Background: Hospital-acquired infections (HAIs) are a leading cause of healthcare morbidity and cost for the health community. It is widely recognized that hand hygiene is the leading contributor infections, but hand hygiene still remains a major problem for nearly all healthcare systems. A longitudinal study was conducted over a 4-year period in a community-based health system. **Methods:** An electronic hand hygiene reminder system was installed in 2 different facilities including both critical care and noncritical units. This system collects data on individual healthcare provider hand hygiene and provides a real-time voice reminder in the event that a provider forgets to perform hand hygiene. The primary study was designed to investigate the impact of a real-time voice reminder to improve hand hygiene. A baseline period of hand hygiene was established prior to the interventions after installing the system without any access to data reporting or the voice reminder. Each of the hospitals had the voice reminder turned on and off 3 times. The baseline HAI rates were established by comparing in each facility for the 12 months prior to the implementation of the system. During the study period, there were no significant changes to other common infection control practices. **Results:** In both facilities, every time the voices were turned on, hand hygiene improved significantly and each clinical unit saw a >200% improvement in hand hygiene within 3 months of turning the voice reminder. HAIs fell by a statistically significant in all clinical areas by 51%. After a period of stabilization, the voice reminder was turned off hand hygiene compliance fell and HAI rates then increased. The voice reminder was then turned back on and off 2 more times. In every case, hand hygiene rates fell back to the baseline and HAIs returned to their baseline. When the voice reminder was then turned back on, HAIs dropped to 54%–81% of the baseline in each of the clinical units. The system also captured individual providers' hand hygiene performance data and displayed it in a simple and engaging way, allowing managers easily understand who was struggling with hand hygiene. These data were then leveraged through a series of competitions to systematically drive hand hygiene performance improvement. These included traditional interventions to address an education issue in addition to interventions to identify workflow problems. **Conclusions:** Using this highly targeted approach, the leadership were able to efficiently drive sustained hand hygiene improvement and a further reduction in HAIs.

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Poster Presentation

Multidisciplinary Response to Nosocomial Influenza

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Background: Nosocomial influenza infections can be caused by direct patient-to-patient transmission, as well as bidirectionally between patient and healthcare workers (HCWs). Lapses in infection control practices (droplet precautions), and HCWs who come to work despite influenza-like illness (ILI, ie, "presenteeism") can potentiate transmission. Cocirculation of >1 strain of influenza may complicate efforts to track infections. We describe a multidisciplinary response that helped control a late winter nosocomial influenza outbreak at a time when both influenza A/H3 and A/H1(2009) were prevalent in the community. **Methods:** Infection control practitioners detected a potential cluster of influenza A/H3 cases on an adult general medicine unit during the middle of March. The patients were spread out in nonadjacent rooms in a 30-bed unit, which suggested a possible common shared source. Further investigation revealed other potential clusters. Hospital incident command (HIC) was deployed to assess and respond to the outbreak; the incident commander was the chief medical officer (CMO) and the hospital epidemiologist was the subject matter expert. Other HIC roles were manned by nursing leadership, hospital administration, employee health, and the clinical laboratory. The group met at least daily (teleconference on weekends) until the extent of the outbreak was known and no new cases were identified. **Results:** A multipronged approach was used to control the outbreak. HCWs who reported to work with ILI symptoms were referred to employee health, tested with a PCR-based influenza screening panel, and sent home. Inpatients with ILI symptoms were tested with a comprehensive respiratory virus panel that could distinguish influenza A/H1(2009) from A/H3. Inpatients who were newly positive for influenza were evaluated to determine whether they were epidemiologically linked to an existing cluster, represented a new case of nosocomial acquisition, or were presumed to be community-acquired. The outbreak involved separate clusters caused by A/H3 and A/H1(2009) that affected 40 patients on 9 clinical units. **Conclusions:** A key component of the response was implementation of a local "mask rule": all physicians, nurses, other employees, students, and visitors were required to wear surgical masks on affected floors regardless of their vaccination status. In addition, the hospital IT team developed a dynamic spreadsheet that listed information about all nosocomial cases (location, date of onset, etc), as well as ILI call-ins for HCWs. A password-protected version was posted on the hospital intranet and facilitated cohorting of infected patients. Additionally, it allowed timely discontinuation of the local mask rule on specific units, once 2 incubation periods concluded without new cases.

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Poster Presentation

Multidrug-Resistant Organism Carriage in Wisconsin Children

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Background: Children attending daycare are at increased risk of carrying multidrug-resistant organisms (MDROs) compared to children not attending daycare. Carriage of MDROs greatly increases the risk of infection, not only in the child but also for others living in the household. Understanding the epidemiology of MDRO carriage in children is essential to devising effective containment strategies. Here, we present the findings from a cross-

sectional study assessing MDRO carriage in daycare-attending and nonattending children in Wisconsin. **Methods:** We applied the following enrollment criteria: Children aged between 6 months and <6 years and not enrolled in kindergarten; children who did not have an MDRO infection in the previous 6 months and did not receive any antimicrobials in the previous month; and children who did not have a gluten allergy, asthma, eczema, allergic rhinitis, cystic fibrosis, or an immunodeficiency. Children were enrolled by a parent or guardian who filled out a questionnaire on MDRO risk factor history and diet. Samples were collected from the nares, axilla or groin (pooled swab), and stool. Nasal samples were cultured for *H. influenzae*, *S. pneumoniae*, *M. catarrhalis*, and methicillin-resistant *S. aureus* (MRSA). Skin samples were cultured for MRSA, and stool samples were cultured for MRSA, *C. difficile*, vancomycin-resistant enterococci (VRE), and extended-spectrum β-lactamase–producing Gram-negative bacilli (ie, ESBL GNR). **Results:** In total, 44 children were enrolled in this study. The average age was 2.6 years and 50% were girls. Furthermore, 30 (68.2%) were identified by their parents as white, 9 (20.5%) as black, and 5 (11.3%) as other or multiracial. Incidentally, 23 children (52.3%) were enrolled in daycare. Overall, 18 children were positive for at least 1 organism, 9 of which had daycare exposure, and 5 children (1 in daycare) were positive for >1 organism (11.4%). From stool samples, 6 children (13.6%, 2 in daycare) were *C. difficile* carriers, 3 were VRE carriers (6.8%, 1 in daycare), 8 carried an ESBL GNR (18.2%, 4 in daycare), and 3 carried MRSA (6.8%, 1 in daycare). One child was positive for *H. influenzae* (2.3%, not in daycare) and 2 were positive for *S. pneumoniae* (4.6%, 1 in daycare) from nares swabs. One child was positive for MRSA (2.3%, not in daycare) from a skin swab. We detected no significant differences between children with and without daycare exposure for any organism. **Conclusions:** Children in this population had higher than expected rates of ESBL GNRs and MRSA for a community population. Daycare exposure was not correlated with increased carriage in this small pilot study, though larger longitudinal studies are needed.

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Multiscale Modeling of Patient Movement to Determine Effects of Surveillance on Healthcare-Associated Infections

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Background: The transmission of pathogenic organisms in healthcare settings is a major cause of healthcare-associated infections (HAIs). In recent years, infections with carbapenem-resistant Enterobacteriaceae (CRE) have become a significant public health threat, in part because many patients are arriving at the hospital already colonized, and colonization is a major risk factor for infection. Reducing transmission requires understanding how patient movement drives the spread of CRE; however, analysis of this issue has mostly been modeled at a hospital-level without much consideration for the population dynamics that occur outside of the hospital setting and how patients move between healthcare settings. Patients move between hospitals, other healthcare settings, such as long-term care facilities (LTCFs), and the community, all of which pose different colonization risks. Thus, studying each environment in isolation fails to realistically address the consequences of large-scale policy interventions. One such intervention is a statewide electronic registry to track patients who are known to be colonized or have had a CRE infection. Understanding the potential for reducing CRE morbidity and mortality requires consideration of small- and large-scale effects on patients' movement and transmission. **Methods:** We developed a multiscale, metapopulation model for hospitals, communities, and LTCFs in the state of Maryland. In our computational simulation, we included a regional- as well as a local-scale model that were informed by the patient-mix data from the Maryland Health Service Cost Review Commission. We examined the impact of implementing a registry compared to less coordinated scenarios. **Results:** The most effective policy was the implementation of an electronic registry which resulted in 9.6% median reduction in CRE HAIs in Maryland for simulated outcomes (Fig. 1). Other interventions included colonization screening at various or all hospitals and using a predictive algorithm to determine at-risk patients that need to be screened. These interventions only resulted in ~1%–3% reductions in HAIs. We also observed that coupling other interventions with an electronic registry does not aid in reducing more HAIs.

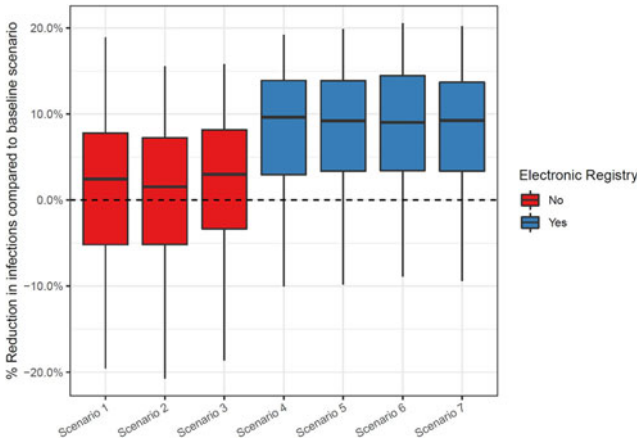

Fig. 1.

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Boxplot of simulated outcomes of all scenarios compared to the baseline scenario. The scenarios include (1) complete screening with no electronic registry, (2) selective screening with no electronic registry, (3) predictive screening with no electronic registry, (4) baseline with an electronic registry, (5) complete screening with an electronic registry, (6) selective screening with an electronic registry, and (7) predictive screening with an electronic registry. Scenarios 5-7 include the same interventions as 1–3 coupled with an electronic registry.

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National Frequencies of Administering or Prescribing Immunosuppressive Opioids in US Ambulatory Care Settings: 2006–2016

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