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Medicaid 1115 Demonstration Evaluation Design Plan

Managed Long-Term Services and Supports

Design Supplement: Interim Outcomes Evaluation
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I. INTRODUCTION AND PURPOSE

States are increasingly turning to managed care delivery systems, rather than fee-for-service (FFS), to provide long-term services and supports (LTSS) to Medicaid beneficiaries who are frail or have disabilities. Managed LTSS programs (MLTSS) have the potential to provide less costly, person-centered home and community-based alternatives to institutional care, improve care coordination, and reduce the use of unnecessary services. However, if managed care plans restrict access to services or do not assure the quality and coordination of services, MLTSS could have adverse effects on health and long-term care outcomes.

The Medicaid 1115 Demonstration Evaluation Design plan, prepared by Mathematica Policy Research and submitted to the Centers for Medicare & Medicaid Services (CMS) in May 2015 (Irvin et al. 2015), proposed a theoretical evaluation strategy for MLTSS programs. Since submitting the design plan, we have evaluated potential data sources and revised our approach to the interim outcomes evaluation. This design supplement presents our revised approach, serving as a bridge between the design plan and the interim outcomes evaluation that we will conduct in 2017. It begins with a summary of revisions to the research questions (Section II), then details available data sources and their limitations (Sections III). Next, it proposes a feasible evaluation design that relies on descriptive data to present trends across all MLTSS states (Section IV), as well as more rigorous methods to estimate program effects in New York and Tennessee, the two states that had available data required to conduct such an evaluation (Section VI). Finally, it concludes with an overview of limitations and challenges to the outcomes evaluation, and implications for future work (Section VII).

II. RESEARCH QUESTIONS AND EVALUATION APPROACH

Through its evaluation of MLTSS programs conducted under the 1115 Demonstration Evaluation, CMS is interested in understanding how LTSS-related outcomes at the program and beneficiary levels differ between managed care and FFS. The design plan proposed four research questions; however, the interim outcomes evaluation will address three slightly modified questions that better accommodate the available data (Table II.1). The data limitations that contributed to the modified research questions are further described in Section III.

Table II.1. Comparison of research questions proposed in the design plan to those planned for the interim outcomes evaluation report

Proposed in design plan	To be addressed in the interim outcomes evaluation	Rationale
1. How does spending on LTSS change in states switching from FFS to MLTSS systems?	1. How does MLTSS spending change over time?	The Medicaid Analytic eXtract (MAX) data system did not contain detail on the cost of services covered in some states, and available data on costs was difficult to interpret in other states; therefore, questions on spending will be addressed using annual, state-level spending data.
2. How does utilization change in states switching from FFS to MLTSS systems?	2. How does utilization and/or access to services compare between MLTSS and FFS systems?	Only two states had encounter data deemed usable for our analysis: New York and Tennessee. The interim outcomes evaluation will present measures that compare inpatient hospital, institutional, and home and community-based services (HCBS). These measures of service use may also illustrate access to and quality of LTSS over time.
3. How does the quality of care provided under MLTSS compare to that provided under FFS?	3. How does the quality of care provided under MLTSS compare to that provided under FFS?	(Same as above)
4. What is the impact on access to care during state transitions from FFS to MLTSS systems?	(Access to care during the transition to MLTSS will not be assessed)	Proposed measures of access continuity would have been difficult to interpret. See Section V.A for further details.

III. DATA SOURCES FOR THE INTERIM OUTCOMES EVALUATION

A. Findings from the assessment of MAX encounter data quality

The design plan proposed using MAX data to calculate individual-level outcomes in states that transition from FFS to MLTSS. To confirm that MAX could support the proposed evaluation approach, we assessed the availability and quality of MLTSS encounter data in MAX (see Appendix A). Two findings from our assessment helped define the study period for the outcomes evaluation. First, we determined that MAX data are only appropriate for studying MLTSS programs that started in 2009 or later, because 2010 was the first year that FFS MAX included the home and community-based service (HCBS) taxonomy, and we could only reliably replicate the taxonomy on one additional data year (2009). Second, we found that MAX was only available for our MLTSS states of interest through 2014. Therefore, we set the study period for our evaluation as calendar years 2009–2014.

As of July 2016, 20 states offered a total of 25 MLTSS programs (excluding Financial Alignment Demonstrations). Twelve of these programs had operated prior to 2009, and we earlier determined they were not suitable for an evaluation of program outcomes; the remaining 13 were implemented between 2009 and 2014 and were the focus of our data assessment work.

The majority of the 25 programs enrolled people on a mandatory basis (14 did so statewide and 4 did so in limited regions); 7 allowed people to voluntarily enroll (5 allowed voluntary opt-in or opt-out in limited regions and 2 allowed this statewide; Kasten et al. 2015).

Our assessment also found significant variation in encounter data availability and quality across states, narrowing the number that could be included in the outcomes evaluation. We first examined states whose programs were not available in all counties at the beginning of the study period and, therefore, would be suited to a rigorous difference-in-difference or pre-post evaluation strategy involving a comparison group. Among these seven states (California, Delaware, Massachusetts, New York, Tennessee, Texas, and Wisconsin[1]), we determined that data are only usable for New York and Tennessee. Among the additional five states that could potentially support a less rigorous evaluation that would not involve a comparison group (Florida, Kansas, Illinois, New Mexico, and North Carolina), none except New Mexico had any years during which MLTSS programs were in place and both HCBS and institutional encounters existed in MAX. Moreover, we found that New Mexico would not be appropriate for our study because it enrolled people on a mandatory basis statewide before 2009, so data would not allow for a sufficient comparison group.

Though it is possible that a state maintains data that differ from what it submits to MSIS/MAX, conversations with state staff in California, Delaware, and Texas suggest that more complete data for managed care encounters are not available directly from these states. Therefore, obtaining data directly from states would not enhance data quality. For this reason, our assessment led us to focus the interim outcomes evaluation on two states: New York and Tennessee.

B. Additional data sources

In addition to MAX, the MLTSS interim outcomes evaluation will use a variety of data sources to measure spending, utilization, transitions in care, and quality, including the following:

- **Medicare fee-for-service (FFS) data**. Because we expect a large percentage of MLTSS enrollees to be dually eligible, with Medicare paying for their acute care services, it is important to obtain Medicare data for this evaluation. Medicare FFS data are available for services reimbursed under Parts A and B for people who qualify for Medicare on the basis of age, disability, and end-stage renal disease (ESRD). The interim outcomes evaluation will use Medicare FFS data to report on utilization of services and quality of care for dually eligible beneficiaries enrolled in MLTSS.
- **Analytic files developed for the Money Follows the Person (MFP) Demonstration.** For our evaluation of the national Money Follows the Person (MFP) demonstration, Mathematica produced a series of analytical files that contain many of the data elements and measures that we propose to examine for FFS LTSS users. Through a data reuse agreement with the MFP evaluation contract, the interim outcomes evaluation will use certain key

[1] Although 20 states offered MLTSS programs by 2016, only seven were implemented in the timeline and manner suited to our evaluation. See Appendix A for a complete discussion of our encounter data assessment.

variables in the MFP analytic files to facilitate our analysis and increase its efficiency (for example, it will rely on the existing linking of MAX data for individuals across years).

- **CMS-64 quarterly expense reports & LTSS annual expenditure reports**. On a quarterly basis, states report their Medicaid expenditures to CMS with Form CMS-64, which is used to determine the amount of Federal Financial Participation (FFP) they receive. Since 2008, Truven Health Analytics has collected details on LTSS-specific expenditures under managed care to supplement the CMS-64 data, which they summarize each year in LTSS annual expenditure reports. The interim outcomes evaluation will use data that Truven collects to report on annual spending measures for MLTSS programs (see Section IV).

The design report proposed several other data sources that, upon further review, are not suitable for use in the interim outcomes evaluation. First, it proposed using Consumer Assessment of Healthcare Providers & Systems (CAHPS) HCBS Experience of Care Survey data to provide information on beneficiary experiences. However, among the potential study states, only Tennessee field tested this survey in 2014, and the state does not have plans to conduct the survey again in 2016 or 2017, limiting the utility of the information it could provide. Second, the design report proposed using the Behavioral Risk Factor Surveillance System (BRFSS) to provide information on whether people with disabilities felt they received needed social and emotional support as well as preventive health care visits. Only Tennessee collected information on social and emotional support, and these questions were only included in 2013. Moreover, improving preventative health service reflects the quality of clinical care rather than the effectiveness of LTSS. For these reasons, the interim outcomes evaluation will exclude both BRFSS measures from the evaluation. Third, the design plan proposed to use Medicare Advantage (MA) data for dual eligibles enrolled in managed care for Medicare services; however, CMS did not begin systematically collecting encounter claims data from MA plans until 2013. Therefore, the interim outcomes evaluation will not be able to use MA encounters and will only calculate measures of acute care utilization for Medicaid-only enrollees and dual eligibles enrolled in Medicare FFS.

IV. DESCRIPTIVE ANALYSES OF TRENDS IN ALL MLTSS STATES

The staggered expansion of MLTSS around the country and the variations in the geographic reach of each program (that is, statewide versus limited regions) present challenges for rigorous cross-state evaluations. Chief among these is a need to observe the counterfactual of what would have happened to people who receive LTSS if they had stayed in FFS rather than making the switch to MLTSS. MLTSS evaluations are also complicated by voluntary enrollment into certain MLTSS programs, which may result in selection bias, relatively low take-up, and small sample sizes. As described in Section III.A, above, and in Appendix A, the realities of program design coupled with limitations in available data have restricted the more rigorous part of the interim outcomes evaluation to two states: New York and Tennessee.

The interim outcomes evaluation reports, however, will also include high-level, contextual information about all MLTSS programs through the presentation of descriptive trend data on all states that have ever implemented MLTSS, and will compare these data with states that have continuously relied on FFS, when possible. Although descriptive trend data cannot be used to attribute differences to the implementation of MLTSS, they may suggest certain correlations,

especially if a change in outcomes coincides with the variation in timing of the introduction of MLTSS across states.

The interim outcomes evaluation will use the following public sources to assess trends in the following areas:

- **Spending**. The LTSS Annual Expenditure Reports described in Section III.B, above, present trends in Medicaid expenditures for LTSS in all 50 states and the District of Columbia by state and service category. In addition to the FFS spending figures presented in the reports, CMS (via Truven Health Analytics) collects the detailed managed care expenditure information that will allow us to present trends related to MLTSS.
- **Enrollment, utilization, and access**. The interim outcomes evaluation will present MLTSS program features as of 2013, including mandatory and voluntary enrollment, eligibility criteria, and covered services. It will also rely on the Medicaid Managed Care Data Collection System (MMCDCS), which has collected data on MLTSS programs and users since 2013, to describe numbers of MLTSS enrollees and users for various programs, similar to what Mathematica presented in a recent chartbook (Wagnerman et al. 2013).
- **Quality.** The interim outcomes evaluation will use Saucier et al. (2012) to provide information on states engaged in LTSS monitoring activities, a critical activity to ensuring quality of care. It will also use the MMCDCS to illustrate state efforts to improve care quality under Medicaid managed care since 2013.

V. ASSESSMENT OF MLTSS OUTCOMES IN NEW YORK AND TENNESSEE

Following a summary of MLTSS trends, the interim outcomes evaluation will present a more rigorous analysis of the effects of MLTSS in New York and Tennessee. The outcome measures we will calculate in each state are presented in Section V.A, below. Due to key differences in the design of their MLTSS programs (mandatory versus voluntary enrollment, statewide versus selected counties), we will use two different approaches, one to evaluate New York's Managed Long Term Care (MLTC) program and another to evaluate Tennessee's CHOICES program. Each state's program features, methodology, and study populations are described in Sections V.B and V.C. below.

A. Outcomes measures for New York and Tennessee

The interim outcomes evaluation will report a number of individual-level outcome measures related to utilization and care quality. We will report some measures for the draft interim report and add others for the final interim report (Table V.1).

Table V.1. Outcomes measures planned for the draft and final interim outcomes evaluation reports

Measure	Draft	Final
Hospitalization measures		
1. Percentage ever admitted to an acute care hospital	Yes	Yes
2. Average number of acute care hospital stays	Yes	Yes
3. Average number of inpatient hospital days	Yes	Yes

Measure	Draft	Final
Long-term care utilization measures	Yes	Yes
4. Percentage of individuals who used Medicaid HCBS as their LTSS	Yes	Yes
5. Percentage of individuals who received a Medicaid personal care visit	Yes	Yes
6. Percentage of individuals who had long-term institutional stays (that is, any ICF-IDD or NF stay beyond 100 days, regardless of whether the admission followed a hospitalization)	No	Yes
Quality measures	No	Yes
7. Percentage of HCBS users who experienced potentially avoidable hospitalizations (AHRQ ACSC PQI#90)	No	Yes
8. Percentage of institutional residents experienced potentially avoidable hospitalizations (AHRQ ACSC PQI#90)	No	Yes
9. Percentage of individuals experiencing severe pressure ulcers	No	Yes

Note: AHRQ=Agency for Healthcare Research Quality; HCBS=home and community-based services; ICF-IDD=intermediate care facility for individuals with developmental disabilities; LTSS=long-term services and supports; NF=nursing facility; PQI=Prevention Quality Indicators

The design plan proposed seven additional measures that will not be included in the interim outcomes evaluation. These measures, and the rationale for excluding them, are below.

- **Average duration of Medicaid personal care visits among individuals who used personal care during the year.** For the Tennessee study, we were unable to calculate a measure that reflected the frequency or volume with which people received personal care. The state used a variety of procedure codes to capture utilization volume; we could not standardize such codes across service types. For example, although many procedure codes provided information about visits in 15-minute increments, others provided information on a per-diem basis.
- **Percentage of individuals who were screened for the following conditions during the year: (1) diabetes, (2) high cholesterol, and (3) cancer.** We chose not to devote study resources to these measures because they chiefly reflect the quality of clinical care rather than the effectiveness of LTSS.
- **(1) Percentage of MLTSS enrollees who received Medicaid personal care from the same provider (individual or setting) following MLTSS implementation**, and **(2) percentage of nursing facilities and HCBS providers each quarter following MLTSS implementation who participated in Medicaid before MLTSS.** In states that transition from FFS to MLTSS, continuity of care—particularly for personal care—is a chief concern. Advocates for LTSS users would argue that beneficiaries who enroll in MLTSS should continue to receive services from the same provider they had under FFS, with whom they have likely built close relationships, and that states should ensure those providers contract with the MLTSS plans in which their clients are enrolled to limit potential disruptions to care. However, states and managed care plans might argue that simply providing the service, even from a different provider, satisfies access requirements. We chose to drop these two measures primarily because they would have been difficult to interpret.

B. Tennessee study

1. Program overview

Tennessee's evaluation will focus on the state's single MLTSS program, TennCare CHOICES, which began enrollment in March 2010 as a Medicaid section 1115 demonstration. CHOICES enrolls three populations of LTSS users statewide on a mandatory basis into three different levels of benefits. CHOICES 1 is for people of all ages who receive nursing home care. CHOICES 2 is for adults ages 21 and older with a physical disability and seniors ages 65 and older who qualify to receive nursing home care but choose to receive home care services instead. CHOICES 3 is for adults with a disability and seniors who do not qualify for nursing home care, but need a more moderate package of home care services to delay or prevent the need for nursing home care. Tennessee's Medicaid agency pays three participating managed care plans a monthly capitation payment for each qualified enrollee; in exchange, these plans provide most acute care services (excluding prescription drugs) and LTSS (including institutional services and HCBS; TennCare n.d.). As of 2013, 60,943 people were enrolled in TennCare CHOICES (CMS 2015).

2. Study population

The interim outcomes evaluation will compare beneficiaries in Tennessee who enrolled in CHOICES (referred to as the treatment group) to a comparison group of beneficiaries in Georgia and Alabama who remained in FFS but would have been eligible for CHOICES had they lived in Tennessee (referred to as the comparison group). We will derive the FFS comparison group from beneficiaries in states other than Tennessee because CHOICES required mandatory enrollment for all eligible individuals; therefore, an in-state comparison group does not exist. Alabama and Georgia have many of the same characteristics as Tennessee (particularly prior to CHOICES on attributes related to LTSS), but only offer LTSS through FFS. We identified these two states through seven measures of supply and demand for LTSS as well as policy factors related to LTSS delivery, which are contextual attributes and difficult to control for directly in a regression framework. Using reported values for each measure among neighboring states (defined as states that were in the same CMS region as Tennessee or shared a geographic border), we constructed variables to indicate each state's value relative to that of Tennessee (see Appendix B). We then selected as our comparison states the two states with the most measure values close to those of Tennessee.

The method for identifying individuals who belong to the treatment and comparison groups is described below. Prior to proceeding with our analysis, we will confirm that the individuals in the treatment and comparison groups match on important demographic and service use characteristics, as described in Section V.B.3, below.

- **Treatment group.** The treatment group will consist of individuals in Tennessee who were eligible for Medicaid and enrolled in CHOICES between 2010 and 2014. CHOICES services include a nursing facility stay under 90 days; personal care services; adult day care; residential care; round-the-clock services; home-based services; home-delivered meals; equipment, technology, and modifications; caregiver support; services supporting participant direction; and other services, which include pest control.

  We will identify individuals who ever enroll in CHOICES using a finder file produced by the state of Tennessee in September 2016. Although CHOICES offers three levels of

benefits that correspond with different levels of eligibility (referred to as CHOICES 1, 2, and Interim CHOICES 3), we will not distinguish between enrollees in each benefit group.

- **Comparison group.** The comparison group will consist of Medicaid beneficiaries in Alabama and Georgia who (1) received FFS LTSS anytime between 2009 and 2014, and (2) would have been eligible for CHOICES 1 or 2 or Interim CHOICES 3 had they lived in Tennessee. We will use eligibility and utilization information in MAX to recreate eligibility conditions for each CHOICES group (see below). Because we cannot identify individuals who meet nursing facility level of care (NF-LOC) during our study period, we will not distinguish between enrollees in each CHOICES benefit group.
  - CHOICES 1 covers people in Tennessee receiving Medicaid-reimbursed care in a nursing facility (NF). Comparison individuals for this group will consist of Medicaid beneficiaries in Alabama or Georgia with at least one claim for NF services between 2009 and 2014.
  - CHOICES 2 covers people in Tennessee ages 65 and older and adults ages 21 and older with physical disabilities who (1) meet the NF-LOC requirement, (2) qualify either as supplemental security income (SSI) recipients or as members of the group of individuals receiving HCBS known as the "CHOICES 217-like HCBS group," and (3) need and are receiving HCBS as an alternative to nursing facility care. CHOICES 2 primarily consists of people who were served on Tennessee's 1915(c) HCBS waiver for persons who are elderly and/or had a physical disability before CHOICES started. The CHOICES 2 comparison group will consist of Medicaid beneficiaries in Alabama or Georgia with at least one claim for a service covered under CHOICES, as defined by the type of service or HCBS taxonomy codes in MAX. Defining services according to the HCBS taxonomy waiver codes will pick up individuals in Alabama and Georgia who are served by their state's HCBS waivers for older adults and people with disabilities and, therefore, meet an NF-LOC criterion as defined by the state.
  - Interim CHOICES 3 was opened for enrollment on July 1, 2012, at the same time that Tennessee raised the NF-LOC for CHOICES 2. CHOICES 3 preserved a pathway to eligibility for individuals who would have met the NF-LOC criteria in effect before July 1, 2012, but did not fully meet program requirements after that time. For this reason, we understand that the group of individuals eligible for CHOICES 2 before July 1 and the group of individuals eligible for CHOICES 2 and 3 following July 1 are equivalent. Therefore, after July 1, 2012, we will use the same methodology described above for CHOICES 2 to construct a comparison group for CHOICES 2 and 3.

3. Methodology

Tennessee first required eligible individuals in 41 of 95 counties to enroll in CHOICES in March 2010; people in remaining counties were required to enroll as of August 2010. Given the program's mandatory enrollment policy, the interim outcomes evaluation will assume all individuals eligible for CHOICES after 2010 enrolled in MLTSS and were exposed to the program or received "treatment." Therefore, in evaluating the CHOICES program, we would be estimating the average treatment effect (ATE) of moving an entire population from "untreated" (that is, FFS) to "treated" (that is, MLTSS). The evaluation question can be framed as "What would be the effects of the statewide mandatory MLTSS program on the entire population needing LTSS if it were applied to all eligibles in another similar state?"

To estimate the ATE of MLTSS at the population level in Tennessee, the interim outcomes evaluation will use a difference-in-differences (DD) design that compares outcome measures between the treatment group (Tennessee) and the comparison group (Alabama and Georgia) before and after the treatment was introduced (that is, March or September 2010). The DD model takes into account preexisting differences between the treatment and comparison groups as well as any general time trend, with the following basic setup:

$$Outcome_{it} = \alpha + \beta_1 TN + \beta_2 Post-treatment + \beta_3 \left(TN * Post-treatment\right) + \beta_x \mathrm{X} + \varepsilon_{it},$$

In this equation, *TN* is a dummy variable that is set to one when an observation is from Tennessee, and observations for Alabama and Georgia are set to zero. *Post-treatment* is a time dummy variable that is set to one in the time period after implementation of CHOICES, and zero otherwise, and can vary between annual, monthly, or quarterly, depending on the level at which the outcome is measured. Because we have a limited number of years in our study period and outcomes such as hospitalization are rare on a monthly basis, we will most likely conduct the analysis at the quarterly level. *X* captures other covariates that might affect the outcome and ε_{it} represents the residual error term. The DD estimator of interest is β_3, which estimates the difference between the pre-post change in the outcome for Tennessee and the change in the outcome for the comparison state over the same time period. We will run the DD model using the two comparison states one at a time, as well as combined, to test the robustness of results. We will also introduce time fixed effects, when we have more than two time periods (that is, if we want to differentiate between early and later implementing counties) in the analysis. These fixed effects will help control for unobserved variation across time that may affect outcomes and will reduce any biases due to nonrandom assignment to the MLTSS program.

To ensure people in the comparison group are as similar as possible to those in the treatment group, the interim outcomes evaluation will use propensity score matching techniques. The propensity score allows us to match a potential MLTSS enrollee in a comparison state with a similar beneficiary in Tennessee based on observable baseline characteristics that may affect the outcome measures of interest and may possibly be correlated with entry into MLTSS. These include demographics (age, gender, race); location (urban/rural); MLTSS enrollment year; category of Medicaid eligibility; dual status; number and type of chronic conditions, as identified by the Chronic Illness and Disability Payment System (CDPS); an additional flag for dementia, which is not classified in CDPS; and prior utilization (use of institutional care, total FFS expenditures in institutional care, use of personal care, number of days in the nursing facility, use of the emergency department, and any hospital admission, as well as number of hospital stays and days). The propensity score is essentially a balancing score that indicates how similar the distribution of the baseline covariates would be between the treatment and comparison group. A well-balanced matching sample is a feature of a randomized controlled trial and the basis for producing unbiased estimates. After matching, we may use different methods to estimate the ATE and test for robustness. For example, we may directly compare the mean outcomes between the treatment and comparison groups in the matched sample, or apply the DD model to the matched sample for estimating the effect of MLTSS.

One limitation of the DD model is that it assumes that whatever happened to the comparison group over time is what would have happened to the treatment group in the absence of the policy

change (this is known as the "parallel trend" assumption). We will test this assumption by comparing the pre-treatment trends for each outcome measure of interest between the treatment and comparison groups.

C. New York study

1. Program overview

New York operates two programs providing MLTSS, the Managed Long-Term Care (MLTC) Partial Capitation program and the Medicaid Advantage Plus (MAP) program; the interim outcomes evaluation will focus on MLTC, the larger of the two. As of 2012, the MLTC and MAP programs enrolled 45,417 and 1,875 individuals respectively. MLTC was first authorized in 1998 using a 1915(a) waiver; MAP was first authorized in 1996 for dual eligibles only, also using a 1915(a) waiver. Prior to June 2012, enrollment in both programs was voluntary.

In July 2012, New York began requiring that eligible individuals enroll in one of the MLTSS programs and slowly introduced mandatory enrollment throughout most counties in the state (Samis 2014). Program expansion changed the probability of enrollment and its determinants; therefore, we will end the study period in June 2012.

During our study period (2009–June 2012), MLTC allowed adults ages 18–64 with physical disabilities and adults ages 65 and over who required nursing home-level care to enroll on a voluntary basis. New York's Medicaid agency paid more than a dozen participating managed care plans a monthly capitation payment for each qualified enrollee. In exchange, these plans provided nursing facility care and HCBS. Primary and acute medical services and prescription drugs were excluded (that is, they were either provided on an FFS basis or covered through separate Medicaid managed care plans). MLTC plans were available primarily in the New York City area and a handful of upstate counties through mid-2012.

In contrast to MLTC, MAP enrolled only people who are dually eligible for Medicare and Medicaid on the basis of age or a long-term physical disability. The Medicaid agency paid about eight participating Medicare Advantage Special Needs Plans (D-SNPs) a capitation payment to cover institutional care and HCBS; these same plans also received monthly premiums from Medicare to cover all acute care services under the same plan. Data on physician, hospital, and skilled nursing facility stays covered by Medicare are contained in Medicare Advantage encounters, which are not available for our study period. For this reason, the interim outcomes evaluation will not calculate outcomes for the MAP program; however, MAP is included in the descriptive analyses of MLTSS trends.

2. Study population

In New York, the interim outcomes evaluation will compare treatment groups who enroll in MLTC to a comparison group of individuals who were eligible but chose not to enroll. To be eligible for MLTC, an individual had to meet the state's nursing facility level of care (NF-LOC) criteria. When New York introduced mandatory MLTC in 2012, it extended eligibility from its original NF-LOC to individuals who were *at risk* of an NF-LOC, defined as the need for more than 120 days of community-based long-term care services. Because MAX does not include an indicator for NF-LOC during any time period, we will use the definition of eligibility under

mandatory MLTC (that is, institutional care or use of 120 days or more of community-based LTSS) as a proxy for eligibility for the control group. Analyses from the New York State Department of Health (NYS DOH) confirmed that the overall functional scores of individuals eligible for MLTC during our study period were relatively comparable to those who met mandatory MLTSS's requirement for 120 days of community-based long-term care. (NYS DOH 2012 and 2013). Our methodology for identifying eligible individuals who did or did not enroll in MLTC is detailed below.

- **Treatment group.** MLTC-treated enrollees will consist of individuals who enrolled in MLTC for any period of time between January 2009 and June 2012 according to the type of plan and plan ID recorded on the MAX eligibility file. The New York State Department of Health confirmed that the plan IDs we used to identify MLTC enrollees were active during our study period.
- **Comparison group**. MLTC-untreated enrollees will include individuals who are eligible for MLTC but chose not to enroll. Specifically, this group will include Medicaid-only and full benefit dually eligible adults ages 18 and older who either resided in a nursing facility or met the state's NF-LOC but resided in the community. MLTC provides the following services to its enrollees: nursing facility care, private duty nursing, home health care, personal care, and adult day health care. Therefore, we will consider any beneficiary as meeting the program eligibility criteria if he or she used an MLTC-covered service for at least 120 days, with gaps of no more than 30 days between otherwise consecutive services. We will consider eligibility to begin during the month in which HCBS use began, continuing through the remainder of the year. We will not consider any individual enrolled in waivers or other special programs that excluded them from participating in MLTC. [2]

3. Methodology

For New York, we will estimate the average treatment effect for the treated (ATT). The voluntary nature of the MLTSS programs in New York prior to 2012 resulted in low take-up in most counties (Samis 2014), likely influenced by barriers to or attitudes towards participation. Given how few people living in counties with MLTC actually enrolled in the programs (or how few within the treatment group actually received treatment), it is unrealistic to estimate the average treatment effect of MLTC at the population level, as if the program were applied to all eligible individuals (as we will in Tennessee). Instead, we propose to estimate the effect of the program on those who were eligible and voluntarily chose to participate. Therefore, the evaluation question will be "What were the effects of a voluntary MLTC program on those needing LTSS who elected to participate in the program?" or "Had an eligible individual chosen to enroll in New York's MLTC program, what would have been the effects?"

Because enrollment in the MLTC is neither random nor mandatory, the interim outcome evaluation cannot directly compare outcomes between the treated (that is, MLTC enrollees) and untreated subjects (that is, those eligible who chose not to enroll). There are simply too many

[2] We will exclude individuals (1) enrolled in the developmental disability, Traumatic Brain Injury, Nursing Home Transition & Diversion, or Long Term Home Health Care Program 1915(c) waivers, or (2) eligible for Medicaid due to the breast and cervical cancer program or family planning-only program.

confounding factors. To reduce the effects of confounding, we propose to use propensity scores to estimate the probability of enrollment conditional on the similarity of baseline characteristics among eligible individuals in counties that offered MLTC during the study period. The majority of MLTC enrollees started their enrollment prior to 2009, the beginning of our study period, and will be the focus of our New York evaluation.[3] Since we do not observe any pre-enrollment period for individuals eligible for MLTC prior to 2009, we will exclude from the propensity score matching process any variables (referred to as endogenous variables) that contribute to both the likelihood of enrollment in MLTC and the outcomes of enrollment (such as prior service utilization). We will only include characteristics that may contribute to the likelihood of enrollment but not to outcomes (referred to as exogenous characteristics), such as demographics, dual status, geographic location (New York City versus other urban versus rural), and chronic conditions. Based on the estimated probability, we will form matched sets of enrolled individuals and eligible but not enrolled individuals who have similar propensity score values.

The interim outcomes evaluation will use the estimated probabilities of enrollment in different approaches to estimate the ATT. Besides directly comparing mean outcomes in the matched sample, we will also use the estimated propensity score to generate weights and create a synthetic weighted sample in which the distribution of baseline characteristics is independent of treatment assignment, a method known as Inverse Probability of Treatment Weighting ("weighting"). A benefit of weighting is that after the adjustment of confounding factors, the approach can accommodate both a simple comparison of weighted means between treated and untreated, as well as a more sophisticated regression model weighted by the inverse probability of treatment. The regression model will also take advantage of the panel nature of the data in New York and include county-specific fixed effects and a time trend. The key estimate of interest will be the indicator for enrollment in MLTC.

Although propensity score matching allows us to reduce confounding and selection bias due to the nonrandomized nature of enrolling in MLTC, we will never be able to estimate an individual's *true* propensity to enroll in MLTC based on the universe of factors that influence an individual's choices. We can only estimate it using a select number of observable and measurable baseline characteristics. The estimates of the treatment effect based on the matched or weighted sample are only unbiased and valid if there are no residual systematic differences in baseline factors between the treatment and comparison groups. We will confirm this balancing assumption by ensuring observable baseline characteristics for the treatment and comparison groups before we perform the matching or weighting.

VI. LIMITATIONS, CHALLENGES, AND FUTURE WORK

The primary limitation to the MLTSS interim outcomes evaluation is that although it will present descriptive trends across all MLTSS states, it will only present outcomes from two state

[3] As of January 1, 2009, over 25,000 were already enrolled in MAP, compared with an estimated 10,000–15,000 beneficiaries who joined the program during the remainder of our study period. The two groups of enrollees would require two different evaluation designs because we only observe a pre-enrollment period for the latter. Due to limited time and resources, and because the first group represents the larger population and provides an opportunity to explore an alternative approach for evaluating the effects on a different population than the Tennessee evaluation, we chose to focus our New York evaluation on the existing MLTC enrollees at the beginning of our study period.

programs. These two programs represent different MLTSS designs that have been replicated in other states; however, unobservable factors have contributed to their successes and challenges, limiting our ability to generalize the results from New York and Tennessee to other MLTSS programs in other states.

The methods we will use to study MLTSS outcomes in each state also have limitations. Though we deemed Alabama and Georgia to be the closest comparison states for Tennessee based on available information, there may be other underlying differences between them that we did not observe that could contribute to differences in outcomes, in which case, the estimates would be biased. Without information on nursing home level of care, we relied on service use to approximate the comparison population; this comparison group may have differed from the treatment group in terms of functional status. Moreover, although propensity score matching will help reduce the effects of confounding in both state evaluations, we need to confirm the balancing assumption. It is possible that residual selection bias may still influence the estimated effects.

Regardless of any limitations to its scope or findings, the interim outcomes evaluation will help shape other evaluations of MLTSS programs, including the final outcomes evaluation scheduled for 2019. The draft and final interim outcomes evaluation reports will document not only the analyses we performed, but also those that we did not. These reports will also identify current limitations that may be resolved in future years (for example, due to additional data becoming available).

REFERENCES

Byrd, Vivian, and Allison Hedley Dodd. "Assessing the Usability of Encounter Data for Enrollees in Comprehensive Managed Care Across MAX 2007–2009." Medicaid Policy Brief, No. 15. Baltimore, MD: Centers for Medicare & Medicaid Services, December 2012.

Centers for Medicare & Medicaid Services (CMS). "Medicaid Managed Care Enrollment Report." Table 5: State Enrollment in Managed Care Programs Covering Long Term Services and Supports (LTSS), as of July 1, 2013. Baltimore, MD: CMS, Winter 2015 (revised). Available at https://www.medicaid.gov/medicaid/managed-care/enrollment/index.html. Accessed January 11, 2017.

Irvin, Carol V., Debra Lipson, Carey Appold, Maggie Colby, Katharine Bradley, Jessica Heeringa, Jenna Libersky, Vivian L.H. Byrd, and Julia Baller. "Medicaid 1115 Demonstration Evaluation Design Plan." Cambridge, MA: Mathematica Policy Research, May 15, 2015.

Kasten, Jessica, Debra Lipson, Paul Saucier, and Jenna Libersky. "Who Enrolls in State Managed Care Programs Covering Long-Term Services and Supports? Implications of Enrollee Diversity for a Cross-State Evaluation." Rapid Cycle Report submitted to CMS in support of the Medicaid 1115 Demonstration Evaluation, July 31, 2015.

Miller, N., and A. Kirk. "Predicting State Investment in Medicaid Home- and Community-Based Services, 2000–2011." *Journal of Aging & Social Policy*, vol. 28, no. 1, 2014, pp. 49–64.

New York State Department of Health (NYS DOH). "2012 Managed Long-Term Care Report." Albany, NY: NYS DOH, 2012.

New York State Department of Health. "2013 Managed Long-Term Care Report." Albany, NY: NYS DOH, 2013.

Ng, Terence, Charlene Harrington, MaryBeth Musumeci, and Erica Reaves. "Medicaid Home and Community-Based Services Programs: 2009 Data Update." Washington, DC: Kaiser Commission on Medicaid and the Uninsured, December 2012. Available at https://kaiserfamilyfoundation.files.wordpress.com/2013/01/7720-06.pdf. Accessed May 17, 2017.

Ng, T., J. Stone, and C. Harrington. "Medicaid Home and Community-Based Services: How Consumer Access is Restricted by State Policies." *Journal of Aging & Social Policy*, vol. 27, no. 1, 2015, pp. 21–46.

Reinhard, S., E. Kassner, A. Houser, and R. Mollica. "Raising Expectations: A State Scorecard on Long-Term Services and Supports for Older Adults, People with Physical Disabilities, and Family Caregivers." Washington, DC: AARP Public Policy Institute, September 2011.

Ruttner, Laura, and Carol Irvin. "Implications of State Methods for Offering Personal Assistance Services." Medicaid policy brief. Princeton, NJ: Mathematica Policy Research, no. 18, June 2013.

Samis, Sarah. "Mandatory Managed Long-Term Care in New York's Medicaid Program: Key Eligibility and Enrollment Issues." New York, NY: United Hospital Fund, 2014.

Saucier, P., J. Kasten, B. Burwell, and L. Gold. "The Growth of Managed Long-Term Services and Supports Programs: A 2012 Update." Baltimore, MD: Truven Health Analytics, July 2012. Available at http://medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Delivery-Systems/Downloads/MLTSSP_White_paper_combined.pdf.

Stevenson, David, and David Grabowski. "Sizing up the Market for Assisted Living." *Health Affairs*, vol. 29, no.1, January 2010, pp. 25–43.

TennCare. "To Qualify for CHOICES," (n.d.). Available at https://tn.gov/tenncare/article/to-qualify-for-choices.

Wagnerman, Karina, Jessica Nysenbaum, and Benjamin Fischer. "Medicaid Managed Care: Trends and Snapshots, 2000–2013." Baltimore, MD: Centers for Medicare and Medicaid Services, 2013.

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APPENDIX A

ANALYSIS OF MEDICAID ENCOUNTER DATA QUALITY

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ANALYSIS OF MEDICAID ENCOUNTER DATA QUALITY

To inform our evaluation design strategy, we reviewed the quality and completeness of home and community-based services (HCBS) and institutional encounters contained in MAX. Our review was limited to the subset of potential study states that (1) transitioned from covering long-term services (LTSS) under fee-for-service (FFS) to managed care in at least one county sometime between 2010 and 2013, and (2) covered LTSS under FFS in 2009 to allow sufficient time for a pre-period. Of the 20 states that have ever operated MLTSS programs as of 2016, 11 fit these criteria: California, Delaware, Florida, Illinois, Kansas, Massachusetts, North Carolina, New York, Tennessee, Texas, and Wisconsin. This analysis found that of these 11 states, only New York and Tennessee have encounter data that are usable for the outcomes evaluation.

A. Availability of MLTSS encounter data in MAX

Given the variation in availability of encounter data in MAX across states (Byrd and Dodd 2012), we limited the assessment of MLTSS encounter quality to states that had at least some encounter records (that is, more than one record) for HCBS and institutional services reported in MAX 2009–2014 and AlphaMAX 2013.[4] We defined HCBS services as encounter claims with a type of service code for personal care, private duty nursing, home health, adult day care, and residential care, or a type of program code applicable to HCBS for disabled and elderly individuals ages 65 and older or HCBS waiver services. We defined institutional services as encounter claims with a type of service code for mental hospital services for the aged, inpatient psychiatric facility for individuals under age 21, intermediate care facility for individuals with intellectual disabilities (ICF-IDD), and nursing facility services. Of the 11 potential study states, we identified 7 with at least some MLTSS encounter data in MAX for a continuous period between 2009 and 2013: California, Delaware, Massachusetts, New York, Tennessee, Texas, and Wisconsin (see Table A.1). The remaining four states (Florida, Kansas, Illinois, and North Carolina) are missing one or more years of MLTSS encounters in MAX during our study period.

[4] CMS develops MAX data as a more research-friendly version of MSIS files. MAX production requires seven quarters of MSIS data, including four quarters for the calendar year plus three additional quarters with adjustment records. Alpha-MAX data are produced without the full seven quarters of MSIS data. At the time of our analysis, MAX 2013 data were not yet available, so we reviewed AlphaMAX from that year. MAX 2013 and 2014 data have since become available for Tennessee, so we incorporated the additional years of MAX data into the interim outcomes evaluation.

Table A.1. Summary of state MLTSS characteristics and MAX data availability

State	Program name(s)	Start	MLTSS in at least some but not all counties between 2010–2013?	At least some HCBS[a] encounters in MAX 2009–2012 and AlphaMax 2013[b]?	At least some LT[c] encounters in MAX 2009–2012 and AlphaMax 2013[b]?
Group 1 – States that have encounter records data in MAX (N = 7)					
California	Senior Care Action Network (SCAN)	1998	Yes	Yes	Yes
Delaware	Diamond State Health Plan-Plus (DSHP-Plus)	2012	Yes	Yes	Yes
Massachusetts	Senior Care Options (SCO)	2004	Yes	Missing 2009–2010[d]	Missing 2009–2010[d]
New York	Managed Long-Term Care (MLTC), Medicaid Advantage Plus (MAP)	1998 (MLTC), 2006 (MAP)	Yes	Yes	Yes
Tennessee	CHOICES	2010	Yes	Yes	Yes
Texas	STAR+PLUS	1998	Yes	Yes	Yes
Wisconsin	Family Care (FC), Partnership (P)	1999 (FC), 1996 (P)	Yes	Yes	Yes
Group 2 – States that do not have sufficient data in MAX (N = 4)					
Florida	Long Term Community Diversion, Long Term Managed Care (LTC)	1998–2013 (Diversion), 2013+ (LTC)	Yes	Missing 2013	Missing 2009–2012
Kansas	KanCare	2013	Yes	Missing 2013	Missing 2013
Illinois	Integrated Care Program-B (ICP)	2013	Yes	Missing 2013	Missing 2013
North Carolina	MH/DD/SAS Health Plan Waiver	2005	Yes	Missing 2009–2013	Missing 2009–2013
Group 3[e] – States that cannot be included in the evaluation using the proposed strategy (N = 8)					
Arizona	Arizona Long Term Care System (ALTCS)	1998	No (statewide prior to 2006)	Missing 2012	Missing 2012
California	MediCal Managed Care	2014	No (began 2014)	n/a	n/a
Hawaii	QUEST Expanded Access Program (QExA)	2009	No (statewide as of 2009)[f]	Yes	Missing 2009–2010
Michigan	Medicaid Managed Specialty Support & Services Program	1997	No (statewide prior to 2006)	Yes	Yes
Minnesota	Minnesota Senior Health Options (MSHO), Senior Care Plus (MSC+)	1997 (MSHO), 2005 (MSC+)	No (MSHO statewide prior to 2009, MSC+ statewide in 2009)	Missing 2013	Missing 2013
New Jersey	MLTSS	2014	No (began 2014)	n/a	n/a
New Mexico	Coordination of Long Term Services (CoLTS; 2008–2013); Centennial Care (2014+)	2008	No (began 2008)	Yes	Yes
Ohio	MyCare	2014	No (began 2014)	n/a	n/a
Rhode Island	Rhody Health Options	2014	No (began 2014)	n/a	n/a

[a] HCBS are identified by (1) the MAX type of service code; these include personal care, private duty nursing, home health, adult day care, and residential care, or (2) the MAX type of program code applicable to HCBS for disabled and elderly individuals ages 65 and older or HCBS waiver services.

[b] AlphaMAX requires four quarters of data for an annual file to be complete.

[c] LT = institutional care services, which include mental hospital services for the aged, inpatient psychiatric facility for individuals under age 21, intermediate care facility for individuals with intellectual disabilities, and nursing facility services.

[d] Although Massachusetts had data missing for 2009 and 2010, we included it in group 1 and explored the possibility of evaluating the state using a shorter study period, but ultimately decided against this approach.

[e] We do not report the availability of MLTSS encounters in MAX for these states because they were statewide prior to our proposed study period and, therefore, not eligible for inclusion in our study.

[f] QExA was statewide before 2010, but the state had an HCBS waiting list in place from 2008–2013 (about 5,000 aged were on this list). In 2014, Hawaii eliminated its HCBS waiting list for the categorically eligible. Because Hawaii is missing LT encounters in some years, we cannot include them in the evaluation unless we obtain the data needed directly from the state.

B. Number of MLTSS enrollees in Group 1 states

The second step in our assessment of MLTSS data quality was to examine the information about enrollment and service use in the subset of seven states that meet the criteria for a rigorous evaluation and reported the necessary encounter records during in 2009–2013. We identified people who were enrolled in an MLTSS program based on a combination of program variables on the MAX enrollment file specific to each state. Where we had questions, we verified our identification approach directly with the state. Specifically:

- **California.** Enrollees must be in one of the SCAN plans (plan ID = 200, 201, 204, 205, 206, or 207).
- **Delaware.** Enrollees must have one or more months of MLTSS eligibility (identified through state-specific eligibility codes 12, 17, 1A, 1V ,22, 27, 28, 2A, 2V, 32, 42, 48, 52, 57, 5A, 5V, 62, 67, 68, 6A, 6V, 82, B2, W1, W2) and a capitation payment on the outpatient or long-term care file for an amount greater than zero.
- **Massachusetts.** Enrollees must be in one of the Senior Care Options plans (plan ID = 110031450, 110031447, 110031449, 110031448, or 110031470, and plan type = 1).
- **New York.** Enrollees must be in one of the MLTC managed care plans (code = 71, 72, 73, or 74 in positions 9 or 10 of any plan ID, or managed care plan type = 5).
- **Tennessee.** Enrollees must be enrolled in CHOICES, according to the finder file obtained directly from the state.
- **Texas.** Enrollees must be in one of the STAR+PLUS plans (plan ID = 5A, 18, 19, 33, 34, 45, 46, 47, 69, 85, 86, 5B, 6C, 7P, 7R, 7S, 8R, 8S, 8T, 9F, 9H, H5, H6, H7, 54, 55, or 58).
- **Wisconsin.** Enrollees must be in one of the Family Care or Partnership Plans (plan ID = 69005530, 69005630, 69005730, 69005830, 69005930, 69007830, 69007833, 69008130, 69008230, 69009009, 69009019, 69009024, 69009038, 69009058, 69009059, 69009062, 69009063, 69009064, 69009065, 69009066, 69009067, 69009068, 69002330, 69002331, 69002341, 69002731, 69005030, 69005230, 69009021, 69009025, 69009039, 69009040, 69009041, 69009042, 69009060, or 69009061, and plan type = 1 or 5)

We then assessed the number of MLTSS enrollees compared to external data sources. We compared the number of MLTSS enrollees in 2012 to data reported by Saucier et al. (2012) and enrollees in 2013 to data reported by the Medicaid Managed Care Data Collection System (CMS

2015; see Table A.2).[5] For New York, we also compared data in each year to enrollment numbers reported by the state.[6] For each state, we also examined MLTSS enrollees in each year based on age, sex, dual eligibility, race/ethnicity, plan enrollment (plan ID and type), waiver enrollment (waiver ID and type), and reason for Medicaid eligibility (MAX uniform eligibility group).

We found that the number of MLTSS enrollees reported in MAX differed from what was reported in MMCDCS in 2013 in all states; the range of the difference varied across states (see Table A.2). Delaware and Massachusetts reported many fewer MLTSS enrollees in MAX than in MMCDCS (39 and 21 percent, respectively), whereas California and New York reported many more enrollees (20 and 24 percent, respectively). Tennessee, Texas, and Wisconsin each reported differences of less than 15 percent. The differences between MAX and MLTSS enrollment reported in Saucier et al. were greater in 2012 (not shown). In New York (the only state that reported expected enrollment in MLTSS for 2009–2011), the difference between MAX and state-reported enrollment ranged from 40 percent in 2009 to 7 percent in 2011.

Table A.2. Number of actual MLTSS enrollees (2009–2013) compared to expected (2013 only)

State	Ever enrolled MLTSS enrollees, MAX (A)					July enrollment, CMS enrollment report (B) [a]	(A) vs (B)	
	2009	2010	2011	2012	2013	2013	2013 (N)	2013 (%)
California	8,392	9,193	9,016	8,712	9,196	7,655	1,541	+20
Delaware	5,660	5,640	5,765	6,313	6,654	10,922	-4,268	-39
Massachusetts	18,707	15,091	16,644	17,922	22,203	28,212	-6,009	-21
New York	36,415	40,460	43,890	86,794	146,553	118,076	28,477	+24
Tennessee	0	47,420	56,466	57,013	55,824	60,943	5,119	- 8
Texas	186,092	192,265	315,707	453,403	459,519	408,808	50,711	+12
Wisconsin	28,200	35,618	38,011	40,428	43,673	39,842	3,831	+10

[a] External data for 2013 are from MMCDCS 2013. California and Texas reported LTSS enrollees, whereas Delaware, Massachusetts, New York, Tennessee, and Wisconsin reported users only.

[5] Though external data provide an important point of comparison, the definition of MLTSS users or enrollees reported directly by states through a one-time data collection often varies across states and time. Refer to the footnotes in Table III.1 for more detail.

[6] External data for New York 2009–2013 are from the New York State Department of Health. Monthly Medicaid Managed Care Enrollment, December. Reports available at https://www.health.ny.gov/health_care/managed_care/reports/enrollment/monthly/ and https://www.health.ny.gov/health_care/managed_care/reports/enrollment/monthly/archives.htm.

C. Volume of MLTSS encounters in Group 1 states

After identifying the MLTSS enrollees in each state, we examined the percentage of enrollees who had at least one HCBS or institutional care encounter record in each study year. HCBS encounters were defined as records with (1) a type of service code indicting home health, personal care services, targeted case management, rehabilitation services, hospice, private duty nursing, durable medical equipment and supplies, residential care, or adult day care, or (2) program code for HCBS waiver services or HCBS care for disabled elderly and individuals ages 65 and over. Institutional care encounters were defined as records with types of service codes indicating mental hospital services for the aged, inpatient psychiatric facility for individuals under age 21, ICR-IDD, or other nursing facility services. The set of services used to define HCBS and institutional care in this part of the analysis is more expansive than what was used to identify MLTSS users, so as to catch all potential services that might apply to an MLTSS user over the long term.

We found that the average number of MLTSS enrollees with at least one MLTSS encounter varied widely across states (Table A.3). Nearly 90 percent of all enrollees in two states (New York and Tennessee) reported at least one MLTSS encounter in each study year. In contrast, less than 50 percent of participants in Delaware and less than 15 percent of participants in California, Massachusetts, Texas, and Wisconsin reported at least one MLTSS encounter in each year. Communications with Delaware suggested that, at least in that state, all MLTSS enrollees should have one or more encounters in a given year.

Table A.3. Percentage of MLTSS enrollees with HCBS or LT encounter records

State	2009	2010	2011	2012	2013	Average (all years)
California	0.0	0.2	2.4	1.4	1.4	1.1
Delaware	-	-	-	40.1	45.7	42.9
Massachusetts	0.0	0.0	0.7	22.6	36.2	11.9
New York	89.9	85.7	90.1	85.7	85.5	87.4
Tennessee	-	91.0	95.7	96.1	95.2	94.5
Texas	5.8	5.8	5.1	9.6	10.8	7.4
Wisconsin	0.3	0.4	0.6	0.7	0.4	0.5

"-" indicates that MLTSS was not in place during the year.

HCBS = home and community-based services; LT = long-term care

We confirmed our approach for identifying MLTSS enrollees and encounters with staff in California, Delaware, and Texas. Staff in these states were not surprised to hear that we were finding so few enrollees with encounter records. Delaware and Texas, in particular, reported difficulties collecting MLTSS encounter data from plans, and suggested that the state did not have high quality data to submit to MSIS in the first place. Without sufficient MLTSS encounter records, we were unable to include California, Delaware, Massachusetts, Texas, or Wisconsin in our outcomes evaluation; for this reason, we did not perform additional checks on the quality of the MLTSS encounter data reported in these three states.

D. Quality of MAX encounter data in New York and Tennessee

The third step in our assessment was to examine the quality of the data fields on HCBS and institutional care encounter records required to measure the outcomes proposed in our evaluation design report. The majority of the measures we examined assessed data completeness (that is, whether certain data fields contained a valid value or whether the number of encounter records per eligible person indicated that we were likely capturing all services delivered). One measure—the percentage of HCBS encounter records with a diagnosis code greater than three characters—assessed whether the variable of interest contained valid values. For most measures, we assessed the results against a target value of 100 percent. We also compared the results for each measure against reference values calculated from 2009 FFS data. We calculated these measures only for the two states that reported a number of MLTSS enrollees with at least one encounter record that was close to what was expected: New York and Tennessee.

Regarding HCBS encounter records, we found that data in both Tennessee and New York were complete across the majority of fields we reviewed (see Table A.4). In both states, more than 90 percent of HCBS encounter records reported values related to service provision, including place of service code, procedure code, and CPT-4 or HCPCS code. In Tennessee, more than 90 percent of HCBS encounter records also reported information on the providers for each service (that is, billing provider ID, National Provider Identifier [NPI], and servicing provider ID); these values were reported less often in New York. We also found that none of the encounters in Tennessee or New York had the HCBS taxonomy applied, suggesting that we should rely on the type of service field to identify HCBS claims in each state. We also drew upon Mathematica's work for the Money Follows the Person demonstration to classify encounters without an HCBS taxonomy code into useable categories. Although there is some variation from year to year, consistency in the percentage of HCBS encounter records reporting each value gave us confidence that the data in these two states were usable for the MLTSS evaluation.

Table A.4. Measures of HCBS encounter record completeness and quality

State	2009	2010	2011	2012	2013	Average (all years)	FFS reference value (2009)
Participants with HCBS encounter records (%)							
New York	88.5	83.3	87.6	83.4	83.4	85.2	n/a
Tennessee	-	42.0	46.0	47.0	50.0	46.3	n/a
Average number HCBS encounter records per enrollee (N)							
New York	96.6	51.9	47.9	66.0	84.0	96.6	n/a
Tennessee	-	10.2	23.4	25.3	28.2	21.8	n/a
HCBS encounter records with a place of service code (%)							
New York	99.8	99.4	99.1	99.6	99.7	99.5	100.0
Tennessee	-	99.0	100.0	100.0	96.0	98.8	99.4
HCBS encounter records with a diagnosis code greater than three characters (%)							
New York	87.3	75.2	73.8	88.8	99.9	85.0	99.0
Tennessee	-	100.0	68.0	86.0	100.0	88.5	99.9
HCBS encounter records with a procedure code (%)							
New York	99.4	97.4	96.6	97.8	98.0	97.8	100.0
Tennessee	-	96.0	99.0	99.0	100.0	98.5	99.6
HCBS encounter records with a CPT-4 or HCPCS procedure code (%)							
New York	99.4	97.3	96.5	97.8	98.0	97.8	3.3
Tennessee	-	96.0	99.0	99.0	100.0	98.5	99.6

State	2009	2010	2011	2012	2013	Average (all years)	FFS reference value (2009)
HCBS encounter records with billing provider ID (%)							
New York	94.2	58.9	53.3	33.0	32.6	54.4	100.0
Tennessee	-	100.0	100.0	100.0	100.0	100.0	100.0
HCBS encounter records with NPI (%)							
New York	76.5	61.2	67.0	80.6	86.5	74.4	44.6
Tennessee	-	100.0	96.0	91.0	92.0	94.8	73.3
HCBS encounter records with a servicing provider ID (%)							
New York	32.4	53.2	52.3	32.0	32.3	40.4	100.0
Tennessee	-	100.0	100.0	100.0	100.0	100.0	99.5
Encounter records with HCBS taxonomy code [a] (%)							
New York	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tennessee	-	0.0	0.0	0.0	0.0	0.0	0.0

[a] For the national evaluation of the Money Follows the Person (MFP) demonstration, Mathematica has done considerable work regarding classification of HCBS into the HCBS taxonomy. We may draw upon this work for the outcomes evaluation where the MAX taxonomy is not available.

We also found that institutional care encounter records in both New York and Tennessee were complete across the majority of fields we reviewed (Table A.5). In both states, 100 percent of institutional care encounter records contained values for service begin date, end date, and patient status—important details related to service provision. In Tennessee, 100 percent of institutional care encounter records also contained values for billing provider ID and NPI; these values were reported less often in New York. Though there is some variation from year to year, consistency in the percentage of institutional care encounter records reporting the values of interest gave us confidence that the data in these two states are usable for the MLTSS evaluation.

Table A.5. Measures of LT encounter completeness and quality

State	2009	2010	2011	2012	2013	Average (all years)	FFS reference value (2009)
Enrollees with LT encounter records (%)							
New York	8.1	8.0	9.2	10.0	14.0	9.9	n/a
Tennessee	-	58.0	60.0	59.0	54.0	57.8	n/a
Average number of LT encounter records per enrollee (N)							
New York	0.8	0.7	0.7	1.98	5.6	1.96	n/a
Tennessee	-	4.3	7.6	7.6	6.8	6.6	n/a
LT encounter records with billing provider ID (%)							
New York	98.5	96.2	95.3	75.0	81.2	89.2	100.0
Tennessee	-	100.0	100.0	100.0	100.0	100.0	100.0
LT encounter records with NPI (%)							
New York	65.1	63.5	79.3	80.1	79.8	73.6	99.9
Tennessee	-	100.0	100.0	100.0	100.0	100.0	100.0
LT encounter records with service begin date (%)							
New York	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Tennessee	-	100.0	100.0	100.0	100.0	100.0	100.0
LT encounter records with service end date (%)							
New York	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Tennessee	-	100.0	100.0	100.0	100.0	100.0	100.0
LT encounter records with patient status code (%)							
New York	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Tennessee	-	100.0	100.0	100.0	100.0	100.0	100.0

LT = institutional care.

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APPENDIX B

MEASURES OF LTSS SUPPLY, DEMAND, AND POLICY IN TENNESSEE AND ITS NEIGHBORING STATES

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MEASURES OF LTSS SUPPLY, DEMAND, AND POLICY IN TENNESSEE AND ITS NEIGHBORING STATES

To identify a comparison state for Tennessee, we reviewed the following seven measures. The values for each measure in neighboring states are presented in Table B.1.

1. **HCBS spending as a share of total LTSS spending for adults over age 65 or under age 65 with physical disabilities.** We included this measure because researchers have observed stronger growth in the share allocated to HCBS among states with an initially low share (or low "investment"; Miller and Kirk 2014).
2. **Whether personal care was provided under a state plan or HCBS waiver.** States with state plan personal care programs tend to have more success rebalancing HCBS expenditures (Ng et al. 2015; Ruttner and Irvin 2013).
3. **The number of Medicaid LTSS participant-years per 100 people age 21 or older with an ADL-limiting disability and income at or below 250 percent of the federal poverty level (FPL).** This indicator is included in our set and in the AARP rebalancing scorecard because it examines the likelihood that people with disabilities and modest incomes will actually receive Medicaid LTSS; a higher percentage indicates a more effective Medicaid LTSS safety net (Reinhard et al. 2011).
4. **Number of home health/personal care aides per 1,000 people over age 65.** This measure is also derived from the AARP scorecard. A higher ratio promotes access to community living (Reinhard et al. 2011).
5. **Number of assisted living units per 1,000 people ages 65 and over.** Like the previous measure, research suggests that a high ratio of assisted living units promotes access to community living (Stevenson and Grabowski 2010).
6. **Number of nursing facility beds per 1,000 people ages 65 and over.** Also derived from the AARP scorecard, lower ratios reported for this measure suggest that access to institutional care is limited (Reinhard et al. 2011).
7. **Number of people on HCBS waiver waiting lists.** Though methods of reporting HCBS waiver waiting lists can vary widely, high numbers generally indicator that demand is higher than supply, and current LTSS policy results in unmet need (Ng et al. 2012).

Table B.1. Measures used to indicate LTSS capacity in Tennessee and neighboring states

State	State share of LTSS that is HCBS for people age 65+ or <65 w/PD, 2000 [a]	Personal care provided under state plan (PCS) or HCBS waiver (W), 2010 [b]	Number of Medicaid LTSS participant-years per 100 people age 21+ with ADL disability and income ≤250 FPL, 2007 [c]	Number of home health/personal care aides per 1,000 people age 65+, 2009 [c]	Number of assisted living units per 1,000 people age 65+, 2007 [d]	Number of nursing facility beds per 1,000 people age 65+ [c]	Number of people on HCBS waiver waiting lists [e]
Tennessee	0.55	W	15.9	27	18	37.1–44.4	2,666
Alabama	10.97	W	21.9	20	11	37.1–44.4	3,750
Georgia	14.21	W	20.5	20	17	29.1–37.0	11,242
Arkansas	30.00	PCS & W	30.0	30	13	56.1–68.7	2,252
Kentucky	23.20	W	*	13	17	37.1–44.4	0
Mississippi	6.69	W	24.8	14	10	37.1–44.4	8,104
South Carolina	22.53	W	23.6	25	24	11.4–29.0	6,004
Missouri	20.91	PCS & W	45.9	34	23	56.1–68.7	301
Virginia	16.35	W	*	31	46	29.1–37.0	7,188
Florida	10.11	PCS & W	24.1	14	20	11.4–29.0	44,596
North Carolina	34.59	PCS & W	45.7	75	32	29.1–37.0	10,722

* Indicates data not available for this state.

[a] Source: Miller and Kirk 2014

[b] Source: Ng et al. 2015

[c] Source: Reinhard et al. 2011

[d] Source: Stevenson and Grabowski 2010

[e] Source: Ng et al. 2012