

Clinical Characteristics of Patients with a Positive VZV PCR in the CSF (N=38) July/2017-November/2021

Age (years)	Median (IQR)	47 (38-69)
	≥ 60 years	13 (34.2%)
	< 60 years	25 (65.8%)
Gender	Male	22 (57.9%)
	Female	16 (42.1%)
Race	White	22 (57.9%)
	African American	10 (26.3%)
	Asian	4 (10.5%)
	Other	2 (5.3%)
Clinical Features	Immunocompromised	15 (39.5%)
	Solid organ malignancy	4 (10.6%)
	Liquid malignancy/BMT	2 (5.3%)
	SOT	2 (5.3%)
	AIDS	2 (5.3%)
	Biologic	5 (13.2%)
	Steroids	6 (15.8%)
	CVID	1 (2.6%)
	Pneumonia	6 (15.8%)
	Rash	26 (68.4%)
	Localized Rash	19/26 (73.1%)
	Disseminated Rash	7/26 (26.9%)
	h/o shingrix vaccine	1 (2.6%)

review was performed to gather data regarding clinical presentation, patient characteristics, and risk factors. **Results:** In total, 38 patients were identified who had a PCR positive for VZV in CSF; 22 (57.9%) were male and 16 (42.1%) were female. The median age was 47 years (IQR, 38–69). Also, 15 patients (39.5%) were immunocompromised. Moreover, 26 patients (68.4%) had a rash; 19 (50%) had localized rash; and 7 (18.4%) had disseminated rash involving ≥3 dermatomes. However, 12 patients (31.5%) had neither rash nor pneumonia. Furthermore, 5 patients (13.1%) had PCR positive for VZV in CSF and developed rash within the following 2–7 days (2 with disseminated rash). In addition, 6 patients (15.8%) had pneumonia. Of the 6 patients with pneumonia, 4 (10.5%) were immunocompromised and 3 (7.9%) were above 65-year-old. 32 patients (84.2%) were kept in airborne and contact precautions. 1 (2.6%) patient had a documented record of at least 1 dose of Shingrix vaccine. **Conclusions:** Most patients with a PCR test positive for VZV in the CSF were not immunocompromised and did not have evidence of disseminated rash or pneumonia. The risk of airborne transmission of VZV via small aerosols appears to be low in patients with a PCR test positive for VZV in the CSF without evidence of disseminated rash or pneumonia. Airborne isolation may not be required for many of these patients.

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Presentation Type: Poster Presentation - Poster Presentation
Subject Category: Patient Safety
Evaluation of an oral care bundle for reduction of nonventilator hospital-acquired pneumonia in a community hospital
Elias Coury and Shannon Dietz

Objectives: We sought to determine the relationship between an oral-care bundle that includes use of new oral care devices, education of best practices for performing oral care, and daily audits to measure compliance with oral care best practices and the reduction of nonventilator hospital-acquired pneumonia (NV-HAP) and NV-HAP-associated sepsis and mortality outcomes. **Methods:** Havasu Regional Medical Center (HRMC) is a 171-bed acute-care community hospital in Lake Havasu City, Arizona. The hospital inpatient units measured in this quasi-experimental study were the medical surgical telemetry ortho unit (MTSO), the intermediate care unit (IMC), and the ICU. There were 30,838 hospital patient days in 2021. NV-HAP were captured as patients coded as an NV-HAP and being discharged in 2021. Sepsis was captured as sepsis being documented with the source being identified as a NV-HAP with a discharge date in 2021. Mortality was captured by coding

of an NV-HAP and mortality with a time of death documented in 2021. **Results:** From January 1, 2021, to June 4, 2021, during the baseline period before the oral-care bundle was implemented, HRMC had 12,415 patient days and experienced a NV-HAP rate of 1.2 per 1,000 patient days and a sepsis rate of 0.56 per 1,000 patient days with the source documented as NV-HAP, and mortality rate of 0.32 per 1,000 patient days with a code of NV-HAP. HRMC used June 5, 2021, as their implementation period of the bundle, which included a new oral-care device, multilevel education to staff on best practices for oral care, and daily audits to measure compliance with oral-care best practices. During the postimplementation period, HRMC had 18,413 patient days, a NV-HAP rate of 0.54 per 1,000 patient days, a sepsis rate of 0.33 per 1,000 patient days with source documented as NV-HAP, and a mortality rate of 0.16 per 1,000 patient days with a code for NV-HAP. **Conclusions:** From June 5, 2021, to December 31, 2021, after the implementation of the oral-care bundle, the NV-HAP rate decreased by 58%, the sepsis rate with source documented as NV-HAP decreased by 41%, and the mortality rate documented as NV-HAP decreased by 50%. Hospital infection control programs should consider implementation of a robust oral-care bundle that includes best-practices education and auditing to monitor staff compliance as a potential strategy to reduce NV-HAP.

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Subject Category: Quality Assessment
Development of a human factors-based tool for evaluating and improving infection prevention and control protocols
Emma MacIntyre; Shawna Perry; Patience Osei; Raymond Terhorst and Ayse Gurses

Background: Infection prevention and control (IPC) protocols and guidelines are important quality management tools for educating care professionals and standardizing care processes. However, most of the actual care (ie, work as done) differ from protocol recommendations (ie, work as imagined). No tool or set of criteria has been established for how to develop human-centered IPC protocols. The goal of this research was to develop a standardized human-factors analysis method to provide healthcare organizations with a tangible framework to improve protocol usefulness and usability. **Methods:** The proposed analysis method combines principles from human-factors engineering (ie, usability heuristics, systems ambiguity framework) and instructional design. Relevant literature was analyzed by experts in human factors and clinical experts to develop a tool with criteria such as visualization and method ambiguity. Overall, 5 IPC-related protocols from a large academic hospital were selected from an electronic database and were evaluated using the proposed criteria. **Results:** During application of the analysis method, 70 human-factors-related problems were identified across 5 IPC protocols (eg, heater

Image 1: Sample of HF problems and suggested solutions

HF Problem	Relevant HFE Principle(s)	Suggested Solution
Protocol instructs that contaminated disposable items should be placed in "appropriate trash bags.", unclear to the reader what constitutes an appropriate trash bag and where to obtain one.	Visualization Method Ambiguity	Add image to Environmental Cleaning, O.R. and Procedural Areas protocol of "appropriate trash bag". Include instruction on where one can obtain the "appropriate trash bag" to dispose of contaminated disposable items.
Protocol references using a screening tool to determine if staff have been screened to use a respiratory protection device, but no link to screening tool or information on where to find screening tool is provided.	Help/Documentation Method Ambiguity	Add reference link to where screening tool is located.

cooler cleaning), including violation of design heuristics and the presence of ambiguity. Frequently violated human-factors design principles included appearance and/or visibility (ie, visual display of content), visualization (ie, providing illustrative examples), and method ambiguity (ie, lack of clarity on how to complete a task). Figure 1 provides a sample of the human-factors problems identified and suggested solutions. Only minor modifications (ie, clarification of criteria definitions) were needed on the final tool. **Conclusions:** The human-factors-based tool developed in this study can be used both to develop new IPC protocols and to evaluate and improve existing protocols.

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Subject Category: Respiratory Viruses

Healthcare-associated respiratory syncytial virus infections in children's hospitals

Lisa Saiman; Susan Coffin; Larry Kociolek; Danielle Zerr; Aaron Milstone; Margaret Aldrich; Celibell Vargas; Morgan Zalot; Megan Reyna; Amanda Adler; Annie Voskertchian; Emily Egbert; Luis Alba; Madelyn Ruggieri and Yoonyoung Choi

Background: Little is known about the impact of healthcare-associated respiratory syncytial virus (HA-RSV) in hospitalized children. To address this gap, we assessed the epidemiology and clinical impact associated with HA-RSV in a multiseason, multicenter study. **Methods:** During respiratory viral seasons 2016–2017, 2017–2018, and 2018–2019, we retrospectively identified HA-RSV cases in hospitalized children 72 hours after admission or within 48 hours of discharge in readmitted patients. Due to reduced availability of testing for non-SARS-CoV-2 viruses during the first year of the COVID-19 pandemic, the 2019–2020 season was excluded. We initiated prospective HA-RSV surveillance during the 2020–2021 season and continued surveillance through November 2021 due to the unusual inter-seasonal RSV community outbreak. We determined demographic and clinical characteristics of HA-RSV cases and explored possible outcomes associated with RSV including transfer to the pediatric ICU and escalation of respiratory support from day –2 to day +4 (day 0 was the day of RSV detection). We explored the timeframe of day –2 to day +4 because events during this timeframe could be attributed to RSV infection. Respiratory support escalation was defined as change from room air to supplemental oxygen, increase in fraction of inspired oxygen (FiO₂) on same respiratory support modality, or change from noninvasive to invasive support. **Results:** Were identified 86 HA-RSV cases: 20 (23.3%) from 2016–2017, 26 (30.2%) from 2017–2018, 34 (39.5%) from 2018–2019, and 6 (7%) from October 2020–November 2021. HA-RSV was diagnosed a median of 14 days (IQR, 8–45) after admission. Moreover, 29 (33.7%), 31 (36.0%), and 26 (30.2%) cases were aged 60 months during these, respective seasons. Also, 33 (38.4%) had >3 comorbid conditions, most commonly gastrointestinal (n = 33, 38.4%), respiratory (n = 28, 32.6%), and/or congenital-genetic disorders (n = 28, 32.6%). However, 9 (10.5%) had no comorbid conditions. From day –2 to day +4, 15 children (17.4%) were transferred to the PICU and 38 (49.3%) of 77 evaluable cases required respiratory support escalation, most commonly supplemental oxygen delivered by nasal cannula (n = 15, 19.5%). Furthermore, 11 patients (14.3%) required invasive support. **Conclusions:** HA-RSV was associated with use of healthcare resources, including the need for respiratory support escalation and/or transfer to intensive care. From October 2020 to November 2021, lower numbers of HA-RSV were observed. The reasons for this are unknown, but potentially occurred in parallel to markedly reduced RSV in the

community and may have resulted from visitor restrictions, which included no siblings and/or universal masking by hospital staff and visitors.

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Subject Category: Respiratory Viruses

Respiratory Virus infections in symptomatic and asymptomatic children: Results of one year of hospital admission screening

Zachary Most; Michael Sebert and Trish Perl

Background: Respiratory viral infections are very common among children. Transmission-based precautions are frequently used with patients who test positive for a respiratory virus in pediatric hospitals to prevent transmission of infections, regardless of whether the patient has symptoms of a respiratory infection or not (asymptomatic). However, few data are available on the prevalence of respiratory viral infections in symptomatic and asymptomatic children who are admitted to a pediatric hospital. The study was conducted in 3 hospitals that combine for a 601-bed pediatric healthcare system in northern Texas. **Methods:** From July 7, 2020, to the present, all patients admitted to the hospital had a nasopharyngeal swab collected and tested with a multiplex PCR panel including SARS-CoV-2 and 8 other common respiratory viruses. Over a 1-year period from October 1, 2020, to September 30, 2021, the prevalences of infection with each of the 9 respiratory viruses were calculated and stratified by respiratory infection symptom status (determined by the ordering provider in an electronic order set) and age group. **Results:** During this 1-year period, 28,421 PCR panels were collected on patients admitted to the hospital. The median age was 5 years (IQR, 1–12 years), and 15,105 patients were male (53.2%). Overall, 12,792 panels were positive for at least 1 virus (45.0%). Among 26,688 panels on individuals with known symptom status, 26.3% of asymptomatic patients and 69.4% of symptomatic patients tested positive for at least 1 virus. The most common virus was rhinovirus or enterovirus (17.7% asymptomatic positive and 40.2% symptomatic positive) (Fig. 1). Asymptomatic rhinovirus or enterovirus prevalence varied by age group and was greatest in children aged 1–4 years (31.7%) and those aged 5–9 years (23.1%). It was lowest in adolescents aged 15–21 years (7.1%) (Fig. 2). Over time, the prevalence of asymptomatic infections fluctuated with local outbreaks. For SARS-CoV-2, in the resolution phase of an outbreak the prevalence of asymptomatic infections tended to overlap or surpass symptomatic infections. **Conclusions:** Asymptomatic respiratory viral infections, and in particular rhinovirus or enterovirus infections, were common among pediatric patients admitted to the hospital during the COVID-19 pandemic and were most common among children aged 1–9 years. However, symptomatic patients were still more likely to test positive for a respiratory virus compared to asymptomatic patients. Prolonged

