Measure Title
AQI69: Intraoperative Antibiotic Redosing

Measure Description
Percentage of patients, aged 18 years and older, who received preoperative antibiotic prophylaxis within 60 minutes prior to incision (if fluoroquinolone or vancomycin, two hours) and undergo a procedure greater than two hours duration who received intraoperative antibiotic redosing at a maximum interval of two half-lives of the selected prophylactic antibiotic.

NQS Domain / Meaningful Measures Area
Patient Safety / Healthcare Associated Infections

Measure Type
Process

High Priority Status
Yes

Inverse Measure
No

Instructions
This measure is to be reported each time a patient undergoes a surgical procedure lasting greater than two hours duration during the reporting period. It is anticipated that qualified anesthesia providers and eligible clinicians who provide denominator-eligible services will submit this measure.

Measure Reporting via the Qualified Clinical Data Registry
CPT codes and patient demographics are used to identify patients who are included in the measure's denominator. Registry codes are used to report the numerator of the measure.

Denominator
All patients, aged 18 years and older, who received preoperative antibiotic prophylaxis within 60 minutes (if fluoroquinolone or vancomycin, two hours) prior to incision and undergo a procedure greater than two hours duration.

Denominator Definition:
For the purpose of this measure, preoperative antibiotic prophylaxis includes, but is not limited to, prophylaxis with the following antimicrobial agents:

- *Ampicillin-sulbactam*
- *Ampicillin*
- *Aztreonam*
- *Cefazolin*
- *Cefuroxime*
- *Cefotaxime*
- *Cefoxitin*
- *Cefotetan*
- *Clindamycin*
- *Piperacillin-tazobactam*

Denominator Criteria (Eligible Cases):

All patients, aged 18 years and older
AND
Patient received antibiotic prophylaxis within 60 minutes (if fluoroquinolone or vancomycin, two hours) prior to incision: **10A87**
AND
Procedure >2 hours duration: **11A60**
AND
Patient encounter during the reporting period (CPT):
00100, 00102, 00103, 00120, 00124, 00126, 00140, 00144, 00145, 00147, 00160, 00162, 00164, 00170, 00172, 00174, 00176, 00190, 00192, 00210, 00211, 00212, 00214, 00215, 00216, 00218, 00220, 00222, 00300, 00320,00322, 00350, 00352, 00400, 00402, 00404, 00406, 00410, 00450, 00454, 00470, 00472, 00474, 00500, 00528, 00529, 00534, 00537, 00539, 00540, 00541, 00542, 00546, 00548, 00550, 00560, 00562, 00563, 00566, 00567, 00580, 00600, 00604, 00620, 00625, 00626, 00630, 00632, 00635, 00640, 00670, 00700, 00730, 00750, 00752, 00754, 00756, 00770, 00790, 00792, 00794, 00796, 00797, 00800, 00802, 00811, 00820, 00830, 00832, 00840, 00842, 00844, 00846, 00848, 00851, 00860, 00862, 00864, 00865, 00866, 00868, 00870, 00872, 00873, 00880, 00882, 00902, 00904, 00906, 00908, 00910, 00912, 00914, 00916, 00918, 00920, 00921, 00922, 00924, 00926, 00928, 00930, 00932, 00934, 00936, 00938, 00940, 00942, 00944, 00948, 00950, 00952, 01120, 01140, 01150, 01160, 01170, 01173, 01200, 01202, 01210, 01212, 01214, 01215, 01220, 01230, 01232, 01234, 01250, 01260, 01270, 01272, 01274, 01320, 01340, 01360, 01382, 01390, 01392, 01400, 01402, 01404, 01430, 01432, 01440, 01442, 01444, 01464, 01470, 01472, 01474, 01480, 01482, 01484, 01486, 01500, 01502, 01520, 01522, 01610, 01620, 01622, 01630, 01634, 01636, 01638, 01650, 01652, 01654, 01656, 01670, 01710, 01712, 01714, 01716, 01732, 01740, 01742, 01744, 01756, 01758, 01760, 01770, 01772, 01780, 01782, 01810, 01829, 01830, 01832, 01840, 01842, 01844, 01850, 01852, 01920, 01924, 01925, 01926, 01930, 01931, 01932, 01933, 01937, 01938, 01939, 01940, 01941, 01942, 01951, 01952, 01961, 01962, 01963, 01965, 01966.

Denominator Exclusions

- Acute Renal failure[23]: **11A61**
- Chronic kidney disease[24]: **11A62**
- Procedure duration <2 half-lives of selected prophylactic antibiotic: **11A63**

Numerator

Patients who received intraoperative redosing of prophylactic antibiotics at a maximum interval of two half-lives of the selected prophylactic antibiotic

Numerator Note: *If multiple redosing windows pass during a procedure, the recommended redosing window is the maximum amount of time that can pass between any two doses in order to meet this measure. Information on dosing and redosing should reflect clinical practice guidelines, local hospital policy, manufacturer guidance, and other materials imperative to safe practice. Antibiotic redosing should occur prior to closing the surgical incision.*

[23] Kidney or renal failure is defined as either: (1) a level of GFR to <15 mL/min/1.73 m2, which is accompanied in most cases by signs and symptoms of uremia, or (2) a need for initiation of kidney replacement therapy (dialysis or transplantation) for treatment for complications of decreased GFR, which would otherwise increase the risk of mortality and morbidity.
[24] Persons reporting this measure should refer to the "KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease" for criteria of chronic kidney disease, renal disfunction and renal insufficiency criteria. Found at: https://kdigo.org/wp-content/uploads/2017/02/KDIGO_2012_CKD_GL.pdf. Accessed October 18, 2020.

Maximum redosing intervals for included antibiotics are listed below:[25]

- Ampicillin-sulbactam: 2 hours
- Ampicillin: 2 hours
- Aztreonam: 4 hours
- Cefazolin: 4 hours
- Cefuroxime: 4 hours
- Cefotaxime: 3 hours
- Cefoxitin: 2 hours
- Cefotetan: 6 hours
- Clindamycin: 6 hours
- Piperacillin-tazobactam: 2 hours

Numerator Quality-Data Coding Options for Reporting Satisfactorily

Performance Met:

11A64 Patient received intraoperative redosing of prophylactic antibiotics at a maximum interval of two half-lives of the selected antibiotic

OR

Performance Met

11A65 Patient received intraoperative redosing of prophylactic antibiotics according to facility antibiotic stewardship program.

OR

Performance Not Met:

11A66 Patient did not receive intraoperative redosing of prophylactic antibiotics at a maximum interval of two half-lives of the selected antibiotic or according to facility antibiotic stewardship program.

NQF Number: Not Applicable

eCQM: Not Applicable

Rationale

While much attention has been focused on antimicrobial stewardship and reducing hospital-acquired infections in recent years, appropriate intraoperative redosing of antibiotics remains an acknowledged area for improvement[26]. Maintaining adequate inhibitory antimicrobial concentrations is an important aspect of infection prevention, with procedure length found to be an independent risk factor for developing surgical site infections[27]. Evidence in the literature has shown wide variation in compliance published

[25] Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. *Am J Health Syst Pharm*. 2013;70:195-283.
[26] Caruso TJ, Wang EY, Colletti AA, and Sharek PJ. Intraoperative antibiotic redosing compliance and the extended postoperative recovery period: often overlooked areas that may reduce surgical site infections. *Pediatric Anesthesia.* 2019;29(3):290-291.
[27] Leong G, Wilson J, Charlett A. Duration of operation as a risk factor for surgical site infection: comparison of English and US data. *J Hosp Infect.* 2006:63;255-262.

recommendations for intraoperative antibiotics, which can be improved through the implementation of multifaceted quality improvement interventions.[28,29]

Clinical Recommendation Statements
2013 ASHP /IDSA/SIS/SHEA Clinical Practice Guidelines for Antimicrobial Prophylaxis in Surgery[30]
"Intraoperative redosing is needed to ensure adequate serum and tissue concentrations of the antimicrobial if the duration of the procedure exceeds two half-lives of the antimicrobial or there is excessive blood loss (i.e., >1500 mL). The redosing interval should be measured from the time of administration of the preoperative dose, not from the beginning of the procedure."

Data Source: Claims/Paper Medical Record, Registry

Measure Steward: American Society of Anesthesiologists (ASA) / Anesthesia Quality Institute (AQI)

Number of Performance Rates: 1

Proportion Measure Scoring: Yes

Continuous Measure Scoring: No

Risk Adjustment: No

Care Setting: Hospital

Telehealth Reporting Option: No

[28] Riggi G, Castillo M, Fernandez M, et al. Improving compliance with timely intraoperative redosing of antimicrobials in surgical prophylaxis. *Infect Control Hosp Epidemiol.* 2014;35(10):1236-1240.
[29] O'Sullivan CT, Rogers WK, Ackman M, Goto M, Hoff BM. Implementation of a multifaceted program to sustainably improve appropriate intraoperative antibiotic redosing. *Am J Infect Control*. 2019;47(1):74-77.
[30] Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. *Am J Health Syst Pharm*. 2013;70:195-283.