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memo

COVID-19-EPIDEMIC :

Should individuals in the community without respiratory symptoms wear facemasks to reduce the spread of COVID-19? – a rapid review

Title	Should individuals in the community without respiratory symptoms wear facemasks to reduce the spread of COVID-19?
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Key messages

Health authorities have given conflicting recommendations regarding the use of facemasks by asymptomatic individuals in the community to reduce the spread of COVID-19. For example, the World Health Organization (WHO) states that "at present, there is no direct evidence (from studies on COVID-19 and in healthy people in the community) on the effectiveness of universal masking of healthy people in the community to prevent infection with respiratory viruses, including COVID-19". Yet, "WHO has updated its guidance to advise that to prevent COVID-19 transmission effectively in areas of community transmission, governments should encourage the general public to wear masks in specific situations and settings as part of a comprehensive approach to suppress SARS-CoV-2 transmission". This includes settings where individuals are unable to keep a physical distance of at least 1 meter. WHO is also strongly encouraging countries to conduct research on this critical topic.

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. 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 evidence of a protective effect of medical facemasks against respiratory infections in community settings. However, study results vary greatly. Randomised trials from community settings indicate a small protective effect. Laboratory studies indicate a larger effect when facemasks are used by asymptomatic but contagious individuals to prevent the spread of virus to others, compared to use by uninfected individuals to prevent themselves from becoming infected. Because incorrect use of medical facemasks limits their effectiveness, countrywide training programmes adapted to a variety of audiences would be needed to ensure the effectiveness of medical facemasks for reducing the spread of COVID-19. It is not known whether the use of medical facemasks would be widely accepted by the healthy population in Norway, or the extent to which correct use could be achieved.

Non-medical facemasks include a variety of products. There is no reliable evidence of the effectiveness of non-medical facemasks in community settings. There is likely to be substantial variation in effectiveness between products. However, there is only limited evidence from laboratory studies of potential differences in effectiveness when different products are used in the community.

Given the low prevalence of COVID-19 currently, even if facemasks are assumed to be effective, the difference in infection rates between using facemasks and not using facemasks would be small. Assuming that 20% of people infectious with SARS-CoV-2 do not have symptoms, and assuming a risk reduction of 40% for wearing facemask, 200 000 people would need to wear facemasks to prevent one new infection per week in the current epidemiological situation.

The undesirable effects of facemasks include the risks of incorrect use, a false sense of security (leading to relaxation of other interventions), and contamination of masks. In addition, some people experience problems breathing, discomfort, and problems with communication. The proportion of people who experience these undesirable effects is uncertain. However, with a low prevalence of COVID-19, the number of people who experience undesirable effects is likely to be much larger than the number of infections prevented.

An expert panel discussed and assessed the evidence using an explicit set of criteria. The panel did not take into consideration the shortage of medical facemasks. The assessments for each criterion were judged both individually and in a consensus process, and the overall recommendation and report were reviewed by the panel.

Conclusion

In the current epidemiological situation in Norway, wearing facemasks to reduce the spread of COVID-19 is not recommended for individuals in the community without respiratory symptoms who are not in near contact with people who are known to be infected. If the epidemiological situation worsens substantially in a geographical area, the use of facemasks as a precautionary measure should be reconsidered. Measures to reduce risks during necessary public transport and during mass events, including wearing facemasks, should be explored further.

If use of facemasks by individuals without respiratory symptoms in the community is recommended in specific circumstances, such as public transport or mass events, medical masks or quality controlled non-medical masks with a documented filtration effect should be used. National priorities for the use of personal protective equipment may apply, given existing shortages. If any such recommendation is made, the community should be given training to ensure correct use and the risks should be explained, especially the risks of a false sense of security and contamination of masks. The training should be tailored to the needs of different groups, including people with different levels of fluency in Norwegian and different socio-economic circumstances.

Hovedbudskap

Helsemyndigheter har gitt ulike anbefalinger om hvordan bruk av munnbind og ansiktsmasker blant asymptomatiske personer kan bidra til å redusere spredningen av covid-19-infeksjon i samfunnet. For eksempel uttaler Verdens helseorganisasjon (WHO) at "foreløpig finnes det ikke direkte dokumentasjon (fra studier på covid-19 og hos friske personer i samfunnet) om effekten av generell bruk av ansiktsmasker blant friske personer i samfunnet for å forhindre infeksjon med luftveisvirus, inkludert covid-19". Likevel, "WHO har oppdatert sin veileder og anbefaler at, for å effektivt forebygge smitte av covid-19 i områder med smittespredning i samfunnet, bør regjeringer oppfordre allmennheten til å bruke masker under gitte forutsetninger og situasjoner som ledd i en helhetlig tilnærming for å redusere smittespredning". Dette inkluderer situasjoner der personer ikke kan holde en fysisk avstand på minst 1 meter. WHO oppfordrer sterkt til å forske mer på dette viktige temaet.

Vi benyttet et Evidence to Decision (EtD) rammeverk til å gjennomgå kunnskapen og utarbeide en anbefaling. Kunnskapsbasen var basert på en strukturert gjennomgang av L·OVE COVID-19-databasen og et levende kart over covid-19 forskning. Vi søkte etter pågående oversikter 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. Vi fant ytterligere noen artikler ved å sjekke referanselistene i identifiserte artikler og gjennom personlige kontakter.

Det finnes dokumentasjon for at medisinske munnbind kan ha beskyttende effekt mot spredning av luftveisinfeksjoner i samfunnet, men resultatene varierer. Randomiserte studier gjennomført utenfor helseinstitusjoner tyder på at munnbind har en liten beskyttende effekt. Laboratoriestudier indikerer at effekten er større når munnbind brukes for å forhindre spredning fra asymptomatiske, smittsomme individer, sammenlignet med når ikke-smittede personer bruker munnbind for å forhindre at de selv blir smittet. Uriktig bruk av medisinske munnbind reduserer effekten, og det vil derfor være behov for opplæring tilpasset ulike målgrupper for å sikre effektiv bruk av medisinske munnbind. Vi vet ikke om den friske befolkningen i Norge vil akseptere å bruke medisinske munnbind, og vi vet ikke i hvilken grad vi kan oppnå riktig bruk av munnbind.

Ikke-medisinske ansiktsmasker omfatter mange ulike produkter. Det er ingen pålitelig dokumentasjon for effekten av ikke-medisinske ansiktsmasker brukt i samfunnet. Det vil sannsynligvis være betydelig variasjon i effekt mellom de ulike produktene. Vi har begrenset dokumentasjon fra laboratorieundersøkelser om mulige forskjeller i effekt når ulike produkter brukes av personer i samfunnet, utenfor helsetjenesten.

Gitt den lave utbredelsen av covid-19 for øyeblikket, og selv om ansiktsmasker antas å være effektive, vil forskjellen i infeksjonsraten mellom å bruke eller ikke å bruke ansiktsmasker være liten. Hvis vi antar at 20% av smittsomme personer med SARS-CoV-2 ikke har symptomer, og videre antar en risiko reduksjon på 40% ved å bruke ansiktsmaske, så må 200 000 personer bruke ansiktsmaske per uke for å forebygge ett nytt tilfelle i den nåværende epidemiologiske situasjonen.

Ulemper ved bruk av ansiktsmasker omfatter risiko for feil bruk, falsk trygghetsfølelse (som kan føre til lemping av andre tiltak) og tilskitning av maskene. Noen opplever også pustebesvær, andre ubehag og kommunikasjonsvansker. Hvor mange mennesker som opplever disse ulempene er usikkert. Med en lav forekomst av covid-19, vil antagelig personer som opplever ulemper sannsynligvis være mye større enn antall infeksjoner som forebygges.

Et ekspertpanel diskuterte og vurderte dokumentasjonen ved bruk av et forhåndsdefinert sett med kriterier. Panelet tok ikke hensyn til en mulig mangel på medisinske munnbind. Evalueringene for hvert kriterium ble bedømt både individuelt og i en konsensusprosess, og den samlede anbefalingen og rapporten ble gjennomgått av panelet.

Konklusjon

I den nåværende epidemiologiske situasjonen i Norge anbefaler vi ikke å bruke ansiktsmasker for å redusere spredningen av covid-19 for personer i samfunnet uten luftveissymptomer og som ikke er i nærkontakt med personer med kjent smitte. Hvis den epidemiologiske situasjonen forverres vesentlig i et geografisk område, bør bruken av ansiktsmasker som et forebyggende tiltak vurderes på nytt. Tiltak for å redusere risikoen ved bruk av offentlig transport og under arrangementer med mange til stede, inkludert bruken av ansiktsmasker, bør utredes nærmere.

Hvis man anbefaler bruk av ansiktsmasker hos personer uten luftveissymptomer i samfunnet i gitte situasjoner, for eksempel ved offentlig transport eller større arrangementer, bør medisinske munnbind eller kvalitetskontrollerte ikke-medisinske ansiktsmasker med dokumentert filtreringseffekt brukes. Ved mangel på personlig beskyttelsesutstyr kan man iverksette prioriteringer av grupper for bruk. En slik anbefaling bør følges opp med opplæringstiltak for å sikre korrekt bruk, og risiko knyttet til falsk trygghetsfølelse og tilskitning av masker bør formidles. Opplæringen bør være tilpasset behovene til forskjellige grupper, inkludert mennesker med ulik norskforståelse og sosioøkonomisk bakgrunn.

Contents

Problem statement

Health authorities have given conflicting recommendations regarding the use of facemasks by asymptomatic individuals in the community to reduce the spread of COVID-19. For example, The World Health Organization (WHO) recommends that "In settings where medical masks are in short supply, medical masks should be reserved for health workers and at-risk individuals when indicated.” [1]. With respect to non-medical facemasks, WHO advises: "The use of facemasks made of other materials (e.g., cotton fabric), also known as non-medical facemasks, in the community setting has not been well evaluated." "WHO is also strongly encouraging countries that issue recommendations for the use of facemasks in healthy people in the community to conduct research on this critical topic." [2]

Using an Evidence to Decision (EtD) framework, a panel at the Norwegian Institute of Public Health (NIPH) developed a recommendation addressing the question “Should individuals in the community without respiratory symptoms wear facemasks to reduce the spread 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 make recommendations or decisions by moving from evidence to decisions in a structured way (https://ietd.epistemonikos.org/#/about/introduction)[3,4]. The process ensures that the pros and cons and important criteria for decisions are considered, and makes the decision process transparent. EtD frameworks also make it possible for people to understand the basis for recommendations.

The process included gathering and reviewing evidence, discussion, and assessment by an expert panel using an explicit set of criteria. The assessments provided the basis for a conclusion and recommendation.

Search strategy

This EtD framework and a second framework (regarding the use of facemasks by asymptomatic healthcare personnel in nursing homes) 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.

All articles coded as “Treatment or prevention, Coronavirus infection, and Masks” in the L·OVE COVID-19 database[5] 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).[6] 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.[7] 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.[8] 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[9] 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)[10] and ClinicalTrials.gov COVID-19 list of registered studies (13 May 2020)[11] 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 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[12] 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).[13]

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. The group also made individual judgements. This informed 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 nine 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.[14, 15]

One systematic review was used as the primary systematic review for effects for the EtD framework.[16] 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. The review is a preprint, not yet peer reviewed preprint, posted April 6, 2020. 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, [17] three non-randomised studies (Supplement Table 3), 11 laboratory studies (Supplement Table 4), and two models of the effects of masks[18, 19] 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.[20] One systematic review of economic evaluations was included.[21] Two qualitative evidence syntheses[22, 23] and one study[24] 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 limited direct evidence of the effect of using facemasks in community settings on COVID-19 infection rates. This evidence comes from ecological studies, summarised in Supplement Table S3. These studies have a high risk of bias.

One randomised trial of the use of medical facemasks by people working outside of their home to prevent COVID-19 infections is ongoing in Denmark[25]. That trial is evaluating the effect on COVID-19 infections in people wearing facemasks, not on COVID-19 infections in people exposed to asymptomatic but infected individuals. No other trials of the use of medical or non-medical facemasks outside of healthcare settings are currently registered in the International Clinical Trials Registry Platform (ICTRP) or ClinicalTrials.gov.

Evidence of the effects of facemasks on preventing other respiratory infections

A systematic review of the effects of facemasks to prevent other respiratory infections found three randomised trials that provide evidence of low certainty that wearing medical facemasks in community settings may reduce the odds of primary infection with influenza-like illness by around 6% [16]. (Supplement Figures 2, 3 and 4) This estimate is based on two studies in university residencies and one in Hajj pilgrims. It is very uncertain whether the effect estimate is applicable to the use of either medical or non-medical facemasks by asymptomatic individuals in the community to prevent COVID-19 transmission.

Other randomised trials of facemasks are less applicable to the use of facemasks in the community for primary prevention of COVID-19, and effect estimates from non-randomised studies vary widely [16]. Brainard and colleagues found one cohort study (using data from a randomised trial of supplements to reduce or prevent common colds) and one case control study that estimated the association between wearing facemasks and primary prevention of respiratory infections in the general community. The cohort study, which included healthy adult volunteers in Japan, included "habit of wearing facemasks" (undefined) as an independent variable. It did not find an association between wearing facemasks and common colds (OR 0.85; 95% CI 0.37 to 1.94) in the intervention group and OR 0.94 (95% CI 0.43 to 2.03) in the control group. The case-control study included probable and suspected SARS cases and controls in Beijing in 2003 and controls matched by sex and age group. In a multivariate analysis, “always wearing a facemask when going out” was associated with a reduction in the risk of clinically diagnosed SARS (OR 0.3; 95% CI 0.1 to 0.6). “Sometimes wearing a facemask when going out” was also associated with a reduction in risk (OR 0.4; 95% CI 0.2 to 0.9). Both studies have a high risk of bias.

There is limited evidence from randomised or non-randomised studies of the effects of non-medical facemasks on preventing respiratory infections [26]. 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) [27].

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 [28]. Key findings of relevant laboratory studies are summarised in Supplement Table S4. 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 or policies to promote 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) [28]. 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[25].

Impact of correct use of facemasks

The effectiveness of facemasks depends on correct use. 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[28].

Potential adverse effects of using facemasks

Potential adverse effects of using facemasks include[28]:

- 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

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 3.

Table 1. 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 2. Panel consensus on Non-medical facemasks or advice to wear non-medical face-masks

	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 3. Panel consensus on No facemasks or no advice to wear or not to wear facemasks

	Favours no facemasks	Probably favours no facemasks	Neither favours no facemasks or other options	Probably does not favour no facemasks	Does not favour no 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		✔			

Problem - Is the problem a priority?
Preventing spread of COVID-19 from symptomatic or pre-symptomatic cases in the community is a high priority. It is likely that asymptomatic infections contribute to the spread of the infection. In the present situation, the prevalence of COVID-19 in the general population is very low. Given that symptomatic cases comply with the recommendation to stay in isolation at home, or in health care, the probability of a random meeting between a pre- or asymptomatic case and a susceptible person in the general population in Norway today is extremely low (1 in 50 000). [29]

The panel discussed how a change in incidence could influence these judgements. An increase in the prevalence of contagious people without symptoms, either locally or nationally, should prompt a re-evaluation of the problem. The panel did not decide on a threshold.

Desirable effects - How substantial are the desirable anticipated effects?
There is evidence for a protective effect of medical facemasks in community settings. However, study results vary greatly. Randomised trials from community settings indicate a small protective effect. Laboratory studies indicate a larger effect when facemasks are worn by asymptomatic but contagious individuals to prevent the spread of virus, than when they are worn by susceptible individuals to protect themselves from becoming infected. To ensure correct use of facemasks, country-wide training programmes adapted to a variety of audiences would need to be implemented. It is not known whether the use of medical facemasks by the healthy population would be widely acceptable or the extent to which correct use could be achieved.

Non-medical facemasks include a variety of products. There is no reliable evidence of the effectiveness of non-medical facemasks in community settings. There is likely to be substantial variation in effectiveness between products. However, there is only limited evidence from laboratory studies of potential differences in effectiveness when different products are used in the community.

Given the low prevalence of COVID-19 currently, even if facemasks are assumed to be effective, the difference in infection rates between using facemasks and not using face-masks would be small.

Undesirable effects - How substantial are the undesirable anticipated effects?
The undesirable effects of facemasks include the risks of incorrect use, a false sense of security (leading to relaxation of other interventions), and contamination of masks. In addition, some people experience problems breathing, discomfort, and problems with communication. The proportion of people who experience these undesirable effects is uncertain. However, with a low prevalence of COVID-19, the number of people who experience undesirable effects is likely to be much larger than the number of infections prevented.

Certainty of the evidence - What is the overall certainty of the evidence of effects?
There is low-certainty evidence for a protective effect of medical facemasks used in a community setting from randomised trials and inconsistent evidence from non-randomised studies. Evidence of the magnitude of undesirable effects is lacking.

Evidence of the desirable effects of non-medical facemasks is very uncertain. The range of different products, without standards for production, contributes to the uncertainty. The undesirable effects of non-medical facemasks are also not well documented.

The effectiveness of facemasks for primary prevention compared to not using facemasks is uncertain. At the same time, it is certain that facemasks have some undesirable effects compared to not using facemasks, although the magnitude of the undesirable effects is uncertain.

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

The value (importance) of limiting the spread of COVID-19 in the population is likely to be dependent on the prevalence and knowledge about the risk of severe disease. The panel believes that the potential desirable and undesirable effects of using facemasks are likely to be valued differently by the elderly and persons belonging to high-risk groups than by younger people without risk factors.

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

The available research evidence suggests a small desirable effect of individuals in the community without symptoms using medical facemasks to prevent the spread of virus. However, there are important undesirable effects. The number needed to mask to prevent one infection is highly dependent on the incidence of COVID-19.

Given the current estimated infection rate of five cases per 100,000 people per week in Norway [29], large numbers of people would need to wear facemask in order to prevent infections. Brainard et al. estimated a relative risk reduction of 6%, whereas Chu et al. gave an unadjusted estimate for non-healthcare settings of 44%, and the adjusted estimate for using surgical facemasks of 67%. Assuming that 20% of people infectious with SARS-CoV-2 do not have symptoms, the following number of people would need to wear a mask for a week to prevent one person from becoming infected:

	Weekly incidence per 100 000			
Risk reduction	**5**	**10**	**15**	**20**
6 %	1 333 000	667 000	444 000	333 000
40 %	200 000	100 000	67 000	50 000
70 %	114 000	57 000	38 000	29 000

The panel judged that with the current low incidence of COVID-19 in Norway, the balance of effects does not favour using medical facemasks.

The desirable effects of non-medical facemasks are uncertain, while the potential undesirable effects are the same as for medical facemasks and may occur more frequently. With the current low incidence of COVID-19 in Norway, the panel judged the balance of effects does not favour using non-medical facemasks.

The panel judged that the balance of effects favours not using facemasks by individuals in the community without symptoms to prevent the spread of virus.

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

The resources required are uncertain. However, the masks have a cost. A mask should not be used over a long time. The 'number needed to mask' to prevent one case of COVID-19 is highly dependent on the incidence and should be considered before making any recommendation.

Certainty of evidence of required resources – What is the certainty of the evidence of resource requirements (costs)?
The costs for medical facemasks are most probably higher than for non-medical facemasks, and may vary greatly depending on quality, documented filtration properties, and demand.

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, with the current low incidence of COVID-19 in Norway, the costs of using either medical or non-medical facemasks and ensuring correct use most probably outweigh the preventive effect, even if it was assumed that the undesirable effects were minimal.

Equity – What would be the impact on health equity?
Preventive measures, if recommended, should be available and affordable for all. The price of facemasks, whether medical or non-medical, will impact equity, as will the ability of different social groups to benefit from training programmes and use facemasks correctly.

Acceptability – Is the option acceptable to key stakeholders?
The panel believes that most people likely would find using medical or non-medical facemasks, or not using facemasks, all acceptable options, if a clear recommendation is given by authorities with an appropriate rationale that is consistent with the available evidence and the epidemiological circumstances.

Feasibility – Is the option feasible to implement?
Use of medical facemasks and non-medical facemasks requires training and follow-up. This probably favours not using facemasks under the current epidemiological circumstances in Norway.

Discussion and conclusion

Discussion

The use of facemasks in the community is not a substitute for other key strategies for reducing the spread of COVID-19, and should only be considered as a possible measure in addition to the core measures.

1. **People infected with SARS-CoV-2 should be detected and isolated.**
   - People with respiratory symptoms should stay at home.
   - Everyone who have symptoms of COVID-19 should be tested.
   - People with COVID-19 should be in isolation until not infectious and according to national guidelines.
   - Close contacts should be traced and placed in quarantine or monitored closely and tested.

2. **Everyone should continue to adhere to general mitigation measures.**
   - Follow good cough etiquette and hand hygiene and avoid touching your face.
   - Keep a distance of at least 1 meter from everyone but your closest circle.

3. **The use of facemasks by the public may be advisable in some situations.**

Despite uncertainty about whether the benefits would outweigh the harms and costs, if infection rates go up or widespread community transmission occurs, facemasks should be considered as a precautionary measure in situations where it is difficult to adhere to social distancing. This includes in:

- Public transportation like busses, trams, trains, and airplanes
- Public spaces like shops, restaurants, and communication hubs
- Mass events, like cultural, religious and sports events, and other public events, in concert halls, cinemas, sports arenas, houses of worship and public halls

The primary purpose of wearing a facemask in the community is to protect others.
The primary purpose of wearing a facemask in situations where social distancing is difficult is for people who are infectious but do not have symptoms and do not know they are infectious to wear facemasks to prevent them from transmitting the virus to others (source control). For vulnerable populations, wearing facemasks may also protect the wearer against infection.

The advisability of using facemasks in the community depends on the risk of infection.
The epidemiological situation plays a major role in determining when facemasks should be worn in the community. The threshold for when to recommend using facemasks in areas of community transmission depends on several factors. WHO has defined geographical areas

with community transmission as “experiencing larger outbreaks of local transmission defined through an assessment of factors including, but not limited to: large numbers of cases not linkable to transmission chains; large numbers of cases from sentinel surveillance; and/or multiple unrelated clusters in several areas of the country/territory/area” (https://www.who.int/publications-detail/global-surveillance-for-covid-19-caused-by-human-infection-with-covid-19-virus-interim-guidance). These are factors which NIPH is monitoring closely.

The effectiveness of facemasks depends on correct use.
If use of facemasks by individuals without respiratory symptoms in the community is recommended in specific situations, the community should be given training to ensure correct use and the risks should be explained, especially the risks of a false sense of security and contamination of masks. The training should be tailored to the needs of different groups, including people with different levels of fluency in Norwegian and different socio-economic circumstances.

The effectiveness of facemasks also depends on the type of facemask that is used.
Only medical masks and quality controlled non-medical masks with a documented filtration effect should be used. For the preventive use for vulnerable populations medical masks are recommended. National priorities for the use of personal protective equipment may apply, given existing shortages. Studies of the preventive effect of facemasks in the community are urgently needed, particularly studies of non-medical facemasks.

Conclusion

In the current epidemiological situation in Norway, wearing facemasks to reduce the spread of COVID-19 is not recommended for individuals in the community without respiratory symptoms who are not in near contact with people who are known to be infected. If the epidemiological situation worsens substantially in a geographical area, the use of facemasks as a precautionary measure should be reconsidered. Measures to reduce risks during necessary public transport and during mass events, including wearing facemasks, should be explored further.

If use of facemasks by individuals without respiratory symptoms in the community is recommended in specific circumstances, such as public transport or mass events, medical masks or quality controlled non-medical masks with a documented filtration effect should be used. National priorities for the use of personal protective equipment may apply, given existing shortages. If any such recommendation is made, the community should be given training to ensure correct use and the risks should be explained, especially the risks of a false sense of security and contamination of masks. The training should be tailored to the needs of different groups, including people with different levels of fluency in Norwegian and different socio-economic circumstances.

Limitations

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 may have identified additional publications. However, for the purposes of this work, we believe that the most relevant publications that were available 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 criteria in the framework. In this process, limitations of the evidence 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.

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2. 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
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Supplementary tables and figures

Figure S1. Flow diagram

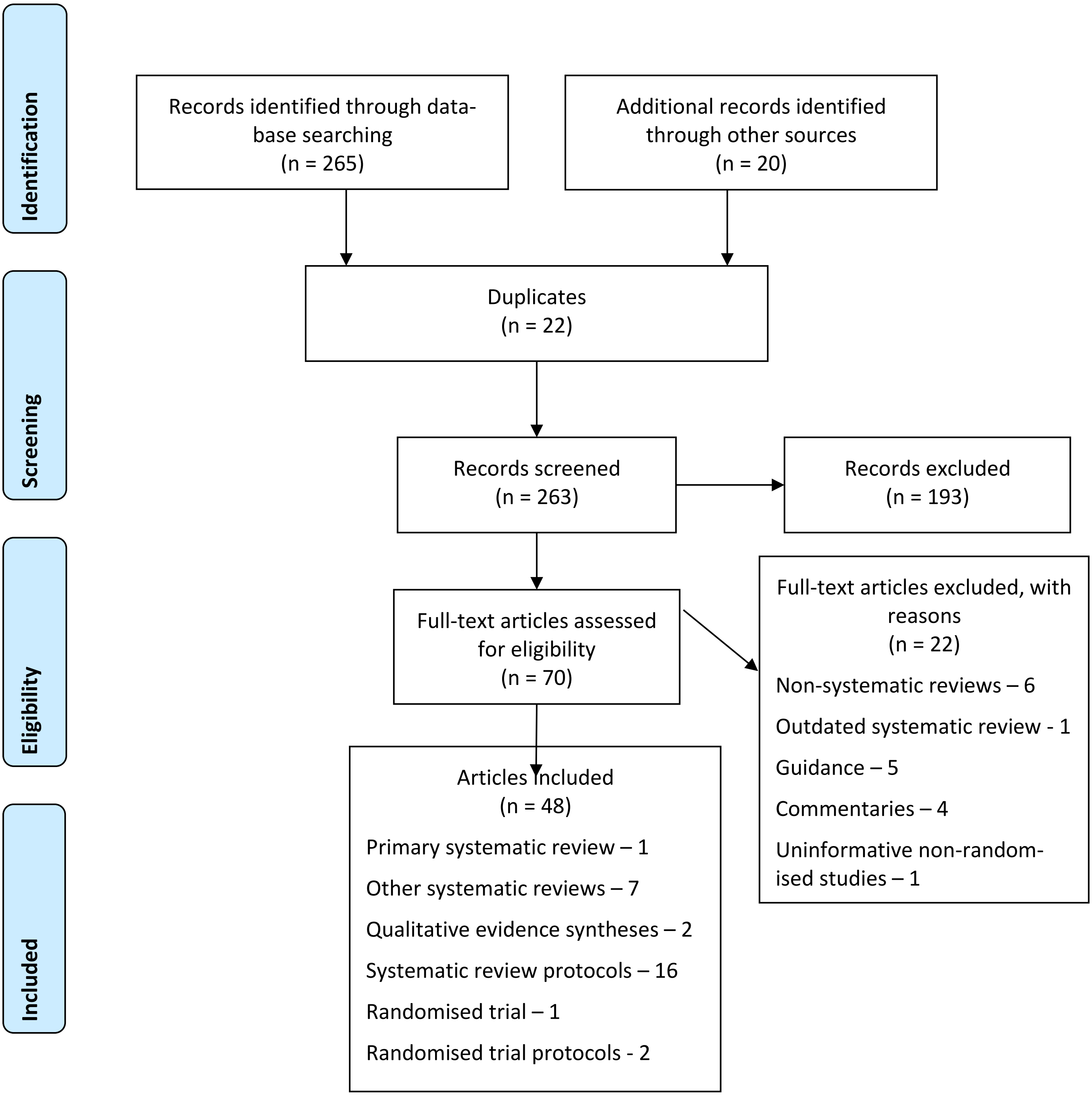


Table S1. ROBIS assessment of the primary systematic review for effects[11]

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 facemasks 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 around the mask area can degrade efficiencies by ~50% or more, pointing out the importance of fit.

Reference	Key findings
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 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
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

First author, title, and ID	Link
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
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

Reference	Reason
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

Summary of Findings table from Brainard and colleagues [Brainard 2020]). This figure is available under a [CC-BY-ND 4.0 International license)](https://creativecommons.org/licenses/by-nd/4.0/)

Masks compared to no masks for influenza-like-illness (ILI)

Patient or population: people without ILI, either in contact with a person with ILI (secondary transmission) or not (primary prevention)
Setting: Any
Intervention: Advice to wear a mask and/or provision of masks
Comparison: No advice to wear a mask

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk without masks	Risk with masks				
Primary prevention, well wear masks - RCT data - outcome ILI	108 per 1,000	**102 per 1,000** (83 to 125)	**OR 0.94** (0.75 to 1.19)	5183 (3 RCTs)	⊕⊕◯◯ LOW [a,b,c,d,e]	Wearing a mask may very slightly reduce the odds of primary infection with influenza-like illness (ILI) by around 6%. Low-certainty evidence, downgraded once each for risk of bias and imprecision.
Secondary transmission, use of masks in homes, only ill person wears mask – RCT data – outcome ILI	68 per 1,000	**65 per 1,000** (38 to 108)	**OR 0.95** (0.53 to 1.72)	903 (2 RCTs)	⊕◯◯◯ VERY LOW [f,g]	When one household member becomes ill with an ILI the effect of their wearing a mask on the odds of house-mates developing ILI is unclear, as the evidence is of very low certainty (downgraded once for risk of bias, twice for imprecision).
Secondary transmission, use of masks in homes, only well person(s) wears mask – RCT data – outcome ILI	121 per 1,000	**114 per 1,000** (86 to 150)	**OR 0.93** (0.68 to 1.28)	2078 (2 RCTs)	⊕⊕◯◯ LOW [f,h]	Both house-mates and the infected household member wearing masks once one household member has contracted an infectious disease may modestly reduce the odds of further household members becoming ill by around 19%. Low certainty evidence (downgraded twice overall for risk of bias, imprecision and inconsistency).
Secondary transmission, use of masks in homes, both well and ill person(s) wear mask – RCT data – outcome ILI	192 per 1,000	**173 per 1,000** (121 to 242)	**OR 0.81** (0.48 to 1.37)	1605 (5 RCTs)	⊕⊕◯◯ LOW [h,i,j]	Both house-mates and the infected household member wearing masks once one household member has contracted an infectious disease may modestly reduce the odds of further household members becoming ill by around 19%. Low certainty evidence (downgraded twice overall for risk of bias, imprecision and inconsistency).

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **OR:** Odds ratio

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations
a. Risk of bias: Outcome assessors were not blinded for ILI (as outcomes are self-reported and participants could not be blinded), but were for lab-based diagnoses (not shown). Allocation concealment often unclear. Downgraded once.
b. Inconsistency: I2 was 19%. Evidence from other study designs were roughly confirmatory of a small beneficial effect. Not downgraded.
c. Indirectness: measured exactly what we wanted to know re primary prevention. Not downgraded.

Figure S3 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

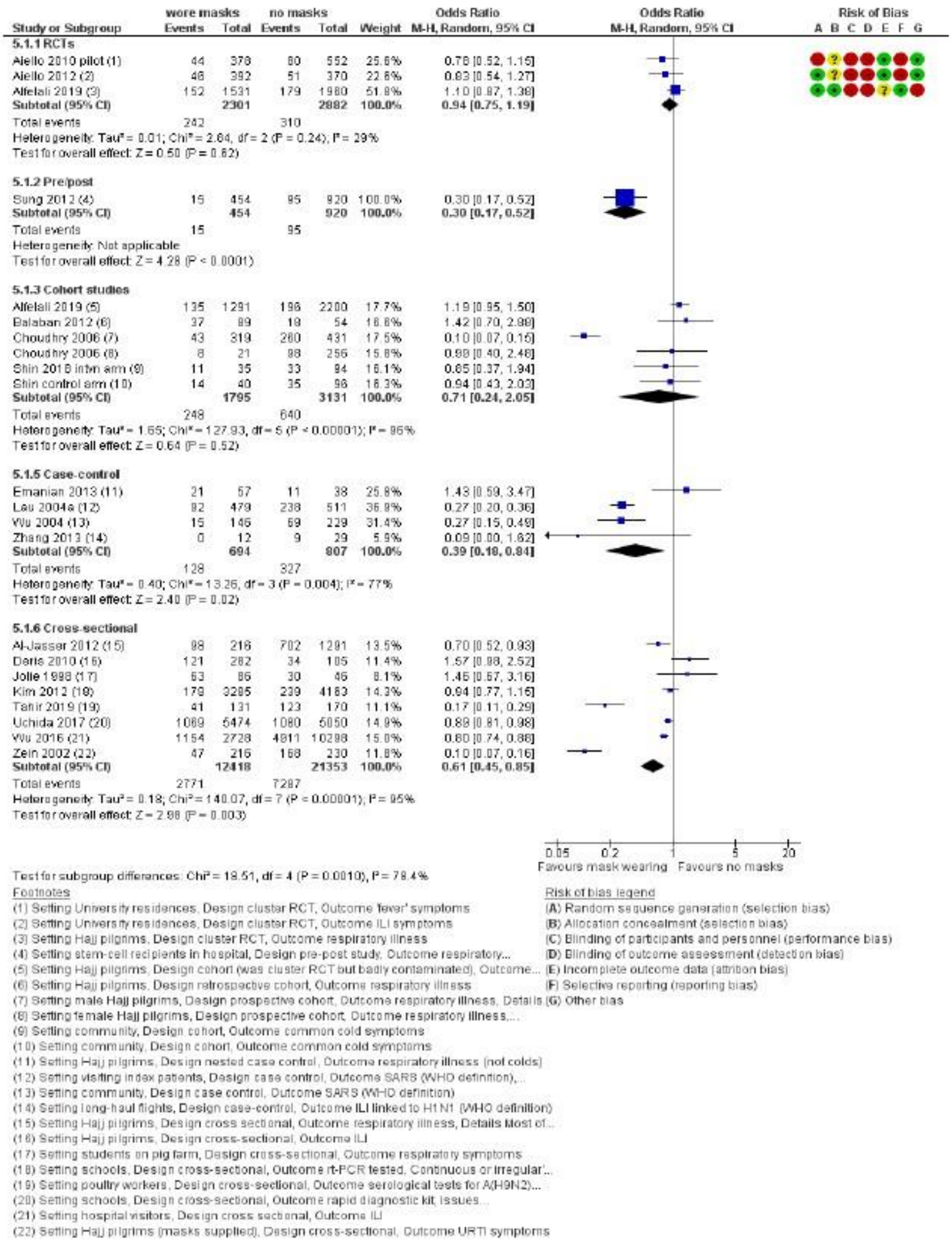
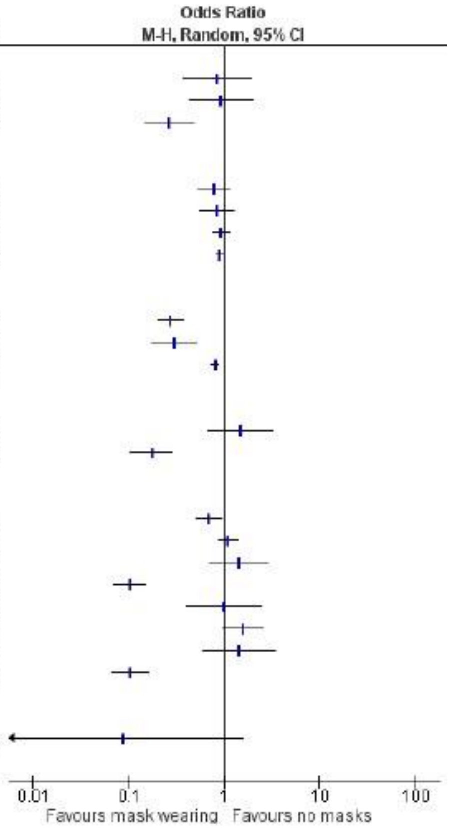


Figure S4from Brainard and colleagues [Brainard 2020]). This figure is available under a

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

	wore masks		no masks		Odds Ratio
Study or Subgroup	**Events**	**Total**	**Events**	**Total**	**M-H, Random, 95% CI**
1.2.1 general community					
Shin 2018 intvn arm (1)	11	35	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, 0.88]
1.2.4 Animal contact					
Jolie 1998 (11)	63	86	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)	98	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	0.99 [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 9 June 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].

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

Table 1. Included articles

Systematic reviews providing supplementary information	
Chu DK, Akl EA, Duda S, et al. 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. https://doi.org/10.1016/S0140-6736(20)31142-9	This review included 30 studies of the association between use of various types of face masks and respirators by health-care workers, patients, or both with transmission of COVID-19, SARS, or MERS. 10 studies contributed data to a meta-analysis of adjusted associations. The estimated OR for surgical facemask or similar (e.g., 12–16-layer cotton) vs no facemask was 0.33 (95% CI 0.17 to 0.61). However, only one study of primary prevention in the community was included [Wu 2004], which was also included in the Brainard review [Brainard 2020] and was considered in our review. The review authors assessed the certainty of the evidence for facemasks vs no facemasks as low overall for any setting without distinguishing between primary and secondary prevention or considering non-medical facemasks. The estimate is very uncertain for the use of masks in the community for primary prevention, especially for non-medical facemasks. It is likely an overestimate, because compliance with correct use would likely be lower and non-medical facemasks are likely to be less effective.
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	This review included 7 non-randomised economic studies that were judged to provide very low certainty evidence. The studies all found that use of personal protective equipment was economically attractive. However, the results were sensitive to assumptions about rate of transmission, facility infection rate, and compliance with interventions, with economic attractiveness increasing when transmission and fatality rates are high.
Liang M, Gao L, Cheng C, et al. Efficacy of face mask in preventing respiratory virus transmission: a systematic	This review included 21 studies of mask use to prevent respiratory virus transmission. It did not

review and meta-analysis. medRxiv 2020. https://doi.org/10.1101/2020.04.03.20051649	include any non-healthcare worker studies that were not included in Bainard 2020. The estimated OR for mask use vs control for non-healthcare workers was 0.53 (95% CI 0.36 to 0.79). There was variation in the effect estimates (I^2 = 45%) and a subgroup difference between healthcare workers and non-healthcare workers (P=0.008), with a stronger association for healthcare workers (OR 0.20; 95% CI 0.11 to 0.37).. There were also subgroup differences for different viruses (influenza, SARS-CoV an SARS-CoV2) (P=0.002), and different study designs (P=0.0002). Cluster-randomised studies indicated a smaller effect (OR 0.65; 95% CI 0.47 to 0.91) and case-control studies indicated the largest effect (OR 0.24; 95% CI 0.18 to 0.33).
Saijonkari M, Booth N, Isojärvi J, Finnilä J, Mäkelä M. Kasvosuojukset COVID-19-tartunnalta suojautumisessa ja infektioepidemian hallinnassa: järjestelmällinen katsaus ja näytön arviointi. (Face masks in preventing COVID-19 infections and controlling the epidemic.) (In Finnish). In: Report on the use of community face coverings to prevent the spread of the COVID-19 epidemic. Reports and Memorandums of the Ministry of Social Affairs and Health 2020:21, Appendix 1. http://urn.fi/URN:ISBN:978-952-00-5421-2	This review included six systematic reviews and six randomised trials. Four of the six RCTs were included in the Brainard review [Brainard 2020]. Saijonkari et al. did not conduct a meta-analysis. None of the included studies examined use of facemasks in a situation similar to the normal living environment of the Finnish population. The review assessed safety and found that facemasks appear to cause discomfort to users, but not actual harm. This review concluded that the effect of facemasks used outside the home on the spread of droplet-mediated respiratory infections in the population is minimal or non-existent
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).
Mitze T, Kosfeld R, Rode J, Wälde K. Face masks considerably reduce COVID-19 cases in Germany: a synthetic control method approach. IZA Institute of Labor Economics Discussion Paper Series 2020; IZA DP No. 13319. http://ftp.iza.org/dp13319.pdf	This study compares infection rates in the city of Jena, Germany where facemasks were introduced on 6 April 2020 to other areas in Germany where facemasks were not introduced until later using a synthetic control, i.e. using a weighted combination of infection rates in other areas as the control to which infection rates in Jena were compared in regression analyses. The study estimates that face masks reduced the cumulative number of registered Covid-19 cases between 2.3% and 13% over a period of 10 days after they became compulsory and that the daily increase in reported infections was reduced by around 40%.

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
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