

UPDATE ALERT

Update Alert 7: Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers

This is the seventh update alert for a living rapid review on the epidemiology of and risk factors for coronavirus infection in health care workers (1). Beginning with this update alert, we shifted from monthly to bimonthly updates and focused on risk factors for coronavirus infection. A key question on the epidemiology (incidence and prevalence) of coronavirus infection in health care workers was dropped because of lack of change in wide ranges in estimates, likely related to variability in health care settings, symptom status, exposure status, use of infection prevention and control measures, community prevalence, and other factors. Searches were updated from 25 October to 24 December 2020 using the same search strategies as the original review. The update searches identified 3869 citations. We applied the same inclusion criteria used for prior updates, with previously described protocol modifications (2) to focus on higher-quality evidence. Eighteen studies on risk factors for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection were added for this update (3-20).

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); 46 studies (44 studies on SARS-CoV-2 infection, 0 studies on SARS-CoV-1 infection, and 2 studies on Middle East respiratory syndrome-CoV infection) were added in prior updates (2, 21-25). For this update, 12 cohort studies (3-9, 11, 14, 15, 18, 19) and 6 cross-sectional studies (10, 12, 13, 16, 17, 20) were added (Supplement Table 1, available at Annals.org). Four studies were done in the United States (4, 7, 18, 20), 10 in Europe (Spain [5, 11, 14], Italy [8, 9], the United Kingdom [12, 17], France [13], Sweden [15], and the Netherlands [15]), 2 in India (6, 10), and 1 each in China (19) and Egypt (3). As with studies included in prior updates, the studies had methodological limitations, including potential recall bias, low or unclear participation rates, small sample sizes, and potential collinearity. Some studies did not control for confounders, and those that reported adjusted estimates were limited in their ability to control for exposures and personal protective equipment (PPE) use.

Similar to prior report updates, estimates did not indicate an association between sex (13 studies [3-6, 9, 11-13, 15, 17-20]) or age (12 studies [3-5, 9, 11-13, 15, 17-20]) and risk for SARS-CoV-2 infection or seropositivity. Fifteen new studies found no consistent association between health worker role (nurse vs. physician) and risk for SARS-CoV-2 infection (3-5, 7-12, 14-16, 18-20). In the only study that controlled for confounders, the adjusted odds ratio (OR) for risk for SARS-CoV-2 seropositivity for nurse versus physician was 1.52 (95% CI, 1.18 to 1.95) (4). Five new studies found that Black race (4, 18); Black or Asian race or ethnic minority (12, 17); or Hispanic (20) race/ethnicity was associated with an increased risk for infection versus White race (Supplement Table 2, available at Annals.org). In 4 studies that controlled for confounders, adjusted ORs ranged from 1.92 to 2.79 (4, 12, 17, 20). Nine new studies reported

inconsistent associations between direct patient contact or contact with patients with COVID-19 and risk for SARS-CoV-2 infection or seropositivity primarily based on unadjusted risk estimates (3-5, 7, 8, 10, 14, 18, 19). In 2 studies that controlled for potential confounders, direct contact with patients with COVID-19 was associated with increased risk for infection versus no contact (adjusted OR, 1.69 [CI, 1.28 to 2.24]) (14) and versus a nonclinical health care worker role (adjusted OR, 3.08 [CI, 1.09 to 8.78]) (13).

Regarding mask use, 1 study found that always using an N95 or surgical mask was associated with decreased risk for SARS-CoV-2 infection versus less complete use (adjusted OR, 0.83 [CI, 0.72 to 0.95] for N95 mask and 0.86 [CI, 0.75 to 0.98] for surgical mask) (4). Another study found that N95 and surgical masks were each associated with decreased risk for SARS-CoV-2 infection versus no mask based on unadjusted estimates; an N95 mask was associated with decreased risk versus a surgical mask (OR, 0.76 [CI, 0.63 to 0.92]) (18). Use of PPE (not limited to masks) was associated with decreased risk for infection versus no PPE in 1 study (5) (adjusted OR, 0.45 [CI, 0.26 to 0.83]). Two other studies did not find an association between PPE use and risk for infection but reported an imprecise estimate (3) or did not control for confounders (20). There was no new evidence for infection control training and education (Supplement Table 3, available at Annals.org). Overall, new evidence indicates an association between Black, Hispanic, or Asian race/ethnicity in health workers in the United States or United Kingdom and increased risk for infection; results regarding risk factors updated with the new studies were otherwise judged to be consistent with the original review and prior updates (Supplement Tables 2 to 6, available at Annals.org).

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