

Supplementary material

Table S1

Terms and definitions

Term	Definition
Days of therapy (DOT)	One DOT represents a specific antimicrobial administered to an individual patient on a calendar day independent of dose and route.
Defined daily dose (DDD)	The assumed average maintenance dose per day for a drug used for its main indication in adults. Items issued×Amount of drug per item=DDD
Length of therapy (LOT)	Number of days during which antimicrobial is used.
Treatment period	Antimicrobial treatment not interrupted by more than one calendar day or discharge.
Clostridium difficile colitis	Colitis associated with Clostridium difficile infection (ICD 10: A04.7)
Multidrug resistant organisms	Resistant to three or more antimicrobial classes, including methicillin-resistant Staphylococcus aureus (MRSA), extended spectrum beta-lactamase producing Enterobacteriaceae (ESBL-E), carbapenem resistant Enterobacteriaceae (CRE), vancomycin-resistant enterococci (VRE), and Pseudomonas aeruginosa.
In-hospital or 30-day surgical site infections (SSIs)	Occurs within 30 days postoperatively and involves skin or subcutaneous tissue of the incision and at least one of the following: (1) purulent drainage from the incision, (2) organisms isolated from an aseptically obtained culture of fluid or tissue from the incision, (3) at least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat, and incision is deliberately opened by surgeon and is culture-positive or not cultured (a culture-negative finding does not meet this criterion), and (4) diagnosis of SSI by the surgeon or attending physician. ¹
Bloodstream infections	Blood stream infection after surgery (ICD 10: A41.9)
Pneumonia	Pulmonary infection after surgery (ICD 10: J98.402)
Myocardial infarction (MI)	In accordance with the fourth edition of MI definition Termed type 5 MI, procedure related MI. ² Briefly, the criteria are as follows: <ul style="list-style-type: none"> • Elevation of cTn>10 times of the 9th percentile URL with patients with normal baseline; • For patients with elevated preprocedural cTn values, elevation of cTn>10-fold increase and manifest a change from the baseline value of over 20%;

	<ul style="list-style-type: none"> • With as least one of the following: • Development of new pathological Q waves; • Imaging evidence of loss of viable myocardium that is presumed to be new and in a pattern consistent with an ischemic aetiology; • Angiographic findings consistent with a procedural flow-limiting complication.
Stroke	Refers to newly onset stroke after surgery (ICD 10: I60.0-I60.9; I61.0-I61.9; I62.0; I62.1; I62.9; I63.0-I63.9; I64)
Acute kidney injury (AKI)	<p>Refers to newly onset AKI after surgery</p> <ul style="list-style-type: none"> • Acute renal dysfunction within 48 hours (ICD 10: N17); • AKI stage I: creatinine $\geq 26.5 \mu\text{mol/L}$; creatinine over 1.5-1.9 times of baseline value; urine output $< 0.5 \text{ml/kg/hour}$ for 6-12 hours; • AKI stage II: creatinine over 2.0 to 2.9 times of baseline value; urine output $< 0.5 \text{ml/kg/hour}$ for over 12 hours; • AKI stage III: creatinine $\geq 353.6 \mu\text{mol/L}$; creatinine over 3 times of baseline value; initiation of renal replacement therapy; urine output $< 0.3 \text{ml/kg/hour}$ for ≥ 24 hours; anuria for ≥ 24 hours.
User satisfaction	Users will primarily include surgeons in the intervention arm, but nurses involved with intervention implementation will also be included, aiming for the maximum achievable sample. We will explore their unique and important perspective using questionnaire and an interview guide for the process evaluation of public health interventions and researches. ³ Also, we will explore participants' experiences of using the intervention resources and experiences of the study implementation. As a part of process evaluation, contextual information on initiatives to prescribe antimicrobial will be collected through a popup window at the time when a new antimicrobial order is input in the CPOE system.
User compliance	As a part of process evaluation, compliance with the multicomponent intervention protocols will be assessed. This will be done by evaluating the total number of times the intervention tools fail to change the physicians' decision on antimicrobial prescription over the intervention period.

ICD=international classification of diseases.

URL=upper range limit.

CPOE= computerized physician order entry.

Reference

1. Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. *Am J Health Syst Pharm* 2013;70(3):195-283. doi: 10.2146/ajhp120568 [published Online First: 2013/01/19]
2. Thygesen K, Alpert JS, Jaffe AS, et al. Fourth Universal Definition of Myocardial Infarction (2018). *J Am Coll Cardiol* 2018;72(18):2231-64. doi: 10.1016/j.jacc.2018.08.1038 [published Online First: 2018/08/30]
3. Linnan L, Steckler A. Process evaluation for public health interventions and research. California: Jossey-Bass San Francisco, 2002.