UPDATE ALERTS

Update Alert 8: Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers

This is the eighth update alert for a living rapid review on the epidemiology of and risk factors for coronavirus infection in health care workers (HCWs) (1). Updates on the original scope were monthly through update alert 7 (2), at which time the interval was switched to bimonthly for subsequent updates that focused on risk factors for coronavirus infection. Update searches were done from 25 December 2020 to 24 February 2021 using the same search strategies as the original review. The update searches identified 3267 citations. We applied the same inclusion criteria used for prior updates, with previously described protocol modifications (3) to focus on higher-quality evidence. Twenty studies on risk factors for SARS-CoV-2 infection were added for this update (**Supplement Tables 1** to **6**) (4–23).

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); 64 studies (62 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, 3, 24–28). For this update, 10 cohort studies (5, 6, 11, 14, 17–19, 21–23) and 10 cross-sectional studies (4, 6–8, 10, 12, 13, 15, 16, 20) were added (**Supplement Table 1**). Fifteen studies were done in Europe (4 studies in Spain [4, 7, 10, 12]; 2 each in Germany [8, 14], Italy [19, 23], and the United Kingdom [9, 12]; and 1 each in Belgium [5], Denmark [21], France [22], Lithuania [20], and Norway [11]) and 5 were done in the United States (13, 15, 16, 18) or Canada (17). Similar to the studies included in prior updates, these 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; those that did report adjusted estimates were limited in their ability to control for exposures and personal protective equipment use.

Similar to prior report updates, estimates did not indicate an association between sex (17 studies [4–16, 18, 19, 22, 23]) and risk for SARS-CoV-2 infection or seropositivity. Thirteen studies (4–6, 8–13, 15, 16, 19, 23) found no consistent association between age and risk for SARS-CoV-2 infection, and 14 new studies (4, 6, 7, 9–11, 13–15, 18–21, 23) found no consistent association between health worker role (nurse vs. physician) and risk for SARS-CoV-2 infection, including 2 studies (14, 19) that reported adjusted risk estimates. Six new studies (6, 9, 13, 15, 16, 18) done in the United States or United Kingdom reported on the relationship between race/ethnicity and SARS-CoV-2 infection. In studies that controlled for confounders, Black HCWs (adjusted odds ratios [ORs], 1.66 to 2.10) (6, 13, 15, 16) and Hispanic HCWs (adjusted ORs, 1.32 to 1.98) were at increased risk for SARS-CoV-2 infection versus White HCWs (13, 16). One other study reported similar findings based on adjusted incidence rate ratios for Black (2.78 [95% CI, 1.78 to 4.33]) and Hispanic (2.41 [CI, 1.42 to 4.07]) HCWs versus non-Hispanic White HCWs (18). The results from the new studies were generally consistent with prior updates on the association between demographic or clinical characteristics and risk for SARS-CoV-2 infection in HCWs (**Supplement Table 3**).

One new study found that the presence of IgG antibodies was associated with a decreased risk for SARS-CoV-2 reinfection in HCWs on the basis of polymerase chain reaction testing (adjusted incidence rate ratio, 0.3 [CI, 0.03 to 0.44] for presence of anti-spike IgG; adjusted incidence rate ratio, 0.06 [CI, 0.01 to 0.46] for presence of anti-spike and anti-nucleocapsid IgG) (**Supplement Table 3**) (9). The association between SARS-CoV-2 antibody status and risk for infection in HCWs was not evaluated in studies included in the original review or prior updates.

Eleven new studies evaluated associations between more direct patient contact or contact with patients with COVID-19 and risk for SARS-CoV-2 infection (**Supplement Table 3**) (6, 8, 10–12, 14–19). In 5 studies that controlled for potential confounders, working in a hospital unit with patients with COVID-19 versus not working in a COVID-19 unit (adjusted ORs, 1.50 to 2.39) (6, 15, 16), being a frontline worker versus a nonfrontline worker (adjusted OR, 1.73 [CI, 1.16 to 2.54]) (18), and direct patient contact versus no or minimal patient contact (adjusted OR, 2.06 [CI, 1.63 to 2.62]) (12) were each associated with increased risk for infection.

Regarding infection control training and use, 1 new study found that personal protective equipment (PPE) training was associated with a decreased risk for infection versus no training, but the estimate was imprecise (adjusted OR, 0.71 [CI, 0.25 to 2.13]) (**Supplement Table 4**) (19). One study reported an imprecise estimate for N95 versus surgical mask and found that use of eye protection (face shield and goggles) versus nonuse was associated with decreased risk (OR, 0.55 [CI, 0.36 to 0.84]) (**Supplement Table 5**) (13). One study reported that use of PPE "as recommended" was associated with decreased risk for SARS-CoV-2 infection versus no use (adjusted OR, 0.8 [CI, 0.4 to 1.4]) or unsure use (adjusted OR, 0.6 [CI, 0.6 to 0.9]) (15). One study reported exposure to a patient with known or suspected COVID-19 without use of PPE (adjusted OR, 1.47 [CI, 1.26 to 1.70]) (6) and 1 study reported patient contact with partial PPE versus no contact (OR, 2.5 [CI, 0.5 to 12.2]) (11) were associated with increased risk. Overall, results regarding exposures and PPE were judged to be consistent with prior updates (**Supplement Tables 3** to **6**).

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