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memo

COVID-19-EPIDEMIC :

# Should healthcare personnel in nursing homes without respiratory symptoms wear facemasks for primary prevention of COVID-19? – a rapid review

**Title** Should healthcare personnel in nursing homes without respiratory symptoms wear facemasks for primary prevention of COVID-19?

**Institution** Folkehelseinstituttet / Norwegian Institute of Public Health

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# Key messages

Internationally, there are conflicting recommendations regarding the use of facemasks by asymptomatic personnel in long-term care facilities for primary prevention (when no cases have yet been identified) of COVID-19 infection.

Nursing home residents are particularly vulnerable to serious COVID-19. Up until 10 May 2020, 138 COVID-19 related deaths have been reported in nursing homes and other healthcare facilities other than hospitals, accounting for 59% of all COVID-19 related deaths in Norway. However, there have been relatively few notifications of COVID-19 outbreaks in nursing homes in Norway, and the number of outbreaks appear to have declined since week 14 without the use of facemasks by healthcare personnel for primary prevention.

An Evidence to Decision (EtD) framework was used to guide the process from reviewing the evidence to a recommendation. An evidence base was made by a structured literature review using the L·OVE COVID-19 database and a living COVID-19 evidence map as data sources. Relevant ongoing reviews and studies were searched for in PROSPERO, the list of COVID-19 trials in the International Clinical Trials Registry Platform (ICTRP) (updated 12 May 2020) and ClinicalTrials.gov COVID-19 list. Additional articles were identified by checking the references in retrieved articles and personal contacts.

There is no direct evidence of the effects of healthcare personnel in nursing homes wearing facemasks for primary prevention (when no cases have yet been identified) of COVID-19 and no directly relevant trials are currently registered in the International Clinical Trials Registry Platform (ICTRP) or ClinicalTrials.gov. There is limited evidence of the effect of widespread use of facemasks in community settings on COVID-19 infection rates. This evidence comes from observational studies on group level which have a high risk of bias.

A systematic review of facemasks and similar barriers to prevent respiratory illness such as COVID-19 did not find any studies in nursing homes or other long-term care facilities.

There is substantial variation in the study populations, the interventions, the outcome measures, the study designs, and the estimated effects of wearing facemasks for primary prevention of respiratory illness. Effect estimates vary based on study design and exposure setting. Across three randomised trials, wearing a facemask reduced the odds of developing influenza-like illness/respiratory symptoms by around 6% (OR 0.94, 95% CI 0.75 to 1.19, $I^2$ 29%, low certainty evidence).

Evidence from laboratory filtration studies suggests that non-medical facemasks may reduce the transmission of larger respiratory droplets. There is little evidence regarding transmission of small aerosolized particulates of the size potentially exhaled by asymptomatic or presymptomatic individuals with COVID-19. Key findings of relevant laboratory studies provide some information about the potential effectiveness of facemasks for preventing COVID-19 infections. However, they do not provide evidence of the actual effects of facemask use.

An expert panel discussed and assessed the background and evidence using a defined set of criteria. The assessments for each criterion were judged in a consensus process and the overall recommendation and report were reviewed by the panel.

## Conclusion

Despite taking into consideration the seriousness of the threat (59% of all registered COVID-19 related deaths in Norway has occurred in nursing homes), in the current epidemiological situation there is little scientific evidence to support recommending that healthcare personnel in nursing homes wear facemasks for primary prevention (when no cases were yet been identified) of COVID-19. If the epidemiological situation worsens substantially in the general population in a particular geographical area or in nearby nursing homes, one may reconsider the recommendation as a precautionary measure despite the lack of evidence.

If facemasks are to be worn for primary prevention in a worsened epidemiological situation, only quality-controlled medical facemasks can be recommended. National priorities for the use of personal protective equipment may apply given existing shortages. This has not been taken into consideration in this review.

Evidence of the effects of non-medical facemasks is still less certain than for medical facemasks, but they are likely to be less effective. We do not recommend the use of non-medical facemasks for primary prevention of COVID-19 in nursing homes. Respirators (N95, FFP2 or FFP3) are intended for protecting the user in high-risk settings. They have no role in primary prevention and should not be used for this purpose.

# Hovedbudskap

Internasjonalt er det motstridende anbefalinger vedrørende bruk av ansiktsmasker hos asymptomatisk personell i sykehjem for primærforebygging (når det ikke er påvist tilfeller) av covid-19-infeksjon.

Sykehjemsbeboere er spesielt utsatt for alvorlige covid-19. Frem til 10. mai 2020 er 138 covid-19-relaterte dødsfall rapportert på sykehjem og andre helseinstitusjoner utenom sykehus, og disse utgjør 59% av alle covid-19-relaterte dødsfall i Norge. Imidlertid har det vært relativt få varsler om covid-19-utbrudd i sykehjem i Norge, og antallet utbrudd ser ut til å ha avtatt etter uke 14 uten at helsepersonell har brukt ansiktsmasker til primær forebygging.

Et «Evidence to Decision» (EtD) rammeverk ble brukt for å gjennomgå kunnskapen fram til en anbefaling. En kunnskapsbase ble utarbeidet basert på en strukturert litteraturgjennomgang av «L OVE COVID-19-databasen» og et oppdatert covid-19 kunnskapskart som datakilder. Det ble søkt etter aktuelle pågående gjennomganger og studier i PROSPERO, listen over covid-19-studier i International Clinical Trials Registry Platform (ICTRP) (oppdatert 12. mai 2020) og ClinicalTrials.gov covid-19-listen. Ytterligere artikler ble identifisert ved å sjekke referansene i identifiserte artikler og ved personlige kontakter.

Det finnes ikke direkte evidens for effekten av bruk av ansiktsmasker hos helsepersonell i sykehjem for primærforebygging (når det ikke er påvist tilfeller) av covid-19, og det er foreløpig ikke registrert noen direkte relevante studier i International Clinical Trials Registry Platform (ICTRP) eller ClinicalTrials.gov. Det er begrenset evidens for effekten på covid-19-infeksjonsrater ved generell bruk av ansiktsmasker i samfunnet. Denne evidensen kommer fra observasjonsstudier av grupper og har høy risiko for bias.

Ved en systematisk gjennomgang av artikler om ansiktsmasker og lignende barrierer for å forebygge luftveissykdom som covid-19 ble det ikke funnet studier gjennomført på sykehjem eller andre langtidsinstitusjoner.

Det er betydelig variasjon i studiepopulasjonene, intervensjonene, resultatmålingene, studiedesign og de beregnede effektene av å bruke ansiktsmasker for primærforebygging av luftveissykdom. Effektestimater varierer basert på studiedesign og eksponeringsmåte. En sammenstilling av tre randomiserte studier viste reduksjon i odds for å utvikle influensalignende sykdommer/luftveissymptomer med rundt 6% (OR 0,94, 95% KI 0,75 til 1,19, I2 29%, lavgradig sikkerhet av evidensen).

Evidens fra laboratoriebaserte filtreringsstudier tyder på at ikke-medisinske ansiktsmasker kan redusere overføringen av større luftveisdråper. Det er lite evidens vedrørende overføring av små aerosoliserte partikler av en størrelse som potensielt kan utåndes av asymptomatisk eller presymptomatiske individer med covid-19. Hovedfunn fra relevante laboratorieundersøkelser gir noe informasjon om den potensielle effektiviteten til ansiktsmasker til å forebygge covid-19-infeksjoner. Disse undersøkelsene gir imidlertid ikke sikker evidens den faktiske effekten av bruk av ansiktsmaske.

Et ekspertpanel diskuterte og vurderte bakgrunn og bevis ved bruk av et definert sett med kriterier. Evalueringene for hvert kriterium ble bedømt i en konsensusprosess, og den samlede anbefalingen og rapporten ble gjennomgått av panelet.

## Konklusjon

Til tross for hvor alvorlig trusselen er (59% av alle registrerte covid-19-relaterte dødsfall i Norge har skjedd på sykehjem), er det i den nåværende epidemiologiske situasjonen lite vitenskapelig evidens for å anbefale at helsepersonell på sykehjem bruker ansiktsmasker for primærforebygging (når det ikke er påvist tilfeller) av covid-19. Dersom den epidemiologiske situasjonen forverres betydelig grad, enten i befolkningen i et bestemt geografisk område eller i nærliggende sykehjem, kan man vurdere å anbefale ansiktsmasker på nytt, til tross for mangel på bevis.

Hvis det besluttes at ansiktsmasker skal brukes for primærforebygging i en forverret epidemiologisk situasjon, anbefales kun kvalitetskontrollerte medisinske munnbind. I en mangelsituasjon kan nasjonale prioriteringer for bruk av personlig beskyttelsesutstyr, spille inn i beslutningen. Dette er ikke vurdert i denne gjennomgangen.

Evidens for effekten av ikke-medisinske ansiktsmasker er fortsatt mindre sikker enn for medisinske ansiktsmasker, men de vil sannsynligvis være mindre effektive. Vi anbefaler derfor ikke bruk av ikke-medisinske ansiktsmasker for primærforebygging av covid-19 på sykehjem. Åndedrettsvern (N95, FFP2 eller FFP3) er til bruk for å beskytte brukeren i høyrisikosituasjoner. De har ingen rolle i primærforebygging og bør ikke brukes til dette formålet.

# Contents

# Problem statement

Nationally and internationally, most countries have clear recommendations for infection prevention and control in health care institutions, including standard precautions and when there are suspected and confirmed patients or residents with communicable diseases in the institution. However, there are conflicting recommendations regarding the use of face-masks by asymptomatic personnel in long-term care facilities for primary prevention (when no cases have yet been identified) of COVID-19 infection.

We have been asked to review the scientific evidence. Using an Evidence to Decision (EtD) framework, a panel at the Norwegian Institute of Public Health (NIPH) developed recommendations answering the question “Should healthcare personnel in nursing homes without respiratory symptoms wear facemasks for primary prevention of COVID-19?”

Screening of research evidence and monitoring of the situation in Norway is ongoing. The EtD framework will be updated and the recommendations reviewed (and revised, if indicated) when new research becomes available, or if the situation in Norway changes.

# Method

## Process overview

We used an Evidence to Decision (EtD) framework to guide the process from reviewing the evidence to a recommendation. EtD frameworks are used to help making healthcare recommendations or decisions by moving from evidence to decisions in a structured way (https://ietd.epistemonikos.org/#/about/introduction)[1,2]. The process ensures that pros and cons and important criteria for decisions are considered. Following this process also makes the decision process transparent. EtD frameworks also make it possible for people to understand the basis for the recommendations.

The process included gathering, reviewing and selecting evidence and data, discussion and assessment by an expert panel following a defined set of criteria. The assessments provided a basis for a conclusion and recommendation.

## Search strategy

This EtD framework and a second framework (regarding the use of facemasks by asymptomatic individuals in the community) were developed rapidly, due to the urgency of the questions. Final decisions about the content of the EtD framework were made by the panel responsible for the recommendations. Screening of research evidence and monitoring of the situation in Norway is ongoing. The EtD framework will be updated and the recommendations reviewed (and revised, if indicated) when new research becomes available or the situation in Norway changes.

All articles coded as "Treatment or prevention, Coronavirus infection, and Masks" in the L·OVE COVID-19 database[3] were screened. This database includes systematic reviews and studies, published or ongoing, of any design identified using multiple search strategies (https://app.iloveevidence.com/covid-19).[4] At the time of the most recent search (13 May 2020), over 100,000 records have been processed for inclusion in this database.

All articles coded as "Infection prevention and control, Infection prevention and control policies, Physical barriers, Use of masks" in the NIPH COVID-19 evidence map were screened.[5] The evidence map includes systematic reviews and studies identified by screening literature searches that are conducted daily or every other day in PubMed and supplemented by regular updates with material retrieved by searches performed by organizations such as WHO, CDC and others.[6] At the time of the most recent search (13 May 2020), 15,404 references had been screened and the map contained 1,779 publications.

PROSPERO[7] was searched (13 May 2020) for systematic reviews in progress using the COVID-19 filter and "masks". The list of COVID-19 trials in the International Clinical Trials

Registry Platform (ICTRP) (updated 12 May 2020)[8] and ClinicalTrials.gov COVID-19 list of registered studies (13 May 2020)[9] were searched for studies in progress using "masks".

Additional articles were identified by checking the references in retrieved articles and through personal contacts.

## Selection criteria

Below we describe how we included relevant research evidence for each criterion in the EtD framework. References that described important considerations that may not have been addressed by available research evidence were included under "Additional considerations".

### Priority of the problem

Any research, including modelling studies, of COVID-19 infection rates in Norway, outbreaks in nursing homes in Norway, or the availability of cloth, medical or N95 facemasks.

Information about infection rates and outbreaks in nursing homes from NIPH weekly reports is included under "Additional considerations".

### Effects of using facemasks or advice to use facemasks

### a) Direct evidence

Any randomised or non-randomised study that estimated the effect on COVID-19 infections or any other important outcome for any kind of facemask used by asymptomatic individuals in the community or by asymptomatic people working in long-term care facilities. The inclusion criteria were:

- P: People potentially exposed to COVID-19
- I: Use of or advice to use any kind of facemask
- C: non-use of facemasks, no advice to use facemasks, or use of a different kind of facemask
- O: any important outcome
- Study design: any quantitative, comparative study design

### b) Systematic reviews of randomised and non-randomised studies of the effects of facemasks to reduce the spread of respiratory infections

Any systematic review that directly addressed the effects of using facemasks or advice to use facemasks for primary prevention (when no cases have yet been identified) of respiratory infections. The following criteria were used to select the primary systematic review summarised in the EtD: comprehensiveness, inclusion of both randomised and non-randomised studies, sensible grouping of studies in meta-analyses and forest plots, assessments of the risk of bias, and a Summary of Findings with assessments of the certainty of the evidence using GRADE[10] or a similar explicit approach. Other systematic reviews that did not meet the inclusion criteria were used to supplement the findings of the primary systematic review.

### c) Systematic reviews comparing different types of facemasks

Any systematic review of randomised or non-randomised studies comparing the effectiveness of different types of facemasks for preventing respiratory infections, randomised trials not included in a systematic review, and any randomised or non-randomised study comparing the use of different types of facemasks for COVID-19.

### d) Laboratory studies

Systematic reviews of laboratory studies of the filtering effects of different types of facemasks for respiratory infections, any laboratory study of the filtering effects of different types of masks for COVID-19 not included in a systematic review, and laboratory studies of different types of masks for other respiratory infections that were considered relevant for COVID-19.

### Values

Any research that measured how people value the potential benefits and harms of facemasks or advice about facemasks.

### Resources required

Any research that estimated the potential costs and savings of the use of any type of facemask by asymptomatic individuals in the community or by asymptomatic people working in long-term care facilities.

### Cost-effectiveness

Any cost-effectiveness analysis that used a transparent model, a plausible range of values, and sensitivity analyses that address the uncertainties in the estimates and assumptions that were used in the model.

### Equity

Any research that addressed impacts or potential impacts of facemask use on equity.

### Acceptability

Any research that investigated the acceptability of facemask usage or recommendations for using facemasks.

### Feasibility

Any research that investigated the feasibility of implementing recommendations to use facemasks.

## Data collection

Judgements about which articles to include and what information to include in the draft EtD frameworks were made by AO, who applied criteria described above, summarised key findings from included research, and identified additional considerations noted in the literature that was reviewed.

Assessments of the risk of bias and the certainty of the evidence were based on the judgements of authors of included systematic reviews, whenever possible. The risk of bias of the primary systematic review used to inform judgements about the effects of facemasks was assessed by ED using ROBIS (Table S1).[11]

## Panel discussion and judgement

The final content of the EtD framework was determined by the expert panel. The panel consisted of six co-workers with the Division of infectious disease control at NIPH (Senior Advisor Torunn Alberg, Senior Medical Officer Tone Bruun, Senior Advisor Mette Fagernes, Senior Medical Officer Siri Feruglio, Specialty Director Frode Forland, and Senior Medical Officer Bjørn Iversen). The evidence and additional considerations were presented to the panel, followed by a discussion and judgments for each assessment criteria. A summary of the discussion was entered in the iEtD framework. The panel agreed on a consensus for assessment of all the criteria for each of the questions. For purposes of training, the group also tried the voting function in the iEtD. However, this was done only as a supplement to the consensus.

The assessment criteria that were judged by the panel were those included in the framework for health system and public health recommendations:

- Problem
- Effects;
    - Desirable effects
    - Undesirable effects
    - Certainty of the evidence
    - Values
    - Balance of effects
- Resources, including
    - Resources required
    - Certainty of evidence of required resources
    - Cost-effectiveness
- Equity
- Acceptability
- Feasibility

A summary of the panel discussions is included under Results. The panel reviewed the report before publication.

# Results

As of 13 May 2020, 24,748 articles about COVID-19 were screened for the L·OVE COVID-19 database and 4043 were selected as relevant for decision-making, including 391 systematic reviews, 3652 primary studies (including 551 randomised trials). 3163 articles did not report data yet (e.g. ongoing trials). 138 articles were identified as relevant for masks for coronavirus infection, including 19 systematic reviews and 118 primary studies (including 9 randomised trials).

The NIPH COVID-19 evidence map included 24 references, including nine systematic reviews, four non-systematic reviews, ten studies (including models), and one article that reported a study and a non-systematic review.

PROSPERO included 885 records using the COVID-19 filter of which 88 included the word "masks". Thirty-nine of those were registered in 2020 and were screened. Only two records in the list of COVID-19 trials in the International Clinical Trials Registry Platform (ICTRP) included the word "masks". Sixty-two records in the ClinicalTrials.gov COVID-19 list of registered studies included the word "masks".

Judgements about the eligibility of the articles that were screened for the draft EtD frameworks are summarised in a flow diagram (Supplement Figure 1). A total of 264 records were screened after duplicates were removed. Forty-nine articles were included, of which 16 were records for systematic reviews in progress and two were records for randomised trials in progress. Two models were found that could inform judgements about the priority of the problem.[12, 13]

One systematic review was used as the primary systematic review for effects for the EtD framework.[14] This was the only review that included a GRADE Summary of Findings table and it appeared to be the most comprehensive and balanced of the systematic reviews that were found. Based on the ROBIS assessment, the systematic review was judged to have a low risk of bias (Supplement Table 1).

Seven other systematic reviews provided some supplementary information (Supplement Table 2). One randomised trial,[15] three non-randomised studies (Supplement Table 3), 11 laboratory studies (Supplement Table 4), and two models of the effects of masks[16, 17] were also included. Sixteen protocols for systematic reviews related to the effects of facemasks and two protocols for randomised trials were found (Supplement Table 5).

One protocol for a systematic review of the direct costs and socioeconomic costs relating to non-pharmaceutical interventions against infectious disease outbreaks was found.[18] One systematic review of economic evaluations was included.[19] Two qualitative evidence syntheses[20, 21] and one study[22] of barriers and facilitators were found. No research addressing

how people value the potential benefits and harms of using facemasks or impacts on equity were found.

Twenty-two full-text articles that were not included (some of which are referenced as background information or under additional considerations) are listed in Supplement Table 6.

## Direct evidence of the effects of facemasks on preventing COVID-19 infections

There is no direct evidence of the effects of healthcare personnel in nursing homes wearing facemasks for primary prevention (when no cases have yet been identified) of COVID-19 and no directly relevant trials are currently registered in the International Clinical Trials Registry Platform (ICTRP) or ClinicalTrials.gov.

There is limited evidence of the effect of widespread use of facemasks in community settings on COVID-19 infection rates. This evidence comes from ecological studies, summarised in Supplement Table 3. These studies have a high risk of bias.

## Evidence of the effects of facemasks on preventing other respiratory infections

A rapid systematic review of facemasks and similar barriers to prevent respiratory illness such as COVID-19 did not find any studies in nursing homes or other long-term care facilities[14]. Trials of health personnel wearing masks in health facilities have focused on preventing respiratory infections in health workers, not infections in patients, and have focused on using masks when caring for infected patients, not on wearing masks all the time while in facilities without known infected cases.

There is substantial variation in the study populations, the interventions, the outcome measures, the study designs, and the estimated effects of wearing facemasks for primary prevention of respiratory illness. Effect estimates vary based on study design and exposure setting (Supplement figure 2 and 3)[14].

A systematic review of medical facemasks compared to N95 facemasks for preventing COVID-19 in healthcare workers found low certainty evidence that medical facemasks and N95 facemask offer similar protection against viral respiratory infection including coronavirus in healthcare workers during non-aerosol-generating care[23].

There is limited evidence from randomised or non-randomised studies of the effects of non-medical facemasks on preventing respiratory infections[24]. One cluster-randomised trial of cloth facemasks compared with medical facemasks in hospital healthcare workers found higher rates of influenza-like illness and laboratory-confirmed virus when cloth facemasks were used compared to medical facemasks or normal practice (which may or may not have included wearing a facemask) [25].

## Evidence from laboratory studies

Evidence from laboratory filtration studies suggests that non-medical facemasks may reduce the transmission of larger respiratory droplets. There is little evidence regarding transmission of small aerosolized particulates of the size potentially exhaled by asymptomatic or presymptomatic individuals with COVID-19[26]. Key findings of relevant laboratory studies are

summarised in Supplement Table 4. These studies provide some information about the potential effectiveness of facemasks for preventing COVID-19 infections. They do not provide evidence of the actual effects of facemask use.

## Additional considerations

### Impact of the construction of non-medical facemasks

A study of how well different fabrics (woven, woven brushed, knitted, knitted brushed, knitted pile) and materials (cotton, polyester, polypropylene, silk) found wide variation in filtration efficiency (ability to stop particles) [26]. Fabrics with greater breathing resistance had higher filtration efficiency. However, facemasks with greater breathing resistance are more difficult for users to wear consistently, which could reduce their effectiveness. Fit of facemasks may also be important since particles can escape through creases and gaps between the mask and face.

### Impact of reusing non-medical facemasks

Cloth facemasks may need to be washed or decontaminated between uses. Various decontaminated methods have been documented, for example, autoclave, isopropyl alcohol, bleach, hydrogen per oxide, microwave, soap and water, ultraviolet radiation, and dry heat. While, the material of cloth facemasks is unlikely to degrade with standard means of disinfection (e.g., chemicals, heat, and radiation), unlike other types of disposable facemasks or respirators, there is little evidence about the effectiveness of these decontamination methods[24].

### Impact of correct use of facemasks

The effectiveness of facemasks depends on their being used correctly. Even if a facemask has a high filtration efficiency and fits well, its effectiveness depends on how well individuals put it on and keep it in place. Moisture saturation is inevitable with fabrics available in most homes. Moreover, moisture can trap virus and become a potential contamination source for others, after a mask is removed[26].

### Potential adverse effects of using facemasks

Use of facemasks by nursing home personnel may cause problems in communication, and increase disorientation and anxiety in nursing home patients. Other potential adverse effects of using facemasks include[27]:

- self-contamination by touching and reusing contaminated facemasks
- breathing difficulties
- a false sense of security, leading to less adherence to physical distancing and hand washing
- a shortage of facemasks for healthcare workers

Potential adverse effects of using N95 facemasks, particularly with frequent and prolonged use, include respiratory fatigue, increased work of breathing, poor work capability, increased nasal resistance, fatigue with minimal workloads, elevated levels of carbon dioxide, facial dermatitis, acne, potential self-contamination events[28], and headaches[29].

## Panel discussion and judgment

When assessing the criteria in the EtD framework, the panel considered both the evidence and additional data. The panel also discussed each of the criteria before reaching a consensus.

The consensus judgements following the panel discussions are summarised in tables 1 to 4.

**Table 1. Panel consensus on N95 facemasks or advice to wear N95 facemasks**

| | Favours N95 facemasks | Probably favours N95 facemasks | Neither favours N95 facemasks or other options | Probably does not favour N95 facemasks | Does not favour N95 facemasks |
|---|---|---|---|---|---|
| Problem | | | | | ✔ |
| Desirable effects | | | | ✔ | |
| Undesirable effects | | | | | ✔ |
| Certainty of the evidence | | | | | ✔ |
| Values | | | | ✔ | |
| Balance of effects | | | | | ✔ |
| Resources required | | | | | ✔ |
| Certainty of evidence of required resources | | | ✔ | | |
| Cost-effectiveness | | | | | ✔ |
| Equity | | | | | ✔ |
| Acceptability | | | | | ✔ |
| Feasibility | | | | | ✔ |

**Table 2. Panel consensus on Medical facemasks or advice to wear medical facemasks**

| | Favours medical facemasks | Probably favours medical facemasks | Neither favours medical facemasks or other options | Probably does not favour medical facemasks | Does not favour medical facemasks |
|---|---|---|---|---|---|
| Problem | | | | ✔ | |
| Desirable effects | | ✔ | | | |
| Undesirable effects | | | | ✔ | |
| Certainty of the evidence | | ✔ | | | |
| Values | | ✔ | | | |
| Balance of effects | | | | ✔ | |
| Resources required | | | | ✔ | |
| Certainty of evidence of required resources | | | ✔ | | |
| Cost-effectiveness | | | | ✔ | |
| Equity | | | ✔ | | |
| Acceptability | | ✔ | | | |
| Feasibility | | | | ✔ | |

**Table 3. Panel consensus on Non-medical facemasks or advice to wear non-medical facemasks**

| | Favours-non-medical facemasks | Probably favours non-medical facemasks | Neither favours non-medical facemasks or other options | Probably does not favour non-medical facemasks | Does not favour non-medical facemasks |
|---|---|---|---|---|---|
| Problem | | | | ✔ | |
| Desirable effects | | | ✔ | | |
| Undesirable effects | | | | ✔ | |
| Certainty of the evidence | | | ✔ | | |
| Values | | | ✔ | | |
| Balance of effects | | | | ✔ | |
| Resources required | | | | ✔ | |
| Certainty of evidence of required resources | | | ✔ | | |
| Cost-effectiveness | | | ✔ | | |
| Equity | | | ✔ | | |
| Acceptability | | | ✔ | | |
| Feasibility | | | | ✔ | |

**Table 4. Panel consensus on No facemasks or no advice to wear or not to wear facemasks**

| | Favours no face-masks | Probably favours no face-masks | Neither fa-vours no facemasks or other options | Probably does not favour no facemasks | Does not favour no facemasks |
|---|---|---|---|---|---|
| Problem | | ✔ | | | |
| Desirable effects | | | ✔ | | |
| Undesirable effects | | ✔ | | | |
| Certainty of the evi-dence | | ✔ | | | |
| Values | | | | ✔ | |
| Balance of effects | | ✔ | | | |
| Resources required | | ✔ | | | |
| Certainty of evi-dence of required resources | | | ✔ | | |
| Cost-effectiveness | | ✔ | | | |
| Equity | ✔ | | | | |
| Acceptability | | ✔ | | | |
| Feasibility | | ✔ | | | |

## Problem - Is the problem a priority?

Preventing spread of COVID-19 from asymptomatic and presymptomatic health care workers into nursing homes is a high priority. Since the beginning of the outbreak in Norway, several nursing homes have had outbreaks, and a high proportion of fatalities from COVID-19 have been reported in nursing homes. The panel considered the question 'Should healthcare personnel in nursing homes without respiratory symptoms wear facemasks for primary prevention of COVID-19?' for settings with no known cases in the nursing homes. Considering the evidence and knowledge at hand, the panel agreed that the problem at present favours not using facemasks. Specifically, the panel judged the problem to not favour use of N95 facemasks, and to probably not favour use of medical or non-medical facemasks.

The panel discussed how a change in incidence could influence these judgements. An increase in cases, either locally or nationally, should prompt a re-evaluation of the problem. The panel did not decide on a threshold, but increased incidence rates could lead to different judgements.

## Desirable effects - How substantial are the desirable anticipated effects?

There is evidence for a good filtration effect of N95 masks, superior to other masks. However, these masks are constructed to protect the user. Some are also provided with a valve, allowing expiration to bypass the filter. The N95 are uncomfortable for the user and cannot be used over longer time periods (several hours). There is no evidence for the protective

effect of these masks in nursing homes. The panel agreed that the desirable effects probably favours other options.

There is evidence for a protective effect of medical facemasks in community settings. Randomised trials from community settings indicate a small protective effect. Medical facemasks are likely to be acceptable by nursing home personnel, and correct use could be achieved. However, training would likely be needed. The panel agreed that the desirable effects of medical facemasks probably favour this option.

Non-medical facemasks include a variety of products. There is no reliable evidence of the effectiveness of non-medical facemasks in nursing homes. There is likely to be some variation in effectiveness between products. Due to the lack of evidence and knowledge, and the uncertainty of differences in effectiveness between products, the panel agreed that desirable effects did not favour use of non-medical masks, nor other options, i.e. a neutral judgement.

Given the low incidence of COVID-19 currently and the probably small or uncertain protective effects of the other options, the panel judged that the desirable effects did not favour using masks or other options compared to not using masks.

### Undesirable effects - How substantial are the undesirable anticipated effects?

The panel agreed that several undesirable effects of N95 facemasks makes this option unfavourable.

The undesirable effects of medical facemasks are mainly risk of incorrect use, false security (leading to relaxation of other interventions) and risk of contamination of masks. The panel considered these undesirable effects substantial in nursing homes without known COVID-19 cases and agreed that this probably favours other options. The panel did not take into consideration the shortage of medical facemasks.

There is a wide variety of non-medical facemasks. A major undesirable effect is the false security when using facemasks without documented effect on primary prevention. There is also a risk of incorrect use and problems with communication. The panel agreed that the undesirable effects of non-medical facemasks favour other options.

There are no undesirable effects of not using facemasks, other than a potential loss of protection against COVID-19 compared to the alternatives above. In nursing homes without known cases, taking into account the available evidence and additional considerations, the panel judged that the undesirable effects of the other options favours not using facemasks.

### Certainty of the evidence - What is the overall certainty of the evidence of effects?

The panel agreed that the evidence for the (superior) filtration effect of N95 masks is good, but there is no evidence for effect of primary prevention with widespread use in the community or in nursing homes. There is research evidence for undesirable effects. This favours other options.

There is low-certainty evidence for a protective effect of medical facemasks used in a community setting (from randomised trials). The evidence for undesirable effects is weaker. The certainty of evidence favours of this option.

The evidence for desirable effects of non-medical facemasks is weak. The range of different products, without standards for production, makes it difficult to get good evidence. The undesirable effects are also not well documented.

The effectiveness of the other options for primary prevention is uncertain compared to not using facemasks. At the same time, it is certain that the other options have some undesirable effects compared to not using facemasks. Given the low incidence of COVID-19 currently, the uncertainty of the evidence of the desirable effects of facemasks favours not using facemasks.

### Values – Is there important uncertainty about, or variability in, how much people value the main outcomes?

The values of both the target group for the intervention, i.e. personnel in nursing homes, and the beneficiaries of the interventions, primarily residents in nursing homes, with their family and friends, were considered.

The panel considered that personnel in nursing homes, would place a high value on limiting the spread of COVID-19 in nursing homes. However, the panel judged that personnel in nursing homes would place a high value on avoiding the undesirable effects of N95 masks. For the residents in nursing homes, it was also considered that they would value to limit spread of COVID-19 in the nursing home, although the consequences of wearing facemasks on communication, anxiety and well-being for the residents could shift the value of the intervention.

The panel otherwise judged that most people would place a much higher value on limiting the spread of COVID-19 in nursing homes than they would on the undesirable effects of using medical or non-medical facemasks. However, there is some uncertainty and potential variability in the value that people might place on the undesirable effects of using medical or non-medical facemasks.

### Balance of effects – Does the balance between desirable and undesirable effects favour the option or the comparison?

N95 facemasks have well-documented filtration effects. However, there is no evidence for desirable effects of using them for primary prevention in nursing homes and there is evidence of undesirable effects. The panel agreed that the balance of effects favours other options.

The available research evidence suggests a small desirable effect of using medical facemasks for primary prevention in nursing homes, but the undesirable effects are substantial. The panel judged that with the current low incidence of COVID-19 in Norway, the balance of effects neither favours using or not using medical facemasks.

The desirable effects of non-medical facemasks are uncertain, while the undesirable effects are likely. With the current low incidence of COVID-19 in Norway, the panel judged in favour of not using non-medical facemasks.

The panel judged in favour of not using facemasks for primary prevention in nursing homes, given the current low incidence of COVID-19 in Norway.

### Resources required – How large are the resource requirements (costs)?

The resources required are uncertain. However, in the present situation, resource use favours not using facemasks.

### Certainty of evidence of required resources – What is the certainty of the evidence of resource requirements (costs)?

This criterion did not favour any of the options.

### Cost-effectiveness – Does the cost-effectiveness of the option favour the option or the comparison?

Both the effects and the costs of facemasks are uncertain. However, N95 facemasks cost the most and may not be any more effective than the other options. Medical facemasks cost more than non-medical facemasks, but are likely to be more effective, and the effectiveness of using non-medical facemasks compared to not using facemasks is uncertain.

### Equity – What would be the impact on health equity?

Residents in nursing homes are a vulnerable group for COVID-19. Preventive measures, if recommended, should be available and affordable for all nursing homes. In the present situation, the panel agreed that equity considerations favours not using facemasks, while neither favouring using or not using medical and non-medical facemasks, and not favouring N95 masks.

### Acceptability – Is the option acceptable to key stakeholders?

Stakeholders are likely to find using medical facemasks and not using facemasks acceptable options. Use of N95 masks is unlikely to be acceptable. The acceptability of non-medical facemasks is uncertain, give the range of different products and the uncertain effects.

### Feasibility – Is the option feasible to implement?

Use of N95 masks are not a feasible option, due to the undesirable effects.

Use of medical facemasks and non-medical facemasks requires training and follow-up. This probably favours not using facemasks under the current circumstances in Norway.

# Discussion and conclusion

The evidence that is included was based on a rapid systematic review. Additional data were collected from national surveillance. The aim was not to perform a systematic literature review, but to provide sufficient evidence for decision making. A more detailed review process could have identified additional publications. However, for the purposes of this work, we believe that the most relevant publications were included.

The process of assessing the evidence with the EtD framework was done by an expert panel. The panel assessed the evidence base and made a judgement for each of the criterion in the framework. In this process, weaknesses in the data were identified and discussed.

The assessment was done by consensus, allowing each panel member to provide input to the judgement. The judgements are reported here, making the basis for our recommendation transparent.

The panel focused primarily on the priority of the problem and the effects of the options. The resource criteria were considered, but the evidence base was limited.

A limitation of the process is that all the panel members were employed by NIPH. We did not invite external panel members, mainly due to limited time. Involving external panel members could strengthen the process. It is uncertain whether this would have affected the recommendation.

## Conclusion

Despite taking into consideration the seriousness of the problem (59% of all registered COVID-19 related deaths in Norway has occurred in nursing homes), in the current epidemiological situation there is little scientific evidence to support a recommendation for healthcare personnel in nursing homes to wear facemasks for primary prevention (when no cases have yet been identified) of COVID-19. If the epidemiological situation worsens substantially in the general population in a particular geographical area or in nearby nursing homes, the use of facemasks as a precautionary measure should be reconsidered.

If facemasks are to be worn for primary prevention in a worsened epidemiological situation, only quality-controlled medical facemasks can be recommended. National priorities for the use of personal protective equipment may apply, given existing shortages. This has not been taken into consideration in this review.

Evidence of the effects of non-medical facemasks is still less certain than for medical facemasks, but they are likely to be less effective. We do not recommend the use of non-medical facemasks for primary prevention of COVID-19 in nursing homes. Respirators (N95, FFP2 or FFP3) are intended for protecting the user in high-risk settings. They have no role in primary prevention and should not be used for this purpose.

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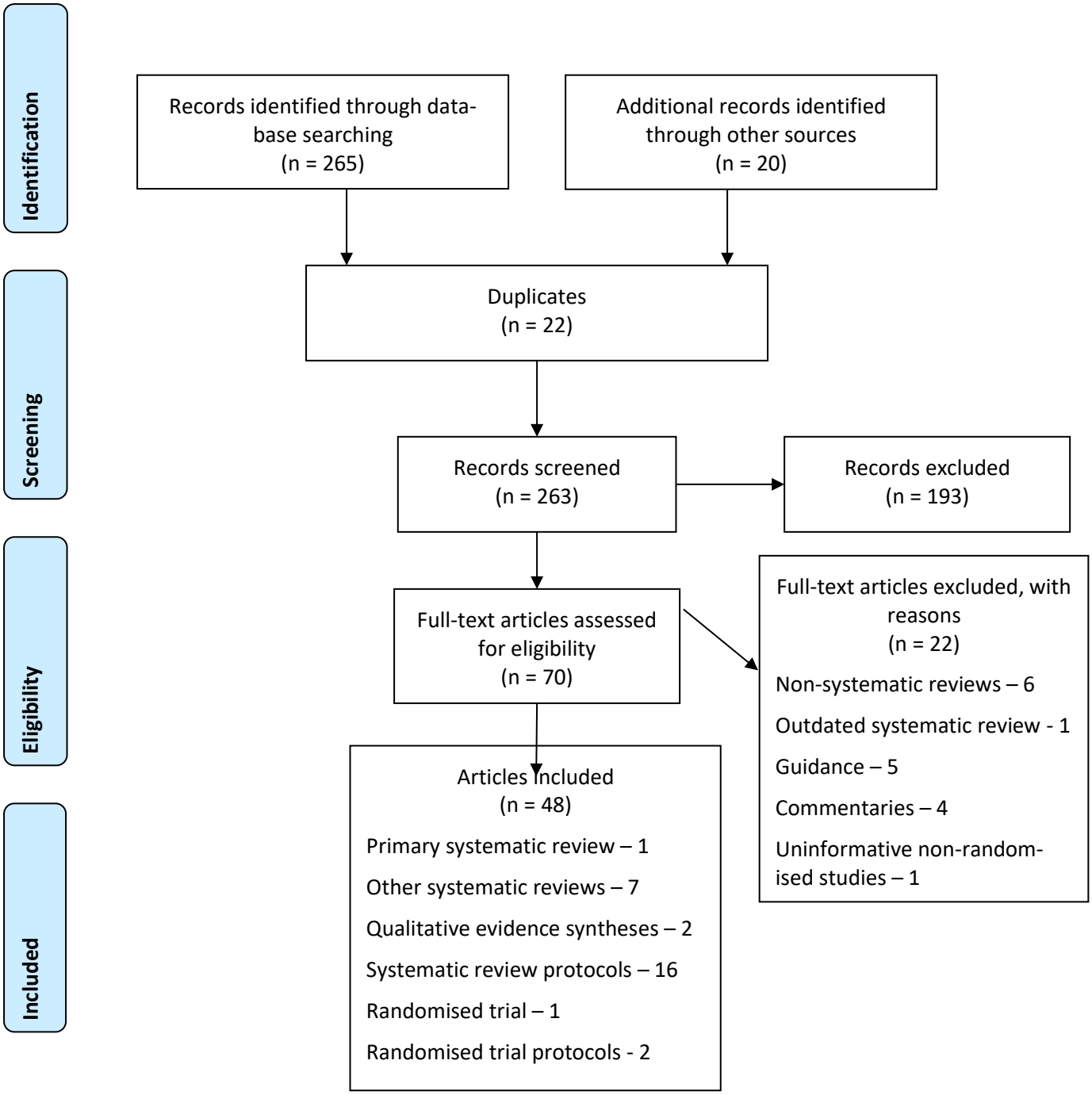
# Supplementary tables and figures

**Figure S1. Flow diagram**



## Table S1. ROBIS assessment of the primary systematic review for effects[9,12]

| Domain* | Judgement† | Comment |
|---|---|---|
| 1. Eligibility | **Low** | Urgency of question justifies potential lack of a protocol in a rapid review? |
| 1.1 | NI | No mention of protocol |
| 1.2 | Y | |
| 1.3 | Y | |
| 1.4 | Y | |
| 1.5 | Y | Not guidelines, discussion, regulations, debate, or commentary |
| 2. Identification and selection | **Low** | |
| 2.1 | Y | SCOPUS; EMBASE and Medline via OVID |
| 2.2 | Y | Two previous relevant reviews were used to find exemplar studies. Search strategy designed to find those studies and similar research. |
| 2.3 | Y | |
| 2.4 | Y | Studies published in English since January 1980 |
| 2.5 | PY | The full text of each article that passed screening was retrieved and eligibility verified as part of data extraction (see 3) |
| 3. Data collection and study appraisal | **Unclear** | Cochrane Rapid Reviews. Interim Guidance 2020 states that rapid reviews should use independent risk of bias assessment. |
| 3.1 | PY | Reported in synthesis section. |
| 3.2 | Y | |
| 3.3 | Y | |
| 3.4 | Y | RCTs assessed by Cochrane Risk of bias tool. |
| 3.5 | N | Single reviewer "Risk of bias in included RCTs was assessed (by LH)", no info on verification by second author |
| 4. Synthesis | **Low** | |
| 4.1 | Y | Three RCTs provide evidence on effect of wearing a mask on respiratory infection. |
| 4.2 | NI | No mention of protocol |
| 4.3 | Y | |
| 4.4 | Y | |
| 4.5 | Y | Three RCTs with total 5183 participants |
| 4.6 | Y | Addressed in GRADE and shown in SoF tables. |

| | |
|---|---|
| 1 Eligibility | **Low** |
| 2 Study identification and selection | **Low** |

| | | |
|---|---|---|
| 3 Data collection and study appraisal | **Unclear** | Single reviewer assessment of risk of bias. |
| 4 Synthesis | **Low** | |

| | | |
|---|---|---|
| 5. RISK OF BIAS | **Low** | |
| 5.1 | PY | The interpretation of the results appears very balanced and risk of bias discussion seems reasonable. |
| 5.2 | Y | |
| 5.3 | Y | |

*The criteria used for each domain are as follows:

DOMAIN 1: STUDY ELIGIBILITY CRITERIA

1.1 Did the review adhere to pre-defined objectives and eligibility criteria?

1.2 Were the eligibility criteria appropriate for the review question?

1.3 Were eligibility criteria unambiguous?

1.4 Were any restrictions in eligibility criteria based on study characteristics appropriate (e.g. date, sample size, study quality, outcomes measured)?

1.5 Were any restrictions in eligibility criteria based on sources of information appropriate (e.g. publication status or format, language, availability of data)?

DOMAIN 2: IDENTIFICATION AND SELECTION OF STUDIES

2.1 Did the search include an appropriate range of databases/electronic sources for published and unpublished reports?

2.2 Were methods additional to database searching used to identify relevant reports?

2.3 Were the terms and structure of the search strategy likely to retrieve as many eligible studies as possible?

2.4 Were restrictions based on date, publication format, or language appropriate?

2.5 Were efforts made to minimise error in selection of studies?

DOMAIN 3: DATA COLLECTION AND STUDY APPRAISAL

3.1 Were efforts made to minimise error in data collection?

3.2 Were sufficient study characteristics available for both review authors and readers to be able to interpret the results?

3.3 Were all relevant study results collected for use in the synthesis?

3.4 Was risk of bias (or methodological quality) formally assessed using appropriate criteria?

3.5 Were efforts made to minimise error in risk of bias assessment?

DOMAIN 4: SYNTHESIS AND FINDINGS

Describe synthesis methods:

4.1 Did the synthesis include all studies that it should?

4.2 Were all pre-defined analyses reported or departures explained?

4.3 Was the synthesis appropriate given the nature and similarity in the research questions, study designs and outcomes across included studies?

4.4 Was between-study variation (heterogeneity) minimal or addressed in the synthesis?

4.5 Were the findings robust, e.g. as demonstrated through funnel plot or sensitivity analyses?

4.6 Were biases in primary studies minimal or addressed in the synthesis?

RISK OF BIAS IN THE REVIEW

Describe whether conclusions were supported by the evidence:

A Did the interpretation of findings address all of the concerns identified in Domains 1 to 4?

B Was the relevance of identified studies to the review's research question appropriately considered?

C Did the reviewers avoid emphasizing results on the basis of their statistical significance?

† The response options are:

Y = Yes

PY = Probably yes

PN = Probably no

N = No

NI = No information

**Table 2. Systematic reviews providing supplementary information**

| Reference | DOI |
|---|---|
| Bartoszko JJ, Farooqi MAM, AlhazzaniW, Loeb M. Medical Masks vs N95 Respirators for Preventing COVID-19 in Health Care Workers A Systematic Review and Meta-Analysis of Randomized Trials. Influenza Other Respir Viruses 2020. | https://dx.doi.org/10.1111/irv.12745 |
| Gupta M, Gupta K, Gupta S. The use of face-masks by the general population to prevent transmission of Covid 19 infection: A systematic review. medRxiv 2020. | https://doi.org/10.1101/2020.05.01.20087064 |
| Jefferson T, Jones M, Ansari LAA, et al. Physical interventions to interrupt or reduce the spread of respiratory viruses. Part 1 - Face masks, eye protection and person distancing: systematic review and meta-analysis. medRxiv 2020. | https://dx.doi.org/10.1101/2020.04.06.20054841 |
| MacIntyre CR, Chughtai AA. 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. Int J Nurs Stud 2020; NS103629. | https://doi.org/10.1016/j.ijnurstu.2020.103629 |
| Marasinghe KM. 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. Research Square 2020. | https://dx.doi.org/10.21203/rs.3.rs-16701/v3 |
| Stern D, López-Olmedo N, Pérez-Ferrer C, et al. [Rapid review of the use of community-wide surgical masks and acute respiratory infections]. Salud Publica Mex 2020. | https://dx.doi.org/10.21149/11379 |
| Zorko DJ, Gertsman S, O'Hearn K, et al. Decontamination interventions for the reuse of surgical mask personal protective equipment: a systematic review. OSF Preprints 2020. | https://doi.org/10.31219/osf.io/z7exu |

**Table S3. Non-randomised studies of the effects of using facemasks**

| Reference | DOI | Study design |
|---|---|---|
| Cheng VCC, Wong SC, Chuang VWM, et al. The role of community-wide wearing of face mask for control of coronavirus disease 2019 (COVID-19) epidemic due to SARS-CoV-2. J Infect. 2020; pii:S0163-4453(20)30235-8. | http://dx.doi.org/10.1016/j.jinf.2020.04.024 | Ecological (country comparison) |
| Hunter PR, Colon-Gonzalez F, Brainard JS, Rushton S. Impact of non-pharmaceutical interventions against COVID-19 in Europe: a quasi-experimental study. medRxiv 2020. | http://dx.doi.org/10.1101/2020.05.01.20088260 | Ecological (country comparison) |
| Kenyon C. Widespread use of face masks in public may slow the spread of SARS CoV-2: an ecological study. medRxiv 2020. | http://dx.doi.org/10.1101/2020.03.31.20048652 | Ecological (country comparison) |

**Table S4. Laboratory studies**

| Reference | Key findings |
|---|---|
| Aydin O, Emon AB, Saif MTA. Performance of fabrics for home-made masks against spread of respiratory infection through droplets: a quantitative mechanistic study. medRxiv 2020. http://dx.doi.org/10.1101/2020.04.19.20071779 | The performance of ten different fabrics, ranging from cotton to silk, in blocking high velocity droplets, was assessed using a 3-layered commercial medical mask as a benchmark material. Breathability and ability to soak water were also assessed. Most home fabrics substantially blocked droplets, even as a single layer. With two layers, blocking performance can reach that of surgical mask without significantly compromising breathability. Home fabrics were hydrophilic to varying degrees, and hence soak water. In contrast, medical masks are hydrophobic, and tend to repel water. Incoming droplets are thus soaked and 'held back' by home fabrics, which might be an advantage of home-made cloth masks. |
| Bae S, Kim MC, Kin JY, et al. Effectiveness of Surgical and Cotton Masks in Blocking SARS-CoV-2: A Controlled Comparison in 4 Patients. Ann Intern Med 2020; M20-1342. http://dx.doi.org/10.7326/M20-1342 | Both surgical and cotton masks seemed to be **ineffective** in preventing the dissemination of SARS–CoV-2 from the coughs of patients with COVID-19 to the environment and external mask surface. |
| Card KJ, Crozier D, Dhawan A, et al. UV Sterilization of Personal Protective Equipment with Idle Laboratory Biosafety Cabinets During the Covid-19 Pandemic. medRxiv 2020. http://medrxiv.org/cgi/content/short/2020.03.25.20043489 | It was calculated that an N95 mask placed within a biosafety cabinet with a manufacturer reported fluence of 100 W/cm^2 should be effectively sanitized for reuse after approximately 15-20 minutes per side. |
| Davies A, Thompson K-A, Giri K, Kafatos G. Testing the Efficacy of Homemade Masks: Would They Protect in an Influenza Pandemic? Disaster Med Pub Health Preparedness 2013; 7:413-8. https://doi.org/10.1017/dmp.2013.43 | Several household materials were evaluated for the capacity to block bacterial and viral aerosols in 21 healthy volunteers. The median-fit factor of the homemade masks was one-half that of the surgical masks. Both masks significantly reduced the number of microorganisms expelled by volunteers, although the surgical mask was 3 times more effective in blocking transmission than the homemade mask. |
| Konda A, Prakash A, Moss GA, et al. Aerosol Filtration Efficiency of Common Fabrics Used in Respiratory Cloth Masks. ACS nano 2020. http://dx.doi.org/10.1021/acsnano.0c03252 | Filtration efficiencies of various commonly available fabrics for use as cloth masks in filtering particles in the significant (for aerosol-based virus transmission) size range was measured. Cotton, natural silk, and chiffon can provide good protection, typically above 50% in the entire 10 nm to 6.0 µm range, provided they have a tight weave. Leakages |

| Reference | Key findings |
|---|---|
| | around the mask area can degrade efficiencies by ~50% or more, pointing out the importance of fit. |
| Lenormand R, Lenormand G. Effect of ethanol cleaning on the permeability of FFP2 mask. medRxiv 2020. http://dx.doi.org/10.1101/2020.04.28.20083840 | The effect of ethanol on the filtering properties of FFP2 masks was assessed. After six cleaning cycles, the permeability remained close to the permeability before cleaning. |
| Leung NJL, Chu DKW, Shiu EYC, et al. Respiratory virus shedding in exhaled breath and efficacy of face masks. Nature Med 2020; 26:676-80. http://dx.doi.org/10.1038/s41591-020-0843-2 | In a cross-over trial, 122 of 246 participants with medically attended acute respiratory infections were randomised to wear or not wear a medical facemask during the first exhaled breath. Corona virus was detected in respiratory droplets and aerosols in 3 of 10 and 4 of 10 samples collected without facemasks, respectively. No virus was detected in respiratory droplets or aerosols collected from participants wearing face masks (P=0.04). |
| Ma QX, Shan H, Zhang HL, et al. Potential utilities of mask wearing and instant hand hygiene for fighting SARS-CoV-2. J Med Virology 2020. http://dx.doi.org/10.1002/jmv.25805 | The efficacy of three types of masks and instant hand wiping was evaluated using avian influenza virus to mock the coronavirus. N95 masks, medical masks, and homemade masks made of 4-layer kitchen paper and 1-layer cloth could block 99.98%, 97.14%, and 95.15% of the virus in aerosols. |
| Mueller AV, Fernandez LA. Assessment of Fabric Masks as Alternatives to Standard Surgical Masks in Terms of Particle Filtration Efficiency. medRxiv 2020. http://dx.doi.org/10.1101/2020.04.17.20069567 | Percent particle removal was determined for ten home-made, fabric masks of different designs. Home-made masks worn as designed always had lower particle removal rates than the 3M masks, achieving between 38% and 96% of this baseline. |
| van der Sande M, Teunis P, Sabel R. Professional and home-made face masks reduce exposure to respiratory infections among the general population. PLoS One 2008; 3:e2618. http://dx.doi.org/10.1371/journal.pone.0002618 | All types of masks reduced aerosol exposure, relatively stable over time, unaffected by duration of wear or type of activity, but with a high degree of individual variation. Personal respirators were more efficient than surgical masks, which were more efficient than home-made masks. Regardless of mask type, children were less well protected. Outward protection (mask wearing by a mechanical head) was less effective than inward protection (mask wearing by healthy volunteers). |
| Zhong H, Zhu Z, Lin J, et al. Reusable and Recyclable Graphene Masks with Outstanding Superhydrophobic and Photothermal Performance. ACS nano 2020. http://dx.doi.org/10.1021/acsnano.0c02250 | A method for producing commercially available surgical masks with “outstanding” self-cleaning and photothermal properties is described. Superhydrophobic states were observed on the treated masks' surfaces, which can cause the incoming aqueous droplets to |

| Reference | Key findings |
| --- | --- |
| | bounce off. Under sunlight illumination, the surface temperature of the functional mask can quickly increase to over 80 °C, making the masks reusable after sunlight sterilization. |

**Table 5. Ongoing systematic reviews and randomised trials**

| First author, title, and ID | Link |
|---|---|
| **Randomised trials** | |
| Bundgaard H. Reduction in COVID-19 Infection Using Surgical Facial Masks Outside the Healthcare System. ClinicalTrials.gov Identifier: NCT04337541 | https://clinicaltrials.gov/ct2/show/NCT04337541 |
| Loeb M. Medical Masks vs N95 Respirators for COVID-19. ClinicalTrials.gov Identifier: NCT04296643 | https://clinicaltrials.gov/ct2/show/NCT04296643 |
| **Systematic reviews** | |
| Chen M 2020. The efficacy of masks for influenza-like illness in the community, a protocol for systematic review and meta-analysis. PROSPERO 2020 CRD42020179358 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020179358 |
| Coclite D 2020. The effectiveness of wearing face masks in the community for reducing the spread of COVID-19: a systematic review. PROSPERO 2020 CRD42020184963 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020184963 |
| Fan D 2020. N95 Respirators vs Surgical Masks for Preventing Respiratory Infection: a systemic review and meta-analysis. PROSPERO 2020 CRD42020172846 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020172846 |
| Gnanapragasam S. Impact of personal protective equipment (PPE) use on patient clinician interactions: a systematic review of the literature. PROSPERO 2020 CRD42020184693 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020184693 |
| Kirellos SA. Efficacy of different methods of disinfection and sterilization to reuse masks and respirators: a systematic review and meta-analysis. PROSPERO 2020 CRD42020177679 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020177679 |
| Kurniawan A. The use of masks in daily life in general public: does it affect the number of new cases and COVID-19-related deaths? A systematic review. PROSPERO 2020 CRD42020184371 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020184371 |
| Li X. Physical interventions to reduce the transmission of COVID-19? Lessons from MERS and SARS. PROSPERO 2020 CRD42020178638 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020178638 |

| First author, title, and ID | Link |
|---|---|
| McNally J. Efficacy and safety of disinfectants for the decontamination of N95 and SN95 filtering facepiece respirators: protocol for a systematic review. PROSPERO 2020 CRD42020178440 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020178440 |
| McNally JD. Microwave and heat-based decontamination for facemask personal protective equipment (PPE). PROSPERO 2020 CRD42020177036 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020177036 |
| McNally JD. Ultraviolet germicidal irradiation (UVGI) for facemask personal protective equipment (PPE): a systematic review. PROSPERO 2020 CRD42020176156 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020176156 |
| Pezzolo E. The effectiveness of surgical masks vs controls in preventing of spreading respiratory infections in real life setting. PROSPERO 2020 CRD42020178913 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020178913 |
| Rajaee A. Will decontamination of N95 filtering facepiece respirators result in compromised performance? A living systematic review. PROSPERO 2020 CRD42020179695 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020179695 |
| Torres D. Efficacy of homemade and commercial cloth facemasks in preventing COVID-19 contamination. a systematic review. PROSPERO 2020 CRD42020178007 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020178007 |
| Tran T. Efficacy of facemasks against airborne infectious diseases: a systematic review and network meta-analysis of randomized-controlled trials. PROSPERO 2020 CRD42020178516 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020178516 |
| Wu G. A systematic review and meta-analysis of the efficacy of masks for the prevention of respiratory infectious diseases. PROSPERO 2020 CRD42020179966 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020179966 |
| Zorko D. Decontamination interventions for the reuse of surgical mask personal protective equipment: a systematic review. PROSPERO 2020 CRD42020178290 | https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020178290 |

**Table 6. Full-text articles that were not included**

| Reference | Reason |
|---|---|
| Abaluck J, Chevalier J, Christakis, et al. The Case for Universal Cloth Mask Adoption & Policies to Increase the Supply of Medical Masks for Health Workers. SSRN 2020. https://dx.doi.org/10.2139/ssrn.3567438 | Commentary |
| Bin-Reza F, Chavarrias VL, Nicoll A, Chamberland ME. The use of masks and respirators to prevent transmission of influenza: a systematic review of the scientific evidence. Influenza 2012; 6:257-67. https://doi.org/10.1111/j.1750-2659.2011.00307.x | Outdated systematic review |
| Brosseau L, Sietsema M. Commentary: Masks-for-all for COVID-19 not based on sound data. Center for Infectious Disease Research and Policy, 2020. https://publichealth.uic.edu/news-stories/commentary-masks-for-all-for-covid-19-not-based-on-sound-data/ | Commentary |
| Centers for Disease Control and Prevention. Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare settings. 13 April 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Finfection-control%2Fcontrol-recommendations.html | Guidance |
| Choi S, Ki M. Estimating the reproductive number and the outbreak size of COVID-19 in Korea. Epidemiol Health 2020; 42:e2020011. https://doi.org/10.4178/epih.e2020011 | Uninformative* model |
| Chowell DR, Chowell G, Roosa K, et al. Sustainable social distancing through face-mask use and testing during the Covid-19 pandemic.MedRxiv 2020. https://www.medrxiv.org/content/10.1101/2020.04.01.20049981v3 | Uninformative model |
| Eikenberry SE, Mancuso M, Iboi E, et al. To mask or not to mask: Modelling the potential for face mask use by the general public to curtail the COVID-19 pandemic. Infect Dis Modelling 2020; 5:293-308. https://doi.org/10.1016/j.idm.2020.04.001 | Uninformative model |
| Fan J, Liu X, Pan W, et al. Epidemiology of 2019 novel coronavirus disease in Gansu Province, China, 2020. Emerg Infect Dis 2020. https://doi.org/10.3201/eid2606.200251 | Uninformative non-randomised study |
| Greenhalgh T, Schmid MB, Czypionka T, et al. Face masks for the public during the covid-19 crisis. BMJ 2020; 369:m1435. https://doi.org/10.1136/bmj.m1435 | Commentary |
| Howard J, Huang A, Tufekci Z, et al. 2020 Face masks against COVID-19: An evidence review. Preprints 2020, 2020040203. https://dx.doi.org/10.20944/preprints202004.0203.v1 | Non-systematic review |
| Juneau C-E, Pueyo T, Bell M, et al. Evidence-based, cost-effective interventions to suppress the COVID-19 pandemic: a rapid systematic review. medRxiv 2020. https://doi.org/10.1101/2020.04.20.20054726 | Broad overview |
| Leung CC, Lam TH, Cheng KK. Mass masking in the COVID-19 epidemic:people need guidance. Lancet 2020; 395:945. https://dx.doi.org/10.1016/s0140-6736(20)30520-1 | Commentary |

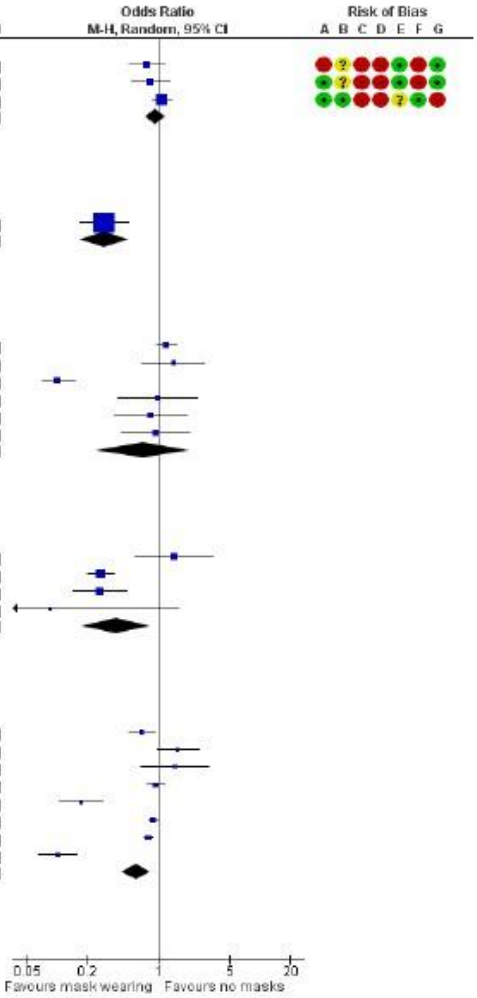
| Reference | Reason |
|---|---|
| Liu X, Zhang S. COVID-19: Face Masks and Human-to-human Transmission. Influenza 2020. https://doi.org/10.1111/irv.12740 | Anecdotal evidence |
| Madhav N, Oppenheim B, Gallivan M, et al. Pandemics: Risks, impacts, and mitigation. In: Jamison DT, Gelband H, Horton S, et al., editors. Disease Control Priorities: Improving Health and Reducing Poverty. 3rd edition. Washington DC: The International Bank for Reconstruction and Development / The World Bank; 2017. https://dx.doi.org/10.1596/978-1-4648-0527-1/pt5.ch17 | Non-systematic review |
| Norwegian Institute of Public Health. Coronavirus – facts, advice and measures. Hand hygiene, cough etiquette, facemasks, cleaning and laundry - Advice and information to the general public. 22 April 2020. www.fhi.no/en/op/novel-coronavirus-facts-advice/facts-and-general-advice/hand-hygiene-cough-etiquette-face-masks-cleaning-and-laundry/ | Guidance |
| Van Hylckama Vlieg A, Rosendaal F, Mook-Kanamori D. FFP2-mondmasker of chirurgisch mondkapje bij COVID-19. 0 Huisarts en Wetenschap 2020. https://dx.doi.org/10.1007%2Fs12445-020-0586-9 | Non-systematic review |
| Vannabouathong C, Devji T, Ekhtiari S, et al. Novel Coronavirus COVID-19: current evidence and evolving strategies. J Bone Joint Surg 2020; 102:734-44. https://dx.doi.org/10.2106/JBJS.20.00396 | Non-systematic review |
| National Academies of Sciences, Engineering, and Medicine. 2020. Rapid Expert Consultation on the Effectiveness of Fabric Masks for the COVID-19 Pandemic (April 8, 2020). Washington, DC: The National Academies Press. https://doi.org/10.17226/25776 | Non-systematic review |
| Royal Society. Face masks for the general public. Royal Sciety DELVE Initiative 2020. https://rs-delve.github.io/reports/2020/05/04/face-masks-for-the-general-public.html | Non-systematic review |
| World Health Organization. Advice on the use of facemasks in the context of COVID-19. Interim guidance 6 April 2020. www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak | Guidance |
| World Health Organization. Infection prevention and control guidance for long-term care facilities in the context of COVID-19. WHO 2020; WHO/2019-nCoV/IPC_long_term_care/2020.1 https://apps.who.int/iris/handle/10665/331508 | Guidance |
| World Health Organization. Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages. Interim guidance 6 April 2020. https://apps.who.int/iris/bitstream/handle/10665/331695/WHO-2019-nCov-IPC_PPE_use-2020.3-eng.pdf | Guidance |

Figure S2

Figure S2 from Brainard and colleagues [Brainard 2020]). This figure is available under a [CC-BY-ND 4.0 International license)](#)

**Figure 1. Mask wearing to prevent primary infection, by study design**

| Study or Subgroup | wore masks Events | wore masks Total | no masks Events | no masks Total | Weight | Odds Ratio M-H, Random, 95% CI |
|---|---|---|---|---|---|---|
| **5.1.1 RCTs** | | | | | | |
| Alello 2010 pilot (1) | 44 | 378 | 80 | 552 | 25.6% | 0.78 [0.52, 1.16] |
| Alello 2012 (2) | 46 | 392 | 51 | 370 | 22.6% | 0.83 [0.54, 1.27] |
| Alfelali 2019 (3) | 152 | 1531 | 179 | 1980 | 51.8% | 1.10 [0.87, 1.38] |
| **Subtotal (95% CI)** | | **2301** | | **2882** | **100.0%** | **0.94 [0.75, 1.19]** |
| Total events | 242 | | 310 | | | |
| Heterogeneity: Tau² = 0.01; Chi² = 2.64, df = 2 (P = 0.24); I² = 29% | | | | | | |
| Test for overall effect: Z = 0.50 (P = 0.62) | | | | | | |
| **5.1.2 Pre/post** | | | | | | |
| Sung 2012 (4) | 15 | 454 | 95 | 920 | 100.0% | 0.30 [0.17, 0.52] |
| **Subtotal (95% CI)** | | **454** | | **920** | **100.0%** | **0.30 [0.17, 0.52]** |
| Total events | 15 | | 95 | | | |
| Heterogeneity: Not applicable | | | | | | |
| Test for overall effect: Z = 4.28 (P < 0.0001) | | | | | | |
| **5.1.3 Cohort studies** | | | | | | |
| Alfelali 2019 (5) | 135 | 1291 | 196 | 2200 | 17.7% | 1.19 [0.95, 1.50] |
| Balaban 2012 (6) | 37 | 89 | 19 | 54 | 16.6% | 1.42 [0.70, 2.99] |
| Choudhry 2006 (7) | 43 | 319 | 280 | 431 | 17.5% | 0.10 [0.07, 0.15] |
| Choudhry 2006 (8) | 8 | 21 | 88 | 256 | 15.6% | 0.99 [0.40, 2.46] |
| Shin 2010 intvn arm (9) | 11 | 35 | 33 | 94 | 16.1% | 0.85 [0.37, 1.94] |
| Shin control arm (10) | 14 | 40 | 35 | 96 | 16.3% | 0.94 [0.43, 2.03] |
| **Subtotal (95% CI)** | | **1795** | | **3131** | **100.0%** | **0.71 [0.24, 2.05]** |
| Total events | 248 | | 640 | | | |
| Heterogeneity: Tau² = 1.65; Chi² = 127.93, df = 5 (P < 0.00001); I² = 96% | | | | | | |
| Test for overall effect: Z = 0.64 (P = 0.52) | | | | | | |
| **5.1.5 Case-control** | | | | | | |
| Emanian 2013 (11) | 21 | 57 | 11 | 38 | 25.8% | 1.43 [0.59, 3.47] |
| Lau 2004a (12) | 92 | 479 | 238 | 511 | 36.9% | 0.27 [0.20, 0.36] |
| Wu 2004 (13) | 15 | 146 | 59 | 229 | 31.4% | 0.27 [0.15, 0.49] |
| Zhang 2013 (14) | 0 | 12 | 9 | 29 | 5.9% | 0.09 [0.00, 1.62] |
| **Subtotal (95% CI)** | | **694** | | **807** | **100.0%** | **0.39 [0.10, 0.94]** |
| Total events | 128 | | 327 | | | |
| Heterogeneity: Tau² = 0.40; Chi² = 13.26, df = 3 (P = 0.004); I² = 77% | | | | | | |
| Test for overall effect: Z = 2.40 (P = 0.02) | | | | | | |
| **5.1.6 Cross-sectional** | | | | | | |
| Al-Jasser 2012 (15) | 88 | 216 | 702 | 1281 | 13.5% | 0.70 [0.52, 0.93] |
| Davis 2010 (16) | 121 | 282 | 34 | 105 | 11.4% | 1.57 [0.98, 2.52] |
| Jolie 1998 (17) | 63 | 86 | 30 | 46 | 8.1% | 1.46 [0.67, 3.16] |
| Kim 2012 (18) | 179 | 3295 | 239 | 4183 | 14.3% | 0.94 [0.77, 1.15] |
| Tahir 2019 (19) | 41 | 131 | 123 | 170 | 11.1% | 0.17 [0.11, 0.29] |
| Uchida 2017 (20) | 1069 | 5474 | 1080 | 5050 | 14.9% | 0.88 [0.81, 0.98] |
| Wu 2016 (21) | 1154 | 2728 | 4811 | 10288 | 15.0% | 0.80 [0.74, 0.86] |
| Zein 2002 (22) | 47 | 216 | 168 | 230 | 11.8% | 0.10 [0.07, 0.16] |
| **Subtotal (95% CI)** | | **12418** | | **21353** | **100.0%** | **0.61 [0.45, 0.85]** |
| Total events | 2771 | | 7287 | | | |
| Heterogeneity: Tau² = 0.18; Chi² = 140.07, df = 7 (P < 0.00001); I² = 95% | | | | | | |
| Test for overall effect: Z = 2.98 (P = 0.003) | | | | | | |




Test for subgroup differences: Chi² = 18.51, df = 4 (P = 0.0010), I² = 78.4%

Footnotes

(1) Setting University residences, Design cluster RCT, Outcome fever' symptoms
(2) Setting University residences, Design cluster RCT, Outcome ILI symptoms
(3) Setting Hajj pilgrims, Design cluster RCT, Outcome respiratory illness
(4) Setting stem-cell recipients in hospital, Design pre-post study, Outcome respiratory...
(5) Setting Hajj pilgrims, Design cohort (was cluster RCT but badly contaminated), Outcome...
(6) Setting Hajj pilgrims, Design retrospective cohort, Outcome respiratory illness
(7) Setting male Hajj pilgrims, Design prospective cohort, Outcome respiratory illness, Details
(8) Setting female Hajj pilgrims, Design prospective cohort, Outcome respiratory illness,...
(9) Setting community, Design cohort, Outcome common cold symptoms
(10) Setting community, Design cohort, Outcome common cold symptoms
(11) Setting Hajj pilgrims, Design nested case control, Outcome respiratory illness (not colds)
(12) Setting visiting index patients, Design case control, Outcome SARS (WHO definition),...
(13) Setting community, Design case control, Outcome SARS (WHO definition)
(14) Setting long-haul flights, Design case-control, Outcome ILI linked to H1N1 (WHO definition)
(15) Setting Hajj pilgrims, Design cross sectional, Outcome respiratory illness, Details Most of...
(16) Setting Hajj pilgrims, Design cross-sectional, Outcome ILI
(17) Setting students on pig farm, Design cross-sectional, Outcome respiratory symptoms
(18) Setting schools, Design cross-sectional, Outcome rt-PCR tested, Continuous or irregular'...
(19) Setting poultry workers, Design cross-sectional, Outcome serological tests for A(H9N2)...
(20) Setting schools, Design cross-sectional, Outcome rapid diagnostic kit, Issues...
(21) Setting hospital visitors, Design cross sectional, Outcome ILI
(22) Setting Hajj pilgrims (masks supplied), Design cross-sectional, Outcome URTI symptoms

Risk of bias legend

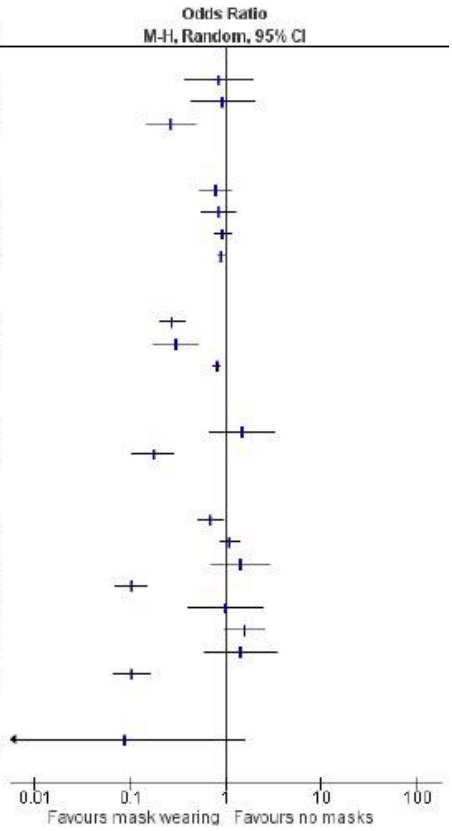
(A) Random sequence generation (selection bias)
(B) Allocation concealment (selection bias)
(C) Blinding of participants and personnel (performance bias)
(D) Blinding of outcome assessment (detection bias)
(E) Incomplete outcome data (attrition bias)
(F) Selective reporting (reporting bias)
(G) Other bias

Figure S3

Figure S3 from Brainard and colleagues [Brainard 2020]). This figure is available under a [CC-BY-ND 4.0 International license)]

**Figure 2. Mask wearing to prevent primary infection, by exposure setting**

| Study or Subgroup | wore masks Events | wore masks Total | no masks Events | no masks Total | Odds Ratio M-H, Random, 95% CI |
|---|---|---|---|---|---|
| **1.2.1 general community** | | | | | |
| Shin 2018 intvn arm (1) | 11 | 36 | 33 | 94 | 0.85 [0.37, 1.94] |
| Shin control arm (2) | 14 | 40 | 35 | 96 | 0.94 [0.43, 2.03] |
| Wu 2004 (3) | 15 | 146 | 69 | 229 | 0.27 [0.15, 0.49] |
| **1.2.2 schools & universities** | | | | | |
| Aiello 2010 pilot (4) | 44 | 378 | 80 | 552 | 0.78 [0.52, 1.15] |
| Aiello 2012 (5) | 46 | 392 | 51 | 370 | 0.83 [0.54, 1.27] |
| Kim 2012 (6) | 178 | 3285 | 239 | 4163 | 0.94 [0.77, 1.15] |
| Uchida 2017 (7) | 1069 | 5474 | 1080 | 5050 | 0.89 [0.81, 0.98] |
| **1.2.3 health care settings (well person wears mask)** | | | | | |
| Lau 2004a (8) | 92 | 479 | 238 | 511 | 0.27 [0.20, 0.36] |
| Sung 2012 (9) | 15 | 454 | 95 | 920 | 0.30 [0.17, 0.52] |
| Wu 2016 (10) | 1154 | 2728 | 4911 | 10298 | 0.80 [0.74, 0.86] |
| **1.2.4 Animal contact** | | | | | |
| Jolie 1996 (11) | 63 | 66 | 30 | 46 | 1.46 [0.67, 3.16] |
| Tahir 2019 (12) | 41 | 131 | 123 | 170 | 0.17 [0.11, 0.29] |
| **1.2.5 Mass gatherings (Hajj)** | | | | | |
| Al-Jasser 2012 (13) | 99 | 216 | 702 | 1291 | 0.70 [0.52, 0.93] |
| Alfelali 2019 (14) | 152 | 1531 | 179 | 1960 | 1.10 [0.87, 1.38] |
| Balaban 2012 (15) | 37 | 89 | 18 | 54 | 1.42 [0.70, 2.88] |
| Choudhry 2006 (16) | 43 | 319 | 260 | 431 | 0.10 [0.07, 0.15] |
| Choudhry 2006 (17) | 8 | 21 | 98 | 256 | 0.89 [0.40, 2.48] |
| Deris 2010 (18) | 121 | 282 | 34 | 105 | 1.57 [0.98, 2.52] |
| Emanian 2013 (19) | 21 | 57 | 11 | 38 | 1.43 [0.59, 3.47] |
| Zein 2002 (20) | 47 | 216 | 168 | 230 | 0.10 [0.07, 0.16] |
| **1.2.6 Air travel** | | | | | |
| Zhang 2013 (21) | 0 | 12 | 9 | 29 | 0.09 [0.00, 1.62] |




Footnotes
(1) Setting community, Design cohort, Outcome common cold symptoms
(2) Setting community, Design cohort, Outcome common cold symptoms
(3) Setting community, Design case control, Outcome SARS (WHO definition)
(4) Setting University residences, Design cluster RCT, Outcome fever' symptoms
(5) Setting University residences, Design cluster RCT, Outcome ILI symptoms
(6) Setting schools, Design cross-sectional, Outcome rt-PCR tested, Continuous or irregular' vs. non-users; school pupils,
(7) Setting schools, Design cross-sectional, Outcome rapid diagnostic kit, Issues denominators add up to > total respondents
(8) Setting visiting index patients, Design case control, Outcome SARS (WHO definition), Comparison 'frequently vs. seldom/no
(9) Setting stem-cell recipients in hospital, Design pre-post design, Outcome respiratory infections (various), lab-confirmed
(10) Setting hospital visitors, Design case control, Outcome ILI
(11) Setting students on pig farm, Design cross-sectional, Outcome respiratory symptoms
(12) Setting poultry workers, Design cross-sectional, Outcome serological tests for A(H9N2) influenza, Comparison Always vs ...
(13) Setting Hajj pilgrims, Design cross sectional, Outcome respiratory illness, Details Most of the time vs. sometimes/never
(14) Setting Hajj pilgrims, Design cluster RCT, Outcome respiratory illness
(15) Setting Hajj pilgrims, Design retrospective cohort, Outcome respiratory illness
(16) Setting male Hajj pilgrims, Design prospective cohort, Outcome respiratory illness, Details most of time vs. sometimes/never
(17) Setting female Hajj pilgrims, Design prospective cohort, Outcome respiratory illness, Details most of time vs. sometimes/never
(18) Setting Hajj pilgrims, Design cross-sectional, Outcome ILI
(19) Setting Hajj pilgrims, Design nested case control, Outcome respiratory illness (not colds)
(20) Setting Hajj pilgrims (masks supplied), Design cross-sectional, Outcome URTI symptoms
(21) Setting long-haul flights, Design case-control, Outcome ILI linked to H1N1 (WHO definition)

# Appendix. Updated search 27 May 2020

In addition to daily L-OVE updates, checking reference lists of full-text articles that are screened, and articles identified through personal communication, the Cochrane COVID-19 Study Register was screened May 23rd using the term "masks", which yielded 35 records and one included study [Matusiak 2020]. Four rapid evidence profiles from the McMaster Health Forum were also screened [McMaster 2020a-d].

Twelve full-text articles were screened, five were included (Table 1) and seven were excluded (Table 2).

**Table 1. Included articles**

| **Systematic reviews providing supplementary information** | |
|---|---|
| Lee KM, Shukla VK, Clark M, et al. physical interventions to interrupt or reduce the spread of respiratory viruses — resource use implications: a systematic review. Ottawa: Canadian Agency for Drugs and Technologies in Health; 2011. http://www.cadth.ca/en/products/health-technology-assessment/publication/3140 | |
| Liang M, Gao L, Cheng C, et al. Efficacy of face mask in preventing respiratory virus transmission: a systematic review and meta-analysis. medRxiv 2020. https://doi.org/10.1101/2020.04.03.20051649 | |
| Siegfried N, Rees K, Kredo T, et al. Should cloth masks be used by the general public for preventing transmission of SARS-CoV-2? Brief Report of Rapid Review. 31 March 2020. https://aenweb.blob.core.windows.net/aenweb/pages/files/COVID19_RAPID_REVIEW_Cloth_Masks_200331_Version_1.0.pdf | |
| **Laboratory studies** | |
| **Reference** | **Key findings** |
| Chan JF-W, Yuan S, Zhang AJ, et al. Surgical mask partition reduces the risk of non-contact transmission 1 in a golden Syrian 2 hamster model for Coronavirus Disease 2019 (COVID-19). Unpublished manuscript 18 May 2020. | Transmission from a hamster infected with COVID-19 to hamsters in separate cages was investigated under three conditions: without a surgical mask partition between the cages, with a surgical mask partition with the outside facing the uninfected hamsters (simulating the infected hamsters wearing a mask), and with the outside facing the infected hamster (simulating the uninfected hamsters wearing a mask). Without a surgical mask partition 10 of 15 hamsters (67%) were infected. When the cages were separated by a surgical mask partition with the outside facing the uninfected hamsters, 2 of 12 hamsters (17%) were infected |

| | |
|---|---|
| | (P=0.019). When the outside of the surgical mask partition with the outside facing the infected hamster, 4 of 12 hamsters (33%) were infected (P=0.128). |
| **Non-randomised studies** | |
| **Reference** | **Key findings** |
| Matusiak L, Szepietowska M, Krajewski P, et al. Inconveniences due to the use of face masks during the COVID-19 pandemic: a survey study of 876 young people. Dermatologic Therapy 2020. https://doi.org/10.1111/dth.13567 | Out of 876 students in Poland who participated in a survey only 27 people (3%) did not complain of any problems related to face mask wearing. Out of all reported inconveniences, difficulty in breathing appeared to the most common one (36%), followed by warming/sweating (21%), misting up of glasses (21%) and slurred speech (12%). Skin reactions were reported less often (itch - 7.7%, skin irritation - 0.9%). Wearing surgical masks compared to other types of masks had a lower risk for difficulty in breathing, warming/sweating, glasses misting up, slurred speech and itch (OR=0.42, OR=0.60, OR=0.10, OR=0.17 and OR=0.04, respectively). Wearing cloth masks had a higher risk of difficulty in breathing (OR=1.56), warming/sweating (OR=1.31), glasses misting up (OR=1.92), slurred speech (OR=1.86) and itch (OR=2.99). |

**Table 2. Excluded articles**

| Reference | Reason |
|---|---|
| Clase CM, Fu EL, Joseph M, et al. Cloth masks may prevent transmission of covid-19: an evidence-based, risk-based approach. Ann Intern Med 2020; https://doi.org/10.7326/M20-2567 | Commentary |
| ECRI. Cloth face coverings worn by public to reduce transmission of viral respiratory infection. Clinical Evidence Assessment 2020. https://www.ecri.org/covid-19-clinical-evidence-assessments | Non-systematic review |
| European Centre for Disease Prevention and Control. Using face masks in the community. Stockholm: ECDC; 2020. https://www.ecdc.europa.eu/en/publications-data/using-face-masks-community-reducing-covid-19-transmission | Guidance |
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