
CBE ID

4490

Title

Hospitalizations for Ambulatory Care Sensitive Conditions among Home and Community Based Service (HCBS) Participants

Project

Cost and Efficiency

Endorsement Status

Endorsed with Conditions

E&M Committee Rationale/Justification

When the measure returns for maintenance, the committee would like to see:

- Recalculate reliability on observed/expected rates,
- Evaluate face validity (specifically addressing whether the measure distinguishes quality), and
- Provide a robust logic model at the HCBS plan level to illustrate areas of improvement

Is Under Review

No

Next Maintenance Cycle

Spring 2029

Previous Endorsement Cycle

Spring 2024

Initial Endorsement

Sun, 09/01/2024 - 11:10

Steward

Centers for Medicare & Medicaid Services

1.0 New or Maintenance

New

1.3 Electronic Clinical Quality Measure (eCQM)

No

1.6 Measure Description

The Hospitalizations for Ambulatory Care Sensitive Conditions among Home and Community Based Participants measure is a risk-adjusted, state-level measure that assesses rates of hospital

admissions for ambulatory care sensitive conditions per 1,000 Medicaid HCBS participants aged 18 years and older. This measure has three rates reported for potentially avoidable inpatient hospital admissions:

1. Chronic Conditions
2. Acute Conditions
3. Chronic and Acute Conditions Composite

1.7 Composite Measure

No

1.7 Measure Type

Outcome

1.8 Level of Analysis

Population or Geographic Area

1.8a Population or Geographic Area Level of Analysis

State

1.9 Care Setting

Hospital: Inpatient, Other

1.9b Other Care Setting

Home and community-based services

1.10 Measure Rationale

Evidence indicates that there are approximately 3.5 million potentially avoidable hospital admissions every year, which account for \$33.7 billion in aggregate hospital costs (McDermott & Jiang, 2020). The HCBS ACSC measure will help monitor rates of avoidable hospitalizations for ambulatory care sensitive conditions among HCBS participants.

Appropriate primary care may also prevent the development or worsening of various chronic conditions and prevent individuals from returning to emergency or inpatient care settings for treatment. Continuity of care improvement efforts, such as increasing the average primary care visits to an optimal rate (generally three or four visits, annually, depending on health status and condition-specific needs), has been shown to reduce the risk of hospitalizations for ambulatory care sensitive conditions (Kao et al., 2019).

Reduced hospital admissions and effective care coordination have the potential to contribute to healthcare cost savings as well as improve quality of care.

References:

Kao, Y., Lin, W., Chen, W., Wu, S., & Tseng, T. (2019). Continuity of outpatient care and avoidable hospitalizations: A systematic review. *American Journal of Managed Care*, 25(4), 126-134.
http://ajmc.s3.amazonaws.com/_media/_pdf/AJMC_04_2019_Kao_final.pdf

McDermott, K. W., & Jiang, H. J. (2020). Characteristics and costs of potentially preventable inpatient stays, 2017. Healthcare Cost and Utilization Project: Agency for Healthcare Research and Quality. <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb259-Potentially-Preve...>

1.13 Data Dictionary

Not attached. I attest that all information will be provided where codes and/or value sets are needed (1.14a - 1.15c).

1.13a Attach Data Dictionary

[HCBS ACSC Value Sets_2024.04.26.xlsx](#)

1.14 Numerator

The number of potentially avoidable acute inpatient hospital admissions ambulatory care sensitive conditions include: Chronic conditions rate: Diabetes short-term complications, diabetes long-term complications, , low-extremity amputation, chronic obstructive pulmonary disease (COPD), persistent asthma, hypertension, heart failure, Parkinson disease, renal disease, and seizure disorder. Acute conditions rate: Acute bronchitis, acute heart failure, constipation, dehydration, falls, pneumonia, complicated urinary tract infection, ketoacidosis (with or without coma), malnutrition, cellulitis, sepsis, and pressure ulcers. Total rate: Sum of acute and chronic composites for acute inpatient hospital admissions.

1.14a Numerator Details

The HCBS ACSC measure is a risk-adjusted, state-level measure that assesses rates of hospital admissions for ambulatory care sensitive conditions per 1,000 Medicaid HCBS participants aged 18 years and older.

The numerator includes the number of potentially avoidable inpatient hospital admissions within 30 days. There are three rates reported for this measure:

- **Rate 1: Chronic Conditions Rate.** The number of Medicaid HCBS participants who had an inpatient admission for a chronic condition during the measurement period.
 - Ambulatory care sensitive conditions for the *chronic conditions rate* include chronic obstructive pulmonary disease, diabetes long-term complications, diabetes short-term complications, heart failure, hypertension, lower-extremity amputation, Parkinson disease, persistent asthma, renal disease, and seizure disorder.
- **Rate 2: Acute Conditions Rate.** The number of Medicaid HCBS participants who had an inpatient admission for an acute condition during the measurement period.
 - Ambulatory care sensitive conditions for the *acute conditions rate* include acute bronchitis, acute heart failure, cellulitis, complicated urinary tract infection, constipation, dehydration, falls, ketoacidosis (with or without coma), malnutrition, pneumonia, pressure ulcers, and sepsis.
- **Rate 3: Total Conditions Rate.** The number of HCBS participants who had an inpatient admission for either an accurate or a chronic condition during the measurement period; this rate sums the values from the *chronic conditions rate* (rate 1) and the *acute conditions rate* (rate 2).

1.15 Denominator

Adults receiving Medicaid HCBS, aged 18 years and older, within each state.

1.15a Denominator Details

The HCBS ACSC measure denominator includes adults receiving Medicaid HCBS, aged 18 years and older, within each state during the measurement period.

1.15b Denominator Exclusions

The following statuses are excluded from the population eligible for inclusion in the denominator:

- Acute hospital transfers;
- Hospice; and
- Hospitalizations for obstetric conditions.

In addition, condition-specific exclusions (i.e., diagnoses that would be included within the conditions identified in the numerator) are removed from the measure numerator. These include:

Chronic Conditions:

- A procedure code for lower extremity amputation AND any diagnosis for diabetes.
 - Excluding any discharge with a diagnosis for traumatic amputation of the lower extremity or toe amputation procedure.
- Primary diagnosis of chronic obstructive pulmonary disease.
 - Excluding any discharge with a diagnosis for cystic fibrosis and anomalies of the respiratory system.
- Primary diagnosis of persistent asthma.
 - Excluding any discharge with a diagnosis for cystic fibrosis and anomalies of the respiratory system.
- Primary diagnosis of chronic obstructive pulmonary disease.
 - Excluding any discharge with a diagnosis for cystic fibrosis and anomalies of the respiratory system.
- Primary diagnosis of heart failure.
 - Excluding any discharges with a cardiac procedure.
- Primary diagnosis of hypertension.
 - Excluding any discharge with a cardiac procedure or diagnosis of State I-IV kidney disease with a dialysis procedure.

Acute Conditions:

- Primary diagnosis of pneumonia.
 - Excluding any discharge with a diagnosis of sickle cell anemia, hemoglobin S disease or procedure or diagnosis for immunocompromised state.
- Primary diagnosis of complicated urinary tract infection.
 - Excluding any discharge with a diagnosis of kidney or urinary tract disorder or procedure or diagnosis for immunocompromised state.

- Primary diagnosis of cellulitis.
 - Excluding any discharge with a procedure or diagnosis for immunocompromised state.
- Primary diagnosis of pressure ulcer.
 - Excluding any discharge with a procedure or diagnosis for immunocompromised status.

1.15c Denominator Exclusions Details

- Acute hospital transfers:
 - Identify acute-to-acute hospital transfers (i.e., transfers from one hospital to another hospital) by keeping the original discharge and eliminating the transfer discharge.
 - Non-acute-to-acute transfers should be included in the measure numerator.
- Discharges to hospice:
 - Exclude inpatient stays for individuals receiving hospice care from the numerator.
 - Exclude Medicaid HCBS participants receiving hospice care at the start of the measurement period from the denominator.
- Discharges for obstetrics:
 - Exclude inpatient stays with a newborn or obstetrics claim type code from the numerator (using admission type code=4, *Newborn*).

1.16 Type of Score

Rate/proportion

1.17 Measure Score Interpretation

Better performance = Lower score

1.18 Calculation of Measure Score

See diagram in measure score calculation attachment.

1.18a Attach measure score calculation diagram

[CBE 4490 Measure Score Diagram.pdf](#)

1.19 Measure Stratification Details

Not applicable—the HCBS ACSC measure is not stratified.

1.20 Types of Data Sources

Claims Data

1.25 Data Source Details

The HCBS ACSC measure is claims based, calculated using existing Medicaid claims data. Participant claims contain the available data needed to capture all desired care settings for the HCBS ACSC measure.

For calendar years 2018 and 2019, quantitative data was obtained from Transformed Medicaid Statistical Information System (T-MSIS) Analytical Files (TAF). T-MSIS contains participant, service utilization, administrative claims, and expenditure data for the Medicaid population, including those covered through both fee-for-service (FFS) and managed-care payers.

Due to data quality issues with more current data, data from 2018 and 2019 were used for specification and testing of the HCBS ACSC measure. The measure developer will continue to monitor the availability and quality of key data elements for this measure within the TAF to validate its specifications using newer data (i.e., claims data available after the COVID-19 public health emergency).

1.26 Minimum Sample Size

There were no minimum sample size requirements for this measure. Two states and two territories (i.e., Mississippi, Rhode Island, Puerto Rico, and Virgin Islands) were excluded from the measure analysis due to data quality. Data were not available within the TAF for three territories (i.e., American Samoa, Guam, and the Northern Mariana Islands).

2.1 Attach Logic Model

[CBE 4490 Logic Model.pdf](#)

2.2 Evidence of Measure Importance

Ambulatory care sensitive conditions are a set of common chronic and acute conditions that can be treated effectively in ambulatory-care settings to prevent or minimize complications. Variations in the rate of potentially avoidable hospitalizations by state, race or ethnicity, and income indicate that performance gaps at the health-system level exist (Agency for Healthcare Research and Quality, 2018).

The cost for treatment of ambulatory care sensitive conditions varies greatly across care settings. On average, the cost of treatment for an ambulatory care sensitive condition in an emergency department setting is twice that of an ambulatory care setting; inpatient care costs are much higher, averaging about four times the cost of emergency-department care (Galarraga et al., 2015).

Effective management of ambulatory care sensitive conditions in outpatient and ambulatory care settings can help lower overall healthcare costs and avoid preventable hospitalizations.

References:

Agency for Healthcare Research and Quality. (2018). *Chartbook on care coordination*. Retrieved March 30, 2024, from <https://www.ahrq.gov/research/findings/nhqrdr/chartbooks/carecoordination/measure3.html>

Galarraga, J. E., Mutter, R., & Pines, J. M. (2015). Costs associated with ambulatory care sensitive conditions across hospital-based settings. *Academic Emergency Medicine*, 22(2), 172-181. <https://doi.org/10.1111/acem.12579>

2.3 Anticipated Impact

The HCBS ACSC measure is anticipated to impact patient outcomes, healthcare costs, and quality of care. The HCBS ACSC measure will help compare care performance for ambulatory care sensitive conditions across participant groups, states, and condition types. Data captured by the HCBS ACSC measure will be used to detect opportunities for improvement in quality of care, population-level access to ambulatory care, and other needs. By helping the Centers for Medicare & Medicaid Services and other stakeholders better understand hospital utilization rates, by type of ambulatory care sensitive condition, and identify the extent of need for high-acuity care for ambulatory care sensitive conditions among HCBS participants, quality-improvement campaigns can be targeted and implemented more precisely.

Through this collection of data, and the related corrective quality improvement interventions, it is expected that the rates of hospitalizations for ambulatory care sensitive conditions among HCBS participants will decrease. Intermediate steps (e.g., identification of care gaps and disparities, quality improvement interventions, ambulatory care system engagement) will help to decrease the hospitalization rates for ambulatory care sensitive conditions among HCBS participants over time.

2.4 Performance Gap

Analysis for the HCBS ACSC measure is aggregated at the state level. Analysis of the measure's performance gap is presented in **Exhibit 1**, in the performance gap attachment. **Exhibit 1** displays the distribution of performance scores and denominator counts across the measure's three rates—chronic conditions, acute conditions, and total conditions. The denominator includes eligible Medicaid HCBS participants in the measurement year.

2.4a Attach Performance Gap Results

[CBE 4490 Performance Gap Tables.pdf](#)

2.5 Health Care Quality Landscape

While other measures might already exist to help track ambulatory care sensitive conditions for Medicaid populations, the HCBS ACSC measure evaluates these conditions focuses on the Medicaid HCBS population, recognizing the high risks and high needs specific to this population, which are monitored in ambulatory care settings to reduce avoidable hospitalizations.

A standalone measure that focuses on HBCS participants' needs will provide states, managed care plans, and other users with valuable feedback on how to improve the quality of care provided to those receiving HCBS.

2.6 Meaningfulness to Target Population

Among the target population, the HCBS ACSC measure may help identify HCBS participants who are at high risk for potentially avoidable hospital admissions. Many adult Medicaid beneficiaries experience higher rates of chronic conditions that are preventable and controllable (Ku et al., 2017). Preventive care—including immunizations and periodic screenings that permit early

detection and management of chronic conditions—improves participants’ prospects for better health outcomes.

Preventive care can also help to reduce the use of avoidable hospitalizations and other high-cost care (Ku et al., 2017). Data from the HCBS ACSC measure can be used to assess concerns about quality of and access to care, assisting states in implementing healthcare quality improvement efforts to maximize health outcomes for participants in need. Effective clinical management of conditions of concern may also minimize the risk of long-term, adverse health outcomes.

The measure developer collected data from a technical expert panel to evaluate the utility of the HCBS ACSC measure. A majority of the technical expert panel’s members (90 percent) also affirmed the proposition that the HCBS ACSC measure would be helpful to states for the implementation of healthcare quality improvement initiatives or other related priorities.

References:

Ku, L., Paradise, J., & Thompson, V. (2017). *Data note: Medicaid’s role in providing access to preventive care for adults*. Kaiser Family Foundation. <https://www.kff.org/medicaid/issue-brief/data-note-medicoids-role-in-pr...>

3.1 Contributions Towards Closing Care Gaps

As shown in **Exhibit 3**, in the performance gap attachment, potential social risk factors were examined to identify disparities in utilization. These factors included age, biological sex, racial or ethnic identity, urbanicity, and dually enrolled status. Notably, higher frequency distributions were observed for gender (female participants, at 60.0 percent) and race (non-Hispanic Black participants, at 20.5 percent). Statistically significant differences in disparities will be evaluated to understand overall opportunities for improving health equity based on these risk factors. These factors will help determine which subcategories experience statistically significant high burden or disparities and is disproportionately impacted. As a result, healthcare interventions will be streamlined and aimed at targeting those populations in need of better care.

4.1 Feasibility Assessment

The feasibility of implementing the HCBS ACSC measure was assessed by the measure developer using qualitative survey, which contained a mix of Likert scale, binary (yes/no), and free-text questions, to which 10 members of the developer’s technical expert panel responded. Expert panel member perspectives reflected in the survey results included providers, Medicaid participants or family members, representatives from interested groups, clinicians, state administrators, advisory experts, and researchers. As a result, the feedback captured in the survey results is representative of a broad array of key stakeholders who could use the measure’s results following its implementation.

For the first question related to feasibility of the HCBS ACSC measure, results indicated that 70 percent of the respondents felt that there would be challenges with capturing data needed for the HCBS ACSC measure. One respondent (10 percent) noted that the data needed should be

capturable from administrative claims data if states are reporting results accurately. Two clinicians (20 percent) added that it may be difficult to obtain the data for dually eligible participants when Medicaid is not the primary payer or when dually eligible participants are treated for physical or behavioral health conditions by a Medicare provider. An industry professional (10 percent) added that mental health conditions are not always screened for, so data for these diagnoses may be missing or incomplete.

The second question related to feasibility of the HCBS ACSC measure collected feedback via a free-text field. Two respondents (20 percent) entered comments. One (10 percent) noted that there is a gap in data between Medicare and Medicaid, which could make it difficult to gain a true picture of the barriers to care that participants face. The other respondent (10 percent) commented that the proposed HCBS ACSC measure is the best option available.

Despite these results, the measure developer is confident that the HCBS ACSC measure can be calculated using administrative claims data. The primary barriers identified by members of the technical expert panel—access to both Medicare and Medicaid claims data—are mitigated by centralized calculation (i.e., using the TAF). The developer did not identify any meaningful challenges in operationalizing the data elements for the HCBS ACSC measure, other than the few state- and territory-level challenges described above.

Results from the qualitative survey related to measure feasibility for HCBS ACSC appear in **Exhibit 2**, in the supplemental attachment.

4.3 Feasibility Informed Final Measure

As noted above, despite the poor results from assessing feasibility of the HCBS ACSC measure using a structured qualitative survey of the measure developer's technical expert panel members, the developer has confirmed that calculation of performance scores using administrative claims data, available within the TAF, is wholly feasible.

4.4 Proprietary Information

Not a proprietary measure and no proprietary components

5.1.1 Data Used for Testing

Data sources include TAF inpatient claims and demographic and enrollment base files within Medicaid and Medicare claims.

5.1.2 Differences in Data

Not applicable—Only a single set of data were used for testing.

5.1.3 Characteristics of Measured Entities

A total of 4,040,676 participants were identified for inclusion in the analytic population; 3,960,577

participants were included in the population used for risk adjustment. **Exhibit 3**, in the supplemental attachment, shows the distribution based on participant characteristics (i.e., age, biological sex, race or ethnicity, age, dually enrolled status, rurality, history of prior hospitalization, Hierarchical Condition Categories [HCC] in the measurement period, and submitting state). Forty-nine states and the District of Columbia were included in the analytic sample. Two states and two territories were excluded due to consideration of data quality and small sample sizes ($n < 100$); three additional territories were excluded due to a lack of data within the TAF.

5.1.4 Characteristics of Units of the Eligible Population

Nearly one-third of Medicaid HCBS participants are under age 18 (using Medicaid administrative claims from 2019), making them ineligible for inclusion in the eligible population. Applying a requirement for continuous enrollment removed nearly 20 percent of Medicaid HCBS participants (using enrollment in Medicaid for ≥ 18 months [July 2018–December 2019, or longer]).

Slightly fewer than 6 percent of the HCBS ACSC measure analytic population had a hospitalization for an ambulatory care sensitive condition during the measurement period. Of those participants with hospitalizations for ambulatory care sensitive conditions, most have one or two admissions. These data emphasize how rare hospitalizations for ambulatory care sensitive conditions are and explain the lower admission counts for those participants who experience hospitalizations for ambulatory care sensitive conditions.

Overall, the analytic population for the HCBS ACSC measure was largely younger than age 65, female, and white. This pattern largely remained the same for those HCBS participants with and without hospitalizations for an ambulatory care sensitive condition; those with hospitalizations for an ambulatory care sensitive condition were slightly older (mean age of 61.54 years) than the overall analytic population (mean age of 51.72). It is important to note that we did conduct chi square significant testing across our descriptive sample; however, due to the large sample size of our analytic population all the chi-square probabilities were either < 0.001 or 0.0000 . For this reason, we do not provide these results in **Exhibit 3**, in the supplemental attachment.

5.2.1 Level(s) of Reliability Testing Conducted

Accountable entity level (i.e., measure score) (e.g., signal-to-noise analysis)

5.2.2 Method(s) of Reliability Testing

Reliability was calculated in accordance with the methods described in *The Reliability of Provider Profiling: A Tutorial* (Adams, 2009). This approach presents the distribution of performance score reliability statistics (via a signal-to-noise ratio). Signal-to-noise values can range from 0.00 to 1.00; they summarize the proportion of variation among state scores that is due to real differences in underlying entity characteristics (e.g., differences in population demographics or medical care) as opposed to background-level or random variation (e.g., due to measurement or sampling error). The consensus-based entity typically considers a signal-to-noise ratio statistic of greater than or equal to 0.70 as acceptable for reliability.

Reference:

Adams, J. L. (2009). *The reliability of provider profiling: A tutorial*. RAND Corporation.
<https://doi.org/10.7249/tr653>

5.2.3 Reliability Testing Results

See table in the reliability attachment.

5.2.3a Attach Additional Reliability Testing Results

[CBE 4490 Reliability.pdf](#)

5.2.4 Interpretation of Reliability Results

As shown in **Exhibit 4**, within the attachment, mean and median signal-to-noise reliability scores of 0.99 or better indicate that HCBS ACSC measure results can be used to distinguish performance among states. This median scores across measures presented above are indicative of very strong measure reliability and suggest that this measure can identify true differences in performance among states.

5.3.1 Level(s) of Validity Testing Conducted

[Accountable entity level \(i.e., measure score\) \(e.g., criterion validity\)](#)

5.3.3 Method(s) of Validity Testing

A systematic assessment of face validity was performed via a survey that contained a mix of Likert scale, binary (yes/no), and free-text questions, which was completed by 10 members of the measure developer's technical expert panel (the composition of the technical expert panel is described in the *Feasibility* section, above).

The survey included three questions assessing face validity. The first question inquired about the extent to which the respondents agreed or disagreed with the structure of the denominator and eligible population for the measure. Eight respondents (80 percent) agreed that the measure should include Medicaid HCBS participants who are aged 18 and older at the start of the measurement period, and that the eligible population for the measure should include all adults receiving Medicaid HCBS (other than those for whom an exclusion criterion applies). One respondent (10 percent) was undecided, and one clinician (10 percent) strongly disagreed.

The second question asked whether the age of individuals captured in the measure denominator is appropriate. Responses to this question varied, with half (50 percent) answering *No* or *Not Sure*, and half (50 percent) answering *Yes*. Multiple respondents added additional comments to the free-text section following the structured question. One noted that people under age 18 are more likely to be living with family, so long-term services and supports would potentially have less oversight of medical care. Another noted that other pediatric Medicaid programs cover participants up to age 21, and suggested making 21 the lower bound for the initial population.

If respondents answered *Yes* to Question 2, they were asked to answer two follow-up, open-ended questions. The first follow-up question stated, *If Yes to question 2, what is the youngest age that should be included in the Ambulatory Care Sensitive Conditions for Medicaid HCBS Participants measure?* Three participants (60 percent) suggested age 18, and one (20 percent) suggested age 21. Another respondent (20 percent) suggested age 25 or 30, adding that this age group may be more likely to receive formal long-term services and supports or live in a residential setting, which would make it easier to track for the HCBS ACSC measure. If respondents answered *yes* to Question 2, then they were asked to answer a second follow-up, open-text question, which stated, *If Yes, to question 2, what is the oldest age that should be included in the Ambulatory Care Sensitive Conditions for Medicaid HCBS Participants measure?* Of those who responded to this question, four participants (80 percent) answered that there should be no upper limit. One participant (20 percent) suggested an upper bound of 85 years old.

The final question was a free-text comment section for additional comments on the face validity of the measure. One respondent (10 percent) provided additional comments. This person noted that data on dually eligible participants may limit the available information needed for the measure.

5.3.4 Validity Testing Results

See **Exhibit 5** and **Exhibit 6** within the validity attachment.

5.3.4a Attach Additional Validity Testing Results

[CBE 4490 Validity.pdf](#)

5.3.5 Interpretation of Validity Results

Overall, technical expert panel members (i.e., clinicians, non-clinicians, and family members of Medicaid participants) generally supported the proposition that the measure's eligible population should include all adults receiving Medicaid HCBS, other than those for whom an exclusion would be present, with only one member (a clinician) disagreeing and another (a non-clinician) having no opinion.

Technical expert panel member responses showed a lack of consensus for the lower age bound, specifically on whether individuals within this measure's eligible population should be aged 18 years or older within the measurement period. Half of the clinician respondents agreed (i.e., they answered *Yes*) with an 18-year-and-older inclusion criterion, while the other half of the clinicians responded either *Not Sure* or disagreed with the criterion (i.e., they answered *No*). Non-clinician technical expert panel members were mostly uncertain for how to specify the lower age bound. One clinician technical expert panel member noted that the age inclusion criterion should be adjusted higher, to 20 or 21 years old, because some pediatric programs cover individuals up to 21 years of age (the suggestion was not accepted so the measure could capture a broader range of adults and include younger adults). Another clinician member of the technical expert panel believed that the age should be lowered, explaining that HCBS participants who have intellectual or developmental disabilities, physical disabilities, or mental illness who are younger than 18 years should not be excluded from the eligible population (the suggestion was not accepted because mental health and substance use disorder conditions were determined to not be

appropriate for inclusion in the measure). Two other technical expert panel members—one a non-clinician and another a clinician—noted that the cutoff for eligible population age should follow HCBS eligibility age. Technical expert panel members largely agreed that an upper limit on age for the denominator was unnecessary (therefore, an upper age limit was not applied); two clinician technical expert panel members noted, however, that an upper limit of 80 or 85 years old may be an appropriate upper bound if a ceiling for participant age is deemed necessary.

5.3.2 Type of Accountable Entity Level Validity Testing Conducted (derived)

Systematic assessment of face validity of the measure's performance score as an indicator of quality or resource use

5.4.1 Methods Used to Address Risk Factors

Statistical risk adjustment model with risk factors

5.4.2 Conceptual Model Rationale

See conceptual model within attachment (CBE 4490 Statistical Detail.xlsx).

5.4.2a Attach Conceptual Model

[4490 Conceptual Model.pdf](#)

5.4.3 Variable Distribution Across Measured Entities

A total of 4,040,676 participants were identified in the analytic population; 3,960,577 participants were included in the testing population for risk adjustment. **Exhibit 3**, in the performance gap attachment, shows the distribution based on various characteristics (i.e., age, gender, race or ethnicity, dually enrolled status, rurality, history of prior hospitalization, HCC, and submitting state). For risk-adjustment purposes, the measure developer removed participants with unknown gender (N=36), unknown rurality status (N=44,519, 1 percent), or residing in states or territories (N=35,621, 1 percent) that were removed due to data quality issues.

Using a participant-level sample, we used a one stage logistic regression model. The purpose of this model was to estimate the likelihood of one HCBS participant having a qualifying inpatient hospitalization for an ambulatory care sensitive condition. This estimate is presented as a performance rate of number of HCBS participants with admissions for ambulatory care sensitive conditions, per 1,000 participants, for the three measure numerators—chronic, acute, and total ambulatory care sensitive conditions (i.e., both acute and chronic ambulatory care sensitive conditions).

Factors included in the risk model can be found in **Exhibit 7**, in the attached risk model file.

All risk factors were obtained and calculated using the 2018 and 2019 TAF. T-MSIS contains participant, service utilization, administrative claims, and expenditure data for the Medicaid population, including those covered through both FFS and managed care payers.

5.4.4 Risk/Case-Mix Adjustment Modeling and/or Stratification Results

The process of selecting risk factors for inclusion or exclusion from the risk model involved the following:

- Review of frequency threshold cutoffs;
- Correlation check;
- Bivariate logit regression to check if a risk factor is a statistically significant predictor for the outcome independently; and
- Collinearity check.

An additional consideration in review of the measure developer's risk-selection process, as well as model results, is that many factors came back as insignificant when tested (e.g., urbanicity, the interaction of age and biological sex). However, from a theoretical perspective, as the developer knows that these factors would impact likelihood of an inpatient hospitalization for an ambulatory care sensitive condition, and from a face-validity perspective, would be questioned if not included, the measure developer ran the risk model to account for these items to assess their impact, ultimately selecting the model of best fit.

5.4.4a Attach Risk/Case-mix Adjustment Modeling and/or Stratification Specifications

[CBE 4490 Statistical Detail.xlsx](#)

5.4.5 Calibration and Discrimination

To validate the measure developer's results, an additional test was conducted, in which we randomly selected two five-percent samples from the full analytic sample, ran the same risk-adjustment approach, and compared the directionality and statistical significance of model coefficients. Two five-percent samples (N=198,029 for both) were mutually exclusive and randomly drawn from the overall sample (N=3,960,577) that were eligible for risk adjustment. Most of coefficient estimates in the models of the small samples had the same directionality and consistent statistical significance as in the full-sample model. The only exception was that in the model for the participants with hospitalizations for acute conditions, the coefficients of several age and gender categories switched their signs but this was statistically insignificant. The probability of one participant with hospitalization for acute conditions was extremely low (around 2.2%), which led to relatively sensitive response of the outcome to even slightly different distribution of categorical risk factors like the age and gender categories in the five-percent samples.

We also compared mean observed and predicted rates of the deciles for the overall sample on the basis of the predicted rates through plotting mean rates of the deciles. Three decile calibration plots for three rates show that the models tended to overestimate the probabilities at the lower deciles. The mean predicted and observed rates were very close from 6th to 8th deciles and at the highest decile.

Additionally, the observed to estimated (expected) ratios at the state level were assessed. A ratio of 1.0 means that the estimated rate is equal to the observed rate. A ratio greater than 1.0 indicates underestimation while a ratio less than 1.0 means overestimation. The ratios for the

three measures ranged from 0.62 to 1.63, with a mean of 0.99 and standard deviation of 0.17. The variation of the ratios at the state level can be partially explained by unobserved factors not considered in the models, for example, state-specific policies.

5.4.6 Interpretation of Risk/Case-mix Factor Findings

See calibration and discrimination testing results attachment (CBE 4490 Statistical Detail.xlsx).

5.4.7 Final Approach to Address Risk Factors

Statistical risk adjustment model with risk factors

6.1.1 Current Status

Not in use

6.1.2 Current or Planned Use(s)

Public Reporting, Quality Improvement with Benchmarking (external benchmarking to multiple organizations)

6.2.1 Actions of Measured Entities to Improve Performance

Data obtained from this measure will provide an opportunity for policy makers and stakeholders at the state level to benchmark and track trends in avoidable hospitalizations for ambulatory care sensitive conditions and identify policy levers for improving performance.

Usability of the HCBS ACSC measure was assessed via qualitative survey, which contained a mix of Likert scale, binary (yes/no), and free-text questions, by 10 members of the measure developer's technical expert panel (the composition of the technical expert panel is described in the *Feasibility* section, above). Results indicate that 90 percent of the respondents agree that the data from the measure, as a whole, would be helpful for states to implement healthcare quality initiatives or other related efforts. One respondent (10 percent) also suggested that data from this measure could help providers assess the impact of interventions to improve ambulatory care sensitive conditions more effectively. Another respondent (10 percent) noted that information from the measure could help identify HCBS participants who are at high risk for potentially avoidable hospital admissions.

7.1 Supplemental Attachment

[CBE 4490 Supplement.pdf](#)

Developer POC email

KHammons@mathematica-mpr.com

Measure Developer POC

Krista Hammons
Mathematica

United States

The measure developer is different from the measure steward

Yes

Steward Address

Kerry Lida
7500 Security Boulevard
Windsor Mill, MD 21244
United States

Steward Organization

Centers for Medicare & Medicaid Services

Steward Organization URL

<https://www.medicaid.gov/medicaid/home-community-based-services/home-community-...>

Steward POC email

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