Presentation Type:
Poster Presentation - Oral Presentation
Subject Category: Surveillance/Public Health

CDC consultations related to ophthalmologic practices and settings, 2016–2021

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Background: Healthcare activities that include instrumentation or manipulation of mucosal tissue or normally sterile sites, such as the eye and its associated structures, place patients at risk of infectious and other complications. We reviewed queries to the CDC Prevention and Response Branch that were focused on ophthalmologic procedures and settings to examine opportunities to improve infection prevention and control (IPC) practices in these settings. **Methods:** We reviewed internal CDC consultation records received from January 1, 2016, through December 31, 2021, to identify those involving ophthalmologic procedures or settings. Consultations were reviewed to determine setting type, number of patients affected, organisms identified, nature of infection control breaches, and whether medical products were implicated. Descriptive statistics were calculated. **Results:** We identified 24 consultations among 19 states and US territories. Of these, 21 (87.5%) involved outpatient settings, of which 9 (43%) were ambulatory surgery centers. Consultations included the following non–mutually exclusive categories. There were 18 adverse postsurgical events (75%), such as mycobacterial infection after laser surgery and toxic anterior segment syndrome following cataract surgery (n = 5). There were 11 infections following ophthalmologic clinical care (46%), such as epidemic keratoconjunctivitis due to adenovirus 8. There were 8 suspected medication-related events (33%) including contamination of ophthalmic medication when manufactured or compounded offsite. There were 8 medical-device reprocessing concerns (33%) including inappropriate high-level disinfection. There were 8 instances of improper environmental cleaning and disinfection (33%), for example, during an adenovirus outbreak. There were 3 cases of potential mishandling of medications onsite (12.5%), such as multiuse eye drops. Also, 3 events (12.5%) were associated with potentially contaminated donor tissue, such as corneas for transplantation. When a consultation included identification of a pathogen (n = 11), organisms included bacteria (n = 7, 64%), viruses (n = 2, 18%), and fungi (n = 3, 27%). In total, 202 patients had confirmed ophthalmologic infections or adverse events. **Conclusions:** Based on our review of recent outbreaks, healthcare personnel in ophthalmologic settings may have deficits in training related to instrument reprocessing and environmental cleaning specific to ophthalmic equipment and settings that can result in harm to patients. These settings could benefit from targeted training to improve IPC practices specific to ophthalmologic examinations and procedures. This review was limited to analysis of investigations that were voluntarily reported to the CDC. A formal surveillance system for adverse outcomes in this setting could clarify the nature and frequency of IPC issues of greatest concern.

Disclosures: None

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An interactive patient transfer network and model visualization tool for multidrug-resistant organism prevention strategies

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Background: The CDC's new Public Health Strategies to Prevent the Spread of Novel and Targeted Multidrug-Resistant Organisms (MDROs) were informed by mathematical models that assessed the impact of implementing preventive strategies directed at a subset of healthcare facilities characterized as influential or highly connected based on their predicted role in the regional spread of MDROs. We developed an interactive tool to communicate mathematical modeling results and visualize the regional patient transfer network for public health departments and healthcare facilities to assist in planning and implementing prevention strategies. **Methods:** An interactive RShiny application is currently hosted in the CDC network and is accessible to external partners through the Secure Access Management Services (SAMS). Patient transfer volumes (direct and indirect, that is, with up to 30 days in the community between admissions) were estimated from the CMS fee-for-service claims data from 2019. The spread of a carbapenem-resistant Enterobacterales (CRE)–like MDROs within a US state was simulated using a deterministic model with susceptible and infectious compartments in the community and healthcare facilities interconnected through patient transfers. Individuals determined to be infectious through admission screening, point-prevalence surveys (PPSs), or notified from interfacility communication were assigned lower transmissibility if enhanced infection prevention and control practices were in place at a facility. **Results:** The application consists of 4 interactive tabs. Users can visualize the statewide patient-sharing network for any US state and select territories in the first tab (Fig. 1). A feature allows users to highlight a facility of interest and display downstream or upstream facilities that received or sent transfers from the facility of interest, respectively. A second tab lists influential facilities to aid in prioritizing screening and prevention activities. A third tab lists all facilities in the state in descending order of their dispersal rate (ie, the rate at which patients are shared downstream to other facilities), which can help identify highly connected facilities. In the fourth tab, an interactive graph displays the predicted reduction of MDRO prevalence given a range of intervention scenarios (Fig. 2). **Conclusions:** Our RShiny application, which can be accessed by public health partners, can assist healthcare facilities and public health departments in planning and tailoring MDRO prevention activity bundles.

Disclosures: None

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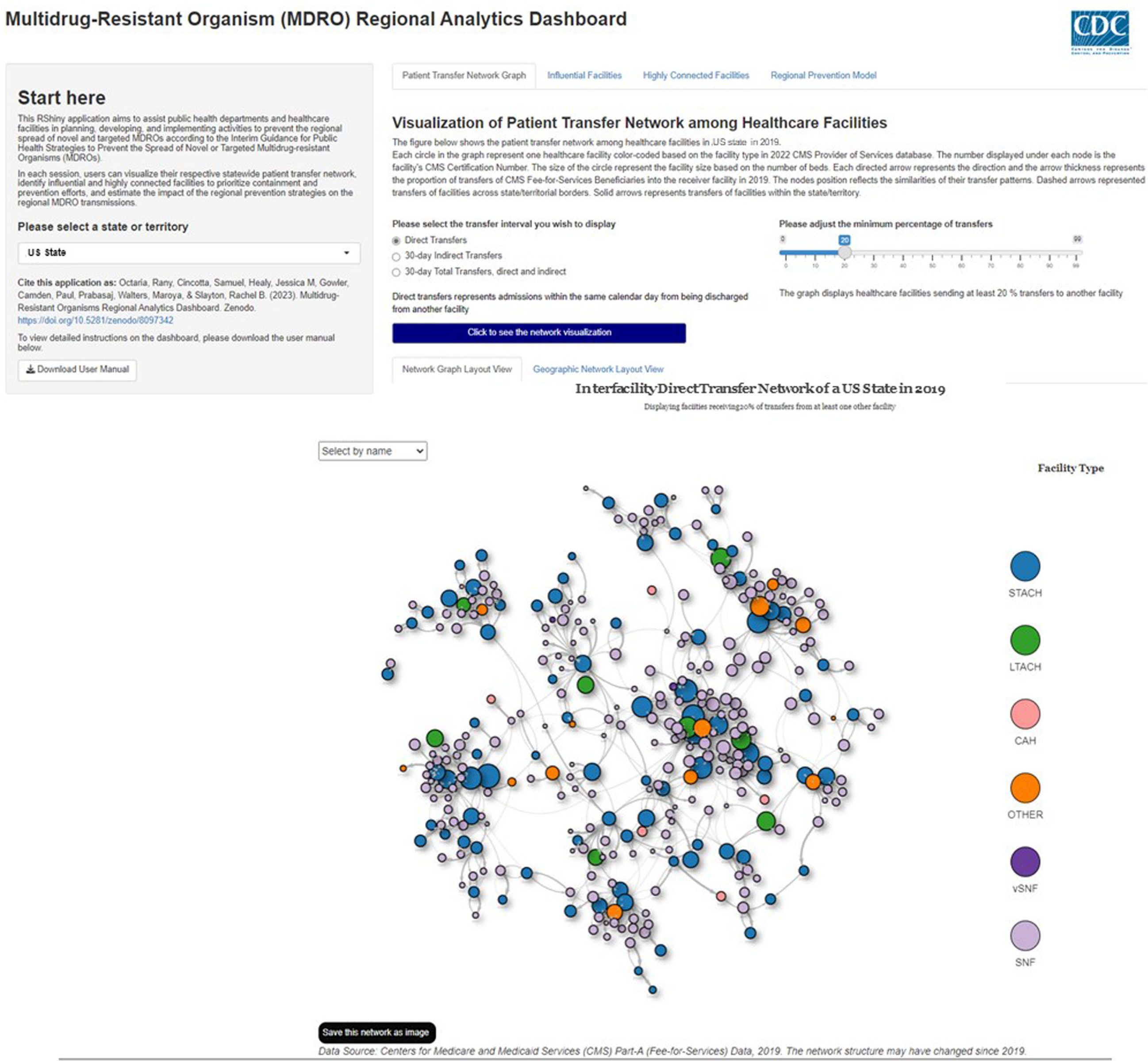

Figure 1. The web application landing page and the first tab show the statewide patient-sharing network of an example US State. The figure shows healthcare facilities that contributed at least 20% of all incoming transfers to another facility (minimum adjustable percentage of transfers toggle). Each circle in the graph represents one healthcare facility color-coded based on the facility type in the 2022 CMS Provider of Services database. The number displayed under each node is the facility's CMS Certification Number. The circle size represents the facility size based on the number of beds. Each directed arrow represents the direction of the transfers, and the arrow thickness represents the proportion of direct transfers of CMS Fee-for-Services Beneficiaries into the receiver facility in 2019. The node position reflects the similarities of their transfer patterns. Abbreviations: STACH, Short-Term Acute Care Hospital; LTACH, Long-term Acute Care Hospital; CAH, Critical Access Hospital; SNF, Skilled Nursing Facility; vSNF, Ventilator-capable SNF.

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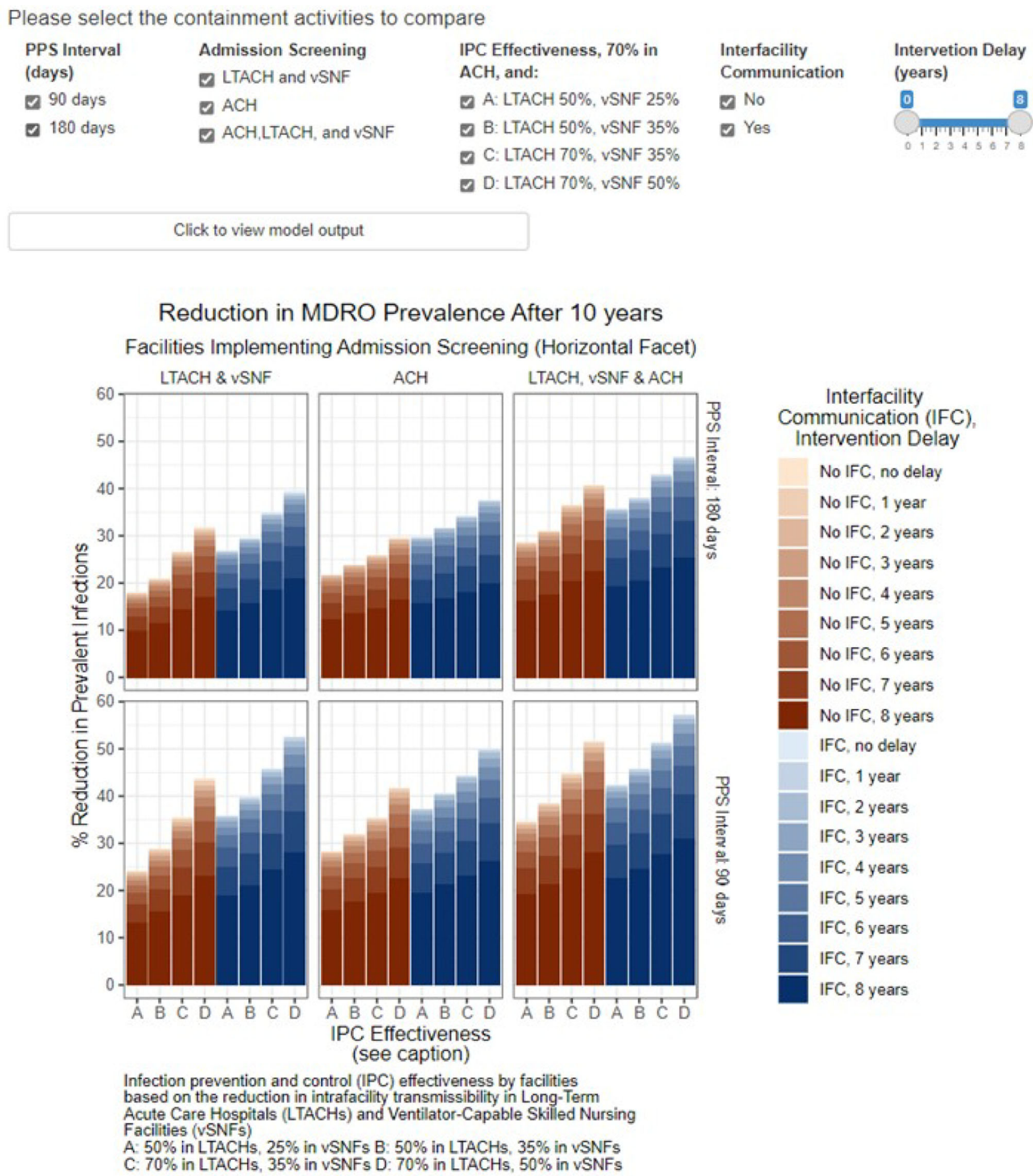

Figure 2. The interactive graph in the fourth application tab visualizes mathematical modeling simulation results of the estimated relative reduction in MDRO prevalence in a US state after ten years compared to no regional intervention. The displayed graph shows combinations of circumstances modeled in the original deterministic compartmental model: case detection through point prevalence survey (PPS) at frequencies of every 90 days or 180 days, admission screening in Long-term Acute Care Hospitals (LTACHs) and Ventilator-capable Skilled Nursing Facilities (vSNFs), admission screening for individuals transferring from an LTACH or vSNF to Acute Care Hospitals (ACHs), or admission screening in all three facility types. Additionally, the x-axis shows different scenarios of IPC effectiveness in different facility types, expressed by the percent reduction in transmissibility of the infected patients in each hospital undergoing the intervention based on their hospital type. The shades of the graph display the range of prevalence reduction with 0-8 years of delay between MDRO importation and the start of preventive measures implementation. An interactive feature (not shown here) allows the user to hover over each element of the graph to display the detailed model parameters and the estimated reduction in MDRO prevalence for each scenario.

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