness (75 percent), individuals with a brain injury (66 percent), and those with a physical disability (46 percent). Overall, 18 percent of individuals were fully dependent with picking up an object from the floor. Individuals were primarily classified as independent or fully dependent for this item; very few managed this task with supervisory, partial, or substantial assistance, and 10 percent indicated that this activity was not applicable (Appendix D, Table D5.a.10).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 183.72$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 174.29$, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D5.b.10). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .85 to .97, indicating little variation in need for assistance with picking up objects from the floor between assessment periods (Appendix D, Table D5.c.10).

Table 8.12. Descriptive Statistics of Rating Scale Use for All Participants for Item 8j. Picking Up Object

8j. Picking Up Object	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	537	59.9	518	57.8
05. Setup or cleanup	4	0.5	8	0.9
04. Supervision/touching	43	4.8	46	5.1
03. Partial/moderate	30	3.3	32	3.6
02. Substantial/maximal	17	1.9	16	1.8
01. Dependent	162	18.1	177	19.7
Total scored respondents	793	88.4	797	88.9
07. Person refused	0	0.0	1	0.1
09. Not applicable	88	9.8	82	9.1
88. Not attempted	16	1.8	17	1.9
Total respondents	897	100	897	100

Walks for 15 minutes. Overall, less than half (45 percent) of individuals were independent with the ability to walk for 15 minutes without stopping (Table 8.13). For individuals who are frail elderly, 11 percent managed this task independently. Individuals with an intellectual or developmental disability were most likely to be independent (80 percent), followed by those with a brain injury (57 percent), individuals with serious mental illness (49 percent), and those with a physical disability (29 percent). Overall, 18 percent of individuals were fully dependent with walking for 15 minutes. Individuals managing this task were primarily coded as independent or fully dependent; approximately a quarter of individuals (24 percent) scored this item as not applicable (Appendix D, Table D5.a.11).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 178.34$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 188.88$, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D5.b.11). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .93 to .99, indicating little variation in need for assistance with walking for 15 minutes between assessment periods (Appendix D, Table D5.c.11).

Table 8.13. Descriptive Statistics of Rating Scale Use for All Participants for Item 8k. Walks for 15 Minutes

8k. Walks for 15 Minutes	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	407	45.4	400	44.6
05. Setup or cleanup	0	0.0	2	0.2
04. Supervision/touching	55	6.1	56	6.2
03. Partial/moderate	16	1.8	17	1.9
02. Substantial/maximal	15	1.7	17	1.9
01. Dependent	165	18.4	174	19.4
Total scored respondents	658	73.4	666	74.3
07. Person refused	0	0.0	0	0.0
09. Not applicable	216	24.1	208	23.2
88. Not attempted	23	2.6	23	2.6
Total respondents	897	100	897	100

Walks across a street. Overall, less than half (40 percent) of individuals were independent with the ability to walk across the street before a traffic light turns red (Table 8.14). For individuals who are frail elderly, 9 percent managed this task independently. Individuals with an intellectual or developmental disability were most likely to be independent (67 percent), followed by individuals with serious mental illness (55 percent) or a brain injury (55 percent), and individuals with a physical disability (19 percent). Overall, 11 percent of individuals were fully dependent with walking across a street. Individuals managing this task were primarily classified as independent or fully dependent; more than one-third of individuals (35 percent) scored this item as not applicable (Appendix D, Table D5.a.12).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 136.00$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 139.60$, df_{20}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D5.b.12). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .87 to .98, indicating little variation in need for assistance with walking across the street between assessment periods (Appendix D, Table D5.c.12).

Table 8.14. Descriptive Statistics of Rating Scale Use for All Participants for Item 8l. Walks Across a Street

8l. Walks Across a Street	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	359	40.0	348	38.8
05. Setup or cleanup	3	0.3	3	0.3
04. Supervision/touching	86	9.6	93	10.4
03. Partial/moderate	13	1.5	14	1.6
02. Substantial/maximal	15	1.7	16	1.8
01. Dependent	99	11.0	105	11.7
Total scored respondents	575	64.1	579	64.6
07. Person refused	1	0.1	1	0.1
09. Not applicable	313	34.9	309	34.5
88. Not attempted	8	0.9	8	0.9
Total respondents	897	100	897	100

Rasch analysis. Results of the Rasch analysis indicated the rating scale steps proceeded monotonically (i.e., in order from 01 to 06) (Appendix E, Table 3). In preliminary analyses, a comparison of medians for each ambulation item across populations indicated that the majority of individuals with an intellectual or developmental disability, a brain injury, or serious mental illness were independent (Appendix D, Table D5.d.1). Individuals who are frail elderly or have a physical disability were coded on a wider range of rating scale steps. A nonparametric comparison of medians (K-sample test) suggested sufficient variation in rating scale use across populations for the ambulation items and differences in the medians across populations for most items.

The hierarchical order of items (from easiest to hardest) was reasonable, with **walks 10 feet** being the least challenging item and **walks 15 minutes** being the most challenging (Table 8.15, Figure 8.1). **Walks 50 feet with two turns** was less challenging than **walks 150 feet** for individuals in this field test. This is in contrast to previous research that indicated that **walks 150 feet** was easier for patients in inpatient rehabilitation, skilled nursing, or home health than

was **walks 50 feet with two turns**.[51] Additionally, **picking up object** and **12 steps** were of similar difficulty; in post-acute care settings **12 steps** was found to be more challenging than **picking up an object**.[52] All items fit the measurement model, and the principal component analysis (eigenvalue = 2.12, 6.6 percent variance explained by the first contrast) indicates that the ambulation items are sufficiently unidimensional.

The hierarchical order of the items was consistent across CB-LTSS populations (no differential item functioning [DIF] detected) (Appendix E, Table E3). The person separation reliability, an indication of measurement precision, was good (.83), although values above .90 are preferred when making individual-level decisions. More than one-third (35 percent) of individuals received a maximum score on these ambulation items. The distribution of response was skewed. Many individuals with an intellectual or developmental disability or serious mental illness had few needs for assistance with ambulation, which may have contributed to the lower person separation reliability. Using Wright's sample independent method for strata, it was determined that the ambulation items can distinguish four levels of functional ability, which equates to a person separation reliability coefficient of .94.

[51] Gage B, Smith L, Ross J, et al. The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set. Vol 2. RTI Project Number 0209853.004, CMS Contract No. HHSM-500-2005-00291. Baltimore, MD: Centers for Medicare & Medicaid Services, Office of Clinical Standards and Quality; 2012.

[52] Ibid.

Table 8.15. Item Calibrations and Fit Statistics in Difficulty Order for Ambulation Mobility

Item	Calibration	SE	Infit		Outfit		Point Biserial Correlation
			MnSq	Zstd	MnSq	Zstd	
Walks 15 minutes	0.75	.04	1.44	5.1	1.17	1.4	.81
Walks across a street	0.62	.04	1.37	2.9	1.32	2.4	.81
Carries something in both hands	0.62	.04	1.56	6.6	1.33	2.8	.80
Picking up object	0.26	.04	1.45	5.8	1.32	3.0	.76
12 steps	0.25	.04	0.97	–0.4	0.84	–1.4	.80
Walks 10 feet on uneven surfaces	0.12	.04	0.90	–1.4	1.08	0.8	.81
Walks 150 feet	0.03	.04	1.05	0.6	0.90	–0.8	.76
4 steps	0.03	.04	0.83	–2.5	0.78	–2.0	.80
1 step curb	–0.10	.04	0.77	–3.6	0.88	–1.1	.78
Walks 50 feet with two turns	–0.46	.04	0.80	–2.8	0.55	–3.7	.71
Walks indoors	–0.98	.05	0.68	–4.0	0.58	–2.2	.62
Walks 10 feet	–1.14	.05	0.62	–4.8	0.55	–2.1	.60

Abbreviations: MnSq, mean square; SE, standard error; Zstd, z-standardized.

The FASI team used Wright maps to ascertain the items' construct validity by checking how well the constructs were represented by empirical results. The left side of the Wright map shows individuals; the right side shows FASI items. The left side of the map shows the distribution of the measured level of functional ability of individuals from highest level of independence at the top to lowest level of independence at the bottom. The items on the right side of the map are distributed from the most difficult items at the top to the least difficult at the bottom. Looking at the results of these maps, the FASI team determined whether more difficult FASI items aligned with identifying the needs of more independent individuals. Figure 8.1 presents the Wright map results for the ambulation mobility items. These results indicated that ambulation mobility items were aligned with individuals' needs.

Figure 8.1. Wright Map Results for the Ambulation Mobility Items

```
Person Measures                                                Item Calibrations
 <more able> ---------------- Persons -+- Items   -------- <more challenging>
  3     .############################  +                                   3
                                      |
                                      |
                                      |
                                      |
                                      |
                                      |
                                      |
                                   .  |
                                   . T|
  2                                   +                                   2
                                      |
                                 .##  |
                                   .  |
                                   .  |
                                  .#  |
                                   .  |
                                 .##  |
                                 .## S|
                                 .##  |
  1                               .#  +                                   1
                                 .##  |
                                 .##  |
                                  .#  |  Walk 15 Minutes
                                  .#  |  Carry Two Hands  Walk Across Street
                                 .##  |
                                  .# M|
                                 .##  |  Pick Up Object
                                 .##  |  12 Steps
                                 .##  |  Walk Uneven Surfaces
  0                              .##  +M 4 Steps  Walk 150 Feet            0
                                  .#  |  1 Step (Curb)
                                 .##  |
                                  .#  |
                                  .#  |
                                  .# S|  Walk 50 Feet
                                   .  |
                                  .#  |
                                   #  |
                                   .  |
 -1                                .  +  Walk Indoor                      -1
                                   .  |  Walk 10 Feet
                                   .  |
                                   .  |
                                   . T|
                                   .  |
                                   .  |
                                   .  |
                                      |
                                      |
 -2                                   +                                  -2
                                      |
                                      |
                                      |
                                   .  |
                                      |
                                      |
                                      |
                                      |
                                      |
 -3                                .  +                                  -3
<less able> ---------------- Persons -+- Items   -------- <less challenging>
Person Measures                                                Item Calibrations
```

Interrater reliability. Interrater reliabilities (IRRs) are reported for each ambulation mobility item by entity (13 entities). (See Appendix D, Table D15.a.3.) For entity 7, there were two subsets of raters and items so that separate IRR coefficients are reported for these two subsets (7A and 7B). Entity 4 was small, and only one individual was submitted to the IRR data set. There were several instances in which the IRR coefficients were below .67:

- Five instances in entity 5
- Three instances in entity 9
- Five instances in entity 12
- One instance in entity 13
- One instance in entity 6
- One instance for **Item 8d. Walks 10 feet on uneven surfaces**
- Three instances for the same item—**Item 8l. Walks across the street**
- Two instances for **Item 8j. Picking up object**
- Two instances for **Item 8i. Carries something in both hands**
- One instance for **Item 8h. Walks indoors**
- Two instances for **Item 8e. 1 step (curb)**
- One instance for **Item 8c. Walks 150 feet**
- One instance for **Item 8b. Walks 50 feet with two turns**
- One instance for **Item 8a. Walks 10 feet**

Tentative evidence existed in one instance for **walks indoors,** in two instances for**1 step (curb),** in one instance for **walks 150 feet,** and in one instance for **walks 10 feet.** The remaining 110 coefficients were all above .80, indicating strong evidence of IRR for the ambulation mobility.

Items were considered to have achieved good IRR if 11 of the 13 entities achieved coefficients above .80. Using these criteria, the items demonstrating good IRR were **walks 50 feet with two turns, walks 150 feet, 4 steps, 12 steps, walks indoors, carries something in both hands, picking up objects,** and **walks 15 minutes.** Overall, three entities accounted for over three-quarters of the low IRRs. Without these entities, only **1 step (curb)** and **walks 50 feet** did not meet the criteria for acceptable IRR.

Assessor Feedback on Ambulation Mobility Items

This section included several new items—**walks indoors, carries something in both hands, walks for 15 minutes,** and **walks across the street.** The FASI team grouped assessors' comments for ambulation mobility into three areas:

Correct coding when assistive devices are used. Several assessors questioned how to correctly code when the person used an assistive device. FASI team members recommended reading the item carefully to determine whether the equipment resulted in the person failing to complete the task as described. For example, **picking up object** specifically states that the person must "bend/stoop"; if a reacher was used and allowed the person to pick up an object without bending or stooping, the person did not complete the task. If a person was able to walk 10 feet with a walker and completed the item as described, independent (code 06) was correct.

Clarifying the use of dependent (code 01) for Item 8k. Walks 15 minutes and Item 8l. Walks across the street. These items were added to the FASI set to provide information on a person's ability to complete activities in the community safely and independently, such as walking in a department store or supermarket without chairs or benches or across a street with traffic lights. If the person could not walk for 15 minutes without a break, assessors questioned whether to score as not applicable (code 09) or dependent (code 01). Not applicable (code 09) was used when the person chose not to complete the activity. If the person could not walk 15 minutes without a rest or with a helper, the correct score was dependent (code 01). Clarification also was requested regarding crossing the street before the light changes if the person walked a path to avoid traffic lights. In this case, not applicable (code 09) was appropriate if the person had not crossed a street with a traffic light in the past days or 1 month. If the person crossed streets with traffic lights but lacked walking speed for some traffic lights, the items were scored dependent (code 01).

Accuracy of self-assessments. Several assessors reported difficulty determining whether a person's self-report was accurate when cognitive deficits were noted and a helper was not present for the assessment. For example, an assessor evaluated a person in a wheelchair who reported the ability to ascend **1 step** (Item 8e) but not **4** or **12 steps** (Items 8f and 8g). Including more guidance in the training as to how to probe further in these situations may be warranted.

Ambulation Mobility Priorities

These priorities items are located at the end of the Mobility section of the FASI (Appendix A) and do not ask about specific types of mobility. In prior chapters, the FASI team describes individuals' responses to the FASI prompt about their top two priorities in the next 6 months.

Observations and Changes to the FASI Ambulation Mobility Items

On the basis of these findings, the FASI team presented results and recommendations to the Technical Expert Panel (TEP) for changes to the FASI set. The following section outlines TEP feedback and the changes made to finalize the FASI.

Summary of Ambulation Mobility Testing

The overall reliability and validity results for the ambulation mobility items were generally good to strong. Therefore, the FASI team did not make any recommendations to the TEP for changes to the FASI ambulation mobility items.

Content validity. There was good evidence for content validity, that is, the extent to which items cover the concept of interest. Items generally reflect the same underlying construct, and assessors generally reported that the content was appropriate.

Concurrent validity. Evidence for concurrent validity (the extent to which items distinguish among groups) was mixed:

- There was wider use of rating scale steps among individuals who have a physical disability and those who are frail elderly.
- Individuals with an intellectual or developmental disability were scored most frequently on scale steps 5 and 6.
- There were significant differences across populations in use of rating scale steps (chi-square test) and little difference in medians for the intellectual or developmental disability, brain injury, and serious mental illness groups (K-sample test).

Structural validity. There was good evidence for structural validity, that is, extent to which the ordering of steps and items is logical:

- Ordering of items makes sense, and principal component analysis was within acceptable ranges.

- The majority of individuals with an intellectual or developmental disability, with serious mental illness, or with a brain injury were independent on ambulation items.
- Measurement precision was moderate (person separation reliability = .83).

Convergent validity. Evidence was strong for convergent validity, that is, the alignment of usual and most dependent scores. There were high correlations between usual (3-day) and most dependent (past month) scores for all items in the Ambulatory Mobility section.

Interrater reliability. There was strong evidence for IRR (the extent to which raters agree on assessment decisions). Results indicate that assessors were able to achieve good IRR on the FASI ambulatory mobility items. Exceptions are noted earlier in this chapter.

There was limited use of the full range of codes to describe the level of assistance required to carry something in both hands, walk for 15 minutes, and walk across the street. Individuals' performance was scored primarily as independent, dependent, or not applicable. Assessor feedback also indicated a high level of uncertainty on how to accurately score these items. However, the TEP members stated that adequate endurance, speed, and ability to pay attention to dual tasks while walking are important skills for independence in the community. Given the TEP feedback, revision to these items may be considered in the future to better represent the range of support required for independent ambulation mobility in all community contexts.

Reference Period Decision

Despite the high level of agreement between usual (3 days) and most dependent (past month) reference periods, TEP members felt strongly that capturing changing needs was critical for individuals in these populations. Therefore, the FASI team maintained the most dependent (past month) reference period in the FASI set.

CHAPTER 9. WHEELCHAIR MOBILITY ITEMS

Introduction

This chapter describes the results of field testing of items related to wheelchair mobility activities. Level of assistance needed with wheelchair mobility activities provides important information about the supports and services needed by individuals applying for or enrolled in community-based long-term services and supports (CB-LTSS) programs that informs the development of the person's service plan. Understanding how much support a person needs for wheelchair mobility is critical to ensuring that the person is safe within his or her home and community environments. Difficulty managing wheelchair mobility can limit access to needed health care and community activities and decrease quality of life.

Needing assistance with wheelchair mobility activities is a key factor for determining eligibility for CB-LTSS in most Medicaid programs. In addition, documenting the need for support with wheelchair mobility activities represents an important aspect of the service plan. Wheelchairs are considered a mobility orthosis because they provide an alternative functional strategy to access and participate in home and community activities.

Description of the Items

The full text for each of the items can be found in Appendix A. The Wheelchair Mobility section of the FASI consists of eight items related to daily wheelchair mobility activities. The assessor gathered information for coding items in this section from multiple sources including discussion with or observation of individuals applying for or receiving supports and services, their family and/or caregivers and written records where necessary. When the individual being assessed walked, the assessor completed assistance needed with ambulation Items 8a through 8i and then proceeded to Question 9. The assessor skipped to Question 9 if the individual being assessed did not walk and walking was not indicated in the future (Question 8). Need for assistance related to Items 9a through 9d was assessed when the individual used a manual wheelchair. The assessor skipped to Question 10 when the individual did not use a manual wheelchair. An individual who used a motorized chair was assessed as need for assistance related to Items 10a through 10d. This skip pattern enabled the assessment of individuals on each of the modes of transportation that he or she used in the home and community. Thus, an individual may be assessed on any combination of the Ambulation, Manual Wheelchair, and Motorized Wheelchair sections.

The **wheels 50 feet with two turns** items (9a and 10a) considered the support a person needed, once seated in the chair, to wheel or advance at least 50 feet with two turns. The wheelchair mobility items did not consider the assistance someone might need to transfer into the chair because that function is assessed in the Functional Mobility section. Similar to the ambulation items, **wheels 150 feet** (9b and 10b) assessed the person's need for support while advancing his or her wheelchair but over a longer distance. The item **wheels for 15 minutes** assessed an individual's endurance, which may be important for the individual to access community activities such as shopping. The item **wheels across a street** before the light turns red is a functional measure of the speed of the individual's wheelchair skills because adequate speed is also important for full access to community environments.

Description of the Rating Scale

The wheelchair mobility items each were coded using one of six numeric codes that best described the individual's need for assistance with the task described.[53] For easy reference, the following is a summary of the rating scale and reference period, detailed in Chapter 6.

- Code 06: **Independent and requires no assistance with this task**
- Code 05: **Setup or cleanup assistance**
- Code 04: **Supervision or touching assistance**
- Code 03: **Partial/moderate assistance**
- Code 02: **Substantial maximal assistance**
- Code 01: **Dependent**

The following codes were used if an activity was not completed:

- Code 07: **Person refused**
- Code 09: **Not Applicable**
- Code 88: **Not attempted**

[53] These codes and definitions align with the standardized items in the Data Element Library (for self-care items and all other items in this report), but some modifications have been made to reflect the needs and perspective of individuals receiving CB-LTSS. For example, the FASI refers to *individuals,* whereas the Minimum Data Set (MDS) version of the item uses the term *resident* and the inpatient version uses the term *patient*.

Assessment Reference Period

Each of the wheelchair mobility items is scored twice: once with regard to usual performance in the past 3 days and again to reflect the most dependent performance in the past month.

Analytic Objectives and Approach

The data analyses were designed to determine the validity and reliability of the FASI items and their effectiveness in capturing the needs of individuals in each of the CB-LTSS populations. Chapter 5, Data Preparation and Testing Approach, presents in detail the FASI Team's approach to testing all FASI items. For easy reference, a brief summary of the analytic methodology is included in Table 9.1 as well.

Table 9.1. Summary of the Analytic Methodology Used to Test the FASI

Type of Validity or Reliability	Purpose	Test Used
Concurrent validity	To evaluate the use of the rating scale for each item within a given section (e.g., self-care) across populations for both the 3-day usual performance and the 30-day most dependent performance	Chi-square analyses
Concurrent validity	To examine the extent to which FASI items detected differences in needs across populations	K-sample equality of medians test to examine the difference in the median scores for each population
Convergent validity	To look at the relationship between 3-day (usual) and past month (most dependent) responses	Rank order association (Kendall's tau-b)
Structural validity	To examine the structure of the rating scale steps, the hierarchical order of items (from easiest to hardest), the extent to which the items represent the same self-care construct (unidimensionality), and whether the hierarchical order of the items differed across CB-LTSS populations (differential item functioning [DIF])	Rasch analysis

Abbreviations: CB-LTSS, community-based long-term services and supports; FASI, Functional Assessment Standardized Items.

Results

Tables presenting descriptive analyses of wheelchair mobility items by population are presented in Appendix D (Section D6 and D7); tables for the total sample are presented in this chapter. Tables presenting Rasch analyses are presented in Appendix E (Tables E4 and E5). Overall item calibrations, fit statistics, and a figure of the hierarchical order of items are presented within this chapter.

Wheelchair Mobility Item Results

Manual wheelchair use. Overall, 31 percent of individuals indicated that they use a manual wheelchair (Table 9.2). The percentage of individuals using a manual wheelchair differed across populations. Almost half of individuals who are frail elderly or have a physical disability, 46 and 44 percent, respectively, and one-third of individuals with a brain injury (31 percent) used a manual wheelchair. Individuals with an intellectual or developmental disability and individuals with serious mental illness were least likely to use a wheelchair—11 percent and 12 percent, respectively (Appendix D, Table D6).

Table 9.2. Descriptive Statistics for All Participants for Item 9. Manual Wheelchair Use

9. Manual Wheelchair Use	n	%
0. No	810	69.5
1. Yes	356	30.5
Total respondents	1,166	100

Manual wheels 50 feet with two turns. Overall, approximately one-third (34 percent) of individuals using manual wheelchairs, were independent in propelling 50 feet with two turns (Table 9.3). Individuals with serious mental illness were most likely to be independent (53 percent), followed by individuals with a physical disability (45 percent), those with a brain injury (33 percent), and individuals with an intellectual or developmental disability (28 percent). Individuals who are frail elderly were least likely to be independent on this activity (22 percent). Overall, 45 percent of individuals using a manual wheelchair were fully dependent in performing this activity. Intermediate response options, 02 through 05, were rarely used indicating that individuals either did the activity independently or the caregiver provided total assistance (Appendix D, Table D6.a.1).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 48.57, df_{20}, p = .0004) and most dependent (past month) (χ^2 = 50.24, df_{20}, p = .0002) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D6.b.1). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .95 to 1.00, indicating little variation in need for assistance with wheeling 50 feet between assessment periods (Appendix D, Table D6.c.1).

Table 9.3. Descriptive Statistics of Rating Scale Use for All Participants for Item 9a. Manual Wheels 50 Feet With Two Turns

9a. Manual Wheels 50 Feet With Two Turns	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	120	34.0	116	32.9
05. Setup or cleanup	2	0.6	2	0.6
04. Supervision/touching	10	2.8	10	2.8
03. Partial/moderate	12	3.4	13	3.7
02. Substantial/maximal	28	7.9	29	8.2
01. Dependent	158	44.8	167	47.3
Total scored respondents	330	93.5	337	95.5
07. Person refused	1	0.3	1	0.3
09. Not applicable	21	6.0	14	4.0
88. Not attempted	1	0.3	1	0.3
Total respondents	353	100	353	100

Manual wheels 150 feet. Overall, approximately one-quarter (24 percent) of individuals using a manual wheelchair were independent in propelling 150 feet (Table 9.4). Individuals with a physical disability were most likely to be independent (34 percent), followed by those with a brain injury (28 percent), individuals with serious mental illness (26 percent), and those with an intellectual or developmental disability (21 percent). Individuals who are frail elderly were least likely to be independent on this activity (13 percent). Overall, 54 percent of individuals using a manual wheelchair were fully dependent in performing this activity. Intermediate response options, 02 through 05, were rarely used, indicating that individuals either did the activity independently or the caregiver provided total assistance (Appendix D, Table D6.a.2).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 52.46, df_{20}, p = .0001) and most dependent (past month) (χ^2 = 51.87, df_{20}, p =

.0001) periods indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D6.b.2). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .98 to 1.00, indicating little variation in need for assistance with wheeling 150 feet between assessment periods (Appendix D, Table D6.c.2).

Table 9.4. Descriptive Statistics of Rating Scale Use for All Participants for Item 9b. Manual Wheels 150 Feet

9b. Manual/Wheels 150 Feet	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	85	24.2	83	23.6
05. Setup or cleanup	1	0.3	1	0.3
04. Supervision/touching	8	2.3	6	1.7
03. Partial/moderate	14	4.0	16	4.6
02. Substantial/maximal	26	7.4	29	8.2
01. Dependent	189	53.7	195	55.4
Total scored respondents	323	91.8	330	93.8
07. Person refused	1	0.3	1	0.3
09. Not applicable	27	7.7	20	5.7
88. Not attempted	1	0.3	1	0.3
Total respondents	352	100	352	100

Manual wheels 15 minutes. Overall, 13 percent of individuals using manual wheelchairs were independent in wheeling for 15 minutes without stopping (Table 9.5). Individuals with a physical disability were most likely to be independent (21 percent), followed by those with a brain injury (15 percent), individuals with an intellectual or developmental disability (10 percent), and those with serious mental illness or who are frail elderly (5 percent for both). Overall, 59 percent of individuals using a manual wheelchair were fully dependent in performing this activity. Intermediate response options, 02 through 05, were rarely used, indicating that individuals either did the activity independently or the caregiver provided total assistance (Appendix D, Table D6.a.3).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 54.01$, df_{20}, $p = .0001$) and most dependent (past month) ($\chi^2 = 52.67$, df_{20}, $p = .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D6.b.3). Rank-order correlations across populations were high,

with Kendall's tau-b (t_b) ranging from .95 to 1.00, indicating little variation in need for assistance with wheeling for 15 minutes between assessment periods (Appendix D, Table D6.c.3).

Table 9.5. Descriptive Statistics of Rating Scale Use for All Participants for Item 9c. Manual Wheels 15 Minutes

9c. Manual/Wheels 15 Minutes	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	45	12.7	42	11.8
05. Setup or cleanup	1	0.3	1	0.3
04. Supervision/touching	2	0.6	2	0.6
03. Partial/moderate	17	4.8	16	4.5
02. Substantial/maximal	18	5.1	22	6.2
01. Dependent	208	58.6	214	60.3
Total scored respondents	291	82.0	297	83.7
07. Person refused	0	0.0	0	0.0
09. Not applicable	62	17.5	57	16.1
88. Not attempted	2	0.6	1	0.3
Total respondents	355	100	355	100

Manual wheels across a street. Overall, only 8 percent of individuals using a manual wheelchair were independent in wheeling across the street before the light turns red (Table 9.6). Individuals with serious mental illness and those with a physical disability were most likely to be independent (15 percent), followed by those with an intellectual or developmental disability (10 percent) and individuals with a brain injury (3 percent). Individuals who are frail elderly were least likely to be independent on this activity (1 percent). Overall, 43 percent of individuals using a manual wheelchair were fully dependent in performing this activity. Intermediate response options, 02 through 05, were rarely used, indicating that individuals either do the activity independently or the caregiver provides total assistance. Notably, 42 percent of individuals indicated that this item was not applicable (Appendix D, Table D6.a.4).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 48.57$, df_{20}, $p = .0004$) and most dependent (past month) ($\chi^2 = 50.24$, df_{20}, $p = .0002$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D6.b.4). Rank-order correlations across populations were high,

with all Kendall's tau-b (t_b) correlations at 1.00, indicating no variation in need for assistance with wheeling across the street in a manual wheelchair (Appendix D, Table D6.c.4).

Table 9.6. Descriptive Statistics of Rating Scale Use for All Participants for Item 9d. Manual Wheels Across a Street

9d. Manual Wheels Across a Street	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	28	7.9	29	8.2
05. Setup or cleanup	0	0.0	0	0.0
04. Supervision/touching	2	0.6	2	0.6
03. Partial/moderate	4	1.1	4	1.1
02. Substantial/maximal	13	3.7	15	4.2
01. Dependent	152	42.8	155	43.7
Total scored respondents	199	56.1	205	57.8
07. Person refused	1	0.3	1	0.3
09. Not applicable	149	42.0	144	40.6
88. Not attempted	6	1.7	5	1.4
Total respondents	355	100	355	100

Motorized wheelchair/scooter use. Overall, a small number of individuals—19 percent—indicated that they use a motorized wheelchair/scooter (Table 9.7). The percentage of individuals using a motorized wheelchair differed across populations. Individuals with a physical disability were most likely to use a motorized wheelchair (40 percent), followed by those with a brain injury (20 percent) and individuals who are frail elderly (16 percent). Individuals with an intellectual or developmental disability and those with serious mental illness were least likely to use a motorized wheelchair (6 percent) (Appendix D, Table D7).

Table 9.7. Descriptive Statistics of Rating Scale Use for All Participants for Item 10. Motorized Wheelchair/Scooter Use

10. Motorized Wheelchair/ Scooter Use	n	%
0. No	942	80.9
1. Yes	222	19.1
Total respondents	1,164	100

Motorized wheels 50 feet with two turns. Overall, approximately two-thirds (78 percent) of individuals using motorized wheelchairs were independent in advancing 50 feet with two turns (Table 9.8). Individuals with a physical disability were mostly likely to be independent (83 percent), followed by those with a brain injury (76 percent), individuals with an intellectual or developmental disability (75 percent), and those who are frail elderly (69 percent). Individuals with serious mental illness were least likely to be independent on this item, although two-thirds indicated that they performed this activity independently (64 percent). Intermediate response options, 02 through 05, were rarely used. A small percentage of individuals were reported as fully dependent on this item, which may reflect a need to clarify coding because it is not clear in what way a caregiver provides total assistance in moving a motorized wheelchair (Appendix D, Table D7.a.1).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 32.58, df_{20}, p = .0375) and most dependent (past month) (χ^2 = 34.97, df_{20}, p = .0203) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D7.b.1). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .92 to 1.00, indicating little variation in need for assistance with advancing 50 feet with two turns between assessment periods (Appendix D, Table D7.c.1).

Table 9.8. Descriptive Statistics of Rating Scale Use for All Participants for Item 10a. Motorized Wheels 50 Feet With Two Turns

10a. Motorized Wheels 50 Feet With Two Turns	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	171	77.7	171	77.7
05. Setup or cleanup	2	0.9	2	0.9
04. Supervision/touching	7	3.2	11	5.0
03. Partial/moderate	4	1.8	3	1.4
02. Substantial/maximal	4	1.8	5	2.3
01. Dependent	14	6.4	15	6.8
Total scored respondents	202	91.8	207	94.1
07. Person refused	0	0.0	0	0.0
09. Not applicable	12	5.5	9	4.1
88. Not attempted	6	2.7	4	1.8
Total respondents	220	100	220	100

Motorized wheels 150 feet. Overall, approximately three-quarters (76 percent) of individuals using motorized wheelchairs or scooters were independent in advancing 150 feet (Table 9.9). Individuals with a physical disability were mostly likely to be independent (82 percent), followed by those with a brain injury (76 percent) and individuals with an intellectual or developmental disability (75 percent). Individuals who are frail elderly as well as those with serious mental illness were least likely to be independent on this activity. Although individuals who are frail elderly and those with serious mental illness were least likely to be independent on this activity, the majority of individuals in both populations were able to perform this task independently (64 percent). Intermediate response options, 02 through 05, rarely were used. A small percentage of individuals were reported as fully dependent on this item, which may reflect a need to clarify coding because it is not clear in what way a caregiver provides total assistance in moving a motorized wheelchair (Appendix D, Table D7.a.2).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 34.69, df_{20}, p = .0218) and most dependent (past month) (χ^2 = 36.80, df_{20}, p = .0124) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D7.b.2). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .98 to 1.00, indicating little variation between assessment periods in need for assistance with advancing a wheelchair 150 feet (Appendix D, Table D7.c.2).

Table 9.9. Descriptive Statistics of Rating Scale Use for All Participants for Item 10b. Motorized Wheels 150 Feet

10b. Motorized Wheels 150 Feet	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	168	76.0	169	76.5
05. Setup or cleanup	1	0.5	1	0.5
04. Supervision/touching	8	3.6	10	4.5
03. Partial/moderate	4	1.8	3	1.4
02. Substantial/maximal	4	1.8	4	1.8
01. Dependent	15	6.8	16	7.2
Total scored respondents	200	90.5	203	91.9
07. Person refused	0	0.0	0	0.0
09. Not applicable	14	6.3	13	5.9
88. Not attempted	7	3.2	5	2.3
Total respondents	221	100	221	100

Motorized wheels 15 minutes. Overall, 68 percent of individuals using motorized wheelchairs were independent in wheeling for 15 minutes without stopping (Table 9.10). Rates of independence for individuals with a physical disability, an intellectual or developmental disability, or a brain injury were similar (75, 75, and 76 percent, respectively). Individuals who are frail elderly and those with serious mental illness were less likely to be independent (48 and 46 percent, respectively). Intermediate response options, 02 through 05, rarely were used. A small percentage of individuals were reported as fully dependent on this item, which may reflect a need to clarify coding because it is not clear in what way a caregiver provides total assistance in moving a motorized wheelchair (Appendix D, Table D7.a.3).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 34.09$, df_{20}, $p = .0053$) and most dependent (past month) ($\chi^2 = 30.18$, df_{20}, $p = .0171$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D7.b.3). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) ranging from .91 to 1.00, indicating little variation between assessment periods in need for assistance with motorized wheeling for 15 minutes (Appendix D, Table D7.c.3).

Table 9.10. Descriptive Statistics of Rating Scale Use for All Participants for Item 10c. Motorized Wheels 15 Minutes

10c. Motorized Wheels 15 Minutes	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	151	68.3	149	67.4
05. Setup or cleanup	0	0.0	0	0.0
04. Supervision/touching	9	4.1	11	5.0
03. Partial/moderate	4	1.8	5	2.3
02. Substantial/maximal	3	1.4	4	1.8
01. Dependent	18	8.1	18	8.1
Total scored respondents	185	83.7	187	84.6
07. Person refused	0	0.0	0	0.0
09. Not applicable	29	13.1	29	13.1
88. Not attempted	7	3.2	5	2.3
Total respondents	221	100	221	100

Motorized wheels across a street. Overall, 43 percent of individuals using a motorized wheelchair were independent in wheeling across the street before the light turns red (Table 9.11). Individuals with an intellectual or developmental disability were mostly likely to be independent (63 percent), followed by those with serious mental illness (55 percent), individuals with a brain injury (48 percent), and those with a physical disability (47 percent). Individuals who are frail elderly were least likely to be independent on this activity (21 percent). Intermediate response options, 02 through 05, were rarely used. A small percentage of individuals were reported as fully dependent on this item, which may reflect a need to clarify coding because it is not clear in what way a caregiver provides total assistance in moving a motorized wheelchair. Of note is the high percentage of individuals who indicated that this activity was not applicable (38 percent) (Appendix D, Table D7.a.4).

Across populations, there were no significant differences in the distribution of codes for both usual (3-day) (χ^2 = 21.44, df_{20}, p = .3715) and most dependent (past month) (χ^2 = 17.85, df_{20}, p = .5973) periods, indicating that this item did not distinguish performance and needs across CB-LTSS populations (Appendix D, Table D7.b.4). Rank-order correlations across populations were high, with Kendall's tau-b (t_b) correlations ranging from .96 to 1.0, indicating no variation between assessment periods in need for assistance with motorized wheeling across the street (Appendix D, Table D7.c.4).

Table 9.11. Descriptive Statistics of Rating Scale Use for All Participants for Item 10d. Motorized Wheels Across a Street

10d. Motorized Wheels Across a Street	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	96	43.2	94	42.3
05. Setup or cleanup	2	0.9	2	0.9
04. Supervision/touching	9	4.1	10	4.5
03. Partial/moderate	4	1.8	4	1.8
02. Substantial/maximal	5	2.3	6	2.7
01. Dependent	15	6.8	15	6.8
Total scored respondents	131	59.0	131	59.0
07. Person refused	0	0.0	0	0.0
09. Not applicable	84	37.8	84	37.8
88. Not attempted	7	3.2	7	3.2
Total respondents	222	100	222	100

Rasch Analysis

Manual wheelchair use. In preliminary analyses, a comparison of the medians for each manual wheelchair mobility item across populations indicated that the majority of individuals who are frail elderly and the majority of individuals with an intellectual or developmental disability were dependent or needed substantial/maximal assistance (Appendix D, Table D6.d.1). Individuals with a physical disability, with a brain injury, or with serious mental illness scored more widely on the rating scale. A nonparametric comparison of medians (K-sample test) was valuable for manual wheelchair items because there was variation in medians and interquartile ranges for three of the five populations.

Rasch analysis indicated that the rating scale steps typically proceeded monotonically (i.e., in order from 01 to 06), with the exception of one rating scale step for wheels 150 feet. Sufficient variation in rating scale use across populations existed for this activity and indicated that the medians were different across populations. The hierarchical order of items (from easiest to hardest) was reasonable, with **wheels 50 feet with two turns** being the least challenging item and **wheels across a street** being the most challenging (Table 9.12, Figure 9.1). This finding was generally consistent with findings in other populations, although new items were tested for individuals in this study.[54] All items fit the measurement model and the principal component analysis (eigenvalue = 1.64, 8.9 percent variance explained by the first contrast) indicated that the manual wheelchair use items were sufficiently unidimensional. Differential item functioning (DIF) was detected for items **wheels 15 minutes** and **wheels across a street**; these items were more challenging for individuals who are frail elderly and less challenging for those with an intellectual or developmental disability relative to other groups.

The person separation reliability, an indication of measurement precision, was fair (.69); values above .90 are preferred. Almost one-fifth (18 percent) of individuals received a maximum score on these manual wheelchair items, whereas almost half (48 percent) received a minimum score on them. Many of those who received a minimum score were individuals who are frail elderly

[54] Gage B, Smith L, Ross J, et al. The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set. Vol 2. RTI Project Number 0209853.004, CMS Contract No. HHSM-500-2005-00291. Baltimore, MD: Centers for Medicare & Medicaid Services, Office of Clinical Standards and Quality; 2012.

and those with a physical disability, suggesting that they had greater need for assistance related to manual wheelchair use.

Motorized wheelchair use. In preliminary analyses, a comparison of the medians for each motorized wheelchair item across populations indicated that the majority of individuals who are frail elderly and those with a physical disability or an intellectual or developmental disability are independent (Appendix D, Table D7.d.1). Individuals with a brain injury or serious mental illness scored more widely on the rating scale. A nonparametric comparison of medians (K-sample test) was less meaningful for individuals who use a motorized wheelchair because there was less variation in medians and interquartile ranges for the populations.

Rasch analysis indicated that the rating scale steps proceeded monotonically (i.e., in order from 01 to 06) (Appendix E, Table E5). The hierarchical order of items (from easiest to hardest) was reasonable, **with wheels 50 feet with two turns** being the least challenging item and **wheels across a street** being the most challenging item (Table 9.13; Figure 9.2). Three items did not fit the measurement model but only wheels across street was too inconsistent (above 1.3 Infit mean square) (Table 9.13). The principal component analysis (eigenvalue = 1.78, 10.9 percent variance explained by the first contrast) indicated that **wheels across a street** may have represented a different dimension than the other items. However, for individuals receiving CB-LTSS, this item was important to assess because it indicated the ability to navigate within an individual's community. DIF was found for three items: **wheels for 15 minutes, wheels across a street,** and **wheels 150 feet. Wheels for 15 minutes** was more challenging for individuals with serious mental illness than for those in other populations. This item was easier for individuals with a brain injury relative to those in the other populations. Compared with those in other populations, **wheels 150 feet** and **wheels for 15 minutes** were less challenging and **wheels across street** was more challenging for individuals with a brain injury.

The person separation reliability, an indication of measurement precision, was fair (.79); values above .90 are preferred when using measures for individual decision-making. Almost three-quarters (74 percent) of individuals who reported on these items received a maximum score. Many of these individuals who received a maximum score were those with a physical disability, suggesting that they have fewer performance needs related to motorized wheelchair use.

Table 9.12. Item Calibrations and Fit Statistics for Manual Wheelchair Use in Difficulty Order

Item	Calibration	SE	Infit		Outfit		Point Biserial Correlation
			MnSq	Zstd	MnSq	Zstd	
Wheels Across a Street	1.16	.17	1.25	1.0	1.04	0.2	.84
Wheels for 15 Minutes	0.94	.12	0.95	–0.2	1.0	0.1	.85
Wheels 150 feet	–0.43	.09	0.72	–1.9	0.76	–1.2	.92
Wheels 50 feet with two turns	–1.67	.09	0.93	–0.4	8.06	6.1	.93

Abbreviations: MnSq, mean square; SE, standard error; Zstd, z-standardized.

The FASI team used Wright maps to ascertain the items' construct validity by checking how well the constructs were represented by empirical results. The left side of the Wright map shows individuals; the right side shows FASI items. The left side of the map shows the distribution of the measured level of functional ability of individuals from highest level of independence at the top to lowest level of independence at the bottom. The items on the right side of the map are distributed from the most difficult items at the top to the least difficult at the bottom. Looking at the results of these maps, the FASI team determined whether more difficult FASI items aligned with identifying the needs of more independent individuals. Figure 9.1 presents the Wright map results for manual wheelchair use items. These results indicate that manual wheelchair use items were aligned with individuals' needs.

Figure 9.1. Wright Map Analysis for Manual Wheelchair Use

```
Person Measures                                                Item Calibrations
  <more able> ---------------- Persons -+- Items   --------- <more challenging>
    3                       .##########  +                                  3
                                         |
                                         |
                                         |
                                         |
                                         |
                                         |
                                         |
    2                                    +                                  2
                                         |
                                      .  |
                                      . T|
                                      .  |
                                      .  |
                                         |
                                      #  | Manual Wheels Across a Street
    1                                    +                                  1
                                      .  |  Manual Wheels for 15 Minutes
                                      .  |
                                      .  |
                                      . S|
                                     .#  |
                                         |
                                     .#  |
    0                                   +M                                  0
                                      .  |
                                      .  |
                                      .  |  Manual Wheels 150 feet
                                      .  |
                                      .  |
                                     .# M|
                                      .  |
   -1                                 .  +                                 -1
                                     .#  |
                                      .  |
                                      .  |
                                         |
                                     .#  |  Manual Wheels 50 feet
                                         |
                                        S|
   -2                                 #  +                                 -2
                                      #  |
                                         |
                                      .  |
                                         |
                                         |
                                      .  |
                                     .#  |
   -3                                    +                                 -3
                                        T|
                                         |
                                         |
                                         |
                                         |
                                         |
                                         |
   -4      ###########################   +                                 -4
  <less able> -------------------- Persons -+- Items   ------- <less challenging>
  Person Measures                                                Item Calibrations
```

Table 9.13. Item Calibrations and Fit Statistics for Motorized Wheelchair/Scooter Use in Difficulty Order

Item	Calibration	SE	Infit		Outfit		Point Biserial Correlation
			MnSq	Zstd	MnSq	Zstd	
Wheels Across a Street	1.65	.21	1.79	2.4	1.88	2.5	.91
Wheels for 15 Minutes	–0.05	.19	1.09	0.4	0.81	–0.5	.93
Wheels 150 feet	–0.63	.20	0.36	–3.2	0.30	–1.9	.94
Wheels 50 feet with two turns	–0.97	.21	0.66	–1.3	0.46	–0.9	.93

Abbreviations: MnSq, mean square; SE, standard error; Zstd, z-standardized.

Figure 9.2 presents the Wright map results for motorized wheelchair/scooter use items. These results indicated that motorized wheelchair/scooter use items were aligned with individuals' needs.

Figure 9.2. Wright Map Showing Analysis for Motorized Wheelchair/Scooter Use

```
Person Measure                                          Item Calibrations
<more able> ---------------- Persons -+- Items   ------ <rmore challenging>
  4       .######################### T+                                  4
                                     |
                                     |
                                     |
                                     |
                                  .  |
                                     |
  3                                  +                                  3
                                     |
                                  #  |
                                     |
                                     |
                                    S|
                                  .  |
  2                                  +                                  2
                                     |
                                  .  |  Wheel Across A Street
                                     |
                                  .  |
                                  .  |
                                  .  |
  1                                  +                                  1
                                     |
                                  . M|
                                     |
                                  .  |
                                     |
                                  .  |
  0                                  +M Wheel 15 Minutes                 0
                                  .  |
                                  .  |
                                  .  |
                                     |  Wheel 150 Feet
                                  .  |
                                  . S|
 -1                                  +  Wheel 50 Feet                  -1
                                  .  |
                                     |
                                  .  |
                                     |
                                  .  |
                                     |
 -2                                  +                                 -2
                                     |
                                     |
                                    T|
                                     |
                                  .  |
                                     |
 -3                                  +                                 -3
                                     |
                                  .  |
                                     |
                                     |
                                     |
                                     |
 -4                               .##  +                                 -4
<less able> ---------------- Persons -+- Items   -------- <less challenging>
Person Measures                                          Item Calibrations
```

Interrater reliability. Interrater reliability was evaluated using Krippendorff's alpha, a reliability coefficient indicating consistency across raters. For most entities, there were too few observations of wheelchair mobility (due to skip patterns) to effectively calculate Krippendorff's alpha scores.

Wheelchair Mobility Priorities

In prior chapters of this document, the FASI team summarizes how respondents answered the FASI prompt regarding their top two functional mobility (bed mobility and transfers, ambulation, and wheelchair mobility) priorities for the following 6 months.

Assessor Feedback on Wheelchair Mobility Items

No concerns were reported by assessors on the Wheelchair Mobility section of the FASI.

Observations and Changes to the FASI Wheelchair Mobility Items

On the basis of these findings, the FASI team presented results and recommendations to the Technical Expert Panel (TEP) for changes to the FASI set. The following section outlines TEP feedback and the changes made to finalize the FASI.

Summary Wheelchair Mobility Testing

The overall reliability and validity results for the wheelchair mobility items generally were good to strong. Therefore, the FASI team did not make any recommendations to the TEP for changes to the wheelchair mobility items.

Content validity. There was good evidence for content validity, that is, the extent to which items cover the concept of interest. Items generally reflect the same underlying construct, and assessors generally reported that the content was appropriate.

Concurrent validity. Evidence for concurrent validity (the extent to which items distinguish among groups) was mixed:

- There was wider use of rating scale steps among individuals with a physical disability, a brain injury, or serious mental illness for manual wheelchair use.
- Individuals with a brain injury or serious mental illness scored more widely on the rating scale for motorized wheelchair use.

- There were significant differences across populations in use of rating scale steps (chi-square test) with the exception of motorized wheels across a street.

Structural validity. There was good evidence for structural validity, that is, extent to which the ordering of steps and items is logical:

- Ordering of items generally makes sense, and item fit and principal component analysis were within acceptable ranges (except **wheels 150 feet** and **crosses the street with a motorized wheelchair**).
- 61 individuals received the maximum score for manual wheelchair use.
- 152 individuals received maximum score for motorized wheelchair/scooter use.
- Measurement precision was fair (person separation reliability = .69 for manual wheelchair and .79 for motorized wheelchair)

Convergent validity. Evidence was strong for convergent validity, that is, the alignment of usual and most dependent scores. There were high correlations between usual (3-day) and most dependent (past month) scores for all items in the Wheelchair Mobility section.

Maintain items with limited score distribution. There was limited use of the range of codes to describe the level of assistance required for most of the items related to wheelchair mobility. Partial assistance is not typical for managing a wheelchair, especially a motorized wheelchair, so it was not surprising that most of the scores fell in the two categories of independent (code 06) or dependent (code 01). Given the importance of wheelchair mobility for those individuals for whom ambulation is not an option, these FASI items provided valuable assessment information.

Reference Period Decision

Despite the high level of agreement between usual (3 days) and most dependent (past month) reference periods, the TEP members felt strongly that leaving both reference periods in the FASI was critical to capturing the needs of individuals living in the community. Therefore, the FASI team maintained the most dependent (past month) reference period in the FASI set.

CHAPTER 10. INSTRUMENTAL ACTIVITIES OF DAILY LIVING ITEMS

Introduction

This chapter describes the results of field testing the FASI related to instrumental activities of daily living (IADLs). IADLs are activities that "support daily life within the home and community."[55] IADLs often require complex interactions with objects, other individuals, and the environment. IADLs are important for assessing individuals applying for or enrolled in community-based long-term services and supports (CB-LTSS) programs because they provide key information about activities with which the person needs assistance, relate to the type and amount of services needed, and inform development of the person's service plan. Understanding how much support a person needs with IADLs plays a key role in enabling individuals to actively participate in their community, maintain their home environment, and manage responsibilities such as health care and personal finances. Ensuring that a person has sufficient supports and services with IADLs is critical to community living; difficulty managing IADLs has been associated with lower levels of community integration and reduced sense of autonomy.[56]

Most CB-LTSS programs evaluate the supports that an individual needs to complete IADLs independently as a key factor in determining eligibility for services. In addition, support with IADLs is a major determinant in the continued need for services. Documenting the need for support and/or services with IADLs is an important aspect of individual service plan development.

Description of the Items

The full text for each of the items can be found in Appendix A. The IADL section of the FASI consists of 12 items related to meal preparation, housework, finances, phone use, medications, and shopping activities. The assessor gathers information for coding items in this section from multiple sources including discussion with, or observation of, the person applying for or receiving supports and services, his or her family and/or caregivers, and written records where necessary. There are no skip patterns in the IADL items; assessors code all items in this section.

---

[55] American Occupational Therapy Association. Occupational therapy practice framework: domain and process (3rd edition). American Journal of Occupational Therapy 2017;68:S1-S48.

[56] Gerber GJ, Gargaro J, McMackin S. Community integration and health-related quality-of-life following acquired brain injury for persons living at home. Brain Injury. 2016;30(13-14):1552-60.

The first two items consider the support a person needs to plan and prepare all aspects of simple meals. The item, **makes a light cold meal,** considers the support a person needs to prepare meals such as a bowl of cereal or sandwich and a cold drink. The item, **makes a light hot meal**, considers the support needed to heat soup or a prepared meal. During pilot testing, assessors commented on the difference in complexity of preparing meals that require use of equipment such as a stove or microwave and transporting hot liquid. As a result, the standardized item was redesigned into two items capturing differing levels of functional cognition and interaction with the home environment.

The **light daily housework** and **heavier periodic housework** items also reflect similar feedback regarding the need to capture differences in complexity. These items were modified to enhance the clarity of the items and better reflect different supports and services an individual may need to live safely at home. The two items differ in regularity, physical effort, and complexity, and they consider activities that are needed so that the person is not at risk of harm within his or her home.

The **light shopping** item reflects the amount of support an individual requires to locate, select, check out, and pay for up to five items.

The **telephone answering** and **placing a call** items align with the standardized items related to the support a person needs to communicate with others outside the home.

Three items consider the supports a person needs to manage medication under three different modes of administration: **oral, inhalant/mist,** and **injectable**. Each of these items considers the support that a person needs in preparing and taking the medication reliably and safely, as well as taking the medication on schedule and in the correct amounts.

The **simple and complex financial management** items capture the various supports a person may need to manage daily and longer-term financial activities.

Description of the Rating Scale

The IADL items are each scored using one of six numeric codes that best describes the individual's need for assistance with the task described.[57] For easy reference, the following is a summary of the rating scale and reference period, detailed in Chapter 6.

- Code 06: **Independent and requires no assistance with this task**
- Code 05: **Setup or cleanup assistance**
- Code 04: **Supervision or touching assistance**
- Code 03: **Partial/moderate assistance**
- Code 02: **Substantial maximal assistance**
- Code 01: **Dependent**

The following codes were used if the activity was not completed:

- Code 07: **The person refused**
- Code 09: **Not applicable**
- Code 88: **Not attempted**

Assessment Reference Period

Each of the IADL items is scored twice: once with regard to usual performance in the past 3 days and again to reflect the most dependent performance in the past month.

Analytic Objectives and Approach

The data analyses were designed to determine the validity and reliability of the FASI items and their effectiveness in capturing the needs of individuals in each of the CB-LTSS populations. Chapter 5, Data Preparation and Testing Approach, presents in detail the FASI Team's approach to testing all FASI items. For easy reference, a brief summary of the analytic methodology is included in Table 10.1 as well.

[57] These codes and definitions align with the standardized items in the Data Element Library (for self-care items and all other items in this report), but some modifications have been made to reflect the needs and perspective of individuals receiving CB-LTSS. For example, the FASI refers to *individuals,* whereas the Minimum Data Set (MDS) version of the item uses the term *resident* and the inpatient version uses the term *patient*.

Table 10.1. Summary of the Analytic Methodology Used to Test the FASI

Type of Validity or Reliability	Purpose	Test Used
Concurrent validity	To evaluate the use of the rating scale for each item within a given section (e.g., self-care) across populations for both the 3-day usual performance and the 30-day most dependent performance	Chi-square analyses
Concurrent validity	To examine the extent to which FASI items detected differences in needs across populations	K-sample equality of medians test to examine the difference in the median scores for each population
Convergent validity	To look at the relationship between 3-day (usual) and past month (most dependent) responses	Rank order association (Kendall's tau-b)
Structural validity	To examine the structure of the rating scale steps, the hierarchical order of items (from easiest to hardest), the extent to which the items represent the same self-care construct (unidimensionality), and whether the hierarchical order of the items differed across CB-LTSS populations (differential item functioning [DIF])	Rasch analysis
Interrater reliability	To evaluate how much homogeneity, or consensus, there was in the ratings given by assessors	Krippendorff's alpha

Abbreviations: CB-LTSS, community-based long-term services and supports; FASI, Functional Assessment Standardized Items.

Results

Tables presenting descriptive analyses of IADL items by population are found in Appendix D, (Section 8); tables for the total sample are presented in this chapter. Tables presenting Rasch analyses are presented in Appendix E (Table E6). Overall item calibrations, fit statistics, and a figure of the hierarchical order of items are presented within this chapter.

IADL Item Results

Makes a light cold meal. Overall, 51 percent of individuals were independent with this item (Table 10.2). Individuals with serious mental illness had the highest percentage of those who were independent (75 percent), whereas individuals who are frail elderly had the lowest (28 percent). About two-thirds of individuals with an intellectual or developmental disability or a brain injury were independent—66 and 57 percent, respectively. Less than half of individuals

with a physical disability were independent with this item (43 percent) (Appendix D, Table D8.a.1).

Overall, 30 percent of individuals were fully dependent with making a light cold meal; the highest percentages of individuals needing full assistance with this item were individuals who are frail elderly or with a physical disability—51 and 37 percent, respectively. Across populations, the highest percentages of individuals were scored as independent (code 06) or dependent (code 01), suggesting that individuals who were not independent with this item generally had someone else do this item for them. Individuals with a brain injury reported the highest percentage of this item being scored not applicable (code 09) (12 percent), most likely indicating that someone else in the home was primarily responsible for meals.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 175.35$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 169.20$, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D8.b.1). Rank-order correlations across populations were highly correlated with Kendall's tau-b (τ_b) ranging from .93 to .95, indicating that there was little variation in need for assistance with making a light cold meal between assessment periods (Appendix D, Table D8.c.1).

Table 10.2. Descriptive Statistics of Rating Scale Use for All Participants for Item 11a. Makes a Light Cold Meal

11a. Makes a Light Cold Meal	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	591	51.0	569	49.1
05. Setup or cleanup	56	4.8	55	4.8
04. Supervision/touching	24	2.1	20	1.7
03. Partial/moderate	39	3.4	44	3.8
02. Substantial/maximal	44	3.8	53	4.6
01. Dependent	343	29.6	358	30.9
Total scored respondents	1,097	94.7	1,099	94.8
07. Person refused	1	0.1	2	0.2
09. Not applicable	58	5.0	54	4.7
88. Not attempted	3	0.3	4	0.4
Total respondents	1,159	100	1,159	100

Makes a light hot meal. Overall, 38 percent of individuals were independent with making a hot meal (Table 10.3). Individuals with serious mental illness had the highest percentage who were independent (60 percent), whereas individuals who are frail elderly had the lowest (21 percent). Less than half of individuals with an intellectual or developmental disability, a brain injury, or a physical disability were independent—47, 44, and 34 percent, respectively (Appendix D, Table D8.a.2).

Overall, 38 percent of individuals were fully dependent with making a light hot meal; individuals who are frail elderly had the highest percentages of individuals needing full assistance with this item (60 percent). Almost half of individuals with a physical disability were dependent (46 percent), as were almost a quarter of individuals with an intellectual or developmental disability or a brain injury—27 and 26 percent, respectively. Across populations, the highest percentages of individuals were scored as independent (code 06) or dependent (code 01). Individuals with a brain injury or serious mental illness reported the highest percentage of 09 (not applicable)—13 percent and 9 percent, respectively—most likely indicating that someone else in the home was primarily responsible for meals.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2= 147.53, df_{20}, $p < .0001$) and most dependent (past month) (χ^2 = 149.32, df_{20}, p

<.0001) periods indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D8.b.2). Rank-order correlations across populations were highly correlated, with Kendall's tau-b (τ_b) ranging from .94 to .97, indicating little variation in need for assistance with making a light hot meal between assessment periods (Appendix D, Table D8.c.2).

Table 10.3. Descriptive Statistics of Rating Scale Use for All Participants for Item 11b. Makes a Light Hot Meal

11b. Makes a Light Hot Meal	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	447	38.4	422	36.3
05. Setup or cleanup	37	3.2	38	3.3
04. Supervision/touching	31	2.7	35	3.0
03. Partial/moderate	57	4.9	62	5.3
02. Substantial/maximal	73	6.3	80	6.9
01. Dependent	441	37.9	453	39.0
Total scored respondents	1,086	93.4	1,090	93.7
07. Person refused	1	0.1	2	0.2
09. Not applicable	71	6.1	66	5.7
88. Not attempted	5	0.4	5	0.4
Total respondents	1,163	100	1,163	100

Light daily housework. Overall, 34 percent of individuals were independent with this item (Table 10.4). Individuals with an intellectual or developmental disability or serious mental illness had the highest percentages who were independent—55 and 51 percent, respectively—whereas individuals who are frail elderly had the lowest (12 percent). Less than half of individuals with a brain injury were independent (41 percent), and about one-quarter of individuals with a physical disability were independent (23 percent) (Appendix D, Table D8.a.3).

Overall, 36 percent of individuals were fully dependent with light daily housework. The highest percentages of individuals needing full assistance with this item were individuals who are frail elderly or have a physical disability—63 percent and 48 percent, respectively. About one-quarter of individuals with a brain injury were dependent with making a light hot meal (26 percent). The lowest percentage of individuals dependent with making a light hot meal were those with an intellectual or developmental disability and those with serious mental illness—10

percent and 17 percent, respectively. Individuals who are frail elderly (8 percent) and those with a physical disability (8 percent) or a brain injury (14 percent) reported the highest percentages of this item being scored not applicable (code 09), most likely indicating that someone else in the home was primarily responsible for light daily housework.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 319.66, df_{20}, $p < .0001$) and most dependent (past month) (χ^2 = 331.89, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D8.b.3). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .94 to .98, indicating little variation in need for assistance with light daily housework between assessment periods (Appendix D, Table D8.c.3).

Table 10.4. Descriptive Statistics of Rating Scale Use for All Participants for Item 11c. Light Daily Housework

11c. Light Daily Housework	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	390	33.7	370	32.0
05. Setup or cleanup	25	2.2	24	2.1
04. Supervision/touching	53	4.6	56	4.8
03. Partial/moderate	73	6.3	74	6.4
02. Substantial/maximal	112	9.7	114	9.9
01. Dependent	414	35.8	433	37.5
Total scored respondents	1,067	92.3	1,071	92.7
07. Person refused	4	0.4	4	0.4
09. Not applicable	83	7.2	75	6.5
88. Not attempted	2	0.2	6	0.5
Total respondents	1,156	100	1,156	100

Heavier periodic housework. Overall, 14 percent of individuals were independent with this item (Table 10.5). Individuals with an intellectual or developmental disability had the highest percentage who were independent (34 percent). Individuals who are frail elderly and those with a physical disability had the lowest at 2 and 4 percent, respectively. About one-fifth of individuals with a brain injury (22 percent) and 16 percent of those with serious mental illness were independent with heavier periodic housework (Appendix D, Table D8.a.4).

Overall, more than half of individuals were fully dependent with this item (52 percent); individuals who are frail elderly and those with a physical disability had the highest percentages of individuals needing full assistance with heavier periodic housework (79 and 71 percent, respectively). Of note, individuals with an intellectual or developmental disability, a brain injury, or serious mental illness all reported significant percentages needing partial/moderate (code 03) and substantial/maximal assistance (code 02), indicating that individuals attempted to do these activities with assistance rather than choosing to have someone else be responsible for doing them. Individuals who are frail elderly (11 percent), individuals with a physical disability (10 percent), and individuals with a brain injury (20 percent) reported the highest percentages of this item being coded not applicable (code 09), most likely indicating that someone else in the home was primarily responsible for heavier periodic housework.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 390.95$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 399.56$, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D8.b.4). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .95 to .99, indicating little variation in need for assistance with heavier periodic housework between assessment periods (Appendix D, Table D8.c.4).

Table 10.5. Descriptive Statistics of Rating Scale Use for All Participants for Item 11d. Heavier Periodic Housework

11d. Heavier Periodic Housework	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	163	14.0	147	12.7
05. Setup or cleanup	14	1.2	18	1.6
04. Supervision/touching	25	2.2	24	2.1
03. Partial/moderate	74	6.4	76	6.5
02. Substantial/maximal	162	13.9	166	14.3
01. Dependent	603	51.9	616	53.0
Total scored respondents	1,041	89.6	1,047	90.1
07. Person refused	1	0.1	2	0.2
09. Not applicable	163	14.0	147	12.7
88. Not attempted	14	1.2	18	1.6
Total respondents	25	2.2	24	2.1

Light shopping. Overall, about one-third (30 percent) of individuals were independent with this item (Table 10.6). Individuals with serious mental illness and those with an intellectual or developmental disability had the highest percentages who were independent—44 and 45 percent, respectively. Individuals who are frail elderly had the lowest at 8 percent. About one-quarter of individuals with a physical disability (26 percent) and two-fifths of individuals with a brain injury (39 percent) were independent (Appendix D, Table D8.a.5).

Overall, 31 percent of individuals were fully dependent with this item; the highest percentages of individuals needing full assistance with light shopping are individuals who are frail elderly or have a physical disability, at 57 and 37 percent, respectively, followed by individuals with a brain injury (20 percent).

Across all five populations, individuals reported significant percentages needing partial/moderate (code 03) and substantial/maximal (code 02) assistance with light shopping, indicating that many individuals attempted to do these activities with assistance rather than choosing to have someone else be responsible for doing them. Individuals who are frail elderly (14 percent) or have a physical disability (13 percent) reported the highest percentages of this item being coded not applicable (code 09), most likely indicating that someone else in the home was primarily responsible for light shopping or that the individual shops mostly online.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 234.01, df_{20}, p < .0001) and most dependent (past month) (χ^2 = 242.72, df_{20}, p < .0001) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D8.b.5). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .95 to .97, indicating little variation in need for assistance with light shopping between assessment periods (Appendix D, Table D8.c.5).

Table 10.6. Descriptive Statistics of Rating Scale Use for All Participants for Item 11e. Light Shopping

11e. Light Shopping	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	347	29.9	334	28.8
05. Setup or cleanup	25	2.2	24	2.1
04. Supervision/touching	82	7.1	83	7.2
03. Partial/moderate	99	8.5	110	9.5
02. Substantial/maximal	142	12.3	151	13.0
01. Dependent	355	30.6	368	31.8
Total scored respondents	1,050	90.6	1,070	92.3
07. Person refused	1	0.1	1	0.1
09. Not applicable	107	9.2	87	7.5
88. Not attempted	1	0.1	1	0.1
Total respondents	1,159	100	1,159	100

Telephone–answering call. Overall, about three-quarters of individuals (74 percent) were independent with answering the telephone (Table 10.7). Individuals with serious mental illness had the highest percentage of individuals who were independent (91 percent), whereas individuals who are frail elderly had the lowest (60 percent). Three-quarters of individuals with a physical disability, an intellectual or developmental disability, or a brain injury were independent—75, 74, and 76 percent, respectively (Appendix D, Table D8.a.6).

Overall, 9 percent of individuals were fully dependent with answering the telephone, with the highest percentages being reported for individuals who are frail elderly (16 percent) and those with a physical disability (11 percent), an intellectual or developmental disability (7 percent), or a brain injury (6 percent). With the exception of individuals with serious mental illness (2

percent), 8–16 percent of individuals were coded not applicable (code 09), suggesting that these individuals may have used alternative modes for communicating with others.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 85.35$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 83.50$, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D8.b.6). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .86 to .97, indicating little variation in need for assistance with answering the telephone between assessment periods (Appendix D, Table D8.c.6).

Table 10.7. Descriptive Statistics of Rating Scale Use for All Participants for Item 11f. Telephone–Answering Call

11f. Telephone–Answering Call	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	861	73.8	846	72.5
05. Setup or cleanup	34	2.9	34	2.9
04. Supervision/touching	22	1.9	28	2.4
03. Partial/moderate	19	1.6	19	1.6
02. Substantial/maximal	17	1.5	18	1.5
01. Dependent	110	9.4	120	10.3
Total scored respondents	1,063	91.1	1,065	91.3
07. Person refused	2	0.2	2	0.2
09. Not applicable	100	8.6	97	8.3
88. Not attempted	2	0.2	3	0.3
Total respondents	1,167	100	1,167	100

Telephone–placing call. Overall, about two-thirds of individuals (68 percent) were independent with placing calls using a telephone (Table 10.8). Individuals with serious mental illness had the highest percentage of individuals who were independent (89 percent), whereas individuals who are frail elderly had the lowest (49 percent). Slightly less than three-quarters of individuals with a physical disability, an intellectual or developmental disability, or a brain injury were independent—72, 70, and 73 percent, respectively (Appendix D, Table D8.a.7).

Overall, only 13 percent of individuals were fully dependent with answering the telephone, with the highest percentages being reported for individuals who are frail elderly (24 percent), and those with a physical disability (14 percent), an intellectual or developmental disability (9

percent), or a brain injury (6 percent). With the exception of individuals with serious mental illness (3 percent), 9–14 percent of individuals were coded not applicable (code 09), suggesting that these individuals may have used alternative modes for communicating with others.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 99.98, df_{20}, $p < .0001$) and most dependent (past month) (χ^2 = 101.19, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D8.b.7). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .93 to .99, indicating little variation in need for assistance with placing a telephone call between assessment periods (Appendix D, Table D8.c.7).

Table 10.8. Descriptive Statistics of Rating Scale Use for All Participants for Item 11g. Telephone-Placing Call

11g. Telephone–Placing Call	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	798	68.4	789	67.7
05. Setup or cleanup	43	3.7	46	4.0
04. Supervision/touching	27	2.3	31	2.7
03. Partial/moderate	25	2.1	26	2.2
02. Substantial/maximal	23	2.0	24	2.1
01. Dependent	147	12.6	148	12.7
Total scored respondents	1,063	91.2	1,064	91.3
07. Person refused	2	0.2	2	0.2
09. Not applicable	99	8.5	96	8.2
88. Not attempted	2	0.2	4	0.3
Total respondents	1,166	100	1,166	100

Medication management–oral medications. Overall, one-quarter of individuals (25 percent) were independent with this item (Table 10.9). Individuals with a physical disability had the highest percentage who were independent (37 percent). About one-fifth of individuals in the other four populations were independent with managing oral medications: individuals who are frail elderly (19 percent) and individuals with an intellectual or developmental disability (23 percent), a brain injury (21 percent), or serious mental illness (19 percent) (Appendix D, Table D8.a.8).

Overall, about one-third (28 percent) of individuals were fully dependent with managing oral medications; individuals with a brain injury had the highest percentages of individuals needing full assistance with this item (41 percent), and those with serious mental illness had the lowest percentage (15 percent). About two-thirds of individuals who are frail elderly or have a physical disability were dependent managing oral medications; about one-fifth of individuals with an intellectual or developmental disability needed this level of assistance (29 percent).

In contrast to other items in this domain—in which the highest percentages of individuals were coded independent (code 06) or dependent (code 01)— individuals used a wider range of supports for managing oral medications and frequently coded setup or cleanup assistance (code 05) or supervision (code 04). Individuals with serious mental illness and individuals with an intellectual or developmental disability also were commonly coded substantial/maximal assistance (code 02). Also, in contrast to other items in this domain, with the exception of individuals with an intellectual or developmental disability, response rates were consistently high across populations (more than 97 percent), suggesting that most individuals in CB-LTSS populations use oral medications. Of note, 12 percent of individuals with an intellectual or developmental disability coded this item as not applicable (code 09), suggesting that they do not use oral medications.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 133.67$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 138.67$, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D8.b.8). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .96 to .99, indicating little variation in need for assistance with managing oral medications between assessment periods (Appendix D, Table D8.c.8).

Table 10.9. Descriptive Statistics of Rating Scale Use for All Participants for Item 11h. Medication Management–Oral Medications

11h. Medication Management–Oral Medications	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	290	24.9	273	23.4
05. Setup or cleanup	210	18.0	214	18.4
04. Supervision/touching	119	10.2	125	10.7
03. Partial/moderate	51	4.4	55	4.7
02. Substantial/maximal	123	10.6	125	10.7
01. Dependent	326	28.0	327	28.0
Total scored respondents	1,119	96.0	1,119	96.0
07. Person refused	2	0.2	2	0.2
09. Not applicable	45	3.9	44	3.8
88. Not attempted	0	0.0	1	0.1
Total respondents	1,166	100	1166	100

Medication management–inhalant/mist medications. Overall, only 30 percent of individuals (n = 345) indicated using inhalant mist medications (Table 10.10). Of these 345 individuals, the highest percentages were individuals with serious mental illness (41 percent), individuals who are frail elderly (34 percent), and those with a physical disability (33 percent). About 20 percent of individuals with an intellectual or developmental disability or a brain injury reported using inhalant/mist medications (Appendix D, Table D8.a.9).

Overall, 15 percent of individuals were independent with this task. Individuals with serious mental illness had the highest percentage who were independent (27 percent). Across the other four populations, 7–17 percent of individuals reported being independent.

Overall, only 6 percent of individuals were fully dependent with managing inhalant/mist medications; the highest percentages of individuals needing full assistance with this item were individuals who are frail elderly or have a physical disability, with 9 and 8 percent, respectively. Across the other three populations, 3–4 percent of individuals reported being dependent with this task.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 40.02, df_{20}, p = .0050) and most dependent (past month) (χ^2 = 40.52, df_{20}, p = .0043) periods, indicating that this item distinguished performance and needs across CB-LTSS

populations (Appendix D, Table D8.b.9). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .94 to 1.00, indicating little variation in need for assistance with managing inhalant/mist medications between assessment periods (Appendix D, Table D8.c.9).

Table 10.10. Descriptive Statistics of Rating Scale Use for All Participants for Item 11i. Medication Management–Inhalant/Mist Medications

11i. Medication Management–Inhalant/Mist Medication	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	170	14.6	173	14.8
05. Setup or cleanup	41	3.5	40	3.4
04. Supervision/touching	29	2.5	33	2.8
03. Partial/moderate	16	1.4	16	1.4
02. Substantial/maximal	18	1.5	18	1.5
01. Dependent	71	6.1	71	6.1
Total scored respondents	345	29.6	351	30.1
07. Person refused	3	0.3	4	0.3
09. Not applicable	818	70.2	811	69.6
88. Not attempted	0	0.0	0	0.0
Total respondents	1,166	100	1,166	100

Medication management–injectable medications. Overall, only 19 percent of individuals (n = 226) indicated using injectable medications (Table 10.11). Of these individuals, the highest percentages were individuals with serious mental illness (29 percent) and those with a physical disability (27 percent). Less than 20 percent of individuals with an intellectual or developmental disability or a brain injury and those who are frail elderly reported using injectable medications (9, 14, and 17 percent, respectively) (Appendix D, Table D8.a.10).

Overall, 6 percent of individuals were independent with this activity. Individuals with serious mental illness and individuals with a physical disability had the highest percentages who were independent at 11 and 10 percent, respectively. Only 2–3 percent of individuals who are frail elderly and those with a brain injury or an intellectual or developmental disability were independent with managing injectable medications.

Overall, about 7 percent of individuals were fully dependent with this item; individuals with a physical disability had the highest percentages (11 percent). For individuals who are frail

elderly and individuals with a brain injury, 8 percent were dependent. Among individuals with serious mental illness, 10 percent were dependent or needed substantial assistance with injectable medications. For the other populations, only 1.4% scored a 02 (substantial/maximal dependent). For individuals with SMI, over 4% received this score. In order to accurately reflect their need for assistance, those scores were combined for the SMI population.

Across populations, there were no significant differences in the distribution of codes for both usual (3-day) (χ^2 = 25.26, df_{20}, p = .1915) and most dependent (past month) (χ^2 = 24.95, df_{20}, p = .2035) periods, indicating that responses were similar on this item across CB-LTSS populations (Appendix D, Table D8.b.10). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .94 to 1.00, indicating little variation in need for assistance with managing injectable medications between assessment periods (Appendix D, Table D8.c.10).

Table 10.11. Descriptive Statistics of Rating Scale Use for All Participants for Item 11j. Medication Management–Injectable Medications

11j. Medication Management–Injectable Medication	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	70	6.0	69	5.9
05. Setup or cleanup	22	1.9	21	1.8
04. Supervision/touching	19	1.6	19	1.6
03. Partial/moderate	16	1.4	16	1.4
02. Substantial/maximal	15	1.3	16	1.4
01. Dependent	84	7.2	88	7.6
Total scored respondents	226	19.4	229	19.7
07. Person refused	1	0.1	3	0.3
09. Not applicable	937	80.5	932	80.1
88. Not attempted	0	0.0	0	0.0
Total respondents	1,164	100	1,164	100

Simple financial management. Overall, 42 percent of individuals were independent with this item (Table 10.12). Individuals with serious mental illness had the highest percentage who were independent (64 percent). Over half of individuals with a physical disability (53 percent), over one-third of individuals with a brain injury (39 percent), one-third of those with an

intellectual or developmental disability (33 percent), and a quarter of those who are frail elderly (25 percent) were independent on this item (Appendix D, Table D8.a.11).

Overall, less than one-third of individuals (29 percent) were fully dependent with simple financial management; individuals who are frail elderly had the highest percentage of individuals needing full assistance with this item (44 percent). Individuals with serious mental illness had the lowest percentage of individuals needing full assistance with this item (13 percent). About one-quarter to one-third of individuals with a physical disability, an intellectual or developmental disability, or a brain injury were dependent with this task—26, 26, and 31 percent, respectively. Individuals who are frail elderly (11 percent) and those with a brain injury (12 percent) reported the highest percentages of this item being coded not applicable (code 09), most likely indicating that someone else in the home was primarily responsible for simple financial tasks or the individual manages most financial tasks online.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 143.37$, df_{20}, $p < .0001$) and most dependent (past month) ($\chi^2 = 149.97$, df_{20}, $p < .0001$) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D8.b.11). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .97 to .99, indicating little variation in need for assistance with simple financial management between assessment periods (Appendix D, Table D8.c.11).

Table 10.12. Descriptive Statistics of Rating Scale Use for All Participants for Item 11k. Simple Financial Management

11k. Simple Financial Management	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	483	41.6	471	40.6
05. Setup or cleanup	22	1.9	26	2.2
04. Supervision/touching	61	5.3	66	5.7
03. Partial/moderate	76	6.6	80	6.9
02. Substantial/maximal	94	8.1	94	8.1
01. Dependent	337	29.0	342	29.5
Total scored respondents	1,073	92.4	1,079	92.9
07. Person refused	2	0.2	2	0.2
09. Not applicable	84	7.2	79	6.8
88. Not attempted	2	0.2	1	0.1
Total respondents	1,161	100	1,161	100

Complex financial management. Overall, 25 percent of individuals were independent with this item (Table 10.13). Individuals with a physical disability or with serious mental illness had the highest percentages who were independent—42 and 36 percent, respectively. Individuals with an intellectual or developmental disability had the lowest percentage who were independent (9 percent). About one-fifth of individuals with a brain injury (20 percent) and individuals who are frail elderly (19 percent) were independent on this item (Appendix D, Table D8.a.12).

Overall, just under half of individuals were fully dependent on this item (46 percent). Individuals with an intellectual or developmental disability had the highest percentage of individuals needing full assistance on this item (57 percent). For individuals who are frail elderly and individuals with a brain injury, almost half—53 and 51 percent, respectively—were dependent with complex financial management. About one-third of individuals with a physical disability (34 percent) or with serious mental illness (32 percent) needed full assistance with this item. Individuals who are frail elderly (12 percent) and those with a physical disability (10 percent) or a brain injury (14 percent) reported the highest percentages of this item being coded not applicable (code 09), most likely indicating that someone else in the home was primarily responsible for complex financial tasks.

Across populations, there were significant differences in the distribution of codes for both usual (3-day) (χ^2 = 145.87, df_{20}, p < .0001) and most dependent (past month) (χ^2 = 155.92, df_{20}, p < .0001) periods, indicating that this item distinguished performance and needs across CB-LTSS populations (Appendix D, Table D8.b.12). Rank-order correlations across populations were high, with Kendall's tau-b (τ_b) ranging from .96 to .99, indicating little variation in need for assistance with complex financial management between assessment periods (Appendix D, Table D8.c.12).

Table 10.13. Descriptive Statistics of Rating Scale Use for All Participants for Item 11l. Complex Financial Management

11l. Complex Financial Management	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	295	25.3	282	24.2
05. Setup or cleanup	11	0.9	16	1.4
04. Supervision/touching	32	2.7	35	3.0
03. Partial/moderate	69	5.9	71	6.1
02. Substantial/maximal	121	10.4	121	10.4
01. Dependent	532	45.6	539	46.2
Total scored respondents	1,060	90.9	1,064	91.3
07. Person refused	3	0.3	3	0.3
09. Not applicable	102	8.8	99	8.5
88. Not attempted	1	0.1	0	0.0
Total respondents	1,166	100	1,166	100

Rasch analysis. Rasch analysis indicated that the rating scale steps generally proceeded monotonically (i.e., in order from 01 to 06) with exceptions for one rating scale step in four of the items (**complex financial management, medication management–injectable medication, makes a light cold meal,** and **telephone–placing phone call**) and two steps in two of the items (**heavier periodic housework** and **light daily housework**). In preliminary analyses, comparisons of the medians for each IADL item, across populations, indicated that the majority of individuals with serious mental illness, a brain injury, or an intellectual or developmental disability were independent or needed only setup/cleanup assistance (see Appendix D, Table D8.d.1). A nonparametric comparison of medians (K-sample test) indicated medians and interquartile ranges varied across the five populations. In addition, sufficient variation in rating scale use

across populations existed for all items, except **makes light cold meal** and **telephone (answering and placing calls),** indicating that the medians were different across populations.

The hierarchical order of items (from easiest to hardest) was reasonable, with answering the phone being the least challenging item and heavier periodic housework being the most challenging (Table 10.14, Figure 10.1). This finding is generally consistent with findings in other populations.[58,59,60] All but one item fit the measurement model, and the principal component analysis (eigenvalue = 2.6, 9.0 percent variance explained by the first contrast) indicates that the IADL items are sufficiently unidimensional. **Heavier periodic housework** showed differential item functioning (DIF) for individuals with a brain injury (DIF size = .87 logits, $p < .001$) and those with an intellectual or developmental disability (DIF size = –.46 logits, $p < .001$), indicating that this item was easier for individuals with an intellectual or developmental disability and more challenging for those with a brain injury. **Complex financial management** showed DIF for individuals with an intellectual or developmental disability (DIF size = .57 logits, $p < .001$).

The person separation reliability, an indication of measurement precision, was good (.79) although values above .90 are preferred when making individual-level decisions. The distribution of response was slightly skewed, which may have contributed to the lower person separation reliability. Using Wright's sample independent method for strata,[61] it was determined that the IADL items can distinguish four levels of functional ability, which equates to a person separation reliability coefficient of .94.[62]

---

[58] Coster WJ, Haley SM, Andres PL, et al. Refining the conceptual basis for rehabilitation outcome measurement: personal care and instrumental activities domain. Medical Care. 2004;42(1 Suppl):I62-72.

[59] Fortinsky RH, Garcia RI, Sheehan J, et al. Measuring disability in Medicare home care patients: application of Rasch modeling to the outcome and assessment information set. Medical Care. 2003;41(5):601-15.

[60] Gage B, Constantine R, Aggarwal J, et al. The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set. Vol 1. RTI Project Number 0209853.004, CMS Contract No. HHSM-500-2005-00291. Baltimore, MD: Centers for Medicare & Medicaid Services, Office of Clinical Standards and Quality; 2012.

[61] Wright BD. Separation, reliability and skewed distributions: statistically different sample-independent levels of performance. Rasch Measurement Transactions. 2001;14(4):786.

[62] Fisher W. Reliability, separation, strata statistics. Rasch Measurement Transactions. 1992;6(3):238.

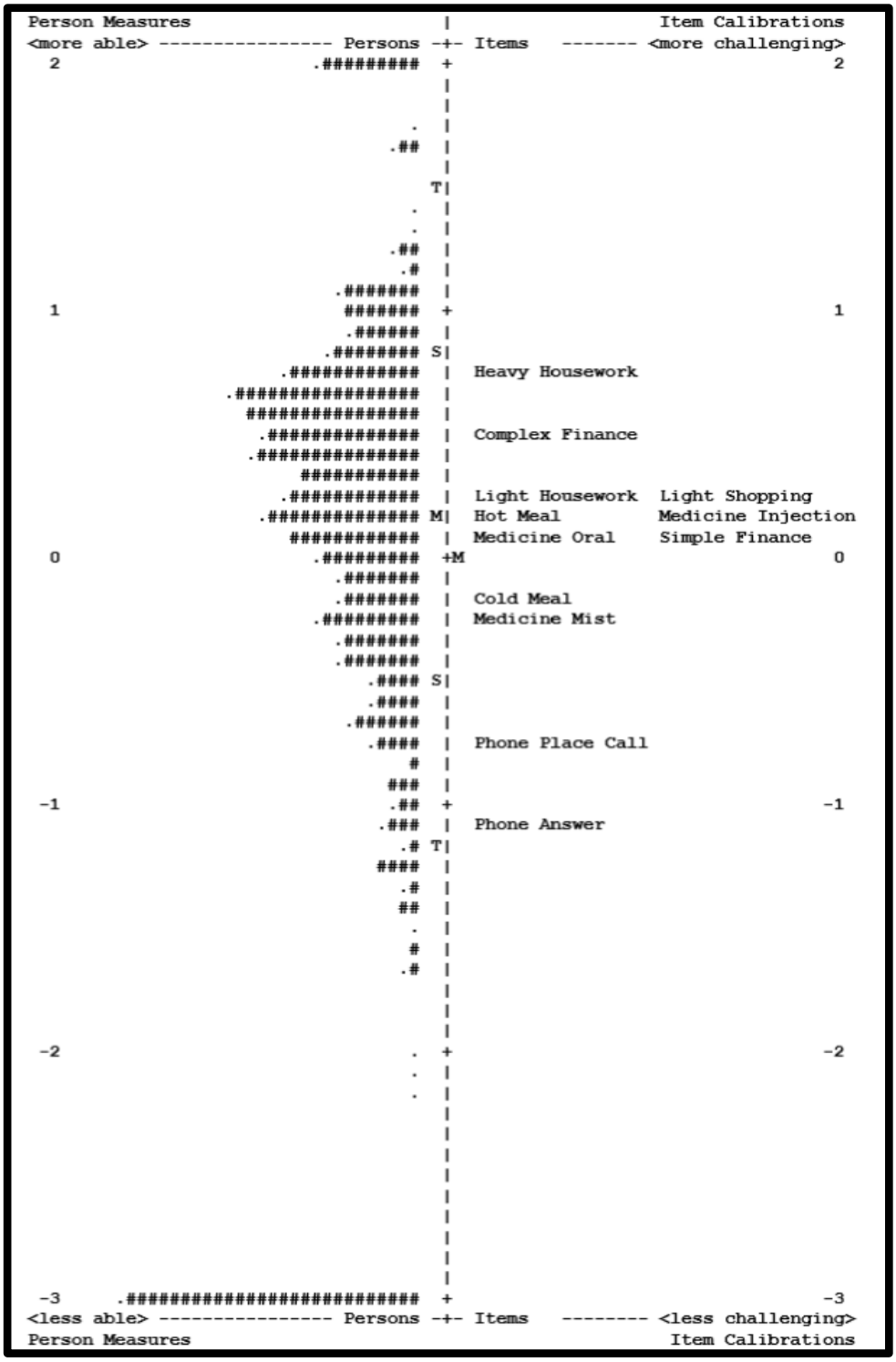
Table 10.14. Item Calibrations and Fit Statistics for Instrumental Activities of Daily Living in Difficulty Order

Item	Calibration	SE	Infit		Outfit		Point Biserial Correlation
			MnSq	Zstd	MnSq	Zstd	
Heavy housework	.78	.02	1.17	3.2	1.09	1.0	.52
Complex finance	.02	.51	7.6	1.4	4.6	1.4	.54
Light shopping	.02	.26	–5.6	0.8	–0.70	1.0	.67
Light housework	.02	.24	1.6	1.1	1.0	1.1	.64
Medicine injection	.18	.04	1.19	1.9	1.23	1.4	.61

Abbreviations: MnSq, mean square; SE, standard error; Zstd, z-standardized.

The FASI team used Wright maps to ascertain the items' construct validity by checking how well the constructs were represented by empirical results. The left side of the Wright map shows individuals; the right side shows FASI items. The left side of the map shows the distribution of the measured level of functional ability of individuals from highest level of independence at the top to lowest level of independence at the bottom. The items on the right side of the map are distributed from the most difficult items at the top to the least difficult at the bottom. Looking at the results of these maps, the FASI team determined whether more difficult FASI items aligned with identifying the needs of more independent individuals. Figure 10.1 presents the Wright map results for IADL items. These results indicated that IADL items were aligned with individuals' needs.

Figure 10.1. Wright Map Showing Instrumental Activities of Daily Living



Interrater reliability. Interrater reliabilities (IRRs) are reported for each IADL item by entity (13 entities). See Appendix E, Table E15.a.5. For entity 7, there were two subsets of raters and items, so separate IRR coefficients are reported (entity 7A and entity 7B). Entity 4 was small, and only one individual was submitted to the IRR data set. Across all IADL items (n = 12) and entities (n = 13), there were 21 instances in which IRR coefficients were below .67. Twelve of these instances occurred in the same two entities (entity 5 and entity 12). Four instances occurred for the same item, **simple financial management.** There were 15 instances of tentative evidence for IRR. Three instances occurred for **light daily housework** and three for **medication management–oral medications**. Three instances occurred in the same entities (entity 8 and entity 9). The remaining 120 coefficients were all above .80, indicating strong evidence of IRR for the IADL items. Items were considered to have achieved good IRR if 11 of the 13 entities achieved coefficients above .80. Using these criteria, the items demonstrating good IRR were **makes light cold meal** and **complex financial management.** There were too few individuals assessed as part of the IRR testing who used inhalant medications or injectable medications to draw conclusions for these items. Overall, three entities accounted for almost three-quarters of the low IRRs. Without these three entities, only **medication management–oral medications** did not meet the criteria for acceptable IRR.

Assessor Feedback on IADL Items

Assessors provided feedback on (1) the lack of items addressing cognitive, behavioral, and social issues, (2) the need for item updates related to mode of bill paying, and (3) concerns about the accuracy of the self-report.

Lack of items addressing cognitive, behavioral, and social issues. Assessors commented on the lack of IADL items that capture the cognitive and social issues limiting functional independence in CB-LTSS populations, particularly for individuals with a brain injury and individuals who are frail elderly. One assessor suggested that the FASI set include an item specific to making an appointment. Another assessor suggested adding the clock drawing test as part of the FASI. Several assessors commented on the absence of items that assess executive functions and the related functional skills of short-term goal setting, structuring time, and developing friendships and social networks.

Needed item updates. Assessors suggested changes to the financial management Items 11k and 11l (**simple** and **complex financial management**) to reflect the routine use of online banking and autopay rather than written checks to pay bills.

Accuracy of person self-report. Several assessors reported particular difficulty in determining whether a person's self-report of need for assistance with IADLs was accurate when cognitive deficits were present and a support person was not available for the assessment.

IADL Priorities

At the conclusion of the IADL section, assessors asked individuals to indicate their top two priorities for the next 2 months in the area of IADL. After reviewing the entire data set, the FASI team established codes by which to categorize the individual's responses:

1. The individual indicated a priority to improve independence in IADLs in an activity addressed by the IADL set.
2. The individual indicated a priority to maintain independence in IADL in an activity addressed by the IADL set.
3. The individual indicated a priority that was not addressed by the IADL set.
4. The individual did not indicate a priority or did not respond.

This coding approach allowed the FASI team to determine (1) how well the IADL set in the FASI represented activities that individuals being assessed deemed priorities and (2) whether it had potential for identifying areas of importance to individuals served by the CB-LTSS programs that are not captured by the items or set. Two members of the FASI team completed the coding. Both team members conducted confirmation of data fit by sampling all data until consensus was reached. Frequencies and percentage of coded responses subsequently were summarized for all respondents as well as by population.

For IADLs, 55.1 percent (n = 588) of individuals identified at least one priority and 22.5 percent (n = 263) indicated a second priority in IADL. For the first priority noted, 21.3 percent (n = 248) indicated a priority to improve an IADL related to a FASI, 6.9 percent (n = 81) indicated a priority to maintain independence in an IADL activity related to an item in the FASI IADL set, and 22.2 percent (n = 259) indicated a priority that was not related to any of the items in the FASI IADL set. Responses in this last category were broad, but some common themes included (1) to be employed, (2) to have access to additional financial resources, and (3) to engage in more health and wellness activities.

A number of responses could not be interpreted without follow-up questions with the individual; these were coded as unrelated to the IADL domain. Examples include comments

such as a description of a medical condition, pain level, or a brief comment about an activity or social setting without elaboration on how that comment linked to a possible priority.

The frequency of responses of individuals who indicated at least one IADL priority was less similar across populations than for self-care and mobility. For IADLs, 43.7 percent of individuals with a brain injury, 41.6 percent of individuals who are frail elderly, 39.2 percent of those with a physical disability, 61.5 percent of individuals with serious mental illness, and 69.3 percent of those with an intellectual or developmental disability indicated a priority in response to the assessor's question at the conclusion of the IADL set. A common priority articulated by individuals with an intellectual or developmental disability was to address financial management skills.

Observations and Changes to the FASI IADL Items

On the basis of these findings, the FASI team presented results and recommendations to the Technical Expert Panel (TEP) for changes to the FASI set. The following section outlines TEP feedback and the changes made to finalize the FASI.

Summary of IADL Testing

The overall reliability and validity results for the IADL items were generally good to strong. However, there were several key issues requiring change to the final FASI set for which the TEP concurred.

Content validity. There was good evidence for content validity, that is, the extent to which items cover the concept of interest. Items generally reflect the same underlying construct, and assessors generally reported that the content was appropriate.

Concurrent validity. Evidence for concurrent validity (the extent to which items distinguish among groups) was mixed. There was wide use of rating scale steps among individuals in all populations. Rating scale use varied across all populations and tended to be more dichotomous for some items.

Structural validity. There was good evidence for structural validity, that is, the extent to which the ordering of steps and items is logical:

- Hierarchical ordering of items made sense.
- Item fit and principal component analysis were within acceptable ranges.

- Only 3 percent of individuals received the maximum score.
- Measurement precision was moderate (person separation reliability = 0.79).

Convergent validity. There was strong evidence for convergent validity, that is, the alignment of usual and most dependent scores. Correlations were high between usual (3-day) and most dependent (past month) scores for all items in the IADL section.

Interrater reliability. There was good evidence for interrater reliability (IRR). Assessors generally were able to achieve good IRR on the FASI IADL items; lower IRR clustered within three entities. **Medication management–oral medications** was challenging for assessors to score consistently.

Update and expand telephone answering and placing call items to reflect contemporary communication technology. The current items related to placing and answering a telephone were very easy for almost all individuals in this field test. However, these items did not reflect current technology with which individuals are able to place and answer calls using voice activation and text messages (that also use voice activation) and the full range of social networking that individuals routinely use to communicate and conduct IADLs such as shopping and financial transactions. TEP members recommended updating these items to more accurately reflect current technology options.

In addition, TEP members supported the recommendation to create and test items in the future that reflect the functional importance of communication technology, including communication for safety and emergency situations and communication to facilitate community integration including communicating with friends and family.

Revise simple financial management examples to provide more modern activities such as making purchases online. Assessors and individuals may have coded the current items as not applicable (code 09) if a person managed his or her finances exclusively online. Therefore, the TEP agreed with the recommendation to update the examples included in these items to better reflect the use of current technology such as online banking and bill pay to manage both day-to-day and longer-term financial transactions and planning.

Clarify oral medication item but maintain the distinction in modes of medication administration. This field test found that **inhalant and injection medication management** items apply to a small number of individuals receiving CB-LTSS. In addition, the oral medication management item showed modest IRR. TEP members did not support the suggestion to

replace the three medication management items with a single general medication management item. TEP members noted that there is continued benefit to maintaining distinctions in mode of administration but did support clarifying how to code the oral medication item.

Develop and test items that capture an individual's ability to plan, organize, initiate, and follow through with functional activities on a regular basis. The FASI set addresses assistance with activities once initiated but does not address initiating and sustaining performance routinely over time, such as needing prompts to get out of bed, get dressed, get showered, or taking medications consistently. In addition, individuals needing assistance to plan and execute daily activities over time still may have appeared independent on current FASI items. Self-Care, Mobility, and IADL skills were not independent of other domains. The FASI set represents only one component of a comprehensive standardized assessment. As the set of standardized items is built out to include domains related to functional cognition (e.g., executive function and short-term goal setting), behavioral, emotional, and social skills, assessors will have more information from which to code IADL items.

Reference Period Decision

Despite the high level of agreement between usual (3 days) and most dependent (past month) reference periods, TEP members felt strongly that capturing changing needs was critical for those individuals in these populations for whom it was a concern. Therefore, the FASI team maintained the most dependent (past month) reference period in the FASI set.

CHAPTER 11. ASSISTIVE DEVICE ITEMS

Introduction

This chapter describes the results of the field testing for the FASI related to assistive devices. An important benefit provided to individuals receiving community-based long-term services and supports (CB-LTSS) is receipt of assistive devices that facilitate performance of daily life activities. It is important to understand the frequency of need for and availability of assistive devices in CB-LTSS populations.

The literature investigating the use of assistive devices in Medicaid CB-LTSS programs demonstrates a wide variation in the use of, and coverage for, assistive devices. A growing number of states are providing assistive technology through CB-LTSS; however, the rate of growth is lower than for the Medicare population.[63] Assistive technology, broadly, is any item, device or equipment that aims to increase, maintain, or improve a person's functional ability. The approach taken in this section of the FASI set aligns with this definition. Considerable state variation in the provision of assistive technology to Medicaid waiver recipients has been documented, as well as variation in use among the CB-LTSS populations. For example, state spending for assistive technology was significantly greater for individuals with an intellectual or developmental disability compared with individuals who are frail elderly or have a physical disability. There is growing interest in assistive technology because of reports of its efficacy and cost-effectiveness, and increasing demand from CB-LTSS beneficiaries.[64] Research has demonstrated improved functioning, lower cost of care, improved quality of life, and increased

[63] Kitchener M, Ng T, Lee H, et al. Assistive technology in Medicaid home- and community-based waiver programs. The Gerontologist. 2008;48(2):181-9.

[64] Russell JN, Hendershot GE, LeClere F, et al. Trends and differential use of assistive technology devices: United States, 1994. Advance Data, 1997;(292):1-9.

self-efficacy for caregivers with the implementation of assistive technology.[65,66,67,68,69] The FASI assistive device items consider which devices individuals need and the current availability and suitability of those devices to support daily living activities.

Description of the Items

The Assistive Devices section of the FASI delineates the need for, and availability of, assistive devices. The Assistive Devices section includes 23 items—22 commonly used devices and one optional write-in item:

- Manual wheelchair
- Motorized wheelchair or scooter
- Specialized seating pad
- Mechanical lift
- Walker
- Walker with seat
- Cane
- Crutch(es)
- Prosthetics
- Orthotics/brace
- Bed rail
- Electronic bed
- Grab bars

---

[65] Agree EM, Freedman VA. A comparison of assistive technology and personal care in alleviating disability and unmet need. The Gerontologist. 2003;43(3):335-44.

[66] Gitlin LN, Corcoran M, Winter L, et al. A randomized, controlled trial of a home environmental intervention: effect on efficacy and upset in caregivers and on daily function of persons with dementia. The Gerontologist. 2001;41(1):4-14.

[67] Hoenig H, Lee J, Stineman M. Conceptual overview of frameworks for measuring quality in rehabilitation. Topics in Stroke Rehabilitation. 2010;17(4):239-51.

[68] Mann WC, Ottenbacher KJ, Fraas L, et al. Effectiveness of assistive technology and environmental interventions in maintaining independence and reducing home care costs for the frail elderly: a randomized controlled trial. Archives of Family Medicine. 1999a;8(3):210-7.

[69] Taylor NF, Brusco NK, Watts JJ, et al. A study protocol of a randomized controlled trial incorporating a health economic analysis to investigate if additional allied health services for rehabilitation reduce length of stay without compromising patient outcomes. BMC Health Services Research. 2010;10:308.

- Transfer board
- Shower/commode chair
- Walk/wheel-in shower
- Glasses or contact lenses
- Hearing aid
- Communication device
- Stair rails
- Lift chair
- Ramps

An "Other" category was provided so that assessors could document any assistive devices that were not included within the current list. A detailed description of each item is provided in the corresponding manual.

Description of the Rating Scale

Each assistive device item is scored using one of five codes to identify the person's need for, and the availability of, the assistive device to support self-care, mobility, or instrumental activities of daily living (IADLs).[70]

- Code 02: **Assistive device needed and available—**Person needs this device to complete daily activities and has the device in the home.
- Code 01: **Assistive device needed but current device unsuitable—**Device is in the home but no longer meets the person's needs.
- Code 00: **Assistive device needed but not available—**Person needs the device, but it is not available in the home.

If the device is not used, code reason:

- Code 07: **Person refused—**Person chooses not to use the needed device.
- Code 09: **Not applicable—**Person does not need this device.

[70] These codes and definitions align with the standardized items in the DEL (for self-care items and all other items in this report), but some modifications have been made to reflect the needs and perspective of individuals receiving CB-LTSS. For example, the FASI refers to *individuals,* whereas the Minimum Data Set (MDS) version of the item uses the term *resident* and the inpatient version uses the term *patient*.

If no assistive device is needed to complete self-care, mobility, and IADLs, the assessor checks the not applicable option, signifying that none of the listed items or any other assistive devices are needed.

Assessment Reference Period

Each of the items is scored once to determine the current use of assistive devices to support self-care, mobility, and IADLs.

Analytic Objectives and Approach

The analyses of this section were designed to determine the frequency of need for, and availability of, assistive devices to support self-care, mobility, and IADLs. Descriptive statistics with frequency tables and rank ordering were used to summarize the field test findings.

Results

A majority of individuals (94 percent) used one or more assistive devices to support self-care, mobility, and IADLs, and 65 percent reported that an assistive device was needed and available or that the individual did not need a device (Table 11.1). The median number of assistive devices used was 5 (Table 11.2). Fifteen percent (175 individuals) required 10 or more devices, and 4 people required 15 devices. For the entire sample, the assistive devices for which the largest percentage of individuals reported a need but the device was not available or the current device was unsuitable were grab bars (6 percent), motorized wheelchairs (5 percent), walk-in shower (5 percent), glasses/contacts (4 percent), and manual wheelchair (4 percent) (Table 11.1). The assistive devices for which the lowest frequency reported a need but the device was not available or the current device was unsuitable were crutches (0.1 percent) and prosthetics (0.1 percent).

The FASI team reviewed all write-in assistive devices and found that the most commonly recorded additional assistive devices were, in rank order, reacher/grabber, glucometer, continuous positive airway pressure machine (CPAP), sock aid, oxygen concentrator, and raised toilet seat. These items were reviewed during the second Technical Expert Panel (TEP), and recommendations were made to add these commonly used items to the predefined list of devices in the final FASI set.

Table 11.1. Frequency and Number of Rating Scale Use for Need of Assistive Devices to Complete Self-Care, Mobility, and Instrumental Activities of Daily Living

Assistive Device	09. Device Not Needed		02. Assistive Device Needed and Available		01. Device Needed but Unsuitable		00. Assistive Device Needed but Not Available		07. Person Refused	
	n	%	n	%	n	%	n	%	n	%
12a. Manual wheelchair	726	62.2	388	33.3	18	1.5	26	2.2	9	0.8
12b. Motorized wheelchair or scooter	882	75.6	215	18.4	21	1.8	40	3.4	9	0.8
12c. Specialized seating pad	918	78.7	213	18.3	9	0.8	27	2.3	0	0.0
12d. Mechanical lift	1,030	88.3	119	10.2	2	0.2	8	0.7	8	0.7
12e. Walker	851	72.9	267	22.9	20	1.7	12	1.0	17	1.5
12f. Walker with seat	909	77.9	205	17.6	12	1.0	29	2.5	12	1.0
12g. Cane	840	72.0	283	24.3	16	1.4	8	0.7	20	1.7
12h. Crutch(es)	1,147	98.3	17	1.5	0	0.0	1	0.1	2	0.2
12i. Prosthetics	1,144	98.0	18	1.5	0	0.0	1	0.1	4	0.3
12j. Orthotics/brace	969	83.0	160	13.7	14	1.2	13	1.1	11	0.9
12k. Bed rail	890	76.3	249	21.3	6	0.5	16	1.4	6	0.5
12l. Electronic bed	874	74.9	262	22.5	5	0.4	23	2.0	3	0.3
12m. Grab bars	564	48.3	530	45.4	6	0.5	65	5.6	2	0.2
12n. Transfer board	1,106	94.8	49	4.2	5	0.4	6	0.5	1	0.1
12o. Shower/commode chair	516	44.2	601	51.5	6	0.5	30	2.6	14	1.2
12p. Walk/wheel-in shower	870	74.6	235	20.1	3	0.3	58	5.0	1	0.1
12q. Glasses or contact lenses	360	30.8	746	63.9	19	1.6	28	2.4	14	1.2
12r. Hearing aid	1,055	90.4	66	5.7	5	0.4	32	2.7	9	0.8
12s. Communication device	1,103	94.5	52	4.5	2	0.2	7	0.6	3	0.3
12t. Stair rails	904	77.5	256	21.9	3	0.3	3	0.3	1	0.1
12u. Lift chair	1,034	88.6	96	8.2	3	0.3	30	2.6	4	0.3
12v. Ramps	852	73.0	292	25.0	2	0.2	21	1.8	0	0.0
Other	23	2.0	10	0.9	171	14.7	3	0.3	957	82.2

There were differences among the various CB-LTSS populations in their need for assistive devices (Appendix D, Tables 10.a.1–5). The median number of devices needed varied among the populations. Individuals who are frail elderly and those with a physical disability reported the highest median number of assistive devices; individuals with an intellectual or developmental disability required the fewest (Table 11.2). This finding contrasts with reported literature that found more waiver programs offering assistive technology to individuals with an intellectual or developmental disability and greater spending on assistive technology in this population than for individuals who are frail elderly and individuals with a physical disability.[71] The rank order of assistive devices needed varied among the different CB-LTSS populations (Table 11.3). However, across populations, glasses/contacts, shower/chair commode, and grab bars were among the top five assistive devices needed to complete self-care, mobility, and IADLs.

Table 11.2. Median Number of Assistive Devices per Community-Based Long-Term Services and Supports Population

Individuals Who Are Frail Elderly	Individuals With a Physical Disability	Individuals With an Intellectual or Developmental Disability	Individuals With a Brain Injury	Individuals With Serious Mental Illness	All Populations
7	7	2	6	4	5

[71] Kitchener M, Ng T, Lee H, et al. Assistive technology in Medicaid home- and community-based waiver programs. The Gerontologist. 2008;48(2):181-9.

Table 11.3. Rank Order of Assistive Devices Most Commonly Needed and Available per Community-Based Long-Term Services and Supports Population

Rank	Individuals Who Are Frail Elderly	Individuals With a Physical Disability	Individuals With an Intellectual or Developmental Disability	Individuals With a Brain Injury	Individuals With Serious Mental Illness
1	Shower/ commode chair (70%)	Shower/ commode chair (65%)	Glasses or contact lenses (64%)	Glasses or contact lenses (66%)	Glasses or contact lenses (69%)
2	Glasses or contact lenses (66%)	Glasses or contact lenses (60%)	Stair rails (31%)	Grab bars (49%)	Grab bars (49%)
3	Grab bars (62%)	Manual wheelchair (50%)	Grab bars (26%)	Shower/ commode chair (49%)	Shower/ commode chair (47%)
4	Manual wheelchair (49%)	Grab bars (45%)	Shower/ commode chair (22%)	Walk/wheel-in shower (39%)	Cane (31%)
5	Walker (46%)	Ramp (40%)	Walk/wheel-in shower (15%)	Manual wheelchair (35%)	Stair rails (25%)

Note: Percentages represent within-population percentage of assistive devices most commonly needed and available.

Assessor Feedback on Assistive Devices Items

An assessor recommended separating shower/commode chair in the list of assistive devices, commenting that an individual who was recently assessed required the use of a separate shower chair and commode chair. Assessors made no other comments or suggestions for changes to Section C: Assistive devices.

Observations and Changes to the FASI Assistive Device Items

The TEP agreed with the following recommendations to modify the Assistive Device section:

Add reacher/grabber, glucometer, CPAP, sock aid, oxygen concentrator, and raised toilet seat to the list of assistive devices. These common assistive devices had higher frequency as write-in devices than some of the lower frequency devices included within the current list. TEP members agreed with these revisions, which have been included in the final version of the FASI set (Appendix B).

Eliminate crutches and prosthetics from the list of assistive devices. For the field test, crutches and prosthetics had very low frequency for scoring in the assistive devices needed but not available or unsuitable codes and had a very high frequency of scoring for the device not needed code (Table 11.1). These devices could be noted in the "Other" write-in section when needed. TEP members agreed with these revisions, which have been included in the final version of FASI set (Appendix B).

CHAPTER 12. LIVING ARRANGEMENTS, AVAILABILITY OF ASSISTANCE, AND CAREGIVER ASSISTANCE ITEMS

Introduction

This chapter describes the field test results of items related to the person's current living arrangements, the availability of his or her caregiver, and the type (paid or unpaid) of caregiver assistance needed. Understanding a person's living arrangements and current level and availability of support is necessary to ensure the person's safety within his or her home and to inform the development of an appropriate service plan. Individuals eligible for or enrolled in community-based long-term services and supports (CB-LTSS) programs may need and receive support from two types of caregivers: caregivers who receive payment for providing services (paid) and informal caregivers who are not paid to provide services (unpaid). Ensuring that the individual receives the combination of paid and unpaid caregiver supports that meets his or her needs and aligns with personal preferences is a cornerstone of quality CB-LTSS.

The following is a description of the items and the rating scale used to score living arrangements, caregiver assistance, and caregiver availability. Items are coded with respect to both paid and unpaid caregiving. The section presents the results of the field test, summarizes feedback from assessors, and concludes with a summary and recommendations.

Description of the Items

The Living Arrangements, Caregiver Assistance, and Caregiver Availability section of the FASI consists of one item for living arrangements and two items for availability of assistance. This section also includes 10 items related to the ability and willingness of the caregiver to provide assistance. The assessor gathers information for coding items from multiple sources, including discussion with, or observation of, the person applying for or receiving supports and services, his or her family and/or caregivers, and written records where necessary. To the extent possible, items follow the standardized data element. Exceptions or modifications to the standard are noted below, including rationale for the modification. The full text for each of the items can be found in Appendix A.

Because individuals may receive both paid and unpaid services, it is important to determine the availability of both types of caregiving. On the basis of feedback from the Technical Expert

Panel (TEP) and pilot testing, the FASI set includes separate items for living arrangements and availability of caregiver assistance.

Living Arrangements Subsection

The **usual living arrangements** item describes where the person lived during the past 3 days and during the past month. Possible living arrangements include the following: living alone, living with others in the home, residing in a congregate home, having no permanent home or being homeless, or residing in a medical facility at the time of the assessment. This item is based on the standardized item in the CMS Data Element Library (DEL). However, it has been modified to include two additional living arrangement codes: no permanent home or homeless and living in a medical facility at the time of the assessment. The addition of these two codes reflects the range of living arrangements for individuals receiving CB-LTSS.

Living Arrangements Codes

The living arrangements items each are scored using one of five numeric codes that best describes the individual's need for assistance with the task described.

- Code 05: The **person lives alone**—there are no other residents in the home.
- Code 04: The **person lives with others in the home**—for example, family, friends, or paid caregiver.
- Code 03: The **person lives in a congregate home**—for example, assisted living or residential care home.
- Code 02: The **person does not have a permanent home or is homeless**.
- Code 01: The **person was in a medical facility.**

Availability of Assistance Subsection

There is one skip pattern in the Availability of Assistance subsection. The assessor determines whether the person has assistance in his or her home; regardless of whether the person has assistance in the home, the assessor moves on to the next section titled Availability of Paid and Unpaid Assistance.

If the person does receive assistance, the assessor codes the **level of paid and unpaid assistance** received during the past month. This item considers the frequency with which paid and unpaid assistance is received in the person's home.

Availability of Assistance Codes

- Code 0: No, if the **person has no assistance in the home** at the time of the assessment. The assessor skips the second question and moves to the **availability of paid and unpaid assistance**.
- Code 1: Yes, if the **person has assistance in his or her home.** The assessor determines the level of both paid (column A) and unpaid (column B) assistance during the past month.

Item 14a

- Code 05: **No assistance received**
- Code 04: **Occasional/short-term assistance**
- Code 03: **Regular nighttime assistance**
- Code 02: **Regular daytime assistance**
- Code 01: **Around the clock assistance**

Availability of Paid and Unpaid Assistance Subsection

The assessor considered eight items in the Availability of Paid and Unpaid Assistance subsection. Four of the items address self-care, mobility, instrumental activities of daily living (IADLs), and medication administration. The need for assistance reported in this section may not completely align with the need for assistance reported in Section B of the FASI, because an individual may need support to complete self-care and mobility activities and IADLs that are assessed in this section but not specifically assessed within Section B. For example, an individual may need and receive unpaid assistance with shaving and cutting nails. These self-care activities are not evaluated in the self-care items in Section B, but the assistance received would be coded here.

This section also considers the availability of assistance needed with community living skills not addressed in Section B through the following items:

- **Medical procedures and treatments** considers assistance with maintaining health at home such as changing wound dressings or monitoring skin for breakdown.
- **Management of equipment** considers the availability of assistance a person needs to use both complicated medical devices such as oxygen and IV fusion equipment and less complex equipment such as a hand splint or leg brace.

- **Supervision** encompasses the need for caregiver supervision related to safety concerns. After pilot testing, this item was modified from the standard. Assessors were confused by the inclusion of the word *safety* in addition to supervision in the item stem. This item was revised for the FASI set to include safety concerns as an example of why supervision might be needed. For example, a person may cross a street unsafely because of a visual field loss or be vulnerable to theft by strangers calling on the phone.
- **Advocacy or facilitation of person's participation in appropriate medical care** considers assistance needed with skills that support effective engagement with health care providers. Examples include transportation to and from appointments, assistance to attend medical appointments, support to engage with the physician at the appointment, and support to understand and follow the physician's plan of care.

Caregiver Availability Subsection

The final item, changes in caregiver availability or willingness, was intended to help identify disruptions in caregiver assistance during the past month that might pose a vulnerability for individuals. The item is coded separately for both paid and unpaid assistance.

Description of the Rating Scale

Coding scales differ for the Living Arrangements, Caregiver Assistance, and Caregiver Availability subsections.

For items 15a–h, the standard items code for all *nonagency* caregivers, which includes family members, friends, and privately paid caregivers. For individuals receiving CB-LTSS, important distinctions exist between paid and unpaid caregivers that the survey must capture to support development of person-centered, quality service plans. A family member may be either paid or unpaid. FASI items in this section code the items separately for paid and unpaid caregivers.

The standard items effective when the FASI were pilot tested (i.e., Outcome and Assessment Information Set [OASIS]-C) include a code indicating that caregivers are unlikely to provide assistance with a given skill or domain. Pilot testing indicated that this was not a useful option for individuals receiving CB-LTSS. In addition, pilot testing indicated that two further codes were required, specifically, Assistance is needed but the person declines and Not applicable. Finally, because the self-care, mobility, and IADL items are scored on a rating scale in which

higher codes indicate greater independence, the availability of assistance rating scale was realigned so that code 05 aligns with independence.

Items 15a-h. Availability of Paid and Unpaid Assistance

- Code 05: **Assistance not needed**—no assistance is needed.
- Code 04: **Caregiver(s) currently provide assistance**—the person's usual caregiver(s) are willing and able to provide needed assistance.
- Code 03: **Caregiver(s) need training/supportive services to provide assistance**—caregiver(s) are available but need assistance to provide support.
- Code 02: **Unclear whether caregiver(s) will provide assistance**—caregiver(s) are available in the home, but it is not clear whether the caregiver(s) will provide needed assistance.
- Code 01: **Assistance needed but no caregiver(s) available**—the person needs assistance but no caregiver(s) are available in the home.
- Code 00: **Assistance needed but person declines assistance**—the person needs support but declines assistance.
- Code 09: **Not applicable**—the person does not do this activity.

Analytic Objectives and Approach

The data analyses were designed to determine the validity and reliability of the FASI items and their effectiveness in capturing the needs of individuals in each of the CB-LTSS populations. Chapter 5, Data Preparation and Testing Approach, presents in detail the FASI Team's approach to testing all FASI items. For easy reference, a brief summary of the analytic methodology is included in Table 12.1 as well.

Table 12.1 Summary of the Analytic Methodology Used to Test the FASI

Type of Validity or Reliability	Purpose	Test Used
Concurrent validity	To evaluate the use of the rating scale for each item within a given section (e.g., self-care) across populations for both the 3-day usual performance and the 30-day most dependent performance	Chi-square analyses
Concurrent validity	To examine the extent to which FASI items detected differences in needs across populations	K-sample equality of medians test to examine the difference in the median scores for each population
Convergent validity	To look at the relationship between 3-day (usual) and past month (most dependent) responses	Rank order association (Kendall's tau-b)
Interrater reliability	To evaluate how much homogeneity, or consensus, there was in the ratings given by assessors	Krippendorff's alpha

Abbreviations: FASI, Functional Assessment Standardized Items.

Results

Tables presenting descriptive analyses of living arrangements, availability of assistance, paid assistance, and unpaid assistance items by population are found in Appendix D, Section D11–D14; tables for the total sample are presented in this chapter.

Living Arrangements, Caregiver Assistance, and Availability Item Results

Overall, 59 percent of individuals lived with others in the home, 27 percent lived alone, and 14 percent lived in congregate homes during both the past 3 days and the past month (Table 12.2). Almost three-quarters of individuals who are frail elderly or have a physical disability (73 percent in each population), and two-thirds of individuals with an intellectual or developmental disability (59 percent) lived with others in the home. Fewer than half of individuals with a brain injury (46 percent) and about one-fifth of those with serious mental illness (21 percent) lived with others in the home. Individuals with serious mental illness were the only group for whom living alone was the most common situation (62 percent). A quarter of individuals with a physical disability or who are frail elderly (26 percent) lived alone. Only about one-tenth of individuals with an intellectual or developmental disability (11 percent) lived alone. About one-third of individuals with a brain injury (35 percent) or an intellectual or developmental disability (30 percent) lived in congregate care homes, and 17 percent of those with serious mental

illness lived in this setting. Homelessness was relatively rare, with only three individuals reporting this situation. Hospitalizations also were rare: two individuals had been hospitalized in the past 3 days and four individuals in the past month (Appendix D, Table D11.a.1).

Across populations, there were significant differences in the distribution of codes for both usual (3-day) ($\chi^2 = 345.26$, df_{16}, $p < .0001$) and most dependent (past month) ($\chi^2 = 343.84$, df_{16}, $p < .0001$) periods, indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D11.b.1).

Table 12.2. Descriptive Statistics of Rating Scale Use for All Participants for Item 13. Identify the Person's Usual Living Arrangement During the Past 3 Days and the Past Month

13. Identify the Person's Usual Living Arrangement	Usual 3-Day		Most Dependent Past Month	
	n	%	n	%
06. Independent	315	27.0	314	26.9
05. Lives alone	687	58.9	686	58.8
04. Lives with others in home	162	13.9	161	13.8
03. Lives in congregate home	1	0.1	2	0.2
02. No permanent house/homeless	2	0.2	4	0.3
01. Was in a medical facility	1,167	100	1,167	100
Total scored respondents	315	27.0	314	26.9

Assistance in the home. Overall, 98 percent of individuals reported having assistance in their home (Table 12.3). (Appendix D, Table D12.a.1). Although a significant association between living arrangements and the CB-LTSS population was found ($\chi^2 = 12.61$, df_4, $p = .01335$), this is a result of a small difference between individuals with serious mental illness and those in other populations (Appendix D, Table D12.b.1).

Table 12.3. Descriptive Statistics of Rating Scale Use for All Participants for Item 14. Does the Person Have Assistance in Their Home?

14. Does the Person Have Assistance in Their Home?	n	%
0. No	20	1.7
1. Yes	1,147	98.3
Total respondents	1,167	100

Paid level of assistance in the home during the past month. Overall, the majority of individuals received paid assistance during regular daytime hours (56 percent) or around-the-clock assistance (27 percent) (Table 12.4). Across populations, the majority of individuals received either around-the-clock or regular daytime assistance. Percentages differed by population: the majority of individuals who are frail elderly and those with a physical disability or serious mental illness received paid assistance during regular daytime hours—66, 75, and 66 percent, respectively. The next most frequent option for individuals who are frail elderly and those with a physical disability or serious mental illness was around-the-clock paid assistance—23, 11, and 19 percent, respectively. In contrast, individuals with a brain injury reported equal percentages of regular daytime (43 percent) and around-the-clock paid assistance (44 percent). The widest range of paid assistance options was reported by individuals with an intellectual or developmental disability: around-the-clock (46 percent), regular daytime (23 percent), occasional (19 percent), and no paid assistance (11 percent) (Appendix D, Table D12.a.2). An association between level of paid assistance and the CB-LTSS population was significant (χ^2 = 228.70, df_4, $p < .0001$), indicating that almost all individuals received assistance in their home (Appendix D, Table D12.b.2).

Table 12.4. Descriptive Statistics of Rating Scale Use for All Participants for Item 14a. Code the Level of Assistance in the Person's Home (Paid) During the Past Month

14a. Paid Level of Assistance in Home	n	%
05. No Assistance received	85	7.3
04. Occasional/short term Assistance	102	8.8
03. Regular nighttime	18	1.5
02. Regular daytime	650	55.8
01. Around the clock	311	26.7
Total respondents	1,166	100

Level of unpaid assistance in the home during the past month. Overall, the highest percentage of individuals received either no unpaid assistance (30 percent) or around-the-clock unpaid assistance (28 percent) (Table 12.5). Almost one-quarter of individuals reported occasional unpaid assistance (23 percent). The percentage of unpaid assistance differed across populations. Half of individuals with an intellectual or developmental disability or serious mental illness and about one-third of individuals with a brain injury (34 percent) received no unpaid assistance. In contrast, about 40 percent of individuals who are frail elderly (41 percent) or have a physical disability (39 percent) received around-the-clock unpaid assistance, as did 22 percent of individuals with a brain injury (Appendix D, Table D12.a.3). An association between level of unpaid assistance and CB-LTSS population was significant ($\chi^2 = 258.07$, df_{16}, $p < .0001$), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D12.b.3).

Table 12.5. Descriptive Statistics of Rating Scale Use for All Participants for Item 14a. Code the Level of Assistance in the Person's Home (Unpaid) During the Past Month

14a. Unpaid Level of Assistance in Home	n	%
05. No assistance received	346	29.8
04. Occasional/short term Assistance	267	23.0
03. Regular nighttime	139	12.0
02. Regular daytime	89	7.7
01. Around the clock	321	27.6
Total respondents	1,162	100

Paid self-care assistance. Overall, almost one-third of individuals did not need paid assistance with self-care activities (31 percent); the majority of individuals (66 percent) received paid caregiver assistance with these activities (Table 12.6). This pattern was consistent for individuals who are frail elderly and for those with a physical disability or brain injury. For individuals with an intellectual or developmental disability or with serious mental illness, just over half received no paid assistance with self-care activities (53 and 52 percent, respectively) and just under half (46 and 44 percent, respectively) received paid assistance (Appendix D, Table D13.a.1). There was a significant association between level of paid assistance and CB-LTSS population (χ^2= 187.50, df_{16}, $p < .0001$), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D3.b.1).

Across populations, fewer than 2 percent of individuals needed paid assistance that was not available; 3 percent of individuals who are frail elderly needed paid assistance but declined this support; and less than 1 percent of individuals in other populations reported declining paid assistance. (Appendix D, Table D13.a.1).

Table 12.6. Descriptive Statistics of Rating Scale Use for All Participants for Item 15a. Paid Self-Care Assistance

15a. Paid Self-Care Assistance	n	%
05. Assistance not needed	365	31.3
04. Caregiver(s) provide assistance	765	65.6
03. Caregiver(s) need training/supportive services	1	0.1
02. Unclear whether caregivers will provide assistance	4	0.3
01. Assistance needed but no caregiver available	12	1.0
Total scored respondents	1,147	98.3
00. Assistance needed but declined	14	1.2
09. Not applicable	6	0.5
Total respondents	1,167	100

Paid mobility assistance. Overall, more than one-third of individuals did not need paid assistance with mobility activities (38 percent); the majority of individuals (59 percent) received paid care assistance with these activities (Table 12.7). This pattern was consistent for individuals who are frail elderly and for those with a physical disability or a brain injury. For individuals with an intellectual or developmental disability or serious mental illness, almost two-thirds received no paid assistance with mobility activities (64 and 62 percent, respectively), and just under half received paid assistance (Appendix D, Table D13.a.2). There was a significant association between level of paid assistance and CB-LTSS population (χ^2= 237.76, df_{16}, $p < .0001$) indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D13.b.2).

Across populations, fewer than 1 percent of individuals needed paid assistance that was not available; 1 percent of individuals who are frail elderly needed paid assistance but declined this support (Appendix D, Table D13.a.2).

Table 12.7. Descriptive Statistics of Rating Scale Use for All Participants for Item 15b. Paid Mobility Assistance

15b. Paid Mobility Assistance	n	%
05. Assistance not needed	443	38.0
04. Caregiver(s) provide assistance	684	58.6
03. Caregiver(s) need training/supportive services	1	0.1
02. Unclear whether caregivers will provide assistance	2	0.2
01. Assistance needed but no caregiver available	11	0.9
Total scored respondents	1,141	97.8
00. Assistance needed but declined	12	1.0
09. Not applicable	14	1.2
Total respondents	1,167	100

Paid IADL assistance. Overall, only 10 percent of individuals did not need paid assistance with IADLs; the majority of individuals (87 percent) received paid care assistance with these activities (Table 12.8). This pattern was consistent across populations; individuals with an intellectual or developmental disability needed the least amount of paid assistance with IADLs at 80 percent (Appendix D, Table D13.a.3). There was a significant association between level of paid IADL assistance and CB-LTSS population (χ^2= 58.77, df_{16}, $p < .0001$), indicating that this item distinguished need for IADL assistance across CB-LTSS populations (Appendix D, Table D13.b.3).

Across populations, 1 percent of individuals needed paid IADL assistance that was not available; 2 percent of individuals who are frail elderly needed paid IADL assistance but declined this support (Appendix D, Table D13.a.3).

Table 12.8. Descriptive Statistics of Rating Scale Use for All Participants for Item 15c – Paid IADL Assistance

15c. Paid IADL Assistance	n	%
05. Assistance not needed	120	10.3
04. Caregiver(s) provide assistance	1,011	86.6
03. Caregiver(s) need training/supportive services	0	0.0
02. Unclear whether caregivers will provide assistance	4	0.3
01. Assistance needed but no caregiver available	15	1.3
Total scored respondents	1,150	98.5
00. Assistance needed but declined	13	1.1
09. Not applicable	3	0.3
Total respondents	1,167	100

Abbreviation: IADL, instrumental activity of daily living.

Paid medication administration assistance. Overall, about one-third of individuals did not need paid assistance with medication administration activities (31 percent); the majority of individuals (62 percent) received paid care assistance with these activities (Table 12.9). This pattern was consistent across populations except for individuals with a physical disability who were almost evenly distributed between no assistance needed (44 percent) and receiving paid assistance (49 percent) (Appendix D, Table D13.a.4). There was a significant association between level of paid assistance with medication administration activities and CB-LTSS population ($\chi^2 = 66.28$, df_{16}, $p < .0001$), indicating that this item distinguished need for assistance with medication administration activities across CB-LTSS populations (Appendix D, Table D13.b.4).

Across populations, less than 1 percent of individuals needed paid assistance with medication administration activities that was not available; 2 percent of individuals who are frail elderly needed paid assistance with medication administration activities but declined this support (Appendix D, Table D13.a.4).

Table 12.9. Descriptive Statistics of Rating Scale Use for All Participants for Item 15d. Paid Medication Administration

15d. Paid Medication Administration	n	%
05. Assistance not needed	363	31.1
04. Caregiver(s) provide assistance	725	62.1
03. Caregiver(s) need training/supportive services	2	0.2
02. Unclear whether caregivers will provide assistance	3	0.3
01. Assistance needed but no caregiver available	8	0.7
Total scored respondents	1,101	94.4
00. Assistance needed but declined	12	1.0
09. Not applicable	53	4.5
Total respondents	1,167	100

Paid medical procedures/treatments assistance. Overall, this item was not applicable for almost half of individuals surveyed (50 percent). Individuals with an intellectual or developmental disability reported the highest percentage of not applicable responses. Overall, 29 percent received paid care assistance with medical procedures/treatments activities; another 20 percent of individuals did not need paid assistance with these activities (Table 12.10). This pattern was consistent for individuals who are frail elderly and for those with a physical disability or a brain injury. Of individuals with serious mental illness, 23 percent received no paid assistance with medical procedures/treatments activities and 19 percent received paid assistance. Among individuals with an intellectual or developmental disability, 27 percent received no paid assistance with medical procedures/treatments activities and 35 percent received paid assistance (Appendix D, Table D13.a.5). There was no significant association between level of paid assistance and CB-LTSS population (χ^2= 24.82, df_{16}, p = .2083), indicating a similar need for assistance with paid medical procedures/treatments activities across CB-LTSS populations (Appendix D, Table D13.b.5).

Across populations, less than 1 percent of individuals needed paid assistance with medical procedures/treatments activities that was not available; less than 1 percent of individuals who are frail elderly needed paid assistance for these activities but declined this support (Appendix D, Table D13.a.5).

Table 12.10. Descriptive Statistics of Rating Scale Use for All Participants for Item 15e. Paid Medical Procedures/ Treatments

15e. Paid Medical Procedures/Treatments	n	%
05. Assistance not needed	232	19.9
04. Caregiver(s) provide assistance	339	29.1
03. Caregiver(s) need training/supportive services	6	0.5
02. Unclear whether caregivers will provide assistance	2	0.2
01. Assistance needed but no caregiver available	5	0.4
Total scored respondents	584	50.0
00. Assistance needed but declined	5	0.4
09. Not applicable	578	49.5
Total respondents	1,167	100

Paid management of equipment assistance. Overall, this item was not applicable for almost 60 percent of individuals. About 22 percent of individuals did not and 17 percent did need paid assistance with managing equipment (Table 12.11). This pattern was consistent across populations (Appendix D, Table D13.a.6). There was a significant association between level of paid assistance and CB-LTSS population ($\chi^2 = 36.85$, df_{16}, $p = .0122$), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D13.b.6).

Across populations, less than 1 percent of individuals needed paid assistance with managing equipment that was not available; less than 1 percent of individuals who are frail elderly needed paid assistance for this activity but declined this support (Appendix D, Table D13.a.6).

Table 12.11. Descriptive Statistics of Rating Scale Use for All Participants for Item 15f. Paid Management of Equipment

15f. Paid Management of Equipment	n	%
05. Assistance not needed	258	22.1
04. Caregiver(s) provide assistance	201	17.2
03. Caregiver(s) need training/supportive services	1	0.1
02. Unclear whether caregivers will provide assistance	1	0.1
01. Assistance needed but no caregiver available	4	0.3
Total scored respondents	465	39.9
00. Assistance needed but declined	6	0.5
09. Not applicable	696	59.6
Total respondents	1,167	100

Paid supervision assistance. Overall, less than 10 percent of individuals reported that this item was not applicable (9 percent). About 21 percent of individuals did not need paid assistance with supervision; 67 percent received paid assistance (Table 12.12). This pattern was consistent across populations (Appendix D, Table D13.a.7). There was a significant association between level of paid assistance and CB-LTSS population ($\chi^2 = 53.96$, df_{16}, $p = .0001$), indicating that this item distinguished need for assistance with paid supervision across CB-LTSS populations (Appendix D, Table D13.b.7).

Across populations less than 1 percent of individuals needed paid assistance that was not available; less than 3 percent of individuals who are frail elderly needed paid assistance but declined this support (Appendix D, Table D13.a.7).

Table 12.12. Descriptive Statistics of Rating Scale Use for All Participants for Item 15g. Paid Supervision

15g. Paid Supervision	n	%
05. Assistance not needed	249	21.3
04. Caregiver(s) provide assistance	785	67.3
03. Caregiver(s) need training/supportive services	1	0.1
02. Unclear whether caregivers will provide assistance	2	0.2
01. Assistance needed but no caregiver available	10	0.9
Total scored respondents	1,047	89.7
00. Assistance needed but declined	11	0.9
09. Not applicable	108	9.3
Total respondents	1,167	100

Paid advocacy assistance. Overall, about 31 percent of individuals did not need paid assistance with advocacy; 64 percent received paid assistance (Table 12.13). This pattern was consistent across populations, with the exception of individuals with a physical disability who had a higher percentage not receiving assistance (39 percent) and just over half (53 percent) received paid assistance (Appendix D, Table D13.a.8). There was a significant association between level of paid assistance and CB-LTSS population (χ^2= 36.80, df_{16}, p = .0124), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D13.b.8).

Across populations less than 1 percent of individuals needed paid assistance that was not available; less than 2 percent of individuals who are frail elderly needed paid assistance but declined this support (Appendix D, Table 13.a.8).

Table 12.13. Descriptive Statistics of Rating Scale Use for All Participants for Item 15h. Paid Advocacy or Facilitation of Person's Participation in Appropriate Medical Care

15h. Paid Advocacy or Facilitation of Person's Participation in Appropriate Medical Care	n	%
05. Assistance not needed	359	30.8
04. Caregiver(s) provide assistance	751	64.4
03. Caregiver(s) need training/supportive services	3	0.3
02. Unclear whether caregivers will provide assistance	4	0.3
01. Assistance needed but no caregiver available	10	0.9
Total scored respondents	1127	96.6
00. Assistance needed but declined	10	0.9
09. Not applicable	29	2.5
Total respondents	1,167	100

Change in paid caregiver ability, willingness, or availability. Across populations, 93 percent reported no change in caregiver willingness or availability during the past month (Table 12.14). Over 12 percent of individuals with serious mental illness and 9 percent of individuals with a brain injury indicated a change in paid caregiver willingness or availability during the past month (Appendix D, Table D13.a.9). There was a significant association between change in paid caregiver availability and CB-LTSS population ($\chi^2 = 14.53$, df_{16}, $p = .0058$), indicating that this item distinguishes change in assistance across CB-LTSS populations (Appendix D, Table D13.b.9).

Table 12.14. Descriptive Statistics of Rating Scale Use for All Participants for Item 16. Change in Paid Caregiver Ability, Willingness, or Availability

16. Change in Paid Caregiver Ability, Willingness, or Availability	n	%
0. No	1,084	93.3
1. Yes	78	6.7
Total respondents	1,162	100

Unpaid self-care assistance. Just over half (53 percent) of individuals did not need unpaid assistance with self-care activities; 42 percent received unpaid care assistance with these activities (Table 12.15). This pattern was consistent for individuals with brain injury. However over three-quarters of individuals with an intellectual or developmental disability (76 percent) or serious mental illness (80 percent) did not receive unpaid assistance for these activities. For individuals who are frail elderly or have a physical disability, about one-third received no unpaid assistance with self-care activities (35 and 33 percent, respectively), and nearly two-thirds received unpaid assistance (Appendix D, Table D14.a.1). There was a significant association between level of unpaid assistance and CB-LTSS population ($\chi^2 = 218.14$, df_{16}, $p < .0001$), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D14.b.1). Across populations, 2 percent of individuals needed unpaid assistance that was not available (Appendix D, Table D14.a.1).

Table 12.15. Descriptive Statistics of Rating Scale Use for All Participants for Item 15a, Unpaid Self-Care Assistance

15a. Unpaid Self-Care Assistance	n	%
05. Assistance not needed	619	53.0
04. Caregiver(s) provide assistance	494	42.3
03. Caregiver(s) need training/supportive services	2	0.2
02. Unclear whether caregivers will provide assistance	15	1.3
01. Assistance needed but no caregiver available	23	2.0
Total scored respondents	1,153	98.8
00. Assistance needed but declined	3	0.3
09. Not applicable	6	0.5
Total respondents	1,167	100

Unpaid mobility assistance. Overall, just over half (53 percent) of individuals did not need unpaid assistance with mobility activities; 43 percent received unpaid care assistance with these activities (Table 12.16). However over three-quarters of individuals with serious mental illness (76 percent) or with an intellectual or developmental disability (81 percent) did not need unpaid assistance for these activities. For individuals who are frail elderly or have a physical disability, about one-third did not need unpaid assistance with mobility activities—29 and 34 percent, respectively, and nearly two-thirds received unpaid assistance—66 and 62 percent,

respectively (Appendix D, Table D14.a.2). There was a significant association between level of unpaid mobility assistance and CB-LTSS population (χ^2 = 261.07, df_{16}, p <.0001), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D14.b.2). Across populations less than 2 percent of individuals needed unpaid mobility assistance that was not available (Appendix D, Table D14.a.2).

Table 12.16. Descriptive Statistics of Rating Scale Use for All Participants for Item 15b. Unpaid Mobility Assistance

15b. Unpaid Mobility Assistance	n	%
05. Assistance not needed	615	52.7
04. Caregiver(s) provide assistance	499	42.8
03. Caregiver(s) need training/supportive services	4	0.3
02. Unclear whether caregivers will provide assistance	6	0.5
01. Assistance needed but no caregiver available	21	1.8
Total scored respondents	1,145	98.1
00. Assistance needed but declined	3	0.3
09. Not applicable	14	1.2
Total respondents	1,167	100

Unpaid IADL assistance. Overall, one-third of individuals did not need unpaid assistance with IADLs; almost two-thirds (61 percent) received unpaid care assistance with these activities (Table 12.17). However, about half of individuals with serious mental illness or an intellectual or developmental disability did not need assistance for these activities (52 and 55 percent, respectively). About 15 and 20 percent, respectively, of individuals who are frail elderly or with a physical disability did not need unpaid assistance with IADL activities; 80 and 77 percent, respectively, received unpaid assistance by a caregiver (Appendix D, Table D14.a.3). There was a significant association between level of unpaid IADL assistance and CB-LTSS population (χ^2 = 185.18, df_{16}, p < .0001), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D14.b.3). Across populations less than 3 percent of individuals needed unpaid IADL assistance that was not available (Appendix D, Table D14.a.3).

Table 12.17. Descriptive Statistics of Rating Scale Use for All Participants for Item 15c. Unpaid IADL Assistance

15c. Unpaid IADL Assistance	n	%
05. Assistance not needed	395	33.9
04. Caregiver(s) provide assistance	712	61.0
03. Caregiver(s) need training/supportive services	2	0.2
02. Unclear whether caregivers will provide assistance	16	1.4
01. Assistance needed but no caregiver available	30	2.6
Total scored respondents	1,155	99.0
00. Assistance needed but declined	3	0.3
09. Not applicable	3	0.3
Total respondents	1,167	100

Abbreviation: IADL, instrumental activity of daily living.

Unpaid medication administration assistance. Overall, half of individuals did not need unpaid assistance with medication administration; 42 percent received unpaid care assistance with this activity (Table 12.18). This pattern was consistent for individuals with a brain injury. About 32 and 42 percent, respectively, of individuals who are frail elderly and those with a physical disability did not need unpaid assistance with medication administration activities; 64 and 52 percent, respectively, received unpaid assistance (Appendix D, Table 14.a.4). There was a significant association between level of unpaid assistance with medication administration and CB-LTSS population ($\chi^2 = 157.03$, df_{16}, $p < .0001$), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table 14.b.4).

Across populations, 2 percent of individuals needed unpaid medication administration assistance that was not available; 3 percent of individuals with an intellectual or developmental disability or a brain injury needed unpaid assistance with this activity but no unpaid caregiver was available (Appendix D, Table 14.a.4).

Table 12.18. Descriptive Statistics of Rating Scale Use for All Participants for Item 15d. Unpaid Medication Administration

15d. Unpaid Medication Administration	n	%
05. Assistance not needed	583	50.0
04. Caregiver(s) provide assistance	485	41.6
03. Caregiver(s) need training/supportive services	0	0.0
02. Unclear whether caregivers will provide assistance	10	0.9
01. Assistance needed but no caregiver available	24	2.1
Total scored respondents	1,102	94.4
00. Assistance needed but declined	2	0.2
09. Not applicable	58	5.0
Total respondents	1,167	100

Unpaid medical procedures/treatments. Overall, this item was not applicable for almost half of individuals (49 percent). Individuals with an intellectual or developmental disability reported the highest percentage of not applicable responses (57 percent). Overall about one-third of individuals (31 percent) did not need unpaid assistance with medical procedures/treatments; less than one- fifth (18 percent) received unpaid care assistance with this activity (Table 12.19). This pattern was consistent for individuals with serious mental illness, a brain injury, or an intellectual or developmental disability. About 24 and 19 percent, respectively, of individuals who are frail elderly and those with a physical disability did not need unpaid assistance with medical procedures/treatments activities; 27 and 23 percent, respectively, received unpaid assistance with these activities (Appendix D, Table D14.a.5). There was a significant association between level of unpaid assistance with medical procedures/treatments and CB-LTSS population ($\chi^2 = 84.98$, df_{16}, $p < .0001$), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D14.b.5). Across populations less than 1 percent of individuals needed unpaid assistance for these activities that was not available (Appendix D, Table D14.a.5).

Table 12.19. Descriptive Statistics of Rating Scale Use for All Participants for Item 15e. Unpaid Medical Procedures/ Treatments

15e. Unpaid Medical Procedures/Treatments	n	%
05. Assistance not needed	360	30.9
04. Caregiver(s) provide assistance	213	18.3
03. Caregiver(s) need training/supportive services	4	0.3
02. Unclear whether caregivers will provide assistance	4	0.3
01. Assistance needed but no caregiver available	5	0.4
Total scored respondents	586	50.2
00. Assistance needed but declined	3	0.3
09. Not applicable	573	49.1
Total respondents	1,167	100

Unpaid management of equipment. Overall, this item was not applicable for three-fifths of individuals (59 percent). Twenty-five percent of individuals did not need unpaid assistance with the management of equipment; 15 percent received unpaid care assistance with this activity (Table 12.20). This pattern was generally consistent for individuals with serious mental illness, a brain injury, or an intellectual or developmental disability. About 19 and 16 percent, respectively, of individuals who are frail elderly and those with a physical disability did not need unpaid assistance with management of equipment; 25 and 20 percent, respectively, received unpaid assistance (Appendix D, Table D14.a.6). There was a significant association between level of unpaid assistance and CB-LTSS population ($\chi^2 = 104.30$, df_{16}, $p < .0001$), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D14.b.6). Across populations less than 1 percent of individuals needed unpaid assistance with the management of equipment that was not available (Appendix D, Table D14.a.6).

Table 12.20. Descriptive Statistics of Rating Scale Use for All Participants for Item 15f. Unpaid Management of Equipment

15f. Unpaid Management of Equipment	n	%
05. Assistance not needed	290	24.9
04. Caregiver(s) provide assistance	170	14.6
03. Caregiver(s) need training/supportive services	0	0.0
02. Unclear whether caregivers will provide assistance	4	0.3
01. Assistance needed but no caregiver available	5	0.4
Total scored respondents	469	40.2
00. Assistance needed but declined	1	0.1
09. Not applicable	692	59.3
Total respondents	1,167	100

Unpaid supervision. Overall, this item was applicable for most individuals (90 percent). More than one-third of individuals (38 percent) did not need unpaid assistance with supervision; 49 percent received unpaid care assistance with this activity (Table 12.21). Over half of individuals with serious mental illness (62 percent) or an intellectual or developmental disability (52 percent) did not need unpaid assistance with this area; 28 and 42 percent, respectively, received unpaid assistance with this area. About 22 and 26 percent, respectively, of individuals who are frail elderly and those with a physical disability did not need unpaid assistance for supervision; 68 and 51 percent, respectively, received unpaid assistance. Individuals with a brain injury were evenly distributed, with 47 percent not needing unpaid assistance and 46 percent receiving paid assistance in this area (Appendix D, Table D14.a.7). There was a significant association between level of unpaid assistance for supervision and CB-LTSS population ($\chi^2 = 125.85$, df_{16}, $p < .0001$), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D14.b.7).

Across populations 2 percent of individuals needed unpaid assistance for supervision that was not available; however, 5 percent of individuals with an intellectual or developmental disability and 4 percent of those with brain injury needed unpaid assistance in this area that was not available (Appendix D, Table D14.a.7).

Table 12.21. Descriptive Statistics of Rating Scale Use for All Participants for Item 15g. Unpaid Supervision

15g. Unpaid Supervision	n	%
05. Assistance not needed	444	38.1
04. Caregiver(s) provide assistance	569	48.8
03. Caregiver(s) need training/supportive services	1	0.1
02. Unclear whether caregivers will provide assistance	7	0.6
01. Assistance needed but no caregiver available	28	2.4
Total scored respondents	1,049	89.9
00. Assistance needed but declined	3	0.3
09. Not applicable	106	9.1
Total respondents	1,167	100

Unpaid advocacy. Overall, this item was applicable for most individuals (97 percent). Overall, more than one-third of individuals (38 percent) did not need unpaid assistance with advocacy; 55 percent received unpaid care assistance with this activity (Table 12.22). Over half of individuals with serious mental illness (61 percent) or an intellectual or developmental disability (51 percent) did not need unpaid assistance with advocacy; 36 and 41 percent, respectively received unpaid assistance with this area. About 21 and 27 percent, respectively, of individuals who are frail elderly and those with a physical disability did not need unpaid assistance for advocacy; 74 and 66 percent, respectively, received unpaid assistance. Individuals with a brain injury were about evenly distributed, with 45 percent not needing unpaid assistance and 50 percent receiving paid assistance in this area (Appendix D, Table D14.a.8).

There was a significant association between level of unpaid assistance for advocacy and CB-LTSS population ($\chi^2 = 143.72$, df_{16}, $p < .0001$), indicating that this item distinguished need for assistance across CB-LTSS populations (Appendix D, Table D14.b.8). Across populations, 2 percent of individuals needed unpaid assistance for advocacy that was not available; however, 5 percent of individuals with an intellectual or developmental disability and 4 percent of those with a brain injury needed unpaid assistance in this area that was not available (Appendix D, Table D14.a.8).

Table 12.22. Descriptive Statistics of Rating Scale Use for All Participants for Item 15h. Unpaid Advocacy or Facilitation of Person's Participation in Appropriate Medical Care

15h. Unpaid Advocacy or Facilitation of Person's Participation in Appropriate Medical Care	n	%
05. Assistance not needed	441	37.8
04. Caregiver(s) provide assistance	646	55.4
03. Caregiver(s) need training/supportive services	2	0.2
02. Unclear whether caregivers will provide assistance	13	1.1
01. Assistance needed but no caregiver available	27	2.3
Total scored respondents	1,129	96.7
00. Assistance needed but declined	2	0.2
09. Not applicable	29	2.5
Total respondents	1,167	100

Change in unpaid caregiver's ability, willingness, or availability. Across populations, 95 percent reported no change in caregiver willingness or availability during the past month (Table 12.23). Almost 9 percent of individual with serious mental illness and 5 percent of individuals who are frail elderly indicated a change in unpaid caregiver willingness or availability during the past month (Appendix D, Table D14.a.9). There was no significant association between level of paid assistance and CB-LTSS population ($\chi^2 = 8.17$, df_{16}, $p = .1265$), indicating similar changes in unpaid caregiver ability, willingness, or availability during the past month across populations (Appendix D, Table D14.b.9).

Table 12.23. Descriptive Statistics of Rating Scale Use for All Participants for Item 17. Has the Unpaid Caregiver's Ability, Willingness, or Availability Changed During the Past Month?

17. Has the Unpaid Caregiver's Ability Willingness, or Availability Changed During the Past Month?	n	%
0. No	1,103	95.3
1. Yes	54	4.7
Total respondents	1,157	100

Interrater reliability. Given the previous evidence of alignment between usual (3-day) and most dependent (past month) responses, the interrater reliability (IRR) was evaluated only on the usual (3-day) scores. Krippendorff alpha is calculated for each item, rather than for a composite scale as is done with some other forms of IRR. IRRs are reported for each ambulation mobility item by the 13 assessment entities (Appendix D, Tables 15.a.6 and 7). For entity 7, there were two subsets of raters and items, so separate IRR coefficients are reported for these two subsets (7A and 7B). Entity 4 was small, and only one individual was submitted to the IRR data set. Four items, paid and unpaid assistance with medical procedures and management of equipment (15e and 15f), had insufficient data to be included in the analysis. The remaining 12 items were examined for IRR.

A total of 58 of 156 coefficients (37 percent) were below desired criteria; 43 were less than .67, and 15 were between .67 and .80. The remaining 98 coefficients were above .80, indicating excellent IRR. Of the 58 coefficients below criteria, 44 were from four assessment entities. Three of these were the same entities that had scored inconsistently on other FASI sections. On closer inspection, the remaining entity had only minor disagreements. This appears to be primarily a function of the uneven distribution of scores on these items. Although there are five rating scale options, more than 90 percent of individuals were scored on only two codes, assistance not needed (code 05) and caregiver(s) provide assistance (code 04); the other code options rarely were used. As a result, even minor disagreements appear as low coefficients. Overall, the FASI team concluded that assessors generally are able to score these items reliably and consistently.

Personal Living Arrangement and Caregiver Priorities

At the conclusion of the Living Arrangements, Caregiver Assistance, and Availability section, assessors asked individuals to indicate their top two priorities for the next 6 months in this area. After reviewing the entire data set, the FASI team established codes by which to categorize the individual's responses:

1. The individual indicated satisfaction with current living arrangements.
2. The individual indicated a priority for a different living arrangement addressed by the FASI.
3. The individual indicated a priority for a different living arrangement not addressed by the FASI code or item.
4. The individual indicated satisfaction with caregiver assistance and availability.
5. The individual indicated a priority to change the caregiver assistance and availability.
6. The individual indicated a priority not addressed by section.

This coding approach allowed us to determine how well this section of the FASI represented activities deemed priorities by individuals being assessed and had potential for identifying areas of importance to individuals served by the CB-LTSS programs that are not captured by the items or set. Two members of the FASI team completed the coding. Both members conducted confirmation of data fit by sampling all data until consensus was reached. Frequencies and percentage of coded responses subsequently were summarized for all respondents as well as by population.

This coding approach allowed the FASI team to determine how well this section of the FASI represented activities deemed priorities by individuals being assessed and had potential for identifying areas of importance to individuals served by the CB-LTSS programs that are not captured by the items or set. Two members of the FASI analytic team completed the coding. Both members conducted confirmation of data fit by sampling all data until consensus was reached. Frequencies and percentage of coded responses subsequently were summarized for all respondents as well as by population.

For living arrangements and caregiving assistance, 56 percent (n = 649) of individuals identified at least one priority and 29 percent (n = 339) indicated a second priority. For the first priority, 20 percent (n = 229) indicated a priority related to the assistance they received and 20 percent (n = 228) indicated a priority related to their current living arrangement.

Of those responding to a priority related to their living arrangement, 127 individuals (56 percent) reported being satisfied with their current arrangements. Of those expressing dissatisfaction (n = 101), 53 percent (n = 54) identified a desire to improve their living arrangement in a manner addressed by a FASI item and 47 percent (n=47) reported an arrangement not described by a FASI item. For example, several individuals expressed the desire to move to a different neighborhood or live in a larger home.

Of those articulating a priority related to caregiving assistance, 42 percent (n = 95) expressed satisfaction with their current level of caregiving assistance and 59 percent (n = 134) reported a desire to change something about their current caregiving assistance such as a need to increase the level of care or alter the schedule of care.

One-third of respondents, 30 percent (n = 192), listed a priority unrelated to living arrangement or caregiving assistance. These responses fell into three general categories: (1) restatement of a priority listed in another section of the FASI (n = 30), (2) a statement or restatement of equipment needs (n = 13), and (3) statements beyond those described by a FASI item (n = 149). Examples of priorities not addressed in the FASI were varied. Some examples included a desire to travel, purchase an item, or engage in increased social opportunities.

In examining the pattern of responses of individuals across populations, more than half expressed at least one priority, with the exception of individuals with a physical disability. Fewer individuals with a physical disability identified a priority in this section (43 percent), compared with 66 percent of individuals with serious mental illness.

Assessor Feedback on Living Arrangements, Caregiver Assistance, and Availability Items

Assessors reported few concerns with the Living Arrangements, Caregiver Assistance, and Availability section of the FASI. However, a few issues were identified for consideration. Several assessors reported a lack of a clear definition of regular daytime assistance, regular nighttime assistance, and around-the-clock assistance in Item 14a. One assessor suggested a comment box to provide greater insight into an individual's situation with paid and unpaid caregivers. Also, consistent with all sections of the FASI, assessors reported difficulty determining whether a person's self-report was accurate when cognitive deficits were present and a helper was not available for the assessment.

Observations and Changes to the FASI Arrangements, Caregiver Assistance and Availability Items

On the basis of these findings, the FASI team presented results and recommendations to the TEP for changes to the FASI set. The following section outlines TEP feedback and the changes made to finalize the FASI.

Summary of FASI Living Arrangements, Caregiver Assistance, and Availability Items Testing

The overall reliability and validity results for the self-care items were generally good to strong. The TEP did agree that the priorities sections for these items be separated.

Content validity. Good evidence of content validity was found for living arrangements, caregiver assistance, and availability items. Assessors generally reported that content was appropriate.

Concurrent validity. Evidence on concurrent validity for the living arrangements, caregiver assistance, and availability items was mixed. Chi-square test results indicated that there were significant differences across populations in use of rating scale steps.

Interrater reliability. Evidence for interrater reliability (IRR) for the living arrangements, caregiver assistance, and availability items was strong. Results indicate that assessors were able to achieve good IRR on this section of FASI items.

Separate the priorities for living arrangements and caregiver assistance. The TEP agreed that combining the priorities in this section reduces the prompts for individuals to separately consider their needs and preferences for assistance and for living arrangements. Additionally, the TEP agreed that separating the questions in order to elicit the individual's priority for both living arrangements and caregiver assistance would ensure that respondents are prompted to indicate needs or goals in both of these areas.

Reference Period Decision

Despite the high level of agreement between usual (3 days) and most dependent (past month) reference periods, TEP members felt strongly that capturing changing needs was critical for those individuals in these populations for whom it was a concern. Therefore, the FASI team maintained the most dependent (past month) reference period in the FASI set.

CHAPTER 13. CONCLUSIONS

In this chapter, the FASI team presents the key findings, as well as known limitations, of the field test.

Community-based long-term services and supports (CB-LTSS) programs are designed to enable individuals who otherwise would need a nursing facility or other institutional-level care to live in the least restrictive community setting of their choice. CB-LTSS programs empower individuals to make choices for their lives—where and with whom they live, as well as the supports and services they need to engage in the community, earn a living, and maintain health, wellness, and quality of life. Assessing the effects of CB-LTSS programs has been challenging, because quality performance metrics based on comparable data between programs and across states have not been available. The FASI field test takes a major step toward making these assessments possible by assessing the reliability, validity, and usability of CMS's standardized functional items. The items are intended to be used across a wide variety of individuals receiving CB-LTSS. This report presents the results of the field test.

Field Test Results

Table 13.1 summarizes the validity and reliability evidence for all FASI set items tested by the FASI team. Additional details for any finding listed in this table—including the qualitative determination of the strength of the evidence as strong, good, and mixed—can be found in that chapter (e.g., self-care items) in this report.

Table 13.1. Summary of Validity and Reliability Evidence for FASI Set

Item Category	Content Validity	Concurrent Validity	Structural Validity	Convergent Validity	Interrater Reliability
Self-care items	Good	Mixed	Good	Strong	Strong
Functional mobility items	Good	Mixed	Good	Strong	Strong
Ambulation mobility	Good	Mixed	Good	Strong	Strong
Wheelchair mobility items	Good	Mixed	Good	Strong	[a]
IADL items	Good	Mixed	Good	Strong	Good
Assistive device items	Good	Mixed	[a]	[a]	Strong
Living arrangements, availability of assistance, and caregiver assistance items	Good	Mixed	[a]	[a]	Strong

Abbreviation: IADL, instrumental activity of daily living.

[a] There were too few individuals in the subset to evaluate this item.

On the basis of these results from extensive psychometric testing (with the methods described in Chapter 5 of this report), the FASI team concluded that the FASI set items generally were valid and reliable. More specifically, the evidence was generally strong for content validity—the extent to which the items in question cover the concept of interest—and structural validity—the extent to which the ordering of steps and items was logical. Evidence for convergent validity—the alignment of 3-day (usual) and last month (most dependent) scores—and interrater reliability also were usually strong. The least strong evidence was for concurrent validity, which measures the extent to which these items distinguished among populations, which had only mixed evidence.

Additional results from the field test and from the related Technical Expert Panel (TEP) were used to highlight improvements needed in the FASI set. The following list summarizes minor changes made to the FASI based on feedback from the 2017 TEP:

1. Assessor instructions for the completion of the Priorities sections were modified to promote the identification of at least one personal priority. Also, the Priorities sections for Living Arrangement and Caregiver Assistance and Availability were separated into two distinct subsections.
2. Additional examples were added to the instrumental activities of daily living: **simple financial management** to include online/mobile bill pay, banking, or shopping.
3. Crutches and prosthetics were deleted from the list of **assistive devices,** and six devices were added: reacher/grabber, sock aid, raised toilet seat, glucometer, continuous positive airway pressure (CPAP), and oxygen concentrator.
4. Two duplicative items were deleted from the Caregiver Assistance section.

The FASI team updated the FASI set and FASI Manual accordingly.

Field Test Limitations

Like all research, the FASI field test had limitations that moderate the interpretations and generalizability of the findings. It is likely that there is quite a bit of heterogeneity among individuals within disability populations, particularly regarding the number and type of comorbid conditions, which this project did not address. For example, some individuals with serious mental illness reported mobility limitations, suggesting that they also may have had significant physical disabilities. Conversely, individuals who are frail elderly also may have had mental health conditions. Thus, although the data were analyzed with respect to the waiver

program in which an individual was enrolled, the individual may have had additional comorbid conditions that influenced his or her need for assistance with functional daily activities.

To establish that individuals were able to provide informed consent, the consent process involved answering six questions about participating in the study. This process, in addition to locating consent guardians when required, may have resulted in underrepresentation of individuals with cognitive concerns or with guardians.

One limitation regarding the qualitative data obtained from the Personal Priorities sections of the FASI was the inability of the FASI team to clarify meanings or obtain further explanation when the statements provided were unclear or lacked specificity; this meant that the team sometimes was unable to interpret the statement provided by the respondent. There also was a fairly high level of nonresponse to the personal priorities; one priority was indicated on about half of the assessments, and approximately one-quarter completed an additional priority. It is not clear why those individuals did not respond more frequently; as such, the FASI team could not be certain whether these individuals did not understand the question or did not have a priority related to that domain. Thus, it is unclear whether rewording the item or more or different training for assessors on these items is needed.

Recruiting individuals to participate in a field test, particularly when the test involves allowing assessors to come to the home and ask personal questions, can be challenging. As with most prospective studies, this was true of FASI. Some states experienced recruitment challenges because of competing state initiatives in CB-LTSS programs. Related to this, some states chose to contract with entities whose assessors did not usually serve as case managers for individuals in the program. In addition, some individuals receiving CB-LTSS were challenging to contact, indicating that sufficient time to contact and recruit these individuals should be built into future studies. Assessors recruited from lists of individuals provided by states. Regular calls with the assessment entities over the data collection period suggested that when assessors and/or entities were not known to the participants, the positive response rates were lower. Some states had to create additional recruitment samples to enable assessment entities to reach enrollment targets. This field test highlighted the importance of working with grantees to pretest the recruitment sample in order to identify data gaps (e.g., some states did not have complete data on names and/or addresses of guardians).

Assessors played a critical role in the success of the FASI field test. Building in more practice time between completing the training and commencing FASI assessments would have allowed all assessors to become fully comfortable with administering the items. The personal priority

items represent an important component of CB-LTSS assessment, but the FASI format may have been new to some assessors. Enhanced training that provides additional guidance on how to solicit and record personal priorities may have been beneficial.

Summary

This FASI field test represented a significant first step in developing standardized, interoperable data elements for use across CB-LTSS programs. The field test results indicated that there generally was good evidence regarding the reliability and validity of the FASI set. An additional strength of the FASI field test was its ability to highlight the participants' personal priorities, which can be used to strengthen person-centered care. Fully incorporating FASI into the CMS Data Element Library (DEL) and electronic specifications for items newly developed for this field test will continue to enhance the utility of the FASI set.

Responsiveness of the standardized items has not been evaluated to date. This key psychometric consideration represents an opportunity for future enhancement of the standardized functional item set. This analytic approach will facilitate interpretation of the change in the FASI between two assessment periods. The minimal detectable change is pertinent for knowing when an individual makes a change beyond measurement error. This will be critical for ensuring that the individuals' needs are being met. For example, if an individual's mobility declines, his or her service plan may need to be adjusted to include additional services or supports.

The FASI set is just one component of a comprehensive, standardized assessment that makes up an individual's CB-LTSS service plan and informs supports necessary for successful community living. Throughout testing, the FASI team heard from assessors, caregivers, and program managers that FASI was a good start; however, it also was challenging because it did not provide all information needed to determine an individual's service plan. Although FASI never was intended to serve that role, these comments highlight the importance of continued development of a standardized assessment tool for CB-LTSS.

The development of FASI-based performance measures can help address the critical challenges for meaningful CB-LTSS quality measures. FASI-based performance measures will allow a uniform approach to measuring functional needs across all care settings and enable cross-setting comparisons of service provision and quality. These efforts align with the goal of improving the quality of services and supports for individuals receiving CB-LTSS so that they can live successfully in the community.

ACKNOWLEDGEMENTS

The FASI team would like to acknowledge the U.S. Department of Health and Human Services' Centers for Medicare & Medicaid Services for sponsoring the TEFT demonstration.

In addition to the FASI team, the following individuals contributed to the FASI field test:

- George Washington University: Barb Gage, Linda Cotton, Anju Paudel, and George Washington University students
- Truven Health Analytics, an IBM Company: Beth Jackson, Kate Sredl, Matt Newnham, Paige Jackson, Linda Lee, and Eileen Walker

In addition, the FASI team would like to thank six states and the assessors and managers from the 13 FASI assessment entities:

- Arizona: Bridgeway Health Solutions/Centene Corporation
- Colorado: Resource Exchange, Developmental Disabilities Resource Center, Larimer County Options for Long Term Care, Weld County Area Agency on Aging, Rocky Mountain Human Services, and Mountain Valley Developmental Services
- Connecticut: University of Connecticut and Connecticut Community Care
- Georgia: Georgia Medical Care Foundation and Legacy Link Area Agency on Aging
- Kentucky: Buffalo Trace Area Agency on Aging and Independent Living, and Kentuckiana Regional Planning & Development Agency
- Minnesota: Vital Research

The FASI team also would like to thank members of the two Technical Expert Panels and the individuals receiving community-based long-term services and supports and their caregivers and guardians who generously agreed to give their time and confidences to participate in this field test.