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EDITORIAL

Déjà Vu: Coronaviruses and Transmission in Health Care Settings

Transmission of respiratory viruses in health care settings can be dramatic. Rarely is a single cause or smoking gun identified. Before the coronavirus disease 2019 (COVID-19) pandemic, outbreaks were linked to failures in transmission-based precautions, crowding, insufficient workforce, and gaps in knowledge about infection prevention practices (1). Nosocomial transmission of COVID-19 in health care settings has remained low (2), yet sporadic outbreaks still occur (3). Such clusters have not revealed inadequacy of personal protective equipment (PPE) but rather insufficient PPE supply, lack of familiarity with equipment or lapses in PPE practices, and breaches of existing infection prevention measures.

In their study, Klompas and colleagues investigated a cluster of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections in an acute care hospital, with transmission between patients and health care personnel (HCP) (3). The likely source of this outbreak was a patient with unrecognized COVID-19. Before diagnosis, multiple transfers between units and services, sharing of rooms by the patient with unrecognized COVID-19 and uninfected patients, assignment of HCP to multiple units, and use of nebulization further promoted the transmission of COVID-19. As part of this extensive and elegant investigation, 83% (1202 of 1457) of HCP and patients affiliated with cluster units were tested for SARS-CoV-2, and 57 persons (15 patients and 42 HCP) met epidemiologic criteria. Of these, 52 (14 patients and 38 HCP) were associated with the cluster on the basis of whole-genome sequencing. Almost 90% of patients who shared rooms with a patient with unrecognized COVID-19 developed the infection. The ambient pressure in the room housing the index patient was positive to the corridor, and tracer studies showed airflow to the nursing station. Finally, a case–control study revealed that persons who acquired COVID-19 were twice as likely to be in a room with a symptomatic patient with dyspnea or cough and 2.5 times more likely to be exposed to nebulization.

This cluster highlights previously recognized and ongoing challenges of preventing transmission of viral respiratory infections, including COVID-19, in health care settings. These findings were compounded by HCP behaviors that facilitated further transmission. Although these associations were not statistically significant, cases were less likely to wear eye protection at all times and to be present in rooms where the COVID-19 case patient was unmasked. In addition, almost 75% of exposed HCP used breakrooms, and only one third wore masks while in them. Another medical center with a similar COVID-19 outbreak reported that "staff . . . convened in a breakroom and removed their masks without observing proper social distancing protocols" (4). The challenges associated with the inability to socially distance in workrooms and breakrooms not designed with adequate physical separation contributed to COVID-19 clusters (5). These observations argue that adherence to PPE use and behaviors surrounding PPE have been unsatisfactory and contributed to these outbreaks. This problem, however, is not new. Before the COVID-19 pandemic, PPE adherence was lacking due to individual perception, perceived discomfort, and availability and was characterized by 3 types of failures: violations (deviations from recommended practices), mistakes (failures of intention), and slips (failures of execution) (6).

As with the Ebola, Middle East respiratory syndrome, and SARS outbreaks, PPE and its use have been a contentious challenge throughout the COVID-19 pandemic. Early in the pandemic, with demand for PPE exceeding supply, controversies surrounded reuse and extended use of PPE. In addition, the World Health Organization and the Centers for Disease Control and Prevention offered different guidance on respiratory protection in HCP. The initial allure of "more is better" for PPE was widespread even though prior studies have shown that complex PPE recommendations increase risk for self-contamination (7). This was further complicated by workforce shortages, exhaustion among HCP, and overstretched infection preventionists who were unavailable to monitor PPE practices. This perfect storm again highlights that the conversation must extend beyond the appropriate selection and availability of PPE to emphasize adherence to and appropriate use of PPE. A drill-down focusing on the causes of such clusters will likely highlight what we already know.

Using these lessons learned, the authors offer operational solutions. They highlight important infection prevention measures and recommend confirming the pressure relationships in units where patients with respiratory infections are housed, closing doors when performing aerosol-generating procedures, and minimizing sharing of patient rooms. However, given the findings and data from past outbreaks, the solutions are more complicated. Missing from the list are strategies to enhance behaviors and change HCP attitudes toward infection prevention recommendations, including PPE adherence, with repeated education, monitoring and reinforcement of best practices, and personal accountability. Whether lapses in PPE use are due to violations, mistakes, or slips, improving adherence will require skills training, closing knowledge gaps, and an in-depth assessment of contributing factors. Violations or deliberate breaches of protocol, such as room entry by HCP without PPE, are attributable to knowledge gaps and the perception that the time and resources associated with PPE use outweigh the potential risk for transmission. Slips are difficult to overcome but can be avoided with a high level of awareness and mindful behaviors (6). Overcoming environmental, behavioral, and logistical challenges may require creative solutions that change care and interactions in health care settings, such as creating additional workrooms or breakrooms where social distancing is possible.

Despite warnings for decades, especially after the near miss of the SARS outbreak in 2003, we were

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unprepared for COVID-19. This pandemic has exposed many weaknesses in our health care systems, including insufficient training in infection prevention. Health care personnel train on the job rather than through standardized group training or formal teaching sessions in medical or nursing curricula. So, this cluster is another déjà vu that demonstrates that novel coronaviruses can be transmitted dramatically in health care settings. Overall, no single practice was identified as the culprit. There are hints, as there have been in the past, that small lapses in infection prevention may add up to transmission because of the high-risk activities that occur in health care settings. Winston Churchill reputedly said, "The farther back you look, the farther forward you are likely to see." Time and time again, clusters like this demonstrate the need to remind, reinforce, and reeducate to improve practice of and adherence to important and easily overlooked strategies that protect the entire health care ecosystem.

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