

## Supplementary Material\*

Chou R, Dana T, Buckley DI, et al. Update alert 8: epidemiology of and risk factors for coronavirus infection in health care workers. *Ann Intern Med.* 30 March 2021. [Epub ahead of print]. doi:10.7326/L21-0143

*Supplement Table 1.* Results of individual studies, risk factors for SARS-CoV-2 infection in HCWs

*Supplement Table 2.* Demographic characteristics, clinical characteristics, and HCW role and risk for infection with SARS-CoV-2 in HCWs

*Supplement Table 3.* Exposure history and risk for infection with SARS-CoV-2 in HCWs

*Supplement Table 4.* Education or training, environmental and physical factors, and infection control policies and risk for infection with SARS-CoV-2

*Supplement Table 5.* Mask use and risk for infection with SARS-CoV-2 in HCWs

*Supplement Table 6.* Infection prevention and control factors (other than masks) and risk for infection with SARS-CoV-2 in HCWs

References

\*This supplementary material was provided by the authors to give readers further details on their article. The material was reviewed but not copyedited.

**Supplement Table 1. Results of individual studies, risk factors for SARS-CoV-2 infection in HCWs**

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
<p>Abdelmoniem et al 2020 (29)</p> <p>Prospective cohort</p> <p>Egypt (Cairo); 1 university hospital; 1 to 14 June 2020</p>	<p>203 asymptomatic ED HCWs</p> <ul style="list-style-type: none"> <li>• Mean age 32 y</li> <li>• 49% female</li> <li>• 37% physician, 44% nurse, 12% cleaning and transportation, 7% administration</li> <li>• 86% contact with confirmed or suspected COVID-19 patient</li> <li>• 13.9% SARS-CoV-2 infection (PCR)</li> </ul>	<p>Age: Mean 31.7 (cases) vs 31.9 (non-cases) years, p=0.86</p> <p>Sex</p> <ul style="list-style-type: none"> <li>• Female: 16.1% (16/99)</li> <li>• Male: 12.5% (13/104) <ul style="list-style-type: none"> <li>◦ Female vs. male: OR 1.35 (0.61-2.97)*</li> </ul> </li> </ul> <p>HCW role</p> <ul style="list-style-type: none"> <li>• Nurse: 16.8% (15/89)</li> <li>• Physician: 9.4% (7/74) <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: OR 1.95 (0.75-5.05)*</li> </ul> </li> <li>• Cleaner/transportation: 20.8% (5/24)</li> <li>• Radiology/lab: 0% (0/2)</li> <li>• Administration: 14.3% (2/14)</li> </ul> <p>Contact with COVID-19 infected patient (suspected or confirmed)</p> <ul style="list-style-type: none"> <li>• Contact: 12.5% (22/176)</li> <li>• No contact: 25.9% (7/27) <ul style="list-style-type: none"> <li>◦ Contact vs. no contact: OR 0.41 (0.15-1.08)*</li> </ul> </li> </ul> <p>Proper hand hygiene practice</p> <ul style="list-style-type: none"> <li>• Yes: 14.1% (27/192)</li> <li>• No: 18.2% (2/11) <ul style="list-style-type: none"> <li>◦ Yes vs. no: OR 0.74 (0.15-3.59)*</li> </ul> </li> </ul> <p>PPE use as recommended</p> <ul style="list-style-type: none"> <li>• Yes: 14.3% (27/189)</li> <li>• No: 14.3% (2/14) <ul style="list-style-type: none"> <li>◦ Yes vs. no: OR 1.00 (0.21-4.72)</li> </ul> </li> </ul> <p>Comorbidities</p> <ul style="list-style-type: none"> <li>• Yes: 8.0% (2/25)</li> <li>• No: 15.2% (27/178) <ul style="list-style-type: none"> <li>◦ Yes vs. no: OR 0.49 (0.11-2.18)</li> </ul> </li> </ul>	<p>No control for confounders; potential recall bias; 37% participation rate</p>
<p>Akinbami et al 2020 (30)</p> <p>Retrospective cohort</p> <p>United States (Detroit metropolitan area, Michigan); regional</p>	<p>16,397 asymptomatic HCWs, first responders and public safety personnel</p> <ul style="list-style-type: none"> <li>• Mean age 42 y</li> <li>• 69% female</li> <li>• 86% HCW (39% nurse, 4% nurse assistant, 14%</li> </ul>	<p>Age</p> <ul style="list-style-type: none"> <li>• 18-24 y: 7.9% (54/686); reference</li> <li>• 25-34 y: 6.9% (337/4,885); adjusted OR 0.89 (0.56-1.39)</li> <li>• 35-44 y: 7.0% (278/3,977); adjusted OR 0.93 (0.57-1.52)</li> <li>• 45-59 y: 6.9% (360/5,222); adjusted OR 0.86 (0.53-1.40)</li> <li>• 60-64 y: 7.5% (83/1,106); adjusted OR 0.97 (0.58-1.62)</li> <li>• ≥65 y: 3.5% (18/521); <b>adjusted OR 0.41 (0.23-0.72)</b></li> </ul> <p>Sex</p> <ul style="list-style-type: none"> <li>• Female: 7.0% (787/11,251):</li> </ul>	<p>Potential recall bias; ~7% of participants were firefighters or police/corrections officers</p>

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healthcare coalition; 18 May to 13 June 2020	physician, 2% pharmacist, 1% physical therapist, 3% respiratory therapist, 6% administration/clerk, 2% clinical technician, 4% imaging technician, 2% laboratory technician, 4% midlevel clinician, 9% other role) 7% EMT, 2% firefighter, 5% police/corrections officer • 6.9% SARS-CoV-2 seropositivity	<ul style="list-style-type: none"> <li>• Male: 6.7% (345/5,146)               <ul style="list-style-type: none"> <li>◦ Female vs. male: <b>adjusted OR 0.79 (0.65-0.95)</b></li> </ul> </li> </ul> Race/ethnicity <ul style="list-style-type: none"> <li>• Non-Hispanic white: 6.0% (771/12,858); reference</li> <li>• Non-Hispanic black: 16.3% (196/1200); <b>adjusted OR 1.92 (1.52-2.43)</b></li> <li>• Non-Hispanic Asian: 7.3% (80/1097); adjusted OR 0.97 (0.74-1.26)</li> <li>• Hispanic: 6.8% (30/440); adjusted OR 1.06 (0.76-1.48)</li> <li>• Other: 7.2% (29/404); adjusted OR 0.95 (0.67-1.35)</li> </ul> HCW <ul style="list-style-type: none"> <li>• Nurse: 7.7% (495/6,426)               <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: <b>adjusted OR 1.52 (1.18-1.95)</b></li> </ul> </li> <li>• Nurse assistant: 12.8% (82/641)               <ul style="list-style-type: none"> <li>◦ Nurse assistant vs. physician: <b>adjusted OR 1.88 (1.24-2.83)</b></li> </ul> </li> <li>• Physician: 6.1% (140/2,297)</li> <li>• Pharmacist: 4.4% (14/321)</li> <li>• Physical therapist: 10.6% (25/235)</li> <li>• Respiratory therapist: 8.3% (34/409)</li> <li>• Administration/clerk: 8.0% (77/964)</li> <li>• Clinical technician: 5.5% (20/365)</li> <li>• Imaging technician: 4.2% (30/719)</li> <li>• Laboratory technician: 3.4% (10/293)</li> <li>• Midlevel clinician: 4.6% (26/566)</li> <li>• Other HCW role: 7.0% (62/888)</li> <li>• EMT: 5.2% (60/1,158)</li> <li>• Firefighter: 6.7% (22/330)</li> <li>• Police/corrections officer: 4.0% (31/785)</li> </ul> Clinical setting (yes vs. no) <ul style="list-style-type: none"> <li>• Hospital emergency department: Adjusted OR 1.16 (1.00-1.35)</li> <li>• Hospital ward: Adjusted OR 1.24 (0.97-1.58)</li> <li>• Hospital intensive care unit: Adjusted OR 0.78 (0.66-0.91)</li> <li>• Hospital operating room/surgical unit: Adjusted OR 0.63 (0.48-0.83)</li> <li>• Other hospital location: Adjusted OR 0.87 (0.74-1.03)</li> <li>• Emergency medical services: Adjusted OR 1.08 (0.70-1.66)</li> </ul> Exposure to persons testing positive for COVID-19 (yes vs. no) <ul style="list-style-type: none"> <li>• Co-worker: 10.0% (680/6799): <b>1.45 (1.21-1.73)</b></li> <li>• Household member: 34.3% (178/519); <b>adjusted OR 6.18 (4.81-7.93)</b></li> <li>• Patient: 7.8% (810/10,389); adjusted OR 1.03 (0.87-1.22)</li> <li>• Other person: 11.5% (312/2709); <b>adjusted OR 1.25 (1.08-1.45)</b></li> </ul>	

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		PPE use (all the time vs. less than all the time) <ul style="list-style-type: none"> <li>• Gown: 6.9% (643/9,316); adjusted OR 1.14 (0.97-1.34)</li> <li>• Gloves: 7.0% (832/11,887); adjusted OR 1.09 (0.90-1.30)</li> <li>• N95: 6.9% (505/7,316); <b>adjusted OR 0.83 (0.72-0.95)</b></li> <li>• PAPR: 7.6% (53/695); adjusted OR 1.10 (0.80-1.52)</li> <li>• Goggles/face shield: 6.5% (428/6,581); adjusted OR 1.12 (0.94-1.32)</li> <li>• Surgical mask: 6.6% (624/9,452); <b>adjusted OR 0.86 (0.75-0.98)</b></li> </ul> Aerosol generating procedure frequency <ul style="list-style-type: none"> <li>• 0 times: reference</li> <li>• 1-5 times: adjusted OR 1.04 (0.85-1.28)</li> <li>• 6-10 times: adjusted OR 0.83 (0.66-1.04)</li> <li>• 11-25 times: adjusted OR 0.89 (0.69-1.16)</li> <li>• &gt;25 times: adjusted OR 1.09 (0.89-1.34)</li> </ul>	
Al Maskari et al, 2020 (31)  Cross-sectional  Oman; 1 tertiary care hospital; 18 March to 11 July 2020	4703 HCWs <ul style="list-style-type: none"> <li>• Mean age not reported</li> <li>• 29% female</li> <li>• 12% physician, 40% nurse, 20% paramedic, 28% administrative/support staff</li> </ul>	SARS-CoV-2 infection (PCR) <ul style="list-style-type: none"> <li>• Male: 2.2% (74/3299)               <ul style="list-style-type: none"> <li>◦ Female: 9.3% (130/1404)</li> </ul> </li> <li>• Female vs. male: OR 4.45 (3.32-5.96)*</li> <li>• Physician: 4.7% (26,556)               <ul style="list-style-type: none"> <li>◦ Nurse: 4.1% (77/1870)</li> </ul> </li> <li>• Nurse vs. physician: 0.88 (0.56-1.38)*</li> <li>• Paramedic: 2.8% (27/969)</li> <li>• Administrative/support staff: 5.6% (74/1308)</li> </ul>	No control for confounders
Algado-Selles et al 2020 (32)  Retrospective cohort  Spain (Alicante); 1 hospital and 12 primary care clinics; 2 March to 16 April 2020	784 symptomatic HCWs <ul style="list-style-type: none"> <li>• Mean age not reported; 88% &lt;age 60 y</li> <li>• 78% female</li> <li>• 27% physician, 34% nurse, 20% nursing assistant or technician, 20% other role</li> <li>• 19.9% SARS-CoV-2 infection (PCR)</li> </ul>	Age <ul style="list-style-type: none"> <li>• &lt;60 y: 19.5% (135/691)</li> <li>• ≥60 y: 22.6% (21/93)               <ul style="list-style-type: none"> <li>◦ &lt;60 vs ≥60: OR 1.2 (0.7-2.0); not included in multivariate model</li> </ul> </li> </ul> Sex <ul style="list-style-type: none"> <li>• Female: 19.2% (118/615)</li> <li>• Male: 22.5% (38/169)               <ul style="list-style-type: none"> <li>◦ Female vs. male: OR 1.2 (0.8-1.8); not included in multivariate model</li> </ul> </li> </ul> HCW role <ul style="list-style-type: none"> <li>• Nurse: 18.1% (49/270)</li> <li>• Physician: 28.2% (60/213)               <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: <b>OR 0.57 (0.37-0.87)*</b></li> </ul> </li> <li>• Nurse assistant/technician: 14.6% (27/185)</li> <li>• Other role: 17.2% (20/116)</li> </ul> Department	Potential recall bias

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		<ul style="list-style-type: none"> <li>• ED: 16.2% (6/37)</li> <li>• Pediatric: 8.3% (4/48)</li> <li>• Critical care unit: 25.0% (30/120)</li> <li>• Adult ward: 14.9% (42/281)</li> <li>• Primary care: 23.7% (23/97)</li> <li>• Non-COVID-19 ward: 25.4% (51/201) <ul style="list-style-type: none"> <li>○ ED vs. non-COVID-19 ward: adjusted OR 0.7 (0.2-1.9)</li> <li>○ Pediatric vs. non-COVID-19 unit: adjusted OR 0.4 (0.1-2.2)</li> <li>○ Critical care vs. non-COVID-19 unit: adjusted OR 0.8 (0.3-1.7)</li> <li>○ Adult ward vs. non-COVID-19 unit: adjusted OR 0.7 (0.4-1.4)</li> <li>○ Primary care vs. non-COVID-19 unit: adjusted OR 1.1 (0.5-2.2)</li> </ul> </li> </ul> <p>Contact type</p> <ul style="list-style-type: none"> <li>• Close: 22.8% (119/523)</li> <li>• Occasional: 14.8% (27/182)</li> <li>• Unknown: 12.7% (10/79) <ul style="list-style-type: none"> <li>○ Close vs. unknown: adjusted OR 2.1 (0.8-5.1)</li> <li>○ Occasional vs. unknown: adjusted OR 1.4 (0.5-3.9)</li> <li>○ Close vs. occasional: OR 1.69 (1.07-2.67)*</li> </ul> </li> </ul> <p>PPE use (surgical mask or N95 [or equivalent] and eye protection for aerosol generating procedures)</p> <ul style="list-style-type: none"> <li>• Yes: 13.7% (40/293)</li> <li>• No: 22.8% (112/491) <ul style="list-style-type: none"> <li>○ Yes vs. no: <b>adjusted OR 0.45 (0.26-0.83)</b></li> </ul> </li> </ul>	
<p>Amendola et al, 2020 (33)</p> <p>Cross-sectional</p> <p>Italy (Milan); 1 pediatric hospital; 15 April 2020</p>	<p>663 asymptomatic HCWs (547 clinical and 116 nonclinical)</p> <ul style="list-style-type: none"> <li>• Mean age 44 y</li> <li>• 84% female</li> <li>• 83% clinical HCW, 17% nonclinical HCW <ul style="list-style-type: none"> <li>○ 32% physician, 32% nurse, 18% technician, 17% non-clinical</li> </ul> </li> </ul>	<p>SARS-CoV-2 seropositivity</p> <ul style="list-style-type: none"> <li>• Female: 4.3% (24/555)</li> <li>• Male: 9.3% (10/108) <ul style="list-style-type: none"> <li>○ Female vs. male: OR 0.44 (0.21-0.96)*</li> </ul> </li> <li>• Clinical HCW: 5.1% (28/547) <ul style="list-style-type: none"> <li>○ Physician: 4.7% (10/214)</li> <li>○ Nurse: 6.0% (13/216) <ul style="list-style-type: none"> <li>▪ Nurse vs. physician: OR 1.31 (0.56-3.05)*</li> </ul> </li> <li>○ Other health technicians: 4.2% (5/117)</li> </ul> </li> <li>• Non-clinical HCW: 5.2% (6/116)</li> <li>• Outpatient services: 6.3% (4/63)</li> <li>• Surgery: 22.2% (6/27)</li> <li>• Pediatric: 1.2% (1/80)</li> <li>• Pediatric ER: 1.8% (1/55)</li> <li>• NICU: 2.1% (1/47)</li> </ul>	<p>No control for confounders</p>

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	<ul style="list-style-type: none"> <li>hospital employee</li> <li>27% labor and delivery, 12% pediatric unit, 10% outpatient clinic, 4% surgical unit, 8% pediatric ER, 7% NICU, 6% PICU, 11% administrative / pharmacy / lab, 15% other</li> <li>Among HCWs (n=547), 56% direct contact with COVID-19 patient, 44% no known direct contact</li> </ul>	<ul style="list-style-type: none"> <li>PICU: 14.3% (6/42)</li> <li>Labor and delivery: 3.3% (6/181) 6 (3.31)</li> <li>Administration/pharmacy/laboratory: 8.6% (6/70)</li> <li>Others: 3.1% (3/98)</li> <li>Direct contact with COVID-19 patient: 6.6% (20/304)</li> <li>No known direct contact: 3.3% (8/243) <ul style="list-style-type: none"> <li>Direct vs. no direct contact with COVID-19 patient: OR 2.07 (0.89-4.78)*</li> </ul> </li> </ul>	
<p>Bahrs et al., 2021 (14)</p> <p>Prospective cohort</p> <p>Germany (Jena); 1 academic hospital 19 May to 19 June 2020</p> <p><b>Added for Update Alert #8</b></p>	<p>660 HCWs</p> <ul style="list-style-type: none"> <li>Median age 40 y</li> <li>73.6% female</li> <li>32.6% nurses, 27.3% administration, 15.6% physicians, 2.7% nursing assistants, 2.7% psychologists, 2.6% ergo therapists</li> <li>2.7% SARS-CoV-2 seropositive</li> </ul>	<p>Sex</p> <ul style="list-style-type: none"> <li>Female: 2.7% (13/486)</li> <li>Male: 2.9% (5/174) <ul style="list-style-type: none"> <li>Female vs. male: OR 0.93 (0.33-2.64)*</li> </ul> </li> </ul> <p>HCW role</p> <ul style="list-style-type: none"> <li>Physician: 4.8% (5/103); reference</li> <li>Nurse or care worker: 2.3% (5/215); adjusted OR 0.38 (0.10-1.34)</li> <li>Cleaner: 16.7% (1/6); adjusted OR 2.75 (0.25-29.93)</li> <li>Reception staff: 5.3% (1/19); adjusted OR 0.73 (0.07-7.32)</li> <li>Administrative staff: 3.3% (6/180); adjusted OR 0.51 (0.13-1.93)</li> <li>Other 0% (0/130)</li> </ul> <p>Work COVID-19 risk category</p> <ul style="list-style-type: none"> <li>High-risk (patient contact with confirmed COVID-19 patients or high number of suspected cases): 1.5% (2/137); reference</li> <li>Intermediate-risk (patient contact, no routine contact with confirmed or suspected COVID-19 patients): 2.9% (10/343); adjusted OR 1.97 (0.42-9.22)</li> <li>Low-risk (no patient contact): 3.3% (6/180); adjusted OR 2.10 (0.40-11.06)</li> </ul>	<p>20% participation rate; no control for confounders</p>
<p>Bai et al, 2020 (34)</p>	<p>118 HCWs with potential exposure to COVID-19 patient</p>	<p>COVID-19 vs. no COVID-19</p> <p>Age (years): <b>36.6 vs. 30.5, p=0.006</b></p> <p>BMI (kg/m<sup>2</sup>): 22.4 vs. 22.0, p=0.85</p>	<p><b>Not peer reviewed;</b> potential recall bias; no control for</p>

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<p>Retrospective cohort</p> <p>China (Wuhan); 1 hospital (neurosurgery department) prior to recognition of outbreak; December 25, 2019 to February 15, 2020</p>	<ul style="list-style-type: none"> <li>• Mean age, 31 years</li> <li>• 64% female</li> <li>• 25% physician, 75% nurse</li> <li>• 10.2% (12/118) diagnosed with COVID-19</li> </ul>	<p>Contact frequency (median, contacts/day): 3.0 vs. 5.0, p=0.95 Contact duration (median, minutes/contact): 4.0 vs. 4.0, p=0.54</p> <p>OR (95% CI) for COVID-19<sup>†</sup></p> <ul style="list-style-type: none"> <li>• Female vs. male: 0.78 (0.23-2.64)</li> <li>• Current smoking (yes vs. no): 0.41 (0.02-7.49)</li> <li>• Current alcohol (yes vs. no): 0.37 (0.02-6.67)</li> <li>• Regular physical activity (yes vs. no): 2.12 (0.64-7.05)</li> <li>• Nurse vs. physician: 0.65 (0.18-2.34)</li> <li>• Working under pressure (yes vs. no): <b>4.24 (1.19-15.05)</b></li> <li>• Contact with index case (yes vs. no): <b>0.27 (0.08-0.94)</b></li> <li>• Air contact vs. no contact: 0.32 (0.07-1.50)</li> <li>• Direct contact vs. no contact: 0.22 (0.05-1.03)</li> <li>• Air or direct contact vs. no contact: 0.31 (0.03-3.01)</li> <li>• In same department as index case (yes vs. no): <b>62.70 (3.60-1092.46)</b></li> <li>• Chronic pulmonary disease (yes vs. no): 1.11 (0.13-9.76)</li> <li>• Chronic non-pulmonary disease (yes vs. no): 0.62 (0.03-11.65)</li> </ul>	<p>confounders; criteria for COVID-19 diagnosis not described; 4 infected HCWs without exposure data excluded</p>
<p>Baker et al 2021 (15)</p> <p>Cross-sectional</p> <p>US (Atlanta); 1 academic health care system including 11 hospitals and 250 locations; 19 April 19 to 26 June 2020</p> <p><b>Added for Update Alert #8</b></p>	<p>10,275 HCWs</p> <ul style="list-style-type: none"> <li>• Mean age not reported; 16% &lt;30 y, 31% 30-39 y, 22% 40-49 y, 19% 50-59 y, 12% ≥60 y</li> <li>• 78% female</li> <li>• 31% nurse, 18% physician, 19% other no patient contact; 15% other direct care; 7% advanced practice provider; 4% nurse tech; 3% radiology tech; 1% respiratory therapist; 0.4% environmental services; 2% not specified</li> <li>• 30% Black, 55% white, 12% Asian,</li> </ul>	<p>Age</p> <ul style="list-style-type: none"> <li>• ≥60: 4.9% (57/1153); reference</li> <li>• 50-59: 5.2% (93/1805); unweighted adjusted OR 0.8 (0.6-1.2)</li> <li>• 40-49: 5.9% (125/2118); unweighted adjusted OR 0.9 (0.7-1.4)</li> <li>• 30-39: 5.8 (171/2953); unweighted adjusted OR 1.0 (0.7-1.4)</li> <li>• &lt;30: 6.9 (109/1581); unweighted adjusted OR 1.2 (0.8-1.7)</li> </ul> <p>Sex</p> <ul style="list-style-type: none"> <li>• Female: 5.7% (428/7456); reference</li> <li>• Male: 5.9% (127/2154); unweighted adjusted OR 1.3 (1.0-1.7)</li> </ul> <p>Race</p> <ul style="list-style-type: none"> <li>• White: 4.3% (226/5263); reference</li> <li>• Black: 8.3% (238/2860); unweighted adjusted OR 2.1 (1.7-2.6)</li> <li>• Asian: 5.3% (60/1133); unweighted adjusted OR 1.3 (0.9-1.7)</li> <li>• Multiracial: 7.6% (10/132); unweighted adjusted OR 1.8 (0.8-3.5)</li> </ul> <p>HCW role</p> <ul style="list-style-type: none"> <li>• Nurse: 5.9% (177/2976); unweighted adjusted OR 1.0 (0.7-1.4)</li> <li>• Physician: 5.0% (87/1753); unweighted adjusted OR 0.9 (0.6-1.4) <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: OR 1.21 (0.93-1.58)*</li> </ul> </li> <li>• Other no patient contact: 5.5% (100/1812); reference</li> <li>• Other direct care: 6.2% (88/1423); unweighted adjusted OR 1.1 (0.7-1.5)</li> <li>• Advanced practice provider: 5.2% (36/698); unweighted adjusted OR 0.9 (0.6-1.5)</li> </ul>	<p>35% participation rate; potential recall bias; limited measurement of exposures and PPE</p>

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	<ul style="list-style-type: none"> <li>1% multiracial, 0.3% American Indian/Alaska native, 0.2% Native Hawaiian/Pacific Islander, 2% not specified; 96% non-Hispanic</li> <li>5.7% SARS-CoV-2 seropositive</li> </ul>	<ul style="list-style-type: none"> <li>Nurse tech: 8.1% (28/346); unweighted adjusted OR 0.9 (0.5-1.5)</li> <li>Radiology tech: 7.0% (21/302); unweighted adjusted OR 1.3 (0.7-2.2)</li> <li>Respiratory therapist: not reported; unweighted adjusted OR 0.8 (0.3-1.7)</li> <li>Environmental services: not reported; unweighted adjusted OR 1.3 (0.3-4.0)</li> </ul> <p>Exposure</p> <ul style="list-style-type: none"> <li>No patient contact: 4.6% (43/941); reference</li> <li>Home: 4.9% (13/267); unweighted adjusted OR 1.2 (0.6-2.2)</li> <li>Other hospital area: 5.6% (52/926); unweighted adjusted OR 1.2 (0.8-2.0)</li> <li>OR/procedure area: 5.7% (38/672); unweighted adjusted OR 1.2 (0.7-2.0)</li> <li>Outpatient, clinical: 5.4% (90/1675); unweighted adjusted OR 1.4 (0.9-2.2)</li> <li>Inpatient, not COVID-19 focused: 5.8% (93/1594); unweighted adjusted OR 1.4 (0.9-2.2)</li> <li>COVID-19 focused: 6.7% (117/1750); unweighted adjusted OR 1.5 (1.0-2.4)</li> <li>ED: 6.7% (67/1007); unweighted adjusted OR 1.5 (0.9-2.4)</li> </ul> <p>PPE use</p> <ul style="list-style-type: none"> <li>As recommended: 5.9% (370/6320); reference</li> <li>Not as recommended: 6.3% (14/221); unweighted adjusted OR 0.8 (0.4-1.4)</li> <li>Unsure: 4.0% (22/546); <b>unweighted adjusted OR 0.6 (0.4-0.9)</b></li> <li>Not applicable: 5.9% (149/2523); unweighted adjusted OR 1.1 (0.8-1.3)</li> </ul> <p>Community contact with confirmed/suspected positive people</p> <ul style="list-style-type: none"> <li>No/not sure: 5.4% (478/8862); reference</li> <li>Yes: 10.3% (77/748); <b>unweighted adjusted OR 1.7 (1.3-2.3)</b></li> </ul>	
<p>Banjeree et al 2020 (35)</p> <p>Retrospective cohort</p> <p>India (Kolkata); 1 hospital; 1 June to 31 August 2020</p>	<p>274 symptomatic HCWs or HCWs who had direct contact with a COVID-19 patient</p> <ul style="list-style-type: none"> <li>Mean age not reported</li> <li>40% female</li> <li>HCW role not reported</li> <li>31% SARS-CoV-2 infection (PCR)</li> </ul>	<p>Sex</p> <ul style="list-style-type: none"> <li>Female: 23.4% (32/109)</li> <li>Male: 26.1% (43/165) <ul style="list-style-type: none"> <li>Female vs. male: OR 0.85 (0.49-1.45)*</li> </ul> </li> </ul>	<p>No control for confounders; limited demographic information; participation rate unclear</p>
<p>Barallat et al 2020 (4)</p> <p>Cross-sectional</p>	<p>7563 HCWs</p> <ul style="list-style-type: none"> <li>Mean age 43 y</li> <li>76% female</li> <li>24% physician, 30% nurse, 11% nursing</li> </ul>	<p>Age</p> <ul style="list-style-type: none"> <li>18-34 y: 10.3% (209/2025); reference</li> <li>35-54 y: 9.0% (330/3664); OR 0.86 (0.72-1.03)*</li> <li>≥55 y: 10.1% (179/1771); OR 0.98 (0.79-1.21)*</li> </ul> <p>Sex</p>	<p>No control for confounders; 81% participation rate</p>



Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
Spain (Barcelona); HCWs in the Northern Metropolitan Area; 4 to 22 May 2020  <b>Added for Update Alert #8</b>	<ul style="list-style-type: none"> <li>assistant, 6%</li> <li>healthcare support services, 16%</li> <li>administration, 8%</li> <li>other role</li> <li>9.4% SARS-CoV-2 seropositivity</li> </ul>	<ul style="list-style-type: none"> <li>Female: 9.2% (522/5673)</li> <li>Male: 10.1% (181/1789)               <ul style="list-style-type: none"> <li>Female vs. male: OR 0.90 (0.75-1.08)*</li> </ul> </li> </ul> HCW role <ul style="list-style-type: none"> <li>Nurse: 9.6% (216/2243)</li> <li>Nursing assistant: 11.9% (85/832)</li> <li>Physician: 27.0% (192/1821)               <ul style="list-style-type: none"> <li>Nurse vs. physician: OR 0.90 (0.74-1.11)*</li> <li>Nurse or nursing assistant vs. physician: OR 0.92 (0.76-1.11)*</li> </ul> </li> <li>Healthcare support services: 4.6% (33/429)</li> <li>Administration: 10.5% (75/1181)</li> <li>Other role: 7.2% (51/616)</li> </ul>	
Barrett et al 2020 (36)  Prospective cohort  United States (New Jersey); 2 hospitals; 24 March to 7 April 2020	546 HCWs with increased risk of SARS-CoV-2 infection ( $\geq 20$ hours work/week, regular patient exposure and regular direct patient contact) <ul style="list-style-type: none"> <li>Mean age not reported; 55% age 20-39 y, 37% age 40-59 y, 8% <math>\geq 60</math> y</li> <li>65% female</li> <li>38% physician, 41% nurse, 21% other HCW role</li> <li>14% COVID-19 symptoms in last week</li> <li>7.3% SARS-CoV-2 infection (PCR)</li> </ul>	HCW role <ul style="list-style-type: none"> <li>Nurse: 11.1% (25/225)</li> <li>Physician (attending, resident or fellow): 2.4% (5/210)               <ul style="list-style-type: none"> <li>Nurse vs. physician: <b>OR 5.12 (1.92-13.65)*</b></li> </ul> </li> <li>Other HCW role: 9% (10/111)</li> <li>Emergency department: 8.2% (20/245)</li> <li>Medical floor: 4.9% (9/185)</li> <li>Operating room: 9.7% (13/134)</li> <li>ICU: 2.2% (4/192)</li> <li>COVID-19 unit: 7.9% (5/63)</li> <li>Other unit: 5.5% (14/255)</li> </ul> PPE use (estimated proportion of patients for which PPE [gloves, gown and surgical or N95 mask] used) <ul style="list-style-type: none"> <li>&lt;25%: 4.6% (4/87)</li> <li>25-49%: 3.5% (2/59)</li> <li>50-74%: 6.7% (4/61)</li> <li>75-99%: 9.8% (4/41) 100%: 10.5% (25/238)               <ul style="list-style-type: none"> <li>&lt;25% vs. 100%: OR 0.41 (0.14-1.22)*</li> </ul> </li> </ul> Average number of patients with suspected or confirmed COVID-19 per shift <ul style="list-style-type: none"> <li>0: 4.1% (6/148)</li> <li>&gt;0-&lt;5: 5.6% (9/162)</li> <li><math>\geq 5</math>: 10.6% (24/226)</li> <li>Missing data: 10% (1/10)               <ul style="list-style-type: none"> <li>0 vs. <math>\geq 5</math> patients: <b>OR 0.36 (0.14-0.89)*</b></li> </ul> </li> </ul> Estimated percentage of work-time spent in patients' rooms <ul style="list-style-type: none"> <li>&lt;25%: 5.2% (11/210)</li> </ul>	No control for confounders; potential recall bias

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		<ul style="list-style-type: none"> <li>• 25-49%: 6.0% (7/117)</li> <li>• 50-74%: 9.5% (11/116)</li> <li>• ≥75%: 11.6% (11/95)               <ul style="list-style-type: none"> <li>○ &lt;25% vs. ≥75%: OR 0.42 (0.18-1.01)*</li> </ul> </li> </ul>	
Blairon et al, 2020 (37)  Prospective cohort  Belgium (Brussels); 4 hospitals; 25 May to 19 June 2020	1499 asymptomatic HCWs <ul style="list-style-type: none"> <li>• Median age 45 y</li> <li>• 72.4% female</li> <li>• 39% nurse or other HCW, 22% physician or dentist, 21% pharmacist or administrative staff, 9% maintenance or technical worker, 4% imaging or lab worker, 5% other/not specified</li> <li>• 37% known exposure to COVID-19-infected patient</li> </ul>	Incidence of SARS-CoV-2 infection <ul style="list-style-type: none"> <li>• Nurse or other clinical HCW: 19.2% (113/588)</li> <li>• Physician or dentist: 11.8% (38/323)               <ul style="list-style-type: none"> <li>○ Nurse vs. physician: OR 1.78 (1.20-2.65)*</li> </ul> </li> <li>• Pharmacist or administrative staff: 9.1% (29/320)</li> <li>• Maintenance or technical worker: 16.4% (22/134)</li> <li>• Imaging or lab worker: 6.6% (2/31)</li> <li>• Inpatient unit: 24.3% (97/399)</li> <li>• Intensive care unit: 13.2% (31/234)</li> <li>• COVID emergency unit: 14.6% (30/205)</li> <li>• Non-COVID emergency unit: 18.5% (34/184)</li> <li>• Other non-COVID patient contact: 14.4% (159/1106)</li> <li>• Other services with no patient contact: 10.5% (33/317)</li> <li>• Performed bronchoscopies: 4.9% (3/61)</li> <li>• Performed intubations: 9.2% (11/119)</li> <li>• Performed other high-risk procedure: 17.4% (37/213)</li> </ul>	48% participation rate; no control for confounders
Buchtele et al, 2020 (38)  Retrospective cohort  Austria (Vienna); stem cell transplant unit; 23 March to 17 April 2020	26 HCWs and staff with face-to-face exposure to SARS-CoV-2 infected colleague <ul style="list-style-type: none"> <li>• Age, sex not reported</li> <li>• 19.2% physician, 69.2% nurse, 11.5% cleaning staff</li> </ul>	Incidence of SARS-CoV-2 infection (PCR) <ul style="list-style-type: none"> <li>• Physician: 0% (0/5)</li> <li>• Nurse: 27.8% (5/18)</li> <li>• Cleaning staff: 0% (0/3)</li> </ul> Nurse vs. physician: OR 4.48 (0.21-95.60)*	No information on demographic or clinical characteristics of HCWs
Calcagno et al 2020 (39)  Prospective cohort	5,444 HCWs (4,306 with HCW role data) <ul style="list-style-type: none"> <li>• Mean age 49 y</li> <li>• 75% female</li> <li>• 16% physician, 42% nurse, 11% nurse</li> </ul>	HCW role <ul style="list-style-type: none"> <li>• Nurse: 8.2% (150/1833)</li> <li>• Physician: 7.8% (55/700)               <ul style="list-style-type: none"> <li>○ Nurse vs. physician: OR 1.05 (0.76-1.44)*</li> </ul> </li> <li>• Nurse assistant: 9.2% (44/476)               <ul style="list-style-type: none"> <li>○ Nurse or nurse assistant vs. physician: OR 1.08 (0.79-1.47)</li> </ul> </li> </ul>	No control for founders; 73% participation rate; incomplete data for 21% of participants

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
Italy (Turin); public hospitals and outpatient clinics; 17 April to 20 May 2020	assistant, 10% healthcare personnel, 0.7% pharmacist, 12% administrative employee, 5% technical personnel, 4% laboratory personnel, 0.3% veterinarian <ul style="list-style-type: none"> <li>• 6.9% SARS-CoV-2 seroprevalence</li> </ul>	<ul style="list-style-type: none"> <li>• Healthcare personnel: 6.7% (23/343)</li> <li>• Pharmacist: 3.4% (1/29)</li> <li>• Administrative employee: 3.3% (18/539)</li> <li>• Technical personnel: 6.9% (15/216)</li> <li>• Laboratory personnel: 11.5% (18/157)</li> <li>• Veterinarian: 0% (0/13)</li> </ul>	
Celebi et al, 2020 (40)  Case-control  Population subset of Celebi 2020 prospective cohort, see above	47 HCWs and 134 controls <ul style="list-style-type: none"> <li>• Mean age 35 y (cases)</li> <li>• 68% female (cases)</li> <li>• 15% physician, 60% nurse, 25% cleaning personnel</li> </ul>	Unadjusted OR (95% CI) for SARS-CoV-2 infection* <ul style="list-style-type: none"> <li>• Female vs. male: 1.27 (0.63-2.57)</li> <li>• Nurse vs. physician: 2.45 (0.98-6.11)</li> <li>• Entered the room with suspected or confirmed COVID-19 patient (yes vs. no): 0.58 (0.28-1.20)</li> <li>• Examined (touched) suspected or confirmed COVID-19 patient (yes vs. no): <b>0.42 (0.21-0.85)</b></li> <li>• Obtained a respiratory sample from a suspected or confirmed COVID-19 patient (yes vs. no): 0.50 (0.22-1.13)</li> <li>• Intubated a suspected or confirmed COVID-19 patient or present in the room during intubation (yes vs. no): 0.79 (0.30-2.09)</li> <li>• Resuscitated a suspected or confirmed COVID-19 patient or present in the room during resuscitation (yes vs. no): 1.25 (0.45-3.48)</li> <li>• Entered the ICU room of a suspected or confirmed patient with mechanical ventilation (yes vs. no): 0.72 (0.32-1.66)</li> <li>• Present in the operation room during a surgical procedure on suspected or confirmed COVID-19 patient (yes vs. no): 0.56 (0.03-11.83)</li> <li>• Improper use of PPE while caring for suspected or confirmed COVID-19 patient (yes vs. no): <b>5.29 (1.64-17.11)</b></li> <li>• Made mistake while implementing infection control precautions (yes vs. no): 2.98 (0.58-15.29)</li> <li>• Stayed in personnel break room with an HCW without wearing medical mask for more than 15 minutes (yes vs. no): <b>6.18 (2.98-12.83)</b></li> <li>• Consumed food within one meter of an HCW (yes vs. no): <b>2.91 (1.43-5.92)</b></li> <li>• Failed to keep a safe social distance from an HCW (yes vs. no): <b>2.54 (1.28-5.03)</b></li> </ul> Adjusted OR (95% CI) for SARS-CoV-2 infection	Potential recall bias; imprecision in adjusted risk estimates

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		<ul style="list-style-type: none"> <li>Improper use of PPE while caring for suspected or confirmed COVID-19 patient (yes vs. no): <b>11.30 (2.18-59)</b></li> <li>Stayed in same personnel break room as an HCW without wearing medical mask for more than 15 minutes (yes vs. no): <b>7.42 (1.90-29)</b></li> </ul>	
Chatterjee et al, 2020 (41)  Case-control  India (throughout); 8 to 23 May 2020	378 HCW cases and 373 HCW controls <ul style="list-style-type: none"> <li>Mean age 35 y (cases)</li> <li>42% female (cases)</li> <li>29% physician, 44% nurse/nurse midwife, 4% housekeeping, 11% lab or operating room technician, 3% security guard, 9% other</li> </ul>	Unadjusted OR (95%) for SARS-CoV-2 infection, <ul style="list-style-type: none"> <li>ICU with suspected or confirmed COVID-19 case on ventilator, yes vs. no: 1.36 (0.88-2.1)</li> <li>Performing endotracheal intubation vs. not performing: <b>2.5 (1.13-5.5)</b></li> <li>Respiratory tract suctioning (yes vs. no): 0.73 (0.37-1.45)</li> <li>Handling clinical specimen (stool, blood, bronchoalveolar lavage) (yes vs. no): 0.89 (0.57-1.39)</li> <li>Doctor vs. laboratory technician/operation theatre technician: 0.94 (0.57-1.57)</li> <li>Nurse vs. laboratory technician/operation theatre technician: 1.2 (0.74-1.96)</li> <li>No PPE use vs. PPE use all/most cases: <b>3.72 (2.12-6.52)</b> <ul style="list-style-type: none"> <li>Any mask vs. no mask: <b>0.35 (0.22-0.57)</b></li> <li>Cap vs. no cap: <b>0.70 (0.52-0.94)</b></li> <li>Gown vs. no gown: <b>0.62 (0.46-0.83)</b></li> <li>Shoe cover vs. no shoe cover: 1.05 (0.78-1.42)</li> <li>Face shield or goggles vs. none: 0.81 (0.61-1.08)</li> <li>Gloves vs. no gloves: <b>0.38 (0.26-0.55)</b></li> </ul> </li> </ul> Adjusted OR (95% CI) for SARS-CoV-2 infection <ul style="list-style-type: none"> <li>Male vs. female: <b>1.93 (1.21-3.07)</b></li> <li>Never used PPE vs used PPE: <b>5.33 (2.27-12.48)</b></li> <li>Performing endotracheal intubation vs. not performing: <b>4.33 (1.16-16.07)</b></li> </ul>	Potential recall bias; 60% of eligible cases included
Colaneri et al 2020 (42)  Retrospective cohort  Italy (Lombardy); 1 hospital; 22 February to 8 May 2020	1,477 HCWs <ul style="list-style-type: none"> <li>Mean age 45 y</li> <li>70% female</li> <li>31% physician, 39% nurse, 18% healthcare assistant, 12% administrative staff</li> <li>11.3% SARS-CoV-2 infection (PCR)</li> </ul>	Age (mean, years): 46.3 (cases) vs. 44.9 (non-cases); p=0.43 Sex <ul style="list-style-type: none"> <li>Female: 10.3% (104/1007)</li> <li>Male: 13.6% (60/440)               <ul style="list-style-type: none"> <li>Female vs. male: OR 0.73 (0.52-1.02)*</li> </ul> </li> </ul> HCW role <ul style="list-style-type: none"> <li>Nurse: 11.1% (63/568)</li> <li>Physician: 12.1% (54/446)               <ul style="list-style-type: none"> <li>Nurse vs. physician: OR 0.91 (0.62-1.33)*; adjusted IRR 1.49 (0.97-2.30)</li> </ul> </li> <li>Healthcare assistant: 13.3% (34/255)</li> <li>Administrative staff: 7.3% (13/178)</li> </ul> Clinical setting; p<0.0001 <ul style="list-style-type: none"> <li>COVID-19 ward: 20.9% (97/465)</li> <li>Non-COVID-19 clinical ward: 7.3% (60/825)</li> </ul>	Potential recall bias

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		<ul style="list-style-type: none"> <li>• No patient contact: 4.5% (7/157)</li> </ul> Contact with CPAP helmets <ul style="list-style-type: none"> <li>• Yes: 26.3% (73/278)</li> <li>• No: 7.8% (91/1169)               <ul style="list-style-type: none"> <li>◦ Yes vs. no: <b>OR 4.22 (3.00-5.94)*</b></li> </ul> </li> </ul> BMI (mean, kg/m <sup>2</sup> ): 24.4 vs. 23.4; p=0.01 Smoking; p<0.0001 <ul style="list-style-type: none"> <li>• Never: 15.7% (113/721)</li> <li>• Former: 23.9% (33/138)</li> <li>• Current: 7.3% (18/247)</li> </ul> Hypertension <ul style="list-style-type: none"> <li>• Yes: 16.2% (16/99)</li> <li>• No: 13.9% (148/1064)               <ul style="list-style-type: none"> <li>◦ Yes vs. no: OR 1.19 (0.68-2.09)*</li> </ul> </li> </ul> Alcohol consumption; p=0.34 <ul style="list-style-type: none"> <li>• None: 10.0% (34/340)</li> <li>• Moderate: 12.3% (83/677)</li> <li>• Not moderate: 6.7% (3/45)</li> <li>• High: 0% (0/0)</li> </ul>	
Dacosta-Urbieta et al, 2020 (43)  Cross-sectional  Spain (Galacia); 1 pediatric hospital; 14 to 16 April 2020	175 HCWs <ul style="list-style-type: none"> <li>• Mean age not reported; 18% ≥55 y</li> <li>• Gender not reported</li> <li>• 33% physician, 47% nurse/nurse's aide 47%, 13% resident, 7% other role</li> </ul>	SARS-CoV-2 seropositivity <ul style="list-style-type: none"> <li>• Nurse/nurse's aide: 4.8% (4/83)</li> <li>• Physician/resident: 3.8% (3/80)               <ul style="list-style-type: none"> <li>◦ Nurse/nurse's aide vs. physician/resident: OR 1.30 (0.28-6.00)*</li> </ul> </li> </ul>	No control for confounders
Dalla Volta et al, 2020 (44)  Cross-sectional  Italy (Brescia); 1 oncology unit; 24 February to 19 May 2020	76 HCWs <ul style="list-style-type: none"> <li>• Median age 46 y</li> <li>• 75% female</li> <li>• 49% nurse, 22% oncologist, 16% resident, 1% psychologist, 7% data manager, 5% administrative</li> <li>• 80% asymptomatic</li> </ul>	SARS-CoV-2 seropositivity <ul style="list-style-type: none"> <li>• Physician/resident: 20.7% (6/29)               <ul style="list-style-type: none"> <li>◦ Nurse: 5.4% (2/37)</li> </ul> </li> <li>• Nurse vs. physician/resident: OR 0.22 (0.04-1.18)*</li> <li>• Administrative: 50% (2/4)</li> </ul>	No control for confounders

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
<p>Ebinger et al 2021 (16)</p> <p>Cross-sectional</p> <p>USA (Los Angeles); health system; beginning 11 May 2020 (end date not reported)</p> <p><b>Added for Update Alert #8</b></p>	<p>6,062 HCWs</p> <ul style="list-style-type: none"> <li>• Mean age 41 y</li> <li>• 68% female</li> <li>• 50% white race, 31% Asian, 6% Black, 13% other</li> <li>• HCW role not reported</li> <li>• 3.5% SARS-CoV-2 seropositive</li> </ul>	<p>Age</p> <ul style="list-style-type: none"> <li>• Per decade increase: <b>adjusted OR 0.80 (0.68 to 0.94)</b></li> </ul> <p>Sex</p> <ul style="list-style-type: none"> <li>• Female: 3.4% (139/4113)</li> <li>• Male: 3.7% (73/1949) <ul style="list-style-type: none"> <li>◦ Female vs. male: adjusted OR 0.84 (0.63-1.12)</li> </ul> </li> </ul> <p>Race/ethnicity</p> <ul style="list-style-type: none"> <li>• Asian: 3.1% (57/1866)</li> <li>• Black: 4.8% (18/372); <b>adjusted OR 2.02 (1.08-3.76)</b></li> <li>• Hispanic/Latino: 5.3% (62/1159); <b>adjusted OR 1.98 (1.34-2.92)</b></li> <li>• Other: 4.2% (33/782)</li> <li>• White: 3.4% (104/3042); reference</li> </ul> <p>Comorbidities</p> <ul style="list-style-type: none"> <li>• Asthma: 1.9% (14/747); adjusted OR 0.25 (0.13 to 0.51)</li> <li>• Autoimmune disease: 1.7% (4/232)^</li> <li>• Cancer: 1.5% (3/198)^</li> <li>• Cardiovascular: 1.6% (2/129)^</li> <li>• COPD: 0% (0/84)^</li> <li>• Diabetes mellitus: 2.1% (8/378)^</li> <li>• HTN: 2.6% (26/993)^</li> <li>• BMI ≥30 kg/m<sup>2</sup>: 3.1% (32/1030)^</li> </ul> <p>Exposure</p> <ul style="list-style-type: none"> <li>• Regular contact with patients with COVID-19: 6.0% (86/1444)^</li> <li>• Work in unit housing/caring for patients with COVID-19: 5.5% (93/1693); <b>adjusted OR 1.61 (95% CI 1.18 to 2.18)</b></li> </ul>	<p>Some data discrepancies; potential recall bias</p>
<p>El Abdellati et al, 2021 (5)</p> <p>Prospective cohort</p> <p>Belgium (Antwerp); 1 psychiatric hospital; 3 to 17 June 2020</p> <p><b>Added for Update Alert #8</b></p>	<p>431 asymptomatic clinical and nonclinical HCW</p> <ul style="list-style-type: none"> <li>• Age and sex not reported for entire cohort</li> <li>• 42.0% nurses, 31.3% non-clinical staff, 13.0% paramedical staff, 6.0% psychologists,</li> </ul>	<p>Age</p> <ul style="list-style-type: none"> <li>• Mean 46.8 (cases) vs. 43.7 (non-cases) years, p&gt;0.05</li> </ul> <p>Sex</p> <ul style="list-style-type: none"> <li>• Female: 2.8% (10/355)</li> <li>• Male: 5.3% (4/76) <ul style="list-style-type: none"> <li>◦ Female vs. male: OR 0.52 (0.16 to 1.71)*</li> </ul> </li> </ul>	<p>No control for confounders; 47% participation rate</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	4.2% physicians, 3.5% other <ul style="list-style-type: none"> <li>3.2% SARS-CoV-2 seropositivity</li> </ul>		
el-Boghdady et al, 2020 (45)  Prospective cohort  Multinational (17 countries); 503 hospitals; 23 March to 2 June 2020	1718 HCWs involved in tracheal intubation of patients <ul style="list-style-type: none"> <li>Mean age 41.5 years</li> <li>40.3% female</li> <li>Physician: 90.7%, non-physician 9.3%</li> <li>Anaesthesia: 83.1%, intensive care medicine: 14.6%, emergency medicine: 1.6%, other specialty 0.6%</li> </ul>	Laboratory-confirmed COVID-19 infection, self-isolation due to symptoms, or hospital admission with $\geq 1$ symptom: <ul style="list-style-type: none"> <li>Physician: 10.7% (166/1558)</li> <li>Non-physician: 11.2% (18/160)</li> <li>Anaesthesia: 10.5% (150/1428)</li> <li>Intensive care medicine: 12.4% (31/251)</li> <li>Emergency medicine: 10.7% (3/28)</li> <li>Other specialty: 0% (0/11)</li> </ul> Unadjusted HR for laboratory-confirmed COVID-19 infection, self-isolation due to symptoms, or hospital admission with $\geq 1$ symptom (95% CI) <ul style="list-style-type: none"> <li>Age (year): 0.99 (0.98-1.01)</li> <li>Female vs. male: 1.44 (1.08-1.93)</li> <li>PPE WHO standard (yes vs. no), analyzed by procedure: 0.97 (0.63-1.51)</li> <li>Bag-mask ventilation (yes vs. no), analyzed by procedure: 0.81 (0.54-1.23)</li> <li>Supraglottic airway device (yes vs. no), analyzed by procedure: 1.40 (0.66-2.97)</li> </ul> Adjusted HR (95% CI) <ul style="list-style-type: none"> <li>Female vs. male: 1.36 (1.01-1.82)</li> </ul>	Criteria for laboratory-confirmed COVID-19 diagnosis not reported; included outcomes based on symptoms without laboratory confirmation
Eyre et al 2020 (6)  Cross-sectional  UK (Oxfordshire); Oxford University hospitals; 23 April to 8 June 2020  <b>Added for Update Alert #8</b>	10034 asymptomatic HCWs <ul style="list-style-type: none"> <li>Mean age not reported</li> <li>74% female; 0.05% transgender; 0.15% not reported</li> <li>72% white, 17% Asian, 4% Black, &gt;1% Chinese, 2% mixed race, 4% other/not reported</li> <li>40% nurse or healthcare assistant, 16%</li> </ul>	<u>SARS-Cov-2 seropositivity or infection (PCR)</u> Age, per 10 years: OR 0.95 (0.90-1.00) Sex <ul style="list-style-type: none"> <li>Female: 10.9% (812/7452)</li> <li>Male: 12.2% (313/2562)               <ul style="list-style-type: none"> <li>Female vs. male: OR 0.88 (0.76-1.01)^</li> </ul> </li> <li>Transgender: 20.0% (1/5)</li> </ul> Race/ethnicity <ul style="list-style-type: none"> <li>White: 9.5% (686/7237); reference</li> <li>Asian: 16.8% (281/1673); <b>adjusted OR 1.51 (1.28-1.77)</b></li> <li>Black: 18.0% (71/394); <b>adjusted OR 1.66 (1.25-2.21)</b></li> <li>Chinese: 7.5% (7/93); adjusted OR 0.75 (0.34-1.67)</li> <li>Mixed race/ethnicity: 11.6% (28/242); adjusted OR .23 (0.82-1.87)</li> </ul> HCW role <ul style="list-style-type: none"> <li>Nurse/healthcare assistant: 14.2% (562/3971)</li> </ul>	Potential recall bias; 73% participation rate; limited control of exposures and PPE

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	<p>physician, 12% administration, 4% laboratory, 3% cleaning staff, 3% physical, occupational or speech/ language therapist, 2% security or catering, 21% other role</p> <ul style="list-style-type: none"> <li>SARS-CoV-2 infection (seropositive or PCR): 11.2% (1128/10034)</li> </ul>	<ul style="list-style-type: none"> <li>Physician: 10.9% (170/1557) <ul style="list-style-type: none"> <li>Nurse/healthcare assistant vs. physician: <b>OR 1.35 (1.12-1.61)*</b></li> </ul> </li> <li>Administration: 7.2% (88/1218)</li> <li>Laboratory staff: 8.2% (29/354)</li> <li>Cleaning staff: 18.6% (60/323)</li> <li>Therapist: 14.9% (47/316)</li> <li>Security or catering: 11.8% (26/221)</li> </ul> <p>Exposure</p> <ul style="list-style-type: none"> <li>Do not work in COVID-19 unit: 8.6% (631/7369); reference</li> <li>Work in COVID-19 unit: 22.6% (358/1586); <b>adjusted OR 2.47 (1.99-3.08)</b></li> <li>Work in any unit: 12.9% (139/1079); <b>adjusted OR 1.39 (1.04-1.85)</b></li> </ul> <p><u>SARS-CoV-2 seropositivity (based on presence of IgG antibodies n=9956)</u></p> <p>Sex (vs. female)</p> <ul style="list-style-type: none"> <li>Male: <b>adjusted OR 1.19 (1.01-1.40)</b></li> <li>Transgender: adjusted OR 3.32 (0.35-31.09)</li> </ul> <p>Race/ethnicity (vs. white)</p> <ul style="list-style-type: none"> <li>Asian: <b>adjusted OR 1.52 (1.29-1.80)</b></li> <li>Black: <b>adjusted OR 1.71 (1.28-2.28)</b></li> <li>Chinese: adjusted OR 0.67 (0.29-1.59)</li> <li>Mixed race/ethnicity: adjusted OR 1.30 (0.86-1.97)</li> </ul> <p>HCW role (vs. administration)</p> <ul style="list-style-type: none"> <li>Nurse/healthcare assistant: adjusted OR 1.33 (0.94-1.87)</li> <li>Senior physician: adjusted OR 0.84 (0.54-1.31)</li> <li>Junior physician: adjusted OR 1.05 (0.70-1.58)</li> <li>Laboratory staff: adjusted OR 0.96 (0.60-1.54)</li> <li>Cleaning staff: <b>adjusted OR 1.96 (1.26-3.04)</b></li> </ul> <p>Specialty (vs. other or none)</p> <ul style="list-style-type: none"> <li>Anaesthetics: adjusted OR 0.70 (0.39-1.25)</li> <li>ED: adjusted OR 1.06 (0.69-1.64)</li> <li>General, urologic, plastic or cardiovascular surgery: adjusted OR 0.90 (0.61-1.33)</li> <li>Hematology or oncology: adjusted OR 1.96 (1.32-2.92)</li> <li>Respiratory infectious disease: adjusted OR 0.76 (0.45-1.28)</li> <li>ICU: <b>adjusted OR 0.47 (0.30-0.74)</b></li> <li>Medicine: <b>adjusted OR 1.47 (1.02-2.11)</b></li> <li>Ob/Gyn: adjusted OR 0.68 (0.38-1.23)</li> <li>Ophthalmology, ENT surgery, or maxillofacial surgery: adjusted OR 0.73 (0.37-1.42)</li> </ul>	



Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		<ul style="list-style-type: none"> <li>Pediatrics: adjusted OR 0.82 (0.55-1.24)</li> <li>Radiology: adjusted OR 0.90 (0.54-1.50)</li> <li>Specialist medicine: adjusted OR 0.87 (0.63-1.21)</li> <li>Trauma and orthopedics, rheumatology: <b>adjusted OR 1.83 (1.23 to 2.72)</b></li> </ul> Exposure (vs. no) <ul style="list-style-type: none"> <li>Exposure to known or suspected COVID-19 patient without PPE: <b>adjusted OR 1.47 (1.26-1.70)</b></li> <li>Work in COVID-19 patient area, yes: <b>adjusted OR 2.39 (1.91-3.00)</b></li> <li>Work in any area: <b>adjusted OR 1.38 (1.03-1.84)</b></li> </ul>	
Faico-Filho et al, 2020 (46) Cross-sectional  Brazil (Sao Paolo); 1 hospital; 22 March to 22 April 2020	466 symptomatic HCWs <ul style="list-style-type: none"> <li>Median age 39 y</li> <li>72% female</li> <li>27% nurse technician, 11% nurse, 23% physician, 3% laboratory personnel, 19% administrative staff, 6% logistic worker, 10% other HCW role</li> </ul>	Incidence of SARS-CoV-2 infection (PCR): 36.2% (169/466) <ul style="list-style-type: none"> <li>Direct patient contact: 33.8% (109/322)               <ul style="list-style-type: none"> <li>Nurse or nurse technician: 40.1% (73/182)</li> <li>Physician: 24.2% (26/107)</li> <li>Laboratory personnel: 28.6% (4/14)                   <ul style="list-style-type: none"> <li>Nurse or nurse technician vs. physician: OR 2.09 (95% CI 1.23-3.55)</li> </ul> </li> </ul> </li> <li>No direct patient contact: 41.7% (60/144)               <ul style="list-style-type: none"> <li>Administrative staff: 31.1% (28/90)</li> <li>Logistic worker: 63.0% (17/27)</li> </ul> </li> </ul>	Participation rate unclear; no control for confounders
Ferreira et al 2021 (17)  Prospective cohort  Canada (Toronto); 1 multisite acute and long-term care system; 17 April to 29 May 2020  <b>Added for Update Alert #8</b>	1669 asymptomatic HCWs <i>Infection (PCR; n=1669)</i> <ul style="list-style-type: none"> <li>Mean age 40 y</li> <li>79% female</li> <li>39% nurse, 9% physician, 27% allied health, 24% other role, 1% role not reported</li> <li>0.5% SARS-CoV-2 infection</li> </ul> <i>Seropositive (n=996)</i> <ul style="list-style-type: none"> <li>Mean age 41 y</li> </ul>	<i>Infection (PCR)</i> HCW role <ul style="list-style-type: none"> <li>Nurse: 1.2% (8/655)</li> <li>Physician: 0% (0/152)               <ul style="list-style-type: none"> <li>Nurse vs. physician: OR 4.00 (0.23-69.75)*</li> </ul> </li> <li>Allied health: 2.2% (1/446)</li> </ul> Exposure <ul style="list-style-type: none"> <li>Direct care of COVID patient: 0.6% (3/472)</li> <li>No direct care of COVID patient: 0.6% (6/1083)               <ul style="list-style-type: none"> <li>Direct care vs. no direct care: OR 1.15 (0.29 to 4.61)*</li> </ul> </li> </ul> <i>Seropositive</i> HCW role <ul style="list-style-type: none"> <li>Nurse: 1.9% (7/361)</li> <li>Physician: 1.0% (1/101)</li> </ul>	Participation rate ~14%; no control for confounders; some missing data; imprecise estimates

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	<ul style="list-style-type: none"> <li>• 78% female</li> <li>• 36% nurse, 10% physician, 26% allied health, 27% other role, 0.1% role not reported</li> <li>• 1.4% SARS-CoV-2 seropositive</li> </ul>	<ul style="list-style-type: none"> <li>○ Nurse vs. physician: OR 1.98 (0.24-16.26)*</li> <li>• Allied health: 1.9% (5/261)</li> </ul> <p>Exposure:</p> <ul style="list-style-type: none"> <li>• Direct care of COVID patient: 0.4% (1/255)</li> <li>• No direct care of COVID patient: 1.9% (13/672) <ul style="list-style-type: none"> <li>○ Direct care vs. no direct care: OR 0.20 (0.03-1.53)*</li> </ul> </li> </ul>	
<p>Folgueira et al, 2020 (47)</p> <p>Retrospective cohort</p> <p>Spain (Madrid); 1 hospital; 1 to 29 March 2020</p>	<p>2085 HCWs tested for SARS-CoV-2 infection</p> <ul style="list-style-type: none"> <li>• Age, sex, HCW role/position not reported</li> </ul>	<p>Incidence of SARS-CoV-2 infection, by department/hospital area</p> <ul style="list-style-type: none"> <li>• Intensive care unit: 52.3% (34/65)</li> <li>• Emergency department: 37.0% (50/135)</li> <li>• Surgery: 45.1% (79/175)</li> <li>• Oncology/hematology: 44.3% (31/70)</li> <li>• Medical areas without COVID-19: 37.4% (93/249)</li> <li>• Pediatrics/neonatal units: 48.6% (53/109)</li> <li>• Obstetrics/gynecology units: 39.5% (32/81)</li> <li>• Radiology: 38.0% (49/129)</li> <li>• Outpatient setting: 31.8% (14/44)</li> <li>• Administrative areas, clerical, informatics, communication, pharmacy: 55.2% (37/67)</li> <li>• Laboratories: 33.3% (28/84)</li> <li>• Kitchen: 38.3% (18/47)</li> </ul>	<p><b>Not peer reviewed</b>; no control for confounders</p>
<p>Fusco et al, 2020 (48)</p> <p>Cross-sectional</p> <p>Italy; single hospital; 23 March to 2 April 2020</p>	<p>115 HCWs in high-risk departments</p> <ul style="list-style-type: none"> <li>• Median age 43 y</li> <li>• 49% female</li> <li>• 23% physician, 50% nurse, 27% other HCW role</li> </ul> <p>92% direct patient care</p>	<p>Incidence of COVID-19 (SARS-CoV-2 infection or IgG seropositivity): 3.5% (4/115)</p> <ul style="list-style-type: none"> <li>• Female: 1.8% (1/55)</li> <li>• Male: 5.1% (3/59) <ul style="list-style-type: none"> <li>○ Female vs. male: OR 0.35 (0.03-3.43)</li> </ul> </li> <li>• Physician: 3.8% (1/26)</li> <li>• Nurse: 3.5% (2/57) <ul style="list-style-type: none"> <li>○ Nurse vs. physician: OR 0.91 (0.08-10.50)</li> </ul> </li> <li>• Other HCW role: 3.1% (1/32)</li> <li>• ED: 3.4% (2/59)</li> <li>• Medical division: 1.8% (1/56)</li> <li>• Direct patient care: 3.7% (4/107)</li> <li>• No direct patient care: 0% (0/8)</li> <li>• &gt;30 days exposure to patients with suspected or confirmed COVID-19: 4.3% (2/46)</li> </ul>	<p>No control for confounders; estimates imprecise</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		<ul style="list-style-type: none"> <li>• &lt;30 days exposure to patients with suspected or confirmed COVID-19: 2.9% (2/69)</li> <li>• Participation in a PPE training event: 4.1% (4/98)</li> <li>• No participation in a PPE training event: 0% (0/13) <ul style="list-style-type: none"> <li>○ PPE training vs. no training: 1.27 (0.06-24.97)</li> </ul> </li> </ul>	
<p>Garcia et al, 2020 (49)</p> <p>Retrospective cohort</p> <p>Spain (Madrid); 1 hospital; 24 February to 30 April 2020</p>	<p>1911 symptomatic HCWs tested for SARS-CoV-1</p> <ul style="list-style-type: none"> <li>• Median age 42 y</li> <li>• 80% female</li> <li>• 25.7% physician</li> <li>• 64.4% nurse</li> <li>• 1.3% nurse supervisor</li> <li>• 2.0% department head</li> <li>• 5.9% other role</li> </ul>	<p>Incidence of COVID-19</p> <p>High-risk setting: 9.1% (52/572)</p> <ul style="list-style-type: none"> <li>• Medical COVID-19 department: 18.7% (9/48)</li> <li>• ICU: 5.7% (13/226)</li> <li>• ED: 10.1% (30/298)</li> </ul> <p>Moderate-risk setting: 12.3% (94/761)</p> <ul style="list-style-type: none"> <li>• Outpatient clinic: 14.1% (25/177)</li> <li>• Obstetrics/gynecology: 5.4% (4/74)</li> <li>• Day unit: 10.5% (4/38)</li> <li>• Medical non-COVID-19 department: 16.1% (37/229)</li> <li>• Surgical unit: 9.9% (24/243)</li> </ul> <p>Low-risk setting: 8.6% (9/105)</p> <ul style="list-style-type: none"> <li>• Pathology: 6.2% (1/16)</li> <li>• Pharmacy: 10.0% (3/30)</li> <li>• Administrative, management, preventive medicine and social work: 8.5% (5.59)</li> </ul> <p>HCW role:</p> <ul style="list-style-type: none"> <li>• Physician: 13.0% (64/491)</li> <li>• Nurse: 10.2% (126/1231)</li> <li>• Nurse supervisor: 37.5% (9/24)</li> <li>• Any nursing role: 10.7% (135/1255)</li> <li>• Department head: 23.1% (9/39)</li> <li>• Other role: 4.4% (5/113)</li> <li>○ Nurse vs. physician: OR 0.76 (0.55-1.05)*</li> </ul>	<p>No control for confounders</p>
<p>Garralda Fernandez et al 2021 (7)</p> <p>Cross-sectional</p> <p>Spain (Fuenlabrada); 1 teaching hospital; 14 April to 13 May</p>	<p>2439 HCWs</p> <ul style="list-style-type: none"> <li>• Mean age 42 y</li> <li>• 78% female</li> <li>• HCW role not reported</li> <li>• 19.9% SARS-CoV-2 seropositivity or infection (PCR)</li> </ul>	<p>Sex</p> <ul style="list-style-type: none"> <li>• Female: 18.5% (353/1911)</li> <li>• Male: 25.0% (132/528) <ul style="list-style-type: none"> <li>○ Female vs. male: <b>OR 0.68 (0.54-0.85)*</b></li> </ul> </li> </ul> <p>HCW role (n/N not reported; vs. administrative staff and management)</p> <ul style="list-style-type: none"> <li>• Doctor: 25.4%; OR 2.13 (1.53–2.96)</li> <li>• Nurse assistant: 22.0%; OR 1.77 (1.26–2.49)</li> <li>• Security: 21.1%; OR 1.68 (1.02–2.78)</li> <li>• Nurse: 19.4%; OR 1.51 (1.09–2.09)</li> <li>• Technician: 18.1%; OR 1.39 (0.87–2.21)</li> </ul>	<p>No control for confounders; 81% participation rate</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
<b>Added for Update Alert #8</b>		<ul style="list-style-type: none"> <li>Cleaners: 16.9%; OR 1.27 (0.68–2.39)</li> </ul>	
<p>Goenka et al 2020 (50)</p> <p>Cross-sectional</p> <p>India (region not described); 1 hospital; 12 July to 23 August 2020</p>	<p>1,122 HCWs</p> <ul style="list-style-type: none"> <li>Mean age not reported; 59% age 30-50 y</li> <li>34% female</li> <li>23% physician, 20% nurse, 20% housekeeping, 9% technician, 7% administrative, 6% lab assistant/ pharmacist, 6% ward executive, 4% dietician, 4% other role</li> <li>11.9% SARS-CoV-2 seropositivity</li> </ul>	<p>HCW role</p> <ul style="list-style-type: none"> <li>Nurse: 9.4% (21/224)</li> <li>Physician: 3.9% (10/255) <ul style="list-style-type: none"> <li>Nurse vs. physician: adjusted OR 1.61 (0.62-4.35)</li> </ul> </li> <li>Housekeeping: 26.1% (59/226)</li> <li>Technician: 12.1% (12/99)</li> <li>Administration: 8.0% (6/75)</li> <li>Lab assistant/pharmacist: 15.3% (11/72)</li> <li>Dietician: 18.4% (9/49)</li> <li>Ward executive: 7.0% (5/71)</li> <li>Other role: 2.0% (1/51)</li> </ul> <p>Exposure</p> <ul style="list-style-type: none"> <li>High-risk HCW (work in COVID-19 unit or ICU or regularly involved in testing or investigating of COVID-19 patients): 19.9% (27/136)</li> <li>Intermediate-risk HCW (workers not meeting high-risk or low-risk criteria): 11.1% (101/911)</li> <li>Low-risk HCW (no direct contact with patients or their belongings): 8.0% (6/75) <ul style="list-style-type: none"> <li>High-risk vs. low-risk: adjusted OR 0.93 (0.13-6.79)</li> <li>Intermediate-risk vs. low-risk: adjusted OR 0.75 (0.11-5.15)</li> </ul> </li> </ul> <p>Time spent in hospital in a week</p> <ul style="list-style-type: none"> <li>&lt;48 hours: 14.0% (102/731)</li> <li>48 hours or more: 7.8% (29/373) <ul style="list-style-type: none"> <li>&lt;48 vs. 48 hours or more: <b>OR 1.92 (1.25-2.97)*</b></li> </ul> </li> </ul> <p>Diabetes</p> <ul style="list-style-type: none"> <li>Yes: 9.2% (6/65)</li> <li>No: 12.1% (128/1057) <ul style="list-style-type: none"> <li>Diabetes (yes vs. no): OR 0.74 (0.31-1.74)*</li> </ul> </li> </ul> <p>Hypertension/coronary artery disease</p> <ul style="list-style-type: none"> <li>Yes: 4.7% (5/107)</li> <li>No: 12.7% (129/1015) <ul style="list-style-type: none"> <li>Hypertension/coronary artery disease (yes vs. no): <b>OR 0.34 (0.13-0.84)*</b></li> </ul> </li> </ul> <p>Lung disease</p> <ul style="list-style-type: none"> <li>Yes: 9.7% (3/31)</li> <li>No: 12.0% (131/1091) <ul style="list-style-type: none"> <li>Lung disease (yes vs. no): OR 0.79 (0.24-2.62)*</li> </ul> </li> </ul>	<p>Potential recall bias; no control for confounders for some analyses; participation rate unclear</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		BCG vaccine <ul style="list-style-type: none"> <li>• Yes: 7.3% (41/561)</li> <li>• No: 16.9% (13/77)               <ul style="list-style-type: none"> <li>◦ BCG vaccine (yes vs. no): <b>OR 0.39 (0.20-0.76)*</b></li> </ul> </li> </ul> MMR vaccine <ul style="list-style-type: none"> <li>• Yes: 8.6% (29/336)</li> <li>• No: 8.2% (25/303)               <ul style="list-style-type: none"> <li>◦ MMR vaccine (yes vs. no): OR 1.05 (0.60-1.84)*</li> </ul> </li> </ul> Hydroxychloroquine prophylaxis <ul style="list-style-type: none"> <li>• Adequate dose (400 mg/week for &gt;6 weeks): 1.3% (1/77)</li> <li>• Inadequate dose: 11.2% (18/160)</li> <li>• Not received: 12.3% (115/885)               <ul style="list-style-type: none"> <li>◦ Hydroxychloroquine prophylaxis with adequate dose vs. inadequate dose or no prophylaxis: <b>OR 0.09 (0.01-0.65)*</b></li> </ul> </li> </ul>	
Grant et al 2021 (51)  Cross-sectional  UK (London); health system; 15 May to 5 June 2020	2,004 HCWs <ul style="list-style-type: none"> <li>• Mean age 40 y</li> <li>• % female not reported</li> <li>• HCW role not reported; 67% clinical role with direct and prolonged patient contact</li> <li>• 31.6% SARS-CoV-2 seropositive</li> </ul>	Clinical setting and patient contact type <ul style="list-style-type: none"> <li>• Clinical environment, direct, prolonged patient contact: 34.7% (467/1345); <b>OR (yes vs. no) 1.57 (1.27-1.93)*</b></li> <li>• Clinical environment, minimal or no direct patient contact: 30% (59/197); OR (yes vs. no) 0.92 (0.66-1.26)*</li> <li>• Nonclinical environment, direct, prolonged patient contact: 25.0% (27/108); OR (yes vs. no) 0.71 (0.45-1.11)*</li> <li>• Nonclinical environment, minimal or no direct patient contact: 22.6% (77/341); <b>OR (yes vs. no) 0.58 (0.44-0.76)*</b></li> <li>• Working from home: 30.8% (4/13); OR (yes vs. no) 0.96 (0.29-3.13)*</li> </ul> Unit type <ul style="list-style-type: none"> <li>• COVID-19 ward with CPAP: 42.0% (84/200); <b>OR (yes vs. no) 1.65 (1.23-2.22)*</b></li> <li>• COVID-19 ward with CPAP, including ED: 175/424 (41.3%); <b>OR (yes vs. no) 1.72 (1.38-2.14)*</b></li> <li>• Operating theatres: 33.6% (43/128); OR (yes vs. no) 1.10 (0.75-1.61)*</li> <li>• Non-COVID-19 unit, including maternity and neonatal unit: 28.9% (82/284); OR (yes vs. no) 0.86 (0.65-1.13)</li> <li>• Non-ward unit: 26.0% (206/792); <b>OR (yes vs. no) 0.64 (0.53-0.78)*</b></li> <li>• ICU: 25.0% (44/176); OR (yes vs. no) 0.70 (0.49-0.998)*</li> </ul>	Participation rate unclear; some exclusions due to missing data; no control for confounders
Gras-Valenti et al 2020 (52)  Retrospective cohort	4,179 HCWs <ul style="list-style-type: none"> <li>• Mean age not reported; 2% ≤24 y, 9% 25-29 y, 10% 30-34 y, 12% 40-44</li> </ul>	Sex <ul style="list-style-type: none"> <li>• Female: 6.4% (197/3,065)</li> <li>• Male: 6.9% (77/1,114)               <ul style="list-style-type: none"> <li>◦ Female vs. male: OR 0.93 (0.70-1.22)*</li> </ul> </li> </ul> Age	No control for confounders

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
Spain (Alicante); 1 hospital and 12 primary care clinics; 24 April to 8 May 2020	<ul style="list-style-type: none"> <li>y, 12% 45-49 y, 13% 50-54 y, 15% 55-59 y, 16% 60-64 y, 2% ≥65 y</li> <li>• 73% female</li> <li>• 23% physician, 28% nurse</li> <li>• 6.6% SARS-CoV-2 infection (PCR)</li> </ul>	<ul style="list-style-type: none"> <li>• ≤24 years: 6.9% (5/72)</li> <li>• 25-29 years: 9.4% (36/383)</li> <li>• 30-34 years: 7.7% (29/375)</li> <li>• 35-39 years: 6.4% (26/408)</li> <li>• 40-44 years: 7.4% (36/487)</li> <li>• 45-49 years: 5.8% (29/503)</li> <li>• 50-54 years: 6.2% (34/553)</li> <li>• 55-59 years: 5.6% (36/645)</li> <li>• 60-64 years: 5.2% (36/688)</li> <li>• ≥65 years: 10.8% (7/65)</li> </ul> <p>HCW role</p> <ul style="list-style-type: none"> <li>• Nurse: 6.6% (78/1,186)</li> <li>• Physician: 8.7% (85/974)</li> <li>• Nurse vs. physician: OR 0.74 (0.53-1.01)*Caretaker: 6.8% (19/286)</li> <li>• Technician: 3.0% (4/127)</li> <li>• Administrative: 16.1% (/672)</li> <li>• Other housekeeping personnel: 3.8% (/158)</li> <li>• Other non-housekeeping personnel: 3.0% (/125)</li> </ul> <p>Clinical setting</p> <ul style="list-style-type: none"> <li>• Primary care: 18.1% (/757)</li> <li>• Urgent care: 7.6% (/318)</li> <li>• Critical care: 6.2% (/259)</li> <li>• Medical specialty: 13.0% (/545)</li> <li>• Surgical specialty: 20.2% (/846)</li> <li>• Other: 34.8% (1454)</li> </ul>	
Heinzerling et al, 2020 (53)  Retrospective cohort  United States (California); 1 hospital with unsuspected COVID-19 case; February 2020	<p>37 HCWs with exposure to COVID-19 patient and at least one aerosol-generating procedure</p> <ul style="list-style-type: none"> <li>• Median age, 39 years</li> <li>• 84% female</li> <li>• 7% physician, 51% nurse, 9% respiratory therapist, 9% phlebotomist, 7%</li> </ul>	<p>Estimated time in patient room (median, minutes): 120 (IQR 120-420) vs. 25 (IQR 10-50), p=0.06</p> <p>Estimated time in patient room during aerosol generating procedures (median, minutes): 95 (IQR 0-160) vs. 0 (IQR 0-3), p=0.13</p> <p>OR (95% CI) for COVID-19 (PCR)*</p> <ul style="list-style-type: none"> <li>• Taking vital sign (yes vs. no): 7.71 (0.61-97.85)</li> <li>• Taking medical history (yes vs. no): 1.93 (0.15-24.46)</li> <li>• Performing physical examination: <b>21.82 (1.02-466.52)</b></li> <li>• Providing medication: 1.20 (0.10-14.79)</li> <li>• Bathing or cleaning patient: 0.97 (0.04-22.02)</li> <li>• Lifting or positioning patient: 0.92 (0.08-11.18)</li> <li>• Emptying bedpan: 8.00 (0.49-13.70)</li> </ul>	Potential recall bias; no control for confounders; few cases and imprecise estimates; 6 tested HCWs were not interviewed and excluded from analysis

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	<p>certified nursing assistant, 7% environmental services worker, 5% nutrition services worker, 2% pharmacist, 2% other</p> <ul style="list-style-type: none"> <li>• 5.4% (2/37) diagnosed with COVID-19</li> <li>• No use of N95 respirators, eye protection, gowns, or PAPR</li> </ul>	<ul style="list-style-type: none"> <li>• Changing linens: 0.77 (0.03-17.01)</li> <li>• Cleaning patient room: 0.97 (0.04-22.02)</li> <li>• Peripheral line insertion: 3.19 (0.11-94.15)</li> <li>• Central line insertion: 3.19 (0.11-94.15)</li> <li>• Drawing arterial blood gas: 16.50 (0.73-372.83)</li> <li>• Drawing blood: 0.77 (0.03-17.01)</li> <li>• Manipulation of oxygen mask or tubing: 11.60 (0.88-153.29)</li> <li>• Manipulation of ventilator or tubing: 0.53 (0.02-11.30)</li> <li>• In room while high-flow oxygen delivered: 1.39 (0.11-17.24)</li> <li>• Collecting respiratory specimen: 1.29 (0.05-30.38)</li> <li>• Airway suctioning: 0.52 (0.02-11.30)</li> <li>• Noninvasive ventilation (BiPAP, CPAP): <b>15.00 (1.09-205.50)</b></li> <li>• Manual (bag) ventilation: 8.00 (0.49-130.70)</li> <li>• Nebulizer treatments: <b>20.67 (1.42-300.55)</b></li> <li>• Breaking ventilation circuit: 0.77 (0.03-17.01)</li> <li>• Sputum induction: 3.19 (0.11-94.15)</li> <li>• Intubation: 8.00 (0.49-130.70) <ul style="list-style-type: none"> <li>○ Performed or assisted (vs. no involvement): 8.00 (0.49-130.70)</li> <li>○ Present in room (vs. no involvement): 1.86 (0.07-46.97)</li> </ul> </li> <li>• Bronchoscopy: 1.29 (0.05-30.38) <ul style="list-style-type: none"> <li>○ Performed or assisted (vs. no involvement): 1.29 (0.05-30.38)</li> <li>○ Present in room (vs. no involvement): 3.19 (0.11-94.15)</li> </ul> </li> <li>• Any aerosol generating procedure: 2.53 (0.21-30.68)</li> <li>• Always gloves during aerosol generating procedures: 3.10 (0.13-75.19)</li> <li>• Always facemask (non-N95) during aerosol generating procedures: 0.77 (0.03-20.02)</li> <li>• Always gloves during non-aerosol generating procedures: 4.40 (0.21-91.92)</li> <li>• Always facemask (non-N95) during non-aerosol generating procedures: 1.29 (0.05-30.38)</li> <li>• Longest single duration of time in room (reference &lt;2 minutes): 2 to 30 minutes: <b>32.00 (1.96-522.78)</b> <ul style="list-style-type: none"> <li>○ 31 to 60 minutes: 1.86 (0.07-46.97)</li> <li>○ &gt;60 minutes: 8.00 (0.59-130.70)</li> </ul> </li> <li>• Within 6 feet of index patient: 1.03 (0.05-23.49)</li> <li>• Direct skin-to-skin contact with index patient: 0.45 (0.02-9.52)</li> <li>• Index patient either masked or on closed system ventilator when contact occurred (reference never): Always: 0.20 (0.01-4.22) <ul style="list-style-type: none"> <li>○ Sometimes: 2.86 (0.24-34.66)</li> </ul> </li> </ul>	

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
<p>Herzberg et al 2021 (8)</p> <p>Cross-sectional</p> <p>Germany (Schleswig-Holstein); single hospital; March to June 2020</p> <p><b>Added for Update Alert #8</b></p>	<p>871 asymptomatic HCWs</p> <ul style="list-style-type: none"> <li>• Mean age 40 y</li> <li>• 75% female</li> <li>• 17% physician, 34% nurse, 11% students or trainees</li> <li>• 2.6% SARS-CoV-2 seropositivity</li> </ul>	<p>Age</p> <ul style="list-style-type: none"> <li>• Age, per 10 years: adjusted OR 1.50 (1.19 to 1.90)</li> </ul> <p>Sex</p> <ul style="list-style-type: none"> <li>• Female vs. male: adjusted OR 0.91 (0.42-2.00)</li> </ul> <p>Other population characteristics</p> <ul style="list-style-type: none"> <li>• Body mass index, per increase of 5 kg/m<sup>2</sup>: <b>adjusted OR 0.72 (0.56-0.94)</b></li> </ul> <p>Exposure</p> <ul style="list-style-type: none"> <li>• Direct patient care, yes vs. no: adjusted OR 0.85 (0.41 to 1.74)</li> </ul>	<p>Details on multivariate analysis lacking; no control for PPE and limited control for exposures</p>
<p>Houlihan et al, 2020 (54)</p> <p>Prospective cohort</p> <p>UK (London); 1 acute care hospital; 26 March to 8 April 2020</p>	<p>200 frontline HCWs</p> <ul style="list-style-type: none"> <li>• Median age 34.7</li> <li>• 61% female</li> <li>• 36% physician, 53% nurse or other front-line clinical staff, 11% other</li> <li>• 17% ER, 18% acute medical admissions, 22% ICU, 21% hematology, 22% other</li> </ul>	<p>Incidence of SARS-CoV-2 infection (seropositive or PCR)</p> <ul style="list-style-type: none"> <li>• Age &lt;30: 54% (31/57)</li> <li>• Age 30-39: 49% (34/70)</li> <li>• Age 40-49: 30% (12/30)</li> <li>• Age ≥50: 33% (10/30)</li> <li>• Female: 40% (49/122)</li> <li>• Male: 50% (38/76) <ul style="list-style-type: none"> <li>◦ Female vs. male: OR 0.67 (0.38-1.20)*</li> </ul> </li> <li>• Physician: 44% (32/72)</li> <li>• Nurse or other frontline clinical staff: 43% (46/106) <ul style="list-style-type: none"> <li>◦ Nurse or other frontline clinical staff vs. physician: OR 0.96 (0.52-1.75)*</li> </ul> </li> <li>• Other healthcare role: 41% (9/22)</li> <li>• ER: 38% (13/34)</li> <li>• Acute medical admissions: 51% (19/37)</li> <li>• ICU: 37% (16/43)</li> <li>• Hematology: 48% (19/40)</li> <li>• Other healthcare setting: 4% (18/43)</li> </ul>	<p>Limited information on demographic characteristics of HCWs; selection of HCWs for testing unclear; no control for confounders</p>
<p>Hunter et al, 2020 (55)</p> <p>Cross-sectional</p> <p>United States (Indiana); 18 locations within one</p>	<p>734 HCWs without active symptoms or previously confirmed COVID-19 who volunteered and completed study</p> <ul style="list-style-type: none"> <li>• Mean age: 42.8 y</li> <li>• 70.1% female</li> </ul>	<p>Prevalence of SARS-CoV-2 IgG antibodies:</p> <ul style="list-style-type: none"> <li>• Physician/APP: 1.1% (3/279)</li> <li>• Nurses: 2.2% (7/317) <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: OR 2.08 (0.53-8.11)*</li> </ul> </li> <li>• RTs: 0% (0/94)</li> <li>• Administrative : 4.5% (2/44)</li> <li>• High risk: 1.3% (5/385)</li> <li>• Low risk: 2.0% (7/349)</li> </ul>	<p>Number of tests allocated according to assessed risk; testing protocol varied according to hospital risk (only offered to ED and COVID units in high risk hospitals); no control for confounders</p>



Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
healthcare system; dates not reported	<ul style="list-style-type: none"> <li>38.0% physicians, 43.2% nurses, 12.8% RTs, 6.0% admin</li> </ul>		
Jeremias et al, 2020 (56)  Cross-sectional  United States (New York); 1 hospital; 1 March to 30 April 2020	3,046 HCWs (asymptomatic or symptom-free for at least 14 days), of whom 1958 underwent testing <ul style="list-style-type: none"> <li>Mean age 43 y</li> <li>70% female</li> <li>6.4% physician, 55.6% nurse, 10.0% technologist, 6.2% environmental worker, 21.7% ancillary worker</li> </ul>	Prevalence of SARS-CoV-2 seropositivity <ul style="list-style-type: none"> <li>Female: 9.4% (118/1259)</li> <li>Male: 11.1% (49/440)               <ul style="list-style-type: none"> <li>Female vs. male: OR 0.83 (0.58-1.17)*</li> </ul> </li> <li>Physician: 11.4% (9/79)</li> <li>Nurse: 9.5% (99/1043)               <ul style="list-style-type: none"> <li>Nurse vs. physician: OR 0.82 (0.40-1.68)*</li> </ul> </li> <li>Technologist: 5.8% (9/155)</li> <li>Environmental worker: 12.0% (12/100)</li> <li>Ancillary worker: 12.1% (39/322)</li> <li>ER: 10.2% (9/88)</li> <li>Floor: 12.3% (60/489)</li> <li>ICU: 6.9% (22/321)</li> <li>Operational: 10.5% (42/400)</li> <li>Procedural: 9.1% (22/243)</li> <li>Other: 7.6% (12/158)</li> </ul>	64% participation rate; demographic characteristics reported for the entire cohort rather than those who underwent testing
Jespersen et al, 2020 (57)  Cross-sectional  Denmark (central region); all hospitals, prehospital and specialist practitioners; 18 May to 19 June 2020	17,971 (17,280 with reported data) HCWs <ul style="list-style-type: none"> <li>Mean age not reported, 11% age &lt;29 y, 22% age 30-39 y, 26% age 40-49 y, 26% age 50-59, 15% age ≥60 y</li> <li>86% female</li> <li>85% hospital worker (n=15,261)               <ul style="list-style-type: none"> <li>13% physician, 46% nurse, 7% laboratory scientist, 9% medical</li> </ul> </li> </ul>	SARS-CoV-2 seropositivity <ul style="list-style-type: none"> <li>Age &lt;29 y: 6.0% (116/1,916)</li> <li>Age 30-39 y: 3.8% (144/3,794)</li> <li>Age 40-49 y: 3.8% (175/4,560)</li> <li>Age 50-59 y: 3.6% (161/4,505)</li> <li>Age ≥60 y: 2.9% (72/2,505)</li> <li>Male: 3.9% (94/2,430)</li> <li>Female: 3.9% (574/14,850)               <ul style="list-style-type: none"> <li>Female vs. male: OR 1.00 (0.80-1.25)*</li> </ul> </li> </ul>	69% overall response rate; discrepant results reported

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	secretary, 25% other role		
Jones et al 2020 (58)  Cross-sectional  UK (Bristol); health service	6858 HCWs (all invited for testing) <ul style="list-style-type: none"> <li>• Mean age not reported</li> <li>• 78% female</li> <li>• 29% nurse/midwife, 12% medical/dental, 9% allied health, 18% administrative/clerical, 21% other clinical services</li> <li>• 9.3% SARS-CoV-2 seroprevalence</li> </ul>	Age <ul style="list-style-type: none"> <li>• ≤20 y: 12.3% (14/114); adjusted OR 1.47 (0.96-2.20)</li> <li>• 21-30 y: 10.9% (192/1757); <b>adjusted OR 1.64 (1.36-1.99)</b></li> <li>• 31-40 y: 7.3% (118/1624); reference</li> <li>• 41-50 y: 10.3% (158/1536); <b>adjusted OR 1.36 (1.11-1.67)</b></li> <li>• 51-60 y: 8.5% (120/1408); <b>adjusted OR 1.45 (1.17-1.80)</b></li> <li>• 61-70 y: 8.7% (35/402); adjusted OR 1.28 (0.94 to 1.73)</li> </ul> Sex <ul style="list-style-type: none"> <li>• Female: 9.3% (498/5338)</li> <li>• Male: 9.2% (140/1520) <ul style="list-style-type: none"> <li>◦ Female vs. male: adjusted OR 1.04 (0.88-1.23)</li> </ul> </li> </ul> Race/Ethnicity <ul style="list-style-type: none"> <li>• Black, Asian, and minority ethnic: 14.6% (160/1095)</li> <li>• White: 8.2% (456/5578) <ul style="list-style-type: none"> <li>◦ BAME vs white: <b>adjusted OR 1.99 (1.69-2.34)</b></li> </ul> </li> </ul> HCW role <ul style="list-style-type: none"> <li>• Nurse/midwife: 10.2% (201/1962)</li> <li>• Medical/dental: 8.6% (74/856) <ul style="list-style-type: none"> <li>◦ Nurse/midwife vs. medical/dental: OR 1.21 (0.91-1.60)*</li> </ul> </li> <li>• Allied health 7.5% (31/413)</li> <li>• Administrative/clerical: 5.9% (73/1233)</li> <li>• Other clinical services: 12.7% (180/1420)</li> </ul>	No control for exposures or PPE; 56% participation rate
Kassem et al, 2020 (59) Prospective cohort  Egypt; gastroenterological unit of 1 hospital; 1 to 14 June 2020	74 HCWs in gastroenterology service with no reported household contact with infected persons <ul style="list-style-type: none"> <li>• Median age 42 y</li> <li>• 59.5% female</li> <li>• 40.5% physician, 37.8% nurses; 12.2% cleaning and transportation; 9.5% administration</li> </ul>	At least one positive test for SARS-CoV-2 infection (RT-PCR or RST) <ul style="list-style-type: none"> <li>• Female: 18.2% (8/44)</li> <li>• Male: 26.7% (8/30) <ul style="list-style-type: none"> <li>◦ Female vs. male: OR 0.61 (0.20-1.86)*</li> </ul> </li> <li>• Physicians: 13.3% (4/30)</li> <li>• Nurses: 21.4% (6/28) <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: OR 91.77 (0.44-7.09)*</li> </ul> </li> <li>• Patient transporters/cleaners: 33.3% (3/9)</li> <li>• Administrative: 42.9% (3/7)</li> <li>• Comorbidities: 18.8% (3/16)</li> <li>• Exposure to suspected or confirmed COVID-19 during work in last 2 weeks: 75% (12/16)</li> <li>• Proper hand hygiene: 93.8% (15/16)</li> <li>• PPE when indicated: Always 93.8% (15/16) vs. occasionally 6.2% (1/16)</li> </ul>	59% participation rate; no control for confounders

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
<p>Khalil et al, 2020 (60)</p> <p>Case-control</p> <p>Bangladesh; multiple hospitals (number not reported); May to June 2020</p>	<p>98 COVID-19 positive HCWs and 92 COVID-19 negative controls</p> <ul style="list-style-type: none"> <li>• Mean age 33 y (cases)</li> <li>• 22% female (cases)</li> <li>• 100% physicians</li> </ul>	<p>Risk of COVID-19 (defined as positive PCR), unadjusted OR (95% CI):</p> <ul style="list-style-type: none"> <li>• Age ≥35 years vs. &lt;35 years: 0.67 (0.35-1.28)</li> <li>• Female vs. male: 0.66 (0.44-1.69)</li> <li>• Workplace setting (reference inpatient) <ul style="list-style-type: none"> <li>○ Outpatient: 0.64 (0.31-1.29)</li> <li>○ ED: 0.94 (0.41-2.15)</li> <li>○ ICU: 1.24 (0.40-3.85)</li> <li>○ Tertiary care: 0.95 (0.31-2.88)</li> </ul> </li> <li>• Received formal training on PPE (yes vs. no): 1.67 (0.89-3.12)</li> <li>• Place of contact with COVID-19 (reference hospital environment) <ul style="list-style-type: none"> <li>○ Suspected contact with COVID-19 patient or health worker: 1.51 (0.67-3.42)</li> <li>○ Confirmed contact with COVID-19 patient or health worker: 0.82 (0.39-1.69)</li> <li>○ Community contact: 1.14 (0.24-5.43)</li> <li>○ Unknown contact: 0.35 (0.13-0.94)</li> </ul> </li> <li>• Participated in direct COVID-19 patient care (yes vs. no): 0.94 (0.50-1.77)</li> <li>• Performed aerosol-generating procedure on COVID-19 patient (yes vs. no): 1.30 (0.64-2.37)</li> <li>• Direct contact with contaminated fomite (yes vs. no): 1.74 (0.90-3.35)</li> <li>• Wore PPE (yes vs. no): 0.15 (0.02-1.21)</li> <li>• Single-use gloves (yes vs. no): 1.01 (0.38-2.68)</li> <li>• Medical/surgical mask (yes vs. no): 1.40 (0.30-6.42)</li> <li>• Face shield/goggles (yes vs. no): <b>0.44 (0.23-0.84)</b></li> <li>• Disposable gown (yes vs. no): 1.08 (0.53-2.20)</li> <li>• Proper donning and doffing of PPE (yes vs. no): 0.57 (0.29-1.14)</li> <li>• Followed hand hygiene – <ul style="list-style-type: none"> <li>○ During patient care (yes vs. no): 0.78 (0.23-2.67)</li> <li>○ During procedure (yes vs. no): 3.28 (0.66-12.30)</li> <li>○ After body fluid exposure (yes vs. no): 0.28 (0.06-1.45)</li> <li>○ After touching fomites (yes vs. no): 1.58 (0.49-5.04)</li> </ul> </li> <li>• Decontaminated surroundings (yes vs. no): <b>0.39 (0.18-0.87)</b></li> </ul>	<p>Proportion of eligible HCW cases included not reported; method of identifying controls unclear; imprecise estimates; potential recall bias; no control for confounders</p>
<p>Korth et al, 2020 (61)</p> <p>Cross-sectional</p> <p>German (Essen); 1 hospital; 25 March to April 21 2020</p>	<p>317 HCWs</p> <ul style="list-style-type: none"> <li>• Mean age, 37 y in high-risk group, 42.3 y in low-risk group</li> <li>• 100% female</li> </ul>	<p>Prevalence of SARS-CoV-2 IgG positivity</p> <ul style="list-style-type: none"> <li>• High-risk (daily contact with COVID-19 patients on designated wards and intensive care units): 1.2% (3/244)</li> <li>• Intermediate-risk (daily non-COVID-19 patient contact): 5.4% (2/36)</li> <li>• Low-risk (no daily patient contact): 0% (0/35)</li> </ul>	<p>No control for confounders</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	<ul style="list-style-type: none"> <li>25% physician, 66% nurse, 6% lab assistant, 3% other</li> <li>1.6% (5/316) diagnosed with SARS-CoV-2 IgG positivity</li> </ul>		
Krastinova et al 2020 (62)  Cross-sectional  France (Creteil); 1 hospital; 17 March to 20 April 2020	314 symptomatic HCWs <ul style="list-style-type: none"> <li>Mean age 40 y</li> <li>81% female</li> <li>HCW role not reported</li> <li>5.0% SARS-CoV-2 infection (PCR)</li> </ul>	Age <ul style="list-style-type: none"> <li>&gt;50 y vs. ≤50 y: adjusted OR 0.69 (0.36-1.32)</li> </ul> Sex <ul style="list-style-type: none"> <li>Female: 34.5% (88/255)</li> <li>Male: 37.2% (22/59)               <ul style="list-style-type: none"> <li>Female vs. male: adjusted OR 1.20 (0.60-2.38)</li> </ul> </li> </ul> Comorbidities <ul style="list-style-type: none"> <li>BMI ≥30 vs. &lt;30 kg/m<sup>2</sup>: adjusted OR 0.92 (0.62-1.63)</li> <li>Former vs. never smoker: adjusted OR 0.83 (0.40-1.74)</li> <li>Current vs. never smoker: <b>adjusted OR 0.30 (0.15-0.62)</b></li> </ul> Exposure <ul style="list-style-type: none"> <li>Non-patient facing vs. non-clinical: adjusted OR 1.57 (0.5-5.31)</li> <li>Direct patient facing vs. non-clinical: adjusted OR 3.08 (1.09-8.78)</li> </ul>	No control for PPE and limited control for exposures
Lackermair et al, 2020 (63)  Cross-sectional  Germany (Dachau); 8 primary care clinics; 2 to 6 April	151 HCWs <ul style="list-style-type: none"> <li>Mean age 38 years</li> <li>83% female</li> <li>36% physician, 64% other HCW</li> <li>28% known unprotected COVID-19 contact</li> <li>72% symptomatic</li> </ul>	Prevalence of SARS-CoV-2 seropositivity <ul style="list-style-type: none"> <li>Female: 1.6% (2/126)</li> <li>Male: 8.0% (2/25)               <ul style="list-style-type: none"> <li>Female vs. male: OR 0.19 (0.02-1.38)*</li> </ul> </li> <li>Physician: 5.6% (3/54)</li> <li>Other HCW role: 1.0% (1/97)</li> <li>Direct contact with COVID-19 patient: 4.8% (2/42)</li> <li>No direct contact with COVID-19 patient: 1.8% (2/109)               <ul style="list-style-type: none"> <li>Direct contact with COVID-19 patient vs. no direct contact: 2.68 (0.36-19.64)*</li> </ul> </li> </ul>	Potential recall bias
Lahner et al, 2020 (64)  Cross-sectional  Italy (Rome); 1 hospital; 18 March to 27 April 2020	2,115 HCWs in a COVID-19 regional hub <ul style="list-style-type: none"> <li>Median age 46 y</li> <li>60.2% female</li> <li>30% physician, 33% nurse, 37% other HCW role</li> </ul>	Incidence of SARS-CoV-2 infection (PCR) <ul style="list-style-type: none"> <li>Physician: 4.1% (26/632)</li> <li>Nurse: 3.8% (27/705)</li> <li>Other HCW role: 0.6% (5/778)</li> </ul>	No non-HCW controls

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
Lai et al, 2020 (65)  Retrospective cohort  China (Wuhan); 1 hospital; 1 January-9 February 2020	9,648 HCWs <ul style="list-style-type: none"> <li>12% ≥45 y, 88% &lt;45 y</li> <li>74% female</li> <li>22% physician, 46% nurse, 32% health care assistant</li> <li>1.1% (110/9648) diagnosed with COVID-19</li> </ul>	OR (95% CI) for COVID-19 (criteria not described)* <ul style="list-style-type: none"> <li>Age &lt;45 y vs. ≥45 y: 0.32 (0.21-0.48)</li> <li>Female vs. male: 0.91 (0.60-1.39)</li> <li>Nurse vs. physician: 1.16 (0.73-1.84)               <ul style="list-style-type: none"> <li>Health care assistant vs. physician: 0.59 (0.33-1.04)</li> </ul> </li> <li>Clinic department for patients presumed not to have COVID-19 vs. fever clinic or ward: 3.00 (1.76-5.09)</li> </ul> Department with no patient contact vs. fever clinic or ward: 1.81 (0.95-3.46)	No control for confounders; incident rate ratios reported but unclear how duration of exposure estimated and results discrepant with data in study; criteria for COVID-19 not described
Lan et al 2021 (18)  Retrospective cohort  USA (Massachusetts); healthcare system; 9 March to 3 June 2020  <b>Added for Update Alert #8</b>	5,177 HCWs <ul style="list-style-type: none"> <li>Mean age 44 y</li> <li>75% female</li> <li>19% RN, 11% other nursing, 8% clinic support, 4% mental health provider, 16% administration, 24% frontline workers (patient-facing)</li> <li>56% white, 20% African American, 13% Hispanic, 11% other race</li> <li>2.9% SARS-CoV-2 infection (PCR)</li> </ul>	Age <ul style="list-style-type: none"> <li>SARS-CoV-2 infection vs. no infection: mean age 42.7 (SD 12.7) vs. 44.3 (SD 13.5); p=0.13</li> </ul> Sex <ul style="list-style-type: none"> <li>Female: 2.5% (91/3641)</li> <li>Male: 2.1% (25/1209)               <ul style="list-style-type: none"> <li>Female vs. male: adjusted IRR 1.15 (0.74-1.80)</li> </ul> </li> </ul> Race/ethnicity <ul style="list-style-type: none"> <li>Non-Hispanic white: 1.5% (38/2544); reference</li> <li>African American: 5.0% (44/875); <b>adjusted IRR 2.78 (1.78-4.33)</b></li> <li>Hispanic: 4.7% (28/592); <b>adjusted IRR 2.41 (1.42-4.07)</b></li> <li>Other race: 1.2% (6/517); adjusted IRR 0.70 (0.29-1.66)</li> </ul> Exposure <ul style="list-style-type: none"> <li>Frontline worker (patient-facing): 3.7% (46/1229)</li> <li>Non-frontline worker (not patient-facing): 2.0% (77/3919)               <ul style="list-style-type: none"> <li>Frontline vs. non-frontline: <b>adjusted OR 1.73 (1.16-2.54)</b></li> </ul> </li> </ul>	Untested HCWs were considered SARS-CoV-2 negative; some missing data and data discrepancies
Leeds et al, 2020 (66)  Prospective cohort  UK (England); multicenter, including 2 main hospitals and 6	991 symptomatic HCWs <ul style="list-style-type: none"> <li>Mean age 43 y</li> <li>85% female</li> <li>59% nurse, 7% allied health professional, 3% clinical support staff,</li> </ul>	Adjusted OR (95% CI) for SARS-CoV-2 infection (repeat PCR over 4 weeks): <ul style="list-style-type: none"> <li>Age: 1.01 (0.99-1.03)</li> <li>Male: 1.03 (0.59-1.79)</li> <li>Frontline worker: 0.79 (0.53-1.17)</li> <li>Black, Asian, and minority ethnic: 1.08 (0.56-2.04)</li> </ul>	Incomplete data on HCW role at baseline

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
community hospitals; 1 to 28 April 2020	5% nonclinical staff (HCW role n=738)		
Lombardi et al, 2020 (67)  Cross-sectional  Italy (Milan); 1 hospital; 24 February to 31 March 31 2020	1,573 HCWs <ul style="list-style-type: none"> <li>• Mean age, 44 y</li> <li>• 64% female</li> <li>• 37% physician, 33% nurse/midwife, 10% healthcare assistant, 11% health technician, 9% clerical workers/technician</li> <li>• 30% at least 1 symptom</li> <li>• 8.8% (138/1573) diagnosed with SARS-CoV-2 infection (PCR)</li> </ul>	Odds ratio (95% CI) for SARS-CoV-2 infection (PCR) <ul style="list-style-type: none"> <li>• Female vs. male: 0.83 (0.58-1.18)</li> <li>• Nurse vs. physician: 0.75 (0.50-1.13)</li> </ul> Prevalence of SARS-CoV-2 infection (PCR) <ul style="list-style-type: none"> <li>• &lt;30 y: 11.7% (29/248)</li> <li>• 30-39 y: 8.8% (34/387)</li> <li>• 40-49 y: 8.0% (26/326)</li> <li>• 50-59 y: 7.9% (35/444)</li> <li>• ≥60 y: 8.3% (14/168)</li> <li>• Physician (including resident): 10.6% (62/582)</li> <li>• Nurses/midwife: 8.2% (43/522)</li> <li>• Healthcare assistant: 8.0% (13/162)</li> <li>• Health technician: 9.4% (16/170)</li> <li>• Clerical worker/technician: 2.9% (4/137)</li> </ul>	No control for confounders
Lumley et al, 2020 et al (9)  Prospective cohort  UK (Oxfordshire); 4 teaching hospitals; 27 March to 30 November 2020  <b>Added for Update Alert #8</b>	12541 HCWs <ul style="list-style-type: none"> <li>• Median age 38 y</li> <li>• 74% female; 0.2% other</li> <li>• 72% white, 16% Asian, 4% Black, 1% Chinese, 6 other race/ethnicity</li> <li>• 36% nurse, 15% physician, 12% administrative staff, 5% medical or nursing student, 4% laboratory staff, 3% therapist, 3% porter or domestic worker, 2% security or</li> </ul>	<u>SARS-CoV-2 seropositivity at baseline</u> Age <ul style="list-style-type: none"> <li>• Median 38 years (positive at baseline) vs. 38-41 years (not positive at baseline)</li> </ul> Sex <ul style="list-style-type: none"> <li>• Female: 9.0% (835/9263)</li> <li>• Male: 10.4% (339/3259) <ul style="list-style-type: none"> <li>◦ Female vs. male: <b>OR 0.85 (0.75-0.97)*</b></li> </ul> </li> </ul> Race/ethnicity <ul style="list-style-type: none"> <li>• White: 7.7% (703/9074); reference</li> <li>• Asian: 14.2% (287/2026); <b>OR 1.97 (1.70-2.28)*</b></li> <li>• Black: 15.9% (81/510); <b>OR 2.25 (1.75-2.89)*</b></li> <li>• Chinese: 6.9% (9/130); OR 0.89 (0.45-1.75)*</li> <li>• Other: 12.1% (97/801)</li> </ul> HCW role <ul style="list-style-type: none"> <li>• Nurse or health care assistant: 12.3% (555/4528)</li> <li>• Physician: 9.9% (184/1860) <ul style="list-style-type: none"> <li>◦ Nurse or health care assistant vs. physician: <b>OR 1.27 (1.07-1.52)*</b></li> </ul> </li> </ul>	No control for confounders (for baseline seropositivity); unclear participation rate

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	<ul style="list-style-type: none"> <li>catering, 20% other role</li> <li>9.4% SARS-CoV-2 seropositivity</li> </ul>	<ul style="list-style-type: none"> <li>Administrative staff: 6.1% (95/1557)</li> <li>Medical or nursing student: 5.8% (36/620)</li> <li>Laboratory staff: 8.0% (36/452)</li> <li>Physical, occupational or speech therapist: 9.6% (37/386)</li> <li>Porter or domestic worker: 15.4% (58/377)</li> <li>Security, estates, or catering staff: 8.5% (23/271)</li> <li>Other: 6.1% (153/2491)</li> </ul> <p><u>SARS-CoV-2 seroconversion incidence</u></p> <p>Sex</p> <ul style="list-style-type: none"> <li>Male vs. female: adjusted IRR 1.03 (0.77-1.39)</li> </ul> <p>Baseline antibody status (vs. negative)</p> <ul style="list-style-type: none"> <li>Anti-spike IgG positive: <b>adjusted IRR 0.3 (0.03-0.44)</b></li> <li>Anti-nucleocapsid IgG positive: <b>adjusted IRR 0.11 (0.03-0.45)</b></li> <li>Both anti-spike and anti-nucleocapsid IgG positive: <b>adjusted IRR 0.06 (0.01-0.46)</b></li> </ul>	
<p>Maltezou et al, 2020 (68)</p> <p>Prospective cohort</p> <p>Greece; HCWs throughout Greece; 13 March to 3 May 2020</p>	<p>3,398 HCWs exposed to a patient or colleague with COVID-19</p> <ul style="list-style-type: none"> <li>Mean age 45 y</li> <li>71% female</li> <li>32% physician, 50% nurse, 18% other HCW role</li> <li>47% low-risk setting, 23% moderate-risk setting, 30% high-risk setting</li> </ul>	<p>Unadjusted OR (95% CI) for SARS-CoV-2 infection</p> <ul style="list-style-type: none"> <li>High- vs. low-risk exposure: <b>5.26 (2.98-9.26)*</b></li> <li>Medium- vs. low-risk exposure: 1.05 (0.45-2.45)*</li> </ul> <p>Adjusted OR (95% CI) for SARS-CoV-2 infection</p> <ul style="list-style-type: none"> <li>Male vs female: <b>1.79 (1.03-3.13)</b></li> <li>Administrative role vs other role: <b>3.34 (1.49-7.49)</b></li> <li>High-risk exposure vs low or moderate risk exposure: <b>3.58 (1.94-6.58)</b></li> </ul> <p>Adjusted OR (95% CI) for COVID-19 diagnosis</p> <ul style="list-style-type: none"> <li>Male vs female: <b>1.82 (1.04-3.20)</b></li> <li>Administrative role vs other role: <b>3.06 (1.43-6.55)</b></li> <li>High-risk exposure vs low or moderate risk exposure: <b>3.06 (1.43-6.55)</b></li> </ul>	<p>Unvalidated method used to categorize risk exposure (based on use of mask by patient and use of PPE by HCW); limited control for confounders</p>
<p>Martin et al, 2020 (69)</p> <p>Cross-sectional</p> <p>Belgium (Brussels); 1 tertiary hospital specializing in infectious disease; 15 April to 18 May 2020</p>	<p>326 HCWs</p> <ul style="list-style-type: none"> <li>Mean age 37 y</li> <li>73% female</li> <li>29% physician, 51% nurse, 9% care assistant, 11% paramedical staff, 8% administrative</li> </ul>	<p>SARS-CoV-2 infection (PCR or seropositivity)</p> <ul style="list-style-type: none"> <li>Male: 11.5% (10/87) <ul style="list-style-type: none"> <li>Female: 13.0% (31/239)</li> </ul> </li> <li>Female vs. male: OR 1.15 (0.54-2.45)*</li> <li>Physician: 11.8% (10/85) <ul style="list-style-type: none"> <li>Nurse: 12.7% (19/150)</li> </ul> </li> <li>Nurse vs. physician: 1.09 (0.48-2.46)*</li> <li>Care assistant: 14.8% (4/27)</li> <li>Paramedical staff: 15.1% (5/33)</li> </ul>	<p>No control for confounders</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	<ul style="list-style-type: none"> <li>staff, 2% cleaning staff</li> <li>• 82% asymptomatic</li> <li>• 11% COVID-19 diagnosis prior to study</li> </ul>	<ul style="list-style-type: none"> <li>• Administrative staff: 0.4% (1/25)</li> <li>• Cleaning staff: 33.3% (2/6)</li> <li>• COVID-19 unit: 14.4% (31/215)</li> <li>• COVID-19 ICU: 5.7% (3/53)</li> <li>• ED: 12.1% (7/58)</li> </ul>	
<p>Milazzo et al 2021 (19)</p> <p>Prospective cohort</p> <p>Italy (Milan) University hospital; 21 February to 27 May 2020</p> <p><b>Added for Update Alert #8</b></p>	<p>679 HCWs</p> <ul style="list-style-type: none"> <li>• Median age 45 y</li> <li>• 76% female</li> <li>• 30% physician, 36% nurse, 11% other healthcare service worker; 13% health services assistants (including cleaning); 10% socio-administrative</li> <li>• 31% direct contact with infected patients</li> <li>• 7% direct contact with infected relatives</li> <li>• 62% trained in PPE use</li> <li>• 4.3% SARS-CoV-2 seropositive</li> </ul>	<p>Age</p> <ul style="list-style-type: none"> <li>• Per 1 year or more of increase: adjusted OR 0.99 (0.95-1.03)</li> </ul> <p>Sex</p> <ul style="list-style-type: none"> <li>• Female: 4.0% (18/452)</li> <li>• Male: 3.3% (5/153) <ul style="list-style-type: none"> <li>○ Female vs. male: adjusted OR 1.27 (0.41-3.85)</li> </ul> </li> </ul> <p>HCW role</p> <ul style="list-style-type: none"> <li>• Nurse: 2.8% (6/214)</li> <li>• Physician: 4.1% (8/194) <ul style="list-style-type: none"> <li>○ Nurse vs. physician: adjusted OR 0.71 (0.22-2.27)</li> </ul> </li> <li>• Healthcare service worker: 1.6% (1/63)</li> <li>• Health service assistant: 5.3% (4/76)</li> <li>• Socio-administrative staff: 6.9% (4/58)</li> </ul> <p>Exposure</p> <ul style="list-style-type: none"> <li>• Contact with infected relative: 14.9% (10/67)</li> <li>• No contact with infected relative: 2.4% (13/538) <ul style="list-style-type: none"> <li>○ Contact vs. no contact with infected relative: <b>adjusted OR 8.12 (2.95-22.34)</b></li> </ul> </li> <li>• Contact with infected patient (in previous 30 days): 3.5% (14/401)</li> <li>• No contact with infected patient: 4.4% (9/204) <ul style="list-style-type: none"> <li>○ Contact vs. no contact with infected patient: adjusted OR 1.19 (0.37-3.79)</li> </ul> </li> </ul> <p>PPE</p> <ul style="list-style-type: none"> <li>• Trained in PPE use: 3.4% (16/469)</li> <li>• Not trained in PPE use: 5.1% (7/136) <ul style="list-style-type: none"> <li>○ Trained vs. not trained: adjusted OR 0.71 (0.25-2.13)</li> </ul> </li> <li>• High/very high confidence with PPE use: 4.1% (18/434)</li> <li>• Low/medium confidence with PPE use: 2.9% (5/171) <ul style="list-style-type: none"> <li>○ High/very high vs. low/medium confidence: adjusted OR 0.96 (0.31-2.98)</li> </ul> </li> </ul>	<p>44% participation rate; potential recall bias</p>
<p>Moncunill et al 2021(10)</p> <p>Cross-sectional</p>	<p>501 asymptomatic HCWs</p> <ul style="list-style-type: none"> <li>• Mean age 42 y</li> <li>• 72% female</li> </ul>	<p>Age</p> <ul style="list-style-type: none"> <li>• Per year: OR 0.98 (0.95-1.02)</li> </ul> <p>Sex</p> <ul style="list-style-type: none"> <li>• Female vs. male: OR 1.27 (0.50-3.24)</li> </ul>	<p>No control for confounders; some estimates very imprecise</p>



Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
Spain (Barcelona); 1 hospital; 27 April to 6 May 2020  <b>Added for Update Alert #8</b>	<ul style="list-style-type: none"> <li>50% nurse/auxiliary services, 26% physician, 8% technician, 17% other role; 75% direct clinical care; 50% COVID-19 unit</li> <li>14.9% incident (4 weeks) SARS-CoV-2 seropositivity or infection (PCR)</li> </ul>	HCW role (vs. other role) <ul style="list-style-type: none"> <li>Nurse/auxiliary services: OR 5.54 (0.72-42.55)</li> <li>Physician: OR 2.77 (0.30-25.25)</li> <li>Technician: <b>OR 13.03 (1.47-116)</b></li> </ul> Comorbidities (yes vs. no) <ul style="list-style-type: none"> <li>Heart and liver disease, diabetes, chronic respiratory and renal disease, cancer and autoimmune disease, or other immunological disorders: OR 0.70 (0.23-2.08)</li> <li>Smoker: OR 1.58 (0.67-3.77)</li> </ul> Exposure (vs. no) <ul style="list-style-type: none"> <li>Work in clinical care: 1.06 (0.41-2.70)</li> <li>Involved with direct patient contact: OR 0.97 (0.38-2.50)</li> <li>Work in COVID-19 unit: OR 1.07 (0.48-2.40)</li> </ul>	
Moscola et al, 2020 (70)  Retrospective cohort  United States (New York); multicenter health system; 20 April to 23 June 2020	40,329 HCWs <ul style="list-style-type: none"> <li>Median age, 42 y</li> <li>73.7% female</li> <li>16.0% Black, 14.0% Hispanic, 0.8% multiracial</li> <li>9.3% physicians, 28.4% nurses</li> </ul>	Positive seroprevalence for COVID-19 IgG antibodies <ul style="list-style-type: none"> <li>18-39 y: 15.0% (2723/18,193)</li> <li>40-49 y: 14.1% (1100/7829)</li> <li>50-59 y: 12.3% (1055/8550)</li> <li>60-69 y: 11.4% (597/5215)</li> <li>≥ 70 y: 8.9% (48/542)               <ul style="list-style-type: none"> <li>Adjusted RR (95% CI) vs. age 18-39 years:                   <ul style="list-style-type: none"> <li>40-49: 1.0 (0.97-1.02)</li> <li>50-59: 0.99 (0.97-1.02)</li> <li>60-69: 1.00 (0.98-1.03)</li> </ul> </li> </ul> </li> <li>≥70: 1.00 (0.94-1.07)</li> <li>Female: 13.7% (4062/29,725)</li> <li>Male: 13.8% (1461/10,604)               <ul style="list-style-type: none"> <li>Female vs. male: adjusted RR, 1.05 (1.01-1.09)</li> </ul> </li> <li>American Indian: 17.0% (32/188)</li> <li>Asian: 11.9% (722/6082)</li> <li>Black: 23.5% (1513/6444)</li> <li>Hispanic: 19.6% (1108/5653)</li> <li>Pacific Islander: 17.2% (35/203)</li> <li>White: 9.6% (2057/21 428)</li> <li>Other/multiracial: 16.9% (56/331)</li> <li>Physicians: 8.7% (327/3746)</li> <li>Nurses: 13.1% (1503/11,468)               <ul style="list-style-type: none"> <li>Nurse vs. physician: OR, 1.58 (1.39-1.79)*</li> </ul> </li> <li>Allied health: 11.6% (949/8156)               <ul style="list-style-type: none"> <li>Physician vs. allied health: adjusted RR,, 0.98 (0.95-1.00)</li> </ul> </li> </ul>	56% of all eligible HCWs; 7 different assays used

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		<ul style="list-style-type: none"> <li>○ Nurse vs. allied health: adjusted RR, 1.00 (0.98-1.01)</li> <li>• Administrative: 12.6% (1217/9645) <ul style="list-style-type: none"> <li>○ Administrative and clerical vs. allied health: adjusted RR, 1.01 (0.99-1.02)</li> </ul> </li> <li>• Service/maintenance (included medical assistants): 20.9% (1527/7314) <ul style="list-style-type: none"> <li>○ Service/ maintenance vs. allied health: adjusted RR, 1.03 (1.00-1.05)</li> </ul> </li> <li>• ED: 17.3% (533/3089)</li> <li>• ICU: 9.9% (331/3355)</li> <li>• Other hospital units: 17.1% (1706/9976)</li> <li>• Other: 12.1% (2448/20)</li> <li>• Direct patient care, no: 12.2% (1562/12 803)</li> <li>• Direct patient care, yes: 14.4% (3437/23 852)</li> <li>• Work in COVID-19 unit, no: 16.0% (2519/15 779)</li> <li>• Work in COVID-19 unit, yes: 12.3% (2247/18 332)</li> <li>• Self-report suspicion of virus exposure, low: 5.3% (1177/22 155)</li> <li>• Self-report suspicion of virus exposure, medium: 11.3% (1180/10 410)</li> <li>• Self-report suspicion of virus exposure, high: 59.2% (2726/4604)</li> <li>• PCR test negative: 10.33% (403/3892)</li> <li>• PCR test positive: 93.5% (2044/2186)</li> </ul>	
<p>Mutambudzi et al, 2020 (71)</p> <p>Prospective cohort</p> <p>United Kingdom; HCWs throughout the United Kingdom; 16 March to 3 May 2020</p>	<p>11,353 HCWs participating in UK Biobank</p> <ul style="list-style-type: none"> <li>• Age, sex of HCWs not reported</li> <li>• 16% healthcare professionals, 12% medical support staff, 71% health associate professionals</li> <li>• 0.7% (76/10,718) diagnosed with SARS-CoV-2 infection</li> </ul>	<p>Incidence of SARS-CoV-2 infection</p> <ul style="list-style-type: none"> <li>• Healthcare professionals: 0.7% (12/1,779)</li> <li>• Medical support staff: 0.8% (10/1,286)</li> <li>• Health associate professionals: 0.7% (54/7,653)</li> </ul>	<p><b><i>Not peer reviewed</i></b></p> <p>No control for confounders; restricted to participants in UK Biobank study</p>
<p>Ng et al, 2020 (72)</p>	<p>41 HCWs with exposure to COVID-19 patient and aerosol-</p>	<p>Incidence of SARS-CoV-2 infection in exposed HCWs: 0% (0/41); no HCWs developed symptoms</p>	<p>No cases of COVID-19 occurred</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
Retrospective cohort  Singapore; February 2020	generating procedures for $\geq 10$ min at $\leq 2$ m <ul style="list-style-type: none"> <li>Age, sex, and HCW role/position not reported</li> <li>0% (0/41) diagnosed with SARS-CoV-2 infection</li> </ul>	<ul style="list-style-type: none"> <li>Aerosol-generating procedures: endotracheal intubation (<math>n = 10</math>), extubation (<math>n = 2</math>), noninvasive ventilation (<math>n = 25</math>), other (<math>n = 4</math>)</li> <li>Mask type during exposures: surgical mask, 85%; N95, 15%</li> </ul>	
Nguyen et al, 2020 (73)  Prospective cohort  United Kingdom and United States; Start March 24 or 29, 2020, end date not reported	99,795 frontline HCWs <ul style="list-style-type: none"> <li>Mean age, 42 years</li> <li>83% female</li> <li>HCW role/position not reported</li> <li>4.0% 30-day incidence of SARS-CoV-2 infection</li> </ul>	HR (95% CI) for SARS-CoV-2 infection Reported inadequate PPE availability vs. adequate: <b>1.24 (1.04-1.47)</b> <ul style="list-style-type: none"> <li>No exposure to COVID-19 patients: <b>1.54 (1.12-2.11)</b></li> <li>Exposure to suspected COVID-19 patients: <b>1.88 (1.25-2.84)</b></li> <li>Exposure to documented COVID-19 patients: <b>5.98 (4.61-7.77)</b></li> </ul> Adjusted hazard ratio (95% CI) for SARS-CoV-2 infection Reported inadequate PPE availability vs. adequate: <b>1.23 (1.03-1.46)</b> <ul style="list-style-type: none"> <li>No exposure to COVID-19 patients: <b>1.53 (1.11-2.09)</b></li> <li>Exposure to suspected COVID-19 patients: <b>1.84 (1.22-2.78)</b></li> <li>Exposure to documented COVID-19 patients: <b>5.94 (4.57-7.72)</b></li> </ul> Inpatient HCW (reference general population): <b>24.3 (21.8-27.1)</b> <ul style="list-style-type: none"> <li>Nursing homes: <b>16.2 (13.4-19.7)</b></li> <li>Outpatient clinics in hospital: <b>11.2 (8.44-14.9)</b></li> <li>Home health sites: <b>7.86 (5.63-11.0)</b></li> <li>Ambulatory clinics: <b>6.94 (5.12-9.41)</b></li> <li>Other healthcare setting: <b>9.52 (7.49-12.1)</b></li> </ul>	Potential selection bias, limited measurement of exposures/risk factors, SARS-CoV-2 infection status based on self-report
Olalla et al, 2020 (74)  Cross-sectional  Spain (Andalusia); 1 hospital; 15 to 24 April 2020	498 HCWs <ul style="list-style-type: none"> <li>Mean age 42 y</li> <li>80% female</li> <li>20% physician, 39% nurse, 26% nursing assistant, 7% security, 2% administrative, 5% housekeeping</li> <li>26% ED, 13% ICU, 44% COVID-19 unit, 9% non-COVID-19</li> </ul>	Prevalence of SARS-CoV-2 IgG seropositivity, negative IgM and negative PCR <ul style="list-style-type: none"> <li>Physician: 1.9% (2/101)</li> <li>Nurse: 0.5% (1/195) <ul style="list-style-type: none"> <li>Nurse vs. physician: OR 0.26 (0.03-2.85)*</li> </ul> </li> <li>Nursing assistant: 2.3% (3/129)</li> <li>Security: 2.9% (1/35)</li> <li>ER: 1.6% (2/129)</li> <li>ICU: 1.6% (1/63)</li> <li>COVID-19 unit: 0.9% (2/219)</li> <li>Non-COVID-19 unit: 4.5% (2/44) <ul style="list-style-type: none"> <li>COVID-19 vs. non-COVID-19 unit: OR 0.19 (0.03-1.41)*</li> </ul> </li> </ul>	Uncertain criteria for testing eligibility; no control for confounders

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	unit, 8% pediatric unit		
Pereckaite et al 2021 (20)  Cross-sectional  Lithuania (Kaunas); hospital system; 15 June to 21 September 2020  <b>Added for Update Alert #8</b>	432 HCWs <ul style="list-style-type: none"> <li>• Mean age 43 y</li> <li>• 85% female</li> <li>• 41% nurse, 39% physician, 12% assistant, 7% other role</li> <li>• 1.2% SARS-CoV-2 seropositive</li> </ul>	HCW role <ul style="list-style-type: none"> <li>• Nurse: 1.1% (2/179)</li> <li>• Physician: 1.2% (2/169)               <ul style="list-style-type: none"> <li>○ Nurse vs. physician: OR 0.94 (0.13-6.77)*</li> </ul> </li> </ul>	Participation rate unclear; no control for confounders; imprecise estimate
Perez-Garcia et al 2020 (75)  Retrospective cohort  Spain (Alcalá de Henares); 1 hospital; 5 March to 30 May 2020	2,963 HCWs <ul style="list-style-type: none"> <li>• Mean age 43 y</li> <li>• 80% female</li> <li>• 9% physician, 29% nurse, 22% nurse technician, 15% medical staff, 5% technical specialist, 6% hospital porter, 2% other HCW, 12% non-healthcare hospital personnel</li> <li>• 37% symptomatic</li> <li>• 36.5% SARS-CoV-2 infection (PCR or seropositivity)</li> </ul>	HCW role <ul style="list-style-type: none"> <li>• Nurse: 39.6% (340/859)</li> <li>• Physician: 33.1% (90/272)               <ul style="list-style-type: none"> <li>○ Nurse vs. physician: OR 1.32 (0.99-1.77)*</li> </ul> </li> <li>• Nurse technician: 39% (250/641)               <ul style="list-style-type: none"> <li>○ Nurse or nurse technician vs. physician: <b>OR 1.31 (1.00-1.72)*</b></li> </ul> </li> <li>• Medical staff: 34.7% (154/444)</li> <li>• Technical specialist: 29.1% (41/141)</li> <li>• Hospital porter: 44.9% (83/185)</li> <li>• Other HCW: 26.4% (19/72)</li> <li>• Non-healthcare hospital personnel: 29.8% (104/349)</li> <li>• Healthcare personnel vs. non-healthcare personnel: <b>OR 1.40 (1.10-1.79)*</b></li> </ul> Exposure <ul style="list-style-type: none"> <li>• Participation in aerosol-generating procedure vs. no participation: <b>OR 2.54 (1.71-3.77)^</b></li> <li>• Contact with co-worker: <b>OR 3.18 (2.64-3.82)^</b></li> <li>• Contact with relatives: <b>OR 2.16 (1.50-3.11)^</b></li> <li>• Close contact with COVID-19 infected person vs. casual contact: adjusted OR 1.32 (0.97-1.80)</li> <li>• Contact with COVID-19 patients (yes vs. no): <b>adjusted OR 1.69 (1.28-2.24)</b></li> </ul> PPE use <ul style="list-style-type: none"> <li>• Use of PPE (included cap, FFP2 mask [or FFP3 mask for aerosol generating procedures], disposable medical protective clothing, gloves, goggles/screens) vs. no use: <b>adjusted OR 0.56 (0.44-0.72)</b></li> </ul> Smoker	Potential recall bias; some analyses did not control for confounders

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		<ul style="list-style-type: none"> <li>• Yes: 25.7% (98/382)</li> <li>• No: 38.1% (983/2581) <ul style="list-style-type: none"> <li>◦ Yes vs. no: <b>OR 0.56 (0.44-0.72)*</b></li> </ul> </li> </ul> <p>Hypertension</p> <ul style="list-style-type: none"> <li>• Yes: 49.5% (95/192)</li> <li>• No: 35.6% (986/2771) <ul style="list-style-type: none"> <li>◦ Yes vs. no: <b>OR 1.77 (1.32-2.38)*</b></li> </ul> </li> </ul> <p>Cardiovascular disease</p> <ul style="list-style-type: none"> <li>• Yes: 43.9% (25/57)</li> <li>• No: 36.3% (1056/2906) <ul style="list-style-type: none"> <li>◦ Yes vs. no: OR 1.37 (0.81-2.32)*</li> </ul> </li> </ul> <p>Chronic obstructive pulmonary disease</p> <ul style="list-style-type: none"> <li>• Yes: 49.6% (56/113)</li> <li>• No: 36.0% (1025/2850) <ul style="list-style-type: none"> <li>◦ Yes vs. no: <b>OR 1.75 (1.20-2.55)*</b></li> </ul> </li> </ul> <p>Pregnancy</p> <ul style="list-style-type: none"> <li>• Yes: 53.8% (14/26)</li> <li>• No: 36.3% (1067/2937) <ul style="list-style-type: none"> <li>◦ Yes vs. no: OR 2.04 (0.94-4.44)*</li> </ul> </li> </ul> <p>Immunosuppression</p> <ul style="list-style-type: none"> <li>• Yes: 50.0% (14/28)</li> <li>• No: 36.4% (1067/2935) <ul style="list-style-type: none"> <li>◦ Yes vs. no: OR 1.75 (0.83-3.69)*</li> </ul> </li> </ul>	
<p>Piapan et al, 2020 (76)</p> <p>Retrospective cohort</p> <p>Italy (Trieste); regional HCWs with known COVID-19 exposure; 1 March to 6 April 2020</p>	<p>903 HCWs with known exposure to a COVID-19-infected patient</p> <ul style="list-style-type: none"> <li>• Mean age 45 y</li> <li>• 71% female</li> <li>• 28% physician, 43% nurse, 18% nurse's aide, 8% resident, 9% other role</li> <li>• 7% high-risk department, 13% moderate-risk department, 80% low-risk department</li> </ul>	<p>Adjusted OR (95% CI), prevalence of SARS-CoV-2 infection (PCR)</p> <ul style="list-style-type: none"> <li>• Female vs. male: 0.67 (0.45-1.02)</li> <li>• HCW role- <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: 0.9 (0.5-1.4)</li> <li>◦ Nurse's aide vs. physician: 1.4 (0.7-2.6)</li> <li>◦ Resident vs. physician: 1.3 (0.5-2.7)</li> <li>◦ Other role vs. physician: 0.9 (0.4-2.0)</li> </ul> </li> <li>• Department- <ul style="list-style-type: none"> <li>◦ High-risk vs. low-risk department: <b>67.9 (34.7-133)</b></li> <li>◦ Medium-risk vs. low-risk department: 9.6 (5.6-16.5)</li> </ul> </li> <li>• Contact - <ul style="list-style-type: none"> <li>◦ Contact with colleagues and patients vs. contact with patients: <b>7.0 (3.7-13.3)</b></li> <li>◦ Contact with colleagues vs contact with patients: 0.9 (0.54-1.5)</li> </ul> </li> <li>• PPE - <ul style="list-style-type: none"> <li>◦ Mask (FFP2-3 or surgical) vs. no mask: : 1.6 (0.9-2.9)</li> <li>◦ FFP2-3 mask vs. surgical mask: <b>7.1 (3.0-16.7)</b></li> </ul> </li> </ul>	<p>Potential recall bias</p>

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<p>Ran et al, 2020 (77)</p> <p>Retrospective cohort</p> <p>China (Wuhan); 1 hospital serving outbreak; follow-up through 28 January 2020</p>	<p>72 HCW with acute symptoms</p> <ul style="list-style-type: none"> <li>• Median age, 31 y</li> <li>• 69% female</li> <li>• 53% clinicians and 47% nurses</li> <li>• 38.9% (28/72) diagnosed with COVID-19</li> </ul>	<ul style="list-style-type: none"> <li>○ Patient wearing mask: <b>7.1 (3.6-13.9)</b></li> </ul> <p>RR (95% CI) for COVID-19 (PCR)</p> <ul style="list-style-type: none"> <li>• High-risk vs. general department: <b>2.13 (1.45-3.95)</b></li> <li>• High-exposure operation: 0.54 (0.19-1.53)</li> <li>• Tracheal tube removal: 0.63 (0.06-7.08)</li> <li>• CPR: 0.63 (0.06-7.08)</li> <li>• Fiberoptic bronchoscopy: 0.63 (0.06-7.08)</li> <li>• Sputum suction: 0.43 (0.12-1.55)</li> <li>• Unqualified handwashing: <b>2.64 (1.04-6.71)</b></li> <li>• Suboptimal handwashing before patient contact: <b>3.10 (1.43-6.73)</b></li> <li>• Suboptimal handwashing after patient contact: <b>2.43 (1.34-4.39)</b></li> <li>• Improper PPE (proper PPE defined as use of hospital masks, round caps, gloves, protective clothing, boot covers, and goggles or face shields): <b>2.82 (1.11-7.18)</b></li> <li>• Increase in work hours: <b>log-rank P = 0.02</b> with interaction with high-risk department</li> </ul> <p>Contact history:</p> <ul style="list-style-type: none"> <li>• Diagnosed family member: <b>2.76 (2.02-3.77)</b></li> <li>• Suspected family member: 1.30 (0.31-5.35)</li> </ul> <p>Diagnosed patient: <b>0.36 (0.22-0.59)</b>  Suspected patient: <b>0.49 (0.27-0.89)</b>  Huanan seafood market: 0.63 (0.06-7.08)</p>	<p>Potential recall bias; unclear if most risk estimates adjusted; reference group unclear for some estimates; some estimates imprecise; 11 of 83 cases dropped for invalid surveys</p>
<p>Rashid-Abdi et al 2020 (78)</p> <p>Prospective cohort</p> <p>Sweden (Vasteras); 1 hospital; 4 May to 19 August 2020</p>	<p>131 infectious disease HCWs</p> <ul style="list-style-type: none"> <li>• Mean age 39 y</li> <li>• 84% female</li> <li>• 36% nurse, 19% physician, 40% nurse assistant, 5% other role</li> <li>• 19.1% SARS-CoV-2 seropositivity</li> </ul>	<p>Age: Mean 38 (cases) vs. 44 (non-cases) years, p not reported</p> <p>Sex</p> <ul style="list-style-type: none"> <li>• Female: 22.7% (25/110)</li> <li>• Male: 0% (0/21) <ul style="list-style-type: none"> <li>○ Female vs. male: OR 12.82 (0.75-219.19)*</li> </ul> </li> </ul> <p>HCW role</p> <ul style="list-style-type: none"> <li>• Nurse: 21.3% (10/47)</li> <li>• Nurse assistant: 24.5% (13/53)</li> <li>• Physician: 8.0% (2/25) <ul style="list-style-type: none"> <li>○ Nurse vs. physician: OR 3.11 (0.62-15.47)*</li> <li>○ Nurse or nurse assistant vs. physician: OR 3.44 (0.75-15.68)*</li> </ul> </li> <li>• Other role: 0% (0/6)</li> </ul> <p>Exposure to COVID-19</p> <ul style="list-style-type: none"> <li>• At work: 20.0% (25/125)</li> <li>• Outside of work: 10.5% (2/19) <ul style="list-style-type: none"> <li>○ At work vs. outside of work: OR 16.88 (3.79-75.19)*</li> </ul> </li> </ul>	<p>No control for confounders; potential recall bias; participation rate unclear</p>

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<p>Rasmussen et al 2021 (21)</p> <p>Prospective cohort</p> <p>Denmark (Copenhagen); hospital otorhinolaryngology department; 27 March to 3 June 2020</p> <p><b>Added for Update Alert #8</b></p>	<p>347 HCWs</p> <ul style="list-style-type: none"> <li>• Mean age not reported</li> <li>• % female not reported</li> <li>• 30% nurse, 23% physician, 5% secretary, 23% theatre personnel, 2% cleaner, 9% porter, 7% other role</li> <li>• 2.0% SARS-CoV-2 infection (PCR); 4.3% SARS-CoV-2 seropositive</li> </ul>	<p>None: 0% (0/5)</p> <p>HCW role <i>Infection (PCR)</i></p> <ul style="list-style-type: none"> <li>• Nurse: 1% (1/104)</li> <li>• Physician: 5% (4/80) <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: OR 0.18 (0.02-1.68)*</li> </ul> </li> <li>• Secretary: 0% (0/18)</li> <li>• Theatre personnel: 0% (0/81)</li> <li>• Cleaner: 0% (0/8)</li> <li>• Porter: 7% (2/31)</li> <li>• Other role: 0% (0/25)</li> </ul> <p><i>Seropositive</i></p> <ul style="list-style-type: none"> <li>• Nurse: 2% (2/104)</li> <li>• Physician: 4% (3/80) <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: OR 0.50 (0.08-3.09)*</li> </ul> </li> <li>• Secretary: 6% (1/18)</li> <li>• Theatre personnel: 5% (4/81)</li> <li>• Cleaner: 0% (0/8)</li> <li>• Porter: 13% (4/31)</li> <li>• Other role: 4% (1/25)</li> </ul>	<p>Some demographic data not reported; no control for confounders</p>
<p>Schmidt et al, 2020 (79)</p> <p>Prospective cohort</p> <p>Germany; 1 neurologic hospital; 20 to 30 March 2020</p>	<p>385 HCWs in a neurological center</p> <ul style="list-style-type: none"> <li>• Mean age not reported; 14% age 18-29 y, 40% age 30-49 y, 44% age 50-64 y, 2% age ≥65 y</li> <li>• 80% female</li> <li>• 9% physician, 40% nurse, 21% therapist, 30% other healthcare role</li> </ul>	<p>Prevalence of SARS-CoV-2 seropositivity</p> <ul style="list-style-type: none"> <li>• 18-29 y: 1.9% (1/55)</li> <li>• 30-49 y: 4.8% (7/154)</li> <li>• 50-64 y: 1.8% (3/170)</li> <li>• ≥65 y: 0% (0/6)</li> <li>• Male: 5.2% (4/77)</li> <li>• Female: 2.3% (7/308)</li> <li>• Physician: 8.8% (3/34)</li> <li>• Nurse: 0% (0/154)</li> <li>• Therapist: 3.8% (3/80)</li> <li>• Other role: 4.3% (5/117)</li> </ul> <p>Unadjusted OR (95% CI) for SARS-CoV-2 seropositivity</p> <ul style="list-style-type: none"> <li>• Female vs. male: 0.42 (0.12-1.49)*</li> <li>• Nurse vs. physician: <b>0.03 (0.002-0.58)*</b></li> </ul>	<p>73% participation rate; no control for confounders</p>
<p>Schmitz et al 2020 (80)</p>	<p>3,064 ED HCWs</p>	<p>HCW role</p> <ul style="list-style-type: none"> <li>• Nurse: 5.6% (121/2153)</li> </ul>	<p>SARS-CoV-2 infection status based on self-</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
Cross-sectional  The Netherlands (countrywide); 43 hospitals; 1 March to 1 May 2020	<ul style="list-style-type: none"> <li>Mean age, % female not reported</li> <li>14% resident physician, 70% nurse, 16% consultant</li> <li>5.4% SARS-CoV-2 infection (PCR)</li> </ul>	<ul style="list-style-type: none"> <li>Resident physician: 6.3% (27/431)</li> <li>Consultant: 3.5% (16/459) <ul style="list-style-type: none"> <li>Nurse vs. physician: OR 1.17 (0.82-1.68)*</li> </ul> </li> <li>PPE use <ul style="list-style-type: none"> <li>High-level PPE hospital (FFP2 mask and eye protection for all patient contact) hospital: (73/944)</li> <li>Other hospital: (91/2099) <ul style="list-style-type: none"> <li>High-level PPE hospital vs. other hospital: <b>OR 1.85 (1.35-2.54)*^</b></li> </ul> </li> </ul> </li> </ul>	report; potential recall bias; no control for confounders; participation rate 70%; PPE used based on hospital policy, not individual HW use
Shields et al 2020b (81)  Cross-sectional  UK (Birmingham); NHS hospital trust; 24 to 25 April 2020	516 HCWs <ul style="list-style-type: none"> <li>Mean age 42 y</li> <li>75% female</li> <li>HCW role not reported</li> <li>24.4% SARS-CoV-2 seropositivity</li> </ul>	Age <ul style="list-style-type: none"> <li>Per additional year: adjusted OR 0.98 (0.96-1.00)</li> </ul> Sex <ul style="list-style-type: none"> <li>Female: (102/388)</li> <li>Male: (24/128) <ul style="list-style-type: none"> <li>Female vs. male: adjusted OR 1.49 (0.81-2.83)</li> </ul> </li> </ul> Race/ethnicity <ul style="list-style-type: none"> <li>BAME vs. white: <b>adjusted OR 1.92 (1.14-3.23)</b></li> </ul> Department (working in the department vs. not working in the department) <ul style="list-style-type: none"> <li>Acute medicine: adjusted OR 0.99 (0.34-2.86)</li> <li>ED: adjusted OR 0.36 (0.05-1.69)</li> <li>Estates: adjusted OR 0.57 (0.11-2.29)</li> <li>Internal medicine: adjusted OR 0.93 (0.42-2.12)</li> <li>Surgery: adjusted OR 0.24 (0.03-1.05)</li> <li>Facilities: adjusted OR 0.52 (0.15-1.60)</li> <li>Housekeeping: adjusted OR 1.01 (0.31-3.09)</li> <li>ICU: adjusted OR 0.28 (0.09-0.78)</li> <li>Ob/gyn: adjusted OR 0.85 (0.30-2.39)</li> <li>Research: adjusted OR 0.44 (0.15-1.22)</li> </ul>	No control for HCW role, exposures, or PPE; participation rate unclear
Shields et al, 2020a (82)  Cross-sectional  United Kingdom (Birmingham, England); four urban hospitals; 25 April 2020	554 asymptomatic HCWs <ul style="list-style-type: none"> <li>Age, sex, HCW role/position not reported</li> </ul>	Prevalence of SARS-CoV-2 (PCR): 2.4% (13/554) Prevalence of SARS-CoV-2 seroconversion (IgG, IgM, IgA): 24.4% (126/516) <ul style="list-style-type: none"> <li>Housekeeping: 34.5% (10/29)</li> <li>Acute medicine: 33.3% (10/30)</li> <li>General internal medicine: 30.3% (30/99)</li> <li>Intensive care: 14.8% (9/61)</li> <li>Emergency medicine: 13.3% (2/15)</li> <li>General surgery: 13.0% (3/23)</li> <li>Female: 26.3% (102/388)</li> <li>Male: 18.8% (24/128)</li> </ul>	<b>Not peer reviewed</b> No information on clinical characteristics of HCWs; no information on clinical outcomes of SARS-CoV-2 infection; participation rate not reported; 7% of patients who underwent PCR testing



Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		OR (95% CI) for SARS-CoV-2 seroconversion <ul style="list-style-type: none"> <li>Female vs. male: 1.55 (0.94-2.54)*</li> </ul>	did not undergo antibody testing
Sims et al 2020 (83)  Prospective cohort  United States (Michigan); health system including 8 hospitals; 13 April to 28 May 2020	20,614 HCWs <ul style="list-style-type: none"> <li>Mean age 43 y</li> <li>77% female</li> <li>40% nurse/nursing support, 19% physician</li> <li>8.8% SARS-CoV-2 seropositivity</li> </ul>	Sex <ul style="list-style-type: none"> <li>Female: 8.8% (1,380/15,728)</li> <li>Male: 9.0% (423/4,700)               <ul style="list-style-type: none"> <li>Female vs. male: OR 0.97 (0.87-1.09)*</li> </ul> </li> </ul> Age (mean, years): 41.3 (cases) vs. 43.3 (non-cases), p>0.05 Race <ul style="list-style-type: none"> <li>White: 7.7% (1235/16141)</li> <li>Asian/Pacific Islander: 11.4% (162/1419)</li> <li>Black: 19.6% (236/1203)</li> <li>Hispanic: 12% (47/388)</li> <li>Other: 10.3% (64/619)               <ul style="list-style-type: none"> <li>Black vs. white: <b>OR 2.95 (2.54-3.44)*</b></li> <li>Hispanic vs. white: <b>OR 1.66 (1.22-2.27)*</b></li> </ul> </li> </ul> HCW role <ul style="list-style-type: none"> <li>Nurse/nursing support: 10.8% (902/8,352)</li> <li>Physician: 7.0% (277/3,957)               <ul style="list-style-type: none"> <li>Nurse/nursing support vs. physician: <b>OR 1.62 (1.41-1.86)*</b></li> </ul> </li> <li>Respiratory therapy: 12.1% (37/306)</li> <li>Phlebotomy: 14.6% (41/281)</li> <li>Clinical support with patient contact: 8.0% (173/2162)</li> <li>Facilities: 8.2% (41/500)</li> <li>Administration: 6.8% (194/2,853)</li> <li>Laboratory: 5.5% (44/800)</li> <li>Security/safety: 6.6% (7/106)</li> <li>Clinical support with no patient contact: 7.7% (102/1,325)</li> <li>Direct patient contact: 9.5% (1,430/15,058)</li> <li>No direct patient contact: 6.9% (388/5,584)               <ul style="list-style-type: none"> <li>Direct vs. no direct patient contact: <b>OR 1.41 (1.25-1.58)*</b></li> </ul> </li> </ul> Mask use <ul style="list-style-type: none"> <li>N95: 10.3% (532/5,165)</li> <li>PAPR: 12.3% (8/65)</li> <li>Surgical: 13.1% (171/1,305)</li> <li>Other mask: 14.2% (11/77)</li> <li>No mask: 17.5% (369/2,108)               <ul style="list-style-type: none"> <li>Any mask vs. no mask: <b>OR 0.58 (0.50-0.66)*</b></li> </ul> </li> </ul>	Participation rate 48%; potential recall bias; limited control for confounders

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		<ul style="list-style-type: none"> <li>○ N95 or surgical mask vs. no mask: <b>OR 0.57 (0.50-0.66)*</b></li> <li>○ N95 vs. no mask: <b>OR 0.54 (0.47-0.62)*</b></li> <li>○ Surgical mask vs. no mask: <b>OR 0.71 (0.58-0.86)*</b></li> <li>○ N95 vs. surgical mask: <b>OR 0.76 (0.63-0.92)*</b></li> </ul> <p>Diabetes</p> <ul style="list-style-type: none"> <li>• Yes: 5.8% (105/912)</li> <li>• No: 8.7% (1713/19,712) <ul style="list-style-type: none"> <li>○ Diabetes (yes vs. no): <b>OR 1.37 (1.11-1.69)*</b></li> </ul> </li> </ul> <p>Cardiovascular disease</p> <ul style="list-style-type: none"> <li>• Yes: 1.9% (33/395)</li> <li>• No: 8.8% (1785/20,219) <ul style="list-style-type: none"> <li>○ Cardiovascular disease (yes vs. no): OR 0.94 (0.66-1.35)*</li> </ul> </li> </ul> <p>Chronic lung disease</p> <ul style="list-style-type: none"> <li>• Yes: 8.2% (58/710)</li> <li>• No: 8.8% (1760/19,904) <ul style="list-style-type: none"> <li>○ Chronic lung disease (yes vs. no): OR 0.92 (0.70-1.20)*</li> </ul> </li> </ul> <p>Chronic kidney disease</p> <ul style="list-style-type: none"> <li>• Yes: 6.4% (5/78)</li> <li>• No: 8.8% (1813/20,536) <ul style="list-style-type: none"> <li>○ Chronic kidney disease (yes vs. no): OR 0.71 (0.29-1.75)*</li> </ul> </li> </ul> <p>Hypertension</p> <ul style="list-style-type: none"> <li>• Yes: 9.3% (284/3064)</li> <li>• No: 8.7% (1534/17,550) <ul style="list-style-type: none"> <li>○ Hypertension (yes vs. no): OR 1.07 (0.93-1.22)*</li> </ul> </li> </ul> <p>Immunosuppressed</p> <ul style="list-style-type: none"> <li>• Yes: 6.5% (25/383)</li> <li>• No: 8.9% (1793/20,231) <ul style="list-style-type: none"> <li>○ Immunosuppressed (yes vs. no): OR 0.72 (0.48-1.08)*</li> </ul> </li> </ul>	
<p>Sotgiu et al. 2020 (84)</p> <p>Retrospective cohort</p> <p>Italy (Milan); 1 hospital; 2 to 16 April 2020</p>	<p>202 HCWs</p> <ul style="list-style-type: none"> <li>• Median age 45 y</li> <li>• 65% female</li> <li>• 47% physician, 26% nurse, 10% resident, 6% socio-sanitary worker, 2% administrative staff, 4% technicians, 4% hospital staff, 1% non-hospital staff</li> </ul>	<p>Incidence of SARS-CoV-2 seropositivity</p> <ul style="list-style-type: none"> <li>• Female, IgG: 6.1% (8/132); IgM: 9.1% (12/132)</li> <li>• Male, IgG: 10.0% (7/70); IgM: 24.3% (17/70) <ul style="list-style-type: none"> <li>○ Female vs. male (IgG): OR 0.58 (0.20-1.67)*</li> </ul> </li> <li>• Age <ul style="list-style-type: none"> <li>○ 20-29 y, IgG: 14.8% (4/27); IgM: 25.9% (7/27)</li> <li>○ 30-39 y, IgG: 2.3% (1/44); IgM: 9.1% (4/44)</li> <li>○ 40-49 y, IgG: 7.0% (4/57); IgM: 5.3% (3/57)</li> <li>○ 50-59 y, IgG: 9.8% (5/51); IgM: 15.7% (8/51)</li> <li>○ 60-69 y, IgG: 4.4% (1/23); IgM: 30.4% (7/23)</li> </ul> </li> <li>• Contact with COVID-19 patient, IgG: 7.6% (12/158); IgM: 13.9% (22/158)</li> </ul>	<p>No control for confounders</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		<ul style="list-style-type: none"> <li>• No contact with COVID-19 patient, IgG: 6.8% (9/44); IgM: 15.9% (7/44)</li> <li>• HCW, IgG: 7.6% (15/197); IgM: 14.7% (29/197) <ul style="list-style-type: none"> <li>○ Physician, IgG: 14.8% (7/115); IgM: 13.9% (16/115)</li> <li>○ Nurse/OSS, IgG: 7.8% (5/64); IgM: 10.9% (7/64) <ul style="list-style-type: none"> <li>▪ Nurse vs. physician (IgG): OR 0.76 (0.23-2.52)*</li> </ul> </li> <li>○ Other role: IgG 13.0% (3/23); IgM: 26.1% (6/23)</li> </ul> </li> <li>• Non-HCW, IgG: 0% (0/5); IgM: 0% (0/5)</li> </ul>	
<p>Stubblefield et al, 2020 (85)</p> <p>Cross-sectional</p> <p>United States (Tennessee); 1 academic medical center; 3 to 13 April 2020</p>	<p>249 frontline HCWs</p> <ul style="list-style-type: none"> <li>• Mean age 34 y</li> <li>• 57% female</li> <li>• 37% nurse, 36% physician/provider, 8% radiology technician, 19% other healthcare role</li> <li>• 59% ED, 22% medical ICU, 19% other setting</li> </ul>	<p>Prevalence of SARS-CoV-2 seropositivity</p> <ul style="list-style-type: none"> <li>• Female: 6.7% (11/163)</li> <li>• Male: 6.6% (8/122)</li> <li>• Nurse: 4.8% (5/105)</li> <li>• Physician/provider: 9.3% (8/86)</li> <li>• Radiology technician: 29.4% (5/17)</li> <li>• Other HCW role: 2.4% (1/41)</li> <li>• ED: 8.2% (12/147)</li> <li>• Medical ICU: 5.5% (3/55)</li> <li>• Other setting: 8.5% (4/47)</li> <li>• Did not use surgical or N95 mask or PAPR during all clinical encounters: 23.1% (3/13)</li> </ul> <p>OR (95% CI) for SARS-CoV-2 seropositivity</p> <ul style="list-style-type: none"> <li>• Female vs. male: 1.03 (0.40-2.65)*</li> <li>• Nurse vs. physician/provider: 0.49 (0.15-1.55)*</li> </ul>	<p>No control for confounders</p>
<p>Trieu et al, 2020 (11)</p> <p>Prospective cohort</p> <p>Norway (Bergen); 3 hospitals; testing began 6 March 2020</p> <p><b>Added for Update Alert #8</b></p>	<p>607 HCWs</p> <ul style="list-style-type: none"> <li>• Median age 39 years</li> <li>• 77% female</li> <li>• 29% physician, 47% nurse; 24% other</li> <li>• 5.3% SARS-CoV-2 seroprevalence</li> </ul>	<p>Age</p> <ul style="list-style-type: none"> <li>• Age 20-35 vs. 36-78 y: OR 1.5 (0.7-3.4)</li> </ul> <p>Sex</p> <ul style="list-style-type: none"> <li>• Female vs. male: OR 1.2 (0.6-2.2)</li> </ul> <p>HCW role</p> <ul style="list-style-type: none"> <li>• Physician vs. other: OR 0.9 (0.4-2.0)</li> <li>• Nurse vs. other: OR 1.3 (0.7-2.7)</li> </ul> <p>Exposure</p> <ul style="list-style-type: none"> <li>• High vs. low-exposure occupational risk group: OR 1.2 (0.5-2.9)</li> <li>• Patient contact vs. no patient contact: OR 1.7 (0.7-4.3)</li> <li>• Patient contact and PPE use (vs. no patient contact) <ul style="list-style-type: none"> <li>○ Patient contact, full PPE: OR 1.1 (0.5-2.7)</li> <li>○ Patient contact, partial PPE: OR 2.5 (0.5-12.2)</li> </ul> </li> </ul>	<p>No control for confounders</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
<p>Tubiana et al 2021 (22)</p> <p>Prospective cohort</p> <p>France (Paris); 1 hospital; 3 March 2020 to 27 April 2020</p> <p><b>Added for Update Alert #8</b></p>	<p>146 HCWs with direct exposure to a SARS-CoV-2 infected person</p> <ul style="list-style-type: none"> <li>• Mean age 35 y</li> <li>• 76% female</li> <li>• 51% nurse, CNA, physiotherapist or student, 34% physician or midwife, 16% nonclinical HCW</li> <li>• 43.2% SARS-CoV-2 infection (confirmed [PCR or serology] and suspected)</li> </ul>	<p>Sex</p> <ul style="list-style-type: none"> <li>• Female: 46.8% (52/111)</li> <li>• Male: 31.4% (11/35) <ul style="list-style-type: none"> <li>◦ Female vs. male: OR 1.92 (0.86-4.30)*</li> </ul> </li> </ul> <p>HCW role</p> <ul style="list-style-type: none"> <li>• Nurse, CNA, physiotherapist or student: 48.6% (36/74)</li> <li>• Physician or midwife: 28.6% (14/49) <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: <b>OR 2.37 (1.10-5.11)*</b></li> </ul> </li> <li>• Non-caregiver HCW: 56.5% (13/23)</li> </ul> <p>Exposure</p> <p><i>Infection vs. no infection</i></p> <ul style="list-style-type: none"> <li>• Cumulative exposure to index case &gt;30 mins: 62.3% (38/61) vs. 73.2% (60/82); OR 0.61 (0.30-1.23)</li> <li>• Provided care during an aerosol-generating procedure: 83.3% (3/36) vs. 10% (3/30); OR 0.82 (0.14-4.73)</li> <li>• In room during an aerosol-generating procedure: 36.1% (13/36) vs. 30% (9/30); OR 1.32 (0.47-3.80)</li> </ul>	<p>Results not stratified by confirmed and possible outcome; controlled confounders not specified</p>
<p>Varona et al 2021 (12)</p> <p>Cross-sectional</p> <p>Spain (Madrid, Coruna, Barcelona, Other); hospital employees of the HM Group (GHM); 15 April to 30 June 2020</p> <p><b>Added for Update Alert #8</b></p>	<p>6038 HCWs (1253 symptomatic in previous 2 mo)</p> <ul style="list-style-type: none"> <li>• Mean age 44 y</li> <li>• 71% female</li> <li>• 62.7 % high-risk (clinical environment; prolonged/ direct contact with patients); 16.8% moderate risk (clinical environment with non-intense/no patient contact); 20.5% low-risk (non-clinical environment)</li> <li>• 11.0% SARS-CoV-2 seroprevalence</li> </ul>	<p>Age</p> <ul style="list-style-type: none"> <li>• &lt;30: 12.3% (112/909); reference</li> <li>• 30-45: 10.2% (273/2679); adjusted OR 0.84 (0.67 to 1.06)</li> <li>• 46-60: 11.1% (209/1881); adjusted OR 0.96 (0.76 to 1.23)</li> <li>• &gt;60: 11.9% (68/569); adjusted OR 1.07 (0.77 to 1.48)</li> </ul> <p>Sex</p> <ul style="list-style-type: none"> <li>• Male: 11.2% (195/1744)</li> <li>• Female: 10.9% (467/4294) <ul style="list-style-type: none"> <li>◦ Female vs. male: adjusted OR 0.98 (0.83 to 1.18)</li> </ul> </li> <li>• Exposure risk category High (prolonged direct contact): 12.1% (457/3786)</li> <li>• Moderate (clinical or non-clinical with non-intense patient contact): 11.4% (116/1014)</li> <li>• Low (non-clinical and minimal/no patient contact): 7.2% (89/1238) <ul style="list-style-type: none"> <li>◦ High vs. low risk: <b>adjusted OR 2.06 (1.63 to 2.62)</b></li> <li>◦ Moderate vs. low risk: <b>adjusted OR 1.77 (1.32 to 2.37)</b></li> </ul> </li> </ul>	<p>Potential recall bias; limited control for potential exposures and no control for PPE</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
<p>Venugopal et al 2021 (13)</p> <p>Cross-sectional</p> <p>USA (South Bronx, NY); Level 1 trauma center; 1 March to 1 May 2020</p> <p><b>Added for Update Alert #8</b></p>	<p>500 HCWs</p> <ul style="list-style-type: none"> <li>• Mean age not reported; 48% 20-39 y; 41% 40-59 y; 11% &gt;60 y</li> <li>• 69% female</li> <li>• 28% Hispanic; 24% White; 24% Asian; 18% Black; 6% Other race/ethnicity</li> <li>• 33% physician; 30% nurse; 15% ancillary service; 22% other role</li> <li>• 14% high and moderate risk of healthcare exposure; 86% low risk of healthcare exposure 25% community exposure</li> <li>• 27.4% SARS-CoV-2 seropositivity</li> </ul>	<p>Age<sup>^</sup></p> <ul style="list-style-type: none"> <li>• 20-39 y: 25% (58/230); reference</li> <li>• 40-59 y: 30% (60/196); OR 1.31 (0.86-2.00)*</li> <li>• ≥60 y: 23% (12/52); OR 0.89 (0.44-1.81)*</li> </ul> <p>Sex<sup>^</sup></p> <ul style="list-style-type: none"> <li>• Female: 26% (87/329)</li> <li>• Male: 29% (43/149) <ul style="list-style-type: none"> <li>◦ Female vs. male: OR 0.89 (0.58-1.36)* 0.90 (0.67-1.24)</li> </ul> </li> </ul> <p>Race/ethnicity:</p> <ul style="list-style-type: none"> <li>• Caucasian: 15% (18/115); reference</li> <li>• Hispanic: 31% (41/132); adjusted OR 1.32 (0.60-2.89)</li> <li>• Black: 32% (28/87); adjusted OR 1.50 (0.62-3.58)</li> <li>• Asian: 26% (30/114); adjusted OR 0.90 (0.39-2.07)</li> <li>• Other race/ethnicity: 43% (13/30); adjusted OR 2.59 (0.86-7.73)</li> </ul> <p>HCW role<sup>^</sup></p> <ul style="list-style-type: none"> <li>• Nurse: 28% (40/142)</li> <li>• Physician: 25% (39/157) <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: OR 1.19 (0.71-1.98)*</li> </ul> </li> <li>• Ancillary service: 28% (20/72)</li> <li>• Other role: 29% (31/107)</li> </ul> <p>PPE<sup>^</sup></p> <ul style="list-style-type: none"> <li>• N95 only (yes vs. no): 25% (19/76); OR 0.87 (0.50-1.54)</li> <li>• Surgical mask only (yes vs. no): 36% (39/109); OR 1.70 (1.08-2.69)</li> <li>• N95 and surgical mask (yes vs. no): 25% (90/361); OR 0.64 (0.41-1.00)</li> <li>• Face shield and goggles (yes vs. no): 23% (77/329); OR 0.55 (0.36-0.84)</li> <li>• No PPE: 50% (1/2)</li> <li>• N95 only vs. surgical mask only: OR 0.60 (0.31-1.15)*</li> </ul> <p>Exposure</p> <ul style="list-style-type: none"> <li>• High/moderate risk (prolonged close contact with patient with COVID-19 with HCW or patient not wearing face mask or aerosol-generating procedure without eye, nose or mouth protection): 38% (25/65)</li> <li>• Low risk: 25% (105/413) <ul style="list-style-type: none"> <li>◦ High/moderate vs. low risk: adjusted OR 2.00 (0.99 to 4.25)</li> </ul> </li> </ul>	<p>Potential recall bias; limited control for exposures; potential data discrepancies between reported OR and data (unadjusted OR re-calculated)</p>
<p>Villanueva et al, 2020 (86)</p> <p>Prospective cohort</p>	<p>324 HCWs with known exposure of signs or symptoms</p> <ul style="list-style-type: none"> <li>• Mean age, 36 y</li> <li>• 67% female</li> </ul>	<p>Positive (PCR) of HCWs screened</p> <ul style="list-style-type: none"> <li>• 20-29 y: 2.3% (2/88)</li> <li>• 30-39 y: 2.9% (4/140)</li> <li>• 40-49 y: 2.9% (2/68)</li> <li>• 50-59 y: 0% (0/24)</li> </ul>	<p>27% participation rate; no control for confounders</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
<p>The Philippines (Manilla); 1 hospital; 20 March to 20 April 2020</p>	<ul style="list-style-type: none"> <li>11% physician, 63% nurse, 19% nursing aid, 2% radiology tech, 4% lab, 1% clerk and other</li> </ul>	<ul style="list-style-type: none"> <li>60-69 y: 0% (0/4)</li> <li>Female: 2.8% (6/216)</li> <li>Male: 1.9% (2/108) <ul style="list-style-type: none"> <li>Female vs. male: OR 1.51 (0.30-7.63)*</li> </ul> </li> <li>Physician: 2.7% (1/37)</li> <li>Nurse: 2.0% (4/203) <ul style="list-style-type: none"> <li>Nurse vs. physician: OR 0.72 (0.08-6.66)*</li> </ul> </li> <li>Lab personnel: 25% (3/12)</li> <li>Radiology tech, clerk, other: 0%</li> <li>High risk: 4.1% (4/97)</li> <li>Low risk: 1.8% (4/227)</li> </ul> <p>Of 8 positive tests</p> <ul style="list-style-type: none"> <li>Care of COVID-19 patient: 12.5% (1/8)</li> <li>Community/worker residence exposure: 87.5% (7/8)</li> <li>At least one underlying disease: 100% (8/8)</li> </ul>	
<p>Vimercati et al 2021 (23)</p> <p>Prospective cohort</p> <p>Italy (Bari); 1 hospital; 8 April 2020 to 7 June 2020</p> <p><b>Added for Update Alert #8</b></p>	<p>2407 asymptomatic HCWs with close contact with COVID-19-positive patients</p> <ul style="list-style-type: none"> <li>Mean age 46 y</li> <li>56% female</li> <li>34% nurse, 35% physician, 14% support operator, 2% healthcare professions, 15% other role</li> <li>5% COVID units; 4% ER; 15% ICU/anesthesiology; 3% ID; 57% other clinical units; 16% non-clinical units</li> <li>Italian and CDC Biological Occupational Risk level: 27% high risk,</li> </ul>	<p><i>Infection (PCR)</i></p> <p>Age</p> <ul style="list-style-type: none"> <li>Mean age, positive vs. negative: 43.2 y vs. 45.7 y; OR 0.98 (0.95-1.02)</li> </ul> <p>Sex</p> <ul style="list-style-type: none"> <li>Female: 0.9% (12/1360)</li> <li>Male: 0.6% (6/1047) <ul style="list-style-type: none"> <li>Female vs. male: OR 1.54 (0.58-4.13)*</li> </ul> </li> </ul> <p>HCW role:</p> <ul style="list-style-type: none"> <li>Nurse: 0.5% (4/809)</li> <li>Physician: 1.6% (13/831) <ul style="list-style-type: none"> <li>Nurse vs. physician: <b>OR 0.31 (0.10-0.96)*</b></li> </ul> </li> <li>Support operator: 0.3% (1/347)</li> <li>Healthcare professions: 0% (0/53)</li> <li>Other role: 0% (0/367)</li> </ul> <p>Hospital unit:</p> <ul style="list-style-type: none"> <li>COVID units: 0% (0/118)</li> <li>ER: 0.9% (1/107)</li> <li>ICU/anesthesiology: 1.1% (4/357)</li> <li>ID: 0% (0/70)</li> <li>Other clinical units: 0.9% (13/1373)</li> <li>Non-clinical units: 0% (0/377)</li> </ul> <p>Risk level:</p>	<p>Participation rate unclear; limited control for exposures and no control for PPE use</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	<p>61% medium risk, 12% low risk</p> <ul style="list-style-type: none"> <li>0.75% SARS-CoV-2 infection, PCR; 11.5% IgM seropositive; 2.4% IgG seropositive</li> </ul>	<ul style="list-style-type: none"> <li>Low: 0% (0/281); reference</li> <li>Medium: 0.8% (12/1452); OR 4.89 (0.29-82.76)*</li> <li>High: 0.8% (5/653); OR 4.77 (0.26-86.6)*</li> </ul> <p><i>Seropositive, IgM</i></p> <p>Age</p> <ul style="list-style-type: none"> <li>Mean age, positive vs. negative: 43.3 y vs. 46.0 y; <b>OR 0.98 (0.97-0.99)</b></li> </ul> <p>Sex:</p> <ul style="list-style-type: none"> <li>Female 11.9% (162/1360)</li> <li>Male: 11.0% (115/1047) <ul style="list-style-type: none"> <li>Female vs. male: adjusted OR 0.97 (0.75-1.27)</li> </ul> </li> </ul> <p>HCW role:</p> <ul style="list-style-type: none"> <li>Nurse: 12.1% (98/809)</li> <li>Physician: 13.6% (113/831) <ul style="list-style-type: none"> <li>Nurse vs. physician: OR 0.88 (0.66-1.17)*</li> </ul> </li> <li>Support operator: 10.1% (35/347)</li> <li>Healthcare professions: 0.9% (5/53)</li> <li>Other: 7.1% (26/367)</li> </ul> <p>Hospital unit:</p> <ul style="list-style-type: none"> <li>COVID units: 15.3% (18/118)</li> <li>ER: 3.7% (4/107)</li> <li>ICU/anesthesiology: 14.6% (52/357)</li> <li>ID: 2.9% (2/70)</li> <li>Other clinical units: 13.3% (183/1373)</li> <li>Non-clinical units: 4.2% (16/377)</li> </ul> <p>Risk level:</p> <ul style="list-style-type: none"> <li>Low: 4.3% (12/281); reference</li> <li>Medium: 12.3% (179/1452); adjusted OR 2.91 (1.57-5.39)</li> <li>High: 11.6% (76/653); adjusted OR 2.84 (1.50-5.39)</li> </ul> <p><i>Seropositive, IgG</i></p> <p>Age</p> <ul style="list-style-type: none"> <li>Mean age, positive vs. negative: 48.9 vs. 45.6; <b>OR 1.03 (1.00-1.059)</b></li> </ul> <p>Sex:</p> <ul style="list-style-type: none"> <li>Female 2.1% (29/1360)</li> <li>Male: 2.7% (28/1047) <ul style="list-style-type: none"> <li>Female vs. male: adjusted OR 0.73 (0.41-1.29)</li> </ul> </li> </ul> <p>HCW role:</p>	

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		<ul style="list-style-type: none"> <li>• Nurse: 2.1% (17/809)</li> <li>• Physician: 2.2% (18/831) <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: OR 0.97 (0.50-1.89)*</li> </ul> </li> <li>• Support operator: 4.0% (14/347)</li> <li>• Healthcare professions: 1.9% (1/53)</li> <li>• Other: 1.9% (7/367)</li> </ul> <p>Hospital unit:</p> <ul style="list-style-type: none"> <li>• COVID units: 2.5% (3/118)</li> <li>• ER: 2.8% (3/107)</li> <li>• ICU/anesthesiology: 1.7% (6/357)</li> <li>• ID: 1.4% (1/70)</li> <li>• Other clinical units: 2.8% (39/1373)</li> <li>• Non-clinical units: 0.8% (3/377)</li> </ul> <p>Risk level:</p> <ul style="list-style-type: none"> <li>• Low: 1.1% (3/281); reference</li> <li>• Medium: 2.7% (39/1452); OR 3.03 (0.90-10.21)</li> <li>• High: 2.0% (13/653); OR 2.32 (0.62-8.62)</li> </ul>	
<p>von Freyburg et al, 2020 (87)</p> <p>Cross-sectional</p> <p>Germany (Dachau); single hospital; 3-5 and April 2020</p>	<p>1170 HCWs</p> <ul style="list-style-type: none"> <li>• Age, sex not reported</li> <li>• 17.8% physician, 35.3% nurse, 43.1% nonmedical staff; 3.8% other</li> </ul>	<p>Incidence of SARS-CoV-2 seropositivity:</p> <ul style="list-style-type: none"> <li>• Physician: 3.8% (8/208)</li> <li>• Nurse: 9.7% (40/413)</li> <li>• Nonmedical: 1.6% (8/505)</li> <li>• Other: 4.5% (2/44)</li> </ul> <p>OR for SARS-CoV-2 seropositivity Nurse vs. physician: 2.68 (1.23-5.84)*</p>	<p>No information on clinical outcomes of infection; limited information on demographic and no information on clinical characteristics of HCWs</p>
<p>Wang Q. et al, 2020 (88)</p> <p>Retrospective cohort</p> <p>China (Hubei province); 107 hospital neurosurgery departments; January 20 to March 1, 2020</p>	<p>5,322 HCWs</p> <ul style="list-style-type: none"> <li>• Mean age, 34 years</li> <li>• 50% female</li> <li>• 45% surgeon, 55% nurse</li> <li>• 2.2% diagnosed with COVID-19(120/5,442)</li> </ul>	<p>OR (95% CI) for COVID-19 (PCR) Level 2 protection (cap, N95 or higher, goggles/eye protection, gown, gloves, shoe covers) (yes vs. no): <b>0.03 (0.003-0.19)*</b></p>	<p><b>Not peer reviewed;</b> potential recall bias; no control for confounders</p>



Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
<p>Wang X. et al 2020b (89)</p> <p>Retrospective cohort</p> <p>China (Wuhan); hospital neurosurgery department; 25 December 2019 to 15 February 2020</p>	<p>118 HCWs in neurosurgery unit</p> <ul style="list-style-type: none"> <li>• Mean age 31 y</li> <li>• 64% female</li> <li>• 75% nurse, 25% physician</li> <li>• 10% SARS-CoV-2 infection (PCR)</li> </ul>	<p>Sex</p> <ul style="list-style-type: none"> <li>• Female: 9.3% (7/75)</li> <li>• Male: 11.6% (5/43) <ul style="list-style-type: none"> <li>◦ Female vs. male: OR 0.78 (0.23-2.64)*</li> </ul> </li> </ul> <p>Age (mean, years): 36.6 (cases) vs. 30.5 (non-cases), p=0.006</p> <p>BMI (mean, kg/m<sup>2</sup>): 22.4 (cases) vs. 22.0 (non-cases), p=0.85</p> <p>HCW role</p> <ul style="list-style-type: none"> <li>• Nurse practitioners: 2.4% (1/42)</li> <li>• Nurse: 9.1% (8/88)</li> <li>• Physician: 13.3% (4/30) <ul style="list-style-type: none"> <li>◦ Nurse vs. physician: OR 0.65 (0.18-2.34)*</li> </ul> </li> </ul> <p>Exposure</p> <ul style="list-style-type: none"> <li>• Contact with COVID-19 index case: 7.3% (7/96)</li> <li>• No contact with index case: 22.7% (5/22) <ul style="list-style-type: none"> <li>◦ Contact vs. no contact with index case: <b>OR 0.27 (0.08-0.94)*</b></li> </ul> </li> <li>• Contact with infected co-worker: 28.6% (12/42)</li> <li>• No contact with infected co-worker: 0% (0/76) <ul style="list-style-type: none"> <li>◦ Contact vs. no contact with infected co-worker: <b>OR 62.70 (3.60-1092.46)*</b></li> </ul> </li> </ul> <p>Night shift work</p> <ul style="list-style-type: none"> <li>• Yes: 17.3% (9/52)</li> <li>• No: 4.5% (3/66) <ul style="list-style-type: none"> <li>◦ Night shift work (yes vs. no): <b>OR 4.40 (1.12-17.18)*</b></li> </ul> </li> </ul> <p>Working under pressure</p> <ul style="list-style-type: none"> <li>• Yes: 19.0% (8/42)</li> <li>• No: 5.3% (4/76) <ul style="list-style-type: none"> <li>◦ Working under pressure (yes vs. no): <b>OR 4.24 (1.19-15.05)*</b></li> </ul> </li> </ul> <p>Smoking</p> <ul style="list-style-type: none"> <li>• Current smoker: 0% (0/9)</li> <li>• Not current smoker: 11.0% (12/109) <ul style="list-style-type: none"> <li>◦ Current smoker (yes vs. no): OR 0.41 (0.02-7.49)*</li> </ul> </li> </ul> <p>Alcohol</p> <ul style="list-style-type: none"> <li>• Current alcohol use: 0% (0/10)</li> <li>• No current alcohol use: 11.1% (12/108) <ul style="list-style-type: none"> <li>◦ Current alcohol use (yes vs. no): OR 0.37 (0.02-6.67)</li> </ul> </li> </ul> <p>Chronic pulmonary disease</p> <ul style="list-style-type: none"> <li>• Yes: 11.1% (1/9)</li> </ul>	<p>No control for confounders; potential recall bias; 2 infected HCWs not included in analysis</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
		<ul style="list-style-type: none"> <li>• No: 10.1% (11/109) <ul style="list-style-type: none"> <li>◦ Chronic pulmonary disease (yes vs. no): OR 1.11 (0.13-9.76)*</li> </ul> </li> <li>Chronic non-pulmonary disease</li> <li>• Yes: 0% (0/6)</li> <li>• No: 10.7% (12/112) <ul style="list-style-type: none"> <li>◦ Chronic non-pulmonary disease (yes vs. no): OR 0.62 (0.03-11.65)*</li> </ul> </li> </ul>	
<p>Wang X. et al, 2020 (90)</p> <p>Retrospective cohort</p> <p>China (Wuhan); 1 hospital; January 2020</p>	<p>493 HCWs</p> <ul style="list-style-type: none"> <li>• Mean age, 32 y</li> <li>• 87% female</li> <li>• 27% doctor, 73% nurse</li> <li>• 2.0% (10/493) diagnosed with COVID-19</li> </ul>	<p>Incidence of COVID-19</p> <ul style="list-style-type: none"> <li>• Respiratory department: 0% (0/70)</li> <li>• ICU: 0% (0/169)</li> <li>• Infectious disease department: 0% (0/39)</li> <li>• Hepatobiliary and pancreatic surgery department: 11% (8/74)</li> <li>• Trauma and microsurgery department: 2% (1/44)</li> <li>• Urology department: 1% (1/97)</li> </ul> <p>Unadjusted OR (95% CI) Nurse vs. doctor: <b>0.04 (95% CI 0.005 to 0.31)<sup>†</sup></b></p> <ul style="list-style-type: none"> <li>• In department with N95 mask use (no vs. yes): <b>28.46 (1.65 to 488.48)<sup>*</sup></b></li> </ul> <p>Adjusted OR (95% CI) for COVID-19</p> <ul style="list-style-type: none"> <li>• In department with N95 mask use (no vs. yes): <b>464.82 (97.73– ∞)</b></li> </ul>	<p>Mask and other PPE use based on department practice, not individual participant use; estimate for mask very imprecise</p>
<p>Yogo et al 2020 (91)</p> <p>Cross-sectional</p> <p>USA (San Diego); 4 acute care hospitals, 1 inpatient behavioral health hospital, 3 skilled nursing facilities; 20 May to 8 June 2020</p>	<p>1770 HCWs in high-risk settings</p> <ul style="list-style-type: none"> <li>• Mean age not reported; 45% 18-35 y, 26% 36-45 y, 18% 46-55 y, 8% 56-65 y, 2% &gt;65 y</li> <li>• 75% female</li> <li>• 64% nurse, 9% nursing assistant, &lt;1% nurse practitioner, 6% physician, 6% phlebotomist, 7% respiratory therapist, 2% social worker, 4% technician, 1%</li> </ul>	<p>Age</p> <ul style="list-style-type: none"> <li>• 18-35 y: reference</li> <li>• 36-45 y: adjusted OR 0.47 (0.17-1.33)</li> <li>• 46-55 y: adjusted OR 0.50 (0.16-1.59)</li> <li>• 56-65 y: adjusted OR 0.32 (0.04-2.50)</li> <li>• &gt;65 y: adjusted OR 1.93 (0.25-14.80)</li> </ul> <p>Sex</p> <ul style="list-style-type: none"> <li>• Female vs. male: adjusted OR 1.00 (0.40-2.51)</li> </ul> <p>Race/ethnicity</p> <ul style="list-style-type: none"> <li>• Caucasian: reference</li> <li>• African American/Black: adjusted OR 1.32 (0.15-11.47)</li> <li>• Asian: adjusted OR 1.16 (0.41-3.31)</li> <li>• Hispanic/Latino: <b>adjusted OR 2.79 (1.02-7.65)</b></li> <li>• Other: adjusted OR 2.85 (0.62-13.15)</li> </ul> <p>HCW role</p> <ul style="list-style-type: none"> <li>• Nurse: reference</li> <li>• Nursing assistant: adjusted OR 0.65 (0.17-2.45)</li> </ul>	<p>Potential recall bias; participation rate 45%</p>

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	therapist, 1% other role <ul style="list-style-type: none"> <li>2.3% SARS-CoV-2 seropositivity or infection (PCR)</li> </ul>	<ul style="list-style-type: none"> <li>Physician: adjusted OR 1.19 (0.19-7.38)</li> <li>Technician: adjusted OR 1.65 (0.38-7.15)</li> <li>Therapist: adjusted OR 0.78 (0.01-70.94)</li> </ul> PPE (exposure without PPE) <ul style="list-style-type: none"> <li>No: reference</li> <li>Yes: adjusted OR 1.17 (0.42-3.26)</li> </ul>	
Zhang G et al, 2020 (92)  Retrospective cohort  China (Wuhan); 1 university hospital; 25 December 2019 to 31 January 2020	237 HCWs with confirmed contact with a COVID-19 infected patient <ul style="list-style-type: none"> <li>Age, sex not reported</li> <li>28% physician, 72% nurse</li> <li>31% respiratory department, 31% hepatobiliary surgery, 38% neurology</li> </ul>	Incidence of SARS-CoV-2 infection (PCR) <ul style="list-style-type: none"> <li>Physician: 14.9% (10/67)</li> <li>Nurse: 1.2% (2/170)               <ul style="list-style-type: none"> <li>Nurse vs. physician: OR 0.07 (0.01-0.32)*</li> </ul> </li> <li>Respiratory department: 0% (0/73)</li> <li>Hepatobiliary surgery: 14.9% (10/74)</li> <li>Neurology: 2.2% (2/90)</li> </ul>	Limited information on demographic characteristics; no control for confounders
Zheng et al, 2020 (93)  Cross-sectional  China (Wuhan); throughout Wuhan area; from March 26, 2020	117,100 HCWs <ul style="list-style-type: none"> <li>Age not reported</li> <li>72% female</li> <li>37% physician, 49% nurse, 14% medical staff</li> <li>2.1% (2,457/117,100) diagnosed with COVID-19</li> </ul>	OR (95% CI) for COVID-19 <ul style="list-style-type: none"> <li>Female vs. male: 1.02 (0.94-1.12)</li> <li>Nurse vs. physician: 1.16 (1.07-1.27)</li> <li>Nurse vs. medical staff: 1.03 (0.91-1.16)</li> </ul> Prevalence of COVID-19 <ul style="list-style-type: none"> <li>General hospital: 2.9% (2,193/74,944)</li> <li>Specialized hospital: 0.80% (140/17,565)</li> <li>Community hospital: 0.50% (124/24,591)</li> </ul>	COVID-19 cases based on requests for financial assistance; denominators based on epidemiological data; limited information on clinical outcomes of COVID-19 infections
Zhou F et al, 2020 (94)  Cross-sectional  China (Wuhan); single hospital; 16 to 25 March 2020	3674 HCWs <ul style="list-style-type: none"> <li>Mean age not reported; 38% age 18-30 y, 45% age 31-50 y; 17% age &gt;50 y</li> <li>68% female</li> <li>65% healthcare role, 14% administrative staff,</li> </ul>	Incidence of SARS-CoV-2 infection (PCR, seropositivity, or CT scan suggesting infection) <ul style="list-style-type: none"> <li>Female: 3.3% (81/2486)</li> <li>Male: 3.8% (45/1188)               <ul style="list-style-type: none"> <li>Female vs. male: OR 0.86 (0.59-1.24)</li> </ul> </li> <li>Age 18-30: 2.5% (35/1378)</li> <li>Age 31-50: 3.3% (55/1656)</li> <li>Age &gt;50: (36/640)</li> <li>Healthcare role: 3.0% (73/2406)</li> </ul>	No control for confounders

Study, Year (Reference) Study Design Setting and Study Dates	Population Characteristics	Outcomes	Limitations
	21% clinical support staff	<ul style="list-style-type: none"> <li>• Administrative staff: 2.4% (12/505)</li> <li>• Clinical staff: 5.4% (41/763)</li> <li>• High risk vs. low-risk setting: <math>p=0.39</math></li> <li>• Attended vs. did not attend training early in the COVID-19 outbreak: <b><math>p&lt;0.01</math></b></li> </ul>	

Abbreviations: BAME = Black, Asian and minority ethnic; BCG = bacille Calmette-Guerin; CPR = cardiopulmonary resuscitation ; ED = emergency department; HCW = healthcare worker; HR = hazard ratio; ICU = intensive care unit; IRR = incidence rate ratio; MMR = measles, mumps and rubella; NICU = neonatal intensive care unit; ob/gyn = obstetrics and gynecology; OR = odds ratio; PAPR = powered air purifying respirator; PCR = polymerase chain reaction; PICU = pediatric intensive care unit; PPE = personal protective equipment; RR = relative risk; VHA = Veterans Health Administration; y=years

\*Unadjusted OR calculated based on available data.

^Variable was not retained in the multivariate model

**Supplement Table 2. Demographic characteristics, clinical characteristics, and HCW role and risk for infection with SARS-CoV-2 in HCWs**

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
Abdelmoniem et al 2020 (29)	Mean 31.7 (cases) vs. 31.9 years (non-cases), p=0.86	Female vs. male: OR 1.35 (0.61-2.97)	--	--	9.4% (7/74)	16.8% (15/89) Nurse vs. physician: OR 1.95 (0.75-5.05)	Cleaner/transportation: 20.8% (5/24)  Radiology/lab: 0% (0/2)  Administration: 14.3% (2/14)
Akinbami et al 2020 (30)	18-24 y: 7.9% (54/686)  25-34 y: 6.9% (337/4,885)  35-44 y: 7.0% (278/3,977)  45-59 y: 6.9% (360/5,222)  60-64 y: 7.5% (83/1,106) ≥65 y: 3.5% (18/521); vs. 18-24 y, <b>adjusted OR 0.41 (0.23-0.72)</b>	Female vs. male: <b>adjusted OR 0.79 (0.65-0.95)</b>	--	--	6.1% (140/2,297)	Nurse: 7.7% (495/6,426) Nurse vs. physician; <b>adjusted OR 1.52 (1.18-1.95)</b>  Nurse assistant: 12.8% (82/641) Nurse assistant vs. physician: <b>adjusted OR 1.88 (1.24-2.83)</b>	Pharmacist: 4.4% (14/321)  Physical therapist: 10.6% (25/235)  Respiratory therapist: 8.3% (34/409)  Administration/clerk: 8.0% (77/964)  Clinical technician: 5.5% (20/365)  Imaging technician: 4.2% (30/719)  Laboratory technician: 3.4% (10/293)  Midlevel clinician: 4.6% (26/566)  Other HCW role: 7.0% (62/888)
Al Maskari et al, 2020 (31)	--	Female vs. male: <b>OR 4.45 (3.32-5.96)</b>	--	--	4.7% (26/556)	4.1% (77/1870) Nurse vs. physician: OR 0.88 (0.56-1.38)	Paramedic: 2.8% (27/969)  Administrative/support staff: 5.6% (74/1308)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
Algado-Selles et al 2020 (32)	<60 y vs ≥60 y: OR 1.2 (0.7-2.0)	Female vs. male: OR 1.2 (0.8-1.8)	--	--	28.2% (60/213)	18.1% (49/270) Nurse vs. physician: <b>OR 0.57 (0.37-0.87)</b>	Nurse assistant/technician: 14.6% (27/185)  Other role: 17.2% (20/116)
Amendola et al, 2020 (33)	--	Female vs. male: OR <b>0.44 (0.21-0.96)</b>	--	--	4.7% (10/214)	6.0% (13/216) Nurse vs. physician: OR 1.31 (0.56-3.05)	Other health technicians: 4.2% (5/117)  Non-clinical HCW: 5.2% (6/116)
Bahrs et al., 2021 (14)  <b>Added for Update Alert #8</b>	--	Female vs. male: OR 0.93 (0.33-2.64)	--	--	4.8% (5/103)	Nurse or care worker: 2.3% (5/215) Nurse or care worker vs. physician: adjusted OR 0.38 (0.10-1.34)	Cleaner: 16.7% (1/6)  Reception staff: 5.3% (1/19)  Administrative staff: 3.3% (6/180)  Other role: 0% (0/130)
Bai et al, 2020 (34)	Mean age: 36.6 y in cases vs. 30.5 in non-cases, <b>P=0.006</b>	Female vs. male: OR 0.78 (0.23-2.64)	--	--	--	Nurse vs. physician: OR 0.65 (0.18-2.34)	--
Baker et al 2021 (15)  <b>Added for Update Alert #8</b>	≥60: reference  50-59: adjusted OR 0.8 (0.6-1.2)  40-49: adjusted OR 0.9 (0.7-1.4)	Female vs. male: adjusted OR 0.77 (0.59-1.00)	White: 4.3% (226/5263); reference  Black: 8.3% (238/2860); <b>adjusted OR 2.1 (1.7-2.6)</b>  Asian: 5.3% (60/1133);	--	5.0% (87/1753)	5.9% (177/2976) Nurse vs. physician: OR 1.21 (0.93-1.58)	Other HCW role with no patient contact: 5.5% (100/1812)  Other direct care: 6.2% (88/1423)  Advanced practice provider: 5.2% (36/698)  Nurse tech: 8.1% (28/346)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
	30-39: adjusted OR 1.0 (0.7-1.4)  <30: adjusted OR 1.2 (0.8-1.7)		adjusted OR 1.3 (0.9-1.7)  Multiracial: 7.6% (10/132); adjusted OR 1.8 (0.8-3.5)				Radiology tech: 7.0% (21/302)
Banjeree et al 2020 (35)	--	Female vs. male: OR 0.85 (0.49-1.45)	--	--	--	--	--
Barallat et al 2020 (4)  <b>Added for Update Alert #8</b>	35-54 vs. 18-34 y: OR 0.86 (0.72-1.03)  ≥55 vs. 18-34 y: OR 0.98 (0.79-1.21)	Female vs. male: OR 0.90 (0.75-1.08)	--	--	27.0% (192/1821)	Nurse: 9.6% (216/2243) Nursing assistant: 11.9% (85/832) Nurse vs. physician: OR 0.90 (0.74-1.11) Nurse or nursing assistant vs. physician: OR 0.92 (0.76-1.11)	Healthcare support services: 4.6% (33/429)  Administration: 10.5% (75/1181)  Other role: 7.2% (51/616)
Barrett et al 2020 (36)	--	--	--	--	2.4% (5/210)	11.1% (25/225) Nurse vs. physician: <b>OR 5.12 (1.92-13.65)</b>	Other HCW role: 9% (10/111)
Blairon et al, 2020 (37)	--	--	--	--	11.8% (38/323)	19.2% (113/588) Nurse vs. physician: OR <b>1.78 (1.20-2.65)</b>	Pharmacist or administrative staff: 9.1% (29/320)  Maintenance or technical worker: 16.4% (22/134)  Imaging or lab worker: 6.6% (2/31)
Buchtele et al, 2020 (38)	--	--	--	--	0% (0/5)	27.8% (5/18) Nurse vs. physician: OR 4.48 (0.21-65.60)	Cleaning staff: 0% (0/3)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
Celebi et al, 2020 (40)	--	Female vs. male: OR 1.27 (0.63-2.57)	--	--	--	Nurse vs. physician: OR 2.45 (0.98-6.11)	--
Calcagno et al 2020 (39)	--	--	--	--	7.8% (55/700)	Nurse: 8.2% (150/1833) Nurse vs. physician: OR 1.05 (0.76-1.44)  Nurse assistant: 9.2% (44/476) Nurse or nurse assistant vs. physician: OR 1.08 (0.79-1.47)	Healthcare personnel: 6.7% (23/343)  Pharmacist: 3.4% (1/29)  Administrative employee: 3.3% (18/539)  Technical personnel: 6.9% (15/216)  Laboratory personnel: 11.5% (18/157)
Chatterjee et al, 2020 (41)	Mean age: 34.7 y in cases vs. 33.5 y in non-cases	Male vs. female: adjusted OR <b>1.93 (1.21-3.07)</b>	--	--	--	--	--
Colaneri et al 2020 (42)	Mean age: 46.3 y in cases vs. 44.9 in non-cases, p=0.43	Female vs. male: OR 0.73 (0.52-1.02)	--	--	12.1% (54/446)	11.1% (63/568) Nurse vs. physician: OR 0.91 (0.62-1.33); adjusted IRR 1.49 (0.97-2.30)	Healthcare assistant: 13.3% (34/255)  Administrative staff: 7.3% (13/178)
Dacosta-Urbieta et al, 2020 (43)	--	--	--	--	Physician/resident: 3.8% (3/80)	Nurse/nurse's aide: 4.8% (4/83)  Nurse/nurse's aide vs. physician/resident: OR 1.30 (0.28-6.00)	--
Dalla Volta et al, 2020 (44)	--	--	--	--	Physician/resident: 20.7% (6/29)	5.4% (2/37) Nurse vs. physician/resident:	Administrative: 50% (2/4)



Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
						OR 0.22 (0.04-1.18)	
Ebinger et al 2021 (16)  <b>Added for Update Alert #8</b>	Per decade increase: <b>adjusted OR 0.80 (0.68 to 0.94)</b>	Female vs. male: adjusted OR 0.84 (0.63-1.12)	Asian: 3.1% (57/1866)  Black: 4.8% (18/372); <b>adjusted OR 2.02 (1.08-3.76)</b>  Hispanic/Latino: 5.3% (62/1159); <b>adjusted OR 1.98 (1.34-2.92)</b>  Other: 4.2% (33/782)  White: 3.4% (104/3042); reference	--	--	--	--
El Abdellati et al, 2021 (5)  <b>Added for Update Alert #8</b>	Mean 46.8 (cases) vs. 43.7 (non-cases) years	Female vs. male: OR 0.52 (0.16-1.71)	--	--	--	--	--
el-Boghdadly et al, 2020 (45)	Age (y): HR, 0.99 (0.98-1.01)	Female vs. male: adjusted HR <b>1.36 (1.01-1.82)</b>	--	--	10.6% (166/1558) Physician vs. non-physician: OR 0.94 (0.56-1.58)	--	Non-physician: 11.2% (18/160)
Eyre et al 2020 (6)  <i>Seropositive or PCR</i>  <b>Added for Update Alert #8</b>	Per 10 years: OR 0.95 (0.90-1.00)	Female vs. male: OR 0.88 (0.76-1.01)	White: 9.5% (686/7237); reference  Asian: 16.8% (281/1673); <b>adjusted OR 1.51 (1.28-1.77)</b>  Black: 18.0% (71/394);	--	10.9% (170/1557)	Nurse/healthcare assistant: 14.2% (562/3971) Nurse/healthcare assistant vs. physician: <b>OR 1.35 (1.12-1.61)*</b>	Administration: 7.2% (88/1218)  Laboratory staff: 8.2% (29/354)  Cleaning staff: 18.6% (60/323)  Therapist: 14.9% (47/316)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
			<p><b>adjusted OR 1.66 (1.25-2.21)</b></p> <p>Chinese: 7.5% (7/93); adjusted OR 0.75 (0.34-1.67)</p> <p>Mixed race/ethnicity: 11.6% (28/242); adjusted OR .23 (0.82-1.87)</p>				Security or catering: 11.8% (26/221)
Eyre et al 2020 (6)  <i>Seropositive</i>  <b>Added for Update Alert #8</b>	--	Male vs. female: <b>adjusted OR 1.19 (1.01-1.40)</b>	<p>vs. <i>White</i> Asian: <b>adjusted OR 1.52 (1.29-1.80)</b></p> <p>Black: <b>adjusted OR 1.71 (1.28-2.28)</b></p> <p>Chinese: adjusted OR 0.67 (0.29-1.59)</p> <p>Mixed race/ethnicity: adjusted OR 1.30 (0.86-1.97)</p>	--	<p>vs. <i>administration</i> Senior physician: adjusted OR 0.84 (0.54-1.31)</p> <p>Junior physician: adjusted OR 1.05 (0.70-1.58)</p>	vs. <i>administration</i> Nurse/healthcare assistant: adjusted OR 1.33 (0.94-1.87)	<p>vs. <i>administration</i> Laboratory staff: adjusted OR 0.96 (0.60-1.54)</p> <p>Cleaning staff: <b>adjusted OR 1.96 (1.26-3.04)</b></p>
Faico-Filho et al, 2020 (46)	--	--	--	--	24.2% (26/107)	Nurse or nurse technician: 40.1% (73/182)  Nurse or nurse technician vs. physician: <b>OR 2.09 (1.23-3.55)</b>	<p>Laboratory personnel: 28.6% (4/14)</p> <p>Administrative staff: 31.1% (28/90)</p> <p>Logistic worker: 63.0% (17/27)</p>
Fusco et al, 2020 (95)	--	Female vs. male: OR	--	--	3.8% (1/26)	3.5% (2/57)	Other HCW role: 3.1% (1/32)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
		0.35 (0.03-3.43)				Nurse vs. physician: OR 1.10 (0.10-12.70)	
Garcia et al, 2020 (49)	--	--	--	--	13.0% (64/491)	Nurse: 10.2% (126/1231)  Nurse supervisor: 37.5% (9/24)  Any nursing role: 10.7% (135/1255)  Nurse vs. physician, COVID-19: OR 0.76 (0.55-1.05)*	Department head: 23.1% (9/39)  Other role: 4.4% (5/113)
Garralda Fernandez et al 2021 (7)  <b>Added for Update Alert #8</b>	--	Female vs. male: <b>OR 0.68 (0.54-0.85)</b>	--	--	25.4% (n/N not reported)  Physician vs. administrator: OR 2.13 (1.53-2.96)	Nurse: 19.4% (n/N not reported) Nursing assistant: 22.0% (n/N not reported)  Nurse vs. administrator: OR 1.51 (1.09-2.09)	Security: 21.1% (n/N not reported)  Technician: 18.1% (n/N not reported)  Cleaning staff: 16.9% (n/N not reported)
Goenka et al 2020 (50)	--	--	--	--	3.9% (10/255)	9.4% (21/224) Nurse vs. physician: adjusted OR 1.61 (0.62-4.35)	Housekeeping: 26.1% (59/226)  Technician: 12.1% (12/99)  Administration: 8.0% (6/75)  Lab assistant/pharmacist: 15.3% (11/72)  Dietician: 18.4% (9/49)  Ward executive: 7.0% (5/71)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
							Other role: 2.0% (1/51)
Gras-Valenti et al 2020 (52)	--	Female vs. male: OR 0.93 (0.70-1.22)	--	--	8.7% (85/974)	6.6% (78/1,186) Nurse vs. physician: OR 0.74 (0.53-1.01)	--
Herzberg et al 2021 (8)  <b>Added for Update Alert #8</b>	Per 10 years: adjusted OR 1.50 (1.19 to 1.90)	Female vs. male: adjusted OR 0.91 (0.42-2.00)	--	--	--	--	--
Houlihan et al, 2020 (54)	<30 y: 54% (31/57)  30-39 y: 49% (34/70)  40-49 y: 30% (12/30)  ≥50 y: 33% (10/30)	Female vs. male: OR 0.67 (0.38-1.20)	--	--	44% (32/72)	Nurse or other frontline clinical staff: 43% (46/106)  Nurse or other frontline worker vs. physician: OR 0.96 (0.52-1.75)	Other healthcare role: 41% (9/22)
Hunter et al, 2020 (55)	--	--	--	--	1.1% (3/279)	2.2% (7/317) Nurse vs. physician: OR 2.08 (0.53-8.11)	Administrative staff vs. all other employees: RR 3.1 (0.71-13.9)
Jeremias et al, 2020 (56)	--	Female vs. male: OR 0.83 (0.58-1.17)	--	--	11.4% (9/79)	9.5% (99/1043) Nurse vs. physician: OR 0.82 (0.40-1.68)	Technologist: 5.8% (9/155)  Environmental worker: 12.0% (12/100)  Ancillary worker: 12.1% (39/322)
Jespersen et al, 2020 (57)	<29 y: 6.0% (116/1,916)  30-39 y: 3.8% (144/3,794)	Female vs. male: OR 1.00 (0.80-1.25)	--	--	Range (according to study site): 1.9%-12.8%	Range (according to study site): 1.24%-18.2%	Range (according to study site):  Laboratory scientist: 1.43%-12.9%

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
	40-49 y: 3.8% (175/4,560)  50-59 y: 3.6% (161/4,505)  ≥60 y: 2.9% (72/2,505)						Medical secretary: 1.09%-2.52%  Other role: 0.80%- 5.77%
Jones et al 2020 (58)	≤20 y: adjusted OR 1.47 (0.96- 2.20)  21-30 y: <b>adjusted OR</b> <b>1.64 (1.36- 1.99)</b>  31-40 y: reference  41-50 y: <b>adjusted OR</b> <b>1.36 (1.11- 1.67)</b>  51-60 y: <b>adjusted OR</b> <b>1.45 (1.17- 1.80)</b>  61-70 y: adjusted OR 1.28 (0.94 to 1.73)	Female vs. male: adjusted OR 1.04 (0.88- 1.23)	BAME: 14.6% (160/1095) White: 8.2% (456/5578) BAME vs white: <b>adjusted OR</b> <b>1.99 (1.69-2.34)</b>	--	Medical/dental: 8.6% (74/856)	Nurse/midwife: 10.2% (201/1962)  Nurse/midwife vs. medical/dental: OR 1.21 (0.91- 1.60)	Allied health 7.5% (31/413)  Administrative/clerical: 5.9% (73/1233)  Other clinical services: 12.7% (180/1420)
Kassem et al, 2020 (59)	--	Female vs. male OR 0.61 (0.20-1.86)	--	--	13.3% (4/30)	21.4% (6/28) Nurse vs. physician: OR 0.56 (0.14-2.25)	Patient transporters/cleaners: 33.3% (3/9)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
							Administrative: 42.9% (3/7)
Khalil et al, 2020 (60)	≥35 years vs. <35 years: OR 0.67 (0.35-1.28)	Female vs. male: OR 0.66 (0.44-1.69)	--	--	--	--	--
Krastinova et al 2020 (62)	>50 y vs. ≤50 y: adjusted OR 0.69 (0.36-1.32)	Female vs. male: adjusted OR 1.20 (0.60-2.38)	--	--	--	--	--
Lackermair et al, 2020 (63)	--	Female vs. male: OR 0.19 (0.02-1.38)	--	--	5.6% (3/54)	--	1.0% (1/97)
Lai et al, 2020 (65)	<45 y vs. ≥45 y: <b>OR 0.32 (0.21-0.48)</b>	Female vs. male: OR 0.91 (0.60-1.39)	--	--	--	Nurse vs. physician: OR 1.16 (0.73-1.84)	Health care assistant vs. physician: OR 0.59 (0.33-1.04)
Lahner et al, 2020 (64)	--	--	--	--	4.1% (26/632)	3.8% (27/705) Nurse vs. physician: OR 0.93 (0.54-1.61)*	Other HCW role: 0.6% (5/778)
Lan et al 2021 (18)  <b>Added for Update Alert #8</b>	--	Female vs. male: adjusted IRR 1.15 (0.74-1.80)	Non-Hispanic white: 1.5% (38/2544); reference  African American: 5.0% (44/875); <b>adjusted IRR 2.78 (1.78-4.33)</b>  Hispanic: 4.7% (28/592); <b>adjusted IRR 2.41 (1.42-4.07)</b>	--	4.1% (8/194)	2.8% (6/214) Nurse vs. physician: adjusted OR 0.71 (0.22-2.27)	--

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
			Other race: 1.2% (6/517); adjusted IRR 0.70 (0.29-1.66)				
Leeds et al, 2020 (66)	Age: adjusted 1.01 (0.99-1.03)	Female vs. male: adjusted 0.97 (0.56-1.69)	--	--	--	--	Frontline worker vs. other worker: adjusted 0.79 (0.53-1.17)
Lombardi et al, 2020 (67)	<30 y: 11.7% (29/248) 30-39 y: 8.8% (34/387) 40-49 y: 8.0% (26/326) 50-59 y: 7.9% (35/444) ≥60 y: 8.3% (14/168)	Female vs. male: OR 0.83 (0.58-1.18)	--	--	Physician (including residents): 10.6% (62/582)	Nurse/midwife: 8.2% (43/522) Nurse vs. physician: OR 0.75 (0.50-1.13)	Healthcare assistant: 8.0% (13/162) Health technician: 9.4% (16/170) Clerical worker, technician: 2.9% (4/137)
Lumley et al, 2020 et al* (9)  <b>Added for Update Alert #8</b>	Median 38 vs. 38-41 y (positive at baseline vs. not positive at baseline)	Female vs. male: <b>OR 0.85 (0.75-0.97)</b>	Asian vs. white: <b>OR 1.97 (1.70-2.28)</b> Black vs. white: <b>OR 2.25 (1.75-2.89)</b> Chinese vs. white: <b>OR 0.89 (0.45-1.75)</b>	vs. <i>negative</i> Anti-spike IgG positive: <b>adjusted IRR 0.3 (0.03-0.44)</b> Anti-nucleocapsid IgG positive: <b>adjusted IRR 0.11 (0.03-0.45)</b>	9.9% (184/1860)	Nurse or health care assistant: 12.3% (555/4528) Nurse or health care assistant vs. physician: <b>OR 1.27 (1.07-1.52)</b>	Administrative staff: 6.1% (95/1557) Medical or nursing student: 5.8% (36/620) Laboratory staff: 8.0% (36/452) Physical, occupational or speech therapist: 9.6% (37/386) Porter or domestic worker: 15.4% (58/377)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
				Both anti-spike and anti-nucleocapsid IgG positive: <b>adjusted IRR 0.06 (0.01-0.46)</b> Either anti-spike or anti-nucleocapsid positive: adjusted IRR 0.42 (0.10-1.69)			Security, estates, or catering staff: 8.5% (23/271)
Maltezou et al, 2020 (68)	--	Female vs. male: <b>adjusted OR 0.55 (0.31-0.96)</b>	--	--	--	--	Administrative role vs other role: <b>adjusted OR 3.06 (1.43-6.55)</b>
Martin et al, 2020 (69)	--	Female: 13.0% (31/239) Male: 11.5% (10/87) Female vs. male: OR 1.15 (0.54-2.45)	--	--	11.8% (10/85)	12.7% (19/150) Nurse vs. physician: OR 1.09 (0.48-2.46)	Care assistant: 14.8% (4/27) Paramedical staff: 15.1% (5/33) Administrative staff: 0.4% (1/25) Cleaning staff: 33.3% (2/6) COVID-19 unit: 14.4% (31/215) COVID-19 ICU: 5.7% (3/53) ED: 12.1% (7/58)
Milazzo et al 2021 (19)	Per 1 year or more of increase:	Female vs. male: adjusted OR	--	--	4.1% (8/194)	2.8% (6/214) Nurse vs. physician:	Healthcare service worker: 1.6% (1/63)



Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
<b>Added for Update Alert #8</b>	adjusted OR 0.99 (0.95-1.03)	1.26 (0.41-3.85)				adjusted OR 0.71 (0.22-2.27)	Health service assistant: 5.3% (4/76)  Socio-administrative staff: 6.9% (4/58)
Moncunill et al 2021 (10)  <b>Added for Update Alert #8</b>	Per year: OR 0.98 (0.95-1.02)	Female vs. male: OR 1.27 (0.50-3.24)	--	--	Physician vs. other HCW role: OR 2.77 (0.30-25.25)	Nurse/auxiliary services vs. other HCW role: OR 5.54 (0.72-42.55)	Technician vs. other HCW role: <b>OR 13.03 (1.47-116)</b>
Moscola et al, 2020 (70)	Adjusted RR (95% CI) vs. age 18-39 years: 40-49: 1.0 (0.97-1.02)  50-59: 0.99 (0.97-1.02)  60-69: 1.00 (0.98-1.03)  ≥70: 1.00 (0.94-1.07)	Female vs. male: adjusted RR, 1.05 (1.01-1.09)	--	--	Physician vs. allied health: adjusted RR, 0.98 (0.95-1.00)	Nurse vs. allied health: adjusted RR, 1.00 (0.98-1.01)  Nurse vs. physician: OR 1.58 (1.38-1.79)	Adjusted RR (95% CI) vs. allied health:  Administrative and clerical: 1.01 (0.99-1.02)  Service/ maintenance: 1.03 (1.00-1.05)
Mutambudzi et al, 2020 (71)	--	--	--	--	--	--	Healthcare professionals: 0.7% (12/1,779)  Medical support staff: 0.8% (10/1,286)  Health associate professionals: 0.7% (54/7,653)
Olalla et al, 2020 (74)	--	--	--	--	1.9% (2/101)	0.5% (1/195) Nurse vs. physician: OR 0.26 (0.03-2.85)	Nursing assistant: 2.3% (3/129)  Security: 2.9% (1/35)
Pereckaite et al 2021 (20)	--	--	--	--	1.2% (2/169)	1.1% (2/179)	--

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
<b>Added for Update Alert #8</b>						OR 0.94 (0.13-6.77)	
Perez-Garcia et al 2020 (75)	--	--	--	--	33.1% (90/272)	39.6% (340/859) Nurse vs. physician: OR 1.32 (0.99-1.77)	Medical staff: 34.7% (154/444)  Technical specialist: 29.1% (41/141)  Hospital porter: 44.9% (83/185)  Other HCW: 26.4% (19/72)  Non-healthcare hospital personnel: 29.8% (104/349)
Piapan et al, 2020 (76)	--	Female vs. male: adjusted OR 0.67 (0.45-1.02)	--	--	12.7 (32/252)	Nurse vs. physician: adjusted OR 0.9 (0.5-1.4)	Nurse's aide vs. physician: adjusted OR 1.4 (0.7-2.6)  Resident vs. physician: adjusted OR 1.3 (0.5-2.7)  Other role vs. physician: adjusted OR 0.9 (0.4-2.0)
Rashid-Abdi et al 2020 (78)	Mean 38 (cases) vs. 44 (non-cases) years, p not reported	Female vs. male: OR 12.82 (0.75-219.19)	--	--	8.0% (2/25)	Nurse vs. physician: OR 3.11 (0.62-15.47)  Nurse or nurse assistant vs. physician: OR 3.44 (0.75-15.68)	Other HCW role: 0% (0/6)
Rasmussen et al 2021 (21)	--	--	--	--	<i>Infection (PCR)</i> 5% (4/80)  <i>Seropositive</i>	<i>Infection (PCR)</i> 1% (1/104)	<i>Infection (PCR)</i> Secretary: 0% (0/18)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
Added for Update Alert #8					4% (3/80)	Nurse vs. physician: OR 0.18 (0.02-1.68)  <i>Seropositive</i> 2% (2/104) Nurse vs. physician: OR 0.50 (0.08-3.09)	Theatre personnel: 0% (0/81)  Cleaner: 0% (0/8)  Porter: 7% (2/31)  Other role: 0% (0/25)  <i>Seropositive</i> Secretary: 6% (1/18)  Theatre personnel: 5% (4/81)  Cleaner: 0% (0/8)  Porter: 13% (4/31)  Other role: 4% (1/25)
Schmidt et al, 2020 (79)	18-29 y: 1.9% (1/55)  30-49 y: 4.8% (7/154)  50-64 y: 1.8% (3/170)  ≥65 y: 0% (0/6)	Female vs. male: OR 0.42 (0.12-1.49)	--	--	8.8% (3/34)	0% (0/154) Nurse vs. physician: <b>OR 0.03 (0.002-0.58)</b>	Therapist: 3.8% (3/80)  Other role: 4.3% (5/117)
Schmitz et al 2020 (80)	--	--	--	--	4.8% (43/890)	5.6% (121/2153) Nurse vs. physician: OR 1.17 (0.82-1.68)	--
Shields et al, 2020a (81)	--	Female vs. male: OR 1.55 (0.94-2.54)	BAME vs. white: <b>adjusted OR 1.92 (1.14-3.23)</b>	--	--	--	--

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
Shields et al 2020b (81)	Per additional year: adjusted OR 0.98 (0.96-1.00)	Female vs. male: adjusted OR 1.49 (0.81-2.83)	--	--	--	--	--
Sims et al 2020 (83)	Mean 41.3 y (cases) vs. 43.3 y (non-cases), p>0.05	Female vs. male: OR 0.97 (0.87-1.09)	--	--	7.0% (277/3,957)	Nurse/nursing support: 10.8% (902/8,352)  Nurse/nursing support vs. physician: <b>OR 1.62 (1.41-1.86)*</b>	Respiratory therapy: 12.1% (37/306)  Phlebotomy: 14.6% (41/281)  Clinical support with patient contact: 8.0% (173/2162)  Facilities: 8.2% (41/500)  Administration: 6.8% (194/2,853)  Laboratory: 5.5% (44/800)  Security/safety: 6.6% (7/106)  Clinical support with no patient contact: 7.7% (102/1,325)
Sotgiu et al. 2020 (84)	IgG 20-29 y: 14.8% (4/27)  30-39 y: 2.3% (1/44)  40-49 y: 7.0% (4/57)	Female vs. male (IgG): OR 0.58 (0.20-1.67)	--	--	IgG: 14.8% (7/115)	IgG: 7.8% (5/64) Nurse vs. physician (IgG): OR 0.76 (0.23-2.52)	Other role: IgG 13.0% (3/23)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
	50-59 y: 9.8% (5/51)  60-69 y: 4.4% (1/23)						
Stubblefield et al, 2020 (85)	--	Female vs. male: OR 1.03 (0.40-2.65)			9.3% (8/86)	4.8% (5/105) Nurse vs. physician: OR 0.49 (0.15-1.55)	Radiology technician: 29.4% (5/17)  Other HCW role: 2.4% (1/41)
Trieu et al, 2020 <b>Added for Update Alert #8</b>	20-35 vs. 36-78 y: OR 1.2 (0.6-2.2)	Female vs. male: OR 1.2 (0.6-2.2)	--	--	Physician vs. other HCW role: OR 0.9 (0.4-2.0)	Nurse vs. other HCW role: OR 1.3 (0.7-2.7)	--
Tubiana et al 2021 (22) <b>Added for Update Alert #8</b>	--	Female vs. male: OR 1.92 (0.86-4.30)*	--	--	Physician or midwife: 28.6% (14/49)	Nurse, CNA, physiotherapist or student: 48.6% (36/74) Nurse, CNA, physiotherapist or student vs. physician or midwife: <b>OR 2.37 (1.10-5.11)</b>	Non-caregiver HCW: 56.5% (13/23)
Varona et al 2021 (12) <b>Added for Update Alert #8</b>	30-45 vs. <30 y: adjusted OR 0.84 (0.67 to 1.06)  46-60 vs. <30 y: adjusted OR 0.96 (0.76 to 1.23)  >60 vs. <30 y: adjusted OR 1.07 (0.77 to 1.48)	Female vs. male: adjusted OR 0.98 (0.83 to 1.18)	--	--	--	--	--
Venugopal et al 2021 (13)	40-59 vs. 20-39 y: OR	Female vs. male: OR	Hispanic vs. white: adjusted	--	25% (39/157)	28% (40/142)	Ancillary service: 28% (20/72)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
<b>Added for Update Alert #8</b>	1.31 (0.86-2.00)*  ≥60 vs. 20-39 y: OR 0.89 (0.44-1.81)*	0.89 (0.58 to 1.36)*	OR 1.32 (0.60 to 2.89)*  Black vs. white: adjusted OR 1.50 (0.62 to 3.58)*  Asian vs. white: adjusted OR 0.90 (0.39 to 2.07)*  Other race/ethnicity vs. white: adjusted OR 2.59 (0.86 to 7.73)*			Nurse vs. physician: OR 1.19 (0.71-1.98)*	Other role: 29% (31/107)
Villaneuva et al, 2020 (86)	20-29 y: 2.3% (2/88)  30-39 y: 2.9% (4/140)  40-49 y: 2.9% (2/68)  50-59 y: 0% (0/24)  60-69 y: 0% (0/4)	Female vs. male: OR 1.51 (0.30-7.63)	--	--	2.7% (1/37)	2.0% (4/203) Nurse vs. physician: OR 0.72 (0.07-6.66)	Lab personnel: 25% (3/12)  Radiology tech, clerk, other: 0%
Vimercati et al 2021 (23)  <b>Added for Update Alert #8</b>	<i>Infection</i> Mean age, positive vs. negative: 43.2 y vs. 45.7 y; OR 0.98 (0.95-1.02)	<i>Infection (PCR)</i> Female vs. male: OR 1.54 (0.58-4.13)	--	--	<i>Infection (PCR)</i> 1.6% (13/831)  <i>Seropositive, IgM</i> 13.6% (113/831)  <i>Seropositive, IgG</i> 2.2% (18/831)	<i>Infection (PCR)</i> 0.5% (4/809) Nurse vs. physician: <b>OR 0.31 (0.10-0.96)</b>  <i>Seropositive, IgM</i> 12.1% (98/809)	<i>Infection (PCR)</i> Support operator: 0.3% (1/347)  Healthcare professions: 0% (0/53)  Other role: 0% (0/367)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
	<p><i>Seropositive, IgM</i> Mean age, positive vs. negative: 43.3 y vs. 46.0 y; <b>OR 0.98 (0.97-0.99)</b></p> <p><i>Seropositive, IgG</i> Mean age, positive vs. negative: 48.9 vs. 45.6; <b>OR 1.03 (1.00-1.06)</b></p>	<p><i>Seropositive, IgM</i> Female vs. male: adjusted OR 0.97 (0.75-1.27)</p> <p><i>Seropositive, IgG</i> Female vs. male: adjusted OR 0.73 (0.41-1.29)</p>				<p>Nurse vs. physician: OR 0.88 (0.66-1.17)</p> <p><i>Seropositive, IgG</i> 2.1% (17/809) Nurse vs. physician: OR 0.97 (0.50-1.89)</p>	<p><i>Seropositive, IgM</i> Support operator: 10.1% (35/347)</p> <p>Healthcare professions: 0.9% (5/53)</p> <p>Other: 7.1% (26/367)</p> <p><i>Seropositive, IgG</i> Support operator: 4.0% (14/347)</p> <p>Healthcare professions: 1.9% (1/53)</p> <p>Other: 1.9% (7/367)</p>
von Freyburg et al, 2020 (87)	--	--	--	--	3.8% (8/208)	9.7% (40/413) Nurse vs. physician: OR 2.68 (1.23-5.84)	4.5% (2/44)
Wang X. et al, 2020a (90)	--	--	--	--	--	Nurse vs. physician: OR 0.04 (0.005-0.31)	--
Wang X. et al 2020b (89)	Mean 36.6 y (cases) vs. 30.5 y (non-cases), p=0.006	Female vs. male: OR 0.78 (0.23-2.64)	--	--	13.3% (4/30)	9.1% (8/88) Nurse vs. physician: OR 0.65 (0.18-2.34)	--
Yogo et al 2020 (91)	18-35 y: reference  36-45 y: adjusted OR 0.47 (0.17-1.33)  46-55 y: adjusted OR	Female vs. male: adjusted OR 1.00 (0.40-2.51)	vs. <i>Caucasian</i> African American/Black: adjusted OR 1.32 (0.15-11.47)  Asian: adjusted OR 1.16 (0.41-3.31)	--	--	Nurse vs. physician: adjusted OR 1.19 (0.19-7.38)	Nursing assistant: adjusted OR 0.65 (0.17-2.45)  Technician: adjusted OR 1.65 (0.38-7.15)  Therapist: adjusted OR 0.78 (0.01-70.94)

Author, Year (Reference)	Age	Sex	Race/ethnicity	Antibody status	Physician	Nurse	Other HCW Role
	0.50 (0.16-1.59)  56-65 y: adjusted OR 0.32 (0.04-2.50)  >65 y: adjusted OR 1.93 (0.25-14.80)		Hispanic/Latino: <b>adjusted OR 2.79 (1.02-7.65)</b>  Other: adjusted OR 2.85 (0.62-13.15)				
Zhang G, et al 2020 (92)	--	--	--	--	14.9% (10/67)	1.2% (2/170) Nurse vs. physician: OR <b>0.07 (0.01-0.32)</b>	--
Zhou et al, 2020 (94)	Age 18-30: 2.5% (35/1378)  Age 31-50: 3.3% (55/1656)  Age >50: (36/640)	Female vs. male: OR 0.86 (0.59-1.24)	--	--	--	--	Healthcare role: 3.0% (73/2406)  Administrative staff: 2.4% (12/505)  Clinical staff: 5.4% (41/763)

Abbreviations: BAME = Black, Asian and minority ethnic; EMT = emergency medical technician; HCW = health care worker; IRR = incidence rate ratio; OR = odds ratio; RR = relative risk.

\*Results based on risk of seropositivity at baseline



**Supplement Table 3. Exposure history and risk for infection with SARS-CoV-2 in HCWs**

Author, Year (Reference)	Intubation	Directness of Contact	Oxygen Administration and Related Exposures	Number or Duration of Contacts and Proximity to Patient	Other Exposures
Abdelmoniem et al 2020 (29)	--	Contact with patient with known or suspected SARS-CoV-2 infection (yes vs. no): OR 0.41 (0.15-1.08)	--	--	--
Akinbami et al 2020 (30)	--	Exposure to patient with COVID-19 (yes vs. no): adjusted OR 1.03 (0.87-1.22)	--	--	Aerosol generating procedure frequency <ul style="list-style-type: none"> <li>• 0 times: reference</li> <li>• 1-5 times: adjusted OR 1.04 (0.85-1.28)</li> <li>• 6-10 times: adjusted OR 0.83 (0.66-1.04)</li> <li>• 11-25 times: adjusted OR 0.78 (0.69-1.16)</li> <li>• &gt;25 times: adjusted OR 1.09 (0.89-1.34)</li> </ul>
Algado-Selles et al 2020 (32)	--	Close vs. occasional contact: OR 1.69 (1.07-2.67)	--	--	--
Amendola et al, 2020 (33)	--	Direct contact with COVID-19 patient vs. no known direct contact: OR 2.07 (0.89-4.78)	--	--	--
Bahrs et al., 2021 (14)  <b>Added for Update Alert #8</b>	--	Work COVID-19 risk category <ul style="list-style-type: none"> <li>• High-risk (patient contact with confirmed COVID-19 patients or high number of suspected cases): 1.5% (2/137); reference</li> </ul>	--	--	--

Author, Year (Reference)	Intubation	Directness of Contact	Oxygen Administration and Related Exposures	Number or Duration of Contacts and Proximity to Patient	Other Exposures
		<ul style="list-style-type: none"> <li>• Intermediate-risk (patient contact, no routine contact with confirmed or suspected COVID-19 patients): 2.9% (10/343); adjusted OR 1.97 (0.42-9.22)</li> <li>• Low-risk (no patient contact): 3.3% (6/180); adjusted OR 2.10 (0.40-11.06)</li> </ul>			
Bai et al, 2020 (34)	--	<p>Contact with index case (yes or no): <b>OR 0.27 (0.08-0.94)</b></p> <ul style="list-style-type: none"> <li>• Air contact vs. no contact: OR 0.32 (0.07-1.50)</li> <li>• Direct contact vs. no contact: OR 0.22 (0.05-1.03)</li> <li>• Air or direct contact vs. no contacts: OR 0.31 (0.03-3.01)</li> </ul>	--	<p>Contact frequency (median, contacts/day): 3.0 in cases vs. 5.0 in non-cases, P=0.95</p> <p>Contact duration (median, minutes/contact): 4.0 in cases vs. 4.0 in non-cases, P=0.54</p> <p>In same department as index case: OR 62.70 (3.60-1092.46)</p>	--
Baker et al 2021 (15) <b>Added for Update Alert #8</b>	--	COVID-19 unit vs. no patient contact: adjusted OR 1.5 (1.0-2.4)	--	--	--
Barrett et al 2020 (36)	--	--	--	<p>Average number of patients with suspected or confirmed COVID-19 per shift, 0 vs. ≥5 patients: <b>OR 0.36 (0.14-0.89)*</b></p> <p>Estimated percentage of work-time spent in</p>	--

Author, Year (Reference)	Intubation	Directness of Contact	Oxygen Administration and Related Exposures	Number or Duration of Contacts and Proximity to Patient	Other Exposures
				patients' rooms, <25% vs. ≥75%: OR 0.42 (0.18-1.01)	
Calcagno et al 2020 (39)	--	Direct patient contact vs. indirect/no patient contact: <b>OR 1.51 (1.11-2.05)*</b>	--	--	--
Celebi et al, 2020 (40)	Intubating a suspected or confirmed COVID-19 patient or being present in the room during intubation, yes vs. no: OR 0.79 (0.30-2.09)	--	Obtaining a respiratory sample from a suspected or confirmed COVID-19 patient: OR 0.59 (0.22-1.13)	--	<p>Resuscitating a suspected or confirmed COVID-19 patient or being present in the room during resuscitation: OR 1.25 (0.45-3.48)</p> <p>Entering a room in which a suspected or confirmed COVID-19 patient was hospitalized: OR 0.58 (0.28-1.20)</p> <p>Examining (touching) a suspected or confirmed COVID-19 patient: <b>OR 0.42 (0.21-0.85)</b></p> <p>Entering the ICU room of a suspected or confirmed patient with mechanical ventilation: OR 0.72 (0.32-1.66)</p> <p>Being present in the operation room during a surgical procedure on a suspected or confirmed COVID-19 patient: OR 0.56 (0.03-11.83)</p>

Author, Year (Reference)	Intubation	Directness of Contact	Oxygen Administration and Related Exposures	Number or Duration of Contacts and Proximity to Patient	Other Exposures
Chatterjee et al, 2020 (41)	Performing endotracheal intubation vs. not performing: <b>adjusted OR 4.33 (1.16-16.07)</b>	--	--	--	In ICU with suspected or confirmed COVID-19 case on ventilator (yes vs. no): OR 1.36 (0.88-2.1)*  Respiratory tract suctioning (yes vs. no): OR 0.73 (0.37-1.45)*  Handling clinical specimen (yes vs. no): OR 0.78 (0.57-1.39)*
Colaneri et al 2020 (42)	--	--	Contact with CPAP helmets (yes vs. no): <b>OR 4.22 (3.00-5.94)</b>	--	--
Ebinger et al 2021 (16)  <b>Added for Update Alert #8</b>	--	Regular contact with patients with COVID-19: 6.0% (86/1444)* Work in unit housing/caring for patients with COVID-19 (yes vs. no): <b>adjusted OR 1.61 (1.18 to 2.18)</b>	--	--	--
el-Boghdady et al, 2020 (45)	Tracheal intubation: 8.97% (462/5148)	--	Apnoeic oxygenation: HR 0.84 (0.63-1.14)  Bag-mask ventilation (yes vs. no): HR 0.81 (0.54-1.23)  Supraglottic airway: device (yes vs. no): HR 1.40 (0.66-2.97)	--	--
Eyre et al 2020 (6)  <i>Seroprevalence or PCR</i>  <b>Added for Update Alert #8</b>	--	Do not work in COVID-19 unit: 8.6% (631/7369); reference  Work in COVID-19 unit: 22.6% (358/1586);	--	--	--

Author, Year (Reference)	Intubation	Directness of Contact	Oxygen Administration and Related Exposures	Number or Duration of Contacts and Proximity to Patient	Other Exposures
		<p><b>adjusted OR 2.47 (1.99-3.08)</b></p> <p>Work in any unit: 12.9% (139/1079); <b>adjusted OR 1.39 (1.04-1.85)</b></p>			
<p>Eyre et al 2020 (6)</p> <p><i>Seroprevalence only</i></p> <p><b>Added for Update Alert #8</b></p>	--	<p><i>vs. no work in a COVID-19 patient area</i></p> <p>Work in COVID-19 patient area: <b>adjusted OR 2.39 (1.91-3.00)</b></p> <p>Work in any area: <b>adjusted OR 1.38 (1.03-1.84)</b></p>	--	--	--
Faico-Filho et al, 2020 (46)	--	Direct patient contact vs. no direct patient contact: OR 0.72 (0.48-1.07)	--	--	--
<p>Ferreira et al 2021 (17)</p> <p><b>Added for Update Alert #8</b></p>	--	<p><i>PCR</i></p> <p>Direct care of COVID patient vs. no direct care: OR 1.15 (0.29 to 4.61)</p> <p><i>Seropositive</i></p> <p>Direct care of COVID patient vs. no direct care: OR 0.20 (0.03-1.53)</p>	--	--	--
Fusco et al, 2020 (48)	--	Direct patient care vs. no direct patient care: OR 0.74 (0.04-14.91)	--	>30 days vs. <30 days exposure to patients with suspected or confirmed COVID-19: OR 1.52 (0.21-11.21)	--
Heinzerling et al, 2020 (53)	--	Direct skin-to-skin contact with index patient: OR 0.45 (0.02-9.52)	--	Estimated time in patient room (median, minutes): 120 vs. 25, P=0.06	Taking vital sign (yes vs. no): OR 7.71 (0.61-97.85)

Author, Year (Reference)	Intubation	Directness of Contact	Oxygen Administration and Related Exposures	Number or Duration of Contacts and Proximity to Patient	Other Exposures
				<p>Estimated time in patient room during aerosol generating procedures (median, minutes): 95 vs. 0, P=0.13</p> <p>Longest single duration of time in room (reference &lt;2 minutes):  2 to 30 minutes: OR <b>32.00 (1.96-522.78)</b></p> <ul style="list-style-type: none"> <li>• 31 to 60 minutes: OR 1.86 (0.07-46.97)</li> <li>• &gt;60 minutes: OR 8.00 (0.59-130.70)</li> </ul> <p>Within 6 feet of index patient: OR 1.03 (0.05-23.49)</p>	<p>Taking medical history (yes vs. no): OR 1.93 (0.15-24.46)  Performing physical examination: <b>OR 21.82 (1.02-466.52)</b></p> <p>Taking vital sign, taking medical history, providing medication, bathing or cleaning patient, lifting or positioning patient, emptying bedpan, changing linens, cleaning patient room, peripheral line insertion, central line insertion, drawing arterial blood gas, drawing blood: No statistically significant associations</p>
Herzberg et al 2021 (8) <b>Added for Update Alert #8</b>	--	Direct patient care, yes vs. no: OR 0.85 (0.41 to 1.7)	--	--	--
Goenka et al 2020 (50)	--	High-risk (work in COVID-19 unit or ICU or regularly involved in testing or investigating of COVID-19 patients) vs. low-risk (no direct contact with patients or their belongings): adjusted OR 0.93 (0.13-6.79)	--	--	Time spent in hospital in a week <48 vs. 48 hours or more: <b>OR 1.92 (1.25-2.97)</b>
Kassem et al, 2020 (59)	-	Exposure to suspected or confirmed COVID-19 during work in last 2 weeks vs. not: OR 0.95 (0.27-3.44)	-	-	-

Author, Year (Reference)	Intubation	Directness of Contact	Oxygen Administration and Related Exposures	Number or Duration of Contacts and Proximity to Patient	Other Exposures
Khalil et al, 2020 (60)	--	Participated in direct COVID-19 patient care vs. no participation (yes vs. no): OR 0.94 (0.50-1.77)	--	--	Performed aerosol-generating procedure on COVID-19 patient (yes vs. no): OR 1.30 (0.64-2.37)
Krastinova et al, 2020 (62)	--	Non-patient facing vs. non-clinical: adjusted OR 1.57 (0.5-5.31)  Direct patient facing vs. non-clinical: adjusted OR 3.08 (1.09-8.78)	--	--	--
Lan et al 2021 (18)  <b>Added for Update Alert #8</b>	--	Frontline vs. non-frontline: <b>adjusted OR 1.73 (1.16-2.54)</b>	--	--	--
Milazzo et al 2021 (19)  <b>Added for Update Alert #8</b>	--	Contact vs. no contact with infected patient: adjusted OR 1.19 (0.37-3.79)	--	--	--
Moncunill et al 2021 (10)  <b>Added for Update Alert #8</b>	--	Direct patient contact (yes vs. no): OR 0.97 (0.38-2.50)  Work in COVID-19 unit (yes vs. no): OR 1.07 (0.48-2.40)	--	--	--
Moscola et al, 2020 (70)	--	--	--	Work in COVID-19 positive unit, yes vs. no: adjusted RR 1.00 (0.98-1.03)	Work location, ED ref RR multivariable ICU: 0.98 (0.93-1.02) Non ICU hospital units: 1.00 (0.96-1.04) Other: 0.99 (0.95-1.03)
Olalla et al, 2020 (74)	--	--	--	COVID-19 vs. non-COVID-19 unit: OR 0.19 (0.03-1.41)	--
Perez-Garcia et al 2020 (75)	--	Direct patient contact vs. no direct patient contact: <b>OR 1.40 (1.10-1.79)</b>	--	Close contact with COVID-19 infected person vs. casual	Participation in aerosol-generating procedure vs. no participation: <b>OR 2.54 (1.71-3.77)</b>

Author, Year (Reference)	Intubation	Directness of Contact	Oxygen Administration and Related Exposures	Number or Duration of Contacts and Proximity to Patient	Other Exposures
		Contact with COVID-19 patients (yes vs. no): <b>adjusted OR 1.69 (1.28-2.24)</b>		contact: adjusted OR 1.32 (0.97-1.80)	Contact with co-worker (yes vs. no): <b>OR 3.18 (2.64-3.82)*</b>
Ran et al, 2020 (77)	Endotracheal tube removal: RR, 0.63 (0.06-7.08)	--	--	--	CPR: RR, 0.63 (0.06-7.08) Fiberoptic bronchoscopy: RR, 0.63 (0.06-7.08) Sputum suction: RR, 0.43 (0.12-1.55)
Rashid-Abdi et al, 2020 (78)	--	--	--	--	Exposure at work vs. outside of work: OR 16.88 (3.79-75.19)
Sims et al 2020 (83)	--	Direct vs. no direct patient contact: <b>OR 1.41 (1.25-1.58)</b>	--	--	--
Trieu et al, 2020 (11) <b>Added for Update Alert #8</b>	--	Patient contact vs. no patient contact: OR 1.7 (0.7-4.3)	--	--	--
Varona et al 2021 (12) <b>Added for Update Alert #8</b>	--	Prolonged direct contact vs. non-clinical and minimal/no patient contact: <b>adjusted OR 2.06 (1.63-2.62)</b>  Clinical or non-clinical with non-intense patient contact vs. non-clinical and minimal/no patient contact: <b>adjusted OR 1.77 (1.32-2.37)</b>	--	--	--
Venugopal et al 2021 (13) <b>Added for Update Alert #8</b>	--	--	--	--	High/moderate (prolonged close contact with patient with COVID-19 with HCW or patient not wearing face mask or aerosol-



Author, Year (Reference)	Intubation	Directness of Contact	Oxygen Administration and Related Exposures	Number or Duration of Contacts and Proximity to Patient	Other Exposures
					generating procedure without eye, nose, or mouth protection) vs. low risk: adjusted OR 2.00 (0.99 to 4.25)
Wang X. et al 2020b (89)	--	Contact vs. no contact with index case: <b>OR 0.27 (0.08-0.94)</b>  Contact vs. no contact with infected co-worker: <b>OR 62.70 (3.60-1092.46)</b>	--	--	--

Abbreviations: BiPAP = bilevel positive airway pressure; CPR = cardiopulmonary resuscitation; ECG = electrocardiography; HCW = health care worker; OR = odds ratio; RR = relative risk; SARS = severe acute respiratory syndrome.

\*Variable not included in a multivariate model.

**Supplement Table 4. Education or training, environmental and physical factors, and infection control policies and risk for infection with SARS-CoV-2**

Author, Year (Reference)	Education or Training on Infection Control	Ventilation or Negative Pressure Isolation Room	Environment and Physical Layout	Infection Control Policies
Fusco et al, 2020 (95)	Participation in a PPE training even vs. no participation: OR 2.86 (0.14-56.58)	--	--	--
Milazzo et al 2021 (19) <b>Added for Update Alert #8</b>	Trained vs. not trained in PPE use: adjusted OR 0.71 (0.25-2.13)	--	--	--
Zhou F et al, 2020 (94)	Attended vs. did not attend training early in the COVID-19 outbreak: <b><i>p&lt;0.01</i></b>	--	--	--

Abbreviations: PPE = personal protective equipment; SARS = severe acute respiratory syndrome

**Supplement Table 5. Mask use and risk for infection with SARS-CoV-2 in HCWs**

Author, Year (Reference)	Mask Use Versus Nonuse	Comparison of Mask Types	Consistency of Mask Use	Multiple Mask Layers Versus Single Layer
Akinbami et al 2020 (30)	--	--	Always use N95 vs. less than always: <b>adjusted OR 0.83 (0.72-0.95)</b>  Always use surgical mask vs. less than always: <b>adjusted OR 0.86 (0.75-0.98)</b>	--
Chatterjee et al, 2020 (41)	Any mask vs. no mask: <b>OR 0.35 (0.22-0.57)*</b>	--	--	--
Heinzerling et al, 2020 (53)	--	--	Always facemask (non-N95) during aerosol generating procedures: OR 0.77 (0.03-20.02)  Always facemask (non-N95) during non-aerosol generating procedures: OR 1.29 (0.05-30.38)	--
Khalil et al, 2020 (60)	Medical/surgical mask (yes vs. no): 1.40 (0.30-6.42)	--	--	--
Piapan et al, 2020 (76)	Mask (FFP2-3 or surgical) vs. no mask: adjusted OR 1.6 (0.9-2.9)	FFP2 mask vs. surgical mask: <b>adjusted OR 7.1 (3.6-13.9)</b>	--	--
Sims et al 2020 (83)	Any mask vs. no mask: <b>OR 0.58 (0.50-0.66)</b>  N95 or surgical mask vs. no mask: <b>OR 0.57 (0.50-0.66)</b>  N95 vs. no mask: <b>OR 0.54 (0.47-0.62)</b>  Surgical mask vs. no mask: <b>OR 0.71 (0.58-0.86)</b>	N95 vs. surgical mask: <b>OR 0.76 (0.63-0.92)</b>	--	--

Author, Year (Reference)	Mask Use Versus Nonuse	Comparison of Mask Types	Consistency of Mask Use	Multiple Mask Layers Versus Single Layer
Venugopal et al 2021 (13)  <b>Added for Update Alert #8</b>	N95 only (yes vs. no): OR 0.87 (0.50-1.54)*  Surgical mask only (yes vs. no): OR 1.70 (1.08-2.69)*  N95 and surgical mask (yes vs. no): OR 0.64 (0.41-1.00)*	N95 only vs. surgical mask only: OR 0.60 (0.31-1.15)	--	--
Wang X. et al, 2020 (90)	In department with mask use (no vs. yes): <b>adjusted OR 464.82 (97.73- ∞)</b>	--	--	--

Abbreviations: HCW = healthcare worker; OR = odds ratio; SARS = severe acute respiratory syndrome

\*Variable not included in a multivariate model.

**Supplement Table 6. Infection prevention and control factors (other than masks) and risk for infection with SARS-CoV-2 in HCWs**

Author, Year (Reference)	Gown	Glove	Handwashing	Eye Protection	PPE
Abdelmoniem et al 2020 (29)	--	--	Proper hand hygiene (yes vs. no): OR 0.74 (0.15-3.59)	--	PPE use as recommended (yes vs. no): OR 1.00 (0.21-4.72)
Akinbami et al 2020 (30)	Use all the time vs less than all the time: 6.9% (643/9,316); adjusted OR 1.14 (0.97-1.34)	Use all the time vs less than all the time: adjusted OR 1.09 (0.90-1.30)	--	Face shield or goggles, use all the time vs less than all the time: adjusted OR 1.09 (0.90-1.30)	PAPR, use all the time vs. less than all the time: adjusted OR 1.10 (0.80-1.52)
Algado-Selles et al 2020 (32)	--	--	--	--	PPE use (surgical mask or N95 [or equivalent] and eye protection for aerosol generating procedures; yes vs. no): <b>adjusted OR 0.45 (0.26-0.83)</b>
Baker et al 2021 (15)  <b>Added for Update Alert #8</b>	--	--	--	--	PPE use as recommended vs. not as recommended: adjusted OR 0.8 (0.4-1.4)  PPE use as recommended vs. unsure use: <b>adjusted OR 0.6 (0.4-0.9)</b>
Barrett et al 2020 (36)	--	--	--	--	Estimated proportion of patients for which PPE (gloves, gown and surgical or N95 mask) was used, <25% vs. 100%: OR 0.41 (0.14-1.22)*
Celebi et al, 2020 (40)	--	--	--	--	Making a mistake while implementing infection control precautions, yes vs. no: OR 2.98 (0.58-15.29)  Improper use of PPE while caring for a suspected or confirmed COVID-19 patient, yes vs. no: <b>adjusted OR 11.30 (2.18-59)</b>  Stayed in personnel break room with other HCW without wearing a medical mask for >15 minutes, yes vs. no: <b>adjusted OR 7.42 (1.90-29.02)</b>

Author, Year (Reference)	Gown	Glove	Handwashing	Eye Protection	PPE
Chatterjee et al, 2020 (41)	Gown vs. no gown: <b>OR 0.62 (0.46-0.83)*</b>	Gloves vs. no gloves: <b>OR 0.38 (0.26-0.55)*</b>	--	Face shield or goggles vs. none: OR 0.81 (0.61-1.08)*	No PPE vs PPE all/most of the time: <b>adjusted OR 5.33 (2.27-12.48)</b>  Shoe cover vs. no shoe cover: OR 1.05 (0.78-1.42)*  Cap vs. no cap: <b>OR 0.70 (0.52-0.94)*</b>
el-Boghdadly et al, 2020 (45)	--	--	--	--	PPE meeting WHO standard, yes vs. no: HR, 0.97 (0.63-1.51)*
Eyre et al 2020 (6)  <i>Seroprevalence</i>  <b>Added for Update Alert #8</b>	--	--	--	--	Exposure to known or suspected COVID-19 patient without PPE, yes vs. no: <b>adjusted OR 1.47 (1.26-1.70)</b>
Heinzerling et al, 2020 (53)	--	Always gloves during aerosol generating procedures: 3.10 (0.13-75.19)  Always gloves during non-aerosol generating procedures: 4.40 (0.21-91.92)	--	--	--
Kassem et al, 2020 (59)	-	-	Proper hand hygiene: OR 0.26 (0.02-4.46)	-	PPE when indicated, always vs. occasionally OR 0.54 (0.05-6.32)
Khalil et al, 2020 (60)	Disposable gown (yes vs. no): OR 1.08 (0.53-2.20)	Single-use gloves (yes vs. no): OR 1.01 (0.38-2.68)	Followed hand hygiene <ul style="list-style-type: none"> <li>• During patient care (yes vs. no): OR 0.78 (0.23-2.67)</li> <li>• During procedure (yes vs. no): OR 3.28 (0.66-12.30)</li> <li>• After body fluid exposure (yes vs. no): OR 0.28 (0.06-1.45)</li> </ul>	Face shield/goggles (yes vs. no): <b>0.44 (0.23-0.84)</b>	Wore PPE (yes vs. no): OR 0.15 (0.02-1.21)  Proper donning and doffing of PPE (yes vs. no): OR 0.57 (0.29-1.14)

Author, Year (Reference)	Gown	Glove	Handwashing	Eye Protection	PPE
			<ul style="list-style-type: none"> <li>After touching fomites (yes vs. no): OR 1.58 (0.49-5.04)</li> </ul>		
Maltezou et al, 2020 (68)	--	--	--	--	High- vs. low- or moderate-risk exposure (based on mask use by patient and PPE use by HCW): <b>adjusted OR 3.06 (1.43-6.55)</b>
Perez-Garcia et al 2020 (75)	--	--	--	--	Use of PPE (included cap, FFP2 mask [or FFP3 mask for aerosol generating procedures], disposable medical protective clothing, gloves, goggles/screens) vs. no use: <b>adjusted OR 0.56 (0.44-0.72)</b>
Ran L et al, 2020 (77)	--	--	<p>Unqualified hand washing: RR 2.64 (1.04-6.71)</p> <p>Suboptimal hand-washing before patient contact: RR 3.10 (1.43-6.73)</p> <p>Suboptimal hand-washing after patient contact: RR 2.43 (1.34-4.39)</p>	--	Improper PPE: RR 2.82 (1.11-7.18)
Schmitz et al 2020 (80)	--	--	--	--	High-level PPE (FFP2 mask and eye protection for all patient contact) hospital vs. other hospital: <b>OR 1.85 (1.35-2.54)*</b>
Trieu et al 2020 (11)  <b>Added for Update Alert #8</b>	--	--	--	--	Patient contact with full PPE vs. no patient contact: OR 1.1 (0.5-2.7)  Patient contact with partial PPE vs. no patient contact: OR 2.5 (0.5-12.2)
Venugopal et al 2021 (13)  <b>Added for Update Alert #8</b>	--	--	--	Face shield and goggles (yes vs. no): OR 0.55 (0.36-0.84)*	--

<b>Author, Year (Reference)</b>	<b>Gown</b>	<b>Glove</b>	<b>Handwashing</b>	<b>Eye Protection</b>	<b>PPE</b>
Wang Q. et al, 2020 (96)	--	--	--	--	Level 2 protection (cap, N95 or higher, goggles/eye protection, gown, gloves, shoe covers) (yes vs. no): <b>OR 0.03 (0.003-0.19)<sup>†</sup></b>
Yogo et al 2020 (91)	--	--	--	--	Exposure to SARS-CoV-2 infected patient without PPE, yes vs. no: adjusted OR 1.17 (0.42-3.26)

Abbreviations: HCW = health care worker; OR = odds ratio; PPE = personal protective equipment; RR = relative risk; SARS = severe acute respiratory syndrome.

<sup>†</sup>Variable not included in a multivariate model



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