## Measure #407: Appropriate Treatment of Methicillin-Susceptible Staphylococcus Aureus (MSSA) Bacteremia– National Quality Strategy Domain: Effective Clinical Care

2017 OPTIONS FOR INDIVIDUAL MEASURES:
CLAIMS ONLY

MEASURE TYPE:
Process

DESCRIPTION:
Percentage of patients with sepsis due to MSSA bacteremia who received beta-lactam antibiotic (e.g. nafcillin, oxacillin or cefazolin) as definitive therapy

INSTRUCTIONS:
This measure is to be reported each episode a patient is hospitalized with sepsis due to MSSA bacteremia during the performance period. This measure may be reported by eligible clinicians who perform the quality actions described in the measure based on the services provided and the measure-specific denominator coding.

Measure Reporting:
The listed denominator criteria is used to identify the intended patient population. The numerator quality-data codes included in this specification are used to submit the quality actions allowed by the measure. All measure-specific coding should be reported on the claim(s) representing the eligible encounter.

DENOMINATOR:
All hospitalized patients with sepsis due to MSSA bacteremia

*DENOMINATOR NOTE: A patient 18 years or older who has an initial inpatient encounter with symptoms of bacteremia that is documented of being methicillin-susceptible Staphylococcus aureus.*

Denominator Criteria (Eligible Cases):
All patients 18 years or older
AND
Diagnosis for Sepsis due to MSSA (ICD-10-CM): A41.01
AND
Patient encounter during **performance period** (CPT): 99218, 99219, 99220, 99221, 99222, 99223, 99231, 99232, 99233, 99234, 99235, 99236, 99291

NUMERATOR:
Number of denominator eligible patients treated with a beta-lactam antibiotic (e.g. nafcillin, oxacillin or cefazolin) as definitive therapy

Definition:
Beta-Lactam – For the purposes of this measure, a beta-lactam antibiotic is defined as Nafcillin, Oxacillin or Cefazolin.

Numerator Quality-Data Coding Options:
Appropriate Beta-lactam antibiotic prescribed

| | |
|---|---|
| *Performance Met:* G9558: | Patient treated with a beta-lactam antibiotic as definitive therapy |

OR


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Beta-lactam antibiotic not Prescribed for Medical Reasons

| | |
|---|---|
| *Denominator Exception:* G9559: | Documentation of medical reason(s) for not prescribing a Beta-lactam antibiotic (e.g., allergy, intolerance to beta-lactam antibiotics) |

OR

Beta-lactam antibiotic not Prescribed, Reason not Given

| | |
|---|---|
| *Performance Not Met:* G9560: | Patient not treated with a beta-lactam antibiotic as definitive therapy, reason not given |

RATIONALE:

With the increase of methicillin-resistant Staphylococcus aureus (MRSA) infections, clinicians have responded by choosing antibiotics that are effective against MRSA, typically vancomycin, for empiric therapy for suspected staphylococcal infections. Clinicians frequently start vancomycin therapy for cases of suspected staphylococcal infection and continue treatment with vancomycin despite the identification of methicillin-susceptible S. aureus (MSSA) as being the infecting pathogen, which can be more effectively treated with a beta-lactam antibiotic. Studies have shown that vancomycin is inferior to beta-lactam to treat MSSA and vancomycin-use leads to higher infection-related mortalities and recurrence of infections in patients with MSSA as well as leading to potential antibiotic resistance.

CLINICAL RECOMMENDATION STATEMENTS:

The following evidence statements are cited from the referenced clinical guideline and manuscripts. Only selected portions of the clinical guideline and manuscripts are quoted here; for more details, please refer to the full guideline and manuscripts.

Vancomycin has been the mainstay of parenteral therapy for MRSA infections. However, its efficacy has come into question, with concerns over its slow bactericidal activity, the emergence of resistant strains, and possible "MIC creep" among susceptible strains. Vancomycin kills staphylococci more slowly than do β-lactams in vitro, particularly at higher inocula (107–109 colony-forming units) and is clearly inferior to β-lactams for MSSA bacteremia and infective endocarditis.

Patients with S. aureus infective endocarditis (IE) have demonstrated positive blood cultures after 7 days of therapy with vancomycin and have a slower response and longer duration of bacteremia than patients treated with β-lactams. One in vivo study evaluated the efficacy of β-lactam antibiotics versus vancomycin in the treatment of S. aureus infections. Investigators observed that β-lactam antibiotics were more effective at the 3- and 7-day time points than vancomycin.

Vancomycin may be less effective for endocarditis because of the need for prolonged high levels of bactericidal antibiotics. The fact that vancomycin was less rapidly bactericidial in vitro than nafcillin is consistent with our concern that vancomycin may be less effective than nafcillin for treating this infection.

Hemodialysis-dependent patients with MSSA bacteremia treated with vancomycin are at a higher risk of experiencing treatment failure than are those receiving cefazolin. In the absence of patient specific circumstances (e.g., allergy to β-lactams), vancomycin should not be continued beyond empirical therapy for hemodialysis-dependent patients with MSSA bacteremia.

Nafcillin was superior to vancomycin in preventing bacteriologic failure (persistent bacteremia or relapse) for methicillin-susceptible S. aureus (MSSA) bacteremia. Duration of antistaphylococcal therapy was not associated with relapse, but type of antibiotic therapy was. Nafcillin was superior to vancomycin in efficacy in patients with MSSA bacteremia.

Our data suggest that vancomycin treatment adversely affects outcome in patients with methicillin-susceptible Staphylococcus aureus bacteremia (MSSA-B). Therefore, our study supports the view that vancomycin treatment should be avoided in patients with MSSA-B when the use of beta-lactam antibiotics is possible.


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The results support the findings of other clinical series in suggesting that vancomycin is inferior to beta-lactam therapy for methicillin-susceptible Staphylococcus aureus (MSSA) and confirms this for injection drug users (IDUs) with MSSA infective endocarditis (IE).

This study suggests that patients with MSSA bacteremia should receive nafcillin or cefazolin as soon as the pathogen is definitively identified by culture since there was a 69% lower risk of death in those patients who were switched from vancomycin. Thus, these results imply that clinicians should not continue vancomycin for dosing scheduling convenience, as any benefits from simplified dosing schedules would be greatly outweighed by the survival benefits of switching to nafcillin or cefazolin.

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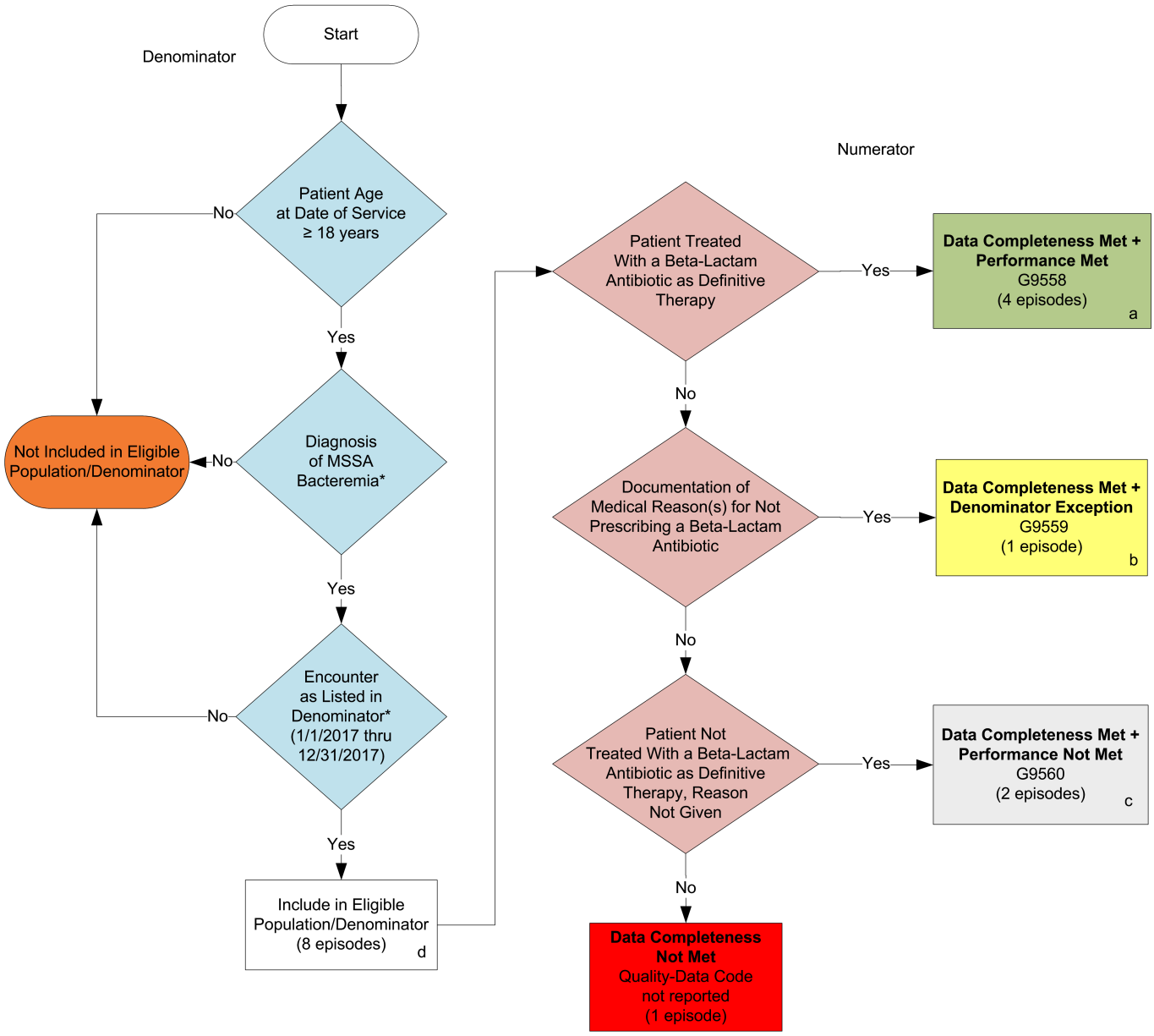
# 2017 Claims Individual Measure Flow
# #407: Appropriate Treatment of Methicillin-Susceptible Staphylococcus Aureus (MSSA) Bacteremia




**SAMPLE CALCULATIONS:**

**Data Completeness=**

Performance Met (a=4 episodes) + Denominator Exception (b=1 episode) + Performance Not Met (c=2 episodes) = 7 episodes = **87.50%**

Eligible Population / Denominator (d=8 episodes) = 8 episodes

**Performance Rate=**

Performance Met (a=4 episodes) = 4 episodes = **66.67%**

Data Completeness Numerator (7 episodes) – Denominator Exception (b=1 episode) = 6 episodes

*See the posted Measure Specification for specific coding and instructions to report this measure.

NOTE: Reporting Frequency: Episode

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## 2017 Claims Individual Measure Flow

## #407: Appropriate Treatment of Methicillin-Susceptible Staphylococcus Aureus (MSSA) Bacteremia

Please refer to the specific section of the Measure Specification to identify the denominator and numerator information for use in reporting this Individual Measure.

1. Start with Denominator
2. Check Patient Age:
    a. If the Age is greater than or equal to 18 years of age on Date of Service and equals No during the measurement period, do not include in Eligible Patient Population. Stop Processing.
    b. If the Age is greater than or equal to 18 years of age on Date of Service and equals Yes during the measurement period, proceed to check Current Encounter Performed.
3. Check Patient Diagnosis:
    a. If Diagnosis for Sepsis due to MSSA equals No during the measurement period, do not include in Eligible Patient Population. Stop Processing.
    b. If Diagnosis for Sepsis due to MSSA equals Yes during the measurement period, proceed to check Current Encounter Performed.
4. Check Encounter Performed:
    a. If Encounter as Listed in the Denominator equals No, do not include in Eligible Patient Population. Stop Processing.
    b. If Encounter as Listed in the Denominator equals Yes, include in Eligible Patient Population
5. Denominator Population:
    a. Denominator population is all Eligible Patients in the denominator. Denominator is represented as Denominator in the Sample Calculation listed at the end of this document. Letter d equals 8 episodes in the sample calculation.
6. Start Numerator
7. Check Appropriate Beta-lactam Antibiotic Prescribed:
    a. If Appropriate Beta-lactam Antibiotic Prescribed equals Yes, include in Data Completeness Met and Performance Met.
    b. Data Completeness Met and Performance Met letter is represented in the Data Completeness and Performance Rate in the Sample Calculation listed at the end of this document. Letter a equals 4 episodes in Sample Calculation.
    c. If Appropriate Beta-lactam Antibiotic Prescribed equals No, proceed to Beta-lactam Antibiotic Not Prescribed for Medical Reason.
8. Check Beta-lactam Antibiotic Not Prescribed for Medical Reason:
    a. If Beta-lactam Antibiotic Not Prescribed for Medical Reason equals Yes, include in Data Completeness Met and Denominator Exception.


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b. Data Completeness Met and Denominator Exception letter is represented in the Data Completeness and Performance Rate in the Sample Calculation listed at the end of this document. Letter b equals 1 episode in the Sample Calculation.

c. If Beta-lactam Antibiotic Not Prescribed for Medical Reason equals No, proceed to Beta-lactam Antibiotic Not Prescribed, Reason Not Given.

9. Check Beta-lactam Antibiotic Not Prescribed, Reason Not Given:

   a. If Beta-lactam Antibiotic Not Prescribed, Reason Not Given equals Yes, include in Data Completeness and Performance Not Met.

   b. Data Completeness Met and Performance Not Met letter is represented in the Data Completeness and Performance Rate in the Sample Calculation listed at the end of this document. Letter c equals 2 episodes in the Sample Calculation.

   c. If Beta-lactam Antibiotic Not Prescribed, Reason Not Given equals No, proceed to Data Completeness Not Met.

10. Check Data Completeness Not Met:

    a. If Data Completeness Not Met equals No, Quality Data Code not reported. 1 episode has been subtracted from the Data Completeness numerator in the sample calculation.

**SAMPLE CALCULATIONS:**

**Data Completeness=**

$$\frac{\text{Performance Met (a=4 episodes) + Denominator Exception (b=1 episode) + Performance Not Met (c=2 episodes)}}{\text{Eligible Population / Denominator (d=8 episodes)}} = \frac{\text{7 episodes}}{\text{8 episodes}} = \mathbf{87.50\%}$$

**Performance Rate=**

$$\frac{\text{Performance Met (a=4 episodes)}}{\text{Data Completeness Numerator (7 episodes) – Denominator Exception (b=1 episode)}} = \frac{\text{4 episodes}}{\text{6 episodes}} = \mathbf{66.67\%}$$


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