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Revisiting the Safety of Health Care Workers

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Health care facilities continually invest tremendous resources to improve the safety and quality of patient care. In 2000, the Institute of Medicine published a report documenting medical errors,¹ which served as a catalyst for health care institutions to invest in systems and expertise needed to build robust, sustainable patient safety programs. The resources to build similarly robust programs to keep health care workers (HCWs) safe have not always been as easy to justify and often compete with other institutional priorities. The coronavirus disease 2019 (COVID-19) pandemic, however, has undeniably escalated occupational health and safety for HCWs to the top of institutional priority lists.

Even before the COVID-19 pandemic, HCWs had the highest rate of occupational injuries of workers in any industry,² higher than that of manufacturing, construction, or mining.³ In addition, HCWs were in 6 of the 8 occupations most affected by occupational injuries and illnesses.⁴

Health care professionals routinely put the needs of their patients ahead of their own needs and consequently face risks ranging from musculoskeletal injury to violence. Infectious diseases are ubiquitous in health care, but with the emergence of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and COVID-19, HCWs must now treat every patient and coworker as potentially infectious because of widespread ongoing transmission.⁴ This became particularly important as we learned more about the role of disease transmission by presymptomatic and asymptomatic persons with COVID-19. Health care settings are the epicenters in the fight against COVID-

19, and the pandemic has brought the importance of HCW safety into sharp focus.⁵ Of immediate importance is the effect of a potentially fatal disease on an infected HCW. If large numbers of HCWs are out ill, the negative effects extend to patient care. Thus, the pandemic has made the link between HCW safety and patient safety glaringly obvious.

Occupational health and safety professionals use the concept “hierarchy of controls” to design safety programs.⁶ For infectious hazards such as COVID-19, HCW safety is optimized through use of engineering controls, such as technology, to deliver remote care; administrative controls, including restrictions on hospital visitation or quarantine of exposed HCWs; and personal protective equipment (PPE), such as facemasks and N95 air-purifying respirators.⁷ Although engineering controls typically do not rely on individual behavior change, the efficacy of administrative controls, including postexposure HCW quarantine and supplying PPE, become critical in ensuring safety of HCWs and controlling the spread of COVID-19.

RESPIRATOR USE FOR HCWS

In the United States and much of the industrialized world, respirators have historically had minimal use in health care. However, SARS-CoV-2 and the prevalence of COVID-19 substantially changed recommendations for respirators, and shortage of respirators relative to demand soon followed. At Mayo Clinic, respirators are now required during aerosol-generating procedures, and facemasks are used for all other patient-facing encounters. For HCWs, medical clearance, training, and

fit-testing are required before they can use respirators.⁸

Managing the Infectious Pathogen Respirator Program requires consideration of many factors, including the following:

- Respirator stewardship: Using respirators only when needed to ensure their availability for high-risk aerosol-generating procedures
- Supply chain management: Evaluating inventory, utilization rates, and orders
- Prioritization: Identifying and fit-testing staff who perform aerosol-generating procedures
- Education: Ensuring that staff use respirators and other PPE appropriately by creating video and pictorial resources and by having PPE champions and nurse educators train frontline staff

At the onset of the pandemic, relatively few HCWs at Mayo Clinic had been cleared medically, trained, and fit-tested for respirators. We used a phased approach to evaluate and fit-test a large number of HCWs for N95 respirators and focused first on emergency departments and inpatient units, followed by select outpatient units where high-risk aerosol generating procedures are performed. To expedite medical clearance of HCWs, we developed an electronic version of the Occupational Safety and Health Administration's respirator medical-evaluation questionnaire,⁸ which allowed staff to complete medical clearance at any time of the day or night. This process improvement will be a permanent addition to the occupational health program. Fit-testing stations were also opened for walk-ins, with care taken for physical distancing, and fit-testing was available on all shifts, including weekends. This approach allowed for medical clearance and fit-testing of thousands of HCWs within weeks.

EXPOSURE INVESTIGATION AND QUARANTINE

Appropriate PPE use and precautions such as physical distancing and hand hygiene are fundamental to prevent exposure to

COVID-19. However, situations do arise in which HCWs are exposed to the virus at work, in the community, at home, or through travel.

Occupational health programs for HCWs routinely manage employee exposure to infectious hazards including bloodborne and respiratory pathogens. These exposure events may involve a single worker being exposed to a patient who is infectious, as in a bloodborne pathogen exposure through a needlestick. However, other exposure investigations can involve identifying dozens, even hundreds, of exposed people through contact tracing for pathogens such as tuberculosis, pertussis, and varicella. Once the exposed people are identified, they need to have a risk assessment and be given appropriate preventive actions, which may include postexposure prophylaxis, laboratory evaluation, symptom monitoring, or work restrictions. At present, quarantine of individuals who have sustained a medium- or high-risk exposure to a person with COVID-19 is our best available intervention to prevent ongoing transmission should the exposed HCW acquire COVID-19. This approach, however, can pose a major challenge to health care systems experiencing a large number of exposures, depleting the available workforce. Safety controls are key to limiting such exposures.

At Mayo Clinic, new technology and resources, including digital tools, have been allocated to support a systematic approach to contact tracing,⁹ quarantine, and return-to-work assessments for HCWs exposed to persons with positive COVID-19 test results. This system will be useful in the future for contact tracing and exposure investigation for other pathogens such as tuberculosis.

CONCLUSION

Systems to support the occupational health and safety of HCWs through management of PPE, investigation of exposure, and contact tracing of exposed workers are critical elements to keeping health care facilities safe for patients and other HCWs. Preventing

exposure to HCWs reduces the frequency of quarantine and ensures adequate staffing. If exposure occurs, removing the HCW from the workplace prevents any additional exposures.

Just as airlines remind us to put our oxygen mask on first before assisting others, we must prioritize the safety of HCWs to continue delivering optimal care to patients. HCW safety and patient safety are inseparable. Certainly, the safety of HCWs is critical during this pandemic, but we must not forget that HCW safety is equally important during normal operations. For the duration of the COVID-19 pandemic and beyond, support for flexible, scalable, robust occupational health and safety programs will be critical for ensuring optimal health care delivery.

ACKNOWLEDGMENT

Editing, proofreading, and reference verification were provided by Scientific Publications, Mayo Clinic.

This supplement is sponsored by Mayo Clinic Foundation for Medical Education and Research and is authored by experts from multiple Departments and Divisions at Mayo Clinic.

Abbreviations and Acronyms: COVID-19 = coronavirus disease 2019; HCWs = health care workers; PPE = personal protective equipment; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2

Potential Competing Interests: The authors report no competing interests.

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