Supplementary Material*

Chou R, Dana T. Major update: masks for prevention of SARS-CoV-2 in health care and community settings—final update of a living, rapid review. Ann Intern Med. 16 May 2023. [Epub ahead of print]. doi:10.7326/M23-0570

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

Supplement Table 1. Inclusion criteria (with protocol revisions)

	Include	Exclude	Protocol changes from original review
Population	Healthcare workers or community members at risk of contracting COVID-19 due to workplace or community-based exposure	Bacterial or other non-SARS-CoV-2 viral infection; non-respiratory infection	Excluded influenza, influenza-like illness, and
Intervention/exposure	N95 respirators or equivalent (e.g., FFP2 or FFP3), surgical/medical masks, and cloth masks.	Powered air-purifying respirators (PAPR), reusable elastomeric respirators, other types of personal protective equipment	Clarified that equivalent respirators include P2, FFP2 (minimum 94% filtration percentage) and FFP3 (minimum 99% filtration percentage) respirators
Comparator	One type of mask versus another type of mask; mask use (any or unspecified type or specific mask type) versus nonuse; mask single use versus re-use or extended	Other personal protective equipment	Clarified that mask use versus nonuse comparisons include any or unspecified mask versus no mask, and specific mask types (N95, surgical, or cloth) versus no mask
Outcomes	Infection with SARS-CoV-2 based on laboratory testing or case definition for COVID-19 Harms of mask usage		Excluded SARS-CoV-1 infection, influenza-like illness, lab-confirmed viral infection, lab-confirmed influenza, and clinical respiratory illness; clarified that SARS-CoV-2 infection based on laboratory testing or case definition for COVID-19
Setting/context	Community or healthcare settings; mask use by healthcare workers (HCWs) or non-HCWs; all geographic areas; findings considered within social distancing and PPE/handwashing context	Masks for prevention of other epidemic viruses (e.g., Ebola) and bacterial infections (e.g., tuberculosis)	None
Study design	Randomized controlled trials, cohort studies or case-control studies that controlled for potential confounders	Systematic reviews (used to identify primary studies); ecological studies and studies of masking policies; non-peer reviewed (unless published after February 2021)	Required observational studies to control for potential confounders; excluded non-peer-reviewed studies unless published after February 2021; clarified that ecological studies and studies of masking policies excluded

Supplement Table 2. Literature search strategies

KQ 1

RCTS

PubMed MEDLINE

((("Respiratory Protective Devices"[Mesh]) OR ("Masks"[Mesh])) OR ((((("N95"[Title/Abstract] OR "N 95"[Title/Abstract] OR mask[Title/Abstract] OR masks[Title/Abstract]) OR ("N95"[Other Term] OR "N 95"[Other Term] OR mask[Other Term] OR masks[Other Term])) OR (facemask OR facemasks OR FFP)) OR (((airborne OR droplet* OR respirator OR respirators) AND (protect OR protection OR protective OR precaution)) NOT (mechanical[Title/Abstract])))) AND (prevent OR prevents OR prevention OR transmit OR transmission OR infect OR infection OR infected) Filters: Randomized Controlled Trial

Elsevier Embase

('respiratory protection'/exp OR 'air-purifying respirator'/exp OR 'face mask'/exp OR n95:ti,ab,kw OR mask:ti,ab,kw OR masks:ti,ab,kw OR facemask:ti,ab,kw OR facemasks:ti,ab,kw OR ffp:ti,ab,kw) AND (prevent OR prevents OR prevention OR transmit OR transmission OR infect OR infection OR infected) AND 'randomized controlled trial'/de AND [embase]/lim NOT ([embase]/lim AND [medline]/lim)

Observational studies

((((("Respiratory Protective Devices"[Mesh]) OR ("Masks"[Mesh])) OR ((((("N95"[Title/Abstract] OR "N 95"[Title/Abstract] OR mask[Title/Abstract] OR masks[Title/Abstract]) OR ("N95"[Other Term] OR "N 95"[Other Term] OR mask[Other Term] OR masks[Other Term])) OR (facemask OR facemasks OR FFP)) OR (((airborne OR droplet* OR respirator OR respirators) AND (protect OR protection OR protective OR precaution)) NOT (mechanical[Title/Abstract])))) AND (prevent OR prevents OR prevention OR transmit OR transmission OR infect OR infection OR infected)) AND (((((("COVID-19" [Supplementary Concept]) OR ("SARS Virus"[Mesh])) OR ("Severe Acute Respiratory Syndrome"[Mesh])) OR ("Middle East Respiratory Syndrome Coronavirus"[Mesh])) OR ((coronavirus[Title/Abstract] OR COVID[Title/Abstract] OR "severe acute respiratory syndrome*"[Title/Abstract] OR SARS[Title/Abstract] OR "middle eastern respiratory syndrome"[Title/Abstract] OR MERS[Title/Abstract]) OR (coronavirus[Other Term] OR COVID[Other Term] OR "severe acute respiratory syndrome*"[Other Term] OR SARS[Other Term] OR "middle eastern respiratory syndrome"[Other Term] OR MERS[Other Term])))

Elsevier Embase

('respiratory protection'/exp OR 'air-purifying respirator'/exp OR 'face mask'/exp OR n95:ti,ab,kw OR mask:ti,ab,kw OR masks:ti,ab,kw OR facemask:ti,ab,kw OR facemasks:ti,ab,kw OR ffp:ti,ab,kw) AND (prevent OR prevents OR prevention OR transmit OR transmission OR infect OR infection OR infected) AND ('severe acute respiratory syndrome' OR 'sars-related coronavirus' OR 'middle east respiratory syndrome' OR 'sars' OR 'mers' OR 'covid') AND ('case control study'/de OR 'cohort analysis'/de OR 'comparative study'/de OR 'controlled study'/de OR 'cross sectional study'/de OR 'crossover procedure'/de OR 'observational study'/de OR 'prospective study'/de OR 'retrospective study'/de) AND [embase]/lim NOT ([embase]/lim AND [medline]/lim)

KQ 2

PubMed MEDLINE

((("Respiratory Protective Devices"[Mesh]) OR ("Masks"[Mesh])) OR ((((("N95"[Title/Abstract] OR "N 95"[Title/Abstract] OR mask[Title/Abstract] OR masks[Title/Abstract]) OR ("N95"[Other Term] OR "N 95"[Other Term] OR mask[Other Term] OR masks[Other Term])) OR (facemask OR facemasks OR FFP)) OR (((airborne OR droplet* OR respirator OR respirators) AND (protect OR protection OR protective OR precaution)) NOT (mechanical[Title/Abstract])))) AND (reuse OR "re use" OR "extended use" OR “multiuse” OR “multi use” OR “multiple use”)

Elsevier Embase

('respiratory protection'/exp OR 'air-purifying respirator'/exp OR 'face mask'/exp OR n95:ti,ab,kw OR mask:ti,ab,kw OR masks:ti,ab,kw OR facemask:ti,ab,kw OR facemasks:ti,ab,kw OR ffp:ti,ab,kw) AND (prevent OR prevents OR prevention OR transmit OR transmission OR infect OR infection OR infected) AND ('reuse' OR 're use' OR 'extended use' OR 'multiuse' OR 'multi use' OR 'multiple use') AND [embase]/lim NOT ([embase]/lim AND [medline]/lim)

Supplement Table 3. Study characteristics of observational studies of mask use

Author, year Country Study design	Inclusion criteria	Dates of study data collection	Sample size	Age	Female (%)	Definition of infection
Community setting						
Andrejko et al 2022 (16) United States Case-control	Cases (SARS-CoV-2 infection) and controls (no SARS-CoV-2 infection) who underwent PCR testing	Feb 18 to Dec 1 2021	N=652 cases and 1,176 controls	Mean age not reported Cases: 32% age 18-29 years, 36% age 30-49 years Controls: 30% 18-29 years, 35% 30-49 years	Cases: 51% Controls: 51%	SARS-CoV-2 infection based on PCR testing
Baumkötter et al 2022 (17) Germany Prospective cohort **Added for 2023 Update**	Representative population-based sample of individuals age 25 to 88 years	Oct 2020 to Apr 2021	N=10,250	Median 57 years	51%	SARS-CoV-2 infection based on PCR testing
da Silva Torres 2022 (22) Brazil Cross-sectional **Added for 2023 Update**	Community-based, unvaccinated volunteers	Oct 2020 to Feb 2021	N=1,337	Not reported	Not reported for entire cohort (65% for SARS-CoV-2 seropositive persons)	SARS-CoV-2 seropositivity
Doernberg et al 2022 (24) United States	HCWs from one of three medical centers in the San Francisco, CA area (mask use when not at work)	Jul 2020 to Jan 2021	N=2,435	Mean age 40 years	79%	SARS-CoV-2 seropositivity or infection based on PCR testing

Author, year **Country** **Study design**	**Inclusion criteria**	**Dates of study data collection**	**Sample size**	**Age**	**Female (%)**	**Definition of infection**
Prospective cohort						
Doung-Ngern et al, 2020 (25) Thailand Case-control	Asymptomatic subjects who had contact with a COVID-19 infected person	Mar to Apr 2020	N=211 cases and 839 controls	Median 38 years	45%	SARS-CoV-2 infection based on PCR testing
Gonçalves et al 2021 (26) Brazil Case-control	Cases (SARS-CoV-2 infection) and controls (no SARS-CoV-2 infection) identified during three seroprevalence surveys	Apr to Jun 2020	*Total cohort* Cases: 271 Controls: 1,396 *Third seroprevalence survey only* Cases: 229 Controls: 464	*Total cohort* Cases: 46 years Controls: 50 years	*Total cohort* Cases: 56% Controls: 62%	SARS-CoV-2 infection based on PCR testing
Lio et al 2021 (29) Macau Case-control	Cases (confirmed diagnosis and hospitalization for COVID-19) and controls (people returning to Macau from high-prevalence countries undergoing mandatory 14-day quarantine)	Mar 17 to 15 Apr 2020	N= 24 cases and 1,113 controls	Cases: 29 years Controls: 30 years	Cases: 56% Controls: 46%	Laboratory-confirmed; otherwise not described
Rebmann et al 2021 (33) United States Cross-sectional	Close contacts of university students with positive SARS-CoV-2 test	Jan to May 2021	N=378	Not reported; all were university students	71%	SARS-CoV-2 infection based on PCR testing
Sugimara et al 2021 (34)	Close contacts of community-dwelling residents with clinically-	Mar 6 to May 31 2020	N=820	Mean/median not reported; 14% age 0-19 years, 53%	46%	SARS-CoV-2 infection based on PCR testing

Author, year Country Study design	Inclusion criteria	Dates of study data collection	Sample size	Age	Female (%)	Definition of infection
Japan Cross-sectional	confirmed COVID-19 diagnosis			age 20-59 years, 10% age >60 years, 23% missing data		
Wang et al, 2020 (36) China Retrospective cohort	Household contacts of laboratory-confirmed COVID-19 cases	Feb 28 to Mar 27 2020	N=124 households (355 contacts of 124 cases)	Not reported for family contacts Among index cases, 45% <18 years, 74% 18-59 years, 26% ≥60 years	Not reported for family contacts Among index cases, 51%	SARS-CoV-2 infection meeting clinical, epidemiological and laboratory testing criteria for COVID-19 simultaneously
Healthcare setting						
Akinbami et al 2020 (15) United States Prospective cohort	Asymptomatic healthcare workers, first responders and public safety personnel	May to June 2020	N=16,397 (86% healthcare worker)	Mean 42 years	69%	SARS-CoV-2 seropositivity
Belan et al 2022 (18) France Case-control **Added for 2023 Update**	Cases: HCWs with confirmed COVID-19 Controls: Matched, uninfected community-based controls or HCWs	Apr to Jul 2021	N=2,076 cases and 2,076 controls	Mean not reported; 14% 18-28 years, 31% 29-38 years, 30% 39-48 years, 26% ≥49 years	85%	SARS-CoV-2 infection based on PCR testing or seropositivity
Carazo et al 2022 (19) Canada Case-control	Cases: High-risk HCWs with SARS-CoV-2 infection identified in a province-wide database Controls: Randomly selected symptomatic, high-risk HCWs without SARS-CoV-2 infection	Dec 2020 to Jul 2021	N=2,046 cases and 1,362 controls	Not reported	83%	SARS-CoV-2 infection based on PCR testing

Author, year **Country** **Study design**	**Inclusion criteria**	**Dates of study data collection**	**Sample size**	**Age**	**Female (%)**	**Definition of infection**
Added for 2023 Update						
Chatterjee et al, 2020 (20) India Case-control	HCWs undergoing SARS-CoV-2 testing	Apr to May 2020	N=378 cases and 373 controls	Mean 35 years (cases)	42% (cases)	SARS-CoV-2 infection based on PCR testing
Collatuzzo et al 2022 (21) Italy Cross-sectional **Added for 2023 Update**	HCWs in an occupational medicine unit of a university hospital	Feb to Sep 2020	N=2,952	Mean 46 years	70%	SARS-CoV-2 infection based on PCR testing
Davido et al 2021 (23) France Cross-sectional	Symptomatic HCWs or HCWs with contact with COVID-19 patient	Mar 5 to May 10 2020	N=99	Median 44 years	73%	SARS-CoV-2 infection based on PCR testing
Haller et al, 2022 (27) Switzerland Prospective cohort	HCWs with patient contact working in healthcare institutions in Switzerland	Jun to Aug 2020	*Total cohort* 3,259 *Seroconverted subgroup* 2,916	*Total cohort* 39 years *Seroconverted subgroup* Not reported	*Total cohort* 81% *Seroconverted subgroup* Not reported	SARS-CoV-2 seropositivity
Howard-Anderson et al 2022 (28) United States	HCWs at an academic health system comprised of 4 hospitals and associated clinics	May to Dec 2020	N=301	Mean age not reported; 57% <40 years	77%	SARS-CoV-2 seropositivity

Author, year Country Study design	Inclusion criteria	Dates of study data collection	Sample size	Age	Female (%)	Definition of infection
Prospective cohort						
Madureira et al 2022 (30) Brazil Prospective cohort **Added for 2023 Update**	HCWs without prior COVID-19 infection working in a hospital ED	May to Jun 2020	N=129	Mean 37 years	60%	SARS-CoV-2 seropositivity
Piapan et al 2020 (31) and 2022 (32) Italy Retrospective cohort	HCWs with known COVID-19 exposure	Mar 1 to May 31 2020	N=963	Mean 44 years	71%	SARS-CoV-2 infection based on PCR testing
Venugopal et al 2021 (35) United States Cross-sectional	Healthcare workers at a Level 1 trauma center	Mar 1 to May 1 2020	N=500	Mean not reported; 48% 20-39 years, 41% 40-59 years, 11% ≥60 years	69%	SARS-CoV-2 seropositivity

Abbreviations: ED=emergency department; HCW=healthcare worker; NA=not applicable; NR=not reported; PCR=polymerase chain reaction; SARS-CoV-2=severe acute respiratory syndrome coronavirus 2

Supplement Table 4. Quality assessment new randomized controlled trials of mask use

Author, year	Random-ization	Allocation concealment	Baseline groups comparable	Blinding of study participants	Blinding of outcomes assessment	Attrition and missing data reported	Intention-to-treat analysis	Analysis for adherence	Cluster trials: Adjustment for clustering	Quality rating
Community setting										
Abaluck et al, 2022 (13)	Yes (by cluster)	Unclear	Yes	No	No	Yes	No	Yes	Yes (accounted for during randomization)	Fair
Bundgaard et al 2021 (14)	Yes	Yes	Yes	No (unblinded study design)	No (unblinded study design)	Yes	Yes	Yes	NA	Good
Healthcare setting										
Loeb et al 2022 (4)	Yes	Yes	Yes	No	Yes	Attrition: yes Missing data: No	No, but few participants had missing data	Yes, based on self-report	NA	Fair*

*The trial also reported a number of protocol changes
Abbreviations: NA=not applicable

Supplement Table 5. Quality assessment of observational studies of mask use

Author, year	Did the study attempt to enroll all (or a random sample of) patients meeting inclusion criteria (inception cohort)?	Did the study use accurate methods for ascertaining exposures and potential confounders?	Were outcome assessors and/or data analysts blinded to exposure being studied?	Did the article report attrition or missing data?	Is there high attrition or missing data?	Were outcomes pre-specified and defined, and ascertained using accurate methods?	Controlled for confounders?*	Quality rating
Community setting								
Andrejko et al 2022 (16)	Yes (participants randomly selected for study inclusion; actual participation 13% for cases and 9% for controls)	Unclear (potential recall bias)	No	No	Unclear	Yes	Yes	Fair
Baumkötter et al 2022 (17)	Yes (representative population-based sampling; participation rate not reported)	Unclear (potential recall bias)	Unclear	No	Unclear	Yes	Yes	Fair
da Silva Torres 2022 (22)	Unclear (participation rate not reported)	Unclear (potential recall bias)	Unclear	Yes	High attrition: no Missing data: yes	Yes	Yes	Fair
Doernberg et al 2022 (24)	No (participation rate 62% among those screened)	Unclear (potential recall bias)	No	Yes	Unclear	Yes	Yes	Fair
Doung-Ngern et al, 2020 (25)	Yes	No (likely recall bias)	Unclear	No	Yes	Yes	Yes	Poor
Gonçalves et al 2021 (26)	No (participation rate <50%)	Unclear (potential recall bias)	No	No	No	Yes	Yes	Fair
Lio et al 2021 (29)	No (participation rate 61% among controls)	Unclear (potential recall bias)	No	No	No	Yes (outcomes pre-specified and defined); ascertainment unclear	Yes	Fair

Author, year	Did the study attempt to enroll all (or a random sample of) patients meeting inclusion criteria (inception cohort)?	Did the study use accurate methods for ascertaining exposures and potential confounders?	Were outcome assessors and/or data analysts blinded to exposure being studied?	Did the article report attrition or missing data?	Is there high attrition or missing data?	Were outcomes pre-specified and defined, and ascertained using accurate methods?	Controlled for confounders?*	Quality rating
Rebmann et al 2021 (33)	Unclear (participation rate not reported)	Unclear (potential recall bias)	No	No	No	Yes	Yes	Fair
Sugimara et al 2021 (34)	No (participation rate 57%)	Unclear (potential recall bias)	No	No	No	Yes (outcomes pre-specified and defined); ascertainment unclear	Partial (gender and contact type only)	Fair
Wang et al, 2020 (36)	Yes (participation rate 90%)	Unclear (potential recall bias)	No	No	Unclear	Yes	Yes	Fair
Healthcare setting								
Akinbami et al 2020 (15)	Unclear (participation rate unclear)	Unclear (potential recall bias)	Unclear	No	Unclear	Yes	Yes	Fair
Belan et al 2022 (18)	No (participation rate among cases 6%)	Unclear (potential recall bias)	Unclear	No	Unclear	Yes	Yes	Fair
Carazo et al 2022 (19)	No (participation rate among cases 47%)	Unclear (potential recall bias)	Unclear	No	Unclear	Yes	Yes	Fair
Chatterjee et al, 2020 (20)	No (participation rate 64%)	Unclear (potential recall bias)	No	No	Unclear	Yes	Yes	Fair
Collatuzzo et al 2022 (21)	Unclear (participation rate not reported)	Unclear (potential recall bias)	Unclear	No	Unclear	Yes	Yes	Fair
Davido et al, 2021 (23)	No (participation rate 50%)	Unclear (potential recall bias)	No	Yes	No	Yes	Yes	Fair
Haller et al, 2022 (27)	Unclear (participation rate not reported)	Unclear (potential recall bias)	No	No	Unclear	Yes	Yes	Fair

Author, year	Did the study attempt to enroll all (or a random sample of) patients meeting inclusion criteria (inception cohort)?	Did the study use accurate methods for ascertaining exposures and potential confounders?	Were outcome assessors and/or data analysts blinded to exposure being studied?	Did the article report attrition or missing data?	Is there high attrition or missing data?	Were outcomes pre-specified and defined, and ascertained using accurate methods?	Controlled for confounders?*	Quality rating
Howard-Anderson et al 2022 (28)	Unclear (participation rate not reported)	Unclear (potential recall bias)	No	No	Unclear	Yes	Yes	Fair
Madureira et al 2022 (30)	Yes (participation rate 93%)	Unclear (potential recall bias)	Unclear	Yes	No	Yes	Unclear (logistic regression performed, but variables in model not reported)	Fair
Piapan et al, 2020 (31) and 2022 (32)	Unclear (participation rate not reported)	Unclear (potential recall bias)	No	No	Unclear	Yes	Yes (for mask vs. no mask); partial (for FFP2 vs. surgical mask, only adjusted for age)	Fair for mask vs. no mask; poor for FFP2 vs. surgical mask
Venugopal et al 2021 (35)	Yes (participation rate 76%)	Unclear (potential recall bias)	Unclear	No	Unclear	Yes	Yes	Fair

*To be graded "yes" studies had to control at a minimum for exposures and behaviors (e.g., other infection control measures).

Supplement Table 6. Mask use and risk for SARS-CoV-2 infection

Author, Year (Reference)	Mask Use Versus Nonuse	Comparison of Mask Types	Consistency of Mask Use
Community setting, randomized controlled trials			
Abaluck et al, 2022 (13)	*Symptomatic SARS-CoV-2 seroprevalence* Mask promotion intervention vs. no intervention: ***adjusted prevalence ratio 0.90 (95% CI 0.82 to 0.995)*** *COVID-19 symptoms, based on WHO criteria* Mask promotion intervention vs. no intervention: ***adjusted prevalence ratio 0.88 (95% CI 0.83 to 0.93)***	*Symptomatic SARS-CoV-2 seroprevalence* Mask promotion intervention vs. no intervention, surgical mask villages: ***adjusted prevalence ratio 0.89 (95% CI 0.78 to 0.997)*** • Age <40 y: 0.97 (95% CI 0.83 to 1.10) • Age 40-49 y: 1.01 (95% CI 0.82 to 1.20) • Age 50-59 y: ***0.77 (95% CI 0.60 to 0.95)*** • Age ≥60 y: ***0.65 (95% CI 0.45 to 0.84)*** Mask promotion intervention vs. no intervention, cloth mask villages: ***adjusted prevalence ratio 0.94 (95% CI 0.78 to 1.10)*** • Age <40 y: 1.06 (95% CI 0.87 to 1.25) • Age 40-49 y: ***0.71 (955 CI 0.46 to 0.97)*** • Age 50-59 y: 0.84 (95% CI 0.52 to 1.15) • Age ≥60 y: 1.08 (95% CI 0.77 to 1.40) *COVID-19 symptoms, based on WHO criteria* Mask promotion intervention vs. no intervention • Surgical mask villages: ***adjusted prevalence ratio 0.87 (95% CI 0.81 to 0.94***) • Cloth mask villages: ***adjusted prevalence ratio 0.91 (95% CI 0.82 to 0.99)***	--
Bundgaard et al, 2021 (14)	Surgical mask vs. no mask: OR 0.82 (95% CI 0.52 to 1.23)	--	--
Community setting, observational studies			
Andrejko et al 2022 (16)	Mask (any type) use vs. no mask use: ***adjusted OR 0.51 (95% CI 0.29 to 0.93)*** Cloth mask use vs. no mask use: adjusted OR 0.44 (95% CI 0.17 to 1.17) Surgical mask use vs. no mask use: ***adjusted OR 0.34 (95% CI 0.13 to 0.90)*** N95/KN95 use vs. no mask use: ***adjusted OR 0.17 (95% CI 0.05 to 0.64)***	N95/KN95 vs. surgical mask: adjusted OR 0.50 (95% CI 0.10 to 2.48)† Surgical mask vs. cloth mask: adjusted OR 0.77 (95% CI 0.20 to 3.03)†	Mask use some of the time vs. no use: adjusted OR 0.71 (95% CI 0.35 to 1.46) Mask use most of the time vs. no use: adjusted OR 0.55 (95% CI 0.29 to 1.05) Mask use all of the time vs. no use: ***adjusted OR 0.44 (95% CI 0.24 to 0.82)***

Author, Year (Reference)	Mask Use Versus Nonuse	Comparison of Mask Types	Consistency of Mask Use
Baumkötter et al 2022 (17) **Added for 2023 Update**	--	--	Mask use always or almost always vs. never to often: adjusted HR 1.22 (0.63-2.27); adjusted prevalence ratio 0.96 (0.68-1.36)
da Silva Torres 2022 (22) **Added for 2023 Update**	--	--	Mask use always vs. sometimes: ***adjusted OR 0.30 (0.11-0.81)***‡§
Doernberg et al 2022 (24)	--	--	Wearing a mask when not at work all of the time vs. most/some of the time or never: adjusted HR 0.8 (0.5-1.6)
Doung-Ngern et al, 2020 (25)	Surgical mask vs. no mask: adjusted OR 0.25 (95% CI 0.12 to 0.53) Cloth (nonsurgical) mask vs. no mask: adjusted OR 0.78 (95% CI 0.32 to 1.90) Any mask vs. no mask: adjusted OR 0.46 (95% CI 0.13 to 1.64)	Surgical mask vs. cloth (nonsurgical) mask: OR 1.06 (95% CI 0.63 to 1.79)* Mask type and risk of SARS-CoV-2 infection: p=0.54	Always wearing a mask vs. not wearing a mask: ***adjusted OR 0.23 (95% CI 0.09 to 0.60)*** Sometimes wearing a mask vs. not wearing a mask: adjusted OR 0.87 (95% CI 0.41 to 1.84)
Gonçalves et al 2021 (26)	*Third seroprevalence survey only* Mask use vs. no mask: ***adjusted OR 0.10 (95% CI 0.03 to 0.25)***	--	--
Lio et al 2021 (29)	Mask use when outdoors vs. no mask: ***adjusted OR 0.31 (95% CI 0.11 to 0.87)***	--	--
Rebmann et al 2021 (33)	Masked exposure to index case vs. not masked: ***adjusted OR 0.20 (95% CI 0.03 to 0.71)***	--	--
Sugimura et al 2021 (34)	Mask use vs. no mask: ***adjusted RR 0.60 (95% CI 0.30 to 0.90)***	--	--
Wang et al, 2020 (36)	Unadjusted OR (95% CI) for household with secondary infection of family member	-	Unadjusted OR (95% CI) for household with secondary infection of family member

Author, Year (Reference)	Mask Use Versus Nonuse	Comparison of Mask Types	Consistency of Mask Use
	Mask use all the time by: • All family members (including index case) vs. no family members before index case illness onset: 0.20 (0.07 to 0.60) • Some family members vs. no family members: 0.72 (0.30-1.73) • At least one family member (including index case) vs. no family members prior to index case illness onset: 0.22 (0.07-0.69) Adjusted OR (95% CI) for household with secondary infection of family member • Mask use all the time by at least one family member or index case vs. no family members prior to index case illness onset: 0.21 (0.06-0.79)		Primary case or family members wore mask (N95, surgical, or cloth) after index case illness onset: • All the time vs. never: 0.30 (0.11-0.82) • Sometimes vs. never: 1.15 (0.46-2.87) Mask use after index case symptom onset not included in multivariate model
Healthcare setting, randomized controlled trials			
Loeb et al 2022 (4) **Added for 2023 Update**	--	N95 vs. surgical mask: 9.3% (47/507) vs. 10.5% (52/497); HR 0.88 (0.59-1.30)‡ (note: the HR for surgical mask vs. N95 was 1.14 [0.77 to 1.69]) • Canada: HR 0.35 (0.09-1.33)‡ • Israel: HR 0.65 (0.18-2.32)‡ • Pakistan: HR 0.67 (0.11-4.00)‡ • Egypt: HR 1.05 (0.67-1.67)‡	--
Healthcare setting, observational studies			
Akinbami et al, 2020 (15)	--	--	Always use N95 vs. less than always: ***adjusted OR 0.83 (0.72-0.95)***§ Always use surgical mask vs. less than always: ***adjusted OR 0.86 (0.75-0.98)***§
Belan et al 2022 (18) **Added for 2023 Update**	--	Surgical mask vs. cloth mask: adjusted OR 0.60 (0.06-5.56)‡ N95 vs. surgical mask: adjusted OR 0.85 (0.55-1.29)	--
Carazo et al 2022 (19) **Added for 2023 Update**	--	Total time period (Nov 15, 2020 to May 29, 2021) N95 vs. surgical mask during contact with COVID-19 patients, non-aerosol-generating medical procedure: ***adjusted OR 0.7 (0.5-0.9)***	Total time period (Nov 15, 2020 to May 29, 2021) Always used mask vs. not always during contact with non-COVID-19 patients: adjusted OR 1.0 (0.7-1.4)

Author, Year (Reference)	Mask Use Versus Nonuse	Comparison of Mask Types	Consistency of Mask Use
		N95 vs. surgical mask during contact with COVID-19 patients, aerosol-generating medical procedure: adjusted OR 0.7 (0.4-1.2) <u>Prevaccination period (Nov 15, 2020 to Jan 15, 2021)</u> N95 vs. surgical mask during contact with COVID-19 patients, non-aerosol-generating medical procedure: adjusted OR 0.8 (0.5-1.2) N95 vs. surgical mask during contact with COVID-19 patients, aerosol-generating medical procedure: adjusted OR 0.6 (0.3-1.1) <u>Postvaccination period (Jan 16, 2021 to May 29, 2021)</u> N95 vs. surgical mask during contact with COVID-19 patients, non-aerosol-generating medical procedure: adjusted OR 0.6 (0.3-1.1) N95 vs. surgical mask during contact with COVID-19 patients, aerosol-generating medical procedure: adjusted OR 0.6 (0.2-2.0)	Masking while at work: • Always vs. sometimes/never: adjusted OR 1.2 (0.6-2.7) • Most of the time vs. sometimes/never: adjusted OR 1.2 (0.5-2.9) <u>Prevaccination period (Nov 15, 2020 to Jan 15, 2021)</u> Always used mask vs. not always during contact with non-COVID-19 patients: adjusted OR 0.8 (0.5-1.2) Masking while at work, always vs. no always: adjusted OR 1.0 (0.6-1.7) <u>Postvaccination period (Jan 16, 2021 to May 29, 2021)</u> Always used mask vs. not always during contact with non-COVID-19 patients: adjusted OR 1.5 (0.7-3.6) Masking while at work, always vs. not always: adjusted OR 0.6 (0.3-1.4)
Chatterjee et al, 2020 (20)	Any mask vs. no mask: ***OR 0.35 (0.22-0.57)****	--	--
Collatuzzo et al 2022 (21) **Added for 2023 Major Update**	FFP2 or FFP3 use by HCW vs. nonuse: adjusted OR 0.48 (0.21-1.09) Any mask use by HCW vs. nonuse: ***adjusted OR 0.63 (0.45-0.87)*** Any mask use by HCW and SARS-CoV-2 infected contact vs. nonuse: ***adjusted OR 0.40 (0.27-0.60)***	--	--
Davido et al, 2021 (23)	--	--	Systematic use of facemask vs. no systematic use: ***adjusted OR 0.07 (0.003-0.56)***
Haller et al, 2022 (27)	--	Mostly FFP2 use vs. mostly surgical mask use: adjusted HR 0.80 (0.64-1.00)[§]	--

Author, Year (Reference)	Mask Use Versus Nonuse	Comparison of Mask Types	Consistency of Mask Use
Howard-Anderson et al 2022 (28)	--	--	Used a mask all/nearly all the time vs. less than nearly all the time: adjusted OR 4.0 (0.7-19.5)§
Madureira et al 2022 (30) **Added for 2023 Update**	--	--	Used a mask all the time vs. some of the time: ***adjusted OR 0.18 (0.04-0.85)***‡§
Piapan et al, 2020 (31)	Mask (FFP2-3 or surgical) vs. no mask: adjusted OR 1.6 (0.9-2.9)	FFP2 mask vs. surgical mask: ***adjusted OR 7.1 (3.6-13.9)***	--
Piapan et al 2022 (32)	N95 use (yes vs. no): ***OR 7.8 (4.0-15.2***); not included in multivariate model	--	--
Venugopal et al, 2021 (35)	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)	--

*Variable not included in a multivariate model
†Calculated from data provided in the study
‡Direction of comparison was reversed
§SARS-CoV-2 infection based on seropositivity only

Supplement Table 7. Summary of evidence for masks and risk of SARS-CoV-2 infection

Setting	Comparison	Number and Type of Studies	Number of Subjects	Directness	Precision	Study Limitations	Consistency	Findings	Strength of Evidence
Community	Mask (any or unspecified type) vs. no mask	2 RCTs (13, 14) and 7 observational studies (1 cohort study (36), 2 cross sectional studies (33, 34), 4 case-control studies (16, 25, 26, 29))	N=354,237 • RCTs: n=348,207 • Cohort study: n=124 • Cross-sectional studies: n=1,198 • Case-control studies: n=1,116 cases, 3,592 controls	Direct	Precise*	Moderate	Consistent	Mask associated with decreased risk	Low to moderate
Community	N95 or equivalent vs. surgical mask	1 observational (case-control) study (16)	N=652 cases, 1,176 controls	Direct	Imprecise	High	Unable to assess	Unable to determine	Insufficient
Community	N95 or equivalent vs. no mask	1 observational (case-control) study (16)	N=652 cases, 1,176 controls	Direct	Imprecise	High	Unable to assess	Unable to determine	Insufficient
Community	Surgical mask vs. no mask	2 RCTs (13, 14) and 2 observational (case-control) studies (16, 25)	N=351,085 • RCTs: n=348,207 • Case-control studies: n=863 cases, 2,015 controls	Direct	Precise*	High	Consistent	Mask associated with decreased risk	Low

Setting	Comparison	Number and Type of Studies	Number of Subjects	Directness	Precision	Study Limitations	Consistency	Findings	Strength of Evidence
Community	Cloth mask vs. no mask	1 RCT (13) and 2 observational (case-control) studies (16, 25)	N=345,061 • RCT: n=342,183 • Case-control studies: n=863 cases, 2,015 controls	Direct	Imprecise	Moderate	Consistent	Unable to determine	Insufficient
Community	Surgical vs. cloth mask	1 RCT (13) and 1 observational (case-control) study (16)	N=344,011 • RCT: n=342,183 • Case-control study: n=652 cases, 1,176 controls	Direct	Imprecise	Moderate	Consistent	Unable to determine	Insufficient
Community	Consistent/always mask use vs. inconsistent mask use	6 observational studies (3 cohort studies (17, 24, 36), 1 cross-sectional study (22), 2 case-control studies (16, 25))	N=17,024 • Cohort studies: n=12,809 • Cross-sectional study: n=1,337 • Case-control studies: n=863 cases, 2,015 controls	Direct	Precise	High	Inconsistent	Unable to determine	Insufficient

Setting	Comparison	Number and Type of Studies	Number of Subjects	Directness	Precision	Study Limitations	Consistency	Findings	Strength of Evidence
Healthcare	Mask (any or unspecified type) vs. no mask	4 observational studies (1 cohort study (31), 2 cross-sectional studies (21, 35), 1 case-control study {Chatterjee, 2020 #2653)	N=5,166 • Cohort study: n=963 • Cross-sectional studies: n=3,452 • Case-control study: 378 cases, 373 controls	Direct	Precise	High	Inconsistent	Unable to determine	Insufficient
Healthcare	N95 vs. no mask	3 observational studies (1 cohort study (32), 2 cross-sectional studies (21, 35))	N=4,415 • Cohort study: n=963 • Cross-sectional studies: n=3,452	Direct	Precise	High	Inconsistent	Unable to determine	Insufficient
Healthcare	Surgical mask vs. no mask	1 observational (cross-sectional) study (35)	N=820	Direct	Precise	High	Unable to assess	Unable to determine	Insufficient

Setting	Comparison	Number and Type of Studies	Number of Subjects	Directness	Precision	Study Limitations	Consistency	Findings	Strength of Evidence
Healthcare	Consistent mask use vs. inconsistent use	5 observational studies (3 cohort studies (15, 28, 30), 1 cross-sectional study (23), 1 case-control study (19))	N=20,334 • Cohort studies: n=16,827 • Cross-sectional study: n=99 • Case-control study: n=2,046 cases, 1,362 controls	Direct	Precise	High	Inconsistent	Unable to determine	Insufficient
Healthcare	N95 or equivalent vs. surgical mask	1 RCT (4) and 4 observational studies (2 cohort studies (31, 55), 2 case-control studies (18, 19))	N=12,443 • RCT: n=1,004 • Cohort studies: n=3,879 • Case-control studies: n=4,122 cases, 3,438 controls	Direct	Some imprecision	Moderate	Some inconsistency	N95 and surgical masks associated with similar risk	Low

*One RCT reported an imprecise estimate and the other reported an estimate that was just within the threshold for statistical significance