

awareness and improve engagement when potential OPAT needs are identified (Fig. 1).

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Poster Presentation - Poster Presentation

Subject Category: Patient Safety

Patient safety and quality care: Time to focus on nonventilator hospital-acquired pneumonia

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Background: A growing body of evidence has reported on the harm and cost of nonventilator hospital-acquired pneumonia (NVHAP), currently the most common hospital-acquired infection (HAI). Although the US Congress and the Center for Medicare and Medicaid Services (CMS) have acted to reduce rates of some HAIs through the Hospital-Acquired Condition Reduction Program (HACRP), NVHAP is not currently included. Thus, most hospitals do not engage in active prevention. Here, we report the findings from our analysis of Medicare claims data on hospital length of stay (LOS), cost for patients with hospital-acquired pneumonia (HAP), including both ventilator-associated pneumonia and NVHAP, and mortality. **Methods:** We used Medicare claims data for Federal Fiscal Year 2019 for inpatient and postdischarge services. Beneficiaries who died, were without continuous Medicare Part A and B enrollment, and patients eligible for Medicare for end-stage renal disease were excluded. Inpatient payments and 30-, 60-, and 90-day postdischarge episodes for 2,457 beneficiaries with HAP were examined and compared to a non-HAP control group of 2,457 beneficiaries. Groups were matched on age, sex, race, and the diagnosis-related group (DRG) for their index hospitalization. **Results:** Most HAP was NVHAP (N = 2,222; 89%) versus VAP (N = 275; 11%). LOS stay was significantly (p HAP patients were 2.8 times more likely to die vs non-HAP. **Conclusions:** These findings provide additional support to previous research on the harm and cost associated with NVHAP. Previous HACRP HAI initiatives, such as catheter-associated urinary tract infection (CAUTI) and surgical-site infection (SSI), have resulted in measurable HAI reductions. Although recent evidence-based NVHAP and initiatives indicate that NVAHP is largely preventable, to date, no acute-care inpatient hospital quality improvement program implemented by Medicare includes measures for NVHAP prevention. The time is right to include NVHAP as an HACRP HAI initiative.

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Retrospective cohort analysis of the safety of outpatient parenteral antimicrobial therapy (OPAT) in an academic hospital

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Background: Although many infectious conditions can be safely treated with oral antimicrobials, select circumstances require parenteral antimicrobial therapy. Benefits of OPAT include prevention of hospital-associated conditions and significant cost savings. However, risks of OPAT include adverse drug events (ADEs) and vascular access device (VAD) complications. We analyzed the safety of OPAT regimens as part of implementing a collaborative OPAT program. **Methods:** We reviewed adult patients discharged home from an academic hospital between January 2019 and June 2021. Patients with cystic fibrosis were excluded. Data on OPAT agents, ADEs, and VAD complications were collected from electronic medical records by 2 reviewers using a standardized REDCap

Table 1. Frequencies of adverse drug events (ADEs) and vascular access device complications (VADs) among all single and multi-drug regimens, stratified by agent class.

Agent class	Single-drug therapy (n=212)		Multi-drug therapy (n=108)		Any ADE (n=110)		VAD Complications (n=72)	
	n	(%)	n	%	n	(%)	n	(%)
Aminoglycosides	0	0.0%	3	2.8%	0	0.0%	1	1.4%
Azoles	0	0.0%	2	1.9%	1	0.9%	0	0.0%
Beta-lactam/Beta-lactamase inhibitors	13	6.1%	4	3.7%	4	3.6%	6	8.3%
Carbapenems	47	22.2%	10	9.3%	16	14.5%	6	8.3%
Cephalosporins	124	58.5%	40	37.0%	46	41.8%	37	51.4%
Echinocandins	1	0.5%	5	4.6%	4	3.6%	2	2.8%
Lincosamides	1	0.5%	1	0.9%	1	0.9%	0	0.0%
Lipopeptides	8	3.8%	35	32.4%	24	21.8%	14	19.4%
Nitroimidazoles	1	0.5%	0	0.0%	0	0.0%	0	0.0%
Nucleoside analogs	1	0.5%	1	0.9%	1	0.9%	0	0.0%
Penicillins	11	5.2%	6	5.6%	7	6.4%	5	6.9%
Polyenes	0	0.0%	1	0.9%	1	0.9%	0	0.0%
Pyrophosphate analogs	5	2.4%	0	0.0%	5	4.5%	1	1.4%

instrument. The institutional review board approved this study. **Results:** The cohort comprised 265 unique patients; 212 (80%) received single-drug therapy and 53 (20%) received multidrug therapy. In total, 81 patients (31%), who received a total of 110 antimicrobials, experienced an ADE. In total, 55 patients (21%), who received a total of 72 antimicrobials, experienced a VAD complication. Patients who received >1 antimicrobial were more likely to experience an ADE (53% vs 25%; $P = .0002$) or a VAD complication (32% vs 18%; $P = .04$). Cephalosporins were the most frequently prescribed antimicrobial class (Table 1). **Conclusions:** ADEs and VAD complications were frequent in patients on OPAT. Local data should inform (1) the selection of OPAT therapy and (2) the standardized monitoring of patients who receive OPAT going forward in the implementation of this collaborative OPAT program.

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Subject Category: Patient Safety

Zoster on the brain: Clinical characteristics of patients PCR positive for varicella-zoster virus in cerebrospinal fluid and implications for transmission base

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Background: Transmission-based precautions against varicella-zoster virus (VZV) in healthcare settings are determined by the extent of rash (localized vs disseminated) and the immune status of the host. At our facility, immunocompetent patients with localized disease are placed in standard precautions whereas patients with disseminated disease and/or immunocompromised status are placed in airborne and contact isolation. The use of molecular diagnostics has increased recently, and patients can have a PCR positive for VZV in cerebral spinal fluid (CSF) without evidence of pneumonia or disseminated rash. These patients are classified as disseminated disease, but it is unlikely that they are spreading VZV via respiratory aerosols in the absence of other symptoms. Infection prevention guidance is limited in this situation, and these patients may be in unneeded isolation, with the potential for adverse patient effects and overutilizing PPE resources. We have described the clinical characteristics of patients with a PCR positive for VZV in CSF, and we evaluated the risk for transmitting VZV via airborne aerosols. **Methods:** A retrospective, single-center chart review was performed on all patients admitted with a PCR positive for VZV in CSF between July 2017 and November 2021. Chart

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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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
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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.