2025 Pre-Rulemaking Measure Review
Preliminary Assessment

MUC ID	Title
MUC2025-016	Excess Antibiotic Duration for Adult Hospitalized Patients with Uncomplicated Community-Acquired Pneumonia
Measure Steward & Developer	**Proposed CMS Programs**
University of Utah	Hospital Inpatient Quality Reporting Program Link: Hospital Inpatient Quality Reporting Program Medicare Promoting Interoperability Program Link: Medicare Promoting Interoperability Program

Measure Overview
Rationale (excerpt from submission): The overall objective of this electronic clinical quality measure is to quantify excess antibiotic duration in hospitalized adults with uncomplicated community-acquired pneumonia (CAP). Antibiotic overuse is a national and international public health emergency with antibiotic resistant infections estimated to directly cause 1.27 million deaths globally and indirectly contribute to 4.95 million deaths.[1] National studies by the Centers for Disease Control and Prevention (CDC) estimate that up to 50% of hospitalized patients receive antibiotic therapy, most commonly for pneumonia, and that up to 40% of antibiotic prescribing could be improved.[2] Because of these harms, the CDC developed recommendations for Antibiotic Stewardship which it published in its "Core Elements of Hospital Antibiotic Stewardship Programs.[3]" These recommendations include "[a]ssessing how often patients are discharged on the correct antibiotics for the recommended duration." Specifically, the CDC recommends, "most cases of uncomplicated pneumonia can be treated for 5 days when a patient has a timely clinical response." The 5-day treatment duration is based on national 5-day guideline recommendations for uncomplicated CAP, multiple randomized clinical trials showing the safety of short vs. long durations, and retrospective observational studies showing higher antibiotic-associated adverse events in patients who receive excess antibiotic durations.[4,5]
CMS-provided program rationale: Antibiotic overuse is a national and international public health emergency, with antibiotic resistant infections estimated to directly cause 1.27 million deaths globally

[1] Antimicrobial Resistance Collaborators. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. Lancet. Feb 12 2022; 399(10325):629-655. doi:10.1016/s0140-6736(21)02724-0
[2] Fridkin S, Baggs J, Fagan R, et al. Vital signs: improving antibiotic use among hospitalized patients. MMWR Morbidity and mortality weekly report. Mar 7 2014; 63(9):194-200.
[3] CDC. Core Elements of Hospital Antibiotic Stewardship Programs. US Department of Health and Human Services. CDC. Accessed August 3, 2022. https://www.cdc.gov/antibiotic-use/healthcare/pdfs/hospital-core-elements-H.pdf
[4] Dunbar LM, Khashab MM, Kahn JB, Zadeikis N, Xiang JX, Tennenberg AM. Efficacy of 750-mg, 5-day levofloxacin in the treatment of community-acquired pneumonia caused by atypical pathogens. Curr Med Res Opin. Apr 2004; 20(4):555-63. doi:10.1185/030079904125003304
[5] Vaughn VM, Flanders SA, Snyder A, et al. Excess Antibiotic Treatment Duration and Adverse Events in Patients Hospitalized with Pneumonia: A Multihospital Cohort Study. Annals of internal medicine. Aug 6 2019; 171(3):153-163. doi:10.7326/M18-3640

Measure Overview
and indirectly contribute to 4.95 million deaths. Monitoring the data incentivizes hospitals to track this health care patient safety concern.
Description: Percentage of adult non-ICU hospitalized patients with uncomplicated pneumonia that qualify for 5-day duration according to national guidelines who received excess antibiotic duration, defined as >/= 7 days of total antibiotic therapy including inpatient and discharge antibiotics. Measure is reported annually at the hospital level.
Measure background: New measure never reviewed by the Measure Applications Partnership (MAP) Workgroup or PRMR; never used in a Medicare program
Numerator: From the denominator population, identify patients who received excess antibiotic duration, defined as >/= 7 days of total antibiotic therapy including inpatient and discharge antibiotics. **Exclusions:** N/A
Denominator: Identify all adult patients with an inpatient (or observation) non-intensive care unit (ICU) hospitalization in which the discharge diagnosis includes pneumonia, or sepsis plus respiratory failure, who: a) received a respiratory antibiotic within 48 hours of hospitalization, b) had chest imaging within +/- 3 days of the hospital encounter, c) were not transferred from another hospital, and d) do not have a concurrent infection. Restrict to patients with uncomplicated pneumonia that qualify for a 5-day duration according to national guidelines. **Exclusions:** To identify uncomplicated Community-Acquired Pneumonia (CAP) patients: Exclude if any of the following are documented in association with the admission: • On mechanical ventilation in first 48 hours • Absolute neutrophil count < 500 cells/uL • Cystic fibrosis • Bronchiectasis • Human immunodeficiency virus (HIV) • Tracheostomy • Transplant • Hematologic malignancy • Pulmonary complication (empyema, lung abscess, necrotizing pneumonia) Exclude cases in which duration is unknown: • Died during hospitalization • Discharged to another hospital • Discharged to inpatient or home hospice Exclude conditions requiring longer duration: • Transferred to ICU during hospitalization • Bacteremic with non-skin commensal • Staphylococcus aureus in respiratory culture • Pseudomonas aeruginosa in respiratory culture • Legionella pneumonia

Measure Overview	
• Time to clinical stability > 5 days Exclude conditions where treatment likely not for uncomplicated CAP: • Less than 3 days of antibiotics • Greater than 14-day total antibiotic duration **Exceptions:** N/A	
Substantive changes from prior version (if applicable): N/A	
Measure type: Process	**Measure is a composite:** No **Measure is digital and/or an eCQM:** Yes **Measure is a paired or group measure:** No
Level of analysis: Facility	**Data source(s):** Digital-Electronic Health Record (EHR) Data
Care setting(s): • Hospital: Acute Care Facility • Hospital: Critical Access • Hospital: Inpatient	**Risk adjustment or stratification:** No
CBE endorsement status: Endorsed	**CBE endorsement history:** Endorsed with Conditions in 2025. The conditions specified that when the measure returns for maintenance (3 years), the measure developer should have: • Continued to explore the exclusion list to determine if changes are needed (e.g., empirical analyses with broader testing across entities) and to further clarify the conditions and justify them based on burden; and • Conducted additional validity testing (data element in additional EHR).
Is measure currently used in CMS programs? No	**Measure addresses statutorily required area?** No

Evaluation

Meaningfulness

Importance	
Type of evidence:	Clinical Guidelines or USPSTF (U.S. Preventive Services Task Force) Guidelines; Empirical data; Peer-Reviewed Original Research [MUC Entry/Review Information Tool (MERIT) Submission Form]
Importance: As outlined in the literature cited in the measure rationale, antibiotic overuse, especially in treating pneumonia, is a major public health concern linked to millions of deaths and rising resistance. Evidence provided from peer-reviewed research and federal surveillance data shows that most hospitalized adults with uncomplicated CAP can be safely treated with a 5-day antibiotic course, yet many receive longer durations, increasing risks and costs. This electronic clinical quality measure supports CDC stewardship guidelines and has demonstrated effectiveness in improving prescribing practices, reducing harm, and enhancing care for a large population of hospitalized patients. The developers did not provide patient perspectives or evaluation of this measure's importance. The evidence supporting the importance of this measure was found to be sufficient during CBE Endorsement review in 2025.	
Rating: Met; Prior CBE Endorsement	

Conformance
Measure alignment with conceptual intent: This measure intends to quantify excess antibiotic duration in hospitalized adults with uncomplicated CAP. The measure's numerator, denominator, and exclusions are clearly defined and directly support the intent of this measure. Specifically, the numerator includes patients who received excess antibiotic duration, defined as greater than or equal to 7 days of total antibiotic therapy from the denominator population of all adult patients with an inpatient (or observation) non-intensive care unit (ICU) hospitalization in which the discharge diagnosis includes pneumonia, or sepsis plus respiratory failure, who: a) received a respiratory antibiotic within 48 hours of hospitalization, b) had chest imaging within 3 or more days of the hospital encounter, c) were not transferred from another hospital, and d) do not have a concurrent infection. The denominator exclusions are appropriate to the population and measure intent. This measure aligns with the Hospital Inpatient Quality Reporting Program objective to improve the quality of care that hospitals provide and to distribute clearly defined and objective data about hospital performance as well as the Promoting Interoperability Program's goal commitment to promoting and prioritizing interoperability and exchange of health care data.
Rating: Met; Prior CBE Endorsement

Feasibility	
Feasibility testing/analysis conducted:	Yes, electronic clinical quality measure (eCQM) testing was performed [MERIT submission form; eCQM Feasibility Scorecard]

Feasibility: For this eCQM, all data elements are in structured fields in electronic sources, and all data elements align with United States Core Data for Interoperability (USCDI)/USCDI+ Quality standard definitions. This eCQM was tested in two EHRs and demonstrated a high level of feasibility.

The feasibility scorecard addresses the following domains:

- Data availability: Data element exists in a structured format in this EHR.
- Data accuracy: Information is from authoritative source and/or is highly likely to be correct.
- Data standards: Data element is coded in a nationally accepted terminology standard or can be mapped to that terminology standard.
- Workflow: The data element is routinely collected during clinical care and requires no, or limited, additional data entry from a clinician or other provider, and no EHR interface changes.

Feasibility testing identified nine data elements that required additional review within the Epic testing site. For the seven lab tests that were not coded or mapped to terminology standards, the feasibility plan indicates that a list of eligible tests corresponding to individual codes may be used to pull information from these searchable fields. The feasibility plan indicates that two elements that required additional review "Procedure, Performed: Transfer from other hospital" and "Encounter discharge disposition: Discharge to Acute Care" are both searchable and will be assessed for potential improvements to streamline this process in future testing.

The feasibility of this measure was sufficiently demonstrated during CBE endorsement review in 2025.

Rating: Met; Prior CBE Endorsement

Validity	
Validity testing method(s):	Face validity; empiric validity [MERIT submission form; Supplemental Materials]
Testing level(s)	Facility
Was this measure tested in the same target population as the CMS program?	Yes

Validity: Developers established the face validity of this measure by asking members of the technical expert panel (TEP) if the measure would differentiate between high- and low-performing hospitals. All eight members of the TEP agreed that the measure could differentiate appropriately.

Empirical validity showed that hospitals with higher rates of excess antibiotic duration for CAP also had higher rates of inappropriate broad-

Validity
spectrum antibiotic use, indicating a weak but significant correlation (r = 0.3, p = 0.002). Excess duration was not linked to serious outcomes such as mortality or readmission, but each additional day of antibiotics increased the odds of patient-reported side effects by 5%. This finding demonstrates that excess antibiotic duration for CAP is associated with antibiotic-related harm. Predictive validity was demonstrated in a pay-for-performance program across 41 Michigan hospitals, where reducing excess duration led to a 22% increase in appropriate short-course therapy and a measurable decrease in antibiotic-related harm (adjusted odds ratio per quarter: 0.98; 95% confidence interval: 0.96-0.99). This finding demonstrates that reducing excess duration for CAP may reduce antibiotic-related harm. The validity of this measure was sufficiently demonstrated during CBE endorsement review in 2025.
Threats to validity: In measure testing, demographics and other patient characteristics were not strongly associated with either measure performance or reliability of the measure score. The developers do not recommend risk adjustment or stratification and instead utilized an extensive exclusion protocol in the measure specification to exclude patients for whom the measure does not apply. Process measures are generally not recommended for risk adjustment.
Rating: Met; Prior CBE Endorsement

Reliability	
Reliability testing method(s):	Signal-to-Noise [MERIT Submission Form, Supplemental Materials]
Testing level:	Facility
Reliability discussion: The developer used a beta-binomial model to calculate entity-level signal-to-noise reliability with a dataset of 28,238 persons across 109 facilities. A summary by decile is shown in Table 1. The reliability of the 1st decile is 62.7%, indicating that at least 90% of the entities have a reliability greater than the threshold of 60%. The median reliability using this method is about 93%. Reliability testing across 109 VA hospitals showed that the measure achieved a median reliability of 80.1% with 49 cases per facility, and cohort-level reliability exceeded 99.9%. The reliability of this measure was found sufficiently demonstrated during prior CBE endorsement review in 2025.	
Additional reliability analyses: Battelle staff performed additional assessment of reliability testing data to provide committee members standardized format to assess reliability by decile across measures. The timeframe for reliability testing was not specified in submitted materials to assess alignment with annual reporting cycles	
Rating: Met; Prior CBE Endorsement	

Reliability Tables

The developer provided information by decile for performance scores and calculated reliability for the 109 entities described in the testing submission. Tables 1 and 2 show deciles by performance score, with a lower score indicating a better quality of care on this proportion score, and reliability. Battelle created Table 1. The measure developer provided Table 2. These tables provide reviewers with a standardized format to assess reliability.

Table 1. MUC2025-016 Performance Score Deciles

Highest Performers ← Lowest Performers

-	Overall	Min	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	Max
Mean Score	39.8%	11.9%	20.5%	27.7%	31.4%	33.8%	35.5%	38.5%	42.6%	46.4%	54.9%	65.6%	79.4%
Entities	109	1	11	11	11	11	10	11	10	12	11	11	1

Table 2. MUC2025-016 Mean Reliability (by Reliability Decile)

-	Overall	Min	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	Max
Reliability	99.9%	30.2%	62.7%	84.3%	90.1%	91.6%	92.7%	93.7%	94.4%	95.5%	96.4%	97.3%	98.3%
Number of Entities	109	1	11	11	11	11	10	11	11	11	11	11	1
Number of Persons/ Encounters/ Episodes	28238	5	348	1,026	1,485	1,851	1,953	2,635	3,075	3,845	4,784	7,236	988

Usability	
Usability considered in application:	Yes, the submission materials briefly discuss the measure's usability within relevant programs.

Usability
Usability discussion: While the measure submission materials acknowledge feasibility concerns, especially for critical access and small hospitals with limited IT infrastructure, they do not specifically address barriers or facilitators to use within the Hospital IQR or Promoting Interoperability programs. The developers note guidance from the TEP that the measure may unintentionally lead to under-treatment in rare cases where patients require longer antibiotic durations, but expert consensus suggests this risk is minimal and difficult to define reliably in electronic clinical quality measures (eCQMs). To mitigate potential harm, the measure targets a conservative duration (≥5 days), and future evaluations will monitor for unforeseen consequences, especially in settings with limited IT infrastructure. The use/usability of this measure was found sufficiently demonstrated during prior CBE endorsement review in 2025.
Rating: Met; Prior CBE Endorsement

Appropriateness of Scale

Appropriateness of Scale	
Similar or related measures in program(s):	Excess Days in Acute Care after Hospitalization for Pneumonia is a related measure within the Hospital IQR Program.
Measure balance, burden, and value across target populations/measured entities: The developer notes that pneumonia is a well-established target of clinical quality and safety monitoring and provides an extensive list of existing and prior measures for pneumonia as well as existing measures for antibiotic use that may be influenced by measures of treatment of pneumonia in their submission materials. However, no directly competing measures are currently active in either the Hospital IQR or Promoting Interoperability programs. Regarding balance of this measure's performance, burden, and benefit across populations, the developer's literature review and analysis do not indicate a potential for differential benefit or harm to specific subgroups of participating entities or their patient populations. **Considerations for the committee:** Based on clinical and professional experience, the committee should consider the distribution of benefits and risks/burdens of the measure within the proposed program population.	

Time-to-Value Realization

Time-to-Value Realization	
Plan for near- and long-term impacts after implementation:	None specified
Measure implementation impacts over time: While the measure developer briefly mentions potential outcomes for their measure on patient populations, there may be need for further examination of near- and long-term impacts of this measure after implementation across provider and patient populations. The measure developer noted the following during collaboration on this PA: In July of 2025 (after the initial measure submission), the American	

Time-to-Value Realization
Thoracic Society updated their guidance for treatment of community-acquired pneumonia (CAP) and now recommend, “For adult inpatients with non-severe CAP who reach clinical stability, we suggest less than five days of antibiotics (minimum of 3 days duration), rather than five or more days of antibiotics that patients who stabilize within 3 days of antibiotic treatment.[6]” We had anticipated this guideline update based on clinical trial guidance (a member of the measurement team is also on the guideline committee). We elected to maintain the 5-day cut-off for this measure for the following two reasons: (1) less than half of hospitalized patients stabilize within 3 days and thus most do not qualify for a 3-day antibiotic duration; and b) to reflect current practice (few patients are currently being treated with 3 days of antibiotic therapy) and thus enhance face validity. Moving toward a 5-day goal would represent a major advance in quality of care for patients with CAP. We anticipate that as people grow accustomed to a 3-day treatment and more evidence is generated about the safety of a 3-day duration for a broader population, this measure could also shift to target shorter durations. **Considerations for the committee:** • What are the potential near- and long-term impacts of this measure on measured entities, proposed CMS programs, and patient populations? • Will benefits and burdens associated with this measure be realized within an appropriate implementation time frame? • How will this measure mature through revisions in the future if added to these programs’ measure sets?

[6] Jones, B. E., Ramirez, J. A., Oren, E., Soni, N. J., Sullivan, L. R., Restrepo, M. I., ... & Wilson, K. (2025). Diagnosis and management of community-acquired pneumonia. An official American thoracic society clinical practice guideline. *American journal of respiratory and critical care medicine*, (ja).