



COVID-19: PROTECTING HEALTHCARE WORKERS FROM INFECTION

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Question: What is the best available evidence regarding protecting healthcare workers in the context of COVID-19?

ALERT Evidence regarding COVID-19 is continually evolving. This Evidence Brief will be updated regularly to reflect new emerging evidence but may not always include the very latest evidence in real-time.

Key messages:

- Healthcare workers are at increased risk of COVID-19 infection due to caring for and working near and around patients with COVID-19.
- Healthcare workers are at increased risk of virus transmission via droplets, contaminated surfaces, and potentially aerosolised particles due to their work with and around COVID-19 patients as well as infected but asymptomatic individuals.
- Protecting healthcare workers during the COVID-19 pandemic is a priority to ensure that their own, their patients', and the wider community is safe from infection and receives safe, effective, and sustainable care from a suitably sized, trained, and supported workforce.
- Comprehensive and routine reporting of healthcare worker infection and death rates including clear demographic, occupation, and industry details is vital to ensuring the safety of both healthcare workers and communities.
- Consistent with broader observations, older healthcare workers are likely to be at higher risk of death following infection.
- Healthcare workers, both those working with patients with suspected or confirmed COVID-19 and in regular roles, are at increased risk of burnout, depression, anxiety, mental health condition exacerbation.
- Working in healthcare in the context of COVID-19 puts additional psychological and physiological strain on healthcare workers which can in turn increase their risk of infection and risk for their patients and others due to stress and exhaustion which may lead to errors.
- To improve infection control, patient and staff outcomes, and reduce health and safety risks, employers must support their workers via a range of strategies to reduce psychological and physiological burdens.
- Healthcare staff in contact with or close proximity to people with suspected or confirmed COVID-19 infection must receive appropriate PPE, clear and understandable information on PPE use, removal, and disposal, and associated resources, information, and services to maintain safe, effective infection control.

Summary

Background: COVID-19 (from ‘severe acute respiratory syndrome coronavirus 2’ (or ‘SARS-CoV-2’) is a newly discovered (novel) corona virus first identified in Wuhan, Hubei province, China in 2019 as the cause of a cluster of pneumonia cases.¹ Coronaviruses are similar to a number of human and animal pathogens including some of those which cause the common cold as well as more serious illnesses including severe acute respiratory syndrome (SARS/ SARS-CoV-1) and Middle East respiratory syndrome (MERS). Since discovery, COVID-19 has spread to many countries and was declared a pandemic by the World Health Organization (WHO) on 30 January 2020.² The most at-risk individuals of infection are those in close contact with patients with COVID-19 which includes healthcare workers.³ Infection among healthcare workers has dire consequences; the risk of personal sickness and death, the risk of transmission to other patients – particularly vulnerable individuals such as older people and immunocompromised patients, other workers, and community members, and the risk of eroding the very workforce at the front line of fighting the pandemic across health, social, and aged care sectors.⁴

COVID-19 transmission

Based on currently available evidence, COVID-19 is transmitted via;³

- direct person-to-person contact,
- respiratory droplets >5-10 µm in diameter (e.g. from coughing and sneezing), and;
- indirect contact from touching infected environmental surfaces/formites and transferring viral particles to the mucosae or conjunctiva.

Droplet transmission, which most frequently occurs when a person coughs or sneezes, is a common form of transmission of respiratory disease including COVID-19. Secretions from the upper respiratory tract and lungs contain relatively high viral loads and thus put those in close contact with symptomatic patients, such as healthcare workers at potentially high risk of infection.⁵ Further, as individuals may be infectious prior to the onset of symptoms or even not display symptoms at all, healthcare workers and others in close contact with these individuals may be infected by people who are unaware that they are ill.^{6,7} Proper use of readily available personal protective equipment (PPE) both for healthcare workers and symptomatic patients along with proper cough and sneeze etiquette is vital to limit droplet transmission and infection of healthcare workers and others.

Surface contamination is also more likely to occur in areas where COVID-19 patients are cared for where symptomatic patients and clinical procedures can readily contaminate surfaces which can then result in infection or dispersal of viral particles to other areas where there are no known COVID-19 patients.^{8,9} Contamination via contact with environmental surfaces is a high risk for healthcare workers who spend long hours in COVID-19 wards and nearby health and aged care environments. Without proper hand hygiene, environmental surface cleaning and decontamination, and correct use and disposal of PPE.

Recent studies have examined the potential for the COVID-19 virus to remain in the air and upon different environmental surfaces. Specific evidence for COVID-19 transmission is emerging and currently scant, particularly around the potential for airborne transmission.¹⁰ The COVID-19 virus may be found in small, aerosolised particles,⁸ but it is currently unknown whether these smaller particles pose an infection risk or how they move in the air under different conditions.¹⁰

A study conducted in intensive care units (ICU) and general wards (GW) in Wuhan tested air and surface samples (e.g. floors, computer mice, rubbish bins, doorknobs, and bedrails) for the presence of COVID-19 virus particles.⁸ The investigators found that more samples from the ICU compared to the GW tested positive the presence of the virus. One hundred percent of floor samples from the pharmacy tested positive as well as half of the samples taken from the soles of ICU staff shoes.

These findings indicate that COVID-19 may be spread between floor surfaces to areas where there are no people with suspected or confirmed COVID-19 infection. Objects such as computer mice, rubbish bins, handrails, and doorknobs also tested positive for the presence of COVID-19, confirming that virus particles may be transferred between surfaces via direct contact. Air samples tested positive for the presence of COVID-19 particles with the most positive results obtained from samples taken from air closest to the patient with fewer positive samples obtained further away. Based on the findings of aerosol distribution, results indicate that COVID-19 virus particles may travel up to around four metres, however viability and infectious potential of the sampled particles could not be determined.⁸

Various clinical procedures can generate aerosolised particles which may lead to risk of infection.³ Exposure to aerosolised particles may include both those directly undertaking aerosol generating procedures, as well as those in close proximity (i.e. within around four meters) to where such procedures occur.⁸ It is important to note however, that the risk posed by smaller aerosolised particles is currently unclear. Collection of respiratory specimens may also result in aerosol production including bronchoalveolar lavage and induced sputum for any patient (including asymptomatic) and any respiratory sample collection procedure with fever, breathlessness and/or severe cough.¹¹ Aerosolised particles may travel greater than one metre and potentially up to four meters, however the viability and infection risk of such particles is not yet known.⁸

Healthcare worker risks of infection

As they care for, work directly with, and are often more frequently and spend longer in close proximity to patients with suspected and confirmed COVID-19 infection and places where these patients are cared for, healthcare staff are at greater risk of infection themselves. In the United States, it is likely that the rates of infection (reported to be 9,282 between February 12 and April 9) and death (27 in the same period) among healthcare workers is far higher than reports currently suggest.¹² Due to uneven reporting nationally, these figures are likely to underrepresent the real toll on the United States' workforce (States with more comprehensive reporting figured around 11 percent of cases have been healthcare workers while States with poorer reporting only report around three percent).¹² The median age of healthcare workers who became infected was 42 years and 73 percent were female. Infected healthcare workers reported contact with COVID-19 patients in healthcare, household, and community settings which makes it difficult to establish exactly where sources of infection were. While most healthcare workers were not hospitalised, severe outcomes, including death, were reported among all age groups with the highest death rate occurring in the group aged 65 years or older (37 percent or 10 individual deaths).¹² That death occurred more commonly in older people is consistent with broader epidemiological findings.¹³

As of March 8, 2020, of the 80,815 COVID-19 reported infections in China, more than 3000 infections occurred among medical staff.¹⁴ Caring for patients in the context of the COVID-19 pandemic is highly stressful for nurses where frequent changes of personal protective equipment (PPE), wearing PPE continuously without bathroom breaks, and hearing of cases where other healthcare workers have died following infection adds to mental and physiological strain including anxiety and insomnia.^{14,15} These burdens are cumulative and lead to increased stress and exhaustion which can result in nurses being less aware of their risk of exposure and to make mistakes such as incorrectly putting on or taking off PPE.¹⁴ Supporting healthcare workers including nurses is vital in the context of COVID-19, in this paper, the hospital in Guangdong China had treated more than 35 confirmed cases of COVID-19 and more than 260 suspected cases with no reported staff infection.¹⁴ Strategies implemented to support this included; intense education and training for nurses, a scientific, reasonable shift schedule that was piloted and preferred by staff (six hours of continuous work, with the next nursing shift overlapping by one hour at the end of shift), a rigorous infection control system, psychological counselling, and the avoidance of unnecessary contact.¹⁴

Erosion of the workforce

The future resilience of many of the world's healthcare services depends heavily on having sufficient numbers of nurses who are adequately resourced to face the challenges of the COVID-19 pandemic both as healthcare workers and as community members.¹⁶

If health or aged care worker infection is suspected to have occurred, in many contexts, workers must then self-isolate and leave the workplace while tests can be conducted to confirm infection status.⁴ This leaves the remaining staff further stretched to provide care to patients who are often also at increased risk of infection due to existing vulnerabilities such as advanced age, current health conditions, or immunocompromised status. Health and aged care workers may also not know if or when they have become infected.¹⁷ As a cornerstone of many sectors' responses to the COVID-19 pandemic, access to testing kits and rapid turnaround for results for priority populations including healthcare professionals is vital to quickly identify who has become infected so that they can be isolated and cared for if required.¹⁸

Nurses play an important role in infection prevention, infection control, isolation, containment, and public health. Working in the context of COVID-19 increases stress and interrelates with other factors such as working hours and anxiety.¹⁹ The COVID-19 pandemic has led to surges in exacerbation of existing mental health issues and new cases of depression and anxiety as well as a particular emotional and physical toll on healthcare workers.²⁰ Factors including resource limitations, longer shifts, disruptions to sleep and to work-life balance, and occupational hazards associated with exposure contribute to physical and mental fatigue, stress and anxiety, and burnout.²⁰ Burnout impacts upon healthcare staff even during normal operations. A study conducted in China found that doctors and nurses working in oncology reported higher levels of burnout than those working in the context of COVID-19.²¹ This highlights that both COVID-19 and usual ward staff should be considered when policies and procedures to support the wellbeing of healthcare workers are developed.²¹

Healthcare worker safety: personal protective equipment

Personal protective equipment alone does not effectively protect staff. Correct and consistently applied hygiene and infection control methods, organisational and point of care risk assessment, engineering and system controls, administrative controls, and patient accommodation must be implemented in tandem for PPE to be effective.²² Access to PPE is an essential part of ensuring healthcare worker safety. In Italy, an insufficient supply of PPE to frontline workers has contributed greatly to figures that healthcare workers make up 9% of the nation's COVID-19 cases (at least 2,609 individuals).⁴ Out of Spain's approximately 94,400 confirmed coronavirus cases, over 9,400, almost 15 percent are healthcare workers.²³

Healthcare staff must have both access to appropriate PPE and receive information and training regarding how to correctly put on (don), take off (doff), and dispose of PPE. Correct fitting, use, and disposal of PPE is essential to safe, effective infection prevention and control activities in the context of responding to COVID-19.^{22,24} Currently, many jurisdictions globally are facing limitations in terms of access to PPE, so correct, rational use is vital.²²

The WHO highlights that PPE is only effective when adopted within the setting of a range of infection control measures including:²²

- Administrative controls and measures that ensure resources, access, testing, policies, placement of patients, triage, adequate staff-to-patient ratios, and training.
- Environmental and engineering controls that aim to reduce pathogen spread and contamination of surfaces and objects through ensuring adequate space and human distance, ventilation, and isolation rooms for patients with suspected or confirmed infection.

Consistent with many international guidelines including current Australian recommendations, the WHO recommends rational use of PPE and urges precautions for droplet and contact transmission in the setting of caring for people with COVID-19 and airborne precautions in settings when aerosols may be generated.³ Recommendations are however not completely consistent across all jurisdictions, with the US Centers for Diseases Control and Prevention (CDC) and the European Centre for Disease Prevention and Control, recommending airborne precautions for any situation involving the care of COVID-19 patients.^{25,26}

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