

## UPDATE ALERT

**Update Alert 3: Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers**

This is the third monthly update alert for a living rapid review on the epidemiology of and risk factors for coronavirus infection in health care workers (HCWs) (1). Searches were updated from 25 June 2020 to 24 July 2020, using the same search strategies as the original review. The update searches identified 2010 citations. We applied the same inclusion criteria used for the prior update, with previously described protocol modifications to focus on higher-quality evidence (2). Eight studies, all on SARS-CoV-2 infection, were added for this update (3-10).

The original rapid review included 15 studies on the burden of SARS-CoV-2 infection (1); 34 studies were added in prior updates (2, 11) (Supplement Tables 1 and 2). Three cohort studies (7-9) and 2 cross-sectional studies (3, 6) on the burden of SARS-CoV-2 infection were added for this update. Of the new studies, 1 was conducted in the United States (3) and the others in Europe: Belgium (8), Italy (6), Germany (9), and Greece (7). The proportion of HCWs with COVID-19 was 1.9% in 1 study (3); the proportion with SARS-CoV-2 infection ranged from 2.2% to 12.6% in 3 studies (6, 8, 9); and the proportion with SARS-CoV-2 seropositivity was 7.6% in 1 study (10). Among HCWs with SARS-CoV-2 infection, the proportion hospitalized ranged from 0% to 1.7% in 3 studies ( $n = 5839$ ), with no deaths (6-8). All estimates were within previously described ranges.

The original rapid review included 31 studies on risk factors for SARS-CoV-2 infection (1); 12 were added in prior updates (2, 11). For this update, 7 new studies ( $n = 8762$ ) evaluated risk factors for SARS-CoV-2 infection in HCWs (Supplement Table 3) (4-10). One case-control study found performing endotracheal intubation and never using personal protective equipment was associated with increased risk for SARS-CoV-2 infection in a multivariate analysis (4). Use of masks, caps, gowns, shoe covers, gloves, or face shields were associated with decreased risk in univariate analysis but were not retained in the multivariate model. Limitations included potential recall bias, failure to address potential collinearity, and limited measurement and control of exposures. A prospective cohort study found high-risk exposure associated with increased risk for a COVID-19 diagnosis versus moderate- or low-risk exposure in an adjusted analysis; exposure was categorized using an unvalidated method, on the basis of mask use by the infected patient and personal protective equipment use by the HCW (7). Four studies (4, 7, 9, 10) found no association between sex and risk for SARS-CoV-2 infection, and 5 studies (5, 6, 8-10) reported inconsistent findings for the risk for SARS-CoV-2 infection in nurses versus physicians. Results for risk factors updated with these studies were judged to be consistent with the original rapid review and prior update (Supplement Tables 4 to 9).

Roger Chou, MD

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

**Disclaimer:** The original review was funded by WHO. WHO staff developed the key questions and scope for the original review but did not have any role in the selection, assessment, or synthesis of evidence for this update.

**Disclosures:** Disclosures can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M20-4806](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M20-4806).

**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](mailto:chour@ohsu.edu).

doi:10.7326/L20-1005

**References**

1. Chou R, Dana T, Buckley DI, et al. Epidemiology of and risk factors for coronavirus infection in health care workers: a living rapid review. *Ann Intern Med.* 2020;173:120-136. [PMID: 32369541] doi:10.7326/M20-1632
2. Chou R, Dana T, Buckley DI, et al. Update alert 2: epidemiology of and risk factors for coronavirus infection in health care workers [Letter]. *Ann Intern Med.* 2020. [PMID: 32663033] doi:10.7326/M20-4806
3. Bays DJ, Nguyen MH, Cohen SH, et al. Investigation of nosocomial SARS-CoV-2 transmission from two patients to health care workers identifies close contact but not airborne transmission events. *Infect Control Hosp Epidemiol.* 2020;1-22. [PMID: 32618530] doi:10.1017/ice.2020.321
4. Chatterjee P, Anand T, Singh KJ, et al. Healthcare workers & SARS-CoV-2 infection in India: A case-control investigation in the time of COVID-19. *Indian J Med Res.* 2020;151:459-467. [PMID: 32611916] doi:10.4103/ijmr.IJMR\_2234\_20
5. García IS, López MJMA, Vicente AS, et al. SARS-CoV-2 infection among healthcare workers in a hospital in Madrid, Spain. *J Hosp Infect.* 2020. [PMID: 32702465] doi:10.1016/j.jhin.2020.07.020
6. Lahner E, Dilaghi E, Prestigiacomo C, et al. Prevalence of SARS-CoV-2 infection in health workers (HWs) and diagnostic test performance: the experience of a teaching hospital in central Italy. *Int J Environ Res Public Health.* 2020;17. [PMID: 32575505] doi:10.3390/ijerph17124417
7. Maltezou HC, Dedoukou X, Tseroni M, et al. SARS-CoV-2 infection in health-care personnel with high-risk occupational exposure: evaluation of seven-day

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exclusion from work policy. *Clin Infect Dis*. 2020. [PMID: 32594160] doi:10.1093/cid/ciaa888

8. Martin C, Montesinos I, Dauby N, et al. Dynamic of SARS-CoV-2 RT-PCR positivity and seroprevalence among high-risk health care workers and hospital staff. *J Hosp Infect*. 2020. [PMID: 32593608] doi:10.1016/j.jhin.2020.06.028

9. Schmidt SB, Grüter L, Boltzmann M, et al. Prevalence of serum IgG antibodies against SARS-CoV-2 among clinic staff. *PLoS One*. 2020;15:e0235417. [PMID: 32584894] doi:10.1371/journal.pone.0235417

10. Stubblefield WB, Talbot HK, Feldstein L, et al; Influenza Vaccine Effectiveness in the Critically Ill (IVY) Investigators. Seroprevalence of SARS-CoV-2 among frontline healthcare personnel during the first month of caring for COVID-19 patients - Nashville, Tennessee. *Clin Infect Dis*. 2020. [PMID: 32628750] doi:10.1093/cid/ciaa936

11. Chou R, Dana T, Buckley DI, et al. Update alert: epidemiology of and risk factors for coronavirus infection in health care workers [Letter]. *Ann Intern Med*. 2020;173:W46-W47. [PMID: 32515983] doi:10.7326/L20-0768