NIPH
Norwegian Institute of Public Health

REPORT

2021

RAPID REVIEW:

Facemasks to prevent transmission of respiratory illness, such as COVID-19

Title	Facemasks to prevent transmission of respiratory illness, such as COVID-19 – a rapid overview of systematic reviews
Norwegian title	Munnbind for å forhindre smitte av luftveisinfeksjoner, som covid-19 – en hurtigoversikt
Institution	Norwegian Institute of Public Health
Responsible	Camilla Stoltenberg, Director-General
Authors	Fønhus MS, project leader, *Senior Researcher, Norwegian Institute of Public Health* Dalsbø TK, *Senior Advisor, Norwegian Institute of Public Health* Brurberg KG, *Head of Department, Norwegian Institute of Public Health*
ISBN	978-82-8406-189-4
Memo	April - 2021
Type of report	Rapid review
No. of pages	17 (23 included appendices)
Commisioned by	Norwegian Institute of Public Health (Folkehelseinstituttet)
Conflict of interest	The authors have no conflicts of interest to declare
Citation	Fønhus MS, Dalsbø TK, Brurberg KG. Facemasks to prevent transmission of respiratory illness, such as COVID-19 - a rapid overview of systematic reviews [Munnbind for å forhindre smitte av luftveisinfeksjoner, som covid-19 – en hurtigoversikt 2021]. Oslo: Norwegian Institute of Public Health, 2021

Plain language summary

In March 2021 we searched for systematic reviews that analyse and summarise the effectiveness of facemasks on respiratory virus transmission, such as COVID-19. We found one systematic review of high quality.

This high-quality systematic review analyses and summarises the effectiveness of facemasks versus no facemasks or different types of facemasks. All types of populations and settings are included. We have communicated the relevant findings of this systematic review as a short communication product called «Briefly summarised». This systematic review searched for studies in April 2020 and does not include studies on COVID-19. Thus, this high-quality systematic review provides indirect evidence regarding COVID-19.

In the process of making this rapid overview we found that it would be very helpful to make a thorough map of the relevant primary studies included in the systematic reviews in one place.

Hovedfunn (Norwegian)

I mars 2021 søkte vi etter systematiske oversikter som analyserer og oppsummerer effekten av å bruke munnbind på smitte av luftveisinfeksjoner, som covid-19. Vi fant én systematisk oversikt av høy kvalitet.

Denne høykvalitetsoversikten analyserer og oppsummerer effekten av å bruke munnbind sammenlignet med ingen munnbind eller ulike typer munnbind eller masker. Alle typer populasjoner og settinger er inkludert. Vi har laget en kort oppsummering av relevante funn i et kort kommunikasjonsprodukt som heter «Briefly summarised» («Kort oppsummert» på norsk).

Den systematiske oversikten søkte etter studier i april 2020 og omfatter ingen studier om covid-19. Denne høykvalitetsoversikten presenterer dermed kun indirekte forskning med hensyn til Covid-19.

I arbeidet med denne hurtigoversikten, fant vi at en grundig kartlegging av de relevante primærstudiene som er med i de systematiske oversiktene, vil være nyttig å samle på ett sted.

Table of content

Background

Respiratory infections can be caused by many viruses such as influenza virus, rhinovirus, adenovirus, and coronavirus. Most of them cause mild respiratory illness. However, some viruses can cause severe respiratory illness that can result in hospitalisation and death.

Viral respiratory infections can be a serious threat, especially if they become epidemic or pandemic. Vaccines and medical treatments may not be enough to prevent their spread and other strategies to prevent transmission is necessary. Like other respiratory viral illnesses, the coronavirus disease 2019 (COVID-19) is transmitted by the respiratory route.

COVID-19 can spread from an infected person's mouth or nose in small liquid particles when they cough, sneeze, speak, sing, or breathe heavily. The virus can also spread after infected people sneeze, cough on, or touch surfaces, or objects, such as tables, doorknobs, and handrails. Other people may become infected by touching these contaminated surfaces, then touching their eyes, noses or mouths without having cleaned their hands first (WHO 2020).

To prevent the spread of COVID-19, the most common strategies have been to promote appropriate physical distance, good hand hygiene, and facemask use. The use of facemasks has received a great deal of attention. It has been debated both politically, and in the mass media as well as social media. Although being debated, it seems that facemask use is perceived to be an effective mean of reducing transmission. This perception has contributed to a political imperative to encourage or mandate the use of facemasks in the public.

In response to the COVID-19 outbreak, the international research community has published numerous systematic reviews on the effectiveness of facemask use on respiratory virus transmission. However, the production of robust research takes time, and systematic reviews appear to summarise many of the same few primary studies. With the increasing number of systematic reviews published, we will here attempt to guide decisionmakers to high-quality systematic reviews that can support well-informed decisions about the effectiveness of facemask use on respiratory virus transmission.

Purpose

The purpose of this overview was to find high-quality systematic reviews that assess the effectiveness of facemask use on respiratory illness transmission, including COVID-19.

Method

This is a rapid overview where we have used a transparent and systematic approach.

The protocol of this rapid overview of systematic reviews was pre-registered on the Open Science Framework February 22, 2021.

Inclusion criteria, PICO

Our inclusion criteria were broad and are described in table 1. We only included systematic reviews that analyse and summarise the effectiveness of facemask use in primary studies (we excluded umbrella reviews, overviews, recommendations etc.).

Table 1. PICOS (Population, Intervention, Comparison, Outcome, Setting)

Population:	All
Intervention:	Facemask (all types of facemasks)
Comparison:	No facemask use, other interventions, or comparisons of different types of facemasks
Outcomes:	At least one of the following two outcomes: Number of people with viral respiratory infection (laboratory-confirmed) Number of people with respiratory illness or influenza-like illness (clinical symptoms)
Setting:	All

Search

We searched for systematic reviews in Cochrane Library, Epistemonikos, Google Scholar, MedRxiv, and PubMed March 9-10, 2021 with different search terms for facemasks (see Appendix 1).

We searched for systematic reviews published after the outbreak of COVID-19 (published between 2020 and 2021). The search strategy was checked by an information specialist and carried out by one of the authors.

Selection of systematic reviews

Two authors independently screened titles and abstracts according to the inclusion criteria. We retrieved full-text copies of all papers that were potentially relevant, including those where the description of the population, intervention, comparison, outcomes, or setting was insufficient in the abstract to decide about inclusion.

Two authors independently assessed the full-text copies of the papers for relevance. We resolved any disagreements by discussion and consensus with a third author. We kept a log of the selection process to complete a PRISMA flow diagram (Moher 2009).

We described studies that initially appeared to meet the inclusion criteria but later were excluded, including the reasons for exclusion.

Assessment of the methodological quality of the systematic reviews

Systematic reviews are considered the gold standard for evidence used to evaluate the effectiveness of healthcare interventions. Some systematic reviews may be of poor quality because they have been designed, conducted, or reported inappropriately. Poorly conducted systematic reviews can lead to inaccurate effect estimates, misleading conclusions, or reduced applicability, all of which are a waste of limited resources (Chalmers and Glasziou 2009).

We assessed the quality in two steps:

1. An initial short step where three questions must be answered with 'yes' to be further considered for a more comprehensive quality assessment. These questions are:
    a) Is it clear what the population(s), intervention(s), comparison(s), and outcomes are?
    b) Has the identification of research studies been described with where they searched (databases), how they searched (search terms), and when they searched (search date)?
    c) Have the included studies been judged for methodological quality (risk of bias)?
2. A comprehensive quality assessment of systematic reviews that fulfilled all three criteria from the first initial short step of quality assessment. We used AMSTAR 2.

Results

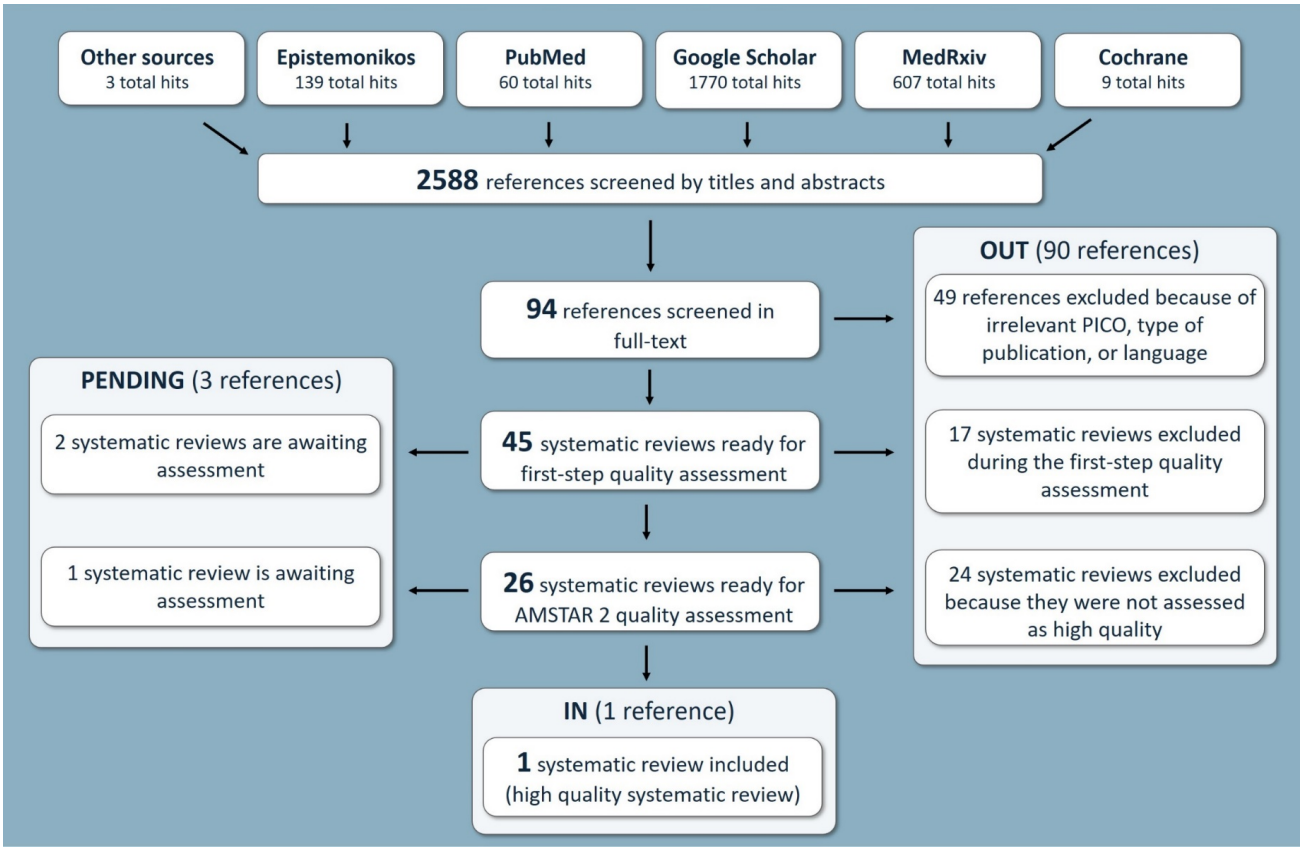
Identification of systematic reviews ready for AMSTAR 2 quality assessment

One author searched in Cochrane Library, Epistemonikos, Google Scholar, MedRxiv, and PubMed March 9-10, 2021 and found 2585 references. We also found three references though other sources. The total number of references were then 2588.

The titles and abstracts of these references were independently screened by two authors (see figure 1). We agreed on which references we needed in full text to assess for inclusion.

We retrieved 94 references in full text, and two authors independently assessed their relevance for inclusion. We excluded 49 full text references for different reasons (see Appendix 2). Thus, we considered 45 of totally 94 references to be systematic reviews. Most of these systematic reviews (36 SRs) could be found through searches in Epistemonikos. Of the nine systematic reviews that could not be found in Epistemonikos five systematic reviews could only be found though searches in Google Scholar and one each in MedRxiv, PubMed and other sources (Google). One systematic review could be found both in Google Scholar and MedRxiv.

Figure 1. Flow chart of the selection process



Two authors independently performed an initial short quality assessment to identify systematic reviews eligible for AMSTAR 2 quality assessment. Of the 45 systematic reviews assessed in an initial short quality step, 26 were considered ready for AMSTAR 2 quality assessment. We excluded 17 systematic reviews due to different limitations and two could not be assessed at this point (see Appendix 2).

From the 26 systematic reviews ready for AMSTAR 2 assessment, almost all (23 SRs) were identified though searches in Epistemonikos (Aggarwal 2020; Bartoszko 2020; Barycka 2020; Camargo 2020; Chou 2020; Chu 2020; Coclite 2021; Iannone 2020; Jefferson 2020; Kim 2021; Li 2020; Liang 2020; Long 2020; Mondal 2020; Nanda 2021; Ollila 2020; Santos 2020; Sharma 2020; Siegfried 2020; Tabatabaeizadeh 2021; Wang 2020; Wu 2020; Yin 2021) while two were found though Google Scholar (Brainard 2020; Rohde 2020) and one though other sources (Google) (Rees 2020).

PICO information from the systematic reviews

One author extracted PICO information from the 26 systematic reviews (SRs) (Aggarwal 2020; Bartoszko 2020; Barycka 2020; Brainard 2020; Camargo 2020; Chou 2020; Chu 2020; Coclite 2021; Iannone 2020; Jefferson 2020; Kim 2021; Li 2020; Liang 2020; Long 2020; Mondal 2020; Nanda 2021; Ollila 2020; Rees 2020; Rohde 2020; Santos 2020; Sharma 2020; Siegfried 2020; Tabatabaeizadeh 2021; Wang 2020; Wu 2020; Yin 2021) that were ready to be quality assessed by AMSTAR 2, and the other author double-checked. We present the results in table 2.

Populations and settings

From table 2 you can see that most of the systematic reviews (22 SRs) include a broad non-specific population (Aggarwal 2020; Barycka 2020; Brainard 2020; Camargo 2020; Chou 2020; Chu 2020; Coclite 2021; Jefferson 2020; Kim 2021; Li 2020; Liang 2020; Long 2020; Mondal 2020; Nanda 2021; Ollila 2020; Rees 2020; Rohde 2020; Santos 2020; Sharma 2020; Siegfried 2020; Tabatabaeizadeh 2021; Wang 2020) while a small number have a more narrow population, such as healthcare workers (four SRs) (Bartoszko 2020; Iannone 2020; Wu 2020; Yin 2021).

Most of the systematic reviews (14 SRs) include all types of settings (Barycka 2020; Brainard 2020; Chou 2020; Chu 2020; Jefferson 2020; Kim 2021; Li 2020; Liang 2020; Long 2020; Nanda 2021; Ollila 2020; Santos 2020; Sharma 2020; Tabatabaeizadeh 2021) while a few include community settings (six SRs) (Aggarwal 2020; Coclite 2021; Rees 2020; Rohde 2020; Siegfried 2020; Wang 2020) or healthcare settings (four SRs) (Iannone 2020; Mondal 2020; Wu 2020; Yin 2021). Two systematic reviews did not report specifically on setting (Bartoszko 2020; Camargo 2020).

Interventions and comparisons

Most of the systematic reviews (14 SRs) define their intervention more generally as 'facemasks' (Aggarwal 2020; Brainard 2020; Chu 2020; Coclite 2021; Jefferson 2020; Kim 2021; Li 2020; Liang 2020; Mondal 2020; Nanda 2021; Ollila 2020; Rohde 2020; Tabatabaeizadeh 2021; Yin 2021) while others define the types of facemasks, such as 'medical masks' (two SRs) (Bartoszko 2020; Barycka 2020), 'N95 respirators' (two SRs) (Iannone 2020; Long 2020), 'clot masks' (three SRs) (Santos 2020; Sharma 2020; Siegfried 2020), 'non-woven facemasks' (Camargo 2020), 'surgical masks' (Wang 2020), 'medical masks and N95 respirators' (two SRs) (Rees 2020; Wu 2020), or 'N95 respirators, surgical masks, and cloth masks' (Chou 2020).

The comparisons are defined as 'no facemasks or other interventions' (five SRs) (Aggarwal 2020; Brainard 2020; Jefferson 2020; Nanda 2021; Wang 2020), 'no facemasks' (six SRs) (Camargo 2020; Coclite 2021; Kim 2021; Ollila 2020; Rees 2020; Rohde 2020), 'control' (two SRs) (Li 2020; Liang 2020), other types of facemasks, respirators or respiratory protective devices (12 SRs) (Bartoszko 2020; Barycka 2020; Chou 2020; Chu 2020; Iannone 2020; Long 2020; Santos 2020; Sharma 2020; Siegfried 2020; Tabatabaeizadeh 2021; Wu 2020; Yin 2021), or not prespecified (Mondal 2020).

Outcomes

All the systematic reviews report on outcomes on respiratory virus transmission. They report respiratory virus transmission as respiratory illness symptoms, either self-reported or clinically verified, (19 SRs) (Aggarwal 2020; Bartoszko 2020; Barycka 2020; Brainard 2020; Camargo 2020; Chou 2020; Chu 2020; Iannone 2020; Jefferson 2020; Long 2020; Mondal 2020; Nanda 2021; Ollila 2020; Rees 2020; Rohde 2020; Santos 2020; Siegfried 2020; Wang 2020; Yin 2021) or lab-confirmed respiratory virus infection (21 SRs) (Bartoszko 2020; Barycka 2020; Brainard 2020; Camargo 2020; Chou 2020; Chu 2020; Iannone 2020; Jefferson 2020; Kim 2021; Li 2020; Liang 2020; Long 2020; Mondal 2020; Nanda 2021; Ollila 2020; Rees 2020; Rohde 2020; Santos 2020; Siegfried 2020; Tabatabaeizadeh 2021; Wang 2020; Yin 2021). A few did not specify how the respiratory virus infection was measured in the studies they included (Coclite 2021; Sharma 2020; Wu 2020).

Table 2. PICO information from systematic reviews assessed with AMSTAR 2

Systematic review	Population (setting)	Intervention	Comparison	Outcomes (relevant)	Studies	COVID-19*?	Search date
Aggarwal 2020	All people (community)	Facemasks	No facemasks Other	Respiratory illness	RCTs	0	April, 2020
Bartoszko 2020	HCWs	Medical masks	N95 respirators	Viral infection (lab), Respiratory illness	RCTs	0	March, 2020
Barycka 2020	All people (all settings)	Medical masks	N95 respirators	Viral infection (lab), Respiratory illness	RCTs	0	April, 2020
Brainard 2020	All people (all settings)	Facemasks	No facemasks Other	Viral infection (lab), Respiratory illness, COVID-19 infection (lab)	All types of study designs	0	June, 2020
Camargo 2020 **	All people	Non-woven facemasks	No facemasks	Viral infection (lab), Respiratory illness	SRs, RCTs, non-RCTs, obs. studies	0	April, 2020
Chou 2020	All people (all settings)	N95, surgical, and cloth masks	N95, surgical, and cloth masks	Viral infection (lab), Respiratory illness, COVID-19 infection (lab)	RCTs and obs. studies	0	April, 2020
Chu 2020	All people (all settings)	Facemasks	Respirators (N95), surgical facemasks	Viral infection (lab), Respiratory illness	All types of study designs	5	May, 2020
Coclite 2021	All people (community)	Facemasks	No facemasks	Respiratory infection rate	All types of study designs	4	April, 2020
Iannone 2020	HCWs (healthcare)	N95 respirators	Surgical masks	Viral infection (lab), Respiratory illness, COVID-19 infection (lab)	RCTs	0	March, 2020
Jefferson 2020	All people (all settings)	Facemasks	No facemasks Other	Viral illness, Influenza infection (lab), Viral infection (lab)	RCTs	0	April, 2020
Kim 2021	All people (all settings)	Facemasks	No facemask (or reduced use)	Viral infection (lab)	RCTs, non-RCTs and obs. studies	N/A Pending	October, 2020
Li 2020	All people (all settings)	Facemasks	"Control"	COVID-19 infection (lab)	All types of study designs	6	October, 2020
Liang 2020	All people (all settings)	Facemasks	"Control"	Viral infection (lab)	All types of study designs	1	March, 2020
Long 2020	All people (all settings)	N95 respirators	Surgical masks	Influenza infection (lab), Viral infection (lab)	RCTs and non-RCTs	0	January, 2020
Mondal 2020	All people (clinical setting)	Facemasks	Not prespecified	Viral infection (lab), Respiratory illness	All types of exp. studies	0	May, 2020
Nanda 2021	All people (all settings)	Facemasks	No facemasks Other	Viral infection (lab), Respiratory illness, COVID-19 infection (lab)	RCTs and obs. studies	1	August, 2020
Ollila 2020	All people (all settings)	Facemasks	No facemasks	Viral infection (lab), Respiratory illness, COVID-19 infection (lab)	RCTs	1	November, 2020
Rees 2020	All people (community)	Medical masks, N95 respirators	No facemasks	Viral infection (lab), Respiratory illness	SRs, RCTs	0	March, 2020
Rohde 2020	All people (community)	Facemasks	No facemasks	Viral infection (lab), Respiratory illness, COVID-19 infection (lab)	RCTs and obs. studies	7	August, 2020
Santos 2020	All people (all settings)	Clot masks	Surgical masks N95 respirators	Viral infection (lab), Respiratory illness, COVID-19 infection (lab)	RCTs, non-RCTs, obs. studies, lab studies	0	April, 2020
Sharma 2020	All people (all settings)	Clot masks	Respiratory protective devices	Virus transmission	All types of exp. and obs. studies	0	May, 2020
Siegfried 2020	All people (community)	Clot masks	Surgical masks Respirators (N95)	COVID-19 infection, Respiratory viral infection (lab), Clinical respiratory illness (CRI)	SRs, RCTs, modelling studies	0	March, 2020
Tabatabaeizadeh 2021	All people (all settings)	Facemasks	Cotton masks, medical masks	COVID-19 infection (lab)	Not predefined	4	October, 2020
Wang 2020	All people (community)	Surgical masks	No facemasks Other	Viral infection (lab), Respiratory illness	RCTs and obs. studies	0	February, 2020
Wu 2020	HCWs (healthcare)	Medical masks, N95 respirators	N95 respirators	Respiratory infectious diseases	RCTs and obs. studies	0	January, 2020
Yin 2021	HCWs (healthcare)	Facemasks	RPPE	Viral infection (lab), Respiratory illness	RCTs	0	December, 2019

Exp.= experimental, HCWs= healthcare workers, Obs.=observational, RCTs= randomised controlled trials, RPPE= respiratory personal protective equipment SRs= systematic reviews * Only studies that are included in the results (not discussion) that fit our PICO (not necessary the same as the total number reported in the systematic review) ** We have only included studies from their own primary analysis, not SRs or other meta-analysis the systematic reviews may have included

How up to date are the systematic reviews?

Most of the systematic reviews' literature searches were carried out between December 2019 and June 2020 (20 SRs) (Aggarwal 2020; Bartoszko 2020; Barycka 2020; Brainard 2020; Camargo 2020; Chou 2020; Chu 2020; Coclite 2021; Iannone 2020; Jefferson 2020; Liang 2020; Long 2020; Mondal 2020; Rees 2020; Santos 2020; Sharma 2020; Siegfried 2020; Wang 2020; Wu 2020; Yin 2021) while a few were carried out between August 2020 and November 2020 (Kim 2021; Li 2020; Nanda 2021; Ollila 2020; Rohde 2020; Tabatabaeizadeh 2021).

COVID-19 direct evidence

Some systematic reviews (eight SRs) include primary studies that have assessed facemask use and COVID-19 infection transmission (Chu 2020; Coclite 2021; Li 2020; Liang 2020; Nanda 2021; Ollila 2020; Rohde 2020; Tabatabaeizadeh 2021). Of these COVID-19 primary studies, one is a randomised controlled trial (RCT) two are cohort studies, 10 are case-control studies, three are cross-sectional studies, and four are modelling studies.

The results of the AMSTAR 2 quality assessments

One systematic review (Kim 2021) could not be quality assessed with AMSTAR 2 and is awaiting assessment (see Appendix 2 for more details). Two authors independently assessed the quality of the remaining 25 systematic reviews with AMSTAR 2 (see Appendix 3 for more details) and came to agreement on the final assessments.

We assessed one systematic review as having critically low quality (Mondal 2020), 10 as having low quality (Aggarwal 2020; Camargo 2020; Li 2020; Liang 2020; Long 2020; Rohde 2020; Sharma 2020; Tabatabaeizadeh 2021; Wang 2020; Yin 2021), 13 as having moderate quality (Bartoszko 2020; Barycka 2020; Brainard 2020; Chou 2020; Chu 2020; Coclite 2021; Iannone 2020; Nanda 2021; Ollila 2020; Rees 2020; Santos 2020; Siegfried 2020; Wu 2020), and one as having high quality (Jefferson 2020) (see table 3).

The main reasons why we rated most systematic reviews to moderate or low quality are that:

- they do not provide information about a protocol or predefined selection criteria on their work (64% of the SRs) – item 2 in AMSTAR 2
- they do not provide information about excluded studies (84% of the SRs) – item 7 in AMSTAR 2
- they do not provide information about how or if the included studies were funded (92% of the SRs) – item 10 in AMSTAR 2
- they do not assess the potential impact of risk of bias in individual studies on the meta-analysis (83% of the SRs) – item 12 in AMSTAR 2

Furthermore, we found only eight systematic reviews that fully fulfil the criteria described for a comprehensive literature search strategy (Chou 2020; Chu 2020; Coclite 2021; Jefferson 2020; Li 2020; Ollila 2020; Santos 2020; Sharma 2020) (item 4 in AMSTAR 2). Also, remarkably few (5 SRs) fully fulfil the criteria for good descriptions of included studies (Chou 2020; Jefferson 2020; Nanda 2021; Ollila 2020; Sharma 2020) (item 8 in AMSTAR 2).

Table 3. AMSTAR 2 assessment

Systematic review	Quality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Aggarwal 2020	L																
Bartoszko 2020	M																
Barycka 2020	M																
Brainard 2020	M																
Camargo 2020	L											N/A	N/A			N/A	
Chou 2020	M											N/A	N/A			N/A	
Chu 2020	M																
Coclite 2021	M																
Iannone 2020	M																
Jefferson 2020	H																
Li 2020	L																
Liang 2020	L																
Long 2020	L																
Mondal 2020	CL											N/A	N/A			N/A	
Nanda 2021	M																
Ollila 2020	M																
Rees 2020	M																
Rohde 2020	L											N/A	N/A			N/A	
Santos 2020	M											N/A	N/A				
Sharma et al. 2020	L											N/A	N/A			N/A	
Siegfried et al. 2020	M											N/A	N/A			N/A	
Tabatabaeizadeh 2021	L																
Wang et al. 2020	L																
Wu et al. 2020	M																
Yin et al. 2021	L																

AMSTAR 2 checklist. CL= critically low quality, H= high quality, L= low quality, M= moderate quality N/A= not applicable

Detailed PICO information from the high-quality systematic review

We extracted more detailed PICO-information from the high-quality systematic review (Jefferson 2020) (see table 4). The authors include only randomised controlled trials and have no limits regarding populations or settings. They include all types of facemasks and all types of comparisons (including comparisons of different types of facemasks against each other). We have communicated the relevant findings of this systematic review as a short communication product called «Briefly summarised».

This high-quality systematic review (Jefferson 2020) searched for studies in April 2020 and does not include primary studies on COVID-19. Thus, this high-quality systematic review provides indirect evidence regarding COVID-19.

Table 4. Detailed PICO table of the high-quality systematic review, Jefferson 2020

PICO	What did they search for?	What did they find?
Study design	RCTs (randomised controlled trials)	All 67 studies were RCTs, of which 19 involved facemask use. 15 RCTs were presented in Summary of findings tables (SoFs)
Population	All populations	Community, including students, pilgrims, families, and health care workers. Three of the 15 studies presented in SoFs were among healthcare workers (Ide 2016; Jacobs 2009; MacIntyre 2015), whilst the remaining studies were among non-healthcare workers (students, households, families, or pilgrims).
Intervention and comparison	Physical interventions (including facemasks)	19 RCTs about facemasks (Aelami 2015; Aiello 2010; Aiello 2012; Barasheed 2014; Canini 2010; Cowling 2008; Cowling 2008; Ide 2016; Jacobs 2009; Larson 2010; Loeb 2009; MacIntyre 2009; MacIntyre 2011; MacIntyre 2013; MacIntyre 2015; MacIntyre 2016; Radonovich 2019; Simmerman 2011; Suess 2012). Relevent comparisons presented in Summary of Findings tables: Face mask versus no facemask (10 studies) (Aiello 2010; Aiello 2012; Barasheed 2014; Canini 2010; Cowling 2008; Jacobs 2009; MacIntyre 2009; MacIntyre 2015; MacIntyre 2016; Suess 2012). One study compared catechin-treated masks to no mask (Ide 2016), and one study included cloth masks versus control (third arm in MacIntyre 2015). Surgical/medical mask and cloth mask and N95/P2 (5 studies) (Loeb 2009; MacIntyre 2009; MacIntyre 2011; MacIntyre 2013; Radonovich 2019). Other relevant facemask comparisons not presented in Summary of Findings tables: Facemask + hand hygiene versus control (6 studies) (Aelami 2015; Aiello 2012; Cowling 2009; Larson 2010; Simmerman 2011; Suess 2012) Facemask + hand hygiene versus hand hygiene (3 studies) (Cowling 2009; Larson 2010; Simmerman 2011). Duration of the intervention among the 15 studies included in this summary, when described, mainly varied from one week to 5 months. Except for 1 study (Radonovich 2019) where health care workers used facemask for 1 year or more when they were in close contact with patients who had acute respiratory illness. Most of the time is also included soap, hand sanitizing, or information material. Control groups usually also got information or educational material.
Outcomes	Respiratory illness Influenza-like illness Laboratory-confirmed influenza Harms / adverse events Deaths Severity of viral illness Absenteeism Hospital admission Illness related complications	Analysis were made for the following outcomes: Clinical respiratory illness Influenza-like illness Laboratory-confirmed influenza Harms / adverse events They found no data for the following outcomes from facemask studies: Deaths Severity of viral illness Absenteeism Hospital admission Illness-related complications
Setting	All countries and all settings	Most studies took place during the influenza season during autumn or winter in the community. One study was conducted during H1N1 pandemic season (Suess 2012). One study was conducted on household individuals (MacIntyre 2009), 5 studies included healthcare workers either in a hospital setting, (Loeb 2009; MacIntyre 2011; MacIntyre 2013), or an outpatient setting (MacIntyre 2009; Radonovich 2019).
Certainty of evidence	They used GRADE to assess the certainty of the evidence.	Very low, low, and moderate evidence due to lack of blinding, imprecision, and inconsistency.
Relevant COVID-19 studies published after the last update		Bundgaard 2020

Discussion

There are many systematic reviews that address the effectiveness of facemasks on respiratory viral infection transmission. We found, surprisingly, only one of these (Jefferson 2020) to be of high quality. All of the systematic reviews except five (Mondal 2020; Ollila 2020; Rees 2020; Siegfried 2020; Wu 2020) had been peer-reviewed. Our quality assessments did not seem to differ among peer-reviewed and non-peer-reviewed systematic reviews.

Previous evaluations of the quality of systematic reviews for other types of effectiveness questions have concluded that many systematic reviews have poor quality (Wasiak 2017 A; Wasiak 2017 B; Opheim 2019; Wei 2020), and that this very much is the case also for COVID-19 related meta-analyses (Pires 2021).

To conduct a trustworthy high-quality systematic review authors have access to good and free sources, such as The Cochrane Handbook (Higgins 2021). Although it takes time and effort to conduct a high-quality systematic review, most of the shortcomings identified during our AMSTAR 2 quality assessment were issues that were more around how well authors describe what they did. These issues are not particularly time-consuming to address but require a clear purpose and a solid plan of how the work will be carried out and described. Thus, if authors are more transparent, explicit, and descriptive in their work with a systematic review, most of the systematic reviews would probably get a higher quality score.

The main purpose for conducting a systematic review should be that it can be used for making well-informed decisions. If readers are going to put things into practise, they need more information than what most systematic reviews provide. For topics or questions where many systematic reviews exist, it is even more important to make good justifications for making new systematic reviews. If good and sound justifications are made it might reduce the number and hopefully raise the quality. The situation we face today is very unsatisfying and is deemed to confuse decision-makers as a redundant pool of systematic reviews on the exact same topic exists (see figure 2).

In 2016 there were 22 systematic reviews published every day (Page 2016). The number of systematic reviews published is thus assumed to have by-passed the number of randomised controlled trials (Ioannidis 2016). Today's situation has become an overload of systematic reviews. This is the opposite of what the evidence-based medicine intentions are.

Conclusion

We here provide a 'quick snapshot overview' of published systematic reviews on facemasks. The effectiveness of facemasks on viral respiratory infection transmission appears to be a highly prioritised question since we found as many as 43 systematic reviews published within the last year. However, only one of these has high quality. We have communicated the relevant findings of this systematic review as a short communication product called «Briefly summarised». This systematic review should be updated as soon as possible to help evidence-based practice and well-informed decisions. With relatively few and easy-to-do improvements, many more of the systematic reviews assessed in this overview, could end up on high quality.

Our work and findings have also pointed out that it may be helpful to map all relevant primary studies and retrieve enough information from each study at one place. This 'one place', should be a map of primary studies that is up to date and can function as a primary source for making meta-analyses or other types of analyses.

Figure 2. An illustration of the ideal versus non-ideal evidence-based decision-making situation

References

References to the included systematic reviews

Aggarwal 2020

Aggarwal N, Dwarakanathan V, Gautam N, Ray A. Facemasks for prevention of viral respiratory infections in community settings: A systematic review and meta-analysis. Indian J Public Health. 2020 Jun;64(Supplement):S192-S200. doi: 10.4103/ijph.IJPH_470_20. PMID: 32496254.

Bartoszko 2020

Bartoszko JJ, Farooqi MAM, Alhazzani W, Loeb M. Medical masks vs N95 respirators for preventing COVID-19 in healthcare workers: A systematic review and meta-analysis of randomized trials. Influenza Other Respir Viruses. 2020 Jul;14(4):365-373. doi: 10.1111/irv.12745. Epub 2020 Apr 21. PMID: 32246890; PMCID: PMC7298295

Barycka 2020

Barycka K, Szarpak L, Filipiak KJ, Jaguszewski M, Smereka J, Ladny JR, Turan O. Comparative effectiveness of N95 respirators and surgical/face masks in preventing airborne infections in the era of SARS-CoV2 pandemic: A meta-analysis of randomized trials. PLoS One. 2020 Dec 15;15(12):e0242901. doi: 10.1371/journal.pone.0242901. PMID: 33320847; PMCID: PMC7737973.

Brainard 2020

Brainard J, Jones NR, Lake IR, Hooper L, Hunter PR. Community use of face masks and similar barriers to prevent respiratory illness such as COVID-19: a rapid scoping review. Eurosurveillance, 25, 2000725 (2020), https://doi.org/10.2807/1560-7917.ES.2020.25.49.2000725

Camargo 2020

Camargo MC, Martinez-Silveira MS, Lima AA, Bastos BP, Santos DLD, Mota SEC et al. Effectiveness of the use of non-woven face mask to prevent coronavirus infections in the general population: a rapid systematic review. Cien Saude Colet. 2020 Sep;25(9):3365-3376. English, Portuguese. doi: 10.1590/1413-81232020259.13622020. Epub 2020 Aug 28. PMID: 32876275.

Chou 2020

Chou R, Dana T, Jungbauer R, Weeks C, McDonagh MS. Masks for Prevention of Respiratory Virus Infections, Including SARS-CoV-2, in Health Care and Community Settings : A Living Rapid Review. Ann Intern Med. 2020 Oct 6;173(7):542-555. doi: 10.7326/M20-3213. Epub 2020 Jun 24. Update in: Ann Intern Med. 2021 Feb;174(2):W24. PMID: 32579379; PMCID: PMC7322812.

Chu 2020

Chu DK, Akl EA, Duda S, Solo K, Yaacoub S, Schünemann HJ; COVID-19 Systematic Urgent Review Group Effort (SURGE) study authors. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. Lancet. 2020 Jun 27;395(10242):1973-1987. doi: 10.1016/S0140-6736(20)31142-9. Epub 2020 Jun 1. PMID: 32497510; PMCID: PMC7263814.

Coclite 2021

Coclite D, Napoletano A, Gianola S, Del Monaco A, D'Angelo D, Fauci A et al. Face Mask Use in the Community for Reducing the Spread of COVID-19: A Systematic Review. Front Med (Lausanne). 2021 Jan 12;7:594269. doi: 10.3389/fmed.2020.594269. PMID: 33511141; PMCID: PMC7835129.

Iannone 2020

Iannone P, Castellini G, Coclite D, Napoletano A, Fauci AJ, Iacorossi L et al. The need of health policy perspective to protect Healthcare Workers during COVID-19 pandemic. A GRADE rapid review on the N95 respirators effectiveness. PLoS One. 2020 Jun 3;15(6):e0234025. doi: 10.1371/journal.pone.0234025. PMID: 32492045; PMCID: PMC7269249.

Jefferson 2020

Jefferson T, Del Mar CB, Dooley L, Ferroni E, Al-Ansary LA, Bawazeer GA et al. Physical interventions to interrupt or reduce the spread of respiratory viruses. Cochrane Database of Systematic Reviews 2020, Issue 11. Art. No.: CD006207. DOI: 10.1002/14651858.CD006207.pub5.

Li 2020

Li Y, Liang M, Gao L, Ayaz Ahmed M, Uy JP, Cheng C et al. Face masks to prevent transmission of COVID-19: A systematic review and meta-analysis. Am J Infect Control. 2020 Dec 19:S0196-6553(20)31043-9. doi: 10.1016/j.ajic.2020.12.007. Epub ahead of print. PMID: 33347937; PMCID: PMC7748970.

Liang 2020

Liang M, Gao L, Cheng C, Zhou Q, Uy JP, Heiner K, Sun C. Efficacy of face mask in preventing respiratory virus transmission: A systematic review and meta-analysis. Travel Med Infect Dis. 2020 Jul-Aug;36:101751. doi: 10.1016/j.tmaid.2020.101751. Epub 2020 May 28. PMID: 32473312; PMCID: PMC7253999.

Long 2020

Long Y, Hu T, Liu L, Chen R, Guo Q, Yang L et al. Effectiveness of N95 respirators versus surgical masks against influenza: A systematic review and meta-analysis. J Evid Based Med. 2020 May;13(2):93-101. doi: 10.1111/jebm.12381. Epub 2020 Mar 13. PMID: 32167245; PMCID: PMC7228345.

Mondal 2020

Mondal A, Das A, Goswami RP. Utility of Cloth Masks in Preventing Respiratory Infections: A Systematic Review. medRxiv 2020.05.07.20093864; doi: https://doi.org/10.1101/2020.05.07.20093864. **PREPRINT**

Nanda 2021

Nanda A, Hung I, Kwong A, Man VC, Roy P, Davies L, Douek M. Efficacy of surgical masks or cloth masks in the prevention of viral transmission: Systematic review, meta-analysis, and proposal for future trial. J Evid Based Med. 2021 Feb 9. doi: 10.1111/jebm.12424. Epub ahead of print. PMID: 33565274; PMCID: PMC8014575.

Ollila 2020

Ollila HM, Partinen M, Koskela J, Savolainen R, Rotkirch A, Laine LT. Face masks to prevent transmission of respiratory diseases: Systematic review and meta-analysis of randomized controlled trials*. medRxiv 2020.07.31.20166116; doi: https://doi.org/10.1101/2020.07.31.20166116. **PREPRINT**

Rees 2020

Rees K, Siegfried N, Naude JTW, Begg K, English R, Rajman A et al. Should medical masks be used by the general public for preventing transmission of SARS-CoV-2? BRIEF REPORT OF RAPID SYSTEMATIC REVIEW. College of Public Health Medicine Evidence-based COVID-19 Task Team, Cochrane South Africa and South African Medical Research Council Health Systems Research Unit 2020. **PREPRINT**

Rohde 2020

Rohde D, Ahern S, Clyne B, Comber L, Spillane S, Walsh KA et al. Effectiveness of face masks worn in community settings at reducing the transmission of SARS-CoV-2: A rapid review. HRB Open Res; 2020. DOI: 10.12688/hrbopenres.13161.1.

Santos 2020

Santos M, Torres D, Cardoso PC, Pandis N, Flores-Mir C, Medeiros R, Normando AD. Are cloth masks a substitute to medical masks in reducing transmission and contamination? A systematic review. Braz Oral Res. 2020 Oct 30;34:e123. doi: 10.1590/1807-3107bor-2020.vol34.0123. PMID: 33146319.

Sharma 2020

Sharma SK, Mishra M, Mudgal SK. Efficacy of cloth face mask in prevention of novel coronavirus infection transmission: A systematic review and meta-analysis. J Educ Health Promot. 2020 Jul 28;9:192. doi: 10.4103/jehp.jehp_533_20. PMID: 33015206; PMCID: PMC7497125.

Siegfried 2020

Siegfried N, Rees K, Kredo T, Chetty T, Balakrishna Y, Oliver J. Should cloth masks be used by the general public for preventing transmission of SARS-CoV-2? BRIEF REPORT OF RAPID REVIEW. College of Public Health Medicine Evidence-based COVID-19 Task Team, Cochrane South Africa and South African Medical Research Council Health Systems Research Unit 2020. **PREPRINT**

Tabatabaeizadeh 2021

Tabatabaeizadeh SA. Airborne transmission of COVID-19 and the role of face mask to prevent it: a systematic review and meta-analysis. Eur J Med Res. 2021 Jan 2;26(1):1. doi: 10.1186/s40001-020-00475-6. PMID: 33388089; PMCID: PMC7776300.

Wang 2020

Wang MX, Gwee SXW, Chua PEY, Pang J. Effectiveness of Surgical Face Masks in Reducing Acute Respiratory Infections in Non-Healthcare Settings: A Systematic Review and Meta-Analysis. Front Med (Lausanne). 2020 Sep 25;7:564280. doi: 10.3389/fmed.2020.564280. PMID: 33102503; PMCID: PMC7546829.

Wu 2020

Gao-hong Wu MM, Ping Jiang MB, Huan Yuan MB et al. A systematic review and meta-analysis of the efficacy of medical masks and N95 respirators for protection against respiratory infectious diseases, including COVID-19 in medical staff, 23 July 2020, **PREPRINT** (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-47687/v1]

Yin 2021

Yin X, Wang X, Xu S, He C. Comparative efficacy of respiratory personal protective equipment against viral respiratory infectious diseases in healthcare workers: a network meta-analysis. Public Health. 2021 Jan;190:82-88. doi: 10.1016/j.puhe.2020.11.004. Epub 2020 Dec 23. PMID: 33360295; PMCID: PMC7755580.

Excluded and pending references

The link to each excluded or pending reference (retrieved in full-text) can be found in Appendix 2.

References to the text of the overview

AMSTAR 2

Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017 Sep 21;358:j4008. doi: 10.1136/bmj.j4008. PMID: 28935701; PMCID: PMC5833365.

Chalmers and Glasziou 2009

Chalmers I, Glasziou P. Avoidable waste in the production and reporting of research evidence. Lancet. 2009 Jul 4;374(9683):86-9. doi: 10.1016/S0140-6736(09)60329-9. Epub 2009 Jun 12. PMID: 19525005.

Higgins 2021

Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). Cochrane Handbook for Systematic Reviews of Interventions version 6.2 (updated February 2021). Cochrane, 2021. Available from www.training.cochrane.org/handbook.

Ioannidis 2016

Ioannidis JP. The Mass Production of Redundant, Misleading, and Conflicted Systematic Reviews and Meta-analyses. Milbank Q. 2016 Sep;94(3):485-514. doi: 10.1111/1468-0009.12210. PMID: 27620683; PMCID: PMC5020151.

Moher 2009

Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med. 2009 Jul 21;6(7):e1000097. doi: 10.1371/journal.pmed.1000097. Epub 2009 Jul 21. PMID: 19621072; PMCID: PMC2707599.

Opheim 2019

Opheim E, Andersen PN, Jakobsen M, Aasen B, Kvaal K. Poor Quality in Systematic Reviews on PTSD and EMDR - An Examination of Search Methodology and Reporting. Front Psychol. 2019 Jul 9;10:1558. doi: 10.3389/fpsyg.2019.01558. PMID: 31354575; PMCID: PMC6630178.

Page 2016

Page MJ, Moher D. Mass Production of Systematic Reviews and Meta-analyses: An Exercise in Mega-silliness? Milbank Q. 2016 Sep;94(3):515-9. doi: 10.1111/1468-0009.12211. PMID: 27620684; PMCID: PMC5020155.

Pires 2021

Pires GN, Bezerra AG, Oliveira TB, Chen SFI, Malfatti VDA, Mello VFF et al. COVID-19 meta-analyses: a scoping review and quality assessment. Einstein (Sao Paulo). 2021 Mar 15;19:eAO6002. doi: 10.31744/einstein_journal/2021AO6002. PMID: 33729287; PMCID: PMC7942841.

Wasiak 2017 A

Wasiak J, Tyack Z, Ware R, Goodwin N, Faggion CM Jr. Poor methodological quality and reporting standards of systematic reviews in burn care management. Int Wound J. 2017 Oct;14(5):754-763. doi: 10.1111/iwj.12692. Epub 2016 Dec 18. PMID: 27990772.

Wasiak 2017 B

Wasiak J, Shen AY, Ware R, O'Donohoe TJ, Faggion CM Jr. Methodological quality and reporting of systematic reviews in hand and wrist pathology. J Hand Surg Eur Vol. 2017 Oct;42(8):852-856. doi: 10.1177/1753193417712660. Epub 2017 Jun 13. PMID: 28610464.

Wei 2020

Wei H, Zhang YJ, Yu T, Yan XY, Jiang Q. Methodological quality evaluation of systematic reviews or meta-analysis of trastuzumab-based therapy for breast cancer: A systematic review. Medicine (Baltimore). 2021;100(4):e24389. doi:10.1097/MD.0000000000024389. PMID: 33530234; PMCID: PMC7850684.

WHO 2020

World Health Organization (WHO). Coronavirus disease (COVID-19): How is it transmitted? 9 July 2020 | Q&A. *This is a webpage resource accessed in March 2021

Keywords

COVID-19; SARS-CoV-2; facemasks; face masks; non-pharmacological interventions, physical interventions

Appendices

Appendix 1. Search strategies

<<Back to text

Epistemonikos (advanced search)

Search date:

First search February 22nd, 2021, last updated March 9th, 2021

Search phrases:

(title:("cloth mask") OR abstract:("cloth mask")) OR (title:("cloth masks") OR abstract:("cloth masks")) OR (title:("medical mask") OR abstract:("medical mask")) OR (title:("medical masks") OR abstract:("medical masks")) OR (title:("surgical mask") OR abstract:("surgical mask")) OR (title:("surgical masks") OR abstract:("surgical masks")) OR (title:("face mask") OR abstract:("face mask")) OR (title:("face masks") OR abstract:("face masks")) OR (title:(facemask) OR abstract:(facemask)) OR (title:(facemasks) OR abstract:(facemasks)) OR (title:("face shield") OR abstract:("face shield")) OR (title:("face shields") OR abstract:("face shields")) OR (title:(N95) OR abstract:(N95)) OR (title:("personal protective mask") OR abstract:("personal protective mask")) OR (title:("personal protective masks") OR abstract:("personal protective masks"))

Filters:

Publication year: 2020-2021, Publication type: systematic review

Update searches:

Articles from the last year are added in Endnote and screened for duplicates and relevance there

Hits:

139 (first search 136 hits)

PubMed (advanced search)

Search date:

First search February 22nd, 2021, last updated March 9th, 2021

Search phrases:

("cloth mask"[Title/Abstract]) OR ("cloth masks"[Title/Abstract]) OR ("medical mask"[Title/Abstract]) OR ("medical mask"[Title/Abstract]) OR ("medical masks"[Title/Abstract]) OR ("surgical mask"[Title/Abstract]) OR ("surgical masks"[Title/Abstract]) OR ("face mask"[Title/Abstract]) OR ("face masks"[Title/Abstract]) OR (facemask[Title/Abstract]) OR (facemasks[Title/Abstract]) OR ("face shield"[Title/Abstract]) OR ("face shields"[Title/Abstract]) OR (N95[Title/Abstract]) OR ("personal protective mask"[Title/Abstract]) OR ("personal protective masks"[Title/Abstract])

Filters:

Publication year: 2020-2021, Publication type: systematic review

Update searches:

Articles from the last year are added in Endnote and screened for duplicates and relevance there

Hits:

60 (first search 59 hits)

Google Scholar (advanced search)

Search date:

First search February 22nd, 2021, last updated March 10th, 2021

Search phrases:

allintitle: "cloth mask" OR "cloth masks" OR "medical mask" OR "medical masks" OR "surgical mask" OR "surgical masks" OR "face mask" OR "face masks" OR facemask OR facemasks OR "face shield" OR "face shields" OR "protective masks" OR "protective masks" OR N95

Filters:

Citations and patents NOT included, Publication year: 2020-2021

Hits:

1770 (first search 1632 hits)

Since 2020: 1770 (first search 1632 hits)

Since 2021: 331 (first search 232 hits)

Update searches:

Sorted by date and screen the hits published in between the two last searches.

MedRxiv (advanced search)

Search date:

February 22nd, 2021, last updated March 10th, 2021

Search phrases:

for abstract or title "mask masks respirator respirators shield shields" (match any words)

Filters:

No filter

Hits:

607 (first search 579 hits)

Update searches:

Sorted by date and screen the hits in between the two last searches.

Cochrane (search manager)

Search date:

First search February 23rd, 2021, last updated March 16th, 2021

Search phrases:

#1 MeSH descriptor: [Respiratory Protective Devices] explode all trees 73

#2 MeSH descriptor: [Personal Protective Equipment] this term only 39

#3 MeSH descriptor: [Masks] this term only 498

#4 (faceshield* or face next shield* or facial next shield* or facemask* or face next mask* or facial next mask* or surgical next mask* or medical next mask* or protective next mask* or respiratory next mask* or "N95 respirator" or "N95 respirators" or "N95 mask" or "N95 masks" or cloth* next mask* or mouth next mask* or respiratory next device* or face next cover* or facial next cover* or face next protection or facial next protection or face next protective or facial next protective or face next shield*):ti,ab,kw 2312

#5 #1 or #2 or #3 or #4 in with Cochrane Library publication date from Jan 2020 to Mar 2021, in Cochrane Reviews 9

Filters:

Cochrane Reviews, Publication year: 2020-2021

Hits:

9 (first search 9 hits)

Update searches:

Sorted by date and screen the hits published in between the two last searches.

Appendix 2. Excluded and pending references

<<Back to text

Table 1. Pending references (3 references)

Reference	Title	Reason	Pending until
Dugré 2020	Masks for prevention of viral respiratory infections among health care workers and the public: PEER umbrella systematic review	Waiting assessment. Search terms not described in the article and supplementary information about search not available from webpage March 2021. Thus, not able to perform quality step 1.	If no information is available within 2021, we will exclude the systematic review.
Kim 2021	Comparative Efficacy of N95, Surgical, Medical, and Non-Medical Facemasks in Protection of Respiratory Virus Infection: A Living Systematic Review and Network Meta-Analysis	Waiting assessment. Under review process, so supplemental material from preprint version is not available March 2021. Thus, not able to perform quality step 2 (AMSTAR 2)	If no information is available within 2021, we will exclude the systematic review.
Saijonkai 2020	Face masks for preventing respiratory infections in the community: A systematic review	Waiting assessment. Search terms not described in the article and supplementary information about search not available from webpage March 2021. Thus, not able to perform quality step 1.	If no information is available within 2021, we will exclude the systematic review.

Table 2. Excluded references during full-text reading (49 references)

Reference	Title	Reason
Alderman 2020	COViD-19: Face Mask Effectiveness, Hand Sanitizer Shortages, and Rapid Medication Therapy Trials	Not a SR
Al-Moraissi 2020	Is Standard Personal Protective Equipment Effective Enough To Prevent COVID-19 Transmission During Aerosol Generating Dental, Oral and Maxillofacial Procedures? A Systematic Review	Irrelevant PICO
Atangana & Atangana 2020	Facemasks simple but powerful weapons to protect against COVID-19 spread: Can they have sides effects?	Not a SR
Azap & Erdinç 2020	Medical mask or N95 respirator: When and how to use?	Not a SR
Bagepally 2021	Cost-effectiveness of surgical mask, N-95 respirator, hand-hygiene and surgical mask with hand hygiene in the prevention of COVID-19: Cost effectiveness analysis from Indian context	Not a SR
Bakhit 2020	Downsides of face masks and possible mitigation strategies: a systematic review and meta-analysis	Irrelevant PICO
Brainard 2020 PREPRINT VERSION	Facemasks and similar barriers to prevent respiratory illness such as COVID-19: A rapid systematic review	Duplicate (Preprint)
Burton 2020	Performance and impact of disposable and reusable respirators for healthcare workers during pandemic respiratory disease: a rapid evidence review	Irrelevant PICO
Lima 2020	Effectiveness of the facial mask (non-woven) in the population to prevent coronavirus infections: A systematic review	Language
Chugthai 2020	Use of personal protective equipment to protect against respiratory infections in Pakistan: A systematic review	Not a SR
Chughtai & Khan 2019	Use of personal protective equipment to protect against respiratory infections in Pakistan: A systematic review	Year
Clase 2020	Cloth Masks May Prevent Transmission of COVID-19: An Evidence-Based, Risk-Based Approach	Not a SR
Conly 2020	Use of medical face masks versus particulate respirators as a component of personal protective equipment for health care workers in the context of the COVID-19 pandemic	Not a SR
Eberhart 2021	The impact of face masks on children - a mini review	Not a SR
Esposito 2020	Universal use of face masks for success against COVID-19: evidence and implications for prevention policies	Not a SR
Freedman & Wilder-Smith 2020	In-flight transmission of SARS-CoV-2: a review of the attack rates and available data on the efficacy of face masks	Not a SR

Reference	Title	Reason
Garcia 2020	Use of facemasks to limit COVID-19 transmission	Not a SR
Gómez-Ochoa & Muka 2020	Meta-analysis on facemask use in community settings to prevent respiratory infection transmission shows no effect	Not a SR
Greenhalgh 2020	Face masks for the public during the covid-19 crisis	Not a SR
Griswold 2020	Personal protective equipment for reducing the risk of COVID-19 infection among healthcare workers involved in emergency trauma surgery during the pandemic: an umbrella review	Not a SR
Harouni & Fallahi-Khoshknab 2020	Comparing of Surgical Masks and N95 Masks in Prevention of Influenza: A systematic Review	Language
Hemmer 2021	Protection from COVID-19: The Efficacy of Face Masks	Language
Howard 2020	An evidence review of face masks against COVID-19	Not a SR
Isaacs 2020	Do facemasks protect against COVID-19?	Not a SR
Javid 2020	Covid-19: should the public wear face masks?	Not a SR
Lazzarino 2020	Covid-19: Important potential side effects of wearing face masks that we should bear in mind	Not a SR
Licina 2020	Use of powered air-purifying respirator (PAPR) by healthcare workers for preventing highly infectious viral diseases-a systematic review of evidence	Not a SR
Liu & Zhang 2020	COVID-19: Face masks and human-to-human transmission	Not a SR
Mahase 2020	Covid-19: Are cloth masks still effective? And other questions answered	Not a SR
Marasinghe 2020 PREPRINT	A systematic review investigating the effectiveness of face mask use in limiting the spread of COVID-19 among medically not diagnosed individuals: shedding light on current recommendations provided to individuals not medically diagnosed with COVID-19	Duplicate (Preprint)
Marchand & Argáez 2020	Masks for Prevention of Influenza Transmission in Acute and Long-Term Care Settings: A Review of Clinical Effectiveness, Cost-Effectiveness and Guidelines	Not a SR
Matuschek 2020	Face masks: benefits and risks during the COVID-19 crisis	Not a SR
Mills 2020	Face masks and coverings for the general public: Behavioural knowledge, effectiveness of cloth coverings and public messaging	Not a SR
Nannyonga 2020	Estimating the Effect and Cost-Effectiveness of Facemasks in Reducing the Spread of the Severe Acute Respiratory Syndrome-Coronavirus 2 (SARS-CoV-2) in Uganda	Not a SR
Naveenaa 2020	Face mask healthy or unhealthy- A review	Not a SR
Nir-Paz 2020	Absence of in-flight transmission of SARS-CoV-2 likely due to use of face masks on board	Not a SR
Parreira 2020	Personal protective masks for COVID-19 prevention: quick systematic review	Language
Pullangott 2021	A comprehensive review on antimicrobial face masks: an emerging weapon in fighting pandemics	Not a SR
Rizki & Kurniawan 2020	Efficacy of Cloth Face Mask in Reducing COVID-19 Transmission: A Literature Review	Irrelevant PICO
Roberge & Roberge 2020	Cloth Face Coverings for Use as Facemasks During the Coronavirus (SARS-CoV-2) Pandemic: What Science and Experience Have Taught Us	Not a SR
Sergi & Leung 2020	The facemask in public and healthcare workers: a need, not a belief	Not a SR
Stern 2020	Rapid review of the use of community-wide surgical masks and acute respiratory infections	Language
Stone 2020	Facemasks and the Covid 19 pandemic: What advice should health professionals be giving the general public about the wearing of facemasks?	Not a SR
Sunjaya & Jenkins 2020	Rationale for universal face masks in public against COVID-19	Not a SR
Szarpak 2020	Cloth masks versus medical masks for COVID-19 protection	Not a SR
Tam 2020	Examining the Evidence: N95 respirators vs surgical masks to prevent transmission of respiratory tract infections to staff in primary care	Not a SR
Ueki 2020	Effectiveness of Face Masks in Preventing Airborne Transmission of SARS-CoV-2	Not a SR
Vestrheim 2020	Should individuals in the community without respiratory symptoms wear facemasks to reduce the spread of Covid-19? – Update 1	Not a SR
Zhang 2020	The role of isolation rooms, facemasks and intensified hand hygiene in the prevention of nosocomial COVID-19 transmission in a pulmonary clinical setting	Not a SR

PICO= Poulation, Intervention, Comparison, Outcome, **SR**= systematic review

Table 3. Excluded systematic reviews, first round of quality assessment (17 references)

Reference	Title	Reason
Abborah-Offei 2021	A rapid review of the use of face mask in preventing the spread of COVID-19	No RoB
Chaabna 2021	Facemask use in community settings to prevent respiratory infection transmission: a rapid review and meta-analysis	No RoB
Daoud 2021	The Potential for Cloth Masks to Protect Health Care Clinicians From SARS-CoV-2: A Rapid Review	No RoB
De Angelis 2020	Hand hygiene and facemask use to prevent droplet transmitted viral diseases during air travel: a systematic literature review	No RoB
Dehaghi 2020	Face masks vs. COVID-19: a systematic review	No RoB
Gupta 2020	The use of facemasks by the general population to prevent transmission of Covid 19 infection: A systematic review	No RoB
Jain 2020	Efficacy and Use of Cloth Masks: A Scoping Review	No RoB
Juneau 2020	Evidence-Based, Cost-Effective Interventions To Suppress The COVID-19 Pandemic: A Systematic Review	No RoB
MacIntyre & Chughtai 2020	A rapid systematic review of the efficacy of face masks and respirators against coronaviruses and other respiratory transmissible viruses for the community, healthcare workers and sick patients	No RoB
Marasinghe 2020	Face mask use among individuals who are not medically diagnosed with COVID-19: A lack of evidence for and against and implications around early public health recommendations	No RoB
Mostafaei 2020	Can Wearing a Face Mask Protect from COVID-19? A Systematic Review	No RoB
Perski 2020	Face masks to prevent community transmission of viral respiratory infections: A rapid evidence review using Bayesian analysis	Inaccurate search
Sharma & Kant 2020	Who should use a face mask during COVID-19 pandemic? An evidence-based review	No RoB
Silva 2020	Cloth masks as respiratory protections in the COVID-19 pandemic period: evidence gaps	No RoB
Taminato 2020	Homemade cloth face masks as a barrier against respiratory droplets - systematic review	No RoB
Wei 2020	Facemasks prevent influenza-like illness: implications for COVID-19	No search terms
Xiao 2020	Nonpharmaceutical Measures for Pandemic Influenza in Nonhealthcare Settings-Personal Protective and Environmental Measures	No RoB

RoB= risk of bias

Appendix 3. AMSTAR 2

<<Back to text

Items in AMSTAR

1	Did the research questions and inclusion criteria for the review include the components of PICO?
2	Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?
3	Did the review authors explain their selection of the study designs for inclusion in the review?
4	Did the review authors use a comprehensive literature search strategy?
5	Did the review authors perform study selection in duplicate
6	Did the review authors perform data extraction in duplicate?
7	Did the review authors provide a list of excluded studies and justify the exclusions?
8	Did the review authors describe the included studies in adequate detail?
9	Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?
10	Did the review authors report on the sources of funding for the studies included in the review?
11	If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?
12	If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?
13	Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?
14	Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?
15	If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?
16	Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?

Scores in AMSTAR

High - Zero or one non-critical weakness: The systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest

Moderate - More than one non-critical weakness*: The systematic review has more than one weakness, but no critical flaws. It may provide an accurate summary of the results of the available studies that were included in the review.

Low - One critical flaw with or without non-critical weaknesses: The review has a critical flaw and may not provide an accurate and comprehensive summary of the available studies that address the question of interest.

Critically low - More than one critical flaw with or without non-critical weaknesses: The review has more than one critical flaw and should not be relied on to provide an accurate and comprehensive summary of the available studies.

Published by the Norwegian Institute of Public Health
April 2021
P.O.B 4404 Nydalen
NO-0403 Oslo
Phone: + 47-21 07 70 00
The report can be downloaded as pdf
at www.fhi.no/en/publ/