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Concise Communication

Virtual infection prevention—The next frontier

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Abstract

The coronavirus disease 2019 (COVID-19) pandemic has resulted in the acceleration of telehealth and remote environments as stakeholders and healthcare systems respond to the threat of this disease. How can infectious diseases and healthcare epidemiology expertise be adapted to support safe care for all?

Keywords: COVID-19; telehealth; virtual work; infection prevention

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"I believe that business is nothing more than a group of people trying to make a difference."

Sir Richard Branson

The coronavirus disease 2019 (COVID-19) pandemic places infectious disease, public health, and epidemiology specialists in the spotlight. As national and international stakeholders seek to contain disease outbreaks, physicians and healthcare systems must respond nimbly to the fluid COVID-19 situation. The pandemic also serves as an accelerant for change; rapid implementation of telehealth services and increasing remote work are 2 examples of the many novel strategies employed to minimize risk to patients and staff while balancing needs for care in varying settings. These rapid changes in healthcare delivery call for added guidance from infection prevention experts. Implementation of remote work is broad and likely to persist even as the pandemic recedes. How can infectious diseases and healthcare epidemiology expertise be adapted to address staffing needs and consultative demands to support safe, high-quality care for all?

The scarcity of infectious diseases specialists

Healthcare trends in physician compensation, market consolidation and private equity have contributed to the shortage of infectious diseases specialty support. Historically, healthcare fee-for-service models influenced the structure of compensation plans for physicians, and heavily consultative, low-procedure-volume specialties were compensated at comparatively lower rates than high-procedure-volume specialties. For example, while infectious disease, critical care, and pulmonary medicine specialists undergo 3 years of postresidency training, infectious disease physicians earn an average of $100,000 less per year than comparable specialists.[1] With infectious disease physicians least likely of 29 specialties surveyed to perceive their compensation as fair, fewer medical residents are choosing this area of practice.[2] The COVID-19 pandemic has highlighted the critical need for this specialty, but market conditions present further challenges to staffing a sustainable infectious disease service.

Even in the pre-COVID environment, healthcare systems consolidated at a rapid pace, with 66% of all hospitals in the United States belonging to a larger system in 2017, up from 55% in 2010.[3] The Herfindahl-Hirschman Index (HHI) is a widely accepted measurement of market concentration. In 2017 HHI metrics indicated 90% of metropolitan areas were highly concentrated for hospitals and 65% were highly concentrated for specialist physicians.[4] Healthcare-sector private equity deals rose over the same period, reaching $42.6 billion (highest point since 2007). The consolidation of a fragmented market and the reduction in the number of employers, coupled with a requirement by private equity firms to return value to shareholders, generally reduces the availability of specialty and subspecialty services in a geographic area, especially if the specialty does not yield immediate profits.

The increasing need for infection prevention and antimicrobial stewardship

Although systems face challenges in recruitment and retention of infectious diseases specialists, infection prevention and antimicrobial stewardship programs are increasingly mandated by regulating bodies and third-party payers. Passage of the Patient Protection and Affordable Care Act (ACA) legislation signaled the industry-wide shift to outcomes-driven healthcare purchasing, launching a variety of Centers for Medicare and Medicaid (CMS) value-based payment programs including the Hospital-Acquired Conditions (HAC) Reduction Program. Private payors have followed suit,

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and now organizations face financial penalties for poor infectious disease prevention. Healthcare-associated infection scores are assigned to participating facilities and are used to determine reimbursement rates under the CMS HAC Reduction Program.[5]

In this environment, virtual infectious healthcare epidemiology services may provide a beneficial tool for a diversity of community and rural stakeholders and an avenue for improvements to patient care and the public health.

The changing landscape of healthcare infection prevention

The COVID-19 experience has forced many infection prevention and control (IPC) programs to strengthen virtual work platforms. Although the virtual work trend began before this pandemic, traditional IPC programs primarily function within the physical hospital setting. Like many other hospital-based departments, COVID-19 necessitated the rapid adaptation to virtual work outside the hospital walls. Certain facets of IPC work, like sharing data visualizations with stakeholders, are well suited for the virtual workplace. Although barriers of transitioning hospital-based IPC programs exist, there are many benefits to the virtual IPC workplace setting.

Historically, due to the limitations of the electronic medical record (EMR) limitations, a large majority of infection prevention work is conducted via human surveillance. Use of machine learning and other automated tools can help with surveillance, goal setting, and assessment of infection prevention practices. Scardoni et al[6] found that it is possible to integrate ML hospital-acquired infection (HAI) surveillance in the near future. However, to effectively integrate machine-learning surveillance, the collaboration between IT and clinical teams will have to be strengthened. Furthermore, many community hospitals are unlikely to have sufficient IT support for machine-learning approaches in the near future. Data from EMRs must be more easily available. For many institutions, extracting relevant clinical data is quite challenging with current EMRs. To improve patient safety and reduce long-term costs, healthcare systems must invest in the improvement of EMR data extraction for HAI surveillance and predictive modeling of risk. Even if machine learning can predict HAIs and can identify patients at increased risk for HAIs, IPC programs outcomes can only improve if hospital leadership make the prevention of HAIs a priority.[7]

Expanding infection prevention beyond the academic medical center model

Electronic, remote, and/or virtual infection prevention should not just be limited to large, academic tertiary-care hospitals. COVID-19 has severely impacted IPCs in community hospitals, where >50% of healthcare is provided.[8] Infection prevention programs in community hospitals are underresourced at baseline, and COVID-19 has exacerbated this issue. Community hospitals are suffering from additional strains on resources due to outbreaks and personnel shortages.[9] Thus, community hospital IPCs can utilize remote strategies for education, surveillance, and feedback. The Duke Infection Control Outreach Network (DICON) has engaged community hospitals for >20 years, leading to decreases in HAIs among participating hospitals through routine on-site visits, education, implementation of best practices, and data collection, review and feedback.[10] This model is an example of an IPC support strategy that can be easily and successfully pivoted to virtual interactions, even for the smallest community hospitals.

The next frontier

Adaptive strategies resulting from shifting threats and resources continue to spur widespread adoption of remote work and virtual telehealth visits. The COVID-19 pandemic has highlighted the need for involvement of epidemiology experts in all facets of healthcare delivery. The widespread need for infectious diseases expertise and healthcare epidemiology in diverse settings will only continue to grow. Successful models exist for the community expansion of healthcare epidemiology programs. The field of healthcare epidemiology must now leverage and adopt evolving models and virtual surveillance and meeting platforms with negotiated, contractual financing to provide expertise across diverse healthcare systems, to maximize the reach and efficiency of our expertise, so as to make a bigger difference in patient safety.

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