



Are interventions such as social distancing effective at reducing the risk of asymptomatic healthcare workers transmitting COVID-19 infection to other household members?

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VERDICT

- We found no studies that examined social distancing of asymptomatic healthcare workers from family members within the home.
- People should be cautious of this step given the increased risk of isolation and anxiety it may bring.
- Symptomatic healthcare workers should follow [guidelines for self-isolating in the home](#).
- Healthcare workers can take other measures to protect family such as hand hygiene both at home and on return from work and using correct personal protective equipment at work, where available.

BACKGROUND

Healthcare workers are at increased risk of contracting communicable diseases, including droplet-spread respiratory viruses, because of their high level of exposure at work. Confirmed prevalence of COVID-19 amongst healthcare workers will depend upon a range of factors, including the availability of personal protective equipment (PPE), the healthcare setting and access to testing. However, it has been estimated that [10%](#) or more of all those infected with COVID-19 in some European countries are healthcare workers.^{1 2} [The incidence](#) of previous coronavirus outbreaks, such as Severe Acute Respiratory Syndrome (SARS) was also [high among healthcare workers](#).^{3 4}

In mild cases, viral clearance of SARS-CoV-2 takes around [ten days](#), but this may be [two weeks](#) in more severe cases.^{5 6} Healthcare workers are typically younger and have less co-morbidity than people in hospital, meaning most are able to self-isolate at home.⁷ Furthermore, not all cases are symptomatic and some people may be infectious before they develop symptoms. As a result, [many healthcare workers are worried](#) about their risk of exposing family members to the virus.⁸

Does current evidence support social distancing of asymptomatic healthcare workers from other household members or other interventions specific to healthcare workers to reduce the risk of transmitting COVID-19?

CURRENT EVIDENCE

Our search found 87 papers of potential relevance and seven were felt to be relevant to the study, including two systematic reviews.^{9 10} The systematic review by Jefferson et al, which included 67 studies, focused on 'Physical interventions to interrupt or reduce the spread of a respiratory viruses' and was published in 2009 in the British Medical Journal and updated as a [Cochrane review in 2011](#).¹⁰ The second review, 'non-pharmaceutical measures for pandemic influenza in non-healthcare settings – social distancing measures', by [Fong et al](#) was published in the May 2020 issue of Emerging Infectious Diseases.⁹

Two independent reviewers [NJ, CC] completed CASP critical appraisals of these reviews. The Jefferson et al review was conducted to a high standard but that the included studies were generally of low quality and there was significant heterogeneity in terms of the interventions and study settings compared. Although there was limited evidence, results are applicable to healthcare workers and key findings were consistent across studies. Included studies were from a range of respiratory illnesses so must be extrapolated to COVID-19 with caution. There were important limitations in the Fong et al review, such as no description of a systematic approach to quality assessment. The studies included were also generally observational studies of low quality, meaning there is low certainty in this review's summary findings. We found three other narrative literature reviews of interventions to protect healthcare workers from SARS infection,¹¹⁻¹³ a modelling study of nosocomial infections among doctors in hospital settings,¹⁴ and a survey study of primary care doctors in Canada and their response to SARS and H1N1 outbreaks.¹⁵

We found no direct research addressing the question of whether asymptomatic healthcare workers should practice social distancing from family or household members to reduce the risk of transmission. There is evidence that living in confined spaces increases the risk of SARS-CoV-2 transmission. evidenced by the early, rapid spread of the virus aboard certain cruise ships, such as the [Diamond Princess](#).¹⁶ One narrative review reports being within one metre of a patient with SARS infection was associated with a high risk of infection, suggesting physical separation measures from infected patients might reduce transmission.¹¹ Twelve studies in the Jefferson et al systematic review reported the impact of social distancing on reducing transmission rates of respiratory infections. Overall the review found insufficient evidence on social distancing to decide whether it is an effective intervention.¹⁰ In contrast, the systematic

review by Fong et al reported that, despite the limited evidence, community transmission of influenza might be helped by isolating ill people at home and quarantining other household members, though warns this approach might place quarantined persons themselves at increased risk of infection.⁹ The [recommendation](#) from the NHS remains that if healthcare workers become symptomatic, they should seek to self-isolate from other family members within the home.

Interventions that were effective at reducing the spread of respiratory viruses within the systematic review included handwashing for a minimum of 11 times daily (OR 0.54, 95% CI 0.44 to 0.67) based on seven studies and wearing a facemask (OR 0.32, 95% CI 0.26 to 0.39) based on seven studies. Three studies found N95 respirator-wearing even more effective (OR 0.17, 95% CI 0.07 to 0.43). All means combined (handwashing, masks, gloves and gowns) achieved very high effectiveness (OR 0.09, 95% CI 0.02 to 0.35) based on two studies.¹⁰ These studies included data from both hospital and community settings. One of the narrative reviews also concludes that ‘failure to implement appropriate barrier precautions was responsible for most nosocomial transmission’ during the SARS outbreak.¹²

Hand hygiene and PPE may be particularly important to break the transmission cycle considering the SARS-CoV-2 virus, which causes COVID-19, has been shown to survive for over [24 hours on clothing](#), three days on glass and six days on plastic.¹⁷ Whether SARS-CoV-2 is airborne [remains disputed](#) at the time of writing. Healthcare workers can therefore reduce the risk of transmission to family members at home by wearing single-use PPE at work, washing their hands, wiping down contact surfaces when entering the house and wearing different clothes to work that are washed separately to other household laundry.

Whilst outside the scope of our search, which focused on distancing, some people may want to reflect on the [current community facemask debate](#),¹⁸ which has seen the CDC [advise citizens](#) to wear cloth facemasks in public, whilst the UK government [mull a similar path](#).^{19 20} Although Jefferson’s review was supportive of facemasks, this included studies from a range of settings, from inpatient to household use. For those contemplating the use of facemasks in the home, it may be relevant to consider the results of [Xiao et al’s recent review](#) in *Emerging Infectious Diseases*,²¹ as discussed by [Greenhalgh et al](#) “They also identified seven studies conducted in households; four provided masks for all household members, one for the sick member only, and two for household contacts only. None showed a significant reduction in laboratory confirmed influenza in the face mask arm. The authors concluded: “randomized controlled trials of [face masks] did not support a substantial effect on transmission of laboratory-confirmed influenza.”¹⁸ Clearly there are cautions attached to these data. The studies covered influenza, not COVID-19, and aren’t based on asymptomatic healthcare workers. Moreover, Xiao and colleagues note that most studies were underpowered and that some reported problems with adherence. Despite the evidence uncertainty, Greenhalgh et al conclude by suggesting that masks worn both in the home and when outside and in contact with other people might significantly reduce transmission and people should consider wearing them, particularly as they are a simple, cheap intervention.¹⁸

A simulated network analysis compared three different interventions to reduce transmission of nosocomial infections in hospital; single isolation rooms for patients, interventions that restricted doctors to working on a single ward rather than across a whole hospital or interventions that limited doctors contact frequency with patients, such as having a single doctor examine a patient rather than a group of doctors. The study concluded that [healthcare workers were the main vectors](#) of transmission so interventions that reduced the number of contacts between doctors and patients were more effective than interventions targeted at protecting patients, such as single patient rooms.¹⁴ Similarly, an early modelling study of COVID-19, which is yet to be peer-reviewed, suggests infection rates of healthcare workers can be reduced by [splitting the workforce into two discrete teams](#) who work alternate 7 day shifts patterns.²² If correct, this could signal a possible way of reducing healthcare worker infection rates and therefore their risk of transmitting it to those in their household. The need for institutional infection control practices to reduce SARS transmission rates was highlighted in a narrative review.¹³

Protecting family members from infection is a concern to many healthcare workers. One study compared two surveys completed by primary care doctors in Canada following a SARS outbreak in 2003 and the H1N1 outbreak in 2010.¹⁵ There were 707 respondents in 2003 and 183 in 2010. In 2003, around 40% of clinicians were either extremely or somewhat worried about their risk of infecting family members but this rose to around 90% of respondents in 2010. In 2010, over 80% also believed their family were concerned about being infected by them and 74.9% responded as being 'very interested' in 'Receiving resources to protect and support the individual, their staff and their family (e.g. masks)'. This item received the highest proportion of 'very interested' responses of any of the various resources listed, above for example, protocols for managing patients, public health updates or patient information sheets. Of note, the response rate was 31% in 2010 (not reported for 2003), and it may be that people particularly worried by the risk of infection in household members were more likely to complete the survey than the wider primary care community.

Although healthcare workers are at increased risk of contracting respiratory tract infections at work, there was no definite evidence that they show high transmission rates to family members. Indeed, during the 2003 SARS outbreak, transmission from positive SARS case to household members was only 4.6%.¹⁰ Data are still emerging with regards the COVID-19 transmission rate from symptomatic people to other household members. A recent pre-print publication from China reported a transmission rate of 15.8% in these circumstances. However, this figure should be treated with caution because, as the authors note, the work has numerous limitations and is 'highly dependent on the number of asymptomatic cases'.²³

CONCLUSIONS

Transmission of COVID-19 infection to family members is a key concern for healthcare workers. We found no evidence regarding self-isolation of asymptomatic healthcare workers from their household. In a high-quality review that included social distancing and respiratory viruses in various settings and using various methods, it was concluded that "The handful of studies (mostly conducted during the SARS epidemic) do not allow us to reach any firm conclusions

regarding social distancing.” There may be some healthcare workers who might consider self-isolation if they work in a particularly high-risk setting or whose family are considered by the NHS to be at [‘increased risk’](#) or [‘extremely vulnerable’](#). Of course, heed must be paid to the possible harms of such an approach, such as the potential impact on mental wellbeing, as well as the fact this may not be practically possible depending on individual circumstances. The comparatively low rates of transmission to household members that were reported in previous coronavirus outbreaks should also provide some reassurance. Current evidence does support hand hygiene, facemasks (both at home and work) and adequate PPE as well as potentially efforts to reduce the number and spread of patient contacts at work to end the risk of onward COVID-19 transmission.

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SEARCH TERMS

A focused search was conducted of MEDLINE, TripDatabase and GoogleScholar. The strategy included (1) “covid-19” OR “novel coronavirus” OR other coronaviruses OR common respiratory viruses in combination with search terms for (2) social distancing OR social isolation and (3) search terms related to healthcare workers.

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CATEGORY

Prevention