Results. A total of 71 and 28 CAUTI events were identified in 2014 and 2016, respectively. The CAUTI rate decreased from 2.29 per 1,000 catheter days in 2014 (95% CI = 2.20,2.39) to 1.23 per 1,000 catheter days in 2016 (95% CI = 1.16,1.30). Rate difference 1.06 (95% CI = 0.94,1.18; $P < 0.001$). Rate ratio 0.573 (95% CI = 0.527,0.622). Catheter days were 31,064 and 23,016 in 2014 and 2016, respectively. Device utilization ratio (DUR) decreased from 0.14 in 2014 to 0.11 in 2016. Using the new UArC criteria, seven CAUTI events in 2014 would have been prevented. This would have translated into 9.86% reduction in CAUTI events for 2014. In 2014, 19.72% of CAUTI events had no UA or UArC order. In 2016, 12.5% of CAUTI events had no UA or UArC order.

Conclusion. Implementing a CAUTI Prevention Bundle significantly reduces CAUTI events. Appropriate use of urine culture provides an opportunity to further reduce inflated CAUTI surveillance rates.

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2146. Clinical Relevance of the 2014 and 2015 National Healthcare Safety Network's Catheter-Associated Urinary Tract Infection Definitions

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Background. The National Healthcare Safety Network's (NHSN) catheter-associated urinary tract infection (CAUTI) definition has changed multiple times in the previous decade with substantial changes occurring in 2009, 2013, and 2015. Efforts to improve the clinical relevance of this definition have been made, notably the exclusion of *Candida* species. This study quantifies the magnitude of discrepancy in CAUTI between the 2014 and 2015 definitions and determines which of these definitions has more clinical relevance.

Methods. This is a retrospective study at a 500 bed academic hospital. Eligible cases were identified by a query of our facility's 2014 NHSN CAUTI cases. We reviewed cases to determine whether they met criteria for CAUTI using the 2014 and 2015 NHSN definitions and also to determine the clinical relevance of the CAUTI. Clinical CAUTI was defined as a provider documenting CAUTI in the progress notes or discharge summary. Subcategories of Clinical CAUTI included "Definite CAUTI", the presence of UTI in clinical documentation without another documented etiology of fever, and "Possible CAUTI", documentation of both UTI and another cause of fever. A positive urinalysis was defined as The presence of ≥10 WBC, moderate/large leukocyte esterase, or nitrites.

Results. There were 65 eligible CAUTI in 61 patients reported to NHSN in 2014. All met the 2014 definition, but only 38 (58%) met the 2015 definition. The median age was 57 years (IQR 51–67), and 54% ($n = 33$) were male. Clinical CAUTI was diagnosed in 44 patients (68%) meeting the 2014 definition and 33 patients (87%) meeting the 2015 definition ($P < 0.001$). Half of Clinical CAUTI identified by the 2014 definition were considered to be Definite CAUTI; similar results were found using the 2015 definition. Independent predictors of Clinical CAUTI included urine cultures positive for Gram-negative bacilli (OR 5.2, 95% CI 0.9 to 29.2), positive urinalysis (OR 7.1, 1.4 to 36.1), and use of the 2015 definition (OR 4.7, 0.9 to 23.4).

Conclusion. This data suggests that introduction of the 2015 definition may result in a 42% reduction in CAUTI. The 2015 definition was associated with more Clinical CAUTI. Further refinement of the 2015 CAUTI definition could be attained by excluding those cases attributed to other causes of fever.

Disclosures. **All authors:** No reported disclosures.

2147. The NHSN 2015 Rebaseline—How Updating CAUTI Risk Adjustment Affects the SIRs

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Background. In January 2017, the CDC's National Healthcare Safety Network (NHSN) updated both the aggregate healthcare associated infection (HAI) data that serve as baselines for standardized infection ratios (SIRs) and the risk adjustment (RA) methods used to calculate SIRs. The new baseline data are 2015 HAI incidence data; the new risk adjustment (RA2) models are predictive models developed using new baseline data. The previous RA1 method for catheter-associated urinary tract infections (CAUTI) used location- and facility-stratified rates to predict CAUTI incidence. The 2015 rebaseline used location- and facility-level factors in log-linear models to determine the expected number of infections. The objective of this study was to compare RA2 vs. RA1 SIRs from acute care hospitals (ACH).

Methods. We analyzed 1 year of CAUTI-ACH data reported to NHSN (2015). We compared differences between SIRs under RA2 vs RA1 at the national- and facility- levels. ACHs with <1 predicted infections were excluded. We used paired T and Empirical Distribution Function (EDF) tests to compare differences between means and medians of the SIR distributions respectively. Using quintiles, we compared shifts in facility-level SIRs between RAs (RA1 - referent group).

Results. 4318 ACHs reported CAUTI data to NHSN in 2015. 2917 (67%) vs 2468 (57%) ACHs had ≥1 expected infections and SIRs calculated using RA1 and RA2 respectively; 2466 (57%) ACHs had SIRs calculated using either RA method. The 2015 national pooled mean RA1 SIR was 0.580 (95% CI: 0.573, 0.588), and 0.983 (95% CI: 0.970, 0.996) under RA2. The means and medians of the two SIR distributions were significantly different ($P < 0.0001$). At the facility level, 1992 (81%) ACHs had SIRs that did not change between RA1 and RA2, 238 (10%) had SIRS that improved (lower in RA2 vs RA1), while 235 (10%) had SIRs increased (higher in RA2 vs RA1).

Conclusion. There was a marked increase in the SIR with the introduction of the new baseline towards 1.00 (the national benchmark). This was attributed to the new RA2 models which control for many factors that are known to influence the number of HAI infections, unlike RA1. Comparable proportions of facilities had SIRS improve or worsen between RA1 and RA2 indicating that shifts in facility level SIRs were not large.

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2148. Insights on the Extremely High Mortality of Ventilator Associated Pneumonia in Cancer Patients

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Background. Patients with cancer are at high risk of infections and subsequent complications. Due to the high prevalence of multidrug resistant pathogens in ventilator associated pneumonia (VAP) in those patients, most studies and guidelines exclude this population in their analysis. In the present study, we sought to investigate the clinical and laboratory presentation, as well as prognosis of cancer patients diagnosed with VAP in a large tertiary care center in Brazil.

Methods. We included all cancer patients admitted to the intensive care unit who were diagnosed with culture positive VAP matching the CDC diagnostic criteria from 2013 to 2016. We collected a detailed clinical, laboratory and microbiological profile of those individuals. Additionally, all patients were followed for 30-day all-cause mortality.

Results. A total of 25 individuals (mean age 58 ± 14 years, 88% males) were included. Among them, 88% presented with solid tumors and 12% with hematologic cancers. The median length of stay at the hospital prior to VAP diagnosis was 30 days (interquartile range (IQR): 13 - 39), with a median duration of ICU admission of 16 days (IQR: 8 – 23) and a median mechanical ventilation duration of 12 days (IQR: 8 – 16). The most common causative agents for VAP were *Acinetobacter baumannii*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* with seven cases (28%) each, followed by *Staphylococcus aureus* and *Stenotrophomonas maltophilia* with two cases (8%) each. From the 21 gram-negative bacteria 20 (90%) were carbapenem-resistant, 5 (24%) were colistin- resistant, while all S. aureus were MRSA. The 30-day mortality rate was 84% (21/25 individuals). The mortality was high across the spectrum of clinical and laboratory presentations, and none of the clinical predictors evaluated, including age, gender, diabetes, smoking, radiotherapy, chemotherapy, post-surgery, reintubation, dialysis, or antibiotic susceptibility, was associated with lower mortality.

Conclusion. Ventilator associated Pneumonia in cancer patients has an extremely high 30-day mortality (88%), with a low *in vitro* susceptibility for broad spectrum antibiotics, such as carbapenems. No clinical predictors are independently associated with lower mortality.

Disclosures. **All authors:** No reported disclosures.

2149. Current Epidemiology of Ventilator-associated Pneumonia in an Intensive Care Unit in Vietnam

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Background. The increase of multi-drug-resistant Gram-negative bacteria as a cause of ventilator-associated pneumonia (VAP) is a global concern. The epidemiology of VAP in Southeast Asia remains largely unknown.

Methods. This prospective cohort study was conducted at the Intensive Care Unit (ICU) of Bach Mai Hospital in Hanoi. Patients who received mechanical ventilation for >48 hours, and were diagnosed with VAP, in November 2015–May 2016 were included. Patients with no positive respiratory culture for a causative organism were excluded.

Those with multiple VAP episodes >7 days apart with a different causative organism were counted separately.

Results. Fifty-six patients (67 episodes) with VAP in 992 admissions were identified. Ten had ≥2 episodes. In 11 episodes, ≥2 isolates were found from a respiratory sample; 78 isolates were identified in total. The cohort median age was 61 (interquartile range [IQR]: 48–70) years, with 43 (76.8%) males. Fourteen (24.6%) patients had diabetes, 10 (17.5%) had chronic kidney diseases, 17 (29.8%) had congestive heart disease, 9 (15.8%) had COPD, and 5 (8.8%) had malignancy. Among isolated bacteria, *Acinetobacter baumannii* (ACB) was highly resistant to meropenem, levofloxacin, and amikacin (Table). The 7-day mortality was 13% (n = 7) and 31-day mortality was 43.8% (n = 21). ACB cases had higher 31-day mortality (18 [56.2%] vs. 4 [25%]; P = 0.041) and longer ICU stay (16 days [IQR: 10–27] vs. 9 [3–15]; P = 0.024; deceased excluded) than non-ACB. Colistin was used in 23 (41.1%) cases as empiric therapy and 25 (44.6%) as definitive therapy.

Conclusion. High resistance rates and worse clinical outcomes were found in VAP cases due to ACB in ICU in Vietnam. Further study is warranted for appropriate treatment and infection control measures.

Table: Antimicrobial resistance of bacterial isolates* in ventilator-associated pneumonia, n (%)

	Acinetobacter baumannii (n = 37)	*Klebsiella pneumoniae* (n = 11)	*Pseudomonas aeruginosa* (n = 15)
Meropenem	37 (100)	7 (63.6)	11 (73.3)
Ceftazidime	37 (100)	11 (100)	10 (66.7)
Levofloxacin	37 (100)	11 (100)	11 (73.3)
Amikacin	35 (94.6)	3 (27.3)	10 (66.7)
Colistin	0	0	0

*Include *Stenotrophomonas maltophilia* (n = 6), *Serratia marcescens* (n = 3), *Enterobacter cloacae* (n = 2), *Elizabethkingia meningoseptica* (n = 2).

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2150. Quality of Non-Bronchoscopic Bronchoalveolar Lavage Specimens and the Diagnosis of Ventilator-Associated Pneumonia

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Background. Ventilator-associated pneumonia (VAP) is a significant cause of hospital-acquired infection. Many institutions use National Healthcare Safety Network (NHSN) definitions for VAP surveillance. One criterion of the NHSN definition for possible VAP (PVAP) is a positive culture obtained via non-bronchoscopic bronchoalveolar lavage (NB-BAL). NB-BAL specimens are not routinely assessed for oropharyngeal contamination prior to quantitative culture. Thus, we hypothesized that NB-BALs can yield poor quality specimens that may contribute to the misdiagnosis of PVAP.

Methods. From May 2016 to January 2017, we performed background quality assessments for NB-BAL specimens collected from patients on mechanical ventilation for >3 days. Thereafter, we retrospectively reviewed NB-BAL quality, culture results, and contribution to NHSN-defined PVAPs. Quality assessments included number of white blood cells (WBC) or squamous epithelial cells (SEC) per low-power field (lpf). Specimens were deemed acceptable if they had ≤10 SEC/lpf by "standard" criteria and zero SEC/lpf by "strict" criteria. All specimens were cultured regardless of quality assessment results, which were not revealed to ordering clinicians.

Results. Of 117 NB-BAL specimens, 8 (7%) did not pass standard quality assessment and an additional 47 (40%) did not pass strict quality assessment. Most samples (82%) were purulent (>25 WBC/lpf). Overall, 56 (48%) of samples resulted in significant growth of at least one species of bacteria (>10^4 CFU/mL). Of the 8 samples that did not pass standard assessment, 7 (87%) resulted in significant bacterial growth. Four PVAPs were diagnosed on the basis of NB-BAL specimens. Of these, all were acceptable by standard criteria, but one failed by strict criteria.

Conclusion. Approximately 50% of our NB-BAL specimens had evidence of oropharyngeal contamination on quality assessment, including one specimen that contributed to a NHSN-reported PVAP. While limited by small sample size and short study duration, our data suggest that the quality of NB-BAL specimens may affect the diagnosis and surveillance of VAP.

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2151. Real-Time Automated Surveillance for Ventilator Associated Events Using Streaming Electronic Health Data

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Background. Criteria defining Ventilator Associated Events (VAEs) are objective and often available in the electronic health record (EHR) data. The use of ventilation data extracted directly from the patient's bedside monitor to allow for real-time surveillance, however, has not been previously incorporated into electronic surveillance approaches. Here we describe validation of a system that can detect and report on VAEs hospital-wide autonomously and in real-time.

Methods. We developed a secure informatics hardware and software platform to identify VAEs autonomously using streaming data. The automated process included 1) archiving and analysis of bedside physiologic monitor data to detect increases in positive end-expiratory pressure (PEEP) or FiO2 settings; 2) real-time querying of EHR data for leukopenia or leukocytosis and concurrent antibiotic initiation; and 3) retrieval and interpretation of microbiology reports for the presence of respiratory pathogens. The algorithm was validated on two 3-month periods in 2015 and 2016 as follows: 1) autonomous surveillance (**AS**) generated detections of three VAE subclasses: VAC, IVAC, and PVAP; 2) manual surveillance (**MS**) by Infection Control (IC) staff independently performed standard surveillance based on chart review, 3) senior IC staff adjudicated the gold standard for cases of AS-MS discordance. The sensitivity (Se), specificity (Sp), and positive predictive value (PPV) of the algorithm are reported.

Results. The number of ventilated patients, ventilator days, and events were: 1,591/9,407/3,014. In cases with complete data, AS detected 66 VAE events identified by MS; AS detected 32 VAEs missed by MS; no MS-identified events were missed by AS. The Se, Sp, and PPV of AS and MS were: 91%/100%/100%, and 61%/100%/83%, respectively. Clinical surveillance case reports generated by AS enabled visual interpretation (figure).

Conclusion. We developed a surveillance tool directly streaming bedside physiologic monitor and EHR data including ventilator settings, laboratory results, and microbiology reports, to apply the CDC's VAE definitions on source data. This resulted in an accurate, objective, and efficient method for real-time hospital-wide surveillance.

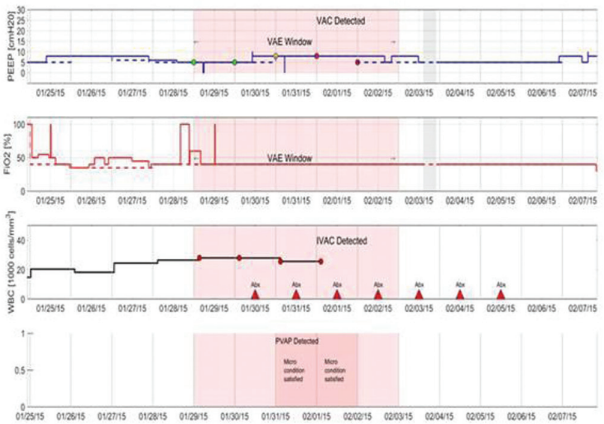

Fig. Example report showing VAE detection. Green dots in the PEEP trend indicate beginning of an initial baseline stability period; the yellow dot indicates worsening PEEP, and red dots indicate persistence of worsening, satisfying criteria for a Ventilator Associated Condition (VAC) event. Pink shading indicates the "VAE window". In this case no concerning trend was detected in the FiO2 data. In the third panel, a rising WBC trend and introduction of a qualifying antibiotic within the VAE window leads to detection of an Infection-related VAC (IVAC) event. In the fourth panel, red shading within the VAE window indicates that microbiology culture results satisfy criteria for detection of a Possible Ventilator Associated Pneumonia (PVAP) event.

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