Presentation Type:
Poster Presentation

Quantifying the Risk of Methicillin-Resistant *Staphylococcus aureus* (MRSA) Transmission From Patient to Healthcare Personnel in the Critical Care Setting

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Background: Healthcare personnel (HCP) acquire MRSA on their gown and gloves during routine care activities for patients who are colonized or infected with MRSA at a rate of ~15%. Certain care activities (eg, physical exam, care of endotracheal tube, wound care and bathing/hygiene) have been associated with a higher frequency of transmission from the patient to HCP gown and gloves than other activities (ie, administration of oral medicines, glucose monitoring, and manipulation of IV tubing/medication delivery). However, quantification of MRSA contamination and risk to subsequent patients is poorly defined. **Objective:** We sought to determine the mean MRSA colony-forming units (CFU) found on the gloves and gowns of HCP who acquire MRSA after various care activities involving patients with MRSA. **Methods:** We conducted a prospective cohort study at the University of Maryland Medical Center from December 2018 to October 2019. We identified patients colonized or infected with MRSA based on culture data from the prior 7 days. HCP performing prespecified care activities on eligible patients were observed. To isolate the risk of each care activity, HCP donned new gloves and gown prior to a specific care activity. Once that care activity was performed, HCP gloves and gown were swabbed prior to the any further care activities. HCP gloves were cultured with an E-swab by swabbing each digit up and down 3 times followed by 2 circles on the palm of their hands. HCP gowns were sampled by swabbing a 15 × 30-cm area along the beltline of the gown and along each inner forearm twice. E-swab liquid was then serially diluted and plated in triplicate on CHROMagar MRSA II (BD, Sparks, MD) to obtain CFU. We calculated the median CFUs and the interquartile range (IQR) for each specific care activity stratified by gown and gloves. **Results:** In total, 604 HCP–patient care interactions were observed. Table 1 displays the mean MRSA CFUs stratified by gown and gloves for each patient care activity of interest. **Conclusions:** The quantity of MRSA found on gowns and gloves varies depending on patient care activities. Recognition of differential transmission rates between various activities may allow different approaches to infection prevention, such as the use of personal protective equipment in high- versus low-risk activities and/or the use of more aggressive interventions for high-risk activities.

Presentation Type:
Poster Presentation

Quantitative Characterization of High-Touch Surfaces in Emergency Departments and Hemodialysis Facilities

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Background: The healthcare environment can serve as a reservoir for many microorganisms and, in the absence of appropriate cleaning and disinfection, can contribute to pathogen transmission. Identification of high-touch surfaces (HTS) in hospital patient rooms has allowed the recognition of surfaces that represent the greatest transmission risk and prioritization of cleaning and disinfection resources for infection prevention. HTS in other healthcare settings, including high-volume and high-risk settings such as emergency departments (EDs) and hemodialysis facilities (HDFs), have not been well studied or defined. **Methods:** Observations were conducted in 2 EDs and 3 HDFs using

TABLE 1. MEDIAN MRSA CFUS STRATIFIED BY GOWN AND GLOVES PER PATIENT CARE ACTIVITY N=604

	Patient Care Activities	Number of Activities observed	Proportion of gloves with MRSA, N (%) **	Median (IQR) Quantity of MRSA for gloves*	Number of Activities observed	Proportion of gowns with MRSA, N (%) **	Median (IQR) Quantity of MRSA for gowns*
HIGH RISK	Care of endotracheal tube	38	18 (47.4)	58.5 (20.0-200)	38	5 (13.2)	151.5 (11.5-1433.5)
	Physical Examination	55	6 (10.9)	10.0 (3.0-17.0)	55	2 (3.6)	200. 0 (200.0-200.0)
	Wound Care	12	3 (25.0)	155.0 (7.0-303.0)	12	1 (8.3)	
	Bathing/Hygiene	42	5 (11.9)	252.0 (15.0-632.5)	42		
LOW RISK	Administration of Oral Medications	54	5 (9.3)	17.0 (13.0-267.0)	54	4 (7.4)	8116.5 (33.0-16200.0)
	Glucose Monitoring	47	2 (4.3)	13.0 (13.0-13.0)	47	1 (2.1)	
	Manipulation of IV tubing	54	5 (5.6)	13.0 (13.0-13.0)	54		

*Median and IQR does not contain gown or gloves that were not quantifiable
**proportion of gloves and gowns were calculated using the qualitatve measurement of mrsa growth. gown or gloves that were unable to quanitfy but had detection of mrsa were included in the calculation

Table 1.

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EMERGENCY DEPARTMENTS
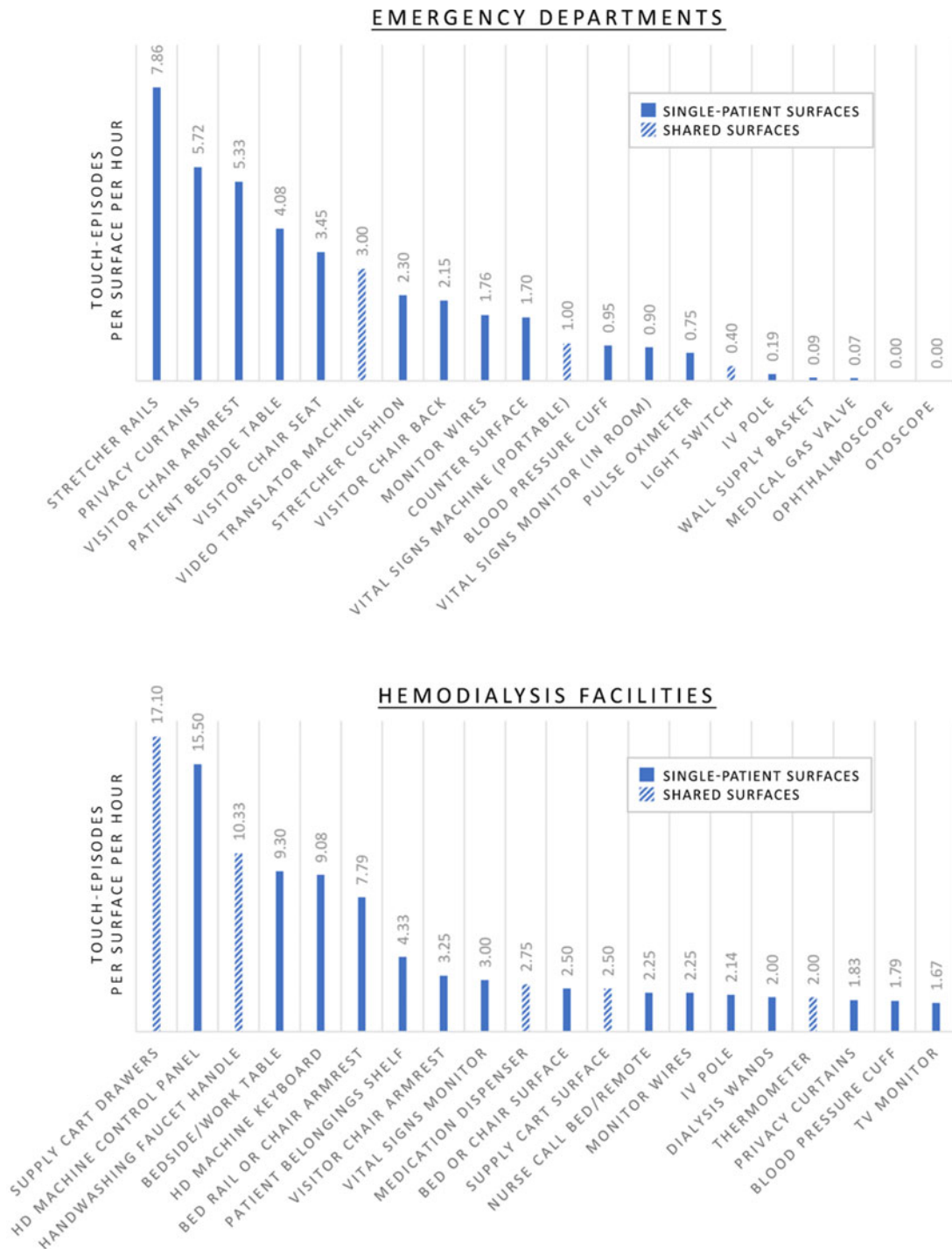

HEMODIALYSIS FACILITIES

FIGURE. Mean frequency of touch-episodes for 20 highest-touch surfaces in emergency departments and hemodialysis facilities.

Fig. 1.

structured observation tools. All touch episodes, defined as hand-to-surface contact regardless of hand hygiene and/or glove use, were recorded. Touches by healthcare personnel, patients, and visitors were included. Surfaces were classified as being allocated to individual patients or shared among multiple patients. The

number of touch episodes per hour was calculated for each surface to rank surfaces by frequency of touch. **Results:** In total, 28 hours of observation (14 hours each in EDs and HDFs) were conducted. 1,976 touch episodes were observed among 62 surfaces. On average, more touch episodes were observed per hour in HDFs than in

EDs (89 vs 52, respectively). The most frequently touched surfaces in EDs included stretcher rails, privacy curtains, visitor chair arm rests and seats, and patient bedside tables, which together accounted for 68.8% of all touch episodes in EDs (Fig. 1). Frequently touched surfaces in HDFs included both shared and single-patient surfaces: 27.8% and 72.2% of HDF touch episodes, respectively. The most frequently touched surfaces in HDFs were supply cart drawers, dialysis machine control panels and keyboards, handwashing faucet handles, bedside work tables, and bed rail or dialysis chair armrests, which accounted for 68.4% of all touch-episodes recorded. **Conclusions:** To our knowledge, this is the first quantitative study to identify HTSs in EDs and HDFs. Our observations reveal that certain surfaces within these environments are subject to a substantially greater frequency of hand contact than others and that a relatively small number of surfaces account for most touch episodes. Notably, whereas HTSs in EDs were primarily single-patient surfaces, HTSs in HDFs included surfaces shared in the care of multiple patients, which may represent an even greater risk of patient-to-patient pathogen transmission than single-patient surfaces. The identification of HTSs in EDs and HDFs contributes to a better understanding of the risk of environment-related pathogen transmission in these settings and may allow prioritization and optimization of cleaning and disinfection resources within facilities.

Presentation Type:
Poster Presentation
Rapid PCR Influenza Testing Decreases Inappropriate Empiric Antibiotic Use

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Background: The clinical picture of influenza-like illness can mimic bacterial pneumonia, and empiric treatment is often initiated with antibacterial agents. Molecular testing such as polymerase chain reaction (PCR) is often used to diagnose influenza. However, traditional PCR tests have a slow turnaround time and cannot deliver results soon enough to influence the clinical decision making. The Detroit Medical Center (DMC) implemented the Xpert Flu test for all patients presenting with influenza-like illness (ILI). We evaluated antibacterial use after implementation of rapid influenza PCR Xpert Flu. **Methods:** We conducted a retrospective study comparing all pediatric and adult patients tested using traditional RT PCR during the 2017–2018 flu season to patients tested using the rapid influenza Xpert Flu during the 2018–2019 flu season in a tertiary-care hospital in Detroit, Michigan. These patients were further divided into 3 groups: not admitted (NA), admitted to acute-care floor (ACF), or admitted to intensive care unit (ICU). The groups were then compared with respect to percentage of antibacterial use after traditional RT PCR versus rapid influenza Xpert Flu testing during their hospital visit for ILI. The χ^2 test was used for statistical analyses. **Results:** In total, 20,923 patients presented with influenza-like illness during the study period: 26% (n = 5,569) had the rapid influenza Xpert Flu and 73.4% (n= 15,354) had traditional RT PCR. For a comparison of the number of patients in 3 groups (NA, ACF, and ICU) and type of influenza PCR performed among these patients, please refer to Table 1. When comparing antibacterial use in the NA group, the proportions of patients who received antibacterial agents in the traditional RT PCR group versus the rapid influenza Xpert Flu group were 24.4% (n = 695) versus 3.9% (n = 450), respectively (P < .0001). In the ACF group, the proportions of patients who received antibacterial agents in the traditional RT PCR group versus the rapid influenza Xpert Flu group was 62.3% (n = 1,406) versus 27.7% (n = 994), respectively (P < .001). In the ICU group, the proportions of patients who received antibacterials in the traditional RT PCR group versus the rapid influenza Xpert Flu group were 80.3% (n = 382) versus 38.3% (n = 204), respectively (P < .0001). **Conclusions:** With rising antimicrobial resistance and increasing influenza morbidity and mortality, rapid diagnostics not only can help diagnose influenza faster but also can reduce inappropriate antimicrobial use.

Presentation Type:
Poster Presentation
Real-Time Bedside Root Cause Analysis (RCA) as a Catalyst for *Clostridioides difficile* Reduction

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Table 1: Total Number of Patients in Each Group and Type of Influenza PCR Performed

Group	Traditional Flu PCR (TF) n (%)	Rapid Influenza Xpert® Flu (RT) n (%)	Total n (%)
Not admitted group (NA)	2837 (20%)	11,287 (80%)	14,124 (67.5%)
Acute Care group (ACF)	2256 (38.9%)	3534 (61%)	5790 (27.6%)
Intensive Care Unit group (ICU)	476 (47.2%)	533 (52.8%)	1009 (4.8%)