Building Managed Long-Term Services and Supports Risk-Adjustment Models: State Experiences Using Functional Data

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IN BRIEF

Risk adjustment is an actuarial tool to predict expected health care costs based on beneficiary characteristics. In Medicaid managed long-term services and supports (MLTSS) programs, functional status is the biggest driver of LTSS resource use. Given the complexity of collecting and analyzing functional assessment data for Medicaid MLTSS programs, only a few states use risk-adjustment models that capture functional status of MLTSS beneficiaries. This brief — supported through the West Health Policy Center — examines the sophisticated risk-adjustment models developed by Wisconsin and New York for their MLTSS programs that reflect many variables, including functional status. States looking to develop an MLTSS risk-adjustment model using functional assessment data need to select variables that are most predictive of LTSS costs while ensuring that model variables are aligned with the state's MLTSS policy goals.

I n Medicaid managed long-term services and supports (MLTSS) programs, risk adjustment is the practice of setting rates specific to a beneficiary's medical or functional needs. Risk adjustment is achieved through statistical modeling, where the resulting models provide a detailed system to group beneficiaries into different risk or resource use classifications. Although commercial and public payers have used risk adjustment to set health care capitation rates for medical care for many years, risk-adjustment models for MLTSS programs must be tailored to the unique needs of states and their MLTSS populations (see *Population Diversity in Medicaid Managed Long-Term Services and Supports Programs: Implications for Risk Adjustment and Rate Setting*).[1]

Beneficiaries' long-term services and supports (LTSS) resource use depends on medical and functional care needs that are not routinely captured in billing records (claims) used to build risk-adjustment models. Beneficiaries who require a nursing home level of care have diverse LTSS needs depending on their functional status, cognitive abilities, behavioral health needs, medical conditions, and availability of informal supports. Although functional assessment data might be available for those living in institutions, it is less uniformly collected for community-based MLTSS populations. Risk-adjustment models must incorporate both medical and functional data to capture the needs of the entire MLTSS population to avoid inappropriate incentives to use more expensive institutional care settings and help predict relative costs so that payment rates better match the risk profile of the enrolled population.

Currently, no national risk-adjustment model exists that includes LTSS, since the need for LTSS is largely related to a person's functional disabilities, and national sources of data on disability have gaps and limitations that make them ill-suited for this purpose.[2] However, several states, including Wisconsin and New York, have developed their own risk-adjustment models for MLTSS.

This brief, supported through the West Health Policy Center, describes risk-adjustment models used in New York and Wisconsin.[3] It first describes risk adjustment overall, including considerations for developing a model and selecting variables. It then describes the New York and Wisconsin models, comparing the approach, structure, and final models for each state. It concludes with guidance on how states can learn from the experience of New York and Wisconsin when using functional assessments in risk adjustment.

Overview of Risk Adjustment

In its broadest sense, risk adjustment is the practice of accounting for differences in enrollees' health status and severity of needs to make fair comparisons across populations. Medicaid programs use risk adjustment for comparing quality measures across managed care plans and modifying plan rates based on the risk profile of each plan's enrollees. In quality measurement programs, risk adjustment improves the comparability of different populations by taking into account demographic, health conditions and other characteristics that affect quality outcomes. For rate setting, risk adjustment is an actuarial tool to predict expected health care costs based on beneficiary characteristics. This brief focuses on risk adjustment in the context of rate setting for Medicaid MLTSS programs.

Building a risk-adjustment model is a data-driven process that requires a team of policy, clinical, and statistical or actuarial members. The model is based on historical expenditures for services covered by a managed care plan or Medicaid fee-for-service (FFS), as well as enrollment and functional and cognitive assessment data on the beneficiary population. With these data in hand, the team can develop a risk-adjustment model to set rates in an iterative process by assessing the predictive accuracy for different beneficiary characteristics, in other words, how well the model performs in predicting costs when using a particular set of variables. The final model can be used to adjust MLTSS rates for each plan's enrollees, but requires maintenance and refinement over time as programs, services, and enrolled populations change.

Some Technical Basics on Modeling

All risk-adjustment models come from a statistical regression with an outcome (i.e., cost) and risk-adjustment variables. The outcome is calculated based on the price and use of all services and derived from encounter data for MLTSS programs. For newer MLTSS programs or when encounter data are unavailable, it is possible to use FFS claims for comparable populations and services to build the model. The risk-adjustment variables, or covariates, are beneficiary characteristics from enrollment, assessment, or claims data. For example, risk adjusters might include functional limitations, comorbidities, behavioral and mental health needs, or other disabilities.

The claims data for the covered population and services included in the MLTSS program are used to develop the underlying base rate, before any adjustment, while the coefficients from the risk-adjustment model are used as "weights" to determine the risk-adjustment factors that are then applied to the base rate in a budget-neutral manner to set the rates specific to each managed care plan. Models are "fit"[4] multiple times to assess predictive ability — usually through R-squared or the proportion of variance explained by the covariates — or comparisons of predicted-to-actual expenditures for key subgroups. The resulting model is then used to determine rates for beneficiaries.

Considerations for Developing a Risk-Adjustment Model and Selecting Variables

Although risk adjustment for rate setting follows actuarial protocols, the team of clinical, statistical, actuarial, and Medicaid program experts must make decisions throughout the model development process. Following are major considerations when building a model:

- **All data used for risk adjustment must be high quality**. High-quality data are broadly defined as linkable, accurate and valid, objective, reliable and standardized, and timely. Linkability means that claims can be linked to enrollment and assessment data at the beneficiary level. Accuracy and validity mean the data measures what it intends to, and objectivity requires that the data inputs (i.e., model variables) are unbiased and individuals providing the data inputs are not influenced by the model output. A reliable and standardized data element captures the same concept over time using the same method. Timeliness means that the data represent the current situation of members, and the current benefits and design of a program to the extent possible.

- **A sufficient quantity of data is required to build risk-adjustment models.** It is difficult to set a general quantity requirement, but programs should strive to develop models on the entire enrollee population, rather than a selected sample that may not be broadly representative.

- **Risk adjustment must balance policy objectives with statistical fit.** The model should minimize the risk of unintended outcomes. For example, even a well-fitting model may omit certain variables that are associated with costs, due to the lack of data; in turn, omitting these variables might lead plans to avoid certain beneficiaries or steer beneficiaries to an inappropriate care setting. Thus, other policies and incentives may be needed to guard against such practices.

- **Risk adjustment must balance model complexity with usability in rate setting**. The model should be easy to use for adjusting capitation rates, and fit the needs of the Medicaid population that it intends to serve. This means that some variables should be combined or removed if they provide little benefit or complicate the model.

- **Separate models should be fit for distinct subpopulations.** MLTSS enrollees have diverse needs that often translate into different resource use. As such, to improve the accuracy of rates, it might be necessary to fit separate models for different populations to the extent the quality and quantity of the data permit. For example, it might be preferable to use separate models for persons with intellectual disabilities versus seniors with functional limitations.

- **Some program features are best addressed outside of the risk-adjustment model**. For example, if the data used to fit the model do not reflect recent changes to Medicaid coverage or benefits, it is possible to account for this after the fact. Other adjustments include the incorporation of quality measures in pay-for-performance programs or geographical wage adjustments.

- **Models must be maintained and updated over time.** This will account for new populations or plan features, updated data, or addition, modification, or removal of risk adjusters.

Comparing Managed Long-Term Services and Supports Risk-Adjustment Models: Wisconsin and New York

Both Wisconsin and New York have developed sophisticated risk-adjustment models for their MLTSS programs, explained in detail in this section. Wisconsin combined functional assessment data with LTSS cost information to develop a regression-based risk-adjustment model to enable the state to risk adjust the capitation rates for its MLTSS programs. The risk-adjustment model reflects variations in level of care, number of Instrumental Activities of Daily Living (IADLs) for which the individual needs help, level of assistance needed to carry out Activities of Daily Living (ADLs), diagnoses, and behavioral indicators. Separate risk-adjustment models were developed for persons with developmental disabilities, persons with physical disabilities, and seniors due to differences in the level and types of services used.[5]

New York also developed a risk-adjustment model for its capitated MLTSS programs, which covers adults with disabilities and seniors who meet the state's eligibility and level of care criteria. The state collected MLTSS encounter data from its existing MLTSS plans, and linked that information to data collected through its assessment tool. The assessment tool includes many different variables including diagnoses, therapies, risk factors, living arrangements, sensory status, skin status, falls, behavioral status, ADLs and IADLs. The state then used a regression approach to determine the variables that were most strongly correlated with cost. These variables included number and type of ADLs/IADLs, disruptive behaviors, impaired behaviors, speech limitations, incontinence and diagnosis.[6] A risk score was then developed for each managed care plan and applied in a budget-neutral manner to the base payment rate (see *Look Before You Leap: Risk Adjustment for Managed Care Plans Covering Long-Term Services and Supports*).[7] The following section provides a comparison of the Wisconsin and New York MLTSS program design, rate structure and risk adjustment models in 2015.[8]

Overview of Wisconsin and New York Program Design

Both Wisconsin and New York offer multiple MLTSS programs. Wisconsin has three voluntary MLTSS programs that target Medicaid beneficiaries who require a nursing home level of care: (1) Family Care; (2) Family Care Partnership; and (3) Program of All-Inclusive Care for the Elderly (PACE). More than 46,000

individuals, including people with physical or developmental disabilities and frail elders, are currently enrolled in these three programs.[9] Each of the three MLTSS programs provide all Medicaid LTSS, including nursing home services, but vary in which acute care services are included and the level of integration with Medicare. Most MLTSS beneficiaries are enrolled in Wisconsin's Family Care program that only covers Medicaid LTSS and excludes acute care services.

New York has four MLTSS programs that target beneficiaries who require nursing home level of care: (1) Managed Long Term Care (MLTC), which primarily covers Medicaid LTSS benefits; (2) Medicaid Advantage Plus (MAP), which covers Medicaid LTSS and acute care services for dually eligible beneficiaries who also receive Medicare acute care through an aligned Medicare Advantage dual eligible special needs plan; (3) PACE; and (4) Fully Integrated Duals Advantage (FIDA), which is a financial alignment demonstration for dually eligible beneficiaries who meet a nursing home level of care or require 120 or more days of community-based LTSS.

As of May 2016, approximately 168,000 individuals, including adults with physical disabilities and frail elders, were enrolled in these programs.[10] Each of the four MLTSS programs include all Medicaid LTSS, including nursing home services, but vary on the inclusion of acute services and the level of integration with Medicare. For MLTC, most physical health services, behavioral health services, and prescription drugs are carved out. PACE, MAP, and FIDA offer a comprehensive benefit package that includes Medicaid acute care, behavioral health care and LTSS and are coordinated with Medicare. New York's MLTSS programs had been voluntary for decades, but the state has recently moved to mandatory Medicaid managed care enrollment for all members who meet the nursing home level of care criteria and is in the process of phasing in nursing facility residents across the state. New York has also recently expanded its FIDA demonstration to include people with developmental and intellectual disabilities; however, the Medicaid rates for these members are not currently risk adjusted. Exhibit 1 summarizes the program design of the two largest MLTSS programs in Wisconsin and New York, other than PACE.

Exhibit 1: Design Elements of MLTSS Programs in Wisconsin and New York.

	Wisconsin Family Care	Wisconsin Partnership	New York MLTC	New York FIDA
Medicare Eligibility	■ Dually eligible and Medicaid only	■ Dually eligible and Medicaid only	■ Dually eligible and Medicaid only	■ Dually eligible only
Covered Populations	■ Frail elderly ■ Adults with physical disabilities ■ Adults with developmental disabilities (DD)	■ Frail elderly ■ Adults with physical disabilities ■ Adults with DD	■ Frail elderly ■ Adults with physical disabilities	■ Frail elderly ■ Adults with physical disabilities
Level of Care	■ Nursing home ■ At risk of institutional placement	■ Nursing home	■ Nursing home	■ Nursing home
Covered Services	■ LTSS [nursing facility (NF) and home- and community-based services (HCBS)]	■ Comprehensive	■ LTSS (NF and HCBS) ■ Ancillary	■ Comprehensive
Enrollment	■ Voluntary — choice between Family Care, Partnership, or self-directed	■ Voluntary — choice between Family Care, Partnership, or self-directed	■ Mandatory for HCBS and new NF residents ■ Voluntary phasing to mandatory for other NF residents	■ Mandatory for HCBS and new NF residents ■ Voluntary phasing to mandatory for other NF residents
Regions	■ Mostly statewide	■ Select counties	■ Statewide	■ Select counties

Rate Structure: Setting Up the Models

Both Wisconsin and New York calculate the MLTSS base rate by blending together all LTSS costs for both nursing home residents and home- and community-based services (HCBS) recipients into a single rate. New York also includes a separate add-on rate for new MLTSS enrollees residing in a nursing facility as the state expands eligibility in its MLTSS program to all nursing facility residents. The add-on applies to beneficiaries who are newly-placed in a nursing facility and are required to mandatorily enroll in MLTSS, as well as previously-placed nursing facility residents who are now able to voluntarily enroll in MLTSS. The add-on is not risk adjusted and is intended to reflect the managed care plans' changing mix of nursing facility/HCBS enrollees as the enrollment of nursing facility residents in MLTSS ramps up. Wisconsin has a separate rate for Family Care enrollees who do not meet the nursing facility level of care criteria but who are at risk of institutional placement. The enrollees who comprise the "at risk" group are assigned to a separate rate cell, which is not included in the risk-adjustment model. Both states also blend the eligible population groups together when setting the rates, although Wisconsin decides annually whether to retroactively adjust for the mix that is actually enrolled. Exhibit 2 highlights some key differences in the ways that Wisconsin and New York have structured the MLTSS base rates.

Exhibit 2: MLTSS Rate Structure in Wisconsin and New York.

	Wisconsin	New York
Rate Structure	■ Blended nursing home care rate including HCBS and NF residents ■ Separate non-nursing home care rate for Family Care	■ Blended rate including HCBS and NF residents*
Rate Cells	■ Combined rate cell across all populations — frail elderly, adults with physical disabilities, and adults with developmental disabilities — with possible retroactive mix adjustment	■ Combined rate cell across all populations — frail elderly and adults with physical disabilities
Geographic Adjustment	■ 13 separate regions ■ Separate geographic adjustment factors	■ Four separate regions ■ Separate geographic adjustment factors

* Rate includes a separate nursing facility add-on as MLTC program transitions to mandatorily enroll nursing home residents. Nursing facility add-on is not currently risk adjusted.

Building the Risk-Adjustment Model

Both states developed their models based on linked functional assessment information, MLTSS plan encounter data, and eligibility data. Wisconsin also supplemented the functional assessment data with a state database on restrictive measures[11] for adults with developmental disabilities. Exhibit 3 describes the database size, data sources, functional assessment tools, and functional screeners used by Wisconsin and New York.

Exhibit 3: Data Used for MLTSS Risk Adjustment Model in Wisconsin and New York.

	Wisconsin	New York
Database Size	■ 42,000 Family Care enrollees ■ 7 Family Care plans ■ Approximately 80% HCBS	■ 97,000 MLTC/PACE enrollees ■ 38 MLTC/PACE plans ■ Approximately 95% HCBS
Data Sources	■ Family Care managed care plan encounters ■ Functional assessment ■ State database on restrictive measures (individuals with developmental disabilities only) ■ Eligibility file	■ MLTC/PACE managed care plan encounters ■ Functional assessment ■ Eligibility file
Functional Assessment Tools	■ State developed HCBS waiver eligibility tool ■ Same for all populations	■ Uniform assessment system (UAS) — based on Community Health Assessment from InterRAI ■ Same for all MLTSS populations
Functional Screeners	■ Initial assessment performed by Aging and Disability Resource Center or state staff ■ Ongoing assessment performed by plan	■ Initial assessment performed by local district staff or enrollment broker ■ Ongoing assessment performed by plan

Wisconsin's model is based on experience data from the Family Care program and includes about 38,000 enrollees from seven different managed care plans. The model incorporates functional data collected from Wisconsin's Long Term Care Functional Screen, the functional assessment tool that is used to determine eligibility for the state's HCBS waiver. The initial assessment is performed by Aging and Disability Resource Center enrollment staff. Ongoing assessments are performed at least annually by the managed care plans. The functional assessment tool collects information in six key areas: ADLs, IADLs, medical diagnoses, health-related services, communication and cognitive abilities, and behavioral/mental health needs.

New York's model is based on MLTC and PACE program experience that includes nearly 100,000 enrollees enrolled in 38 different plans.[12] Most of New York's MLTC enrollees resided in the community in 2015, since the eligibility criteria limited enrollment of nursing facility residents. However, the mix of nursing facility and community enrollees is expected to change as the state began to mandate enrollment of both nursing facility residents and community-dwelling beneficiaries into MLTSS. The model incorporates functional data collected from the state's uniform assessment system (UAS-NY), the functional assessment tool used to determine eligibility for most of the state's HCBS waiver programs. The initial UAS-NY assessment is performed by county staff or the enrollment broker, while ongoing assessments are performed by the managed care plans at least semi-annually. The UAS-NY tool collects information in three key areas: functional status (ADLs, IADLs), health conditions, and cognition. The UAS-NY tool also captures diagnosis information and demographic data.

Both states have found it critically important to have robust encounter data to develop the model and determine the cost weights. Cost weights assign a value to each variable in the risk-adjustment model. While the states and managed care plans continue to improve the encounter data submissions, both Wisconsin and New York have found that the encounter data has been reasonably sufficient to develop the model and establish the cost weights. Exhibit 4 provides more detail on the construction of the risk-adjustment models in Wisconsin and New York.

Exhibit 4: MLTSS Risk-Adjustment Model Construction in Wisconsin and New York.

	Wisconsin	New York
Services Included in Risk-Adjustment Model	■ MLTSS risk adjustment applied to LTSS component of rate ■ Separate hierarchical condition categories risk-adjustment model for acute care component of Partnership rate	■ MLTSS risk adjustment applied to LTSS component of rate (including some ancillary services) ■ Acute care component of FIDA rate not risk adjusted
Regression Model Approach	■ Linear regression model ■ Risk model varies by population (3 models) ■ Same model for Family Care, Partnership and PACE	■ Linear regression model with categorical approach ■ Same model for MLTC, FIDA, and PACE
Model Cost Weights	■ Statewide concurrent cost weights based on managed care plan encounter data	■ Statewide concurrent cost weights based on managed care plan encounter data
Number of Risk Predictors in Model	■ Frail elderly adults: 38 variables ■ Adults with physical disabilities: 61 variables ■ Adults with developmental disabilities: 67 variables	■ 24 variables

Wisconsin developed three separate risk-adjustment models to reflect the different needs of each of the three major population groups: individuals with physical disabilities; individuals with developmental disabilities; and frail elders. The current risk models include between 38 and 67 different variables and combinations of variables. Model variables and cost weights are reviewed and updated every year. Wisconsin's risk-adjustment model only applies to the LTSS component of the rate. Wisconsin separately risk adjusts the acute care component of the Partnership program rate — the comprehensive, integrated managed care program for beneficiaries dually eligible for Medicare and Medicaid — using the Centers for Medicare & Medicaid Services (CMS) hierarchical condition categories (CMS-HCC) risk-adjustment model.[13]

New York uses a single risk-adjustment model for MLTC, FIDA, and PACE programs; MAP is not currently risk adjusted. New York applies the risk-adjustment model to LTSS services plus a small number of select ancillary services such as dental, durable medical equipment, vision, and transportation services that are included in the MLTC rates. Other Medicaid-covered acute care services included in the FIDA and PACE programs are not risk adjusted. The risk model includes 24 different variables that have remained fairly consistent over the past five years, even as the state has transitioned to a new assessment tool. However, the variables and associated cost weights are reviewed at least every other year and will likely change due to the increased number of nursing facility residents transitioning into MLTSS during 2015 and 2016.

Comparing Wisconsin and New York Risk-Adjustment Models

Both Wisconsin and New York have found that their MLTSS risk-adjustment models are highly predictive and that a few key variables, such as ADLs and IADLs, drive the results. Considerable variation exists in the models and variables selected between the two states due to the differences in program design, rate structure, and data collected. The data tends to drive the risk-adjustment model and variables selected. Appendix A provides a comparison of some of the variables used in each state's 2015 risk-adjustment model.[14]

Common Variables

In general, both the Wisconsin and New York models have found that the variables most predictive of costs include the number and level of need for assistance with ADLs and IADLs and certain diagnosis codes. Exhibit 5 lists the common variables in both Wisconsin's and New York's models.

Exhibit 5: Common Variables in Both Wisconsin's and New York's Models.

	Wisconsin	New York
ADLs*	■ Specific ADLs and level of limitation	■ Specific ADLs and level of limitation ■ Grouped ADLs (ADL hierarchy)
IADLs*	■ Number of IADLs	■ Specific IADLs (capacity)
Diagnosis	■ Musculoskeletal — Parkinson's disease/multiple sclerosis, spinal injury ■ Brain/Central Nervous System — brain injury, seizure disorder, Alzheimer's disease/dementia ■ Respiratory — ventilator dependency ■ Mental Illness — anxiety, bi-polar disorder, depression, schizophrenia ■ Substance Abuse ■ Developmental Disabilities — autism, Prader-Willi syndrome, cerebral palsy	■ Musculoskeletal — Parkinson's disease/multiple sclerosis, paralysis ■ Brain/Central Nervous System — Alzheimer's disease/dementia, stroke ■ Sensory — visual impairments ■ Heart/Circulation — congestive heart failure

* See the Appendix for ADLs and IADLs included in each model.

Both Wisconsin and New York include specific ADLs in their models and have subcategories based on the level of limitation. For example, Wisconsin has three separate variables related to toileting, depending on the level of help needed. New York also includes a grouped ADL variable that combines four ADLs (i.e., personal hygiene, toilet use, locomotion, and eating) into one variable with six levels of limitation, ranging from independence to total dependence in all four ADLs.

For IADLs, Wisconsin includes the count of all IADLs, while New York looks at specific IADLs. New York's assessment tool includes both performance and capacity questions related to the IADL that generates two different indicators in the functional data. A "performance" indicator measures actual performance of activities around the home in the most recent three-day period whereas a "capacity" indicator is determined by the assessor and is based on the presumed ability to carry out the activity regardless if an individual does the activity. New York identified the need to distinguish between performance and capacity when reviewing assessments for nursing facility residents. New York found that the performance indicator was not reliable for nursing home residents since there was a high proportion of members where the IADL performance indicator recorded that the activity "did not occur" — logical for many nursing facility residents who do not need to prepare meals or do laundry. So, the state relied solely on the IADL capacity indicator to ensure consistency between nursing facility and community residents.

Diagnosis, as captured on the functional assessment tool, is also an important indicator and varied based on whether a person was age 65 or older, or had physical or developmental disabilities. While there were some common diagnoses that were found to be highly predictive of LTSS costs in both states, such as Alzheimer's disease/dementia and Parkinson's disease/multiple sclerosis, there were several differences between the diagnosis codes included in Wisconsin's and New York's models. For example, Wisconsin found several behavioral health diagnoses to be important predictors, while New York did not find a strong correlation between behavioral health diagnoses and LTSS costs and so did not include any behavioral health diagnoses in its model.

Unique Variables

Variables that are unique to Wisconsin's or New York's models include some demographic indicators, behaviors, communication and cognition, health services/treatments and other health conditions. Exhibit 6 lists the unique variables in each state's model.

Of note, Wisconsin also found several variables that were significant for the population with developmental disabilities, particularly certain behavioral indicators, which were not necessarily as predictive for people with physical disabilities or frail senior populations.

Exhibit 6: Variables Unique to Wisconsin's or New York's Models.

	Wisconsin	New York
Demographic	■ Age group as part of interaction terms (developmental disability, physical disability) ■ Dually eligible status (frail elderly)	■ Female ■ Age 80+
Behavioral Indicators	■ Offensive/Violent behavior ■ Resistive to care (developmental disability) ■ Restrictive measures (developmental disability) ■ Self-injury ■ Wandering	■ None
Communication and Cognition	■ Communication (developmental disability)	■ Procedural memory loss
Health Services/ Treatments	■ Dialysis ■ Tracheostomy (developmental and physical disability) ■ Oxygen Therapy ■ Ulcer ■ Overnight care	■ None
Other Health Conditions	■ Wounds (physical disability)	■ Continence ■ Foot problems ■ Balance — difficulty standing

Variables Captured But Not Used

Some of the variables that were captured in both states' functional assessment tool were not used in the models. The reasons for not using certain variables in the model include both quantitative and qualitative considerations. Quantitative reasons for not using the variables included determinations that the variables were not statistically significant, were highly correlated with other risk adjustors, were not stable over time, or were negatively associated with LTSS costs. Qualitative considerations that led to not using certain variables in the model included whether the variable was contrary to program goals, was an indicator of poor quality/outcomes or could be easily gamed through the assessment or by the health provider. For example, both states capture living arrangement in their assessment instruments but do not include these as variables in the model since recognizing costs differences due to location of care (i.e., community vs nursing facility) is contrary to program goals, one of which is to ensure members can live in the community if that is where they choose to live and receive services. Exhibit 7 lists variables collected by Wisconsin or New York but not used in their risk-adjustment models.

Exhibit 7: Variables Captured by Wisconsin or New York but Not Used in Models.

Reason for Exclusion	Wisconsin	New York
Not Significant/ Lack of Stability	■ Gender ■ Obesity ■ CHF ■ Stroke ■ Vision ■ Daily decision making ■ Short term memory loss ■ Intravenous medication ■ Continence	■ Daily decision making ■ Short term memory ■ Communication ■ Balance — difficulty turning ■ Resistive behaviors ■ Wandering ■ Some behavioral variables
Contrary to Program Goals	■ Living arrangement	■ Living arrangement

In addition, New York determined that urinary tract infections, ulcers, and skin problems were indicators of poor quality and so, while these health conditions may result in increased LTSS costs, the state did not include these variables in the model to avoid "rewarding" plans that had high rates of such conditions. Similarly, New York was concerned about the potential for gaming service utilization metrics such as ventilator use in the last three days, IV medication use, and oxygen therapy use, so it did not include these variables in the model. While the utilization of these services may be important cost predictors, both states found it important to restrict their use in the model in order to avoid inappropriate incentives for health plans and providers. Exhibit 8 lists additional variables collected but not used in New York's risk-adjustment model.

Exhibit 8: Additional Variables Captured and Not Used in New York's Model.

Reason for Exclusion	Variables
Highly Correlated with Another Variable	■ Bathing ■ Dressing lower body ■ Toilet transfer
Negative Association with LTSS Costs	■ Mental health diagnoses ■ Dyspnea ■ Pain control ■ Change in decision making ■ Some behavioral variables
Indicator of Poor Quality/Outcomes	■ Urinary tract infection ■ Ulcer ■ Skin problems
Easily gamed	■ Ventilator use in last three days ■ IV medication use ■ Oxygen therapy use

Assessing the Models

Both states have developed models that are highly predictive of LTSS costs, as measured by the R-squared value, a measure of predictive accuracy in which an R-squared value of 100 percent is perfect accuracy. The R-squared values for Wisconsin and New York's models range from 35 percent to 49 percent. By comparison, most risk-adjustment models used for acute care services have R-squared values ranging from 15 percent to 28 percent.[15] Exhibit 9 describes both the stability and predictive ability of Wisconsin's and New York's models.

These models are also dynamic in that both states review the data, the model, and the variables on a continuous basis. Wisconsin evaluates its model annually, and New York does so at least every other year. Wisconsin changes some of the variables in the model every year to help improve the accuracy of the model and to minimize the potential for gaming. New York has also changed its model as the managed care plans have improved or changed coding practices in response to a model variable. For example, when paralysis was included as a significant variable in the model, there was an observed increase in the number of people with paralysis. In reviewing the data, the state found an increase in the reporting of hemiplegia, where previously, managed care plans were not as diligent in coding this particular diagnosis on the assessment tool. As a result, the state further refined the paralysis variable to separately recognize different types of paralysis (quadriplegia, paraplegia and hemiplegia) in the cost weights, reflecting the more accurate coding by the health plans.

Exhibit 9: Assessment of Wisconsin's and New York's MLTSS Risk-Adjustment Models.

	Wisconsin	New York
Model Stability	■ Variables and cost weights are reviewed annually ■ About 25% of variables change each year	■ Variables and cost weights are reviewed every one to two years ■ Model recently updated with change in assessment tool, but variables in model are similar and allowed for addition of IADLs
Predictive Ability	■ 35% R-squared for frail elderly ■ 42% R-squared for individuals with physical disabilities ■ 49% R-squared for individuals with developmental disabilities	■ 42% R-squared

Conclusion

Both Wisconsin and New York have well-established models for risk adjusting their Medicaid MLTSS program rates using functional data. The models have been found to be highly predictive of the costs of the enrolled MLTSS populations. Each state has developed its model based on linked encounter data and functional assessment data and has continued to refine its model over time. State program goals coupled with the availability and quality of the data are key factors that drive the risk-adjustment model and variables selected.

Despite the many demographic and programmatic differences between the Wisconsin and New York MLTSS programs and the data collected, both states have found that a combination of ADLs, IADLs and diagnosis codes have been most predictive of LTSS costs. Additional variables unique to each state have been found to further enhance the predictability of the risk-adjustment model.

States looking to develop a MLTSS risk-adjustment model using functional assessment data need to strike the proper balance between selecting variables that are most predictive of LTSS costs while ensuring the model variables are aligned with program goals and minimize opportunities for gaming. A well-designed risk-adjustment model will support the state's MLTSS policy goals by aligning incentives and mitigating financial risk for both state and its contracted plans.[16]

ABOUT THE CENTER FOR HEALTH CARE STRATEGIES

The Center for Health Care Strategies (CHCS) is a nonprofit policy center dedicated to improving the health of low-income Americans. It works with state and federal agencies, health plans, providers, and consumer groups to develop innovative programs that better serve people with complex and high-cost health care needs. For more information, visit www.chcs.org.

MEDICAID MANAGED LONG-TERM SERVICES AND SUPPORTS RATE SETTING RESOURCES

This brief is a product of CHCS' *Medicaid Managed Long-Term Services and Supports Rate-Setting Initiative*, which is made possible by the West Health Policy Center to help states and other stakeholders advance rate-setting methods for MLTSS programs. Other resources on www.chcs.org, include:

- *Engaging Managed Care Plans in Rate Setting for Medicaid Managed Long-Term Services and Supports Programs*

- *Developing Capitation Rates for Medicaid Managed Long-Term Services and Supports Programs: State Considerations*

- *Look Before You Leap: Risk Adjustment for Managed Care Plans Covering Long-Term Services and Supports*

- *Population Diversity in Medicaid Managed Long-Term Services and Supports Programs: Implications for Risk Adjustment and Rate Setting*

- *Strategies to Mitigate Risk in Medicaid Managed Long-Term Services and Supports Programs*

- *Trust but Verify: Tennessee's Approach to Ensuring Accurate Functional Status Data in its Medicaid Managed Long-Term Services and Supports Program*

Appendix: Summary of MLTSS Risk-Adjustment Variables in Wisconsin and New York

	Wisconsin[a] Developmentally Disabled	Wisconsin[a] Physically Disabled	Wisconsin[a] Frail Elderly	New York[b] Physically Disabled and Frail Elderly
General Risk Model Information				
MLTSS Program	Family Care/Family Care Plus/PACE	Family Care/Family Care Plus/PACE	Family Care/Family Care Plus/PACE	MLTC/PACE/FIDA
Rate Year	CY2015	CY2015	CY2015	FY2016
Number of Variables in LTSS Risk Model	67	61	38	24
R-Squared	49%	42%	35%	42%
Services included in LTSS Risk Model	LTC	LTC	LTC	LTC plus ancillary
Demographics				
Age	✔	✔	⊘	✔
Gender	⊘	⊘	⊘	✔
Dual Status	⊘	⊘	✔	⊘
Living Arrangement				
Facility/Institution	⊘	⊘	⊘	⊘
Community Living Situation	⊘	⊘	⊘	⊘
Functional Status: ADLs				
Bathing	✔	✔	✔	⊘
Dressing	✔	✔	✔	✔
Eating	✔	✔	✔	✔
Personal Hygiene	-	-	-	✔
Mobility	✔	✔	✔	✔
Toileting	✔	✔	✔	✔
Transferring	✔	✔	✔	✔
Functional Capacity: IADLs				
Equipment Management	-	-	-	⊘
Laundry/Chores	⊘	⊘	⊘	⊘
Medication Management	✔	✔	✔	✔
Meal Preparation	✔	✔	✔	✔
Money Management	✔	✔	✔	⊘
Phone Use	✔	✔	✔	✔
Shopping	-	-	-	⊘
Stairs	-	-	-	✔
Transportation	✔	✔	✔	⊘
Employment Assistance	✔	✔	✔	-

✔ = Captured and used in model
⊘ = Captured and not used in model
- = Not captured

Note: Variables listed do not reflect all variables collected in functional assessment tool and other data sources.

[a] Wisconsin Family Care Rate Setting Report dated December 16, 2014: "Calendar 2015 Family Care Capitation Rates", Exhibit II, https://www.dhs.wisconsin.gov/familycare/mcos/capitationrates.htm and Wisconsin functional assessment tool: https://www.dhs.wisconsin.gov/forms/f0/f00366.pdf.
[b] New York MMLTC Risk Adjusted Rate Report dated August 17, 2015: "Medicaid Managed Long Term Care Risk Adjusted Rates Fiscal Year 2016 Summary of Methods."

	Wisconsin[a] Developmentally Disabled	Wisconsin[a] Physically Disabled	Wisconsin[a] Frail Elderly	New York[b] Physically Disabled and Frail Elderly
Diagnosis				
Developmental Disability				
Autism	✔	⊘	⊘	–
Prader-Willi Syndrome	✔	⊘	⊘	–
Cerebral Palsy	✔	✔	⊘	–
Endocrine/Metabolic				
Diabetes	⊘	⊘	⊘	⊘
Obesity	⊘	⊘	⊘	–
Heart/Circulation				
Congestive Heart Failure	⊘	⊘	⊘	✔
Musculoskeletal/Neuromuscular				
Parkinson's Disease/Multiple Sclerosis	✔	✔	⊘	✔
Paralysis/Spinal Injury	⊘	✔	⊘	✔
Brain/Central Nervous System				
Alzheimer's Disease/Dementia	⊘	✔	✔	✔
Brain Injury	✔	✔	✔	–
Seizure	✔	✔	✔	–
Stroke/Cerebrovascular Accident	⊘	⊘	⊘	✔
Respiratory				
Ventilator Dependency[c]	✔	✔	✔	–
Genitourinary				
Urinary Tract Infection	⊘	⊘	⊘	⊘
Mental Illness				
Anxiety	✔	✔	✔	⊘
Bi-Polar Disorder	✔	✔	✔	⊘
Depression	✔	✔	✔	⊘
Schizophrenia	✔	✔	✔	⊘
Infections/Immune System				
Cancer	⊘	⊘	⊘	⊘
AIDS/HIV	⊘	⊘	⊘	⊘
Sensory				
Visual Impairment	⊘	⊘	⊘	✔
Hearing	⊘	⊘	⊘	⊘
Substance Abuse	✔	✔	✔	⊘

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Note: Variables listed do not reflect all variables collected in functional assessment tool and other data sources.

[a] Wisconsin Family Care Rate Setting Report dated December 16, 2014: "Calendar 2015 Family Care Capitation Rates", Exhibit II, https://www.dhs.wisconsin.gov/familycare/mcos/capitationrates.htm and Wisconsin functional assessment tool: https://www.dhs.wisconsin.gov/forms/f0/f00366.pdf.
[b] New York MMLTC Risk Adjusted Rate Report dated August 17, 2015: "Medicaid Managed Long Term Care Risk Adjusted Rates Fiscal Year 2016 Summary of Methods."
[c] Ventilator dependence is captured as a diagnosis in Wisconsin's assessment tool, whereas New York's tool captures ventilator use.

	Wisconsin[a] Developmentally Disabled	Wisconsin[a] Physically Disabled	Wisconsin[a] Frail Elderly	New York[b] Physically Disabled and Frail Elderly
Behavioral Variables				
Offensive/Violent Behavior	✔	✔	✔	⊘
Resistive to Care	✔	⊘	⊘	⊘
Restrictive Measures	✔	⊘	⊘	-
Self-Injury	✔	✔	✔	⊘
Wandering	✔	✔	✔	⊘
Communication and Cognition				
Communication	✔	⊘	⊘	⊘
Daily Decision Making	⊘	⊘	⊘	⊘
Procedural Memory Loss	-	-	-	✔
Short Term Memory Loss	⊘	⊘	⊘	⊘
Health Services/Treatments				
Dialysis	✔	✔	✔	⊘
Tracheostomy	✔	✔	⊘	⊘
Intravenous Medication	⊘	⊘	⊘	⊘
Oxygen Therapy	✔	✔	✔	⊘
Ulcer	✔	✔	✔	⊘
Urinary Catheter	✔	✔	⊘	-
Overnight Care	✔	✔	✔	✔
Ventilator Use[c]	-	-	-	⊘
Other	✔	✔	✔	⊘
Other Health Conditions				
Continence	⊘	⊘	⊘	✔
Dyspnea	-	-	-	⊘
Fatigue	-	-	-	⊘
Foot problems	-	-	-	✔
Pain Control	-	-	-	⊘
Skin problems/Wound	⊘	✔	⊘	⊘
Balance - Difficulty Standing	-	-	-	✔
Balance - Difficulty Turning	-	-	-	⊘

✔ = Captured and used in model
⊘ = Captured and not used in model
– = Not captured

Note: Variables listed do not reflect all variables collected in functional assessment tool and other data sources.

[a] Wisconsin Family Care Rate Setting Report dated December 16, 2014: "Calendar 2015 Family Care Capitation Rates", Exhibit II, https://www.dhs.wisconsin.gov/familycare/mcos/capitationrates.htm and Wisconsin functional assessment tool: https://www.dhs.wisconsin.gov/forms/f0/f00366.pdf.
[b] New York MMLTC Risk Adjusted Rate Report dated August 17, 2015: "Medicaid Managed Long Term Care Risk Adjusted Rates Fiscal Year 2016 Summary of Methods."
[c] Ventilator dependence is captured as a diagnosis in Wisconsin's assessment tool, whereas New York's tool captures ventilator use.

ENDNOTES

[1] For a description of the diversity of MLTSS enrollees and how states that are considering a risk adjustment model for their MLTSS programs can use this information to inform their rate setting strategies see: J. Libersky and D. Lipson. "Population Diversity in Medicaid Managed Long-Term Services and Supports Programs: Implications for Risk Adjustment and Rate Setting." Center for Health Care Strategies, August 2016. Available at: http://www.chcs.org/resource/population-diversity-medicaid-managed-long-term-services-supports-programs-implications-rate-setting-risk-adjustment/.

[2] G. Livermore, D. Whalen, and D. Stapleton. "Assessing the Need for a National Disability Survey: Final Report." Mathematica Policy Research report prepared for the U.S. Assistant Secretary for Planning and Evaluation, September 2011.
Available at: https://www.mathematica-mpr.com/-/media/publications/pdfs/disability/national_disability_survey.pdf.

[3] This brief describes Wisconsin's CY 2015 risk adjustment model and New York's FY 2016 risk adjustment model. Both states make periodic updates to their risk adjustment models, so the models presented in this brief do not reflect the most current models being used.

[4] Fitting a model is the process of solving a regression equation for input data. A well-fitting regression model results in predicted values close to the observed data values.

[5] Wisconsin Department of Health Services Calendar Year 2015 Family Care Capitation Rates. Prepared by PricewaterhouseCoopers, December, 2014.
Available at: https://www.dhs.wisconsin.gov/files/fc2015capitationrates.pdf.

[6] New York State, Medicaid Managed Long-Term Care Risk Adjusted Rates. Summary of Methods for rates effective April 1, 2015.

[7] For an explanation of the role of risk adjustment in setting capitation rates for MLTSS plans, and the challenges in developing risk adjustment models that are suited to MLTSS, see: D. Lipson. "Look Before You Leap: Risk Adjustment for Managed Care Plans Covering Long-Term Services and Supports." Center for Health Care Strategies, August 2016. Available at: http://www.chcs.org/resource/look-leap-risk-adjustment-managed-care-plans-covering-long-term-services-supports/.

[8] Wisconsin's risk-adjustment model contains several revisions for Calendar Year 2016. Additional information can be found in the State of Wisconsin Department of Health Services Calendar Year 2016 Capitation Final Rate Development for Family Care Program. Prepared by Milliman, December 2015. Available at: https://www.dhs.wisconsin.gov/familycare/reports/fc-2016capitationrates.pdf.

[9] G. Cummings. Section Chief, Benefit Rate and Finance Section, Wisconsin Department of Health Services. Personal communication, June 29, 2016.

[10] For May 2016 New York MLTC, PACE, MAP and FIDA enrollment reports, see: New York State, Department of Health. "Medicaid Managed Care Enrollment Reports." Available at: http://www.health.ny.gov/health_care/managed_care/reports/enrollment/momthly and https://www.health.ny.gov/health_care/medicaid/redesign/fida/2016-07-06_fida_trends.htm.

[11] Wisconsin defines restrictive measures as the use of restraints, isolation, protective equipment, or medical restraints as a method of last resort to assure safety and temporarily address challenging or dangerous behavior. For more information see: https://www.dhs.wisconsin.gov/waivermanual/appndx-r1.pdf.

[12] New York's initial MLTSS risk-adjustment model implemented in 2010 was based on a database size of approximately 30,000 members.

[13] The CMS-HCC is the same model used by CMS to adjust Medicare capitation payments to Medicare Advantage health care plans.

[14] The summary in Appendix A is not an exhaustive list of all the variables included in each model, but includes key variables of interest. A complete list of variables in Wisconsin's model can be found at https://www.dhs.wisconsin.gov/files/fc2015capitationrates.pdf and in New York's model in the "New York State, Medicaid Managed Long-Term Care Risk Adjusted Rates — Fiscal Year 2016 Summary of Methods."

[15] American Academy of Actuaries Issue Brief. "Risk Assessment and Risk Adjustment." May 2010.
Available at: http://www.actuary.org/pdf/health/Risk_Adjustment_Issue_Brief_Final_5-26-10.pdf.

[16] Ibid.