

UPDATE ALERTS

Update Alert 10: Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers

This is the 10th update alert for a living rapid review on the epidemiology of and risk factors for coronavirus infection in health care workers (HCWs) (1). Initial updates were monthly through update alert 7 (2, 3), then bimonthly for update alerts 8 (4) and 9 (5), which focused on risk factors for coronavirus infection. Beginning with this update, we limited inclusion to studies that reported adjusted risk estimates to focus on higher-quality evidence, and the update interval was extended to biannually given stable findings in prior updates. We excluded non-peer-reviewed studies, except for those comparing mask types and done in or after January 2021, which is when the Delta variant emerged. Searches for this update were done from 25 April to 24 October 2021 using the same search strategies as the original review, and 8656 citations were identified. We applied the same inclusion criteria used for prior updates, other than described above. Twenty studies on risk factors for SARS-CoV-2 infection were added for this update (Supplement Tables 1 to 6) (6-25).

The original rapid review included 34 studies on risk factors for coronavirus infections (3 studies on SARS-CoV-2 infection, 29 studies on SARS-CoV-1 infection, and 2 studies on Middle East respiratory syndrome-CoV infection) (1); 93 studies (91 studies on SARS-CoV-2 infection and 2 studies on Middle East respiratory syndrome-CoV infection) were added in prior updates (2-5, 26-29). For this update, 4 cohort studies (6-9) (including 1 preprint study [9]), 15 cross-sectional studies (10-24), and 1 case-control study (25), all on SARS-CoV-2, were added (Supplement Table 1). Ten studies were done in Europe, and 7 were done in North America. The others were done in Kuwait, Qatar, and Turkey. In 18 studies, data were collected from February to December 2020. One non-peer-reviewed study collected data from June 2020 to March 2021 (9), and 1 other study collected data from December 2020 to May 2021 (25). As in prior updates, new studies had methodological limitations, including potential recall bias, limited control of confounders, and low or unclear participation rates.

New evidence was consistent with prior updates in finding no consistent association between risk for SARS-CoV-2 infection in HCWs and age (13 studies [6, 8, 10, 11, 14-17, 19, 22-25]), sex (13 studies [6, 8, 10, 11, 13, 14, 16, 17, 19, 22-25]), or HCW role (15 studies [6, 7, 11-16, 19-25]) (Supplement Table 2). Also consistent with prior updates, 5 studies done in the United States, Canada, or Ireland found that non-White race (Black, Asian or Asian/Pacific Islander, or combined non-White races) or Hispanic ethnicity was associated with increased risk for infection (Supplement Table 2) (6, 8, 11, 15, 16).

Thirteen new studies reported on the association between exposures and likelihood of infection (Supplement Table 3) (6-8, 11, 12, 14, 16, 17, 19, 20, 23-25). Seven studies (7, 8, 12, 19, 20, 23, 24) consistently found that exposure to COVID-19 in a household or private setting was associated with increased risk for SARS-CoV-2 infection in HCWs (adjusted odds ratios [ORs] ranged from 2.55 to 8.98) (Supplement Table 3). In most studies, household or private setting exposure was a stronger risk factor than work exposure. Nine studies found that direct contact in a work environment to patients with COVID-19 was associated with increased risk for infection (7, 8, 11, 12, 17, 19, 23-25).

No new study evaluated the association between education or training (Supplement Table 4) and risk for infection in HCWs. One non-peer-reviewed study (9) based on data collected from June 2020 to March 2021 (mostly before the emergence of the Delta variant) found that primarily using filtering facepiece 2 masks versus surgical masks was associated with decreased risk for SARS-CoV-2 infection (adjusted OR for seroconversion, 0.73 [95% CI, 0.53 to 1.00]) (Supplement Table 5).

Two new studies (10, 18) examined other infection prevention and control measures and risk for SARS-CoV-2 infection (Supplement Table 6). One study found that glove use compared with nonuse (adjusted OR, 2.93 [CI, 1.19 to 7.22]) was associated with an increased risk for infection; estimates for gown use (adjusted OR, 0.64 [CI, 0.31 to 1.32]) and goggle use (adjusted OR, 1.27 [CI, 0.72 to 2.27]) were imprecise (10). The other study (18) found that being a frontline HCW and performing an aerosol-generating procedure on a patient with COVID-19 without appropriate personal protective equipment (including a mask, apron, gown, and/or gloves) was associated with increased risk for infection versus not being a frontline worker (adjusted OR, 2.39 [CI, 1.00 to 6.18]). Both studies were limited with regard to controlling for exposures and other confounders, including adherence to personal protective equipment use.

Evidence across all risk factors is summarized in Supplement Table 7. Despite large numbers of studies and participants, most evidence remains low or moderate certainty because of methodological limitations, imprecision, and inconsistency.

Roger Chou, MD

Pacific Northwest Evidence-based Practice Center and Oregon Health & Science University, Portland, Oregon

Tracy Dana, MLS

Pacific Northwest Evidence-based Practice Center and Oregon Health & Science University, Portland, Oregon

David I. Buckley, MD, MPH

Pacific Northwest Evidence-based Practice Center and School of Public Health, Oregon Health & Science University-Portland State University, Portland, Oregon

Shelley Selph, MD, MPH

Pacific Northwest Evidence-based Practice Center and Oregon Health & Science University, Portland, Oregon

Rongwei Fu, PhD

Pacific Northwest Evidence-based Practice Center and School of Public Health, Oregon Health & Science University-Portland State University, Portland, Oregon

Annette M. Totten, PhD

Pacific Northwest Evidence-based Practice Center and Oregon Health & Science University, Portland, Oregon

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Corresponding Author: Roger Chou, MD, Oregon Health & Science University, 3181 SW Sam Jackson Park Road, Mail Code BICC, Portland, OR 97239; e-mail, chour@ohsu.edu.

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