Background. Influenza and respiratory syncytial virus (RSV) are recognized as important causes of hospital-acquired infection. Increased use of multiplex molecular diagnostic testing is shedding light on the incidence of other hospital-associated respiratory virus infections (HA-RVI). However, the incidence and clinical impact of HA-RVI are not well understood.

Methods. We identified hospitalized patients admitted between July 1, 2017 and June 30, 2018 who were clinically tested to diagnose respiratory virus infections. HA-RVI were defined as respiratory virus positivity beginning more than 48 hours after hospital admission. The clinical outcomes of HA-RVI were compared with respiratory virus infections that were not considered hospital-associated (non-HA-RVI).

Results. Respiratory virus testing was performed on 4,690 individuals during 5,942 inpatient encounters. At least 1 virus was identified in 1,871 (31%) encounters, and 229 (12%) were defined as HA-RVI (median hours from admission to positivity [IQR]: 154 [79, 308]). Among the patients with a respiratory virus infection, 56% were adults, 52% were male, 77% were non-Hispanic white, and the median Charlson score was 2 (IQR: 1, 4); HA-RVI patients were more likely to be male (59% vs. 51%, P = 0.01) and had higher median Charlson scores (3 vs. 2, P = 0.001). All 14 respiratory viruses in the diagnostic panel were positive for at least one HA-RVI (Figure 1), but rhinovirus/enterovirus (99), influenza A (27), human metapneumovirus (22) and respiratory syncytial virus (20) were most common. Compared with non-HA-RVI patients, those with HA-RVI had longer post-infection lengths of stay (median: 9 vs. 4 days, P < 0.001) and were more likely to die during hospitalization (odds ratio [95% confidence interval]: 3.4 [2.0, 5.7]) (Table 1).

Conclusion. A substantial number of HA-RVI were identified during the 2017–2018 respiratory virus season, and they were associated with a striking number of severe outcomes. More in depth analyses are required to determine whether severe outcomes are a direct result of HA-RVI or whether HA-RVI are more common in critically ill patients and serve as a marker for severe morbidity. A broader understanding of HA-RVI transmission and prevention strategies is needed.

Table 1. Demographics Characteristics and Clinical Outcomes of Patients with Hospital-Associated Respiratory Virus Infections (HA-RVI) and Non-Hospital Associated Respiratory Virus Infections (New-HA-RVI).

| Characteristics | Non-HA-RVI | HA-RVI | P-value |
|-----------------|----------|-------|--------|
| Age, years (%)  | 48.7 (10) | 62.2 (7) | 0.09   |
| Male, (%)       | 66.7 (24) | 79.9 (20) | 0.28   |
| 0–14 years, (%) | 51.0 (25) | 39.0 (6)  | 0.02   |
| 15–49 years, (%)| 21.9 (12) | 21.8 (4)  | 0.67   |
| Charlson score, median (IQR) | 1 (0, 3) | 5 (3, 8) | <0.001 |

Disclosures. All authors: No reported disclosures.

1184. Making Pneumonia Surveillance Easy: Automation of Pneumonia Case Definitions

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Session: 143. HAI: Respiratory Infections (incl VAP, HAP)
Friday, October 4, 2019: 12:15 PM

Background. Pneumonia (PNU) is the second most common nosocomial infection in the United States and is associated with substantial morbidity and mortality. While definitions for CDC were developed to increase the reliability of surveillance data, reduce the burden of surveillance in healthcare facilities, and enhance the utility of surveillance data for improving patient safety - the algorithm is still laborious. We propose an implementation of a refined algorithm script which combines two CDC definitions with the use of natural language processing (NLP), a tool which relies on pattern matching to determine whether a condition of interest is reported as present or absent in a report, to automate PNU surveillance.

Methods. Using SAS v9.4 to write a query, we used a combination of National Healthcare Safety Networks (NHSNS) PNU and ventilator-associated event (VAE) definitions that use discrete fields found in electronic medical records (EMR) and trained an NLP tool to determine whether chest x-ray report was indicative of PNU (Fig1). To validate, we assessed sensitivity/specificity of NLP tool results compared with clinicians’ interpretations.

Results. The NLP tool was highly accurate in classifying the presence of PNU in chest x-rays. After training the NLP tool, there were only 4% discrepancies between NLP tool and clinicians interpretations of 223 x-ray reports - sensitivity 92.2% (81.1–97.8), specificity 97.1% (94.1–99.1). Combining the automated use of discrete EMR fields with NLP tool significantly reduces the time spent manually reviewing EMRs. A manual review for PNU without automation requires approximately 10 minutes each day per admission. With a monthly average of 2,350 adult admissions at our hospital and 16,170 patient-days for admissions with at least 2 days, the algorithm saves approximately 2,695 review hours.

Conclusion. The use of discrete EMR fields with an NLP tool proves to be a timelier, cost-effective yet accurate alternative to manual PNU surveillance review. By allowing an automated algorithm to review PNU, timely reports can be sent to units about individual cases. Compared with traditional CDC surveillance definitions, an automated tool allows real-time critical review for infection and prevention activities.

Disclosures. All authors: No reported disclosures.

1183. Effect of Chlorhexidine Bath on the Prevention of Ventilator-associated Pneumonia: A Meta-Analysis

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Session: 143. HAI: Respiratory Infections (incl VAP, HAP)
Friday, October 4, 2019: 12:15 PM

Background. Ventilator-associated pneumonia, defined as pneumonia occurring more than 48 hours after patients have been intubated and received mechanical ventilation, represents one of the most important nosocomial infections in critically ill patients. Chlorhexidine, an antiseptic solution, is a safe and effective product with broad antiseptic activity. This meta-analysis would like to investigate if Chlorhexidine bathing significantly reduced the incidence of Ventilator-associated pneumonia.

Methods. We searched PubMed and Cochrane Central Register database to check for all published studies related to the reduction of VAP with the application of chlorhexidine bath vs. control. Various study designs such as randomized controlled trials, Before-and After study were included in this meta-analysis.

Results. This meta-analysis analyzed eight studies. One hundred Thirty-nine (139) events developed in the chlorhexidine group over 33,030 patient-days which were significantly lower compared with 183 in the soap and water group over 35,213 patient-days. The overall incidence of Ventilator-associated Pneumonia (VAP) with the application of chlorhexidine was significantly reduced by 23% with a pooled Risk Ratio (RR) of 0.77 with 95% Confidence Interval (CI): 0.62–0.96, I² = 52%. In the subgroup analysis, a more significant outcome was observed using Before-And-After study as the research design (pooled RR 0.63, 95% Confidence Interval (CI): 0.48–0.83, I² = 31%). Daily chlorhexidine bath generated a more favorable outcome, compared with every other day application as evident on the pooled RR 0.78, 95% confidence interval (CI): 0.62–0.98, I²=59%

Conclusion. This meta-analysis clearly favors the use of daily chlorhexidine bath in the prevention of ventilator-associated pneumonia.

Disclosures. All authors: No reported disclosures.