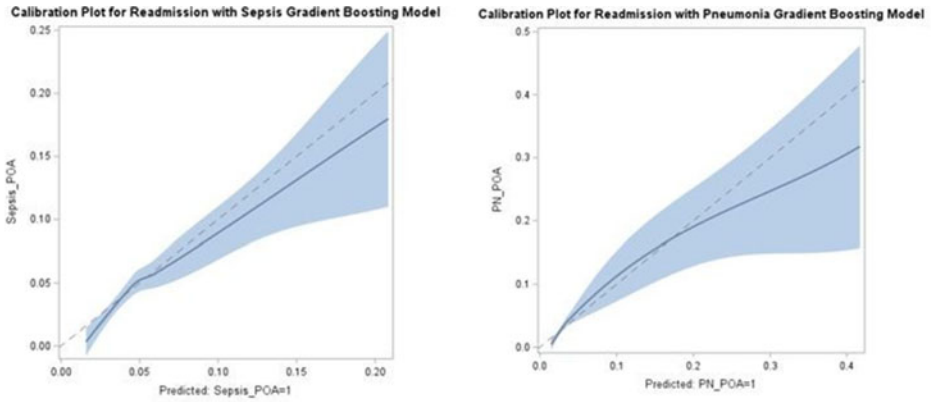

Figure 2. Calibration plot curves for gradient boosting model predicting readmission after discharge to SNF due to sepsis and pneumonia

Fig. 2.

and Enterprise Miner 14.3 (SAS Institute, Cary, NC). We assessed the discrimination and calibration to select the most effective prediction model. Using the resulted risk estimates, we created a notification system and reports for key stakeholders. **Results:** Figures 1 and 2 show the discrimination and calibration results of the final selected gradient boosting model (GBM). For predicting unplanned readmissions *with sepsis* and *with pneumonia* within 30 days after discharge to SNF, the c-statistic for final GBM model with 140 features was 0.69 (95% CI 0.65-0.73) and 73 features was 0.71 (95% CI 0.66-0.75), respectively. Table 1 lists features important to the validation set of the prediction model. We used estimates from these models to develop a daily email notification of patients discharged to SNF stratified into a low, medium, and high risk group for sepsis and pneumonia. We additionally created reports with case-mix adjustments to benchmark SNFs and discharging physicians to monitor and understand performance. **Conclusions:** Hospitals should leverage the plethora of data found in EHRs to curate readmission prediction models, and promote collaboration among transitional care teams and IPC to ultimately reduce readmissions due to sepsis and pneumonia.

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Table 1. Top 25 most important features for Sepsis and Pneumonia Gradient Boosting Model

Sepsis Features	Pneumonia Features
Acetic Acid	Albuterol Sulfate
Idarucizumab	Cefepime
Apixaban	Low Body Temperature
Normal Potassium Results	High Platelet Count
Furosemide	Circulatory disorder diagnosis in problem list
Vancomycin	Charlson Comorbidity Score
Diatrizoate Meg-Diatrizoat	High Neutrophil Absolute Count
Potassium Chloride	Renal Disease
Adenosine (Diagnostic)	Cerebrovascular Disease
Vancomycin	Presence Of Invasive Device
Insulin	Pulse Oximetry
Piperacillin-Tazobactam	Azithromycin
Digestive disease diagnosis in problem list	Haloperidol Lactate
Sulfamethoxazole-Trimethoprim	Congenital disorder diagnosis in problem list
Ephedrine Sulfate	Insertion Of Intralum Dev Into Inf Vena Cav
Dexamethasone	Chronic Pulmonary Disease
Respiratory diseases in problem list	Abemaciclib
Portable X-Ray administered	Injury Diagnosis
Ferrous Sulfate	Aclidinium Bromide
Low BMI	Number Of Medication Classes
Adenosine	Digestive disorder diagnosis in problem list
5-Hydroxytryptophan	Length Of Stay
Desflurane	White Blood Cell Value
Introduction of Nutritional into Up GI	Oncology Service

Presentation Type:
Oral Presentation

Detection of Possible Medical Product-Related Infection or Pathogen Transmission—United States, 2015–2019

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Background: Medications, medical devices, biological products, and other medical products can cause healthcare-associated infections related to contamination in production or transportation (intrinsic contamination) or contamination at the point of use (extrinsic contamination). Rapid identification of contaminated medical products can lead to actions to decrease further patient harm. We sought to describe events that prompted public health investigations of contaminated medical products in healthcare facilities. **Methods:** We reviewed records of CDC consultations with health departments and healthcare facilities from January 2015 through August 2019 to identify public health investigations in which medical products were identified as a likely source of patient infection or pathogen transmission to at least 1 patient. We collected data on products, contamination type, pathogens, route of patient exposure, healthcare setting where exposure occurred, and resulting actions. **Results:** There were 34 investigations involving medications (n = 15, 44%), medical devices (n = 12, 35%), biological products (n = 3, 9%), and other medical products (n = 4, 12%). Intrinsic contamination was suspected in 15 investigations (44%), with 13 (87%) based on isolation of a pathogen from unopened products and 2 (13%) based on isolation of similar pathogens from patients in contact with a medical product at multiple facilities. Extrinsic contamination was suspected in 19 investigations (56%) based on evidence of pathogen transmission at a single healthcare facility and concurrent infection control gaps at that facility supporting a mechanism of contamination. The most common pathogens prompting investigation were nontuberculous mycobacteria (n = 9, 26%), *Burkholderia* spp (n = 7, 21%), *Klebsiella* spp (n = 3, 9%), *Serratia* spp (n = 2, 6%), and other environmental and commensal organisms. Patients were most commonly exposed in hospitals (n = 19, 56%) and outpatient settings (n = 9, 26%). The most common patient exposures that resulted in transmission of the pathogen were infusions and injections (n = 15, 44%), diagnostic and therapeutic procedures (n

= 9, 26%), and surgery (n = 5, 15%). Patient were notified and offered testing in at least 6 investigations (18%) . Interventions included product removal, healthcare provider alerts, patient notification and testing, modification of injection safety practices and other general infection control practices, correction of improper storage and handling, and changes in product design, manufacturing processes, or instructions for use. **Conclusions:** Public health investigations identified intrinsic and extrinsic contamination of medications, devices, and other products as a cause of healthcare-associated infections. Healthcare facilities should consider contaminated products in investigations of healthcare-associated infections, take steps to identify local infection control concerns, and alert public health authorities to events that could suggest widespread contamination.

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Oral Presentation

Development and Evaluation of a Structured Tool to Assess the Preventability of Hospital-Onset Bacteremia and Fungemia

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Background: Hospital-onset bacteremia and fungemia (HOB) may be a preventable hospital-acquired condition and a potential healthcare quality measure. We developed and evaluated a tool to assess the preventability of HOB and compared it to a more traditional consensus panel approach. **Methods:** A 10-member healthcare epidemiology expert panel independently rated the preventability of 82 hypothetical HOB case scenarios using a 6-point Likert scale (range, 1= "Definitively or Almost Certainly Preventable" to 6= "Definitely or Almost Certainly Not Preventable"). Ratings on the 6-point scale were collapsed into 3 categories: Preventable (1–2), Uncertain (3–4), or Not preventable (5–6). Consensus was defined as concurrence on the same category among ≥70% expert raters. Cases without consensus were deliberated via teleconference, web-based discussion, and a second round of rating. The proportion meeting consensus, overall and by predefined HOB source attribution, was calculated. A structured HOB preventability rating tool was developed to explicitly account for patient intrinsic and extrinsic healthcare-related risks (Fig. 1). Two additional physician reviewers independently applied this tool to adjudicate the same 82 case scenarios. The tool was iteratively revised based on reviewer feedback followed by repeat independent tool-based adjudication. Interrater reliability was evaluated using the Kappa statistic. Proportion of cases where tool-based preventability category matched expert consensus was calculated. **Results:** After expert panel round 1, consensus criteria were met for 29 cases (35%), which increased to 52 (63%) after round 2. Expert consensus was achieved more frequently for respiratory or surgical site infections than urinary tract and central-line–associated bloodstream infections (Fig. 2a). Most likely to be rated preventable were vascular catheter infections (64%) and contaminants (100%). For tool-based adjudication, following 2 rounds of rating with interim tool revisions, agreement between the 2 reviewers was 84% for cases overall (κ, 0.76; 95% CI, 0.64–0.88]), and 87% for the 52 cases with expert consensus (κ, 0.79; 95% CI, 0.65–0.94). Among cases with expert consensus, tool-based rating matched expert consensus in 40 of 52 (77%) and 39 of 52 (75%) cases for reviewer 1 and reviewer 2, respectively. The proportion of cases rated "uncertain" was lower among tool-based adjudicated cases with reviewer agreement (15 of 69) than among cases with expert consensus (23 of 52) (Fig. 2b).

		PREVENTABILITY RELATIVE TO EXTRINSIC HEALTHCARE-RELATED RISK		
		LOW	MEDIUM	HIGH
INTRINSIC RISK DUE TO UNDERLYING CONDITIONS (ACUTE ILLNESS AND CHRONIC CO-MORBIDITY)	LOW	Less likely Preventable than Not (4)	Moderately Likely to be or Probably Preventable (2)	Definitely or Almost certainly Preventable (1)
	MEDIUM	Moderately likely to be or Probably Not Preventable (5)	More Likely Preventable than Not (3)	Moderately Likely to be or Probably Preventable (2)
	HIGH	Definitely or Almost certainly Not Preventable (6)	Moderately likely to be or Probably Not Preventable (5)	More Likely Preventable than Not (3)

Figure 1. Preventability matrix for rating of HOB case scenarios. Examples of intrinsic risk conditions include desquamating skin condition (high), neutropenia (high), solid organ transplant >30 days prior (medium), and acute myocardial infarction (low). Examples of preventability relative to extrinsic healthcare-related risk include arterial catheter infection (high), pressure ulcers that develop or worsen during the hospital stay (high), mechanical ventilation complicated by pneumonia (medium), and infection following contaminated/dirty surgical procedures (low).

Fig. 1.