

Presentation Type:

Poster Presentation

Using a Human Factors Framework to Assess Clinician Perceptions of and Barriers to High Reliability in Hand Hygiene

Ana Maria Vaughan, Boston Children's Hospital; Thomas J. Sandora, Boston Children's Hospital

Background: Hand hygiene is essential to prevent healthcare-associated infections, but adherence among clinicians remains low.**Objective:** We used a human factors framework to understand clinician perceptions of and barriers to achieving high reliability in hand hygiene. **Methods:** The Systems Engineering Initiative for Patient Safety 2.0 model was used to develop a 24-item electronic survey. Perceived barriers to hand hygiene were classified into several domains: technology and tools, person, organization, tasks, environment, and care processes. After pilot testing, the survey was distributed to a stratified random sample of attending physicians, nurse practitioners, and physician assistants in medical specialties and surgery-anesthesia at a quaternary-care pediatric hospital. Frequencies, percentages, and descriptive statistics were used to summarize responses. **Results:** Of 200 clinicians, 61 (31%) responded to the survey: 74% were attending physicians, 18% were nurse practitioners, and 7% were physician assistants. Moreover, 51% of respondents represented medical specialties, and 49% came from surgical disciplines or anesthesia. Respondents had served a median 12 years (IQR, 5–19 years) in their current role. Overall, 70% perceived hand hygiene to be “essential” among patient safety issues at the institution, and 84% agreed that leadership openly promotes hand hygiene. Additionally, 97% believed personal hand hygiene efforts were effective in preventing healthcare-associated infections. The availability of alcohol-based hand rub and being a good example for colleagues were perceived as “very effective” in permanently improving hand hygiene reliability by most respondents (87%

and 67%, respectively). Furthermore, 77% of clinicians reported alcohol-based hand rub dispensers to be “sometimes” or “often” empty; 52% cited distractions in the workplace as hindrances to hand hygiene; and 21% reported that peers do not openly promote hand hygiene. One-quarter of the respondents indicated that the layout of patient care areas was not conducive to performing hand hygiene. Staffing shortages and the pace and demands of work precluded hand hygiene for 15% and 11% of respondents, respectively.

Conclusions: Most clinicians view hand hygiene as essential to patient safety, but aspects of organizational culture, environment, tasks, and tools were identified as barriers to high performance reliability. These data can inform efforts to use human factors engineering principles to optimize systems and organizations to more effectively promote hand hygiene.**Funding:** None**Disclosures:** None

Doi:10.1017/ice.2020.1084

Presentation Type:

Poster Presentation

Using Basic Principles of an Outbreak Investigation to Investigate Fractured Central Venous Catheter Hubs

Michele Honeycutt, Arkansas Children's Hospital; Christy Wisdom, Arkansas Children's Hospital; Sharon Barron, Arkansas Children's Hospital; Jared Capouya, Arkansas Children's Hospital

Background: Central venous catheters (CVCs) are used to provide necessary vascular access. Mechanical issues with the catheters, such as fractures, result in a break in the sterility of the line, increasing the patient's risk for infection or other adverse events. During a 5-month period in 2018, 15 CVCs (involving 13 patients) were noted to have cracked hubs. **Methods:** An outbreak should be suspected when a number of adverse events occur above the expected rate. We used a standardized process, Association for Professionals**Table 1.**

Steps of the Investigation	Results
1. Confirming presence of outbreak	Retrospective patient event record review.
2. Alerting key stakeholders	Quality, Risk and Safety, Infection Prevention, State Health Department, Food and Drug Administration (FDA)
3. Performing literature review	FDA, MedWatch Reports, List Serves, Journal Reviews
4. Establishing preliminary case definition	Any patient with a CVC
5. Developing methodology for case finding	Safety event recording program
6. Preparing line list and epidemic curve	Date, patient identifiers, type of line, insertion date, removal date, adverse events related to fracture
7. Observing and reviewing potentially implicated patient care activities.	Types of catheters, dressing/tubing change equipment or procedures, substitute products related to backorders.
8. Considering environmental sampling.	Testing various factors that may affect line integrity.
9. Implementing initial control measures.	Discontinue use of implicated catheters; identify substitute.
10. Refining case definition.	Identify other products used in conjunction with CVC.
11. Continuing case finding and surveillance.	Refine tracking process.
12. Reviewing control measures on a regular basis.	Regular meetings, rounding, safety event program.
13. Considering whether an analytic study should be performed.	Consult State Health Department.

in Infection Control and Epidemiology (APIC) Basic Principles of an Outbreak Investigation, to conduct the epidemiological investigation of the outbreak. Results: All 15 CVCs required replacement, and 1 case of bacteremia was recorded. We suspect that the underlying cause was related to changes in the manufacturing process of hubs along with the product used to prepare the hubs prior to access (Table 1). Conclusions: Following an outbreak investigation process to investigate a noninfectious related outbreak can ensure that a thorough and comprehensive investigation is being completed. Early recognition of an outbreak is essential to recognition of the outbreak and the implementation of mitigation strategies. Inconsistent reporting of adverse events related to mechanical issues with the catheters may have contributed to a delay in recognition.

Funding: None

Disclosures: None

Doi:[10.1017/ice.2020.1085](https://doi.org/10.1017/ice.2020.1085)

Presentation Type:

Poster Presentation

Using Data Collected from a Commercial Sensor System to Inform Mathematical Models of Healthcare-Associated Infections

Jiazhao Liang, The University of Iowa; Hankyu Jang, The University of Iowa; D M Hasibul Hasan, The University of Iowa; Philip Polgreen, University of Iowa; [Sriram Pemmaraju, University of Iowa](#); Alberto Segre, Department of Computer Science, University of Iowa

Background: Hospital-acquired infections are commonly spread through the movement of healthcare professionals (HCPs). Computational simulations provide a powerful tool for understanding how HCP behavior contributes to these infections, but how well they reflect the real world rests on a number of critical parameters. Our goal is to provide accurate, fine-grained estimates of real HCP movement and interaction parameters suitable for simulating the potential spread of pathogens over different types of inpatient facilities. **Methods:** We obtained a commercial data set with 44 million deidentified elements compiled from >27,000 HCPs from >30 job types. The data were collected over 27 months from >20 facilities of varying size using a proprietary electronic sensor system. Each observation recorded an HCP visiting 1 of 12,000 rooms (38% being patient rooms) and consisted of the entry and exit time stamps, hand hygiene behavior, and for many rooms, their (x, y) geometric coordinates within the facility. From these data, we can reconstruct the behavior (including location and hand-hygiene adherence) of each instrumented HCP across multiple shifts. **Results:** Distributions describing various aspects of HCP behavior (eg, arrival rates and dwell times) were derived using HCP job function, department or unit assignment, type of shift (day vs night), time of day, facility size, and staffing of facility. In a similar fashion, we constructed HCP cross-table transition probabilities using job type, room type, department type, unit type, and facility type. These distributions were used to generate reasonable HCP movement and behavior patterns in a simulation environment. Distributions of dwell time were, for the most part, heavy tailed, but they varied by type of job and facility: dwell times over all facilities, job types, and room types averaged ~339 seconds (SD, 495 seconds), with a mean of maximums by job type of ~37,168 seconds. However, these distributions differ within job type but across facilities (ie, nurses in 1 facility averaged 397

seconds, but 277 seconds in another) and within facility but across job type. For example, physicians averaged 292 seconds, whereas nurses averaged 397 seconds and physical therapists averaged 861 seconds. **Conclusions:** Our results provide a unique resource for disease modelers who wish to build meaningful simulations of the transmission of hospital-acquired infections. The scale and diversity of the data gave us the unique capability to provide, with confidence, distinct parameter sets for different types and sizes of healthcare facilities across a wide range of situations.

Funding: None

Disclosures: None

Doi:[10.1017/ice.2020.1086](https://doi.org/10.1017/ice.2020.1086)

Presentation Type:

Poster Presentation

Utilizing a Risk-Based Criteria Framework to Identify Infection Prevention and Control Risks in Australian Dental Settings

[Kylie Robb, Australian Dental Association \(New South Wales Branch\)](#)

Background: A dental practitioner must comply with the Dental Board of Australia's guidelines on infection control. In this project, we developed a risk-based criteria framework to assess a practitioner's infection prevention and control (IPC) systems and processes. This project allowed for the provision of the highest standard of infection control continuing education and advice relevant to the needs of members of the Australian Dental Association (NSW Branch). **Methods:** A review of 1,050 continuing professional development (CPD) IPC course evaluation forms was conducted to determine the key IPC areas that participants have the most difficulty with. All core IPC documents that practitioners are expected to understand and comply with were determined and any regulator- and profession-led compliance checklists were collated. These data were consolidated to generate a risk-based criteria framework that was then applied to 99 private, office-based, dental practices to determine IPC compliance. **Results:** After the review of 99 dental practices, the total aggregate compliance score was 78%, and the 15 key IPC areas were ranked from highest to lowest. These data assisted with the development of a full-day IPC course focusing on the top 5 risks in each category. The five areas of opportunity identified were Hand Hygiene (52%), Surgical Procedures and Aseptic Technique (59%), Documentation, Policy and Knowledge (61%), Sharps (72%), Steam Sterilisers (72%). **Conclusions:** This project identified key IPC risks for office-based dental practices from the capture of performance-based data. This data formed a targeted education framework that prioritized areas of opportunity to improve IPC standards in Australian dental practices.

Funding: None

Disclosures: None

Doi:[10.1017/ice.2020.1087](https://doi.org/10.1017/ice.2020.1087)

Presentation Type:

Poster Presentation

Utilizing Telemedicine During Outbreak Events to Reduce Exposure Risk

[Anjali Bisht, UCLA Health](#); Stacey Weinstein, Internal Medicine and Pediatrics, David Geffen Sch of Med/UCLA; Daniel Uslan, David Geffen Sch of Med/UCLA

Background: As of October 2019, the United States has seen the greatest number of annual measles cases reported since 1992, of