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BUILDING
A HEALTHY
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APPENDICES

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A systemic review of non-pharmaceutical interventions for reducing the risk of transmission of respiratory infection in early childhood education and care settings

PREPARED FOR
The Commonwealth of Australia

AS REPRESENTED BY
National Health and Medical Research Council
Staying Healthy Advisory Committee

PREPARED BY
HT ANALYSTS Pty Ltd

Report information

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Dates

This technical report and accompanying evidence evaluation report received approval from the NHMRC Staying Healthy Advisory Committee (SHAC) on 14 February 2023.

The protocol for the evidence evaluation received approval from the NHMRC SHAC on 14 September 2022.

History

The ONHMRC is seeking to update the evidence underpinning the *2013 Staying Healthy – Preventing infectious diseases in early childhood education and care services* (Staying Healthy) resource. The NHRMC's SHAC has met twice to consider the information provided by the sector, through stakeholder surveys, email enquiries and preliminary scoping reviews of the literature. While there are many topics outlined in this resource, the SHAC has identified two key priority areas that require a systematic review of the literature to provide evidence-based guidance.

To support the ONHMRC in the conduct of the systematic review, **HT**ANALYSTS has been engaged to conduct a systematic review for research question one, which focuses on the effect of non-pharmaceutical interventions to prevent the transmission of respiratory infections.

This Research Protocol has been developed by **HT**ANALYSTS in conjunction with the ONHMRC and SHAC to provide a framework outlining the methodology that will be used to review the evidence about exclusion measures in child education and care services. It is intended that all associated materials will be developed in a robust and transparent manner in accordance with relevant best practice standards (1-3).

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List of abbreviations

CDC	Centre for Disease Control and Prevention
CI	Confidence interval
COMET	Core Outcome Measures in Effectiveness Trials
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HR	Hazard ratio
JBI	Joanna Briggs Institute
MD	Mean difference
MeSH	Medical Subject Headings
ONHMRC	The Office of National Health and Medical Research Council
NICE	The National Institute for Health and Care Excellence
OR	Odds ratios
PICO	Population, Intervention, Comparator, Outcome
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	Randomised controlled trial
RoB	Risk of bias
RR	Risk ratio
SD	Standard deviation
SHAC	Staying Healthy Advisory Committee
SMD	Standardised mean difference
SR	Systematic review

Appendix A Searching, selection criteria and screening

A1 Search methods

This appendix documents the search strategy used to inform the systematic review on non-pharmaceutical measures for preventing the spread of infectious diseases in early childhood and education care services.

A1.1 Electronic searches

The literature search strategy was developed in Ovid (for Embase, Cochrane and MEDLINE) based on the key element of research question (i.e. the population, intervention, setting, outcome). Methodological filters developed in-house were used for identifying SRs, RCTs and cohort studies to assist in the screening process. In developing the search strategy, we appraised and adapted keywords and MeSH terms previously reported; with the search strategies of SRs identified in the scoping report also reviewed to identify additional potentially relevant concepts. Terms or concepts proven not suitable were removed and other terms added.

No language or geographic limitations were applied when conducting the search of English language databases. Non-English databases were not searched and only studies published after 2000 were eligible for inclusion.

The strategy was adapted to suit the required syntax for the following electronic bibliographic databases:

- Embase (via Ovid)
- MEDLINE (via Ovid)
- Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials (via Cochrane Library)
- CINAHL (via *EBSCO*Host) – Cumulative Index to Nursing and Allied Health Literature
- PubMed (limited to in-process citations and citations not indexed in MEDLINE) – to retrieve citations not yet indexed in OVID

Details of the search strategy and the number of hits for each database are provided in **Appendix A2**.

A1.2 Other resources

In addition to the above databases, simple text searches of the following databases were conducted:

- OpenGrey
- Clinical trial registries (ClinicalTrials.gov, WHO International Clinical Trials Registry Platform
- Websites of suitable international and national agencies including WHO, CDC, NICE, CADTH, Agency for Healthcare Research Quality, State and Commonwealth Departments of Health.
- Guideline databases (MAGICApp, Guidelines International Network)

A1.3 Publication date

There were no limitations on publication date, however the suggested publication date range included publications from 2000 onwards.

Eligible studies that were published after the literature search date were not included and are listed within the *'Studies awaiting classification'* table of the evaluation report. These studies were not subject to a formal evidence evaluation, however, a brief statement about the study and its potential impact on the overall conclusions of the evidence review was included under the relevant sections of the review.

A1.4 Studies published in languages other than English

The literature search was not limited by language of publication. Non-English databases were not searched, however studies in languages other than English may have been identified via the English-language databases. For pragmatic reasons, potentially eligible studies did not undergo full-text translation or data extraction but are documented in Section A5.3 Studies published in languages other than English.

A2 Search strategy

The search strategy was developed in-house for the Ovid interface and was adapted to suit EBSCOHost, the Cochrane Library and PubMed (limited to in-process citations and citations not indexed in MEDLINE).

Table A-1 Search strategy

	Concept	Search strategy
1	Study design limits	exp meta analysis/ or meta analysis.mp. or exp systematic review/ or systematic review.mp. or pooled analysis.mp. or ((exp review/ or review.mp.) and (systemat* or pool*).mp.)
2		exp comparative study/ or comparative study.mp. or exp clinical trial/ or clinical trial.mp. or randomized controlled trial.mp. or randomi?ed controlled trial.mp. or exp randomized controlled trial/ or exp randomization/ or randomization.mp. or randomi?ation.mp. or exp single blind procedure/ or single blind procedure.mp. or exp double blind procedure/ or double blind procedure.mp. or exp triple blind procedure/ or triple blind procedure.mp. or exp crossover procedure/ or crossover procedure.mp. or exp placebo/ or placebo*.mp. or random*.mp. or rct.mp. or single blind.mp. or single blinded.mp. or double blind.mp. or double blinded.mp. or treble blind.mp. or triple blind.mp. or triple blinded.mp. or exp prospective study/ or prospective study.mp.
3		exp clinical study/ or exp case control study/ or exp family study/ or exp longitudinal study/ or exp retrospective study/ or exp cohort analysis/ or (cohort adj1 stud*).mp. or (case control adj1 stud*).mp. or (exp prospective study/ not randomi?ed controlled trials.mp.) or (follow up adj1 stud*).mp. or (observational adj1 stud*).mp. or (epidemiologic* adj1 stud*).mp. or (cross sectional adj1 stud*).mp.
4		letter.pt.
5		(editorial or comment or historical article).pt.
6	Setting	kindergarten/ or child care/ or child day care/
7		school/
8		(creche? or preschool$ or pre-school$ or pre?school$ or minischool$ or mini-school$ or mini?school$).ti,ab.
9		(daycare or day-care or day?care).ti,ab.
10		(family adj (care or day-care or day?care)).ti,ab.
11		((daycare or day-care or day?care) adj2 (centre? or center? or setting or facilit$)).ti,ab.
12		((childcare or child-care or child?care) adj2 (centre? or center? or setting or facilit$)).ti,ab.
13		or/6-12
14	Condition - Respiratory infection	exp influenza/ or exp respiratory tract disease/ or exp common cold/ or exp coronavirus/ or exp SARS coronavirus/ or exp coronavirus infection/ or exp severe acute respiratory syndrome/ or exp pneumovirus/ or exp human respiratory syncytial virus/
15		(influenza$ or influenza?like or ILI or Flu$ or common cold or colds).ti,ab.
16		(coronavirus$ or severe acute respiratory syndrome$ or sars).ti,ab.
17		(respiratory syncytial virus$ or rsv or parainfluenza$).ti,ab.
18		(pertussis or whooping cough or croup or haemophilus or bronchit$ or tuberculosis or listeriosis or listeria).ti,ab.
19		respiratory illness.ti,ab.
20		(transmission and (coughing or sneezing)).ti,ab.
21		(respiratory tract and (infection$ or illness$)).ti,ab.
22		exp communicable disease/pc [Prevention]
23		or/14-22
24	General infection control	Contact Tracing/ or infection control/ or Fumigation/ or Universal Precautions/
25		communicable disease control/
26		exp disease transmission/
27		Disease Transmission, Infectious/
28		fomite transmission/ or vector transmission/ or oral transmission/ or bacterial transmission/ or asymptomatic transmission/ or mother to child transmission/ or parasite transmission/ or droplet transmission/ or child to adult transmission/ or airborne transmission/ or virus transmission/ or aerosol transmission/ or fecal oral transmission/ or pathogen transmission/

	Concept	Search strategy
29		((fomite or vector or bacterial or asymptomatic or "mother to child" or parasite or droplet or "child to adult" or airborne or virus or aerosol or "fecal oral" or pathogen or secondary) and transmission).ti,ab.
30		secondary transmission.ti,ab.
31		((infectio$ or bacteri$ or viral or virus or pathogen or fungal or fungus or fungi) adj4 (control or prevent*)).ti,ab.
32		(((protozoa or mite or parasite or worm) adj3 (control or prevent$)) and (respirat$ or lung)).ti,ab.
33		((reduce$ or reduc$ or lower) and (incidence or occurrence or transmission)).ti,ab.
34		cross infection/dm, pc [Disease Management, Prevention]
35		or/24-34
36	Hand hygiene, gloves and masks	exp hand washing/ or exp hand disinfection/ or exp hand hygiene/
37		exp protective glove/
38		face mask/ or reprocessed non continuous ventilator mask/ or surgical mask/
39		exp Respiratory Protective Devices/
40		(handwash$ or hand-wash$ or hand hygiene or hand disinfect$).ti,ab.
41		(alcohol and (wash$ or clean$ or rinse$ or rub or rubbing or saniti?er or disinfect$)).ti,ab.
42		(glove or gloves or facemask$ or mask$ or hygiene intervention or faceshield$ or face?shield$).ti,ab.
43		N95 respirator$.ti,ab.
44		or/36-43
45	Ventilation	exp air purification/ or exp air purifier/
46		exp air filtration/ or exp air filters/ or exp air cleaner/
47		exp ventilate/ or exp ventilation/
48		((outdoor or outside) adj2 play).ti,ab.
49		or/45-48
50	Exclusion	physical distancing/
51		quarantine/ or quarantine.ti,ab.
52		((exclusion and (period$ or measure$ or policy)) or temporary exclusion$).ti,ab.
53		((school$ or classroom$) and (closure$ or closed)).ti,ab.
54		case isolation.ti,ab.
55		cohorting.ti,ab.
56		((isolation adj2 room*) or isolation strateg*).ti,ab.
57		isolation/ or Home Isolation/ or contact isolation/
58		or/50-57
59	Infection	infection rate/
60		infection risk/
61		((Secondary attack or Secondary infection or infection) and (rate or risk)).ti,ab.
62		((infectious or transmission) and period).ti,ab.
63		or/59-62
64		(animals/ or nonhuman/) not humans/
65	Setting and condition	13 and 23
66	Intervention	35 or 44 or 49 or 58 or 63
67	Combined PICO	(65 and 66) not 64
68	SRs	1 and 67
69	RCTs	(2 and 67) not 68
70	NRSIs	(3 and 67) not (68 or 69)
71	letters	(4 and 67) not (68 or 69 or 70)

	Concept	Search strategy
72	editorials	(5 and 67) not (68 or 69 or 70 or 71)
73	ALL	(68 or 69 or 70 or 71) NOT 72
74	Other	67 NOT (73 or 72)

The above strategy was designed for OVID (Embase and Medline) will be adapted to suit EBSCO (CINAHL, AMED), the Cochrane Library and PubMed (limited to in-process citations and citations not indexed in MEDLINE).

As noted in the protocol, a hierarchical approach to screening occurred. Citations identified in line 68 were screened before those identified in Line 69, Line 70, and Line 71. At each point a decision was made to either stop screening (meaning we are confident we have sufficient evidence to answer the research question) or continue to the next step. Publication date limits or further targeting to specific interventions or outcomes were made at each stage.

Ovid syntax

Exp explodes controlled vocabulary term (i.e. includes all narrower terms in the hierarchy)
* denotes a term that has been searched as a major subject heading
/ denotes controlled vocabulary terms (EMTREE)
$ truncation character (unlimited truncation)
$*n* truncation limited to specified number (*n*) of characters (e.g. time$1 identifies time, timed, timer, times but not timetable)
* truncation character (unlimited truncation)
? substitutes any letter (e.g. oxidi?ed identifies oxidised and oxidized)
adj*n* search terms within a specified number (*n*) of words from each other in any order
.ti. limit to title field
.ti,ab. limit to title and abstract fields
.kw,ti,ab. limit to keyword, title and abstract field
.pt limit to publication type

CINHAL syntax

* truncation character (unlimited truncation)
# wildcard character will replace 1 or 0 characters (e.g. f#etus will retrieve fetus and foetus)
? wildcard character will replace one character (e.g. wom?n will retrieve women and woman)
MH - Search the exact CINAHL® subject heading; searches both major and minor headings
MH"heading"+ Search an exploded subheading
TI search title fields
AB search abstract fields
Nn – Proximity "near" operator will find a result if the terms are within a certain number (n) words of each other, regardless of the order in which they appear. (e.g. eating N5 disorders for results that contain eating disorders, as well as mental disorders and eating pathology.)
PT limit to publication type

PubMed syntax

The PubMed search will be restricted to records that are not indexed for MEDLINE (i.e. in-process citations and citations from journals (or parts of journals) that are not currently MEDLINE-indexed)

The search will comprise free-text terms only and replicates the free-text sets in the Embase search (converted from the Ovid syntax).

* truncation character (unlimited truncation)
[TI] limit to title field
[TIAB] limit to title and abstract fields
[EDAT] date citation added to PubMed
[SB] PubMed subset
AND pubmednotmedline[sb] will be added to the last line of search string

A3 Search results

This appendix documents the results of the literature search and screening for a systematic review on the effect of non-pharmaceutical measures for preventing the transmission of respiratory infections in childhood education and care services. The literature search strategy was developed and conducted as described in **Appendix A1**.

A3.1 Embase

The search for eligible studies was conducted on 15th September 2022

Databases searched were as follows:

- Embase Classic+Embase 1947 to 2022 September 15

Table A-2 Search results: Embase

	Concept	Search strategy	Results
1	Study design limits	exp meta analysis/ or meta analysis.mp. or exp systematic review/ or systematic review.mp. or pooled analysis.mp. or ((exp review/ or review.mp.) and (systemat* or pool*).mp.)	727664
2		exp comparative study/ or comparative study.mp. or exp clinical trial/ or clinical trial.mp. or randomized controlled trial.mp. or randomi?ed controlled trial.mp. or exp randomized controlled trial/ or exp randomization/ or randomization.mp. or randomi?ation.mp. or exp single blind procedure/ or single blind procedure.mp. or exp double blind procedure/ or double blind procedure.mp. or exp triple blind procedure/ or triple blind procedure.mp. or exp crossover procedure/ or crossover procedure.mp. or exp placebo/ or placebo*.mp. or random*.mp. or rct.mp. or single blind.mp. or single blinded.mp. or double blind.mp. or double blinded.mp. or treble blind.mp. or triple blind.mp. or triple blinded.mp. or exp prospective study/ or prospective study.mp.	5326087
3		exp clinical study/ or exp case control study/ or exp family study/ or exp longitudinal study/ or exp retrospective study/ or exp cohort analysis/ or (cohort adj1 stud*).mp. or (case control adj1 stud*).mp. or (exp prospective study/ not randomi?ed controlled trials.mp.) or (follow up adj1 stud*).mp. or (observational adj1 stud*).mp. or (epidemiologic* adj1 stud*).mp. or (cross sectional adj1 stud*).mp.	12173266
4		letter.pt.	1239105
5		(editorial or comment or historical article).pt.	737330
6	Setting	kindergarten/ or child care/ or child day care/	44806
7		school/	83496
8		(creche? or preschool$ or pre-school$ or pre?school$ or minischool$ or mini-school$ or mini?school$).ti,ab.	47409
9		(daycare or day-care or day?care).ti,ab.	12739
10		(family adj (care or day-care or day?care)).ti,ab.	2448
11		((daycare or day-care or day?care) adj2 (centre? or center? or setting or facilit$)).ti,ab.	5251
12		((childcare or child-care or child?care) adj2 (centre? or center? or setting or facilit$)).ti,ab.	2107
13		or/6-12	183360
14	Condition - Respiratory infection	exp influenza/ or exp respiratory tract disease/ or exp common cold/ or exp coronavirus/ or exp SARS coronavirus/ or exp coronavirus infection/ or exp severe acute respiratory syndrome/ or exp pneumovirus/ or exp human respiratory syncytial virus/	3324980
15		(influenza$ or influenza?like or ILI or Flu$ or common cold or colds).ti,ab.	2381496
16		(coronavirus$ or severe acute respiratory syndrome$ or sars).ti,ab.	168415
17		(respiratory syncytial virus$ or rsv or parainfluenza$).ti,ab.	32376
18		(pertussis or whooping cough or croup or haemophilus or bronchit$ or tuberculosis or listeriosis or listeria).ti,ab.	373472

	Concept	Search strategy	Results
19		respiratory illness.ti,ab.	8589
20		(transmission and (coughing or sneezing)).ti,ab.	652
21		(respiratory tract and (infection$ or illness$)).ti,ab.	56937
22		exp communicable disease/pc [Prevention]	12470
23		or/14-22	5661144
24	General infection control	Contact Tracing/ or infection control/ or Fumigation/ or Universal Precautions/	107959
25		communicable disease control/	3719
26		exp disease transmission/	232472
27		Disease Transmission, Infectious/	109273
28		fomite transmission/ or vector transmission/ or oral transmission/ or bacterial transmission/ or asymptomatic transmission/ or mother to child transmission/ or parasite transmission/ or droplet transmission/ or child to adult transmission/ or airborne transmission/ or virus transmission/ or aerosol transmission/ or fecal oral transmission/ or pathogen transmission/	109126
29		((fomite or vector or bacterial or asymptomatic or "mother to child" or parasite or droplet or "child to adult" or airborne or virus or aerosol or "fecal oral" or pathogen or secondary) and transmission).ti,ab.	139380
30		secondary transmission.ti,ab.	688
31		((infectio$ or bacteri$ or viral or virus or pathogen or fungal or fungus or fungi) adj4 (control or prevent*)).ti,ab.	185885
32		(((protozoa or mite or parasite or worm) adj3 (control or prevent$)) and (respirat$ or lung)).ti,ab.	101
33		((reduce$ or reduc$ or lower) and (incidence or occurrence or transmission)).ti,ab.	686229
34		cross infection/dm, pc [Disease Management, Prevention]	11329
35		or/24-34	1167515
36	Hand hygiene, gloves and masks	exp hand washing/ or exp hand disinfection/ or exp hand hygiene/	19283
37		exp protective glove/	5470
38		face mask/ or reprocessed non continuous ventilator mask/ or surgical mask/	15291
39		exp Respiratory Protective Devices/	6989
40		(handwash$ or hand-wash$ or hand hygiene or hand disinfect$).ti,ab.	15966
41		(alcohol and (wash$ or clean$ or rinse$ or rub or rubbing or saniti?er or disinfect$)).ti,ab.	8924
42		(glove or gloves or facemask$ or mask$ or hygiene intervention or faceshield$ or face?shield$).ti,ab.	138453
43		N95 respirator$.ti,ab.	660
44		or/36-43	176664
45	Ventilation	exp air purification/ or exp air purifier/	2526
46		exp air filtration/ or exp air filters/ or exp air cleaner/	2225
47		exp ventilate/ or exp ventilation/	39031
48		((outdoor or outside) adj2 play).ti,ab.	595
49		or/45-48	42040
50	Exclusion	physical distancing/	7232
51		quarantine/ or quarantine.ti,ab.	15503
52		((exclusion and (period$ or measure$ or policy)) or temporary exclusion$).ti,ab.	58619
53		((school$ or classroom$) and (closure$ or closed)).ti,ab.	4632
54		case isolation.ti,ab.	148
55		cohorting.ti,ab.	847
56		((isolation adj2 room*) or isolation strateg*).ti,ab.	1562

	Concept	Search strategy	Results
57		isolation/ or Home Isolation/ or contact isolation/	6903
58		or/50-57	92455
59	Infection	infection rate/	39543
60		infection risk/	99314
61		((Secondary attack or Secondary infection or infection) and (rate or risk)).ti,ab.	499654
62		((infectious or transmission) and period).ti,ab.	65136
63		or/59-62	624367
64		(animals/ or nonhuman/) not humans/	6981208
65	Setting and condition	13 and 23	23116
66	Intervention	35 or 44 or 49 or 58 or 63	1881146
67	Combined PICO	(65 and 66) not 64	4771
68	SRs	1 and 67	188
69	RCTs	(2 and 67) not 68	1022
70	NRSIs	(3 and 67) not (68 or 69)	1359
71	letters	(4 and 67) not (68 or 69 or 70)	104
72	editorials	(5 and 67) not (68 or 69 or 70 or 71)	74
73	ALL	(68 or 69 or 70 or 71) NOT 72	2673
74	Other	67 NOT (73 or 72)	2024

A3.2 Medline (via Ovid.com)

The search for eligible studies was conducted on the 15th September 2022

Databases searched were as follows:

- Ovid MEDLINE(R) 1946 to September 15, 2022

Table A-3 Search results: Medline

	Concept	Search strategy	Results
1	Study design limits	exp meta analysis/ or meta analysis.mp. or exp systematic review/ or systematic review.mp. or pooled analysis.mp. or ((exp review/ or review.mp.) and (systemat* or pool*).mp.)	490932
2		exp comparative study/ or comparative study.mp. or exp clinical trial/ or clinical trial.mp. or randomized controlled trial.mp. or randomi?ed controlled trial.mp. or exp randomized controlled trial/ or exp randomization/ or randomization.mp. or randomi?ation.mp. or exp single blind procedure/ or single blind procedure.mp. or exp double blind procedure/ or double blind procedure.mp. or exp triple blind procedure/ or triple blind procedure.mp. or exp crossover procedure/ or crossover procedure.mp. or exp placebo/ or placebo*.mp. or random*.mp. or rct.mp. or single blind.mp. or single blinded.mp. or double blind.mp. or double blinded.mp. or treble blind.mp. or triple blind.mp. or triple blinded.mp. or exp prospective study/ or prospective study.mp.	4155300
3		exp clinical study/ or exp case control study/ or exp family study/ or exp longitudinal study/ or exp retrospective study/ or exp cohort analysis/ or (cohort adj1 stud*).mp. or (case control adj1 stud*).mp. or (exp prospective study/ not randomi?ed controlled trials.mp.) or (follow up adj1 stud*).mp. or (observational adj1 stud*).mp. or (epidemiologic* adj1 stud*).mp. or (cross sectional adj1 stud*).mp.	4039616
4		letter.pt.	1193235
5		(editorial or comment or historical article).pt.	1754777

6	Setting	kindergarten/ or child care/ or child day care/	6002
7		school/	48752
8		(creche? or preschool$ or pre-school$ or pre?school$ or minischool$ or mini-school$ or mini?school$).ti,ab.	38045
9		(daycare or day-care or day?care).ti,ab.	9523
10		(family adj (care or day-care or day?care)).ti,ab.	1910
11		((daycare or day-care or day?care) adj2 (centre? or center? or setting or facilit$)).ti,ab.	4182
12		((childcare or child-care or child?care) adj2 (centre? or center? or setting or facilit$)).ti,ab.	1850
13		or/6-12	101799
14	Condition - Respiratory infection	exp influenza/ or exp respiratory tract disease/ or exp common cold/ or exp coronavirus/ or exp SARS coronavirus/ or exp coronavirus infection/ or exp severe acute respiratory syndrome/ or exp pneumovirus/ or exp human respiratory syncytial virus/	1661961
15		(influenza$ or influenza?like or ILI or Flu$ or common cold or colds).ti,ab.	1864756
16		(coronavirus$ or severe acute respiratory syndrome$ or sars).ti,ab.	157947
17		(respiratory syncytial virus$ or rsv or parainfluenza$).ti,ab.	24514
18		(pertussis or whooping cough or croup or haemophilus or bronchit$ or tuberculosis or listeriosis or listeria).ti,ab.	304731
19		respiratory illness.ti,ab.	6225
20		(transmission and (coughing or sneezing)).ti,ab.	530
21		(respiratory tract and (infection$ or illness$)).ti,ab.	38081
22		exp communicable disease/pc [Prevention]	81588
23		or/14-22	3715241
24	General infection control	Contact Tracing/ or infection control/ or Fumigation/ or Universal Precautions/	36784
25		communicable disease control/	29924
26		exp disease transmission/	0
27		Disease Transmission, Infectious/	10914
28		fomite transmission/ or vector transmission/ or oral transmission/ or bacterial transmission/ or asymptomatic transmission/ or mother to child transmission/ or parasite transmission/ or droplet transmission/ or child to adult transmission/ or airborne transmission/ or virus transmission/ or aerosol transmission/ or fecal oral transmission/ or pathogen transmission/	28791
29		((fomite or vector or bacterial or asymptomatic or "mother to child" or parasite or droplet or "child to adult" or airborne or virus or aerosol or "fecal oral" or pathogen or secondary) and transmission).ti,ab.	119150
30		secondary transmission.ti,ab.	586
31		((infectio$ or bacteri$ or viral or virus or pathogen or fungal or fungus or fungi) adj4 (control or prevent*)).ti,ab.	144829
32		(((protozoa or mite or parasite or worm) adj3 (control or prevent$)) and (respirat$ or lung)).ti,ab.	86
33		((reduce$ or reduc$ or lower) and (incidence or occurrence or transmission)).ti,ab.	470231
34		cross infection/dm, pc [Disease Management, Prevention]	24511
35		or/24-34	759496
36	Hand hygiene, gloves and masks	exp hand washing/ or exp hand disinfection/ or exp hand hygiene/	7973
37		exp protective glove/	5130
38		face mask/ or reprocessed non continuous ventilator mask/ or surgical mask/	296
39		exp Respiratory Protective Devices/	2656
40		(handwash$ or hand-wash$ or hand hygiene or hand disinfect$).ti,ab.	11361

41		(alcohol and (wash$ or clean$ or rinse$ or rub or rubbing or saniti?er or disinfect$)).ti,ab.	5503
42		(glove or gloves or facemask$ or mask$ or hygiene intervention or faceshield$ or face?shield$).ti,ab.	106197
43		N95 respirator$.ti,ab.	630
44		or/36-43	125513
45	Ventilation	exp air purification/ or exp air purifier/	553
46		exp air filtration/ or exp air filters/ or exp air cleaner/	553
47		exp ventilate/ or exp ventilation/	6250
48		((outdoor or outside) adj2 play).ti,ab.	511
49		or/45-48	7251
50	Exclusion	physical distancing/	2185
51		quarantine/ or quarantine.ti,ab.	13357
52		((exclusion and (period$ or measure$ or policy)) or temporary exclusion$).ti,ab.	32272
53		((school$ or classroom$) and (closure$ or closed)).ti,ab.	3778
54		case isolation.ti,ab.	148
55		cohorting.ti,ab.	571
56		((isolation adj2 room*) or isolation strateg*).ti,ab.	1110
57		isolation/ or Home Isolation/ or contact isolation/	4438
58		or/50-57	56389
59	Infection	infection rate/	0
60		infection risk/	0
61		((Secondary attack or Secondary infection or infection) and (rate or risk)).ti,ab.	341817
62		((infectious or transmission) and period).ti,ab.	44176
63		or/59-62	378394
64		(animals/ or nonhuman/) not humans/	5012497
65	Setting and condition	13 and 23	10069
66	Intervention	35 or 44 or 49 or 58 or 63	1204944
67	Combined PICO	(65 and 66) not 64	2602
68	SRs	1 and 67	102
69	RCTs	(2 and 67) not 68	576
70	NRSIs	(3 and 67) not (68 or 69)	467
71	letters	(4 and 67) not (68 or 69 or 70)	48
72	editorials	(5 and 67) not (68 or 69 or 70 or 71)	39
73	ALL	(68 or 69 or 70 or 71) NOT 72	1193
74	Other	67 NOT (73 or 72)	1370

A3.3 Cochrane Systematic Reviews and Central Register of Controlled trials (via Ovid.com)

The search for eligible studies was conducted on 15th September 2022

Databases searched were as follows:

- EBM Reviews - Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials 2005 to September 14, 2022

Table A-4 Search results: Cochrane Systematic Reviews and Central Register of Controlled Trials

	Concept	Search strategy	Results
1	Setting	kindergarten/ or child care/ or child day care/	99
2		school/	2538
3		(creche? or preschool$ or pre-school$ or pre?school$ or minischool$ or mini-school$ or mini?school$).ti,ab.	5256
4		(daycare or day-care or day?care).ti,ab.	1663
5		(family adj (care or day-care or day?care)).ti,ab.	173
6		((daycare or day-care or day?care) adj2 (centre? or center? or setting or facilit$)).ti,ab.	602
7		((childcare or child-care or child?care) adj2 (centre? or center? or setting or facilit$)).ti,ab.	315
8		or/1-7	9554
9	Condition - Respiratory infection	exp influenza/ or exp respiratory tract disease/ or exp common cold/ or exp coronavirus/ or exp SARS coronavirus/ or exp coronavirus infection/ or exp severe acute respiratory syndrome/ or exp pneumovirus/ or exp human respiratory syncytial virus/	68374
10		(influenza$ or influenza?like or ILI or Flu$ or common cold or colds).ti,ab.	110305
11		(coronavirus$ or severe acute respiratory syndrome$ or sars).ti,ab.	6604
12		(respiratory syncytial virus$ or rsv or parainfluenza$).ti,ab.	1412
13		(pertussis or whooping cough or croup or haemophilus or bronchit$ or tuberculosis or listeriosis or listeria).ti,ab.	13019
14		respiratory illness.ti,ab.	713
15		(transmission and (coughing or sneezing)).ti,ab.	35
16		(respiratory tract and (infection$ or illness$)).ti,ab.	6229
17		exp communicable disease/pc [Prevention]	19
18		or/9-17	187211
19	General infection control	Contact Tracing/ or infection control/ or Fumigation/ or Universal Precautions/	687
20		communicable disease control/	135
21		exp disease transmission/	0
22		Disease Transmission, Infectious/	119
23		fomite transmission/ or vector transmission/ or oral transmission/ or bacterial transmission/ or asymptomatic transmission/ or mother to child transmission/ or parasite transmission/ or droplet transmission/ or child to adult transmission/ or airborne transmission/ or virus transmission/ or aerosol transmission/ or fecal oral transmission/ or pathogen transmission/	689
24		((fomite or vector or bacterial or asymptomatic or "mother to child" or parasite or droplet or "child to adult" or airborne or virus or aerosol or "fecal oral" or pathogen or secondary) and transmission).ti,ab.	4057
25		secondary transmission.ti,ab.	22
26		((infectio$ or bacteri$ or viral or virus or pathogen or fungal or fungus or fungi) adj4 (control or prevent*)).ti,ab.	10882
27		(((protozoa or mite or parasite or worm) adj3 (control or prevent$)) and (respirat$ or lung)).ti,ab.	10
28		((reduce$ or reduc$ or lower) and (incidence or occurrence or transmission)).ti,ab.	85870
29		cross infection/dm, pc [Disease Management, Prevention]	0
30		or/19-29	97065
31	Hand hygiene, gloves and masks	exp hand washing/ or exp hand disinfection/ or exp hand hygiene/	505
32		exp protective glove/	20
33		face mask/ or reprocessed non continuous ventilator mask/ or surgical mask/	11

	Concept	Search strategy	Results
34		exp Respiratory Protective Devices/	85
35		(handwash$ or hand-wash$ or hand hygiene or hand disinfect$).ti,ab.	1497
36		(alcohol and (wash$ or clean$ or rinse$ or rub or rubbing or saniti?er or disinfect$)).ti,ab.	1817
37		(glove or gloves or facemask$ or mask$ or hygiene intervention or faceshield$ or face?shield$).ti,ab.	26957
38		N95 respirator$.ti,ab.	59
39		or/31-38	29797
40	Ventilation	exp air purification/ or exp air purifier/	40
41		exp air filtration/ or exp air filters/ or exp air cleaner/	40
42		exp ventilate/ or exp ventilation/	86
43		((outdoor or outside) adj2 play).ti,ab.	70
44		or/40-43	196
45	Exclusion	physical distancing/	14
46		quarantine/ or quarantine.ti,ab.	276
47		((exclusion and (period$ or measure$ or policy)) or temporary exclusion$).ti,ab.	24423
48		((school$ or classroom$) and (closure$ or closed)).ti,ab.	285
49		case isolation.ti,ab.	0
50		cohorting.ti,ab.	13
51		((isolation adj2 room*) or isolation strateg*).ti,ab.	70
52		isolation/ or Home Isolation/ or contact isolation/	51
53		or/45-52	25090
54	Infection	infection rate/	1
55		infection risk/	0
56		((Secondary attack or Secondary infection or infection) and (rate or risk)).ti,ab.	34743
57		((infectious or transmission) and period).ti,ab.	3283
58		or/54-57	37329
59		(animals/ or nonhuman/) not humans/	8
60	Setting and condition	8 and 18	1069
61	Intervention	30 or 39 or 44 or 53 or 58	172027
62	Combined PICO	(60 and 61) not 59	296

A3.4 EBSCO*Host*

The search for RCTs via EBSCO*Host* was conducted on 20 September 2022

Databases searched were as follows:

- CINAHL Complete (inception to 20 September 2022)

Table A-5 Search results – CINAHL Complete

#	Term	Field	Results
1	Child Day Care OR Child Care	MH	7561
2	("Schools, Nursery") OR (“Schools, Elementary”) OR (“Schools, Special”)	MH	8116

#	Term	Field	Results
3	(creche? or preschool$ or pre-school$ or pre?school$ or minischool$ or mini-school$ or mini?school$).	TI	7108
4	(creche? or preschool$ or pre-school$ or pre?school$ or minischool$ or mini-school$ or mini?school$).	AB	11369
5	(family) N0 ((care or day-care or day?care))	TI	741
6	(family) N0 ((care or day-care or day?care))	AB	2160
7	((daycare or day-care or day?care) N2 (centre? or center? or setting or facilit$))	TI	485
8	((daycare or day-care or day?care) N2 (centre? or center? or setting or facilit$))	AB	1234
9	((childcare or child-care or child?care) N2 (centre? or center? or setting or facilit$))	TI	440
10	((childcare or child-care or child?care) N2 (centre? or center? or setting or facilit$))	AB	1045
11	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10		32620
12	“Influenza, Human+” OR “Respiratory Tract infections+” OR “Coronavirus+” OR “Coronavirus Infections+” OR “Respiratory Syncytial viruses”	MH	122268
13	(influenza$ or influenza?like or ILI or Flu$ or common cold or colds)	TI	26158
14	(influenza$ or influenza?like or ILI or Flu$ or common cold or colds).	AB	31057
15	(coronavirus$ or severe acute respiratory syndrome$ or sars).	Ti	10208
16	(coronavirus$ or severe acute respiratory syndrome$ or sars).	AB	24957
17	(respiratory syncytial virus$ or rsv or parainfluenza$)	TI	1929
18	(respiratory syncytial virus$ or rsv or parainfluenza$)	AB	2706
19	(pertussis or whooping cough or croup or haemophilus or bronchit$ or tuberculosis or listeriosis or listeria)	TI	21097
20	(pertussis or whooping cough or croup or haemophilus or bronchit$ or tuberculosis or listeriosis or listeria	AB	23068
21	respiratory illness	TI	706
22	respiratory illness	AB	2973
23	(transmission and (coughing or sneezing))	TI	4
24	(transmission and (coughing or sneezing))	AB	111
25	(respiratory tract and (infection$ or illness$))	TI	1855
26	(respiratory tract and (infection$ or illness$))	AB	6832
27	"Communicable Diseases+/PC"	MH	2776
28	S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27		193890
29	“Contact Tracing” OR “Infection control” OR “Fumigation” OR Universal Precautions”	MH	33008
30	Disease Transmission+	MH	18743
31	((fomite or vector or bacterial or asymptomatic or "mother to child" or parasite or droplet or "child to adult" or airborne or virus or aerosol or "fecal oral" or pathogen or secondary) and transmission).	TI	2576

#	Term	Field	Results
32	((fomite or vector or bacterial or asymptomatic or "mother to child" or parasite or droplet or "child to adult" or airborne or virus or aerosol or "fecal oral" or pathogen or secondary) and transmission).	AB	16119
33	secondary transmission	TI	53
34	secondary transmission	AB	344
35	((infectio$ or bacteri$ or viral or virus or pathogen or fungal or fungus or fungi) N4 (control or prevent*)	TI	1062
36	((infectio$ or bacteri$ or viral or virus or pathogen or fungal or fungus or fungi) N4 (control or prevent*)	AB	4134
37	(((protozoa or mite or parasite or worm) N3 (control or prevent$)) and (respirat$ or lung))	TI	0
38	(((protozoa or mite or parasite or worm) N3 (control or prevent$)) and (respirat$ or lung))	AB	3
39	((reduce$ or reduc$ or lower) and (incidence or occurrence or transmission))	TI	1698
40	((reduce$ or reduc$ or lower) and (incidence or occurrence or transmission))	AB	68890
41	"Cross Infection/PC"	MH	14457
42	S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41		137674
43	"Handwashing+"	MH	9743
44	"Masks" or "N95 Respirators"	MH	3963
45	Respiratory Protective Devices+	MH	2086
46	(handwash$ or hand-wash$ or hand hygiene or hand disinfect$).	TI	2415
47	(handwash$ or hand-wash$ or hand hygiene or hand disinfect$).	AB	3404
48	(alcohol and (wash$ or clean$ or rinse$ or rub or rubbing or saniti?er or disinfect$))	TI	211
49	(alcohol and (wash$ or clean$ or rinse$ or rub or rubbing or saniti?er or disinfect$))	AB	709
50	(glove or gloves or facemask$ or mask$ or hygiene intervention or faceshield$ or face?shield$)	TI	6574
51	(glove or gloves or facemask$ or mask$ or hygiene intervention or faceshield$ or face?shield$)	AB	12638
52	S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51		29370
53	Air filters	MH	255
54	Ventilation+	MH	2361
55	((outdoor or outside) N2 play)	TI	121
56	((outdoor or outside) N2 play)	AB	307
57	S53 OR S54 OR S55 OR S56		2940
58	Social distancing	MH	2452
59	quarantine/ or quarantine	TI	579
60	quarantine/ or quarantine	AB	1792
61	((exclusion and (period$ or measure$ or policy)) or temporary exclusion$).	TI	88
62	((exclusion and (period$ or measure$ or policy)) or temporary exclusion$).	AB	8027
63	((school$ or classroom$) and (closure$ or closed)).	TI	176
64	((school$ or classroom$) and (closure$ or closed)).	AB	1269
65	case isolation	TI	44

#	Term	Field	Results
66	case isolation	AB	456
67	cohorting	TI	44
68	cohorting	AB	214
69	((isolation N2 room*) or isolation strateg*)	TI	116
70	((isolation N2 room*) or isolation strateg*)	AB	672
71	Patient isolation+	MH	2880
72	S60 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71		15331
73	((Secondary attack or Secondary infection or infection) and (rate or risk)).	TI	10975
74	((Secondary attack or Secondary infection or infection) and (rate or risk)).	AB	102737
75	((infectious or transmission) and period)	TI	57
76	((infectious or transmission) and period)	AB	7431
77	S75 OR S74 OR S75 OR S76		108057
78	S11 AND S28		956
79	S42 OR S52 OR S57 OR S72 OR S77		259689
80	S78 AND S79		368
81	(MH "Animals+")	MH	104153
82	S80 NOT S81		363

Expanders – Apply equivalent subjects; Search modes – Boolean/Phrase

A3.5 PubMed

The PubMed search was restricted to records not indexed for MEDLINE and to records recently added to PubMed (i.e. in-process citations and citations from journals (or parts of journals) that are not currently MEDLINE-indexed). The search comprised free-text terms only and replicates the free-text sets in the Embase search (converted from the Ovid syntax).

The search for RCTs was conducted on 16 September 2022.

Table A-6 Search results - PubMed

	Concept	Search strategy	Results
1	Setting	“child care” [mesh:noexp]	5995
2		“schools” [mesh:noexp]	48619
3		(“creche”?[tiab] OR preschool*[tiab] OR pre-school*[tiab] OR pre?school*[tiab] OR mini?school*[tiab])	40010
4		("family"[tiab] AND ("care"[tiab] OR "day-care"[tiab] OR day?care[tiab]))	117732
5		(("daycare"[tiab] OR "day-care"[tiab] OR day?care[tiab]) AND ("centre"?[tiab] OR "center"?[tiab] OR "setting"[tiab] OR facilit*[tiab]))	3590
6		(("childcare"[tiab] OR "child-care"[tiab] OR child?care[tiab]) AND ("centre"?[tiab] OR "center"?[tiab] OR "setting"[tiab] OR facilit*[tiab]))	3228
7		#1 OR #2 OR #3 OR #4 OR #5 OR #6	212562
8		"influenza"[mesh] OR "respiratory tract disease"[mesh] OR "common cold"[mesh] OR "coronavirus"[mesh] OR "SARS coronavirus"[mesh] OR "coronavirus infection"[mesh] OR "severe acute respiratory syndrome"[mesh] OR "pneumovirus"[mesh] OR "human respiratory syncytial virus"[mesh]	1713306
9		(influenza*[tiab] OR influenza?like[tiab] OR "ILI"[tiab] OR Flu*[tiab] OR "common cold"[tiab] OR "colds"[tiab])	147277

10	Condition - Respiratory infection	(coronavirus*[tiab] OR severe acute respiratory syndrome*[tiab] OR "sars"[tiab])	170495
11		(respiratory syncytial virus*[tiab] OR "rsv"[tiab] OR parainfluenza*[tiab])	25063
12		("pertussis"[tiab] OR "whooping cough"[tiab] OR "croup"[tiab] OR "haemophilus"[tiab] OR bronchit*[tiab] OR "tuberculosis"[tiab] OR "listeriosis"[tiab] OR "listeria"[tiab])	331155
13		"respiratory illness"[tiab]	6358
14		("transmission"[tiab] AND ("coughing"[tiab] OR "sneezing"[tiab]))	553
15		("respiratory tract"[tiab] AND (infection*[tiab] OR illness*[tiab]))	40815
16		"communicable disease/Prevention and Control"[mesh]	43
17		#9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16	2022644
18		"Contact Tracing"[mesh:noexp] OR "infection control"[mesh:noexp] OR "Fumigation"[mesh:noexp] OR "Universal Precautions"[mesh:noexp]	36759
19	General infection control	"communicable disease control"[mesh:noexp]	29759
20		"disease transmission"[mesh]	29784
21		"Disease Transmission, Infectious"[mesh:noexp]	9262
22		"fomite transmission"[mesh:noexp] OR "vector transmission"[mesh:noexp] OR "oral transmission"[mesh:noexp] OR "bacterial transmission"[mesh:noexp] OR "asymptomatic transmission"[mesh:noexp] OR "mother to child transmission"[mesh:noexp] OR "parasite transmission"[mesh:noexp] OR "droplet transmission"[mesh:noexp] OR "child to adult transmission"[mesh:noexp] OR "airborne transmission"[mesh:noexp] OR "virus transmission"[mesh:noexp] OR "aerosol transmission"[mesh:noexp] OR "fecal oral transmission"[mesh:noexp] OR "pathogen transmission"[mesh:noexp]	10912
23		(("fomite"[tiab] OR "vector"[tiab] OR "bacterial"[tiab] OR "asymptomatic"[tiab] OR "mother to child"[tiab] OR "parasite"[tiab] OR "droplet"[tiab] OR "child to adult"[tiab] OR "airborne"[tiab] OR "virus"[tiab] OR "aerosol"[tiab] OR "fecal oral"[tiab] OR "pathogen"[tiab] OR "secondary"[tiab]) AND "transmission"[tiab])	19375
24		"secondary transmission"[tiab]	594
25		((infectio*[tiab] OR bacteri*[tiab] OR "viral"[tiab] OR "virus"[tiab] OR "pathogen"[tiab] OR "fungal"[tiab] OR "fungus"[tiab] OR "fungi"[tiab]) AND ("control"[tiab] OR prevent*[tiab]))	617305
26		((("protozoa"[tiab] OR "mite"[tiab] OR "parasite"[tiab] OR "worm"[tiab]) AND ("control"[tiab] OR prevent*[tiab])) AND (respirat*[tiab] OR "lung"[tiab]))	1264
27		((reduce*[tiab] OR reduc*[tiab] OR "lower"[tiab]) AND ("incidence"[tiab] OR "occurrence"[tiab] OR "transmission"[tiab]))	472248
28		("cross infection/DM"[mesh:noexp] OR "cross infection/Prevention and Control"[mesh:noexp])	103321
29		#19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28	1239346
30		"hand washing"[mesh] OR "hand disinfection"[mesh] OR "hand hygiene"[mesh]	10047
31	Hand hygiene, gloves and masks	"protective glove"[mesh]	56
32		"face mask"[mesh:noexp] OR "reprocessed non continuous ventilator mask"[mesh:noexp] OR "surgical mask"[mesh:noexp]	4729
33		"Respiratory Protective Devices"[mesh]	2650
34		(handwash*[tiab] OR hand-wash*[tiab] OR "hand hygiene"[tiab] OR hand disinfect*[tiab])	11576
35		("alcohol"[tiab] AND (wash*[tiab] OR clean*[tiab] OR rinse*[tiab] OR "rub"[tiab] OR "rubbing"[tiab] OR saniti?er[tiab] OR disinfect*[tiab]))	5486
36		("glove"[tiab] OR "gloves"[tiab] OR facemask*[tiab] OR mask*[tiab] OR "hygiene intervention"[tiab] OR faceshield*[tiab] OR face?shield*[tiab])	107132
37		N95 respirator*[tiab]	675
38		#31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37	125330
39		"air purification"[mesh] OR "air purifier"[mesh]	615
40	Ventilation	"air filtration"[mesh] OR "air filters"[mesh] OR "air cleaner"[mesh]	1301

41		"ventilate"[mesh] OR "ventilation"[mesh]	6250
42		(("outdoor"[tiab] OR "outside"[tiab]) AND "play"[tiab])	6578
43		#40 OR #41 OR #42	14456
44		"physical distancing"[mesh:noexp]	2170
45	Exclusion	"quarantine"[mesh:noexp] OR "quarantine"[tiab]	13772
46		(("exclusion"[tiab] AND (period*[tiab] OR measure*[tiab] OR "policy"[tiab])) OR temporary exclusion*[tiab])	32529
47		((school*[tiab] OR classroom*[tiab]) AND (closure*[tiab] OR "closed"[tiab]))	3813
48		"case isolation"[tiab]	151
49		"cohorting"[tiab]	571
50		(("isolation"[tiab] AND room*[tiab]) OR isolation strateg*[tiab])	3648
51		"isolation"[mesh:noexp] OR "Home Isolation"[mesh:noexp] OR "contact isolation"[mesh:noexp]	283948
52		#45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51	332864
53		“infection risk” [tiab]	17250
54	Infection	“infection rate”[tiab]	7084
55		((“secondary attack” [tiab] OR “Secondary infection”[tiab] OR “infection”[tiab] AND (“rate”[tiab] OR “risk”[tiab]))	349376
56		((“infectious”[tiab] OR “transmission”[tiab] AND “period”[tiab]))	45185
57		#53 OR #54 OR #55 OR #56	386576
58		“animals”[mesh:noexp} OR “non-human” [tiab] NOT “humans”[mesh:noexp]	5013215
59		#7 AND #17	13899
60	Setting and condition	#29 OR #38 OR #43 OR #53 OR #57	1876635
61	Intervention	#59 AND #60	4272
62	Combined PICO	#61 NOT #58	4267
63		Pubmednotmedline[sb]	4482520
64		#62 AND #63	273

A3.6 Alternate sources

An umbrella review of nonpharmaceutical interventions to prevent viral respiratory infections in community settings was identified (6) from which 17 additional SR reviews not detected in the above literature reviews were sourced for inclusion. The SR of physical interventions to interrupt or reduce the spread of respiratory viruses by Jefferson, Del Mar (7) identified one additional SR that was included. Additionally, 13 SR were identified from a search of the Epistemonikos database.

A4 Study selection criteria

A4.1 Types of studies

A4.1.1 Study design

Eligible studies were systematic reviews, RCTs and observational studies that examined the effectiveness of non-pharmaceutical interventions for reducing transmission of respiratory infection in early childhood education and care services compared to control or an alternative, or less intense intervention. Grey literature, reports and guidelines from reputable international and national agencies were also eligible for inclusion.

The types and definition of study designs eligible for inclusion were based on guidance from the JBI Manual for Evidence Synthesis (8)[1].

The systematic review was conducted using a stepped process (see Figure A-1), in which evidence of higher certainty was assessed before evidence of lower certainty was considered. The order of preference was as follows:

1. Systematic review of RCTs and prospective cohort studies
1. Randomised controlled trials
2. Comparative nonrandomised studies with preference for prospective cohort studies over retrospective cohort studies[2]
3. Mechanistic/modelling studies[3]

A systematic review was considered the highest level of evidence. If the top tier evidence effectively addresses the specified outcomes of interest, assessment of RCTs and nonrandomised comparative studies was not conducted. However, an update of the literature was conducted to identify any RCTs (or cohort studies) published since the search date of the key evidence from systematic reviews.

If no relevant systematic reviews were identified, the literature screening was expanded to identify relevant RCTs. If no RCTs were identified, the process was repeated to identify relevant nonrandomised comparative studies. For primary and secondary outcomes not addressed by systematic review or RCT evidence, screening for nonrandomised comparative studies was conducted for that outcome only.

The minimum design features of eligible nonrandomised comparative studies are:

- allocation to, or practice of, the intervention occurs by choice (by the participant or other)
- researchers used methods to control for confounding, either:
    - in principle (for any confounding)
    - in principle (for time invariant unobserved confounding), or
    - for confounding (by observed covariates)
- potential confounders were measured before the intervention

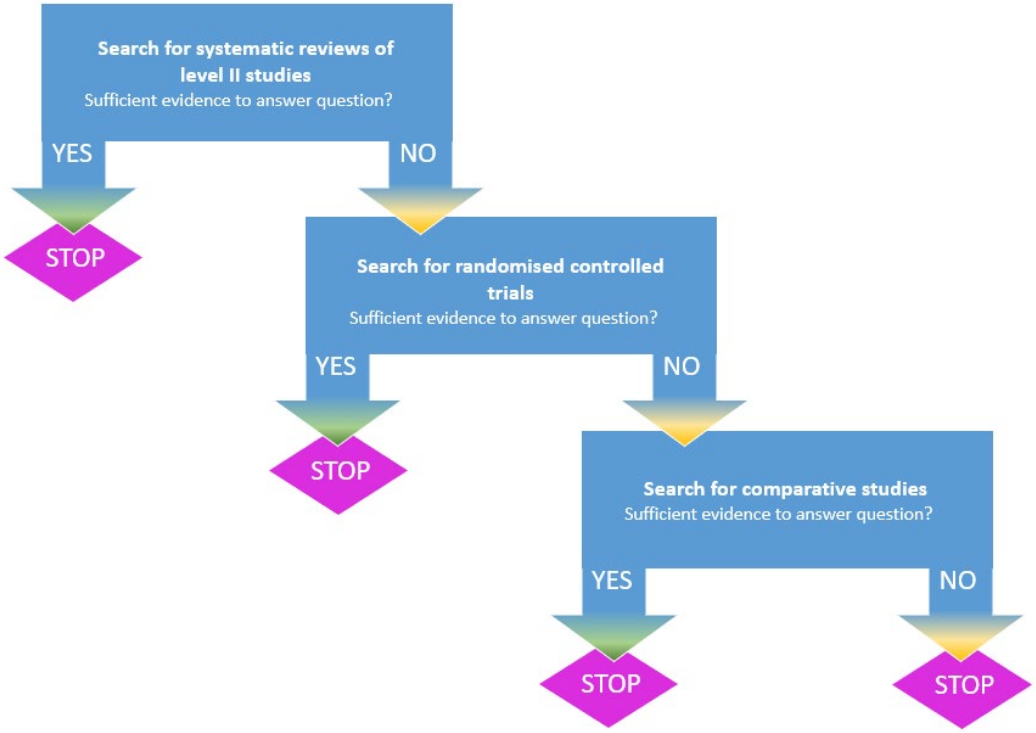
Single arm studies (e.g. case series with post-test or pre-test/post-test outcomes), cross-sectional studies and case reports were not eligible for inclusion, as the design features of these study designs make it difficult to attribute observed changes in outcomes at this level.

[1] Available at: https://jbi-global-wiki.refined.site/space/MANUAL/4688265/3.2.4.5+Types+of+studies

[2] Studies in which the effect of the intervention is compared with a concurrent control group were considered before studies that use a historical (or non-parallel or non-concurrent) control group. This is due to higher concerns of bias related to residual confounding or unmeasurable changes in clinical practice over time.

[3] Mechanistic modelling studies specific to ventilation were eligible for inclusion

Figure A-1 Schematic representation of literature review hierarchy



A4.1.2 Publication date

There were no limitations on publication date, however the suggested publication date range includes publications from 2000 onwards. Eligible studies that are published after the literature search date will be listed within the *'Studies awaiting classification'* table of the evaluation report. These studies were not subject to a formal evidence evaluation, however, a brief statement about the study and its potential impact on the overall conclusions of the evidence review will be included under the relevant sections of the review (e.g. 'Overall completeness and applicability of evidence').

A4.1.3 Studies published in languages other than English

The literature search was not limited by language of publication. Non-English databases were not searched, however studies in languages other than English may be identified via the English-language databases. One study was identified in a language other than English. For pragmatic reasons, the study did not undergo full-text translation or data extraction but was documented in a "studies awaiting classification" table.

A4.2 Types of participants and setting

Four categories of study participants were eligible for inclusion

- Children aged 0–4
- Children aged 5–12 years
- Adults (working or entering facilities), inclusive of:
    - Staff
    - Parents of children attending childcare
    - Pregnant women
- Immunocompromised adults or children

Children are susceptible to a range of respiratory infections, with all types of RTIs in the scope for this review.

Settings: There were no limits on the setting within education and care centres. That is, eligible settings are inclusive of (but not limited to) early childhood education and care settings, out-of-hour school care, family day care, schools, household settings and other community settings that involve infants and children.

Studies set in aged care, tertiary hospitals and other acute health care settings were not considered eligible for inclusion.

A4.3 Types of interventions

A4.3.1 Intervention

Any non-pharmaceutical intervention for reducing the risk of transmission of respiratory infections was eligible for inclusion. This included hand hygiene (such as hand washing with soap, detergent, alcohol wipes), respiratory hygiene (such as covering mouth and nose when coughing or sneezing, use of tissues), masks (cloth, surgical Grade), gloves (latex, other), exclusion (timing and duration), isolating, cohorting, physical distancing, screening at entry, ventilation, air filtration, outdoor play, and environmental cleaning.

Pharmaceutical interventions and immunisation measures were not eligible interventions.

A4.3.2 Comparators

There were no restrictions on comparators. Where the control is poorly described it was considered an 'inactive' comparator (i.e. mask wearing versus usual care [inactive]).

In addition to the studied intervention, co-interventions (e.g. education programs, medication, immunisation) may be administered simultaneously to the intervention and control group. Studies with co-interventions were included if all arms of a study received the same co-interventions (i.e. the effectiveness of the non-pharmaceutical intervention is not confounded).

Head-to-head studies comparing different types or forms of non-pharmaceutical intervention (e.g. medical/surgical masks vs cloth masks) were included where there is sufficient information available for each form of intervention.

A4.4 Types of outcome measures

A4.4.1 Outcome role

Outcomes were not used as a criterion for including or excluding studies.

A4.4.2 Outcome domains of interest

The outcomes were intended to assess the impact of the non-pharmaceutical interventions on preventing transmission of respiratory infections and the impact of these interventions on the specified population.

The primary outcomes of interest were:

- Transmission related outcomes (e.g. number of secondary cases, number or proportion of cases) of any type of respiratory infection.
- Adverse events (including safety) related to the intervention

Secondary outcomes that were also considered are:

- Absenteeism
- Severity of viral illness or complications related to illness
- Length of illness
- Behaviour or practice change

It was out of scope of this review to assess personal health care preferences, patient experience measures (PREMS) (e.g. satisfaction with care) or economic/cost outcomes.

A4.4.3 Outcome measures and timepoints of interest

Outcome measures were limited to clinically accepted measures used to determine infection or adverse events (preferably accepted surrogate outcome measures such as proportion of population with influenza-like illness, or laboratory confirmed influenza) and patient-reported outcome measures (PROMS) (preferably measured using validated tools).

All outcomes measured (or pre-specified in protocols or clinical trial registries) in each eligible study were listed in the '*Characteristics of included studies*' tables. Results were extracted for the pre-specified primary and secondary outcomes identified for this review, with results for eligible outcomes meta-analysed and reported in GRADE summary of findings (SoF) tables with corresponding evidence statements (see Section 4, Evaluation Report).

A5 Selection of studies (inclusion decisions)

This appendix documents how studies were identified, collected and managed so as to conduct the SR on the effect of non- pharmaceutical interventions on reducing the transmission of respiratory illness.

A5.1 Studies identified in the literature searches

A5.1.1 Title/abstract screening

Citations (title/abstracts) retrieved by the literature searches were imported into EndNote. Citations were then imported to Covidence (www.covidence.org), an online tool that streamlines the screening and data extraction stages of a systematic review. Studies were uploaded for hierarchical screening, beginning with Embase and Medline Level 1 (SR) evidence, and results from Cochrane databases, CINAHL and Pubmed.

Each citation (title/ abstract) was screened by a single evidence reviewer (KN) who discarded ineligible studies (marked as irrelevant and tagged with a reason for exclusion) and retained potentially eligible ones (marked as relevant or maybe). Where there was uncertainty regarding relevance, a decision was made through discussion with the lead reviewer (MJ), who decided to either mark the citation as irrelevant or take it through to full text. Citations that were in a language other than English were tagged and managed as described below (see *Studies published in languages other than English).*

A5.1.2 Full text screening

Full text articles identified for possible inclusion in the evidence synthesis were retrieved and assessed for inclusion by a single reviewer (KN). A prespecified, hierarchical approach was used to annotate reasons for exclusion, with the results of the study selection process illustrated in a PRISMA flow. Where there was uncertainty regarding inclusion, a decision was made through discussion with the lead reviewer (MJ). The lead reviewer also reinspected approximately 40% of articles marked as excluded to ensure adherence to the *a priori* exclusion criteria, with any differences resolved by discussion.

Trial registration numbers, author names and study titles, locations and dates were used to identify multiple reports arising from the same study. As per Cochrane guidelines the unit of analysis is considered to be the study, not the report, to avoid including the same data multiple times. No published errata or corrigenda were identified in the search were checked and linked to the appropriate study. One eligible study that was not available in English was noted and managed as described in the section below (see *Studies published in languages other than English).*

Screening of systematic reviews provided sufficient high-level evidence for most outcomes. For outcomes where SR evidence was not identified, such as screening at entry and ventilation Level 2 and Level 3 literature from Medline and Embase were manually screened in Endnote, using search terms appropriate to the respective outcome.

A5.1.3 Studies published in languages other than English

Studies published in languages other than English that do not have an available English translation were not included in the review. Full text translation will not occur to determine eligibility. Studies assessed as potentially eligible for inclusion in the review were recorded in a *'Studies Awaiting Classification'* table. This information is also reflected in the PRISMA flow diagram.

A5.2 Overlap tables

As described in Figure A-1, this SR was conducted in a stepwise manor, with SRs of RCTs and prospective cohort studies considered the highest level of evidence. For outcomes where multiple SRs were identified, overlap tables were generated using the Graphical Representation of Overlap for OVErviews (GROOVE) tool (9) to determine which SRs to included evidence synthesis.

The most recent SRs were considered the best available evidence for each intervention, additional studies were then included based on overlap with other SR which were identified to ensure the range of studies identified by the SRs were represented in the evidence synthesis. Studies which were identified as eligible but were not included in the evidence evaluation are shown in Table A-7.

The SRs for hand hygiene and environmental cleaning were assessed to have an overall moderate degree of overlap (Figure A-2), and SRs for face masks were assessed to have slight overlap (Figure A-3).

Figure A-2 Overlap table for systematic reviews assessing hand hygiene intervention

	Nanda 2021	Munn 2020	Jefferson 2020	Abdullahi 2020	Xiao 2020	Monicon 2019	McGuiness 2018	Wang 2017	Mbakaya 2017	Saunders-Hasting 2017	Willmott 2016	Smith 2015	Serra 2014	Wong 2014	Warren-Gash 2013	Aiello 2010	Rabie 2006
Munn 2020	0.0%																
Jefferson 2020	15.3%	8.8%															
Abdullahi 2020	11.5%	0.0%	4.9%														
Xiao 2020	40.9%	6.1%	18.9%	13.3%													
Monicon 2019	14.8%	0.0%	11.4%	21.4%	16.1%												
McGuiness 2018	3.7%	14.3%	9.0%	6.9%	10.0%	6.5%											
Wang 2017	0.0%	20.0%	7.2%	0.0%	8.8%	0.0%	9.7%										
Mbakaya 2017	0.0%	8.0%	3.9%	0.0%	3.7%	0.0%	25.0%	3.6%									
Saunders-Hasting 2017	3.6%	0.0%	1.2%	3.2%	0.0%	6.3%	0.0%	2.9%	0.0%								
Willmott 2016	0.0%	34.6%	10.0%	0.0%	9.1%	0.0%	17.9%	37.0%	12.0%	3.0%							
Smith 2015	33.3%	0.0%	8.5%	4.5%	19.0%	8.7%	0.0%	0.0%	0.0%	0.0%	0.0%						
Serra 2014	0.0%	8.7%	5.4%	0.0%	0.0%	0.0%	4.5%	0.0%	0.0%	0.0%	8.3%	0.0%					
Wong 2014	43.8%	3.8%	14.3%	13.0%	40.0%	21.7%	8.7%	7.4%	5.3%	4.0%	7.7%	30.8%	0.0%				
Warren-Gash 2013	11.1%	6.3%	16.0%	6.5%	16.7%	16.7%	10.3%	9.1%	12.5%	0.0%	9.4%	9.1%	4.2%	28.6%			
Aiello 2010	2.4%	4.4%	8.7%	0.0%	2.1%	4.3%	2.3%	11.4%	5.3%	0.0%	9.1%	2.8%	15.2%	2.6%	17.5%		
Rabie 2006	0.0%	4.2%	5.4%	0.0%	0.0%	0.0%	0.0%	3.8%	5.9%	0.0%	4.0%	0.0%	6.7%	0.0%	31.6%	15.2%	
Mo 2022	26.7%	4.5%	8.6%	4.8%	14.3%	9.1%	16.7%	4.2%	0.0%	4.8%	4.3%	18.2%	0.0%	33.3%	9.5%	2.9%	0.0%

153	=	Total nodes (pairs of reviews)
76	=	Slight overlap (<5%)
34	=	Moderate overlap (5% to <10%)
15	=	High overlap (10% to <15%)
28	=	Very High overlap (≥15%)

Figure A-3 Overlap table for systematic reviews assessing face mask intervention

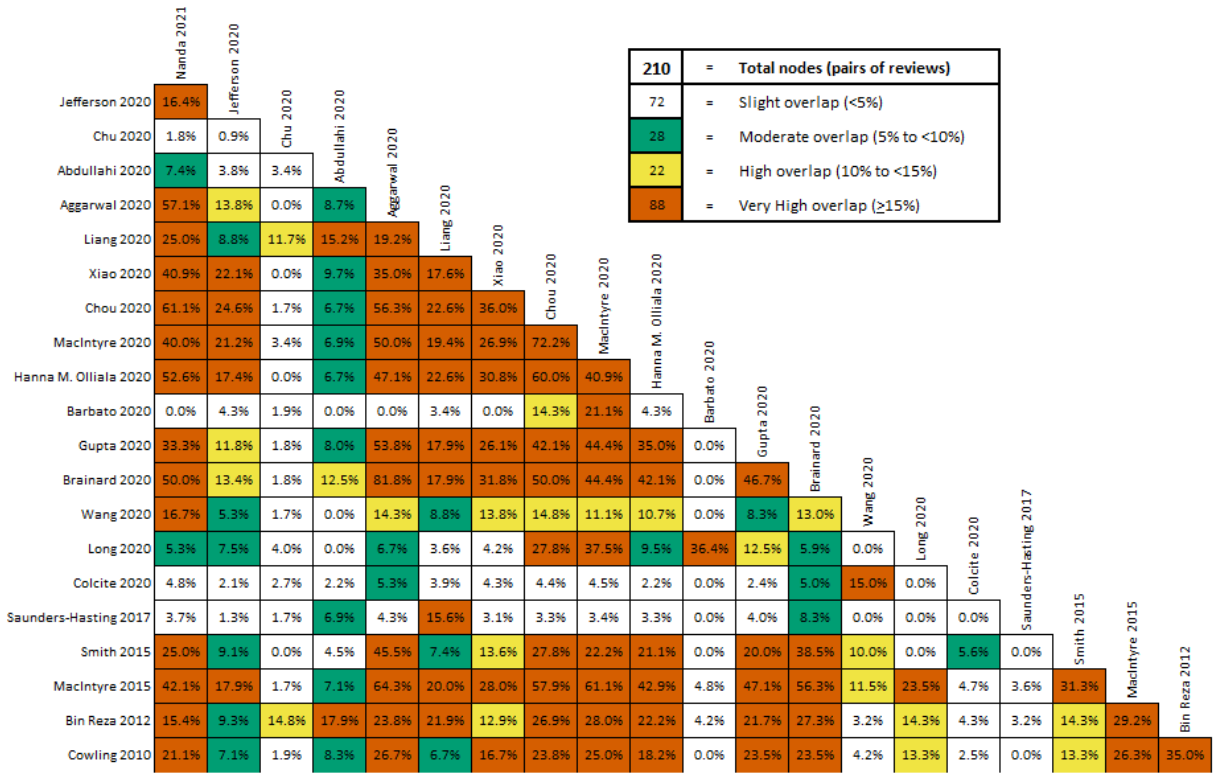


Figure A-4 Overlap table for systematic reviews assessing environmental cleaning intervention

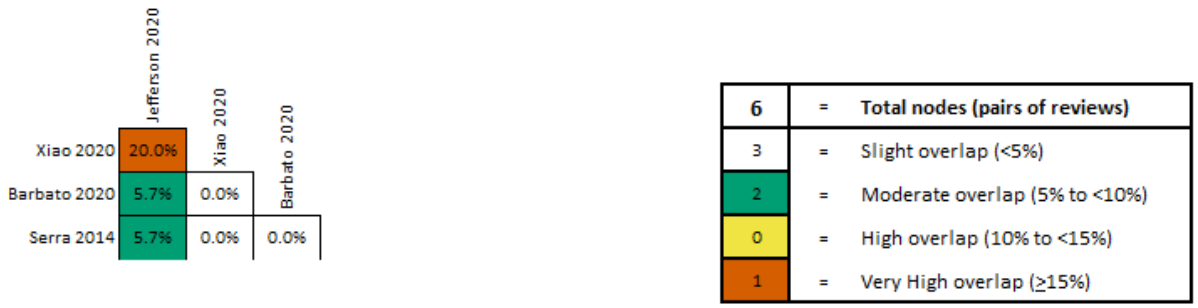


Table A-7 Eligible studies identified in the literature search but not included (overlap with included SRs)

Title	Authors/Clinical trial identifier	Year
The effect of hand hygiene frequency on reducing acute respiratory infections in the community: a meta-analysis	Mo, Y.; Pham, T. M.; Lim, C.; Horby, P.; Stewardson, A. J.; Harbarth, S.; Scott, G. M.; Cooper, B. S.	2022
Quarantine alone or in combination with other public health measures to control COVID-19: a rapid review	Nussbaumer-Streit, B.; Mayr, V.; Dobrescu, A. I.; Chapman, A.; Persad, E.; Klerings, I.; Wagner, G.; Siebert, U.; Ledinger, D.; Zachariah, C.; Gartlehner, G.	2020
Effect of hygiene interventions on acute respiratory infections in childcare, school and domestic settings in low- and middle-income countries: a systematic review	McGuinness, S. L.; Barker, S. F.; O'Toole, J.; Cheng, A. C.; Forbes, A. B.; Sinclair, M.; Leder, K.	2018
Effectiveness of hand hygiene interventions in reducing illness absence among children in educational settings: a systematic review and meta-analysis	Willmott, M.; Nicholson, A.; Busse, H.; MacArthur, G. J.; Brookes, S.; Campbell, R.	2016
Prevention of respiratory infections at day care centers: recommendations and systematic review of the evidence	Serra, M. E.	2014
Rinse-free hand wash for reducing absenteeism among preschool and school children	Munn, Z.; Tufanaru, C.; Lockwood, C.; Stern, C.; McAneney, H.; Barker, T. H.	2020
The impact of common infections on school absenteeism during an academic year	Ernestina Azor-Martínez, Yolada Gonzalez-Jimenez, Maria Luisa Seijas-Vazquez, Elena Cobos-Carrascosa, Joaquin Santisteban-Martínez, Jose Miguel Martínez-López, Esperanza Jimenez-Noguera, María del Mar Galan-Requena, Pablo Garrido-Fernández, Jenna M Strizzi, Francisco Gimenez-Sanchez	2014
Effectiveness of a Hand Hygiene Program at Child Care Centers: A Cluster Randomized Trial	Azor-Martinez, Ernestina; Yui-Hifume, Romy; Munoz-Vico, Francisco J.; Jimenez-Noguera, Esperanza; Strizzi, Jenna Marie; Martinez-Martinez, Irene; Garcia-Fernandez, Llenalia; Seijas-Vazquez, Maria L.; Torres-Alegre, Pilar; FernÃ¡ndez-Campos, Maria A.; Gimenez-Sanchez, Francisco	2018
School Safety, Masking, and the Delta Variant	Boutzoukas, Angelique E.; Zimmerman, Kanecia O.; Benjamin, Daniel K.	2022
Effectiveness of Online Health Literacy Program for COVID-19 Prevention among Teachers in Childcare Centers: A Quasi- experimental Study	Chayapa, Chaisuwan; Pattaranuch, Witoonsakul; Apawan, Nookong	2022
A cluster-randomized controlled trial of handrubs for prevention of infectious diseases among children in Colombia	Correa, Juan C.; Pinto, Diana; Salas, Lucas A.; Camacho, Juan C.; Rondon, Martin; Quintero, Juliana	2012
Preventing sickness absence from early years education	Croghan, E.	2008
Model-Estimated Association Between Simulated US Elementary School Related SARS-CoV-2 Transmission, Mitigation Interventions, and Vaccine Coverage Across Local Incidence Levels	Giardina, John; Bilinski, Alyssa; Fitzpatrick, Meagan C.; Kendall, Emily A.; Linas, Benjamin P.; Salomon, Joshua; Ciaranello, Andrea L.	2022

Title	Authors/Clinical trial identifier	Year
Risk factors for nasopharyngeal carriage of Streptococcus pneumoniae and effects of a hygiene intervention: repeated cross-sectional cohort study at day care centres	Gudnason, Thorolfur; Hrafnkelsson, Birgir; Laxdal, Brynja; Kristinsson, Karl G.	2014
The effect of a comprehensive handwashing program on absenteeism in elementary schools	Guinan, M.; McGuckin, M.; Ali, Y.	2002
Effect of hand sanitizer use on elementary school absenteeism	Hammond, B.; Ali, Y.; Fendler, E.; Dolan, M.; Donovan, S.	2000
Infection prevention at day-care centres: feasibility and possible effects of intervention	Hedin, K.; Petersson, C.; Cars, H.; Beckman, A.; Hakansson, A.	2006
Effect of cleaning and disinfection of toys on infectious diseases and micro-organisms in daycare nurseries	Ibfelt, T.; Engelund, E. H.; Schultz, A. C.; Andersen, L. P.	2015
Impact of an infection control program in a specialized preschool	Krilov, L. R.; Barone, S. R.; Mandel, F. S.; Cusack, T. M.; Gaber, D. J.; Rubino, J. R.	1996
Illness transmission in the home: a possible role for alcohol-based hand gels	Lee, G. M.; Salomon, J. A.; Friedman, J. F.; Hibberd, P. L.; Ross-Degnan, D.; Zasloff, E.; Bediako, S.; Goldmann, D. A.	2005
Comparative efficacy of a simplified handwashing program for improvement in hand hygiene and reduction of school absenteeism among children with intellectual disability	Lee, Regina L. T.; Leung, Cynthia; Tong, Wah Kun; Chen, Hong; Lee, Paul H.	2015
Masking Adherence in K-12 Schools and SARS-CoV-2 Secondary Transmission	Moorthy, Ganga S.; Mann, Tara K.; Boutzoukas, Angelique E.; Blakemore, Ashley; Brookhart, M. Alan; Edwards, Laura; Jackman, Jennifer G.; Maradiaga Panayotti, Gabriela M.; Warren, Todd; Pendleton, Joanna; Willis Garcias, Andrew; Corneli, Amy; Weber, David J.; Kalu, Ibukunoluwa C.; Benjamin Jr, Daniel K.; Zimmerman, Kanecia O.	2022
Association of Child Masking With COVID-19â€“Related Closures in US Childcare Programs	Murray, Thomas S.; Malik, Amyn A.; Shafiq, Mehr; Lee, Aiden; Harris, Clea; Klotz, Madeline; Humphries, John Eric; Patel, Kavin M.; Wilkinson, David; Yildirim, Inci; Elharake, Jad A.; Diaz, Rachel; Reyes, Chin; Omer, Saad B.; Gilliam, Walter S.	2022
Mandatory handwashing in elementary schools reduces absenteeism due to infectious illness among pupils: a pilot intervention study	Nandrup-Bus, I.	2009
Proper handwashing promotes wellness in child care	Niffenegger, J. P.	1997
Duration or technique to improve the effectiveness of children' hand hygiene: A randomized controlled trial	Oncu, Emine; Sumbule Koksy Vayisoglu	2021
Can Flu-Like Absenteeism in Kindergartens Be Reduced Through Hand Hygiene Training for Both Parents and Their Kindergarteners?	Or, Peggy Pui-Lai; Ching, Patricia Tai-Yin; Chung, Joanne Wai-Yee	2020
Appropriate time-interval application of alcohol hand gel on reducing influenza-like illness among preschool children: A randomized, controlled trial	Pandejpong, Denla; Danchaivijitr, Somwang; Vanprapa, Nirun; Pandejpong, Temyos; Cook, Earl Francis	2012
The effect of enhanced hygiene practices on absences due to infectious diseases among children in day care centers in Helsinki	Ponka, A.; Poussa, T.; Laosmaa, M.	2004
Effect of infection control measures on the frequency of upper respiratory infection in child care: a randomized, controlled trial	Roberts, L.; Smith, W.; Jorm, L.; Patel, M.; Douglas, R. M.; McGilchrist, C.	2000

Title	Authors/Clinical trial identifier	Year
A randomized, controlled trial of a multifaceted intervention including alcohol-based hand sanitizer and hand-hygiene education to reduce illness transmission in the home	Sandora, T. J.; Taveras, E. M.; Shih, M.; Resnick, E. A.; Lee, G. M.; Ross-Degnan, D.; Goldmann, D. A.	2005
The impact of statewide school closures on COVID-19 infection rates	Staguhn, Elena D.; Weston-Farber, Elias; Castillo, Renan C.	2021
Compliance with a multilayered nonpharmaceutical intervention in an urban elementary school setting	Stebbins, S.; Stark, J. H.; Vukotich, C. J., Jr.	2010
Health promotion and injury prevention in a child development center	Ulione, M. S.	1997
Practice applications of research. Comparing hand washing to hand sanitizers in reducing elementary school students' absenteeism	Vessey, J. A.; Sherwood, J. J.; Warner, D.; Clark, D.	2007
A hand hygiene intervention to reduce infections in child daycare: a randomized controlled trial	Zomer, T. P.; Erasmus, V.; Looman, C. W.; Tjon-A-Tsien, A.; Van Beeck, E. F.; De Graaf, J. M.; Van Beeck, A. H. E.; Richardus, J. H.; Voeten, H. A. C. M.	2015
Improving hand hygiene compliance in child daycare centres: a randomized controlled trial	Zomer, T. P.; Erasmus, V.; Looman, C. W.; Van Beeck, E. F.; Tjon-A-Tsien, A.; Richardus, J. H.; Voeten, H. A. C. M.	2016
A hand hygiene intervention to decrease infections among children attending day care centers: design of a cluster randomized controlled trial	Zomer, Tizza P.; Erasmus, Vicki; Vlaar, Nico; van Beeck, Ed F.; Tjon-A-Tsien, Aimee; Richardus, Jan Hendrik; Voeten, Helene A. C. M.	2013
Alcohol Based Hand Sanitizers for the Prevention of Acute Diarrheal Disease and Acute Respiratory Infection in Children Under 5 Attending Childcare Centers in Bogota, Cundinamarca and Tolima, in Colombia: a Cluster Randomized Control Trial	NCT00963391	2009
Prevention of Respiratory Infections Among Children Under 3 Years of Age Attending Daycare Centres	NCT02588963	2015
Impact of a Multifactorial Program of Hand Hygiene on Infections in Children Attending in Day-care Centres	NCT03294772	2017
The importance of hand hygiene education on primary schoolgirls' absence due to upper respiratory infections in Saudi Arabia. A cluster randomized controlled trial	Alzaher, A. A.; Almudarra, S. S.; Mustafa, M. H.; Gosadi, I. M.	2018
Household transmission of influenza A and B in a school-based study of non-pharmaceutical interventions	Azman, A. S.; Stark, J. H.; Althouse, B. M.; Vukotich, C. J.; Stebbins, S.; Burke, D. S.; Cummings, D. A.	2013
Hand Hygiene Program Decreases School Absenteeism Due to Upper Respiratory Infections	Ernestina Azor-Martinez, Elena Cobos-Carrascosa, Maria Luisa Seijas-Vazquez, Carmen Fernández-Sánchez, Jenna M Strizzi, Pilar Torres-Alegre, Joaquin Santisteban-Martínez, Francisco Gimenez-Sanchez	2016
Effectiveness of a Behavior Change Intervention with Hand Sanitizer Use and Respiratory Hygiene in Reducing Laboratory-Confirmed Influenza among Schoolchildren in Bangladesh: a Cluster Randomized Controlled Trial	Biswas, D.; Ahmed, M.; Roguski, K.; Ghosh, P. K.; Parveen, S.; Nizame, F. A.; Rahman, M. Z.; Chowdhury, F.; Rahman, M.; Luby, S. P.; Sturm-Ramirez, K.; Iuliano, A. D.	2019

Title	Authors/Clinical trial identifier	Year
A cluster-randomized controlled trial evaluating the effect of a handwashing-promotion program in Chinese primary schools	Bowen, A.; Ma, H.; Ou, J.; Billhimer, W.; Long, T.; Mintz, E.; Hoekstra, R. M.; Luby, S.	2007
Occurrence of infectious symptoms in children in day care homes	Butz, A. M.; Larson, E.; Fosarelli, P.; Yolken, R.	1990
Effectiveness of a training program in reducing infections in toddlers attending day care centers	Carabin, H.; Gyorkos, T. W.; Soto, J. C.; Joseph, L.; Payment, P.; Collet, J. P.	1999
The Hi Five study: design of a school-based randomized trial to reduce infections and improve hygiene and well-being among 6-15 year olds in Denmark	Johansen, A.; Denb; aelig;k, A. M.; Bonnesen, C. T.; Due, P.	2015
Effect of hand hygiene intervention on the absenteeism of pre-school children in Klang Valley, Malaysia: a quasi-experimental study	Mohamed, N. A.; Mohd Rani, M. D.; Tengku Jamaluddin, T. Z. M.; Ismail, Z.; Ramli, S.; Faroque, H.; Abd Samad, F. N.; Ariffien, A. R.; Che Amir Farid, A. A. R.; Isahak, I.	2020
Additional training in recommended hygiene practices for the prevention of bacterial cross-infection and respiratory illness in Australian child care centres: a randomised controlled trial	Morris, P.; Leach, A.; Wilson, C.; Bailie, R.	2003
Additional training in recommended training practices for the prevention of bacterial cross-infection and respiratory illness in Australian child care centers: a randomized controlled trial	Morris, P.; Leach, A.; Wilson, C.; Baillie, R.	2003
An investigation of the effects of a hand washing intervention on health outcomes and school absence using a randomised trial in Indian urban communities	Nicholson, J. A.; Naeeni, M.; Hoptroff, M.; Matheson, J. R.; Roberts, A. J.; Taylor, D.; Sidibe, M.; Weir, A. J.; Damle, S. G.; Wright, R. L.	2014
Comparison of Interactive Education Versus Fluorescent Concretization on Hand Hygiene Compliance Among Primary School Students: a Randomized Controlled Trial	Emine Öncü, Sümbüle Köksoy Vayısoğlu, Diğdem Lafci, Dilek Yurtsever, Ebru Ravlı Bulut, Esra Peker	2019
Access to waterless hand sanitizer improves student hand hygiene behavior in primary schools in Nairobi, Kenya	Pickering, A. J.; Davis, J.; Blum, A. G.; Scalmanini, J.; Oyier, B.; Okoth, G.; Breiman, R. F.; Ram, P. K.	2013
Hand sanitiser provision for reducing illness absences in primary school children: a cluster randomised trial	Priest, P.; McKenzie, J. E.; Audas, R.; Poore, M.; Brunton, C.; Reeves, L.	2014
Reduction in the incidence of influenza A but not influenza B associated with use of hand sanitizer and cough hygiene in schools: a randomized controlled trial	Stebbins, S.; Cummings, D. A.; Stark, J. H.; Vukotich, C.; Mitruka, K.; Thompson, W.; Rinaldo, C.; Roth, L.; Wagner, M.; Wisniewski, S. R.; Dato, V.; Eng, H.; Burke, D. S.	2011
Effects of hand hygiene campaigns on incidence of laboratory-confirmed influenza and absenteeism in schoolchildren, Cairo, Egypt	Talaat, M.; Afifi, S.; Dueger, E.; El-Ashry, N.; Marfin, A.; Kandeel, A.; Mohareb, E.; El-Sayed, N.	2011
Influenza Transmission in Preschools: Modulation by contact landscapes and interventions	Adalja, A. A.; Crooke, P. S.; Hotchkiss, J. R.	2010
Hand hygiene and risk of influenza virus infections in the community: a systematic review and meta-analysis	V W Y Wong, B J Cowling, A E Aiello	2014
Facemasks for prevention of viral respiratory infections in community settings: a systematic review and meta-analysis	Nishant Aggarwal, Vignesh Dwarakanathan, Nitesh Gautam, Animesh Ray	2020
Impact of water, sanitation and hygiene interventions on growth, non-diarrheal morbidity and mortality in children residing in low- and middle-income countries: a systematic review	Tarun Gera, Dheeraj Shah, Harshpal Singh Sachdev	2018

Title	Authors/Clinical trial identifier	Year
Efficacy of face mask in preventing respiratory virus transmission: a systematic review and meta-analysis.	Mingming Liang, Liang Gao, Ce Cheng, Qin Zhou, John Patrick Uy, Kurt Heiner, Chenyu Sun	2020
Handwashing and risk of respiratory infections: a quantitative systematic review	Tamer Rabie, Valerie Curtis	2006
Effectiveness of surgical face masks in reducing acute respiratory infections in non-healthcare settings: a systematic review and meta-analysis	Min Xian Wang, Sylvia Xiao Wei Gwee, Pearleen Ee Yong Chua , Junxiong Pang	2020
Effectiveness of hand hygiene practices in preventing influenza virus infection in the community setting: a systematic review	K Moncion, K Young, M Tunis, S Rempel, R Stirling, L Zhao	2019
Use of non-pharmaceutical interventions to reduce the transmission of influenza in adults: a systematic review	Sheree M S Smith, Sandra Sonego, Gwenyth R Wallen, Grant Waterer, Allen C Cheng, Philip Thompson	2015
Face masks to prevent transmission of influenza virus: a systematic review.	B J Cowling, Y Zhou, D K M Ip, G M Leung, A E Aiello	2015
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	C Raina MacIntyre, Abrar Ahmad Chughtai	2020
Hand hygiene intervention strategies to reduce diarrhoea and respiratory infections among schoolchildren in developing countries: a systematic review.	Balwani Chingatichifwe Mbakaya , Paul H Lee, Regina L T Lee	2017
Hand hygiene to reduce community transmission of influenza and acute respiratory tract infection: a systematic review	Charlotte Warren-Gash, Ellen Fragaszy, Andrew C Hayward	2013
Effectiveness of personal protective measures in reducing pandemic influenza transmission: a systematic review and meta-analysis.	Patrick Saunders-Hastings, James A G Crispo, Lindsey Sikora, Daniel Krewski	2017
Face masks to prevent transmission of respiratory diseases: Systematic review and meta-analysis of randomized controlled trials	Hanna M Ollila, Markku Partinen, Jukka Koskela, John Borghi, Riikka Savolainen, Anna Rotkirch, Liisa T Laine	2022
Effect of Hand Hygiene on Infectious Disease Risk in the Community Setting: A Meta-Analysis	Allison E Aiello, Rebecca M Coulborn, Vanessa Perez, Elaine L Larson	2008
Effectiveness of day care centre infection control interventions	V Mann, C Buffett, M Campbell, K Lee, and R O'Donnell.	1999
Effectiveness of N95 respirators versus surgical masks against influenza: A systematic review and meta-analysis	Youlin Long, Tengyue Hu, Liqin Liu, Rui Chen, Qiong Guo, Liu Yang, Yifan Cheng, Jin Huang, Liang Du	2020
Face Mask Use in the Community for Reducing the Spread of COVID-19: A Systematic Review	Daniela Coclite, Antonello Napoletano, Silvia Gianola, Andrea Del Monaco, Daniela D'Angelo, Alice Fauci, Laura Iacorossi, Roberto Latina, Giuseppe La Torre, Claudio M Mastroianni, Cristina Renzi, Greta Castellini, Primiano Iannone	2021
Facemasks for the prevention of infection in healthcare and community settings	C Raina MacIntyre, Abrar Ahmad Chughtai	2015
Surface disinfection and protective masks for SARS-CoV-2 and other respiratory viruses: A review by SIdP COVID-19 task force	Luigi Barbato, Francesco Bernardelli, Giovanni Braga, Marco Clementini, Claudio Di Gioia, Crisitnano Littarru, Francesco Oreglia, Mario Raspin, Eugenio Brambilla, Ivo Iavicoli, Vilma Pinchi, Luca Landi, Nicola Marco Sforza, Raffaele Cavalcanti, Alessandro Crea, Francesco Cairo	2022

Title	Authors/Clinical trial identifier	Year
The use of facemasks by the general population to prevent transmission of Covid 19 infection: A systematic review	Madhu Gupta, Khushi Gupta, Sarika Gupta	2020
The use of masks and respirators to prevent transmission of influenza: a systematic review of the scientific evidence	Faisal Bin-Reza, Vicente Lopez Chavarrias, Angus Nicoll, Mary E Chamberland	2012
Physical Interventions to Interrupt or Reduce the Spread of Respiratory Viruses — Resource Use Implications: A Systematic Review	KM Lee, VK Shukla, M Clark, M Mierzwinski-Urban, CL Pessoa-Silva, and J Conly	2012
Facemasks and similar barriers to prevent respiratory illness such as COVID-19: A rapid systematic review	Julii Brainard, Natalia Jones, Iain Lake, Lee Hooper, Paul R Hunter	2020

A6 Summary of screening results

A6.1 Search of published literature

Results of the literature search and application of the study selection criteria are summarised in Table A-8

Studies were excluded based on hierarchical, prespecified exclusion criteria, with all citations returned by the literature searches reviewed based on information in the publication title and abstract (where available). Potentially relevant publications were then retrieved and reviewed in full text before a final decision was made on their inclusion or exclusion for the review.

Citation details of studies assessed at full text but not included in the evidence review (with reasons for exclusion) are listed in **Appendix C**.

Table A-8 Screening results

Database	**Study design**	**Number of studies identified**
Embase	Systematic review	188
	Randomised controlled trial	1022
	Nonrandomised study of an intervention	1359
	Letters	104
	Editorials	74
MEDLINE (via OVID)	Systematic Review	102
	Randomised controlled trial	576
	Nonrandomised study of an intervention	467
	Letters	48
	Editorials	39
Cochrane Systematic Reviews and Central Register of Controlled Trials	All	296
EBSCOHost (CINAHL complete)	All	363
Pubmed (not MEDLINE)	All	273
Epistemonikos database	Systematic review	13
Nonpharmaceutical interventions to prevent viral respiratory infection in community settings: an umbrella review (6)	Systematic review	16
Physical interventions to interrupt or reduce the spread of respiratory viruses (7)	Systematic review	1
TOTAL		**4941**
Studies uploaded to Covidence for screening		1222
Duplicates removed by Covidence		152
Number of citations screened TITLE/ABSTRACT		**1068**
Non-human study		5
Intervention out of scope		749
Population out of scope		14
Outcome out of scope		36

Database	Study design	Number of studies identified
Publication type out of scope (opinion piece/editorial/commentary)		7
Study design out of scope		10
Total excluded a title/abstract stage		**821**
Studies not yet screened		3719
Unable to be retrieved		11
Number of citations screened at FULL TEXT		**236**
Nonhuman study		2
Population out of scope		11
Intervention out of scope		80
Outcome out of scope		19
Study design out of scope (not a comparative study)		19
Not an intervention study examining effectiveness		16
Publication type out of scope (opinion piece, editorial, or commentary)		15
Ongoing		2
TOTAL EXCLUDED		**164**
Total identified through literature search		72
Citations identified through other sources		33
TOTAL INCLUDED		**105**

Appendix B Methods of data appraisal, collection, analysis and reporting (included studies)

This appendix documents the methods used to critically appraise, data extract, synthesise and develop evidence statements about the effect on non- pharmaceutical measures on reducing the transmission of respiratory illnesses.

B1 Risk of Bias

B1.1 Tools used

The risk of bias of included studies was assessed using the most appropriate risk of bias assessment tool according to the type of study as follows:

- Systematic reviews: AMSTAR-2 quality assessment checklist (10)
- RCTs: Revised Cochrane Risk of Bias (RoB) tool v2 (11, 12)
- Nonrandomised comparative studies: JBI checklist (13)

B1.1.1 Systematic reviews

The methodological quality of included systematic reviews was assessed using the AMSTAR-2 quality assessment checklist (14, 15). The AMSTAR-2 consists of 16 domain questions that are answered as 'yes', 'no', or 'partial yes'; with a 'yes' answer denoting a positive result. For this review, four domains have been classified as being a 'critical flaw' (see Table B-1).

Table B-1 AMSTAR-2: Domain classification

Critical flaw	Weakness	
Domain 4: Adequacy of the literature search Domain 8: Detailed description of included studies Domain 9: Risk of bias from individual studies being included in the review Domain 11: Appropriateness of meta-analytical methods	Domain 1: Inclusion of PICO in research questions and inclusion criteria Domain 2: Registration of protocol before commencement of the review Domain 3: Discussion of selection of study designs for inclusion Domain 5: Duplicate study selection Domain 6: Duplicate data extraction Domain 7: Justification for excluding individual studies Domain 16: Reporting of potential sources of conflict of interest including any funding received	Domain 10: Review of sources of funding for included studies Domain 12: Discussion of impact of risk of bias of included studies on meta-analysis results Domain 13: Consideration of risk of bias when interpreting the results of the review Domain 14: Discussion of heterogeneity Domain 15: Assessment of presence and likely impact of publication bias

Source: Adapted from Shea 2017 (10)

An overall judgement summarising the overall confidence in the results of the SR was reported based on the potential impact of an inadequate rating for each item, noting that multiple noncritical weaknesses may diminish confidence in the review (10). It is noted that the AMSTAR-2 leads to a judgement of the methodological quality (or limitations) of a systematic review, not a judgement about the risk of bias of the body of evidence included within the review.

Judgements will be guided by (but not limited to) the following rating criteria:

- *High* (*no or one noncritical weakness)* – the systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest.
- *Moderate (more than one noncritical weakness)* – the systematic review has more than one weakness but no critical flaws. It may provide an accurate summary of the results of the available studies that were included in the review.
- *Low (one critical flaw with or without noncritical weaknesses)* – the review has a critical flaw and may not provide an accurate and comprehensive summary of the available studies that address the question of interest.
- *Critically low (more than one critical flaw with or without noncritical weaknesses)* – the review has more than one critical flaw and should not be relied on to provide an accurate and comprehensive summary of the available studies.

B1.1.2 Randomised controlled trials

The Cochrane RoB v2 consists of five domains that assess bias arising from the randomisation process: bias due to deviations from intended interventions; bias due to missing outcome data; bias in measurement of the outcome; and bias in selection of the reported result. Each domain was assessed for bias, recorded as 'high', 'low', or 'some concerns'. Concerns of bias was raised when it is considered plausible (i.e. likely, probable, possible or conceivable) that bias was present, with the algorithm provided for the RoB v2 used to guide decision making (available online at https://www.riskofbias.info). Versions of the RoB v2 relevant to different study designs (i.e. cluster randomised control trials and crossover trials) was used where appropriate.

Consistent with the Cochrane Handbook of the effects of interventions (12) and GRADE (3), the risk of bias for domain 2 was judged according to the effect of assignment to the intervention (the intention-to-treat effect). In this context, it is noted that, there is a potential for bias associated with non-blinding of trial participants or trial personnel (in particular for individualised interventions).

The only deviations from the intended intervention that were assessed are:

- those considered to arise because of the trial context (i.e. unconscious or conscious processes associated with recruitment and engagement activities),
- those considered to be inconsistent with the trial protocol, and
- those judged likely to influence the outcome (as per guidance for RoB v2) (12).

This means that any deviations considered to occur outside the trial context did note lead to a judgement of bias for the effect of assignment to the intervention (e.g. dropouts due to a change in circumstance that prevents the participants' ability to participate).

An overall risk of bias for each outcome in the RCT was judged based on the following criteria:

- *overall low risk of bias* – low risk of bias for all domains
- *some concerns* – at least one domain has some concerns raised, but none are found to be at high risk of bias
- *overall high risk of bias* – high risk of bias for one or more domains

B1.1.3 Nonrandomised studies

Critical appraisal of nonrandomised studies was guided by the methods described in the JBI Risk of Bias checklist. The JBI Critical Appraisal checklist for Cohort Studies is made up of eleven key questions of which an answer of yes, no ,unclear or not applicable is answered.

The overall appraisal judgement for a specific study is defined as either *'include"*, *'exclude*', or '*seek further info*' and is based upon the following guide:

- Were the two groups similar and recruited from the same population?
- Were the exposures measured similarly to assign people to both exposed and unexposed groups?
- Was the exposure measured in a valid and reliable way?
- Were confounding factors identified?
- Were strategies to deal with confounding factors stated?
- Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?
- Were the outcomes measured in a valid and reliable way?
- Was the follow up time reported and sufficient to be long enough for outcomes to occur?
- Was follow up complete, and if not, were the reasons to loss to follow up described and explored?
- Were strategies to address incomplete follow up utilized?
- Was appropriate statistical analysis used?

B1.2 Assessment process

The risk of bias for each included study was assessed by one reviewer. A second reviewer then checked and confirm all assessments made. Disagreements were resolved by discussion, with advice sought from a third reviewer if agreement could not be reached.

The assessment was based on the primary outcome for that study (if a primary outcome is not stated, the assessment will be on the main/key outcome of the report). The second reviewer checked the risk of bias assessment when conducting the evidence synthesis (i.e. when examining the outcome results of the study for inclusion in a meta-analysis), with the focus of the assessment being on the outcome of interest.

For each outcome we reported our judgement of risk of bias (e.g. low, moderate, high, critical) by domain and provided a rationale for the judgement with supporting information.

B2 Data extraction process

The characteristics of all included studies was extracted by one reviewer (KN) using a standardised data collection form. Studies were grouped according to the intervention and study type to which they had been categorised.

All data extraction forms were checked for completeness and accuracy by a second reviewer (MJ), with checks made at the same time as the evidence synthesis. Where there was uncertainty or disagreement about included data, a decision was made through discussion with the lead reviewer (MJ).

B2.1 Data items

A standardised data collection form was used to collect all data items relating to the study features.

This included (but was not limited to) the following:

- Study identifier (author date)
- Study Reference (including all citations)
- Study design (SR, Modelling study, RCT, cohort)
- Author affiliation
- Source of funds
- Declared interests of study authors
- Setting (such as childcare centre, school, community)
- Country(s) & region (if reported)
- Length of followup (time period for including studies in SRs and intervention time for RCTs)
- Description of population (including the number of participants, inclusion and exclusion criteria and any notable demographics)
- Description of intervention & comparators (including the type of exclusion measure and control used)
- Method of analysis
- Internal validity including the overall quality or risk of bias of the study
- List of Outcomes, including the following:
    - Comparison (Exclusion measure vs control or exclusion measure vs. alternate intervention)
    - Number of participants in the intervention group / comparator group
    - Reported results in the intervention group / comparator group (e.g. means and standard deviations or medians and interquartile ranges)
    - Estimates of effect (e.g. mean differences or adjusted mean differences), 95% confidence intervals, *p*-values)

B2.2 Requests for data

No attempts were made to obtain or clarify data from published peer-reviewed studies. There was also no attempt made to obtain additional data from eligible primary studies not published in English, ongoing trials and studies published as conference abstracts.

B3 Data analysis

This appendix documents the methods used to synthesise the evidence for non-pharmaceutical interventions to prevent the transmission of respiratory illness.

B3.1 Measures of treatment effect

For all measures of effects, where available we reported 95% confidence intervals and *p*-values.

To reduce effects of confounding, adjusted effect estimates from nonrandomised studies were reported, if available (e.g. adjusted odds ratios (OR) from logistic regression or adjusted rate ratios from Poisson regression analyses). The variables that have been used for adjustment will be recorded.

B3.2 Quantitative synthesis

Synthesis (meta-analysis) was undertaken for studies that compare non-pharmaceutical interventions with 'no intervention' or 'alternative intervention'

B3.2.1 Data from RCTs

Data synthesis from RCTs only was performed using RevMan 5.4 (16). Within each comparison (PICO) effect estimates were combined across studies for each outcome using a random effects model to take into account expected differences between studies. Statistical heterogeneity was assessed by visually inspecting the overlap of confidence intervals on the forest plots, formally testing for heterogeneity using the Chi^2 test (using a significance level of α=0.1), and quantifying heterogeneity using the I^2 statistic (17).

B3.2.2 Data from nonrandomised studies

Data synthesis from nonrandomised studies was performed in the same way as RCTs.

Effect estimates were combined across outcomes if the included nonrandomised studies are judged to be at low to moderate risk of bias (see **Appendix B1**) and were sufficiently homogenous to be combined. This means the PICO criteria of the NRSIs must be sufficiently similar and the study design features should be comparable.

B3.2.3 Non-quantitative synthesis

The evidence review provided a structured narrative summary of the results for each intervention identified (including study design and population demographics) along with risk of bias assessments and other intervention characteristics. This was followed by a summary of results grouped by comparator and outcome domain. Results from each study will be reported, with the range and magnitude of observed effects noted.

Results tables were structured by comparator ('control' or 'other' intervention), outcome domain, and study design and were ordered by study ID (author, date). Where possible, a visual representation of the results of included studies was presented in a forest plot (without a summary estimate) grouped by risk of bias. Any important differences in study design or features that may influence the interpretation of results were considered and discussed in the text.

Qualitative descriptors of the size of the effect (small, large etc.) were used only in relation to the evidence statement and will be based on the smallest difference that patients perceive as beneficial (or detrimental) for that outcome.

B4 Evidence statements

B4.1 Summary of findings and certainty of the evidence

Across each population, we assessed the certainty of the evidence using the GRADE approach (3). Evidence comparing exclusions measures with either a 'control' or alternate intervention was considered.

GRADE certainty of evidence is categorised as follows:

- High (⊕⊕⊕⊕): further research is very unlikely to change the confidence in the estimate of effect
- Moderate (⊕⊕⊕⊖): further research is likely to have an important impact in the confidence in the estimate of effect
- Low (⊕⊕⊖⊖): further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate
- Very low (⊕⊖⊖⊖): any estimate of effect is very uncertain

The GRADE process provides a framework for determining the certainty of the evidence and is based on consideration of the following five factors:

- *Risk of bias.* Based on a summary assessment (i.e. the overall risk of bias) across studies for each outcome reported (18). Serious concerns were raised if the outcome result was influenced by the inclusion of studies judged to be at high risk of bias (i.e. removing these studies changed the size of the effect). Serious concerns were also raised if it was considered plausible (i.e. likely, probable or conceivable) that missing outcome data made a difference to the estimated effect (considering the weight of studies that had substantial missing data).
- *Inconsistency.* Based on heterogeneity in the observed intervention effects across studies that suggests important differences in the effect of the intervention and whether this can be explained (19). This included considering measures of statistical heterogeneity (e.g. I^2 statistic) and any non-overlap of confidence intervals (suggesting important difference in the observed effect). Inconsistency was not downgraded when there was only one study.
- *Imprecision.* Based on interpretation of the upper and lower confidence limits of the pooled result in relation to a minimal clinically important threshold (i.e. the confidence interval includes both appreciable benefit and harm); and whether the optimal information size has been reached (i.e. the total number of patients meets the required sample size for a sufficiently powered individual study) (20). In the absence of a published clinically important threshold a rough guide was used: for dichotomous outcomes a 25% relative risk reduction or increase; for continuous outcomes based on the threshold defined for a small effect (the mean difference being less than 10% of the scale).
- *Indirectness.* Based on important differences between the review questions and the characteristics of included studies (population or intervention) that may lead to important differences in the intervention effects (21).
- *Publication bias*. Based on the extent to which the evidence is available. This included: checking trial registries for missing outcome results in published studies, checking the ongoing studies and studies awaiting classification (including those published in a language other than English) and making a judgement on whether the studies were not complete, failed to report an outcome, were not published (or translated) due to the nature of their results (i.e., selective non-reporting of results). Given most of the outcome results came from small studies, any missing results due to non-reporting in a meta-analysis was considered likely to impact the results. Publication bias was also suspected when the evidence was limited to a small number of small trials (22).

B4.2 Development of evidence statements

As part of the summary of findings table, an evidence statement pertaining to each outcome was included. The evidence statement was guided by the prescribed format provided in GRADEPro (23), with the preferred statement selected listed in Table B-2.

Table B-2 List of informative statements to communicate results of systematic reviews

Size of the effect estimate	Suggested statements *
HIGH Certainty of the evidence	
Large effect	X results in a large reduction/increase in outcome
Moderate effect	X reduces/increases outcome
Small important effect	X reduces/increases outcome slightly
Trivial, small unimportant effect or no effect	X results in little to no difference in outcome
MODERATE Certainty of the evidence	
Large effect	X probably results in a large reduction/increase in outcome
Moderate effect	X probably reduces/increases outcome
Small important effect	X probably results in a slight reduction/increase in outcome
Trivial, small unimportant effect or no effect	X probably results in little to no difference in outcome
LOW Certainty of the evidence	
Large effect	The evidence suggests X results in a large reduction/increase in outcome
Moderate effect	The evidence suggests X results in a reduction/increase in outcome
Small important effect	The evidence suggests X results in a slight reduction/increase in outcome
Trivial, small unimportant effect or no effect	The evidence suggests that X results in little to no difference in outcome
VERY LOW Certainty of the evidence	
Any effect	The evidence is very uncertain about the effect of X on outcome

Source: modified from Santesso et al. (2020) (23)

* Replace X with intervention, replace 'reduce/increase' with direction of effect, replace 'outcome' with name of outcome, include 'when compared with Y' when needed)

Appendix C Details of studies assessed at full text but not included

This appendix documents the studies that were screened in full text for a systematic review on the effect of non-pharmaceutical interventions for reducing the spread of respiratory infections in childcare settings but were not included in the evidence synthesis as they did not meet the eligibility criteria.

C1 Citation details of excluded studies (not eligible)

Table C-1 Details of studies screened at full text (by reason for exclusion)

Title	Author	Year	Reason for exclusion
Practice of Home Remedies among the Mothers of Under Five Children with Upper Respiratory Tract Infection	Siva, N.; Nayak, Baby S.	2019	Intervention out of scope
Risk factors for respiratory infections among children attending day care centres	Alexandrino, Ana S.; Santos, Rita; Melo, Cristina; Bastos, Josae M.	2016	Intervention out of scope
Comparison of efficiency and preference of metal and plastic spacers in preschool children	Amirav, I.; Tiosano, T.; Chamny, S.; Chirurg, S.; Oren, S.; Grossman, Z.; Kahan, E.; Newhouse, M. T.; Mansour, Y.; Network, Ipros	2004	Intervention out of scope
2013 CAEP/ACMU Scientific Abstracts, CAEP 2013	Anonymous	2013	Intervention out of scope
Tuberculosis outbreaks among students in mainland China: a systematic review and meta-analysis	Bao, H.; Liu, K.; Wu, Z.; Wang, X.; Chai, C.; He, T.; Wang, W.; Wang, F.; Peng, Y.; Chen, B.; Jiang, J.	2019	Intervention out of scope
Effect of In-Person Primary and Secondary School Instruction on County-Level Severe Acute Respiratory Syndrome Coronavirus 2 Spread in Indiana	Bosslet, Gabriel T.; Pollak, Micah; Jang, Jeong Hoon; Roll, Rebekah; Sperling, Mark; Khan, Babar	2022	Intervention out of scope
SARS-CoV-2 Circulation in the School Setting: A Systematic Review and Meta-Analysis	Caini, S.; Martinoli, C.; La Vecchia, C.; Raimondi, S.; Bellerba, F.; D'Ecclesiis, O.; Sasso, C.; Basso, A.; Cammarata, G.; Gandini, S.	2022	Intervention out of scope
Reasons for SARS-CoV-2 infection in children and their role in the transmission of infection according to age: a case-control study	Calvani, Mauro; Cantiello, Giulia; Cavani, Maria; Lacorte, Eleonora; Mariani, Bruno; Panetta, Valentina; Parisi, Pasquale; Parisi, Gabriella; Roccabella, Federica; Silvestri, Paola; Vanacore, Nicola	2021	Intervention out of scope
Day care attendance in the first year of life and illnesses of the upper and lower respiratory tract in children with a familial history of atopy	Celedon, J. C.; Litonjua, A. A.; Weiss, S. T.; Gold, D. R.	1999	Intervention out of scope
Transmission of SARS-CoV-2 by children: a rapid review, 30 December 2019 to 10 August 2020	Clyne, B.; Jordan, K.; Ahern, S.; Walsh, K. A.; Byrne, P.; Carty, P. G.; Drummond, L.; O'Brien, K. K.; Smith, S. M.; Harrington, P.; Ryan, M.; O'Neill, M.	2022	Intervention out of scope

Title	Author	Year	Reason for exclusion
Hand washing practice at critical times and its associated factors among mothers of under five children in Debark town, northwest Ethiopia, 2018	Dagne, Henok; Bogale, Laekemariam; Borcha, Muluneh; Tesfaye, Anley; Dagnew, Baye	2019	Intervention out of scope
Indoor air quality, ventilation and health symptoms in schools: an analysis of existing information	Daisey, J. M.; Angell, W. J.; Apte, M. G.	2003	Intervention out of scope
Impact of early daycare on healthcare resource use related to upper respiratory tract infections during childhood: prospective WHISTLER cohort study	de Hoog, Marieke L. A.; Venekamp, Roderick P.; van der Ent, Cornelis K.; Schilder, Anne; Sanders, Elisabeth Am; Damoiseaux, Roger Amj; Bogaert, Debby; Uiterwaal, Cuno Spm; Smit, Henriette A.; Bruijning-Verhagen, Patricia	2014	Intervention out of scope
Influenza-like illness and presenteeism among school employees	de Perio, Marie A.; Wiegand, Douglas M.; Brueck, Scott E.	2014	Intervention out of scope
The implementation of protective and hygienic measures in day care centres in Germany...14th European Public Health Conference (Virtual), Public health futures in a changing world, November 10-12, 2021	Diefenbacher, S.; Grgic, M.; Spensberger, F.	2021	Intervention out of scope
Infections in Child Day Care Centers and Later Development of Asthma, Allergic Rhinitis, and Atopic Dermatitis: Prospective Follow-up Survey 12 Years After Controlled Randomized Hygiene Intervention	Dunder, T.; Tapiainen, T.; Pokka, T.; Uhari, M.	2007	Intervention out of scope
Immunity-targeted approaches to the management of chronic and recurrent upper respiratory tract disorders in children	Feleszko, W.; Marengo, R.; Vieira, A. S.; Ratajczak, K.; Mayorga Butron, J. L.	2019	Intervention out of scope
Risk factors for respiratory tract infections in children aged 2-5 years	Forssell, G.; Hakansson, A.; Mansson, N.	2001	Intervention out of scope
Prevention of hospitalization due to respiratory syncytial virus: results from the Palivizumab Outcomes Registry	Frogel, M.; Nerwen, C.; Cohen, A.; VanVeldhuisen, P.; Harrington, M.; Boron, M.	2008	Intervention out of scope
Duration of day-care attendance and acute respiratory infection	Fuchs, S. C.; Maynart, Rd; Costa, L. F.; Cardozo, A.; Schierholt, R.	1996	Intervention out of scope
Relative frequency, Possible Risk Factors, Viral Codetection Rates, and Seasonality of Respiratory Syncytial Virus Among Children With Lower Respiratory Tract Infection in Northeastern Brazil	Gurgel, Ricardo Queiroz; de Matos Bezerra, PatrÃcia Gomes; Bezerra Duarte, Maria do Carmo Menezes; Moura, Adriana Ã□vila; Souza, Edna Lucia; da Silveira Silva, Luciana Sobral; Suzuki, Claudia Eiko; Peixoto, Rodrigo Buzzatti; Bezerra, PatrÃcia Gomes de Matos; Duarte, Maria do Carmo Menezes Bezerra; Silva, Luciana Sobral da Silveira	2016	Intervention out of scope
Prevalence and Transmission of Severe Acute Respiratory Syndrome Coronavirus Type 2 in Childcare Facilities: A Longitudinal Study	Haag, Luise; Blankenburg, Judith; Unrath, Manja; Grabietz, Johanna; Kahre, Elisabeth; Galow, Lukas; Schneider, Josephine; Dalpke, Alexander H.; Dalpke, Christian; Buttner, Leo; Berner, Reinhard; Armann, Jakob P.	2021	Intervention out of scope
Evaluation of a Test to Stay Strategy in Transitional Kindergarten Through Grade 12 Schools -- Los Angeles County, California, August 16-October 31, 2021	Harris-McCoy, Kimberly; Lee, Veronica C.; Munna, Cortney; Kim, Andrea A.	2021	Intervention out of scope

Title	Author	Year	Reason for exclusion
Factors associated with acute respiratory illness in day care children	Hatakka, K.; Piirainen, L.; Pohjavuori, S.; Poussa, T.; Savilahti, E.; Korpela, R.	2010	Intervention out of scope
Bifidobacterium animalis subsp. lactis in prevention of common infections in healthy children attending day care centers Randomized, double blind, placebo-controlled study	Hojsak, Iva; Mocic Pavic, Ana; Kos, Tea; Dumancic, Jelena; KolaÄ□ek, Sanja	2016	Intervention out of scope
Effectiveness of interventions as part of the One Health approach to control coronavirus disease 2019 and stratified case features in Anhui Province, China: A real-world population-based cohort study	Huang, L.; Zhang, X.; Xu, A.	2021	Intervention out of scope
Risk of infection and transmission of SARS-CoV-2 among children and adolescents in households, communities and educational settings: A systematic review and meta-analysis	Irfan, O.; Li, J.; Tang, K.; Wang, Z.; Bhutta, Z. A.	2021	Intervention out of scope
Primary care management of respiratory tract infections in Dutch preschool children	Jansen, A. G. S.; Sanders, E. A. M.; Schilder, A. G. M.; Hoes, A. W.; de Jong, V. F. G.; Hak, E.	2006	Intervention out of scope
Association of COVID-19 Mitigation Measures With Changes in Cardiorespiratory Fitness and Body Mass Index Among Children Aged 7 to 10 Years in Austria	Jarnig, G.; Jaunig, J.; van Poppel, M. N. M.	2021	Intervention out of scope
Enterococcus spp on fomites and hands indicate increased risk of respiratory illness in child care centers	Julian, Timothy R.; Pickering, Amy J.; Leckie, James O.; Boehm, Alexandria B.	2013	Intervention out of scope
Population-based study of the impact of childcare attendance on hospitalizations for acute respiratory infections	Kamper-Jorgensen, M.; Wohlfahrt, J.; Simonsen, J.; Gronbaek, M.; Benn, C. S.	2006	Intervention out of scope
Risk of infection and contribution to transmission of SARS-CoV-2 in school staff: a systematic review	Karki, S. J.; Joachim, A.; Heinsohn, T.; Lange, B.	2021	Intervention out of scope
COVID-19 Pandemic Impact on Respiratory Infectious Diseases in Primary Care Practice in Children	Kaur, R.; Schulz, S.; Fuji, N.; Pichichero, M.	2021	Intervention out of scope
Novel respiratory infectious diseases in Korea	Kim, H. J.	2020	Intervention out of scope
The relationship between mothers' knowledge and practice level of cough etiquette and their children's practice level in South Korea	Kim, J.; Oh, S.	2021	Intervention out of scope
Potential interventions for the prevention of childhood pneumonia in developing countries: A systematic review	Kirkwood, B. R.; Gove, S.; Rogers, S.; Lob-Levyt, J.; Arthur, P.; Campbell, H.	1995	Intervention out of scope
Pertussis: The Identify, Isolate, Inform Tool Applied to a Re-emerging Respiratory Illness	Koenig, Kristi L.; Farah, Jennifer; McDonald, Eric C.; Thihalolipavan, Sayone; Burns, Michael J.	2019	Intervention out of scope
Respiratory infections in infants: interaction of parental allergy, child care, and siblings -- the PIAMA Study	Koopman, L. P.; Smit, H. A.; Heijnen, M. A.; Wijga, A.; van Strien, R. T.; Kerkhof, M.; Gerritsen, J.; Brunekreef, B.; de Jongste, J. C.; Neijens, H. J.	2001	Intervention out of scope
Fomite-mediated transmission as a sufficient pathway: a comparative analysis across three viral pathogens	Kraay, Alicia N. M.; Hayashi, Michael A. L.; Hernandez-Ceron, Nancy; Spicknall, Ian H.; Eisenberg, Marisa C.; Meza, Rafael; Eisenberg, Joseph N. S.	2018	Intervention out of scope

Title	Author	Year	Reason for exclusion
The role of culture in relation to the seasonal influenza prevention practices of Hong Kong Chinese parents with preschool children	Lam, Winsome; Fowler, Catherine; Dawson, Angela	2018	Intervention out of scope
Risks for upper respiratory infections in infants during their first months in day care included environmental and child-related factors	Laursen, R. P.; Larnkjaer, A.; Ritz, C.; Hojsak, I.; Michaelsen, K.; Molgaard, C.	2018	Intervention out of scope
Risks for upper respiratory infections in infants during their first months in day care included environmental and child-related factors	Laursen, Rikke Pilmann; Larnkiar, Anni; Ritz, Christian; Michaelsen, Kim; MÃ¸lgaard, Christian; Hojsak, Iva	2018	Intervention out of scope
School-based prevention of acute rheumatic fever: a group randomized trial in New Zealand	Lennon, D.; Stewart, J.; Farrell, E.; Palmer, A.; Mason, H.	2009	Intervention out of scope
A school-based program for control of group a streptococcal upper respiratory tract infections: a controlled trial in Southern China	Lin, S.; Kaplan, E. L.; Rao, X.; Johnson, D. R.; Deng, M.; Zhuo, Q.; Yang, P.; Mai, J.; Dong, T.; Liu, X.	2008	Intervention out of scope
The impact of COVID-19 lockdown on dengue transmission in Sri Lanka; A natural experiment for understanding the influence of human mobility	Liyanage, P.; Rocklov, J.; Tissera, H. A.	2021	Intervention out of scope
Child day care risks of common infectious diseases revisited	Lu, N.; Samuels, M. E.; Shi, L.; Baker, S. L.; Glover, S. H.; Sanders, J. M.	2004	Intervention out of scope
Children are unlikely to be the main drivers of the COVID-19 pandemic - A systematic review	Ludvigsson, J. F.	2020	Intervention out of scope
Acute respiratory infection and pneumonia in India: A systematic review of literature for advocacy and action: UNICEF-PHFI series on newborn and child health, India	Mathew, J. L.; Patwari, A. K.; Gupta, P.; Shah, D.; Gera, T.; Gogia, S.; Mohan, P.; Panda, R.; Menon, S.	2011	Intervention out of scope
Transmission risks of respiratory infectious diseases in various confined spaces: A meta-analysis for future pandemics	Moon, J.; Ryu, B. H.	2021	Intervention out of scope
Learning from previous lockdown measures and minimising harmful biopsychosocial consequences as they end: A systematic review	Muehlschlegel, P. A.; Parkinson, E. A.; Chan, R. Y.; Arden, M. A.; Armitage, C. J.	2021	Intervention out of scope
Day care center characteristics and children's respiratory health	Nafstad, P.; Jaakkola, J. J. K.; Skrondal, A.; Magnus, P.	2005	Intervention out of scope
Prevention of Respiratory Infections and MAnagement Among Children (PRIMAKid)	NCT00161122	2005	Intervention out of scope
MORDOR II Burkina Faso: Longitudinal Trial	NCT03676751	2018	Intervention out of scope
WOB and Paediatric Mechanical Ventilation	NCT0525469	2022	Intervention out of scope
[Relationship between child day-care attendance and acute infectious disease. A systematic review]	Ochoa Sangrador, C.; Barajas Sanchez, M. V.; Munoz Martin, B.	2007	Intervention out of scope

Title	Author	Year	Reason for exclusion
Consensus conference on acute bronchiolitis (II): epidemiology of acute bronchiolitis. Review of the scientific evidence. [Spanish]	Ochoa Sangrador, C.; Gonzalez de Dios, J.	2010	Intervention out of scope
[Infectious diseases among Brazilian preschool children attending daycare centers]	Pedraza, D. F.; Queiroz, Dd; Sales, M. C.	2014	Intervention out of scope
Hand hygiene virtual learning object for people with hearing impairment	Prieto, Liz Anyela Ospina; Rey, Karen Milena Velasco; Aragaen, Sandra Catalina Guerrero	2019	Intervention out of scope
Role of children in the transmission of the COVID-19 pandemic: A rapid scoping review	Rajmil, L.	2020	Intervention out of scope
School Nurse Inspections Improve Handwashing Supplies	Ramos, Mary M.; Schrader, Ronald; Trujillo, Rebecca; Blea, Mary; Greenberg, Cynthia	2011	Intervention out of scope
Determinants of acute respiratory infections among under five children in a rural area of Tamil Nadu, India	Savitha, A. K.; Gopalakrishnan, S.	2018	Intervention out of scope
Effect of pneumonia case management on mortality in neonates, infants, and preschool children: A meta-analysis of community-based trials	Sazawal, S.; Black, R. E.	2003	Intervention out of scope
Tuberculosis transmission among children and adolescents in schools and other congregate settings: a systematic review	Schepisi, M. S.; Motta, I.; Dore, S.; Costa, C.; Sotgiu, G.; Girardi, E.	2019	Intervention out of scope
Transmission of respiratory and gastrointestinal infections in German households with children attending child care	Schlinkmann, K. M.; Bakuli, A.; Karch, A.; Meyer, F.; Dreesman, J.; Monazahian, M.; Mikolajczyk, R.	2018	Intervention out of scope
The Infectious Diseases Act and Resource Allocation during the COVID-19 Pandemic in Bangladesh	Siraj, M. S.; Dewey, R. S.; Hassan, Asmfu	2020	Intervention out of scope
Hand-Washing Practices among Adolescents Aged 12-15 Years from 80 Countries	Smith, L.; Butler, L.; Tully, M. A.; Jacob, L.; Barnett, Y.; Lopez-Sanchez, G. F.; Lopez-Bueno, R.; Shin, J. I.; McDermott, D.; Pfeifer, B. A.; Pizzol, D.; Koyanagi, A.	2020	Intervention out of scope
Risk factors for severe respiratory syncytial virus lower respiratory tract infection	Sommer, C.; Resch, B.; Simpues, E. A.	2011	Intervention out of scope
Guidelines for acute otitis media in children worldwide: Useful or useless?	Spoial, A. E. L.; Rosu, E.; Dusa, C.; Gavrilovici, C.	2021	Intervention out of scope
Health impact of air pollution to children	Sram, Radim J.; Binkova, Blanka; Dostal, Miroslav; Merkerova-Dostalova, Michaela; Libalova, Helena; Milcova, Alena; Rossner Jr, Pavel; Rossnerova, Andrea; Schmuczerova, Jana; Svecova, Vlasta; Topinka, Jan; Votavova, Hana; Rossner, Pavel, Jr.	2013	Intervention out of scope
The effect of grade on compliance using nonpharmaceutical interventions to reduce influenza in an urban elementary school setting	Stebbins, Samuel; Downs, Julie S.; Vukotich Jr, Charles J.	2011	Intervention out of scope
Prevention and treatment of recurrent viral-induced wheezing in the preschool child	Stokes, Jeffrey R.; Bacharier, Leonard Benjamin	2020	Intervention out of scope

Title	Author	Year	Reason for exclusion
Risk factors of influenza transmission in households	Viboud, C.; Boelle, P.; Cauchemez, S.; Lavenu, A.; Valleron, A.; Flahault, A.; Carrat, F.	2004	Intervention out of scope
Transmission of SARS-CoV-2 by children and young people in households and schools: A meta-analysis of population-based and contact-tracing studies	Viner, R.; Waddington, C.; Mytton, O.; Booy, R.; Cruz, J.; Ward, J.; Ladhani, S.; Panovska-Griffiths, J.; Bonell, C.; Melendez-Torres, G. J.	2022	Intervention out of scope
Day care characteristics associated with Haemophilus influenzae disease	Wenger, J. D.; Harrison, L. H.; Hightower, A.; Broome, C. V.	1990	Intervention out of scope
SARS-CoV-2 transmission in schools: An updated living systematic review (version 2; November 2020)	Xu, W.; Li, X.; Dong, Y.; Dozier, M.; He, Y.; Kirolos, A.; Lang, Z.; Mathews, C.; Siegfried, N.; Theodoratou, E.	2021	Intervention out of scope
What is the evidence for transmission of COVID-19 by children in schools? A living systematic review	Xu, W.; Li, X.; Dozier, M.; He, Y.; Kirolos, A.; Lang, Z.; Mathews, C.; Siegfried, N.; Theodoratou, E.; Uncover	2020	Intervention out of scope
Factors affecting the transmission of SARS-CoV-2 in school settings	Yuan, H.; Reynolds, C.; Ng, S.; Yang, W.	2021	Intervention out of scope
Novel Coronavirus 2019 Transmission Risk in Educational Settings	Yung, Chee Fu; Kam, Kai-qian; Nadua, Karen Donceras; Chong, Chia Yin; Tan, Natalie Woon Hui; Li, Jiahui; Lee, Khai Pin; Chan, Yoke Hwee; Thoon, Koh Cheng; Ng, Kee Chong	2021	Intervention out of scope
Risk factors for recurrent respiratory tract infection in preschool-aged children	Zhou, Bo; Niu, Wenquan; Liu, Fangyu; Yuan, Yuan; Wang, Kundi; Zhang, Jing; Wang, Yunfeng; Zhang, Zhixin	2021	Intervention out of scope
COVID-19-associated school closures and related efforts to sustain education and subsidized meal programs, United States, February 18-June 30, 2020	Zviedrite, N.; Hodis, J. D.; Jahan, F.; Gao, H.; Uzicanin, A.	2021	Intervention out of scope
Occurrence of bacteria and viruses on elementary classroom surfaces and the potential role of classroom hygiene in the spread of infectious diseases	Bright, K. R.; Boone, S. A.; Gerba, C. P.	2010	Nonhuman study (in vitro studies)
Occurrence of respiratory viruses on school desks	Zulli, Alessandro; Bakker, Alexa; Racharaks, Ratanachat; Nieto-Caballero, Marina; Hernandez, Mark; Shaughnessy, Richard; Haverinen-Shaughnessy, Ulla; Ijaz, M. Khalid; Rubino, Joseph; Peccia, Jordan	2021	Nonhuman study (in vitro studies)
Causes of common illnesses: an overview...Proceedings from the Healthy School Summit: the importance of cleanliness and disinfection in the school	Babinchak, T.	2009	Not a systematic review
The science behind Lysol: relevance for schools...Proceedings from the Healthy School Summit: the importance of cleanliness and disinfection in the school... Short Hills, NJ, October 12, 2001	Rubino, J. R.; Gaber, D.	2002	Not a systematic review
Knowledge and practices of university day care center workers relative to acute respiratory infections in childhood	Alves, E. C. P.; Verassimo MA, R.	2006	Outcome out of scope
Balanced nutrition and hand hygiene for children in South Africa	Bobbins, Amy C.; Manhanzva, Rufaro; Bhandankar, Manisha; Srinivas, Sunitha C.	2019	Outcome out of scope

Title	Author	Year	Reason for exclusion
School closures during the 2009 influenza pandemic: national and local experiences	Cauchemez, S.; Van Kerkhove, M. D.; Archer, B. N.; Cetron, M.; Cowling, B. J.; Grove, P.; Hunt, D.; Kojouharova, M.; Kon, P.; Ungchusak, K.; Oshitani, H.; Pugliese, A.; Rizzo, C.; Saour, G.; Sunagawa, T.; Uzicanin, A.; Wachtel, C.; Weisfuse, I.; Yu, H.; Nicoll, A.	2014	Outcome out of scope
Knowledge and beliefs about guidelines for exclusion of ill children from child care	Copeland, K. A.; Duggan, A. K.; Shope, T. R.	2005	Outcome out of scope
Feasibility and acceptability of daily testing at school as an alternative to self-isolation following close contact with a confirmed case of COVID-19: a qualitative analysis	Denford, S.; Towler, L.; Ali, B.; Treneman-Evans, G.; Bloomer, R.; Peto, T. E.; Young, B. C.; Yardley, L.	2022	Outcome out of scope
[Impact of wearing face masks in public to prevent infectious diseases on the psychosocial development in children and adolescents: a systematic review]	Freiberg, A.; Horvath, K.; Hahne, T. M.; Drossler, S.; Kampf, D.; Spura, A.; Buhs, B.; Reibling, N.; De Bock, F.; Apfelbacher, C.; Seidler, A.	2021	Outcome out of scope
The effects of the measures against COVID-19 pandemic on physical activity among school-aged children and adolescents (6-17 years) in 2020: A protocol for systematic review	Hu, D.; Zhang, H.; Sun, Y.; Li, Y.	2021	Outcome out of scope
Reopening Schools during the COVID-19 Pandemic: Overview and Rapid Systematic Review of Guidelines and Recommendations on Preventive Measures and the Management of Cases	Lo Moro, G.; Sinigaglia, T.; Bert, F.; Savatteri, A.; Gualano, M. R.; Siliquini, R.	2020	Outcome out of scope
Promotion of Preventive Measures in Public Nursery Schools: Lessons From the H1N1 Pandemic	Michail, Koralia A.; Ioannidou, Christina; Galanis, Petros; Tsoumakas, Kostantinos; Pavlopoulou, Ioanna D.	2017	Outcome out of scope
[Impact of social distancing for covid-19 on young people: type and quality of the studies found through a systematic review of the literature.]	Minozzi, S.; Saulle, R.; Amato, L.; Davoli, M.	2021	Outcome out of scope
School Closures and Social Anxiety During the COVID-19 Pandemic	Morrissette, M.	2021	Outcome out of scope
Pandemic Influenza Preparedness Among Child Care Center Directors in 2008 and 2016	Shope, Timothy R.; Walker, Benjamin H.; Aird, Laura D.; Southward, Linda; McCown, John S.; Martin, Judith M.	2017	Outcome out of scope
Using nonpharmaceutical interventions to prevent influenza transmission in elementary school children: parent and teacher perspectives	Stebbins, S.; Downs, J. S.; Vukotich, C. J., Jr.	2009	Outcome out of scope
School closures were over-weighted against the mitigation of COVID-19 transmission: A literature review on the impact of school closures in the United States	Tan, W.	2021	Outcome out of scope
School Closures During Social Lockdown and Mental Health, Health Behaviors, and Well-being Among Children and Adolescents During the First COVID-19 Wave: A Systematic Review	Viner, R.; Russell, S.; Saulle, R.; Croker, H.; Stansfield, C.; Packer, J.; Nicholls, D.; Goddings, A. L.; Bonell, C.; Hudson, L.; Hope, S.; Ward, J.; Schwalbe, N.; Morgan, A.; Minozzi, S.	2022	Outcome out of scope

Title	Author	Year	Reason for exclusion
Feasibility of a Saliva-Based COVID-19 Screening Program in Abu Dhabi Primary Schools	Virji, Ayaz; Al Hamiz, Aisha; Al Hajeri, Omniyat; Al Shehhi, Budoor; Ali Al Memari, Shammah Abdulla; Al Maskari, Ahlam; Alhajri, Noora; Mahmoud, Sally; Piotrowska, Monika; Ali, Raghib	2021	Outcome out of scope
Do school closures and school reopenings affect community transmission of COVID-19? A systematic review of observational studies	Walsh, S.; Chowdhury, A.; Braithwaite, V.; Russell, S.; Birch, J. M.; Ward, J. L.; Waddington, C.; Brayne, C.; Bonell, C.; Viner, R. M.; Mytton, O. T.	2021	Outcome out of scope
School closure in response to epidemic outbreaks: Systems-based logic model of downstream impacts	Thomas, J.; Kneale, D.; O'Mara-Eves, A.; Rees, R.	2020	Outcome out of scope;
A novel CFD analysis to minimize the spread of COVID-19 virus in hospital isolation room	Bhattacharyya, S.; Dey, K.; Paul, A. R.; Biswas, R.	2020	Population out of scope
Infection control in the management of highly pathogenic infectious diseases: consensus of the European Network of Infectious Disease	Brouqui, P.; Puro, V.; Fusco, F. M.; Bannister, B.; Schilling, S.; Follin, P.; Gottschalk, R.; Hemmer, R.; Maltezou, H. C.; Ott, K.; Peleman, R.; Perronne, C.; Sheehan, G.; Siikamaki, H.; Skinhoj, P.; Ippolito, G.	2009	Population out of scope
Facemask use in community settings to prevent respiratory infection transmission: A rapid review and meta-analysis	Chaabna, K.; Doraiswamy, S.; Mamtani, R.; Cheema, S.	2021	Population out of scope
Architectural design strategies for infection prevention and control (IPC) in health-care facilities: towards curbing the spread of Covid-19	Emmanuel, U.; Osondu, E. D.; Kalu, K. C.	2020	Population out of scope
Redesigning a large school-based clinical trial in response to changes in community practice	Gerald, L. B.; Gerald, J. K.; McClure, L. A.; Harrington, K.; Erwin, S.; Bailey, W. C.	2011	Population out of scope
Physical distancing interventions and incidence of coronavirus disease 2019: Natural experiment in 149 countries	Islam, N.; Sharp, S. J.; Chowell, G.; Shabnam, S.; Kawachi, I.; Lacey, B.; Massaro, J. M.; D'Agostino, R. B.; White, M.	2020	Population out of scope
Tuberculosis Contact Investigations Conducted in New York City Adult Day Care and Senior Centers, 2011â€“2018	Jordan, Hannah T.; Calderon, Magali; Pichardo, Carolina; Ahuja, Shama D.	2022	Population out of scope
The use of technology to improve health care to Saskatchewan's First Nations communities	Khan, I.; Ndubuka, N.; Stewart, K.; McKinney, V.; Mendez, I.	2017	Population out of scope
Effect of School Integrated Pest Management or Classroom Air Filter Purifiers on Asthma Symptoms in Students With Active Asthma: A Randomized Clinical Trial	Phipatanakul, W.; Koutrakis, P.; Coull, B. A.; Petty, C. R.; Gaffin, J. M.; Sheehan, W. J.; Lai, P. S.; Bartnikas, L. M.; Kang, C. M.; Wolfson, J. M.; Samnaliev, M.; Cunningham, A.; Baxi, S. N.; Permaul, P.; Hauptman, M.; Trivedi, M.; Louisias, M.; Liang, L.; Thorne, P. S.; Metwali, N.; Adamkiewicz, G.; Israel, E.; Baccarelli, A. A.; Gold, D. R.; School Inner-City Asthma Intervention study, team	2021	Population out of scope

Title	Author	Year	Reason for exclusion
Impact of non-drug therapies on asthma control: A systematic review of the literature	Schuers, M.; Chapron, A.; Guihard, H.; Bouchez, T.; Darmon, D.	2019	Population out of scope
A phenomenological approach to assessing the effectiveness of COVID-19 related nonpharmaceutical interventions in Germany	Wieland, T.	2020	Population out of scope
Daycaritis	Bailey, P.	2013	Publication type out of scope
Closing schools for SARS-CoV-2: a pragmatic rapid recommendation	Bekkering, G.; Delvaux, N.; Vankrunkelsven, P.; Toelen, J.; Aertgeerts, S.; Crommen, S.; Bruyckere, P.; Devisch, I.; Lernout, T.; Masschalck, K.; Milissen, N.; Molenberghs, G.; Pascal, A.; Plomteux, O.; Raes, M.; Rans, L.; Seghers, A.; Sweldens, L.; Vandenbussche, J.; Vanham, G.; Wollants, E.; Aertgeerts, B.	2021	Publication type out of scope
Infectious disease in pediatric out-of-home child care	Brady, M. T.	2005	Publication type out of scope
Health services: results from the School Health Policies and Programs Study 2006	Brener, N. D.; Wheeler, L.; Wolfe, L. C.; Vernon-Smiley, M.; Caldart-Olson, L.	2007	Publication type out of scope
Infection control challenges in child-care centers	Churchill, R. B.; Pickering, L. K.	1997	Publication type out of scope
Association Between Markers of Classroom Environmental Conditions and Teachers' Respiratory Health	Claudio, Luz; Rivera, Glory A.; Ramirez, Olivia F.	2016	Publication type out of scope
Compliance with American Academy of Pediatrics and American Public Health Association illness exclusion guidelines for child care centers in Maryland: who follows them and when?	Copeland, K. A.; Harris, E. N.; Wang, N.; Cheng, T. L.	2006	Publication type out of scope
Disinfection and the prevention of infectious disease	Cozad, A.; Jones, R. D.	2003	Publication type out of scope
Presentation of a participatory approach to develop preventive measures to reduce COVID-19 transmission in child care	Diebig, Mathias; Gritzka, Susan; Dragano, Nico; Angerer, Peter	2021	Publication type out of scope
Factors Influencing School Closure and Dismissal Decisions: Influenza A (H1N1), Michigan 2009	Dooyema, Carrie A.; Copeland, Daphne; Sinclair, Julie R.; Shi, Jianrong; Wilkins, Melinda; Wells, Eden; Collins, Jim	2014	Publication type out of scope
Infections in day care	Ferson, Mark J.; Ferson, M. J.	1993	Publication type out of scope
COVID-19 & Children: Stop the Spread of Germs	Garden-Robinson, Julie	2021	Publication type out of scope
Child-care practices: effects of social change on the epidemiology of infectious diseases and antibiotic resistance	Holmes, S. J.; Morrow, A. L.; Pickering, L. K.	1996	Publication type out of scope
Essential interventions for child health	Lassi, Z. S.; Mallick, D.; Das, J. K.; Mal, L.; Salam, R. A.; Bhutta, Z. A.	2014	Publication type out of scope

Title	Author	Year	Reason for exclusion
The public health problem of acute respiratory illness in childcare	McCutcheon, H.; Fitzgerald, M.	2001	Publication type out of scope
Day Care Increases the Risk of Respiratory Morbidity in Chronic Lung Disease of Prematurity	McGrath-Morrow, S. A.; Lee, G.; Stewart, B. H.; McGinley, B. M.; Lefton-Greif, M. A.; Okelo, S. O.; Collaco, J. M.	2010	Publication type out of scope
Infections in child-care facilities and schools	Mink, C. M.; Yeh, S.; Mink, Chrisanna M.; Yeh, Sylvia	2009	Publication type out of scope
Differences in Psychological and Behavioral Changes between Children following School Closure due to COVID-19	Nakachi, K.; Kawabe, K.; Hosokawa, R.; Yoshino, A.; Horiuchi, F.; Ueno, S. I.	2021	Publication type out of scope
Personal Cleanliness Activities in Preschool Classrooms	Obeng, C. S.	2008	Publication type out of scope
Responses to Coronavirus Pandemic in Early Childhood Services Across Five Countries in the Asia-Pacific Region: OMEP Policy Forum	Park, E.; Logan, H.; Zhang, L.; Kamigaichi, N.; Kulapichitr, U.	2020	Publication type out of scope
Hygienic practices and acute respiratory illness in family and group day care homes	St. Sauver, J.; Khurana, M.; Kao, A.; Foxman, B.	1998	Publication type out of scope
Implementation of preventive measures to prevent COVID-19: a national study of English primary schools in summer 2020	Sundaram, Neisha; Bonell, Chris; Ladhani, Shamez; Langan, Sinead M.; Baawuah, Frances; Okike, Ifeanychukwu; Ahmad, Shazaad; Beckmann, Joanne; Garstang, Joanna; Brent, Bernadette E.; Brent, Andrew J.; Amin-Chowdhury, Zahin; Aiano, Felicity; Hargreaves, James	2021	Publication type out of scope
Asymptomatic Transmission and the Infection Fatality Risk for COVID-19: Implications for School Reopening	Vermund, Sten H.; Pitzer, Virginia E.	2021	Publication type out of scope
The Segregation of Pneumonia		2020	Publication type out of scope (opinion piece/editorial/commentary)
How to Safely Open Schools in the Time of COVID	Ahc, Media	2021	Publication type out of scope (opinion piece/editorial/commentary)
Comprehensive and safe school strategy during COVID-19 pandemic	Esposito, S.; Cotugno, N.; Principi, N.	2021	Publication type out of scope (opinion piece/editorial/commentary)
School Closure during the Coronavirus Disease 2019 (COVID-19) Pandemic: An Effective Intervention at the Global Level?	Esposito, S.; Principi, N.	2020	Publication type out of scope (opinion piece/editorial/commentary)
Is Sanitizer Better Than Soap?	Fischer, Philip R.	2019	Publication type out of scope (opinion piece/editorial/commentary)

Title	Author	Year	Reason for exclusion
The time has come to invest more in the prevention of day care-associated infection in children	Hojsak, I.	2019	Publication type out of scope (opinion piece/editorial/commentary)
COVID-19, children and schools: overlooked and at risk	Hyde, Z.	2021	Publication type out of scope (opinion piece/editorial/commentary)
Infectious disease, child care and school	Merrick, Joav	2011	Publication type out of scope (opinion piece/editorial/commentary)
Common infections in child care	O'Connor, D. L.	1998	Publication type out of scope (opinion piece/editorial/commentary)
Schools and Coronavirus Disease 2019 Prevention...van den Berg P, Schechter-Perkins EM, Jack RS, et al. Effectiveness of three versus six feet of physical distancing for controlling spread of COVID-19 among primary and secondary students and staff: a retr	Pechter, Elise; Lessin, Nancy; Brosseau, Lisa	2021	Publication type out of scope (opinion piece/editorial/commentary)
Children and the COVID-19 Pandemic	Phelps, Chavez; Sperry, Linda L.	2020	Publication type out of scope (opinion piece/editorial/commentary)
COVID-19, children and schools: overlooked and at risk	Ryan, K. E.; Goldfield, S.; Danchin, M. H.; Russell, F.	2021	Publication type out of scope (opinion piece/editorial/commentary)
Effect of Hand Sanitizers in School	T, H.	2015	Publication type out of scope (opinion piece/editorial/commentary)
Pandemic school closures: risks and opportunities	The Lancet, Child; Adolescent, Health	2020	Publication type out of scope (opinion piece/editorial/commentary)
Children and adolescents in the CoVid-19 pandemic: Schools and daycare centers are to be opened again without restrictions. The protection of teachers, educators, carers and parents and the general hygiene rules do not conflict with this	Walger, Peter; Heininger, Ulrich; Knuf, Markus; Exner, Martin; Popp, Walter; Fischbach, Thomas; Trapp, Stefan; HÃ¼bner, Johannes; Herr, Caroline; Simon, Arne	2020	Publication type out of scope (opinion piece/editorial/commentary)
Who's sick at school: linking poor school conditions and health disparities for Boston's children	Graham, T.; Zotter, J.; Camacho, M.	2009	Study design out of scope (case series or other)
Tuberculosis in adolescents and young adults: Emerging data on tb transmission and prevention among vulnerable young people	Laycock, K. M.; Enane, L. A.; Steenhoff, A. P.	2021	Study design out of scope (case series or other)
Limited Secondary Transmission of SARS-CoV-2 in Child Care Programs - Rhode Island, June 1-July 31, 2020	Link-Gelles, Ruth; DellaGrotta, Amanda L.; Molina, Caitlin; Clyne, Ailis; Campagna, Kristine; Lanzieri, Tatiana M.; Hast, Marisa A.; Palipudi, Krishna; Dirlikov, Emilio; Bandy, Utpala	2020	Study design out of scope (case series or other)

Title	Author	Year	Reason for exclusion
Transmission Dynamics of COVID-19 Outbreaks Associated with Child Care Facilities - Salt Lake City, Utah, April-July 2020	Lopez, Adriana S.; Hill, Mary; Antezano, Jessica; Vilven, Dede; Rutner, Tyler; Bogdanow, Linda; Claflin, Carlene; Kracalik, Ian T.; Fields, Victoria L.; Dunn, Angela; Tate, Jacqueline E.; Kirking, Hannah L.; Kiphibane, Tair; Risk, Ilene; Tran, Cuc H.	2020	Study design out of scope (case series or other)
Varicella outbreak among primary school students -- Beijing, China, 2004	Ma, H.; Fontaine, R.	2006	Study design out of scope (case series or other)
Comparative intervention study among Danish daycare children: the effect on illness of time spent outdoors	Mygind, O.; RÃ¸nne, T.; SÃ¸e, A.; Wachmann, C. H.; Ricks, P.	2003	Study design out of scope (case series or other)
Sars, preschool routines and children's behaviour: Observations from preschools in Hong Kong	Rao, N.	2006	Study design out of scope (case series or other)
Respiratory tract infection rates are similar between children with prolonged day-care exposure and children in home care	Schuezâ Havupalo, Linnea; Karppinen, Sinikka; Terosâ Jaakkola, Tamara; Toivonen, Laura; Peltola, Ville; Schuez-Havupalo, Linnea; Teros-Jaakkola, Tamara	2020	Study design out of scope (case series or other)
SARS-CoV-2 Infections and Incidence at a North Carolina Pre-Kindergarten-12 School During Inâ€Person Education: August 2020 to January 2021	Thakkar, Pavan V.; Zimmerman, Kanecia O.; Benjamin, Daniel K.; Kalu, Ibukunoluwa C.	2022	Study design out of scope (case series or other)
Feasibility of Social Distancing Practices in US Schools to Reduce Influenza Transmission During a Pandemic	Uscher-Pines, Lori; Schwartz, Heather L.; Ahmed, Faruque; Zheteyeva, Yenlik; Tamargo Leschitz, Jennifer; Pillemer, Francesca; Faherty, Laura; Uzicanin, Amra	2020	Study design out of scope (case series or other)

C2 Citation details of studies awaiting classification

This appendix documents the potentially met the prespecified inclusion criteria for a systematic review on the effect of non-pharmaceutical interventions for reducing the spread of respiratory infections in childcare setting, but certainty of inclusion is precluded by missing information (i.e. they were published in another language, not able to be retrieved, incomplete).

Table C-2 Studies published in a language other than English

Title	Authors	Year
The effect of mobile air filter systems on aerosol concentrations in large volume scenarios against the background of the risk of infection of COVID-19. Can classroom teaching be resumed?	Oberst, M.; Klar, T.; Heinrich, A.	2021

Table C-3 Studies with full text not able to be retrieved

Title	Authors	Year
A review of the evidence for hand hygiene in different clinical and community settings for family physicians	Yeung, J. W. K.; Tam, W. W. S.; Wong, T. W.	2007
Alcohol-based hand gel use may reduce respiratory illness transmission in homes with young children enrolled in day care	AHRQ research activities	2005
Infectious problems in daycare	Jadavji, T.; Davies, H. D.	1994
Invasive Haemophilus influenzae type B infections: a continuing challenge	Janai, H.; Stutman, H. R.; Marks, M. I.	1990
Handwashing education can decrease illness absenteeism	Kimel, L. S.	1996
Future prevention and treatment of pertussis infection	Kimmel, S. R.	2005
Common day-care diseases: patterns and prevention	Smith, D. P.	1986
Infectious diseases associated with child day care	Welker, M. J.; Aring, A.; Haines, D. J.	1999
Evaluation of a hygienic intervention in child day-care centres	Kotch, J. B.; Weigle, K. A.; Weber, D. J.; Clifford, R. M.; Harms, T. O.; Loda, F. A.; Gallagher, P. N.; Edwards, R. W.; LaBorde, D.; McMurray, M. P.	1994
Clinical study concerning the prevention of infections of the upper respiratory tract of preschool children.	Martin du Pan, R. E.; Martin du Pan, R. C.	1982

C3 Citation details of ongoing studies

Table C-4 Overview of ongoing studies

Title	Authors/Clinical trial identifier	Year
School closures and reopenings during the COVID-19 pandemic: a scoping review protocol	Li, D.; Nyhan, K.; Zhou, X.; Zhu, Y.; Castro, D.; Vermund, S. H.; Brault, M.	2022
Back to ECE Safely With SAGE: Reducing COVID-19 Transmission in Hispanic and Low-income Preschoolers	Clinical trial NCT05178290	2022

C4 Citation details of studies included in the review for exclusion measures

Table C-5 Studies eligible for inclusion in the review of exclusion measures

Title	Authors	Year
Effectiveness of public health measures in reducing the incidence of covid-19, SARS-CoV-2 transmission, and covid-19 mortality: systematic review and meta-analysis	Talic, S.; Shah, S.; Wild, H.; Gasevic, D.; Maharaj, A.; Ademi, Z.; Li, X.; Xu, W.; Mesa-Eguiagaray, I.; Rostron, J.; Theodoratou, E.; Zhang, X.; Motee, A.; Liew, D.; Ilic, D.	2021
The effects of school closures on influenza outbreaks and pandemics: systematic review of simulation studies	Jackson, C.; Mangtani, P.; Hawker, J.; Olowokure, B.; Vynnycky, E.	2014
Evidence compendium and advice on social distancing and other related measures for response to an influenza pandemic	Rashid, H.; Ridda, I.; King, C.; Begun, M.; Tekin, H.; Wood, J. G.; Booy, R.	2015
Management and control of communicable diseases in schools and other child care settings: systematic review on the incubation period and period of infectiousness	Czumbel, I.; Quinten, C.; Lopalco, P.; Semenza, J. C.; group, Ecdc expert panel working	2018
Model-Based Comprehensive Analysis of School Closure Policies for Mitigating Influenza Epidemics and Pandemics	Fumanelli, L.; Ajelli, M.; Merler, S.; Ferguson, N. M.; Cauchemez, S.	2016
School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review	Viner, R. M.; Russell, S. J.; Croker, H.; Packer, J.; Ward, J.; Stansfield, C.; Mytton, O.; Bonell, C.; Booy, R.	2020
School closure during novel influenza: A systematic review	Bin Nafisah, S.; Alamery, A. H.; Al Nafesa, A.; Aleid, B.; Brazanji, N. A.	2018
Upper Respiratory Infections in Schools and Childcare Centers Reopening after COVID-19 Dismissals, Hong Kong	Fong, Min Whui; Leung, Nancy H. L.; Cowling, Benjamin J.; Wu, Peng	2021

Appendix D Critical appraisal of included studies

This appendix documents the quality of systematic reviews and risk of bias of primary studies that met the prespecified inclusion criteria for a systematic review on the effect of non-pharmaceutical interventions on preventing the transmission of respiratory illnesses and were included in the evidence synthesis.

Table D-1 AMSTAR quality of included systematic reviews

Review ID	Nanda 2021	Hammond 2021	Chu 2020	Chou 2020	Jefferson 2020	Abdullahi 2020	Xiao 2020	Munn 2020	Krishnaratne 2020	Wang 2017
1. Did the research questions and inclusion criteria for the review include the components of the PICO?	NO	NO	YES	YES	YES	YES	YES	NO	YES	YES
2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	NO	PARTIAL YES	PARTIAL YES	PARTIAL YES	YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	YES	YES
3. Did the review authors explain their selection of the study designs for inclusion in the review?	YES	NO	YES	PARTIAL YES	YES	NO	PARTIAL YES	YES	YES	YES
4. Did the review authors use a comprehensive literature search strategy?	PARTIAL YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	YES	PARTIAL YES	YES	PARTIAL YES
5. Did the review authors perform study selection in duplicate?	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
6. Did the review authors perform data extraction in duplicate?	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
7. Did the review authors provide a list of excluded studies and justify the exclusions?	NO	NO	NO	NO	YES	NO	NO	YES	YES	YES
8. Did the review authors describe the included studies in adequate detail?	YES	YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	PARTIAL YES	YES	YES	PARTIAL YES	YES

Review ID	Nanda 2021	Hammond 2021	Chu 2020	Chou 2020	Jefferson 2020	Abdullahi 2020	Xiao 2020	Munn 2020	Krishnaratne 2020	Wang 2017
9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?										
Overall RCTs	YES	N/A	N/A	N/A	YES	YES	YES	YES	YES	NO
Overall NRSIs	YES	NO	YES	YES	N/A	YES	YES	YES	YES	NO
10. Did the review authors report on the sources of funding for the studies included in the review?	NO	YES	YES	YES	NO	NO	NO	YES	NO	YES
11. If meta-analysis was performed, did the review authors use appropriate methods for statistical combination of results?										
Overall RCTs	YES	No meta-analysis conducted	N/A	N/A	YES	YES	YES	YES	N/A	NO
Overall NRSIs	NO	No meta-analysis conducted	NO	NO	N/A	NO	NO	YES	N/A	N/A
12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	YES	No meta-analysis conducted	YES	YES	YES	NO	YES	YES	N/A	YES
13. Did the review authors account for RoB in individual studies when interpreting/discussing the results of the review?	YES	NO	YES	YES	YES	NO	YES	YES	YES	YES
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	YES	NO	YES	YES	YES	NO	YES	YES	YES	YES
15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES

Review ID	Nanda 2021	Hammond 2021	Chu 2020	Chou 2020	Jefferson 2020	Abdullahi 2020	Xiao 2020	Munn 2020	Krishnaratne 2020	Wang 2017
16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Overall METHODOLOGICAL QUALITY of the review	**Moderate**	**High**	**Moderate**	**Moderate**	**High**	**Low**	**Moderate**	**High**	**High**	**Low**

Table D-2 Risk of Bias of included RCTs

Study ID		Young 2021		Forster 2022	
	Signalling question	**Judgement**	**Comments**	**Judgement**	**Comments**
Bias arising from the randomisation process	1.1 Was the allocation sequence random?	Y	Cluster randomised	Y	Cluster randomised
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?	Y	Random number generator	N	Not reported
	1.3 Did baseline differences between intervention groups suggest a problem with the randomisation process?	N	The groups were not statistically significantly different at baseline	N	The groups were not statistically significantly different at baseline
	Risk-of-bias judgement	*Some concerns*		*Some concerns*	
Bias due to deviations from intended interventions (effect of assignment to intervention [ITT])	2.1. Were participants aware of their assigned intervention during the trial?	Y	The nature of the intervention means participants were aware of their group assignment.	Y	The nature of the intervention means participants were aware of their group assignment.
	2.2. Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	The nature of the intervention means carers and people delivering the intervention were aware of the group assignment.	Y	The nature of the intervention means carers and people delivering the intervention were aware of the group assignment.
	2.3. If Y/PY/NI to 2.1 or 2.2: Were there deviations from the intended intervention that arose because of the trial context?	N	There were no deviations or changes to intervention groups reported.	N	There were no deviations or changes to intervention groups reported.
	2.4 If Y/PY to 2.3: Were these deviations likely to have affected the outcome?	NA		NA	

Study ID		Young 2021		Forster 2022	
	Signalling question	**Judgement**	**Comments**	**Judgement**	**Comments**
	2.5. If Y/PY/NI to 2.4: Were these deviations from intended intervention balanced between groups?	NA		NA	
	2.6 Was an appropriate analysis used to estimate the effect of assignment to intervention?	Y	ITT used	PY	
	2.7 If N/PN/NI to 2.6: Was there potential for a substantial impact (on the result) of the failure to analyse participants in the group to which they were randomized?	NA		NA	
	Risk-of-bias judgement	*Low*		*Low*	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	PY	Data available for all, or nearly all, participants randomised.	PY	Data available for all, or nearly all, participants randomised.
	3.2 If N/PN/NI to 3.1: Is there evidence that the result was not biased by missing outcome data?	NA		NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA		NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA		NA	
	Risk-of-bias judgement	*Low*		*Low*	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	There is no evidence to suggest the method of measuring the outcome was inappropriate	N	There is no evidence to suggest the method of measuring the outcome was inappropriate
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	Outcomes were measured using the same instruments and time periods between the intervention and control groups.	N	Outcomes were measured using the same instruments and time periods between the intervention and control groups.
	4.3 If N/PN/NI to 4.1 and 4.2: Were outcome assessors aware of the intervention received by study participants?	Y	Participants were not masked to treatment allocation	Y	Participants were not masked to treatment allocation
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	PN	Participants and investigators were aware of the intervention they were receiving, this is unlikely to have effected outcomes due to binary nature of outcomes.	N	Participants and investigators were aware of the intervention they were receiving, this is unlikely to have effected outcomes due to binary nature of outcomes.

Study ID		**Young 2021**		**Forster 2022**	
	Signalling question	**Judgement**	**Comments**	**Judgement**	**Comments**
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	NA		NA	
	Risk-of-bias judgement	*Some concerns*		*Low*	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	Y	Methods explain analysis plan	Y	protocol specifies analysis plan
	Is the numerical result being assessed likely to have been selected, on the basis of the results, from... 5.2. ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	There is clear evidence through examination of the results that all eligible reported results for the outcome domain correspond to all intended outcome measurements.	N	
	Is the numerical result being assessed likely to have been selected, on the basis of the results, from... 5.3 ... multiple eligible analyses of the data?	N	There is clear evidence through examination of the results that all eligible reported results for the outcome domain correspond to all intended outcome measurements.	N	
	Risk-of-bias judgement	*Low*		*Low*	
Overall risk of bias		**Some concerns**	**The study has plausible bias that raises some doubt about the results.**	**Some concerns**	**The study has plausible bias that raises some doubt about the results.**

Figure D-1 Risk of bias summary: review authors' judgements about each risk of bias item for each included RCT

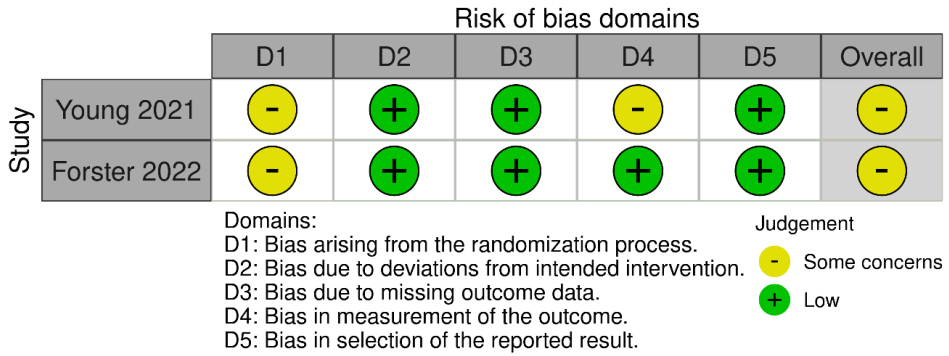


Table D-3 JBI critical appraisal of bias for included modelling studies

Domain	Bilinksi 2021/2022		Mendell 2013		Curtius 2021	
	Rating	**Comments**	**Rating**	**Comments**	**Rating**	**Comments**
Were the two groups similar and recruited from the same population?	Yes	Cohort chosen from same school	Yes	Study included three regions in California	Yes	Classrooms located in same school
Were the exposures measured similarly to assign people to both exposed and unexposed groups?	Yes	Same group exposed to model	N/A	Prospective study	Yes	Same measurements taken between rooms with and without filter
Were confounding factors identified?	Yes	Limitations discussed	Yes	Limitations discussed	Yes	Factors related to room design and window opening considered
Were strategies to deal with confounding factors stated?	Partial	Strategies to mitigate confounding factors discussed but not implemented	No	Confounding factors discussed but not addressed in interpretation of results	Partial	The effect of confounding factors is referenced in interpretation of the results
Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?	Yes	Testing program not in place before	N/A		Yes	Filters introduced to classrooms

Domain	Bilinksi 2021/2022		Mendell 2013		Curtius 2021	
	Rating	**Comments**	**Rating**	**Comments**	**Rating**	**Comments**
Were the outcomes measured in a valid and reliable way?	Yes	Weekly saliva PCR	Yes	Study used Web connected CO_2. sensors in classroom, student absence and demographic data was collected	Yes	Aerosol concentrations measured by condensation particle counts, and size by a scanning mobility particle sizer. A CO_2 sensor monitored CO_2 mixing ratio
Was the follow up time reported and sufficient to be long enough for outcomes to occur?	Yes	Model ran 1000 times for 30 days	Yes	Data was collected over two years	Partial	Air purifiers operated at school for a week – time may not be sufficient
Was follow up complete, and if not, were the reasons to loss to follow up described and explored?	N/A		N/A		N/A	
Were strategies to address incomplete follow up utilised?	N/A		N/A		N/A	
Was appropriate statistical analysis used?	Yes	One way sensitivity analysis for multiple parameters to evaluate uncertainty in the number of infections	Yes	Statistical analysis performed using STATA (release 11)	No	Statistical interpretation of results not undertaken
Overall appraisal	**Include**	**Moderate risk**	**Include**	**Moderate risk**	**Include**	**Moderate risk**

Appendix E Characteristics of included studies

This appendix documents the studies that met the prespecified inclusion criteria for a systematic review on the effect of non-pharmaceutical interventions on preventing the transmission of respiratory illnesses and are included in the evidence synthesis It provides an overview of the PICO criteria of included studies, a summary of the risk of bias assessment, and data extracted for data synthesis for the main comparison.

E1 List of studies

Review ID	Study design	Setting	Location	Condition	Intervention/ Comparator	Outcomes
Various nonpharmaceutical measures						
Abdullahi 2020	SR/MA	LMIC Households School General Community	China, Bangladesh, Thailand, Romania, Serbia, Madagascar, Mexico, Peru	SARS and influenza	Facemask, hand hygiene, and social distancing	SARS and influenza incidence
Chu 2020	SR/MA	Health care and community settings	Saudi Arabia, China, USA, Vietnam, Canada, Taiwan, South Korea, Singapore, Germany, Thailand, Australia, UAE, Iran, Malaysia, Brazil, Hong Kong, The Netherlands	COVID-19 and related diseases (e.g. SARS, MERS)	Physical distancing, face masks, and eye protection	Risk of transmission to people in healthcare or non-healthcare settings by those infected.
Jefferson 2020	SR	Heterogeneous settings, ranging from suburban schools to hospital wards in high-income countries; crowded inner city settings in low-income countries; and an immigrant neighbourhood in a high-income country	Japan, Denmark, Saudi Arabia, Egypt, USA, Israel, France, New Zealand, Thailand. Pakistan, Finland, Germany, Hong Kong	Respiratory virus transmission	Physical interventions (screening at entry ports, isolation, quarantine, physical distancing, personal protection, hand hygiene, face masks, and gargling) compared with no or another intervention	*Primary outcomes*: 1. Numbers of cases of viral illness (including ARIs, ILI, and laboratory-confirmed influenza, or other viral pathogens). 2. Adverse events related to the intervention. *Secondary outcomes:* 1. Deaths. 2. Severity of viral illness as reported in the studies. 3. Absenteeism.

Review ID	Study design	Setting	Location	Condition	Intervention/ Comparator	Outcomes
						4. Hospital admissions. 5. Complications related to the illness
Nanda 2021	SR	Community Households University residence halls Hajj mass gathering	USA, Saudi Arabia, France, Hong Kong, Australia, Thailand, Germany	Respiratory viral illness or influenza-like-illness	Facemask Facemask with or without hand hygiene Facemask and hand hygiene	Laboratory confirmed respiratory viral illness Influenza like illness
Xiao 2020	SR/MA	Community settings	USA, Thailand, Bangladesh, Hong Kong, Germany, Egypt, Saudi Arabia, Australia, Finland, Denmark	Influenza	Effectiveness of hand hygiene, respiratory etiquette, face masks, and surface and object cleaning	Incidence of laboratory confirmed influenza For respiratory etiquette and surface and object cleaning: also included incidence of influenza-like illness and respiratory illness outcomes
Krishnaratne 2022	SR	School	North America, South America, Europe and China	COVID-19	Measures reducing the opportunity for contacts Measures making contacts safer Surveillance and response measures Multicomponent measures	Transmission related outcomes Healthcare utilisation Societal, economic and ecological outcomes
Hand Hygiene						
Munn 2020	SR	Six studies were conducted in preschools or day-care centres, with the remaining 13 conducted in elementary or primary schools	Eight studies were conducted in the USA, two were conducted in Spain, and one each in China, Colombia, Finland, France, Kenya, Bangladesh, New Zealand, Sweden, and Thailand	Acute respiratory illness and acute gastrointestinal illness	Rinse free handwash vs. No rinse free handwashing program, No hand washing, Conventional handwashing with soap and water, or other hand hygiene strategies	Absenteeism for any reason Absenteeism due to any illness Adverse skin reactions Absenteeism due to acute respiratory illness Absenteeism due to acute gastrointestinal illness Compliance with the intervention or program Perception of the hand hygiene strategy or stratification with the hand hygiene strategy

Review ID	Study design	Setting	Location	Condition	Intervention/ Comparator	Outcomes
Wang 2017	SR	Elementary schools	12 studies were conducted in the United States and the remaining were conducted in Denmark (2), China (1), Egypt (1), New Zealand (1), Spain (1), or Thailand (1)	Acute respiratory illness and acute gastrointestinal illness	Hand hygiene	Absenteeism
Masks						
Chou 2020	SR	Community or healthcare settings in all geographic areas	Eight trials were conducted in Asia, the United States (4), Canada (1), Australia (1), Europe (2), and Saudi Arabia (2)	SARSCoV-2, SARS-CoV-1, MERS-CoV infection, influenza, ILI, and other viral respiratory infections	Effectiveness of N95, surgical, and cloth masks in community and health care settings for preventing respiratory virus infections, and effects of reuse or extended use of N95 masks.	Effectiveness of respirators (N95 or equivalent), face masks (surgical), and cloth masks for prevention of: (a) SARS-CoV-2 infection? (b) SARS-CoV-1 or MERS-CoV infection? (c) influenza, ILI, and other viral respiratory infection? Evidence for extended or reuse of N95 respirators for prevention of SARSCoV-2, SARS-CoV-1, or MERS-CoV infection?
Ventilation						
Hammond 2021	SR	Office building Emergency room	Beijing and USA	Respiratory infection	Air filters, including HEPA filters vs. No air filters	Incidence of respiratory infection
Curtius 2020	RCT	School setting – Air filters in place Monday to Friday. During 8 single lessons (45 min each) and two double lessons (90min each). 18 lessons were held in the reference (control room)	Germany	SARS-CoV-2	Air purifiers equipped with HEPA filters vs. air purifiers without HEPA filters	Aerosol number concentration for particles >3nm at two locations in the room and aerosol size distribution in the range from 10 mm to 10 µm, PM_{10} and CO_2 concentration

Review ID	Study design	Setting	Location	Condition	Intervention/ Comparator	Outcomes
Mendell 2013	Prospective/ modelling study	162 3rd-5th grade classrooms in 28 schools in three school districts: South Coast, Bay Area and Central Valley	California, UA	Respiratory illness	Estimated relationship between daily illness absence (IA) and ventilation rates (VR) in zero-inflated negative binomial models. Authors also compared IA benefits and energy costs of increased VRs.	Daily illness absence count in each classroom CO_2 concentration Temperature Relative humidity Estimated VR per person (Vo) in l/s-person in each classroom for each school day during the study
Surveillance						
Young 2021	RCT (cluster)	Secondary schools and further education colleges	England	COVID-19	Voluntary daily lateral flow device testing for 7 days with LFD-negative contacts remaining at the school vs. Self-isolation of school-based COVID-19 contacts for 10 days	Number of COVID-19 related school absences among those otherwise eligible to be in school The extent of in-school SARS-CoV-2 transmission
Bilinksi 2021	Modelling study	Elementary and middle school communities	USA	COVID-19	Screening for COVID-19 vs. no screening	Cumulative incidence of SARS-CoV-2 infection; proportion of cases detected; proportion of planned and unplanned days out of school; and the cost of testing programs and of childcare costs associated with different strategies
Forster 2021	Non-randomised controlled trial and modelling study	Nine day-care centres	Wuerzburg, Germany	SARS-CoV-2	Continuous surveillance of asymptomatic children and childcare workers by SARS-CoV-2 PCR testing of either mid-turbinate nasal swabs twice weekly (module 1) or once weekly (module 2) or self-sampled saliva samples twice weekly (module 3) vs. Symptom-based, on-demand testing of children, childcare workers, and their household members by oropharyngeal swabs (module 4)	Acceptance of the respective surveillance protocols (feasibility study) Estimated number of secondary infections (ASI) (mathematical modelling).

Abbreviations: ARI, acute respiratory illness; COVID-19, Coronavirus-2019; HEPA, high efficiency particulate air; ILI, influenza-like illness; LFD, lateral flow device; LMIC, low and middle income countries; MERS, Middle East respiratory syndrome; PCR, polymerase chain reaction; SARS, Severe acute respiratory syndrome; UAE, United Arab Emirates; USA, United States of America

E2 Study details and outcome data

E2.1 Systematic reviews & modelling studies

E2.1.1 Various interventions

STUDY DETAILS: Abdullahi 2020			
Citation			
Abdullahi, L., Onyango, J.J., Mukiira, C., Wamicwe, J., Githiomi, R., Kariuki, D., Mugambi, C., Wanjohi, P., Githuka, G., Nzioka, C., Orwa, J., Oronje, R., Kariuki, J., Mayieka, L., 2020. Community interventions in Low—And Middle-Income Countries to inform COVID-19 control implementation decisions in Kenya: A rapid systematic review. PLOS ONE 15, e0242403. doi: 10.1371/journal.pone.0242403			
Affiliation/Source of funds			
The study was a collaboration among partners of the Heightening Institutional Capacity for Government Use of Health Research (HIGH-Res) in Kenya i.e. African Institute of Development Policy (AFIDEP), Ministry of Health (MoH), and Kenya Medical Research Institute (KEMRI). All authors affiliated with AFIDEP, MOH or the KEMRI in Kenya, Africa The authors declared no conflicts of interest.			
Study design	**Level of evidence**	**Location**	**Setting**
SR/MA	I	China, Bangladesh, Thailand, Romania, Serbia, Madagascar, Mexico, Peru	Low- and Middle-income countries Households Schools General Community
Prognostic factor		**Comparator**	
Facemasks, Hand Hygiene, and Social Distancing		N/A	
Population characteristics			
One study enrolled children aged between 1yr and 5yrs residing in Bangladesh; one study enrolled adolescents, hospital workers, inpatients, and residents/visitors; 14 studies enrolled mixed participants comprising of children, adolescent and parents; with one study enrolling passengers and crew team in a flight from New York to China, Hong Kong and from China, Hong Kong to Fuzhou			
Length of follow-up		**Outcomes measured**	
Search of PubMed, Google scholar, WHO website, MEDRXIV and Google. No date limit		SARS and influenza incidence	
INTERNAL VALIDITY			
Overall quality (AMSTAR)			
Rating: Low One critical flaw with or without non-critical weaknesses – the review has a critical flaw and *may not* provide an accurate and comprehensive summary of the available studies that address the question of interest. *Included studies:* For the three RCTs, the risk of bias was judged by the review authors to be moderate to high. The risk of bias on the observational design studies was assessed to be generally low to moderate. Authors did not provide a narrative discussion of risk of bias assessment.			

STUDY DETAILS: Abdullahi 2020			
RESULTS:			
Outcome **No. patients** **(No. trials)**	**Narrative summary**	**Risk estimate (95% CI)**	**Statistical significance (*p*-value)** **Heterogeneity[a] I^2 (*p*-value)**
Face mask vs no face mask			
Efficacy of mask wearing N = 2717 (5 studies)	In general, masks are effective in preventing the spread of Influenza and SARS viruses among the general population. Facemask use demonstrates no significant benefit to the composite of influenza and SARS spread versus control	RR 0.78 (95% CI 0.36, 1.67)	Heterogeneity: Tau^2 = 0.54, Chi^2= 37.33, df = 4 (p < 0.00001), I^2 = 89%

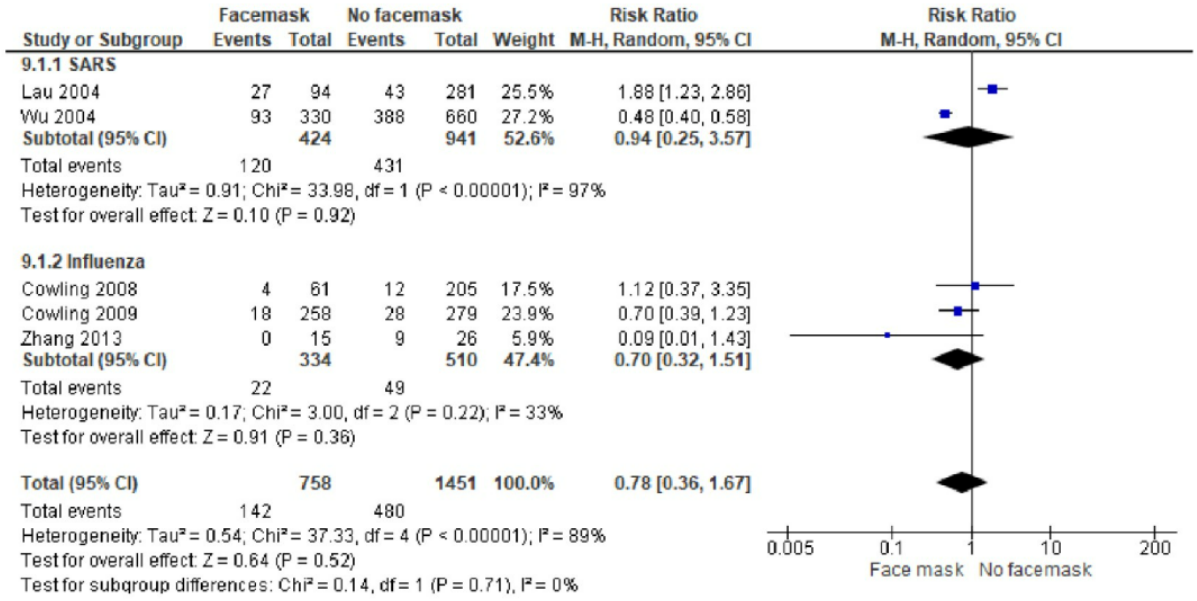


Fig 3. Face mask intervention only in management of an outbreak disease. Fig 3 shows the effect of face mask intervention in preventing influenza and SARS viruses among population.

Hand hygiene vs no hand hygiene			
Efficacy of hand washing N = 3665 (6 studies)	Following hand hygiene practices, the risk of contracting SARS and Influenza was reduced slightly, hence protective effect. Hand hygiene demonstrates no significant benefit to SARS and influenza spread versus control.	RR 0.95 (95% CI 0.83, 1.08)	Heterogeneity: Tau^2 = 0.02, Chi^2= 75.29, df = 5 (p < 0.00001), I^2 = 0%

STUDY DETAILS: Abdullahi 2020

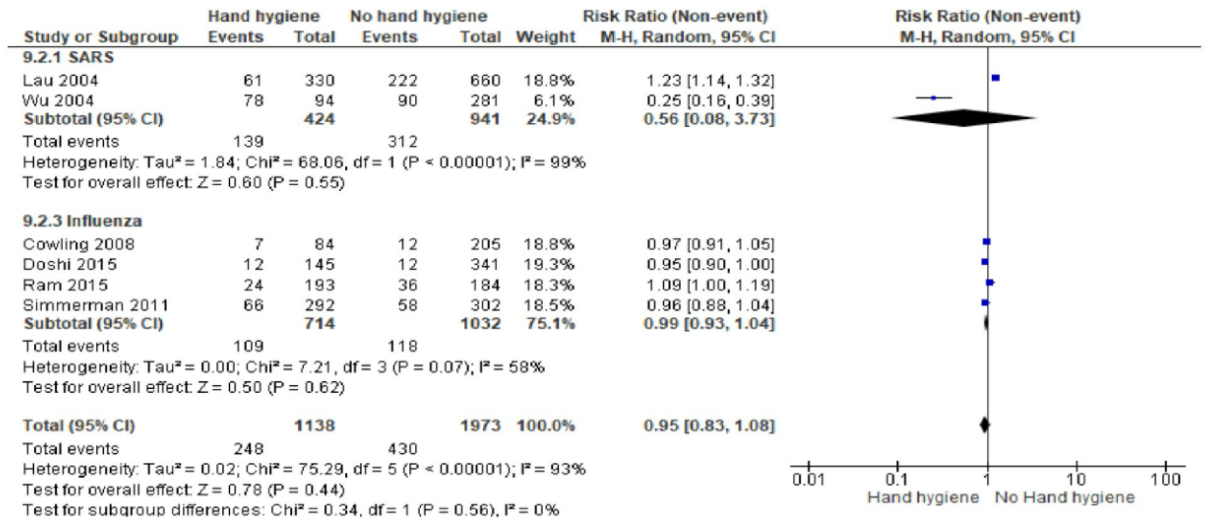
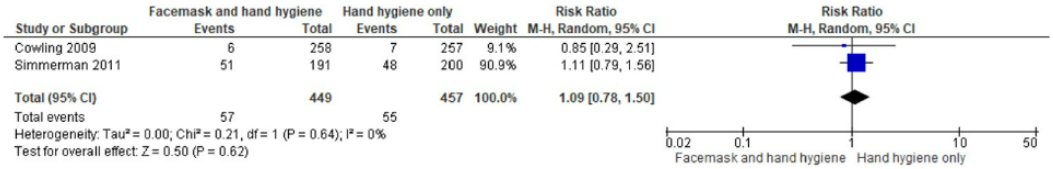


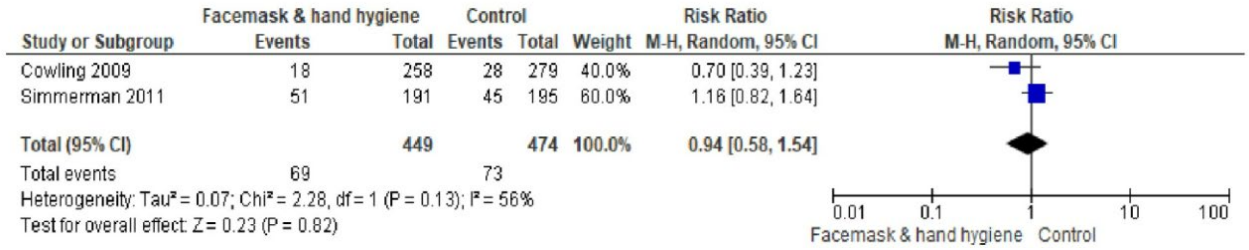
Fig 4. Hand hygiene intervention only in management of an outbreak disease. Fig 4 shows the effect of hand hygiene intervention in preventing influenza and SARS viruses among population.

Face mask and hand hygiene vs hand hygiene only			
Efficacy of combined intervention N = 1679 (2 studies)	Compared to hand hygiene only, the combined intervention of face masks and hand hygiene did not show effectiveness in preventing the spread of influenza among the general population.	OR 1.09 (95% CI 0.78, 1.50)	Heterogeneity: Tau^2 = 0.00, Chi^2= 0.21, df = 1 (p = 0.64), I^2 = 0%



Face mask and hand hygiene vs no intervention			
Efficacy of combined intervention N = 1679 (2 studies)	Facemasks with hand hygiene demonstrates no significant benefit to influenza spread versus control	RR 0.94 (95% CI 0.58, 1.54)	Heterogeneity: Tau^2 = 0.07, Chi^2= 2.28, df = 1 (p = 0.13), I^2 = 56%

STUDY DETAILS: Abdullahi 2020



Social distancing vs no intervention

Efficacy of social distancing NR (9 studies)	Social distancing interventions may slow down the spread of influenza (low-certainty evidence, 9 studies not pooled)	NR	NR

Additional comments

Authors conclusions:

The evidence confirms the use of face masks, good hand hygiene and social distancing as community interventions are effective to control the spread of SARS and influenza in LMICs. However, the effectiveness of community interventions in LMICs should be informed by adherence of the mitigation measures and contextual factors taking into account the best practices. The study has shown gaps in adherence/compliance of the interventions, hence a need for robust intervention studies to better inform the evidence on compliance of the interventions. Nevertheless, this rapid review of currently best available evidence might inform interim guidance on similar respiratory infectious diseases like Covid- 19 in Kenya and similar LMIC context.

CI, confidence interval; NR, not reported; OR, odds ratio; RCT, randomised controlled trial; RR, relative risk; SD, standard deviation

a. Only applicable to systematic reviews with formal meta-analysis. Heterogeneity defined as follows: (i) no significant heterogeneity if $P_{het} > 0.1$ and $I^2 < 25\%$; (ii) mild heterogeneity if $I^2 < 25\%$; moderate heterogeneity if I^2 between 25–50%; substantial heterogeneity $I^2 > 50\%$.

STUDY DETAILS: Chu 2020

Citation

Chu, D. K., Akl, E. A., Duda, S., Solo, K., Yaacoub, S., Schünemann, H. J., Chu, D. K., Akl, E. A., El-Harakeh, A., Bognanni, A., Lotfi, T., Loeb, M., Hajizadeh, A., Bak, A., Izcovich, A., Cuello-Garcia, C. A., Chen, C., Harris, D. J., Borowiack, E., . . . Schünemann, H. J. (2020). 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. The Lancet, 395(10242), 1973-1987. https://doi.org/10.1016/s0140-6736(20)31142-9

Affiliation/Source of funds

The study was funded by the World Health Organisation, whereby this SR was written on the behalf of the COVID-19 systematic urgent review group effort, to inform WHO guidance documents

All authors affiliated with the Department of Health Research Methods, Evidence and Impact, tertiary institutions in Canada or Lebanon or the Michael G DeGroote Cochrane Canada and GRADE Centres

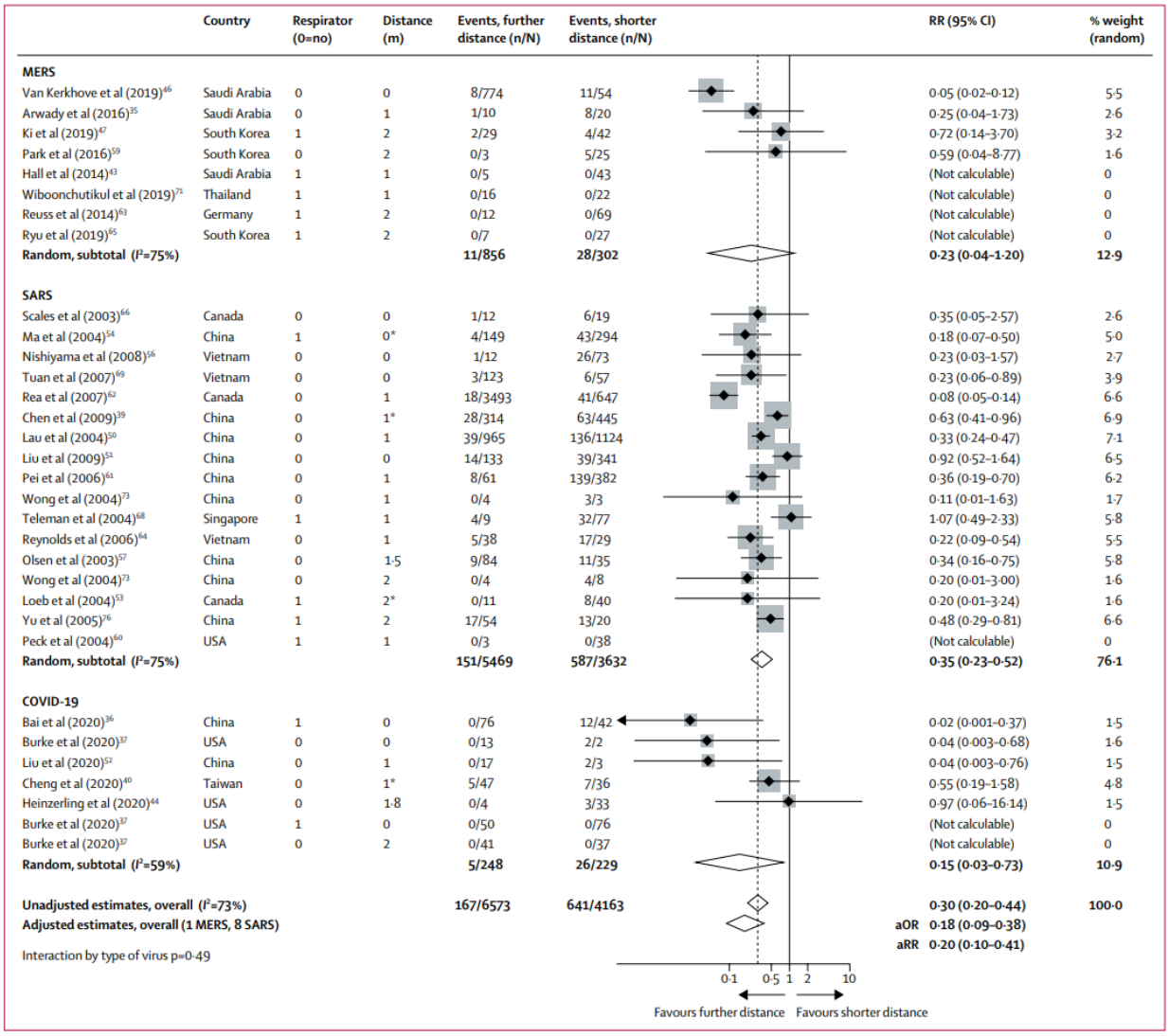
The authors declared no conflicts of interest.

Study design	Level of evidence	Location	Setting
Systematic review and meta-analysis	I-III	Saudi Arabia, China, USA, Vietnam, Canada, Taiwan, South Korea, Singapore, Germany, Thailand, Australia, UAE, Iran, Malaysia, Brazil, Hong Kong, Netherlands (note most studies are from China)	Health care and community settings

STUDY DETAILS: Chu 2020	
Prognostic factor	**Comparator**
Physical distancing, face masks, and eye protection to prevent transmission of the viruses that cause COVID-19 and related diseases (e.g., severe acute respiratory syndrome [SARS] and Middle East respiratory syndrome [MERS])	N/A
Population characteristics	
Infected individuals and people close to them (e.g., household members, caregivers, and healthcare workers).	
Length of follow-up	**Outcomes measured**
Searched (up to March 26, 2020) MEDLINE (using the Ovid platform), PubMed, Embase, CINAHL (using the Ovid platform), the Cochrane Library, COVID-19 Open Research Dataset Challenge, COVID-19 Research Database (WHO), Epistemonikos (for relevant systematic reviews addressing MERS and SARS, and its COVID-19 Living Overview of the Evidence platform), EPPI Centre living systematic map of the evidence, ClinicalTrials.gov, WHO International Clinical Trials Registry Platform, relevant documents on the websites of governmental and other relevant organisations, reference lists of included papers, and relevant systematic reviews. Also handsearched (up to May 3, 2020) preprint servers (bioRxiv, medRxiv, and Social Science Research Network First Look) and coronavirus resource centres of The Lancet, JAMA, and N Engl J Med.	Risk of transmission (i.e., WHO defined confirmed or probable COVID-19, SARS, or MERS) to people in healthcare or non-healthcare settings by those infected Contextual factors such as acceptability, feasibility, effect on equity and resource considerations.
INTERNAL VALIDITY	
Overall quality (AMSTAR)	
Rating: Moderate More than one non-critical weakness – the systematic review has more than one weakness but no critical flaws. It *may* provide an accurate summary of the results of the available studies that were included in the review. *Included studies:* All studies were non-randomised and evaluated using the Newcastle-Ottawa Scale; Risk of bias was generally low-to-moderate after considering the observational designs but both within studies and across studies the overall findings were similar between adjusted and unadjusted estimates. In the body of evidence for any intervention some studies had a higher risk of bias than did others, but no important difference was noted in sensitivity analyses excluding studies at higher risk of bias; we did not further rate down for risk of bias. No strong evidence of publication bias was detected	
RESULTS:	

Outcome **No. patients (No. trials)**	**Relative effect**	**Anticipated absolute effect (95% CI), eg. Chance of viral infection or transmission**			
		Intervention	**Comparator**	**Difference (95% CI)**	**Author notes**
Physical distance (≥ 1m vs < 1m)					
Transmission of virus NR (9 adjusted studies, 29 unadjusted studies)	Adjusted odds ratio (aOR) 0.18 (0.09 to 0.38) Unadjusted RR 0.30 (95% CI 0.20 to 0.44)	Further distance, 2.6% (1.3 to 5.3)	Shorter distance, 12.8%	-10.2% (-11.5 to -7.5)	A physical distance of more than 1 m probably results in a large reduction in virus infection; for every 1 m further away in distancing, the relative effect might increase 2·02 times

STUDY DETAILS: Chu 2020



	Country	Respirator (0=no)	Distance (m)	Events, further distance (n/N)	Events, shorter distance (n/N)	RR (95% CI)	% weight (random)
MERS							
Van Kerkhove et al (2019)[46]	Saudi Arabia	0	0	8/774	11/54	0·05 (0·02–0·12)	5·5
Arwady et al (2016)[35]	Saudi Arabia	0	1	1/10	8/20	0·25 (0·04–1·73)	2·6
Ki et al (2019)[47]	South Korea	1	2	2/29	4/42	0·72 (0·14–3·70)	3·2
Park et al (2016)[59]	South Korea	0	2	0/3	5/25	0·59 (0·04–8·77)	1·6
Hall et al (2014)[43]	Saudi Arabia	1	1	0/5	0/43	(Not calculable)	0
Wiboonchutikul et al (2019)[71]	Thailand	1	1	0/16	0/22	(Not calculable)	0
Reuss et al (2014)[63]	Germany	1	2	0/12	0/69	(Not calculable)	0
Ryu et al (2019)[65]	South Korea	1	2	0/7	0/27	(Not calculable)	0
Random, subtotal (I^2=75%)				**11/856**	**28/302**	**0·23 (0·04–1·20)**	**12·9**
SARS							
Scales et al (2003)[66]	Canada	0	0	1/12	6/19	0·35 (0·05–2·57)	2·6
Ma et al (2004)[54]	China	1	0*	4/149	43/294	0·18 (0·07–0·50)	5·0
Nishiyama et al (2008)[56]	Vietnam	0	0	1/12	26/73	0·23 (0·03–1·57)	2·7
Tuan et al (2007)[69]	Vietnam	0	0	3/123	6/57	0·23 (0·06–0·89)	3·9
Rea et al (2007)[62]	Canada	0	1	18/3493	41/647	0·08 (0·05–0·14)	6·6
Chen et al (2009)[39]	China	0	1*	28/314	63/445	0·63 (0·41–0·96)	6·9
Lau et al (2004)[50]	China	0	1	39/965	136/1124	0·33 (0·24–0·47)	7·1
Liu et al (2009)[51]	China	0	0	14/133	39/341	0·92 (0·52–1·64)	6·5
Pei et al (2006)[61]	China	0	1	8/61	139/382	0·36 (0·19–0·70)	6·2
Wong et al (2004)[73]	China	0	1	0/4	3/3	0·11 (0·01–1·63)	1·7
Teleman et al (2004)[68]	Singapore	1	1	4/9	32/77	1·07 (0·49–2·33)	5·8
Reynolds et al (2006)[64]	Vietnam	0	1	5/38	17/29	0·22 (0·09–0·54)	5·5
Olsen et al (2003)[57]	China	0	1·5	9/84	11/35	0·34 (0·16–0·75)	5·8
Wong et al (2004)[73]	China	0	2	0/4	4/8	0·20 (0·01–3·00)	1·6
Loeb et al (2004)[53]	Canada	1	2*	0/11	8/40	0·20 (0·01–3·24)	1·6
Yu et al (2005)[76]	China	1	2	17/54	13/20	0·48 (0·29–0·81)	6·6
Peck et al (2004)[60]	USA	1	1	0/3	0/38	(Not calculable)	0
Random, subtotal (I^2=75%)				**151/5469**	**587/3632**	**0·35 (0·23–0·52)**	**76·1**
COVID-19							
Bai et al (2020)[36]	China	1	0	0/76	12/42	0·02 (0·001–0·37)	1·5
Burke et al (2020)[37]	USA	0	0	0/13	2/2	0·04 (0·003–0·68)	1·6
Liu et al (2020)[52]	China	0	1	0/17	2/3	0·04 (0·003–0·76)	1·5
Cheng et al (2020)[40]	Taiwan	0	1*	5/47	7/36	0·55 (0·19–1·58)	4·8
Heinzerling et al (2020)[44]	USA	0	1·8	0/4	3/33	0·97 (0·06–16·14)	1·5
Burke et al (2020)[37]	USA	1	0	0/50	0/76	(Not calculable)	0
Burke et al (2020)[37]	USA	0	2	0/41	0/37	(Not calculable)	0
Random, subtotal (I^2=59%)				**5/248**	**26/229**	**0·15 (0·03–0·73)**	**10·9**
Unadjusted estimates, overall (I^2=73%)				**167/6573**	**641/4163**	**0·30 (0·20–0·44)**	**100·0**
Adjusted estimates, overall (1 MERS, 8 SARS)						**aOR 0·18 (0·09–0·38)**	
						aRR 0·20 (0·10–0·41)	
Interaction by type of virus p=0·49							

Figure 2: **Forest plot showing the association of COVID-19, SARS, or MERS exposure proximity with infection**
SARS=severe acute respiratory syndrome. MERS=Middle East respiratory syndrome. RR=relative risk. aOR=adjusted odds ratio. aRR=adjusted relative risk. *Estimated values; sensitivity analyses excluding these values did not meaningfully alter findings.

Face mask vs no face mask

Transmission of virus (10 adjusted studies, 29 unadjusted studies)	aOR 0.15 (0.07 to 0.34), unadjusted RR 0.34 (95% CI 0.26 to 0.45)	Face mask, 3.1% (1.5 to 6.7)	No face mask 17.4%	-14.3% (-15.9 to -10.7)	Medical or surgical face masks might result in a large reduction in virus infection; N95 respirators might be associated with a larger reduction in risk compared with surgical or similar masks.

STUDY DETAILS: Chu 2020					
					Associations were stronger in healthcare settings (RR 0·30, 95% CI 0·22 to 0·41) compared with non-health-care settings (RR 0·56, 95% CI 0·40 to 0·79. The association with protection from infection was more pronounced with N95 or similar respirators (aOR 0·04, 95% CI 0·004 to 0·30) compared with other masks (aOR 0·33, 95% CI 0·17 to 0·61

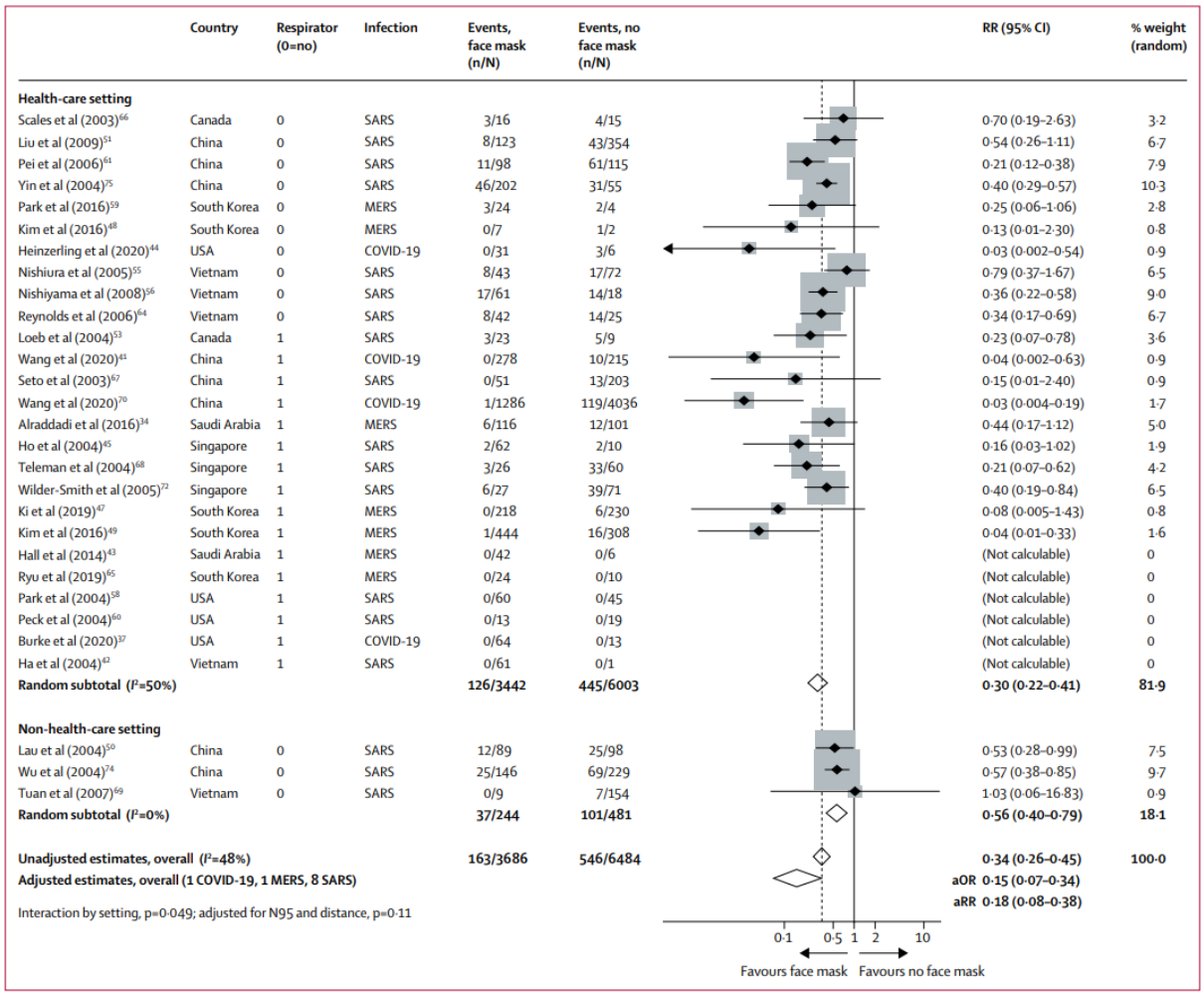


Figure 4: **Forest plot showing unadjusted estimates for the association of face mask use with viral infection causing COVID-19, SARS, or MERS**
SARS=severe acute respiratory syndrome. MERS=Middle East respiratory syndrome. RR=relative risk. aOR=adjusted odds ratio. aRR=adjusted relative risk.

Eye protection (Face shield, goggles) vs no eye protection					
Eye protection NR (13 adjusted studies)	Unadjusted RR 0·34 (0·22 to 0·52)	Eye protection, 5·5% (3·6 to 8·5)	No eye protection, 16·0%	–10·6% (–12·5 to –7·7)	Eye protection might result in a large reduction in virus infection

STUDY DETAILS: Chu 2020

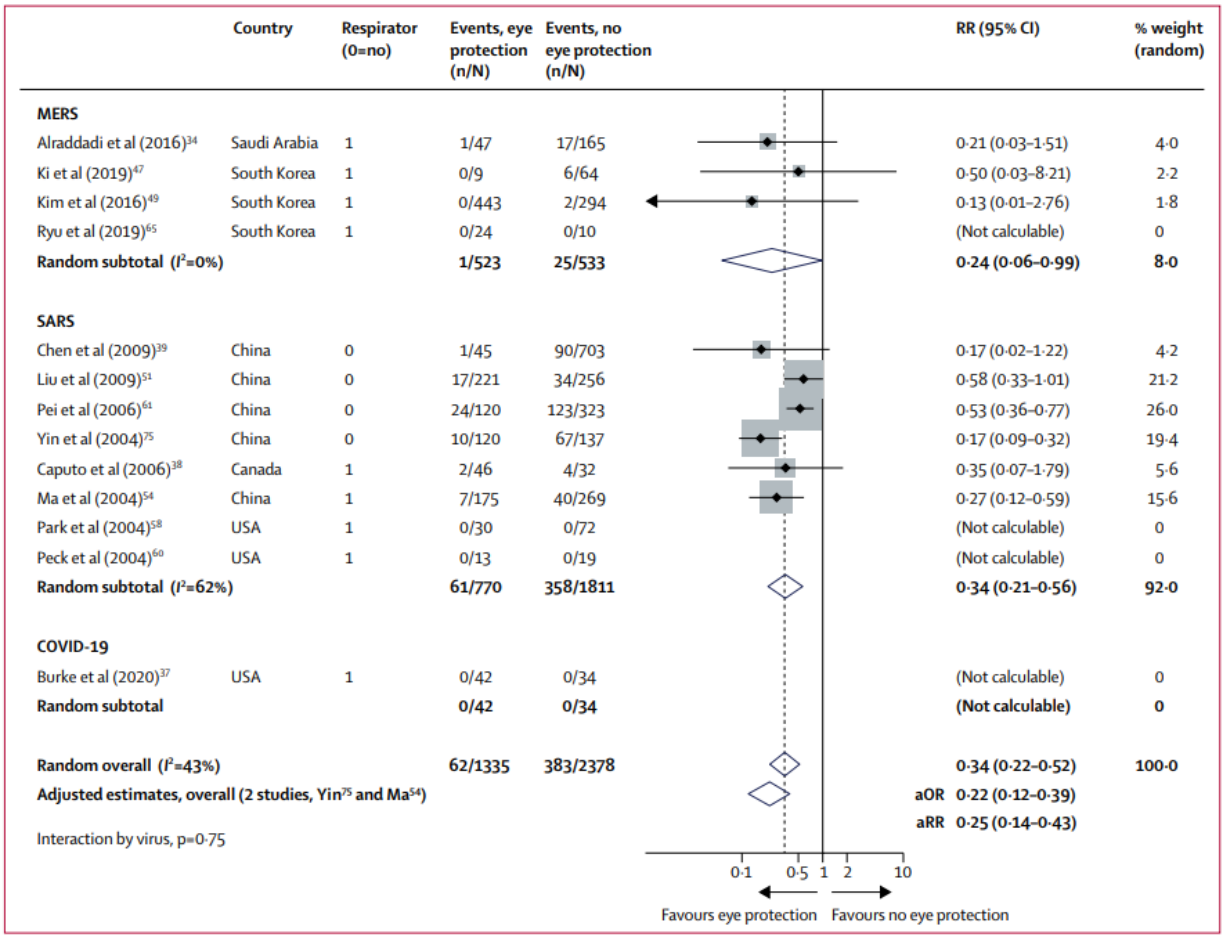


Figure 6: **Forest plot showing the association of eye protection with risk of COVID-19, SARS, or MERS transmission**
Forest plot shows unadjusted estimates. SARS=severe acute respiratory syndrome. MERS=Middle East respiratory syndrome. RR=relative risk. aOR=adjusted odds ratio. aRR=adjusted relative risk.

Additional comments

Authors conclusions:

No randomised trials were identified for these interventions in COVID-19, SARS, or MERS.

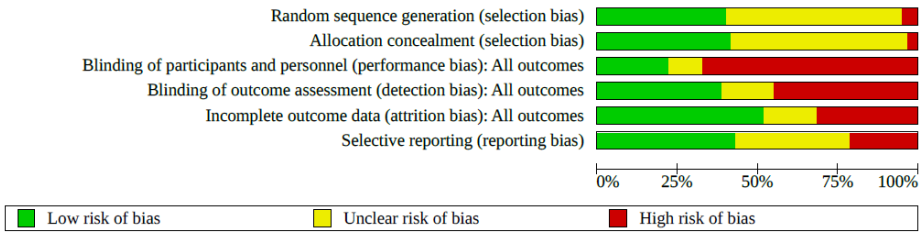
Physical distancing of at least 1 m is strongly associated with protection, but distances of up to 2 m might be more effective. Although direct evidence is limited, the optimum use of face masks, in particular N95 or similar respirators in health-care settings and 12–16-layer cotton or surgical masks in the community, could depend on contextual factors; action is needed at all levels to address the paucity of better evidence. Eye protection might provide additional benefits. Globally collaborative and well conducted studies, including randomised trials, of different personal protective strategies are needed

CI, confidence interval; NR, not reported; RCT, randomised controlled trial; RR, relative risk; SD, standard deviation

STUDY DETAILS: Jefferson 2020			
Citation			
Jefferson T, Del Mar CB, Dooley L, Ferroni E, Al-Ansary LA, Bawazeer GA, van Driel ML, Jones MA, Thorning S, Beller EM, Clark J, Hoffmann TC, Glasziou PP, Conly JM. Physical interventions to interrupt or reduce the spread of respiratory viruses. Cochrane Database of Systematic Reviews 2020, Issue 11. Art. No.: CD006207. DOI: 10.1002/14651858.CD006207.pub5.			
Affiliation/Source of funds			
Internal and external sources of funding and declarations of interest for each author provided in detail. All authors affiliated with tertiary institutions or hospitals in the UK, Australia, Italy, Saudi Arabia, Belgium and Canada			
Study design	**Level of evidence**	**Location**	**Setting**
Systematic review of RCTs, cluster RCTs, or quasi-RCTs	I-II	Japan. Denmark. Saudi Arabia. Egypt. USA, Israel. France. New Zealand. Thailand. Pakistan. Finland. Germany. Hong Kong	Heterogeneous settings, ranging from suburban schools to hospital wards in high-income countries; crowded inner city settings in low-income countries; and an immigrant neighbourhood in a high-income country
Prognostic factor		**Comparator**	
Physical interventions (screening at entry ports, isolation, quarantine, physical distancing, personal protection, hand hygiene, face masks, and gargling) to prevent respiratory virus transmission compared with no or another intervention.		N/A	
Population characteristics People of all ages			
Length of follow-up		**Outcomes measured**	
Searched CENTRAL, PubMed, Embase, CINAHL on 1 April 2020. We searched ClinicalTrials.gov, and the WHO ICTRP on 16 March 2020. Also conducted a backwards and forwards citation analysis on the newly included studies. This study is an update of the review first published in 2007.		*Primary outcomes* 1. Numbers of cases of viral illness (including ARIs, influenza-like illness (ILI), and laboratory-confirmed influenza, or other viral pathogens). 2. Adverse events related to the intervention. *Secondary outcomes* 1. Deaths. 2. Severity of viral illness as reported in the studies. 3. Absenteeism. 4. Hospital admissions. 5. Complications related to the illness, e.g. pneumonia.	
INTERNAL VALIDITY			
Overall quality (AMSTAR)			
Rating: High No or one non-critical weakness – the systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest. *Included studies:*			

STUDY DETAILS: Jefferson 2020

Figure 2. 'Risk of bias' graph: review authors' judgements about each risk of bias item presented as percentages across all included trials.



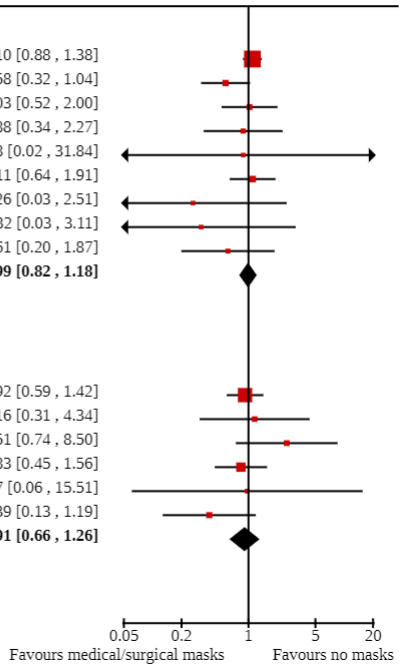
RESULTS:

Outcome **No. patients (No. trials)**	**Anticipated absolute effects (95% CI)**		**Risk estimate (95% CI)**	**Comments**
	Risk with control	**Risk with randomised studies**		
Medical/surgical masks compared to no masks				
Viral illness – influenza like illness N = 3507 (9 RCTs)	160 per 1000	158 per 1000 (131 to 189)	RR 0.99 (0.82 to 1.18)	Wearing a mask will make little to no difference for the number of cases of viral illness
Viral illness – laboratory-confirmed influenza N = 3005 (6 RCTs)	40 per 1000	36 per 1000 (26 to 50)	RR 0.91 (0.66 to 1.26)	Wearing a mask will make little to no difference for the number of cases of laboratory viral illness
Influenza-like illness in healthcare workers N = 1070 (2 RCTs)	40 per 1000	15 per 1000 (2 to 100)	RR 0.37(0.05 to 2.50)	
Adverse events NR (3 RCTs)	NR	NR	NR	Adverse events were not reported consistently and could not be meta-analysed. Adverse events reported for masks included warmth, discomfort, respiratory difficulties, humidity, pain, and shortness of breath, in up to 45% of participants.
Severity of viral illness as reported in the studies N = 1 RCTs	One study reported that participants in the mask group were significantly more likely to experience more days with headache and feeling bad. They found no significant differences between the two groups for symptom severity scores. None of the other trials reported this outcome. NR		NR	

STUDY DETAILS: Jefferson 2020

Analysis 1.1. Comparison 1: Randomised trials: medical/surgical masks versus no masks, Outcome 1: Viral illness

Study or Subgroup	log[RR]	SE	Medical/surgical masks Total	No masks Total	Weight	Risk Ratio IV, Random, 95% CI
1.1.1 Influenza-like illness						
Aiello 2012	0.095	0.115	392	370	64.5%	1.10 [0.88 , 1.38]
Barasheed 2014	-0.55	0.3	75	89	9.5%	0.58 [0.32 , 1.04]
Canini 2010	0.025	0.342	148	158	7.3%	1.03 [0.52 , 2.00]
Cowling 2008	-0.128	0.483	61	205	3.7%	0.88 [0.34 , 2.27]
Jacobs 2009	-0.126	1.83	17	15	0.3%	0.88 [0.02 , 31.84]
MacIntyre 2009	0.1	0.28	186	100	10.9%	1.11 [0.64 , 1.91]
MacIntyre 2015	-1.335	1.15	580	458	0.6%	0.26 [0.03 , 2.51]
MacIntyre 2016	-1.139	1.16	302	295	0.6%	0.32 [0.03 , 3.11]
Suess 2012	-0.494	0.571	26	30	2.6%	0.61 [0.20 , 1.87]
Subtotal (95% CI)			**1787**	**1720**	**100.0%**	**0.99 [0.82 , 1.18]**
Heterogeneity: Tau² = 0.00; Chi² = 7.29, df = 8 (P = 0.51); I² = 0%						
Test for overall effect: Z = 0.13 (P = 0.90)						
1.1.2 Laboratory-confirmed influenza						
Aiello 2012	-0.083	0.223	392	370	51.6%	0.92 [0.59 , 1.42]
Cowling 2008	0.148	0.674	61	205	6.0%	1.16 [0.31 , 4.34]
MacIntyre 2009	0.92	0.6225	186	100	7.0%	2.51 [0.74 , 8.50]
MacIntyre 2015	-0.182	0.32	580	458	25.8%	0.83 [0.45 , 1.56]
MacIntyre 2016 (1)	-0.03	1.414	302	295	1.4%	0.97 [0.06 , 15.51]
Suess 2012	-0.942	0.57	26	30	8.3%	0.39 [0.13 , 1.19]
Subtotal (95% CI)			**1547**	**1458**	**100.0%**	**0.91 [0.66 , 1.26]**
Heterogeneity: Tau² = 0.00; Chi² = 5.08, df = 5 (P = 0.41); I² = 1%						
Test for overall effect: Z = 0.58 (P = 0.56)						



Footnotes

(1) Both MacIntyre studies reported on laboratory confirmed respiratory virus infection

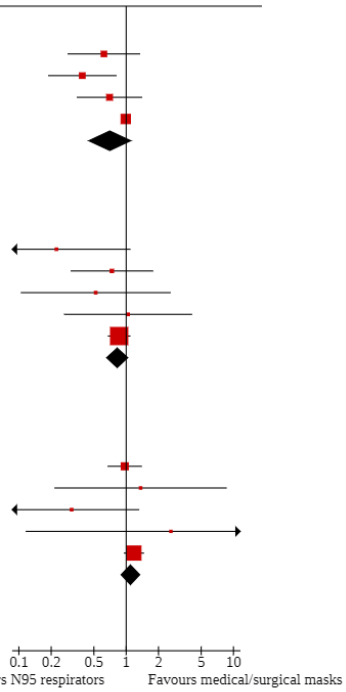
N95/P2 respirators compared to medical/surgical masks

Viral illness – clinical respiratory illness N = 7799 (3 RCTs)	120 per 1000	84 per 1000 (54 to 132)	RR 0.70 (0.45 to 1.10)	All studies in hospital settings with healthcare workers
Viral illness – influenza like illness N = 8407 (5 RCTs)	50 per 1000	41 per 1000 (33 to52)	RR 0.82 (0.66 to 1.03)	
Viral illness – laboratory confirmed influenza N = 8407 (5 RCTs)	70 per 1000	77 per 1000 (63 to 94)	RR 1.10 (0.90 to 1.34)	
Adverse events (5 RCTs)	There was insufficient consistent reporting of adverse events to enable meta-analysis. Only 1 study reported detailed adverse events: discomfort was reported in 41.9% of N95 wearers versus 9.8% of medical mask wearers ($p < 0.001$); headaches were more common with N95 (13.4% versus 3.9%; $p < 0.001$); difficulty breathing was reported more often in the N95group (19.4% versus 12.5%; $P = 0.01$); and N95 caused more problems with pressure on the nose (52.2% versus 11.0%; $p < 0.001$). 4 RCTs either reported no adverse events or only reported on comfort wearing masks.			
Absenteeism NR (1 RCT)	One study reported that 42 participants (19.8%) in the surgical mask group reported an episode of work-related absenteeism compared with 39 (18.6%) of participants in the N95 respiratory group		absolute risk difference −1.24%, 95% CI −8.75% to 6.27%	$P = 0.75$

STUDY DETAILS: Jefferson 2020

Analysis 2.1. Comparison 2: Randomised trials: N95 respirators compared to medical/surgical masks, Outcome 1: Viral illness

Study or Subgroup	log[RR]	SE	N95 respirators Total	Medical/surgical masks Total	Weight	Risk Ratio IV, Random, 95% CI
2.1.1 Clinical respiratory illness						
MacIntyre 2011	-0.478	0.397	949	492	18.5%	0.62 [0.28 , 1.35]
MacIntyre 2013	-0.942	0.374	581	286	19.7%	0.39 [0.19 , 0.81]
MacIntyre 2013 (1)	-0.357	0.355	516	286	20.8%	0.70 [0.35 , 1.40]
Radonovich 2019	-0.01	0.035	2243	2446	41.0%	0.99 [0.92 , 1.06]
Subtotal (95% CI)			**4289**	**3510**	**100.0%**	**0.70 [0.45 , 1.10]**
Heterogeneity: Tau² = 0.13; Chi² = 8.37, df = 3 (P = 0.04); I² = 64%						
Test for overall effect: Z = 1.54 (P = 0.12)						
2.1.2 Influenza-like illness						
Loeb 2009	-1.496	0.81	210	212	2.0%	0.22 [0.05 , 1.10]
MacIntyre 2009	-0.306	0.45	92	94	6.6%	0.74 [0.30 , 1.78]
MacIntyre 2011	-0.654	0.817	949	492	2.0%	0.52 [0.10 , 2.58]
MacIntyre 2013	0.04	0.7	1097	572	2.7%	1.04 [0.26 , 4.10]
Radonovich 2019	-0.151	0.124	2243	2446	86.7%	0.86 [0.67 , 1.10]
Subtotal (95% CI)			**4591**	**3816**	**100.0%**	**0.82 [0.66 , 1.03]**
Heterogeneity: Tau² = 0.00; Chi² = 3.19, df = 4 (P = 0.53); I² = 0%						
Test for overall effect: Z = 1.68 (P = 0.09)						
2.1.3 Laboratory-confirmed influenza						
Loeb 2009	-0.031	0.186	210	212	27.7%	0.97 [0.67 , 1.40]
MacIntyre 2009 (2)	0.31	0.94	92	94	1.2%	1.36 [0.22 , 8.61]
MacIntyre 2011	-1.171	0.74	949	492	1.9%	0.31 [0.07 , 1.32]
MacIntyre 2013	0.96	1.59	1097	572	0.4%	2.61 [0.12 , 58.93]
Radonovich 2019	0.166	0.11	2243	2446	68.8%	1.18 [0.95 , 1.46]
Subtotal (95% CI)			**4591**	**3816**	**100.0%**	**1.10 [0.90 , 1.34]**
Heterogeneity: Tau² = 0.00; Chi² = 4.15, df = 4 (P = 0.39); I² = 4%						
Test for overall effect: Z = 0.89 (P = 0.37)						



Footnotes

(1) MacIntyre 2013 includes 2 comparisons: N95 vs surgical masks and targeted N95 vs surgical masks

(2) MacIntyre 2009 reported on outcome laboratory confirmed infections

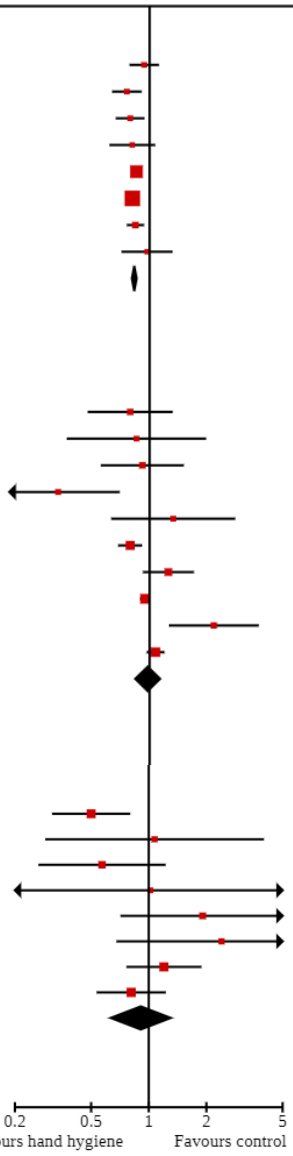
Hand hygiene compared to control for preventing the spread of viral respiratory illness

Acute respiratory illness N = 44129 (7 RCTs)	380 per 1000	319 per 1000 (312 to 327)	RR 0.84 ((0.82 to 0.86)	The populations of these studies included adults, children, and families, in settings such as schools, childcare centres, homes, and offices. None of the studies was conducted during a pandemic, although a few studies were conducted during peak influenza seasons. Data suggest a probable benefit
Influenza-like illness N = 32641 (10 RCTs)	90 per 1000	88 per 1000 (77 to 102)	RR 0.98 (0.85 to 1.13)	The estimates of the effect were heterogeneous, suggesting that hand hygiene made little or no difference
Laboratory-confirmed influenza N = 8332 (8 RCTs)	80 per 1000	73 per 1000 (50 to 104)	0.91 (0.63 to 1.30)	The estimates of the effect were heterogeneous, suggesting that hand hygiene made little or no difference

STUDY DETAILS: Jefferson 2020				
Composite of acute respiratory illness, influenza-like illness, influenza N = 61372 (16 RCTs)	200 per 1000	178 per 1000 (168 to 190)	RR 0.89 (0.84 to 0.95)	Pooled results show 11% relative reduction in participants with a respiratory illness, suggesting that hand hygiene may offer a benefit, but with high heterogeneity
ARI or ILI or influenza: subgroup analysis Children N = 21283 (9 RCTs) Adults N = 40089 (7 RCTs)			Children: 0.92 (0.84-1.01) Adults: 0.85 (0.79,0.92)	
Adverse events NR (2 RCTs)				Data were insufficient to conduct meta-analysis. 1 study reported that no adverse events were observed, and another study reported that skin reaction was recorded for 10.4% of participants in the hand sanitiser group versus 10.3% in the control group
Absenteeism N = 3150 (3 RCTs)			RR 0.64 (0.58-0.71)	Three trials measured absenteeism from school or work and demonstrated a 36% relative reduction in the numbers of participants with absence in the hand hygiene group

Analysis 3.1. Comparison 3: Randomised trials: hand hygiene compared to control, Outcome 1: Viral illness

Study or Subgroup	log[RR]	SE	Hand hygiene Total	Control Total	Weight	Risk Ratio IV, Random, 95% CI
3.1.1 Acute respiratory illness						
Azor-Martinez 2018	-0.062	0.086	274	149	2.4%	0.94 [0.79 , 1.11]
Azor-Martinez 2018 (1)	-0.261	0.086	339	149	2.4%	0.77 [0.65 , 0.91]
Correa 2012	-0.223	0.084	794	933	2.5%	0.80 [0.68 , 0.94]
Larson 2010	-0.199	0.134	946	904	1.0%	0.82 [0.63 , 1.07]
Little 2015	-0.151	0.02	8241	8667	35.2%	0.86 [0.83 , 0.89]
Millar 2016	-0.198	0.016	10000	10000	48.7%	0.82 [0.80 , 0.85]
Nicholson 2014	-0.163	0.05	847	833	6.9%	0.85 [0.77 , 0.94]
Sandora 2005	-0.03	0.15	602	451	0.8%	0.97 [0.72 , 1.30]
Subtotal (95% CI)			**22043**	**22086**	**100.0%**	**0.84 [0.82 , 0.86]**
Heterogeneity: Tau² = 0.00; Chi² = 7.51, df = 7 (P = 0.38); I² = 7%						
Test for overall effect: Z = 13.09 (P < 0.00001)						
3.1.2 Influenza-like illness						
Biswas 2019	-0.223	0.249	5077	5778	6.1%	0.80 [0.49 , 1.30]
Cowling 2008	-0.151	0.408	84	205	2.7%	0.86 [0.39 , 1.91]
Cowling 2009	-0.083	0.243	257	279	6.3%	0.92 [0.57 , 1.48]
Hubner 2010	-1.05	0.36	64	65	3.4%	0.35 [0.17 , 0.71]
Larson 2010	0.271	0.363	946	904	3.4%	1.31 [0.64 , 2.67]
Little 2015	-0.223	0.07	8241	8667	18.7%	0.80 [0.70 , 0.92]
Ram 2015	0.215	0.149	193	184	11.5%	1.24 [0.93 , 1.66]
Roberts 2000	-0.051	0.03	299	259	21.8%	0.95 [0.90 , 1.01]
Simmerman 2011	0.737	0.263	292	302	5.6%	2.09 [1.25 , 3.50]
Zomer 2015	0.068	0.052	278	267	20.3%	1.07 [0.97 , 1.19]
Subtotal (95% CI)			**15731**	**16910**	**100.0%**	**0.98 [0.85 , 1.13]**
Heterogeneity: Tau² = 0.02; Chi² = 32.18, df = 9 (P = 0.0002); I² = 72%						
Test for overall effect: Z = 0.31 (P = 0.76)						
3.1.3 Laboratory-confirmed influenza						
Biswas 2019	-0.693	0.24	508	689	19.8%	0.50 [0.31 , 0.80]
Cowling 2008	0.07	0.671	84	205	6.0%	1.07 [0.29 , 4.00]
Cowling 2009	-0.562	0.39	257	279	12.7%	0.57 [0.27 , 1.22]
Hubner 2010	0.02	0.834	64	65	4.2%	1.02 [0.20 , 5.23]
Larson 2010	0.648	0.504	946	904	9.2%	1.91 [0.71 , 5.13]
Ram 2015	0.875	0.644	193	184	6.4%	2.40 [0.68 , 8.48]
Simmerman 2011	0.182	0.23	292	302	20.4%	1.20 [0.76 , 1.88]
Stebbins 2011	-0.211	0.212	1695	1665	21.4%	0.81 [0.53 , 1.23]
Subtotal (95% CI)			**4039**	**4293**	**100.0%**	**0.91 [0.63 , 1.30]**
Heterogeneity: Tau² = 0.11; Chi² = 13.58, df = 7 (P = 0.06); I² = 48%						
Test for overall effect: Z = 0.53 (P = 0.60)						



Footnotes

(1) Azor 2018 included 2 hand-washing groups: one using soap and water (RR 0.94) and the other using hand sanitizer (RR 0.77)

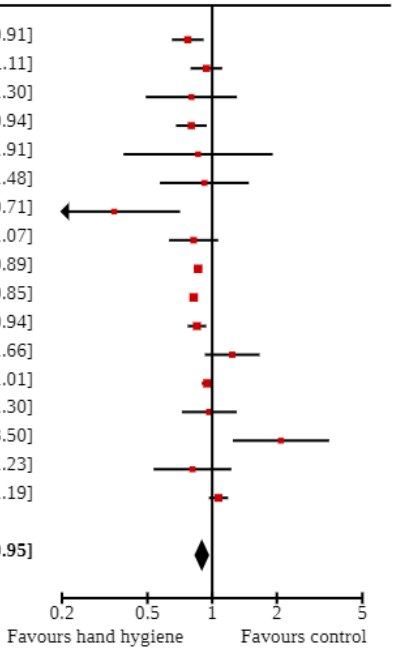
Analysis 3.2. Comparison 3: Randomised trials: hand hygiene compared to control, Outcome 2: ARI or ILI or influenza (including outcome with most events from each study)

Study or Subgroup	log[RR]	SE	Hand hygiene Total	Control Total	Weight	Risk Ratio IV, Random, 95% CI
Azor-Martinez 2018	-0.261	0.086	339	149	7.1%	0.77 [0.65 , 0.91]
Azor-Martinez 2018 (1)	-0.062	0.086	274	149	7.1%	0.94 [0.79 , 1.11]
Biswas 2019	-0.223	0.249	5077	5778	1.5%	0.80 [0.49 , 1.30]
Correa 2012	-0.223	0.084	794	933	7.2%	0.80 [0.68 , 0.94]
Cowling 2008	-0.151	0.408	84	205	0.6%	0.86 [0.39 , 1.91]
Cowling 2009	-0.083	0.243	257	279	1.6%	0.92 [0.57 , 1.48]
Hubner 2010	-1.05	0.36	64	65	0.8%	0.35 [0.17 , 0.71]
Larson 2010	-0.199	0.134	946	904	4.2%	0.82 [0.63 , 1.07]
Little 2015	-0.151	0.02	8241	8667	13.1%	0.86 [0.83 , 0.89]
Millar 2016	-0.198	0.016	10000	10000	13.3%	0.82 [0.80 , 0.85]
Nicholson 2014	-0.163	0.05	847	833	10.4%	0.85 [0.77 , 0.94]
Ram 2015	0.215	0.149	193	184	3.6%	1.24 [0.93 , 1.66]
Roberts 2000	-0.051	0.03	299	259	12.3%	0.95 [0.90 , 1.01]
Sandora 2005	-0.03	0.15	602	451	3.5%	0.97 [0.72 , 1.30]
Simmerman 2011	0.737	0.263	292	302	1.4%	2.09 [1.25 , 3.50]
Stebbins 2011	-0.211	0.212	1695	1665	2.0%	0.81 [0.53 , 1.23]
Zomer 2015	0.068	0.052	278	267	10.2%	1.07 [0.97 , 1.19]
Total (95% CI)			**30282**	**31090**	**100.0%**	**0.89 [0.84 , 0.95]**

Heterogeneity: $Tau^2 = 0.01$; $Chi^2 = 65.64$, df = 16 ($P < 0.00001$); $I^2 = 76\%$

Test for overall effect: Z = 3.38 (P = 0.0007)

Test for subgroup differences: Not applicable

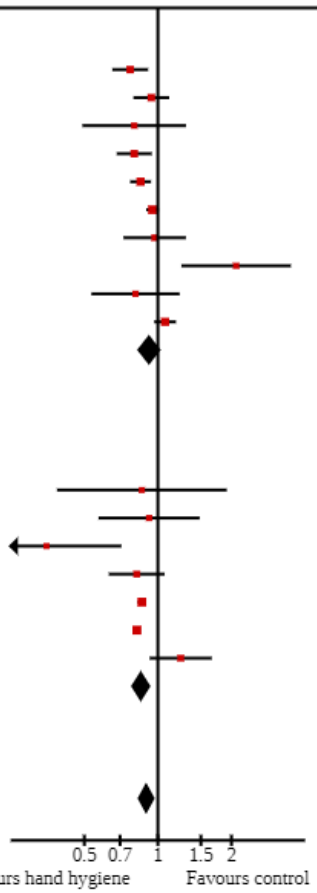


Footnotes

(1) Azor 2018 included 2 treatment groups: soap and water (RR 0.94); and hand sanitizer (RR 0.77)

Analysis 3.4. Comparison 3: Randomised trials: hand hygiene compared to control, Outcome 4: ARI or ILI or influenza: subgroup analysis

Study or Subgroup	log[RR]	SE	Hand hygiene Total	Control Total	Weight	Risk Ratio IV, Random, 95% CI
3.4.1 Children						
Azor-Martinez 2018 (1)	-0.261	0.086	339	149	7.1%	0.77 [0.65 , 0.91]
Azor-Martinez 2018	-0.062	0.086	274	149	7.1%	0.94 [0.79 , 1.11]
Biswas 2019	-0.223	0.249	5077	5778	1.5%	0.80 [0.49 , 1.30]
Correa 2012	-0.223	0.084	794	933	7.2%	0.80 [0.68 , 0.94]
Nicholson 2014	-0.163	0.05	847	833	10.4%	0.85 [0.77 , 0.94]
Roberts 2000	-0.051	0.03	299	259	12.3%	0.95 [0.90 , 1.01]
Sandora 2005	-0.03	0.15	602	451	3.5%	0.97 [0.72 , 1.30]
Simmerman 2011	0.737	0.263	292	302	1.4%	2.09 [1.25 , 3.50]
Stebbins 2011	-0.211	0.212	1695	1665	2.0%	0.81 [0.53 , 1.23]
Zomer 2015	0.068	0.052	278	267	10.2%	1.07 [0.97 , 1.19]
Subtotal (95% CI)			**10497**	**10786**	**62.8%**	**0.92 [0.84 , 1.01]**
Heterogeneity: Tau² = 0.01; Chi² = 29.46, df = 9 (P = 0.0005); I² = 69%						
Test for overall effect: Z = 1.79 (P = 0.07)						
3.4.2 Adults						
Cowling 2008	-0.151	0.408	84	205	0.6%	0.86 [0.39 , 1.91]
Cowling 2009	-0.083	0.243	257	279	1.6%	0.92 [0.57 , 1.48]
Hubner 2010	-1.05	0.36	64	65	0.8%	0.35 [0.17 , 0.71]
Larson 2010	-0.199	0.134	946	904	4.2%	0.82 [0.63 , 1.07]
Little 2015	-0.151	0.02	8241	8667	13.1%	0.86 [0.83 , 0.89]
Millar 2016	-0.198	0.016	10000	10000	13.3%	0.82 [0.80 , 0.85]
Ram 2015	0.215	0.149	193	184	3.6%	1.24 [0.93 , 1.66]
Subtotal (95% CI)			**19785**	**20304**	**37.2%**	**0.85 [0.79 , 0.92]**
Heterogeneity: Tau² = 0.00; Chi² = 16.39, df = 6 (P = 0.01); I² = 63%						
Test for overall effect: Z = 4.22 (P < 0.0001)						
Total (95% CI)			**30282**	**31090**	**100.0%**	**0.89 [0.84 , 0.95]**
Heterogeneity: Tau² = 0.01; Chi² = 65.64, df = 16 (P < 0.00001); I² = 76%						
Test for overall effect: Z = 3.38 (P = 0.0007)						
Test for subgroup differences: Chi² = 1.59, df = 1 (P = 0.21), I² = 37.2%						

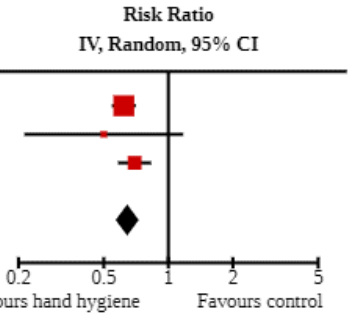


Footnotes

(1) Azor 2018 includes 2 intervnetion groups: soap and water (RR 0.94) and hand sanitizer (RR 0.77)

Analysis 3.5. Comparison 3: Randomised trials: hand hygiene compared to control, Outcome 5: Absenteeism

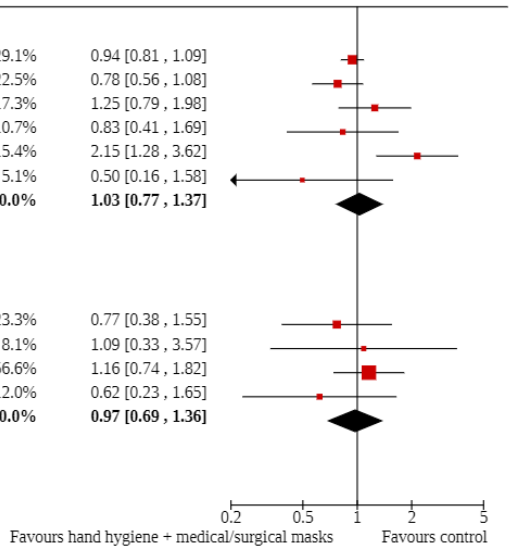
Study or Subgroup	log[RR]	SE	Hand Hygiene Total	Control Total	Weight	Risk Ratio IV, Random, 95% CI
Azor-Martinez 2016	-0.478	0.065	621	720	64.8%	0.62 [0.55 , 0.70]
Hubner 2010	-0.693	0.435	64	65	1.4%	0.50 [0.21 , 1.17]
Nicholson 2014	-0.362	0.09	847	833	33.8%	0.70 [0.58 , 0.83]
Total (95% CI)			**1532**	**1618**	**100.0%**	**0.64 [0.58 , 0.71]**
Heterogeneity: Tau² = 0.00; Chi² = 1.43, df = 2 (P = 0.49); I² = 0%						
Test for overall effect: Z = 8.45 (P < 0.00001)						
Test for subgroup differences: Not applicable						



STUDY DETAILS: Jefferson 2020				
Hand hygiene + medical/surgical masks compared to control				
Number of cases of influenza like illness N = 4504 (3 RCTs)			1.03 (0.69, 1.53)	four of these trials were in households, two in university student residences, and one at the annual Hajj pilgrimage. For both outcomes (ILI and influenza), pooling demonstrated an estimate of effect suggesting little or no difference between the hand hygiene and medical/surgical mask combination and control.
Number of cases of laboratory confirmed illness N = 3121 (3 RCTs)			0.99 (0.69, 1.44)	
Adverse events				Adverse events associated with mask wearing consistent with first comparison.

Analysis 4.1. Comparison 4: Randomised trials: hand hygiene + medical/surgical masks compared to control, Outcome 1: Viral illness

Study or Subgroup	log[RR]	SE	Hand hygiene + medical/surgical masks Total	Control Total	Weight	Risk Ratio IV, Random, 95% CI
4.1.1 Influenza-like illness						
Aelami 2015	-0.062	0.075	306	358	29.1%	0.94 [0.81 , 1.09]
Aiello 2012	-0.25	0.165	349	370	22.5%	0.78 [0.56 , 1.08]
Cowling 2009	0.223	0.235	258	279	17.3%	1.25 [0.79 , 1.98]
Larson 2010	-0.185	0.363	938	904	10.7%	0.83 [0.41 , 1.69]
Simmerman 2011	0.765	0.266	291	302	15.4%	2.15 [1.28 , 3.62]
Suess 2012	-0.7	0.59	67	82	5.1%	0.50 [0.16 , 1.58]
Subtotal (95% CI)			**2209**	**2295**	**100.0%**	**1.03 [0.77 , 1.37]**
Heterogeneity: Tau² = 0.07; Chi² = 13.52, df = 5 (P = 0.02); I² = 63%						
Test for overall effect: Z = 0.18 (P = 0.86)						
4.1.2 Laboratory-confirmed Influenza						
Cowling 2009	-0.261	0.358	258	279	23.3%	0.77 [0.38 , 1.55]
Larson 2010	0.082	0.607	938	904	8.1%	1.09 [0.33 , 3.57]
Simmerman 2011	0.148	0.23	291	302	56.6%	1.16 [0.74 , 1.82]
Suess 2012	-0.48	0.5	67	82	12.0%	0.62 [0.23 , 1.65]
Subtotal (95% CI)			**1554**	**1567**	**100.0%**	**0.97 [0.69 , 1.36]**
Heterogeneity: Tau² = 0.00; Chi² = 1.86, df = 3 (P = 0.60); I² = 0%						
Test for overall effect: Z = 0.16 (P = 0.87)						

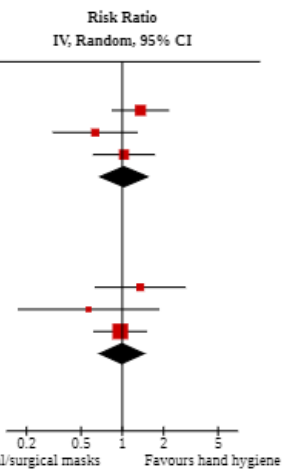


Hand hygiene + medical/surgical masks compared to hand hygiene				
Number of cases of influenza like illness N = 2982 (3 RCTs)			1.03 (0.69, 1.53)	All three studies showed no difference between hand hygiene plus medical/surgical mask groups and hand hygiene alone, for all outcomes. The estimates of effect suggested little or no difference when adding masks to hand hygiene compared to hand hygiene alone:

STUDY DETAILS: Jefferson 2020				
Number of cases of laboratory confirmed illness N = 2982 (3 RCTs)			0.99 (0.69,1.44)	

Analysis 5.1. Comparison 5: Randomised trials: hand hygiene + medical/ surgical masks compared to hand hygiene, Outcome 1: Viral illness

Study or Subgroup	log[RR]	SE	Hand hygiene + medical/surgical masks Total	Hand hygiene Total	Weight	Risk Ratio IV, Random, 95% CI
5.1.1 Influenza-like illness						
Cowling 2009	0.307	0.243	258	257	40.3%	1.36 [0.84 , 2.19]
Larson 2010	-0.456	0.363	938	946	23.6%	0.63 [0.31 , 1.29]
Simmerman 2011	0.028	0.266	291	292	36.2%	1.03 [0.61 , 1.73]
Subtotal (95% CI)			**1487**	**1495**	**100.0%**	**1.03 [0.69 , 1.53]**
Heterogeneity: Tau² = 0.04; Chi² = 3.07, df = 2 (P = 0.22); I² = 35%						
Test for overall effect: Z = 0.13 (P = 0.90)						
5.1.2 Laboratory-confirmed influenza						
Cowling 2009	0.301	0.39	258	257	23.3%	1.35 [0.63 , 2.90]
Larson 2010	-0.566	0.607	938	946	9.6%	0.57 [0.17 , 1.87]
Simmerman 2011	-0.034	0.23	291	292	67.1%	0.97 [0.62 , 1.52]
Subtotal (95% CI)			**1487**	**1495**	**100.0%**	**0.99 [0.69 , 1.44]**
Heterogeneity: Tau² = 0.00; Chi² = 1.49, df = 2 (P = 0.48); I² = 0%						
Test for overall effect: Z = 0.04 (P = 0.97)						



Medical/surgical masks compared to other (non-N95 masks)			
Numbers of cases of viral illness (including ARIs, ILI, and laboratory confirmed influenza) NR (2 RCTs)	One study found that the rate of ILI was higher in the cloth mask arm compared to the medical/surgical masks arm Another study did not find a benefit from the catechin-treated masks over untreated masks on influenza infection rates	RR 13.25, 95% CI 1.74, 100.97 OR: 2.35, 95% CI 0.40, 13.72	 *p* = 0.34
Adverse events NR (2 RCTs)	One study found adverse events associated with face mask use were reported in 40.4% (227/562) of HCWs in the medical/surgical mask arm and 42.6% (242/568) in the cloth mask arm (*p* = 0.45). The most frequently reported adverse events were general discomfort (35.1%; 397/1130) and breathing problems (18.3%; 207/1130). Another reported no serious adverse events.		
Soap and water compared to sanitised and comparisons of different types of sanitiser			
Numbers of cases of viral illness (including ARIs, ILI, and laboratory confirmed influenza) NR (4 RCTs)		Rate ratio 1.21, 95% CI 1.06, 1.39	In one trial, ARI incidence was significantly higher in the soap-and-water group compared with the hand sanitiser group. In contrast, there was no significant difference between interventions in another trial. In the rhinovirus challenge study, all hand sanitisers tested led to a significant lowering of infection rates, but no differences between sanitisers were observed.
Absenteeism NR (1 RCT)	One study observed a significant benefit for hand sanitiser in reduction in days absent, whereas there was no difference between intervention groups in the Savolainen-Kopra 2012 trial. The study on frequency of use of sanitiser found that use of sanitiser every hour significantly reduced days absent compared with use every two hours or with use only before the lunch break.		

STUDY DETAILS: Jefferson 2020			
Surface/object disinfection (with or without hand hygiene) compared to control			
Numbers of cases of viral illness (including ARIs, ILI, and laboratory confirmed influenza) NR (6 RCTs)		OR 0.47, 95% CI 0.48, 0.65	One study utilised a combination of provision of hand hygiene products, and cleaning and disinfection of surfaces, and demonstrated a significant reduction in ARI in the intervention group One trial compared disinfection alone to usual care. This study demonstrated a significant reduction in some viruses detected on surfaces in the childcare centres (adenovirus, rhinovirus, respiratory syncytial virus (RSV), and metapneumovirus), but not in other viruses, including coronavirus.
Absenteeism		Rate ratio for intervention to control 1.10, 95% CI 0.97, 1.24	No significant difference between groups for the outcome of absence due to respiratory illness
Complex interventions compared to control ***Complex interventions are either multifaceted environmental programmes (such as those in low-income countries) or combined interventions including hygiene measures and gloves, gowns, and masks.***			
Numbers of cases of viral illness (including ARIs, ILI, and laboratory confirmed influenza) NR (4 RCTs)	Four trials studied complex hygiene and sanitation interventions in low-income country settings. All four trials of complex interventions observed no significant differences between groups in rates of viral respiratory illness.		
Physical distancing/quarantine compared to control			
Numbers of cases of viral illness (including ARIs, ILI, and laboratory confirmed influenza) NR (1 RCT)	One quasi-cluster-RCT assessing the effectiveness of quarantining workers found in the intervention group 2.75% of workers contracted influenza, compared with 3.18% in the control group However, the risk of a worker being infected was 2.17-fold higher in the intervention group where workers stayed at home with their infected family members. .		Cox hazard ratio 0.799, 95% CI 0.66 to 0.97; *p* = 0.02), indicating that the rate of infection was reduced by 20% in the intervention group
Gargling compared to control			
Numbers of cases of viral illness (including ARIs, ILI, and laboratory confirmed influenza) N = 830 (3 RCTs)	In a meta-analysis of gargling versus control based on two trials (Goodall 2014; Satomura 2005), the pooled estimate of effect suggested little or no difference for the outcome of clinical URTI due to gargling	0.91 (0.63,1.31)	
Severity of viral illness N = 830 (3 RCTs)	Satomura 2005 reported that the mean peak score in bronchial symptoms was lower in the water gargling group (0.97) than in the povidone-iodine gargling group (1.41) and the control group (1.40)	*P* = 0.055.	

STUDY DETAILS: Jefferson 2020			
	Goodall 2014 reported that symptom severity was greater in the gargling group for clinical and laboratory confirmed URTI, but this was not statistically significant (225.3 versus 191.8, and 210.5 versus 191.8, respectively).		

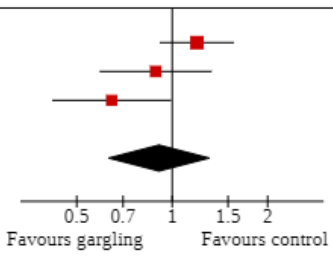
Analysis 6.1. Comparison 6: Randomised trials: gargling compared to control, Outcome 1: Viral illness

Study or Subgroup	log[RR]	SE	Gargling Total	Control Total	Weight	Risk Ratio IV, Random, 95% CI
Goodall 2014	0.18	0.137	256	236	39.5%	1.20 [0.92 , 1.57]
Satomura 2005	-0.12	0.207	119	58	31.0%	0.89 [0.59 , 1.33]
Satomura 2005 (1)	-0.44	0.22	104	57	29.5%	0.64 [0.42 , 0.99]
Total (95% CI)			**479**	**351**	**100.0%**	**0.91 [0.63 , 1.31]**

Heterogeneity: $Tau^2 = 0.07$; $Chi^2 = 6.01$, df = 2 (P = 0.05); $I^2 = 67\%$

Test for overall effect: Z = 0.52 (P = 0.61)

Test for subgroup differences: Not applicable



Footnotes

(1) Satomura 2005 included 2 intervention groups

Virucidal tissues compared to control			
Numbers of cases of viral illness (including ARIs, ILI, and laboratory confirmed influenza) NR (3 RCTs)			The three trials of virucidal tissues reported no differences in infection rates between tissues and placebo, and between tissues and no tissues
Adverse events NR (1 RCT)			One study reported cough in 4% of participants using virucidal tissues versus 57% in the placebo group, but 24% reported nasal burning in the virucidal tissue group versus 8% in the placebo group.

Additional comments

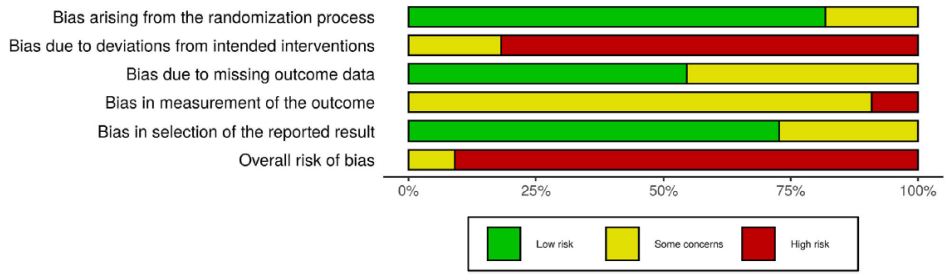
Authors conclusions:

Evidence summarised in this review on the use of masks is largely based on studies conducted during traditional peak respiratory virus infection seasons up until 2016. The observed lack of effect of mask wearing in interrupting the spread of influenza or ILI can be attributed to flaws in study design and flaws with compliance and style of mask worn.

Findings show that hand hygiene has a modest effect as a physical intervention to interrupt the spread of respiratory viruses. Studies had a high heterogeneity which may suggest there are differences in the effect of different interventions. There are few trials comparing hand hygiene maters (e.g. alcohol-based sanitizer or soap and water). Hand hygiene intervention requires high compliance. There is little evidence of effectiveness of combinations of hand hygiene with other interventions. Findings with respect to hand hygiene should be considered generally relevant to all viral respiratory infections, given the diverse populations where transmission occurs.

The highest-quality cluster RCT's indicate that the most effect on preventing respiratory virus spread from hygienic measures occurs in younger children. Additional benefit from reduced transmission from them to other members of the household is broadly supported by the results of other study designs where the potential for confounding is greater.

STUDY DETAILS: Jefferson 2020
CI, confidence interval; ITT, intention-to-treat; MD, mean difference; PP, per-protocol; RCT, randomised controlled trial; RR, relative risk; SD, standard deviation

STUDY DETAILS: Nanda 2021			
Citation			
Nanda, A., Hung, I., Kwong, A., Man, V. C., Roy, P., Davies, L., & Douek, M. (2021). Efficacy of surgical masks or cloth masks in the prevention of viral transmission: Systematic review, meta-analysis, and proposal for future trial. Journal of evidence-based medicine. https://doi.org/10.1111/jebm.12424			
Affiliation/Source of funds			
Details on funding not provided. All authors affiliated with the University of Oxford or The University of Hong Kong The authors declared no conflicts of interest.			
Study design	**Level of evidence**	**Location**	**Setting**
Systematic review	I	USA, Saudi Arabia, France, Hong Kong, Australia, Thailand, Germany	Community Households University residence halls Hajj mass gathering
Prognostic factor		**Comparator**	
Facemask Facemask with or without hand hygiene Facemask and hand hygiene		N/A	
Population characteristics			
Any person at risk of SARS-CoV-2 infection			
Length of follow-up		**Outcomes measured**	
A systematic review of the literature was performed using PubMed, Cochrane CENTRAL, and Embase with the last search being performed on 15 August 2020. Studies of SARS-CoV-2 and facemasks and randomized controlled trials (RCTs) of n≥50 for other respiratory illnesses were included. Except for English language, no further restrictions were added to the search.		Laboratory confirmed respiratory viral illness Influenza like illness	
INTERNAL VALIDITY			
Overall risk of bias (descriptive)			
Rating: Moderate More than one non-critical weakness – the systematic review has more than one weakness but no critical flaws. It *may* provide an accurate summary of the results of the available studies that were included in the review. *Included studies:*  			

STUDY DETAILS: Nanda 2021		
RESULTS:		
Outcome **No. participants (No. trials)**	**Risk estimate (95% CI)**	**Statistical significance (p-*value*)** **Heterogeneity[a]** ***I²* (p-*value*)**
Facemask use with or without hand hygiene vs no mask		
Laboratory confirmed respiratory viral illness NR (10 RCTs)	RR = 0.99; 95% CI: 0.98-1.01	No significant difference, *p* = 0.4 The 10 RCTs that looked at face mask use with or without hand hygiene had moderate heterogeneity that was significant (I^2=54%, *p* = .02)

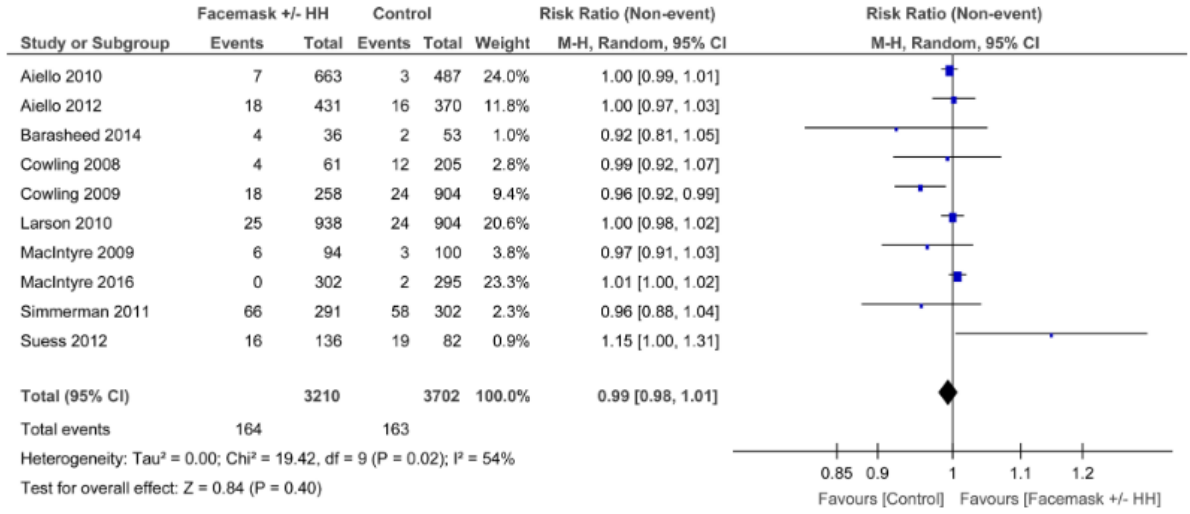


FIGURE 6 Forest plot for RCTs comparing face masks ± hand hygiene to no masks for laboratory confirmed virus

Face masks alone vs no mask		
Laboratory confirmed respiratory viral illness NR (7 RCTs))	RR=1.00, 95% CI: 0.98-1.02	No significant difference, *p* = 0.93 There was moderate heterogeneity that was not significant (I^2 = 53%, *p* = 0.05) among the 7 RCT's for facemasks alone.

STUDY DETAILS: Nanda 2021

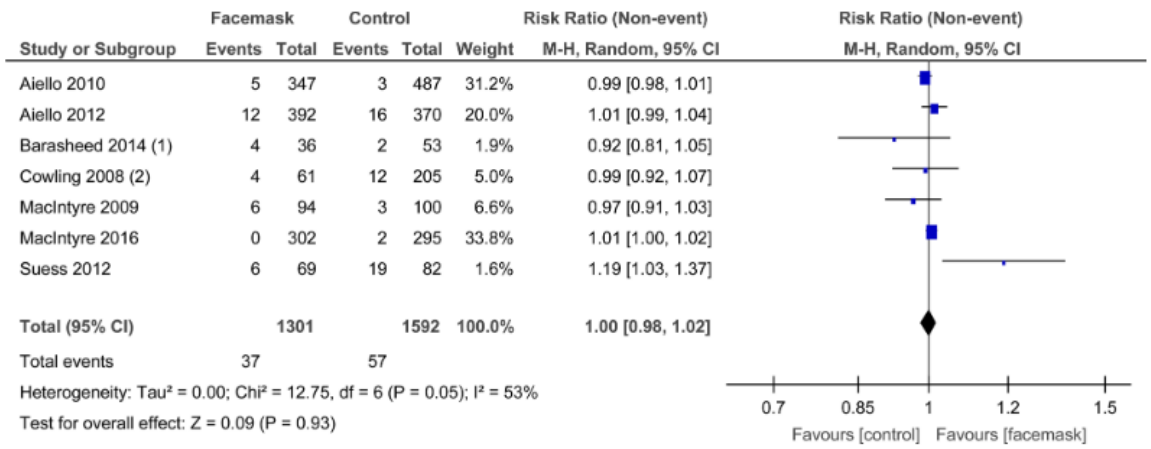


FIGURE 7 Forest plot for RCTs comparing face masks alone to no masks for laboratory confirmed virus

Facemask with hand hygiene vs no mask

Laboratory confirmed respiratory viral illness NR (6 RCTs)	RR 1.01 (95% CI 0.99, 1.02)	No significant benefit There was moderate heterogeneity that was not significant (I^2 = 40%, p = 0.14) among the six RCTs

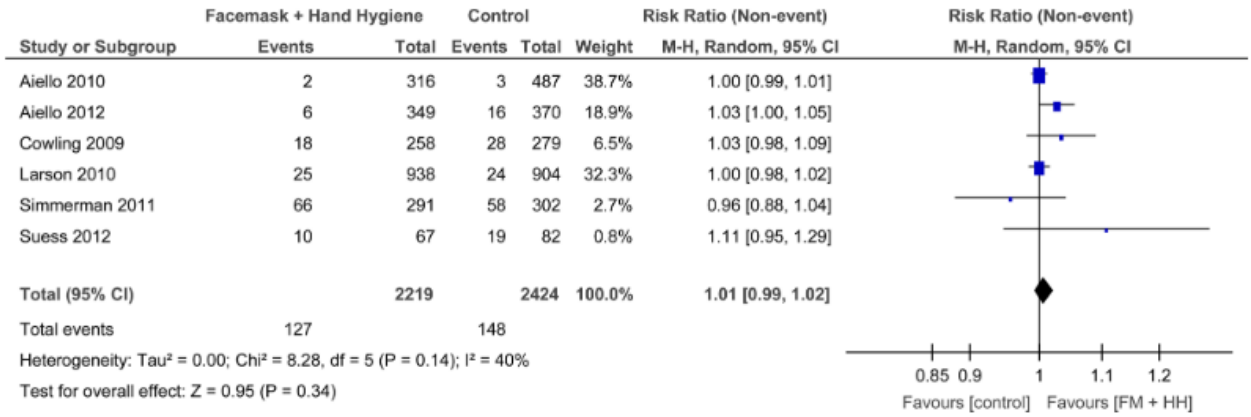


FIGURE 8 Forest plot for RCTs comparing face masks + hand hygiene to no masks for laboratory confirmed virus

Facemask use with or without hand hygiene vs no mask

Influenza like illness symptoms NR (11 RCTs)	RR = 1.03, 95% CI: 0.98-1.07	No difference in mask use and no mask groups, p = 0.22 There was significant heterogeneity (I^2=84%, p < .001)

STUDY DETAILS: Nanda 2021

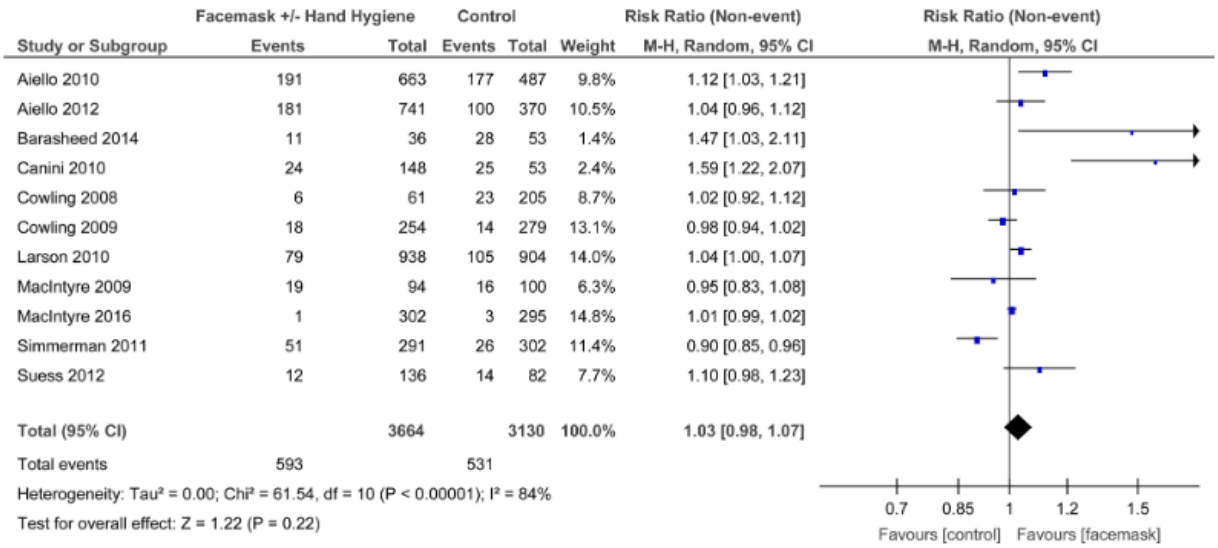


FIGURE 9 Forest plot for RCTs comparing face masks ± hand hygiene to no masks for influenza-like-illness symptoms

Face masks alone vs no mask		
Influenza like illness symptoms N = 8 RCTs (no. of studies)	RR = 1.03 (95% CI 0.97, 1.09)	No significant difference, $p = 0.33$ There was substantial heterogeneity that was significant ($I^2 = 72\%$, $p < 0.0008$).

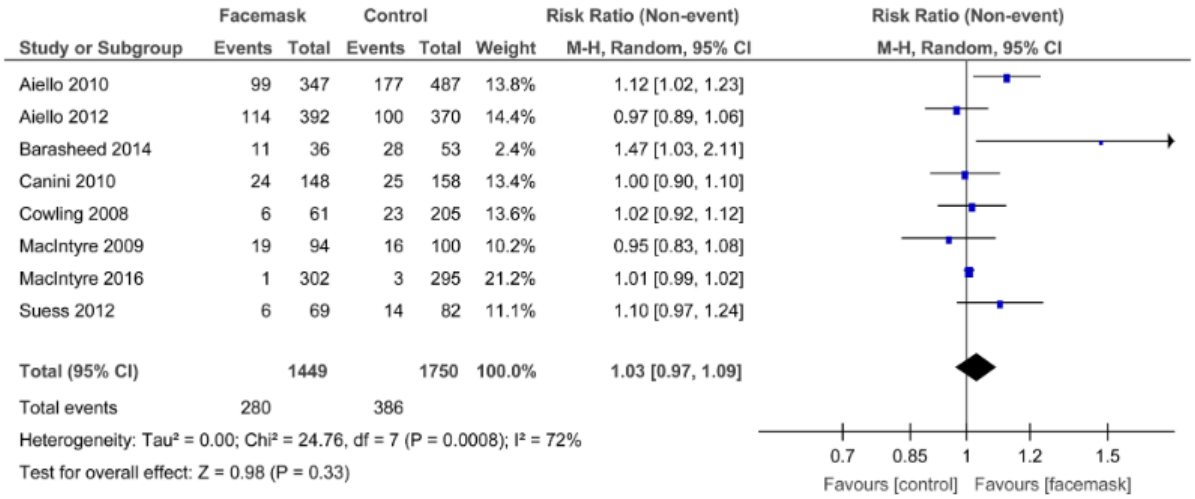
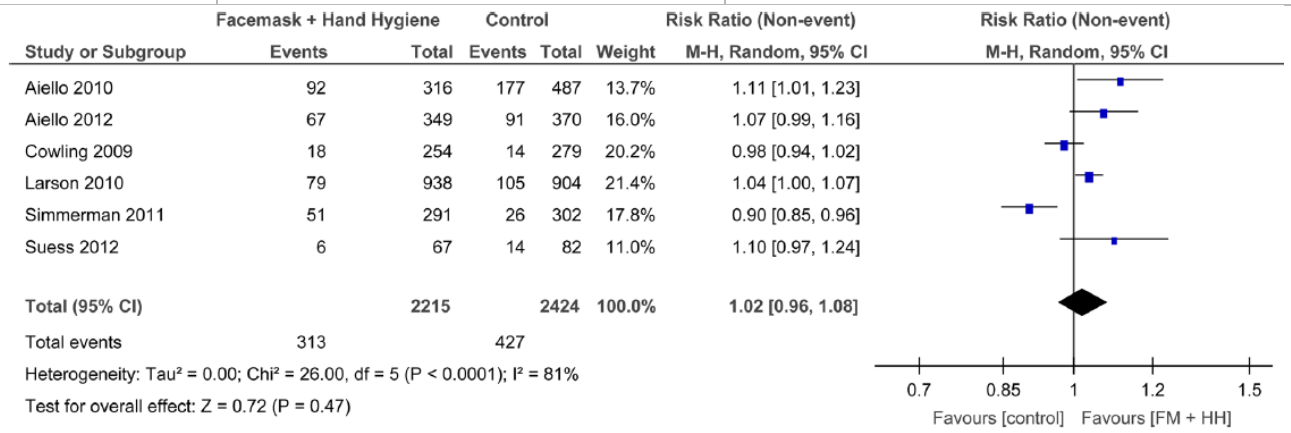


FIGURE 10 Forest plot for RCTs comparing face masks alone to no masks for influenza-like-illness symptoms

Facemask with hand hygiene vs no mask		
Influenza like illness symptoms NR (6 RCTs)	RR 1.02 (95% CI 0.96, 1.08)	No significant benefit of masks plus hand hygiene, $p = 0.47$ There was substantial heterogeneity that was significant ($I^2 = 81\%$, $p < .0001$) amongst the six RCTs

STUDY DETAILS: Nanda 2021



Study or Subgroup	Facemask + Hand Hygiene Events	Total	Control Events	Total	Weight	Risk Ratio (Non-event) M-H, Random, 95% CI
Aiello 2010	92	316	177	487	13.7%	1.11 [1.01, 1.23]
Aiello 2012	67	349	91	370	16.0%	1.07 [0.99, 1.16]
Cowling 2009	18	254	14	279	20.2%	0.98 [0.94, 1.02]
Larson 2010	79	938	105	904	21.4%	1.04 [1.00, 1.07]
Simmerman 2011	51	291	26	302	17.8%	0.90 [0.85, 0.96]
Suess 2012	6	67	14	82	11.0%	1.10 [0.97, 1.24]
Total (95% CI)		**2215**		**2424**	**100.0%**	**1.02 [0.96, 1.08]**
Total events	313		427			

Heterogeneity: Tau² = 0.00; Chi² = 26.00, df = 5 (P < 0.0001); I² = 81%

Test for overall effect: Z = 0.72 (P = 0.47)

Cloth masks

1 cluster RCT comparing the efficacy of cloth masks and medical face masks	Surgical masks: ILI: 1/580 Lab confirmed: 13/569	Cloth Masks: ILI: 19/580 Lab confirmed: 31/569	ILI: RR = 6.64, 95% CI: 1.45-28.65 Laboratory confirmed virus: RR = 1.72, 95% CI: 1.01-2.94	Significant benefit of surgical masks compared to cloth masks in reducing ILI

Additional comments

Authors conclusions:

The published preclinical body of evidence that directly investigates SARS-CoV-2 and masks is limited, authors identified one, which was of high quality in verified animal model for SARS-CoV-2 and suggests benefit of surgical masks in limiting the transmission of SARS-CoV-2. No such study with cloth masks has been performed to date but would be useful to perform.

There is currently no published evidence from randomized trials studying face masks to prevent SARS-CoV-2 transmission.

11 RCTs studies mask use in preventing transmission of respiratory illnesses (synthesised in meta-analysis shown above). The results of the meta-analysis show no statistically significant benefit of surgical-mask use when used with or without hand hygiene for influenza like illness symptom reporting nor laboratory confirmed viral illnesses.

Overall, the available preclinical findings limited clinical and indirect evidence suggests biological plausibility that face masks may reduce the spread of SARS-CoV-2. The available clinical trial evidence shows no significant difference in limiting transmission respiratory viral illnesses, but the evidence is of poor quality. All current evidence focuses on protection for the wearer not on controlling spread. There is an urgent need for randomized controlled trials to investigate the impact of surgical and cloth masks on transmission of SARS-CoV-2 and user reported outcomes such as comfort and compliance.

CI, confidence interval; ILI, influenza-like illness; RCT, randomised controlled trial; RR, relative risk

a. Only applicable to systematic reviews with formal meta-analysis. Heterogeneity defined as follows: (i) no significant heterogeneity if P_{het} > 0.1 and I^2 < 25%; (ii) mild heterogeneity if I^2 < 25%; moderate heterogeneity if I^2 between 25–50%; substantial heterogeneity I^2 > 50%.

STUDY DETAILS: Xiao 2020

Citation

Xiao J, Shiu EYC, Gao H, Wong JY, Fong MW, Ryu S, Cowling BJ. Nonpharmaceutical Measures for Pandemic Influenza in Nonhealthcare Settings-Personal Protective and Environmental Measures. Emerg Infect Dis. 2020 May;26(5):967-975. doi: 10.3201/eid2605.190994. Epub 2020 May 17. PMID: 32027586; PMCID: PMC7181938.

STUDY DETAILS: Xiao 2020			
Affiliation/Source of funds			
The study was funded by the World Health Organization. J.X. and M.W.F were supported by the Collaborative Research Fund from the University Committee of Hong Kong All authors affiliated with the University of Hong Kong, Hong Kong, China This study was conducted in preparation for the development of guidelines by the World Health Organization on the use of nonpharmaceutical interventions for pandemic influenza in nonmedical settings			
Study design	**Level of evidence**	**Location**	**Setting**
Systematic review and meta-analysis of observational studies	I	USA, Thailand, Bangladesh, Hong Kong, Germany, Egypt, Saudi Arabia, Australia, Finland, Denmark	Community settings
Prognostic factor		**Comparator**	
Effectiveness of nonpharmaceutical personal protective measures and environmental hygiene measures in non-healthcare settings Includes: Hand Hygiene, Respiratory etiquette, Face masks, Surface and object cleaning		N/A	
Population characteristics			
NR, assumed community			
Length of follow-up		**Outcomes measured**	
Medline, PubMed, EMBASE, and CENTRAL were search for literature in all languages for RCTs on 14 August 2018 to identify literatures that were available during January 1, 2013–August 13, 2018. For hand hygiene, Wong 2014 was used as the reference base of the review.		Incidence of laboratory confirmed influenza For respiratory etiquette and surface and object cleaning: also included incidence of influenza-like illness and respiratory illness outcomes	
INTERNAL VALIDITY			
Overall quality (AMSTAR)			
Rating: Moderate More than one non-critical weakness – the systematic review has more than one weakness but no critical flaws. It *may* provide an accurate summary of the results of the available studies that were included in the review. *Included studies:* No serious risk of bias is recorded for hand hygiene and face mask studies. The overall quality of respiratory etiquette and surface and object cleaning are not reported.			
RESULTS:			
Outcome **No. patients** **(No. trials)**	**[intervention]** **n/N (%)** **Mean ± SD**	**[comparator]** **n/N (%)** **Mean ± SD**	**Risk estimate (95% CI)**	**Statistical significance** ***p*-value** **Heterogeneity[a]** ***I*² (*p-value*)**
Hand hygiene versus control				
Effect of hand hygiene only prevention of laboratory-confirmed influenza	Authors did not generate an overall pooled effect of hand hygiene only or of hand hygiene with or without face mask because of high heterogeneity in individual estimates			
Hand hygiene with or without face mask versus control				
Effect of hand hygiene intervention on prevention of laboratory-confirmed influenza NR 10 RCTs	434/6478 (6.7%)	504/5392 (9.3%)	RR 0.91, 95% CI 0.73, 1.13	No statistical significance, $p = 0.30$ $I^2 = 35$

STUDY DETAILS: Xiao 2020

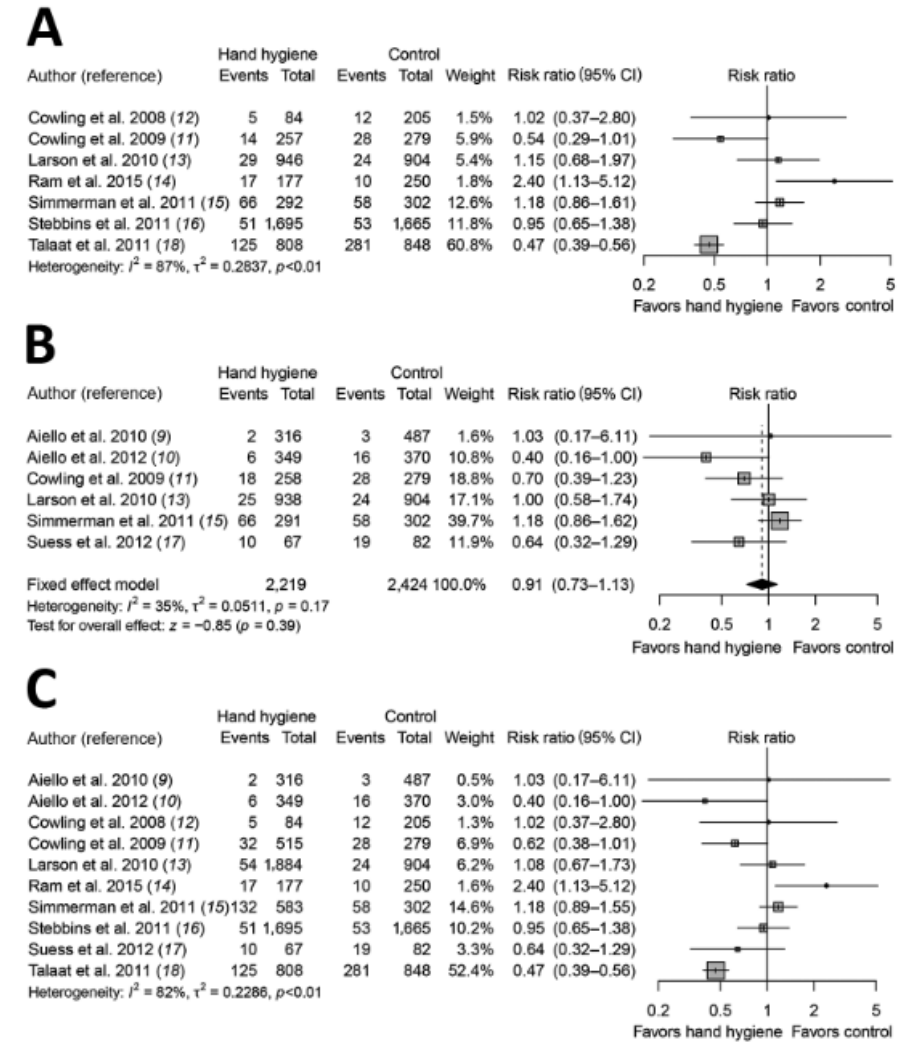
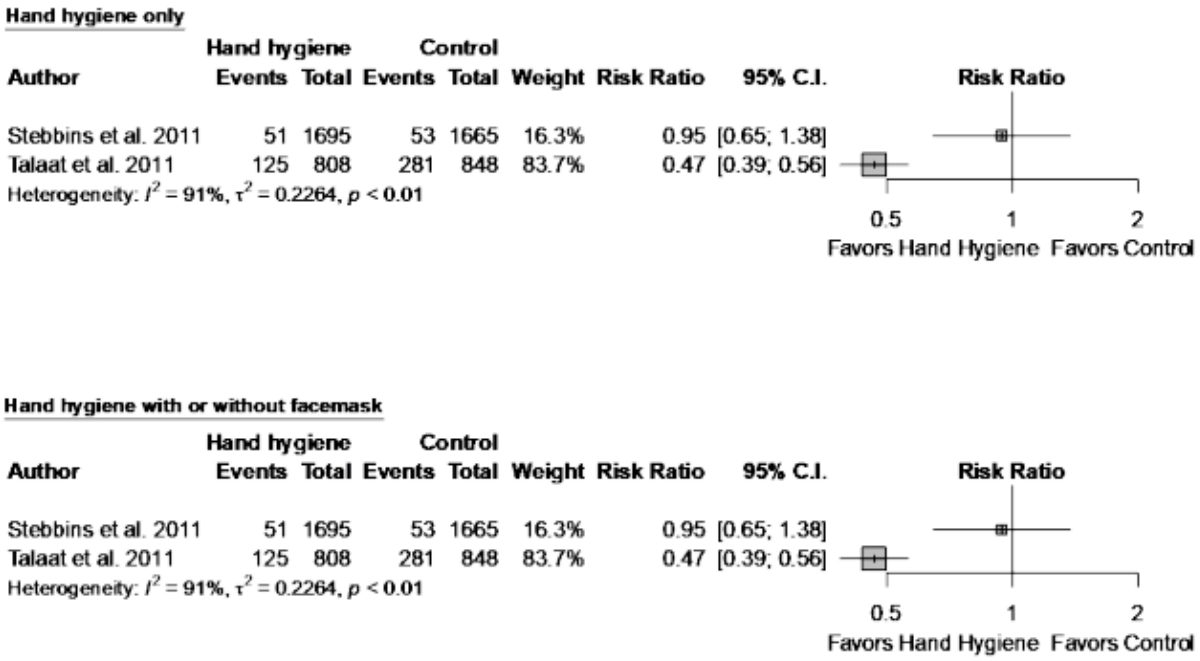


Figure 1. Meta-analysis of risk ratios for the effect of hand hygiene with or without face mask use on laboratory-confirmed influenza from 10 randomized controlled trials with >11,000 participants. A) Hand hygiene alone; B) hand hygiene and face mask; C) hand hygiene with or without face mask. Pooled estimates were not made if there was high heterogeneity (I^2 ≥75%). Squares indicate risk ratio for each of the included studies, horizontal line indicates 95% CIs, dashed vertical line indicates pooled estimation of risk ratio, and diamond indicates pooled estimation of risk ratio. Diamond width corresponds to the 95% CI.

Effect of hand hygiene by setting – elementary school

STUDY DETAILS: Xiao 2020



Appendix Figure 5. Metaanalysis of risk ratios for the effect of hand hygiene with or without face mask use on laboratory-confirmed influenza in elementary school setting.

Respiratory Etiquette - covering the nose and mouth with a tissue or a mask (but not a hand) when coughing or sneezing, followed by proper disposal of used tissues, and proper hand hygiene after contact with respiratory secretions				
Effect of respiratory etiquette on prevention of laboratory-confirmed influenza NR 2 studies				No research was identified evaluating the effectiveness of respiratory etiquette on influenza transmission
Facemasks				
Effect of face masks on prevention of laboratory-confirmed influenza NR 10 studies	156/3495	161/3052	RR 0.92 (0.75–1.12)	No substantial effect, p = 0.25 I^2 = 30%

STUDY DETAILS: Xiao 2020

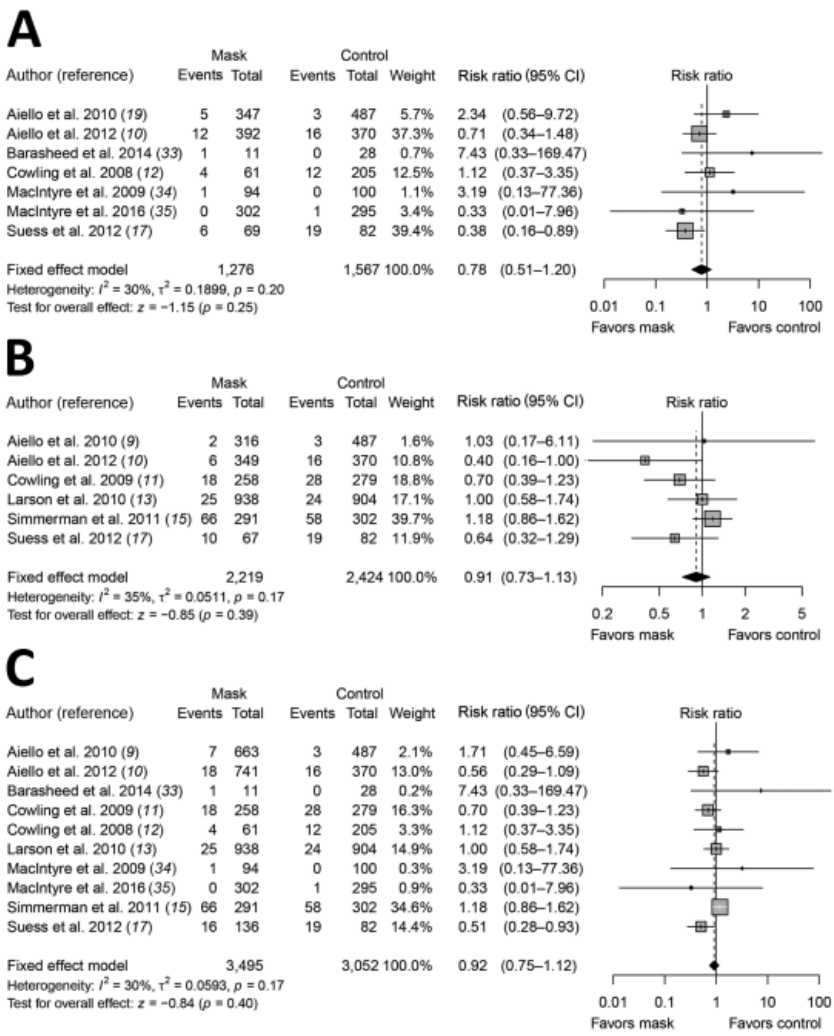


Figure 2. Meta-analysis of risk ratios for the effect of face mask use with or without enhanced hand hygiene on laboratory-confirmed influenza from 10 randomized controlled trials with >6,500 participants. A) Face mask use alone; B) face mask and hand hygiene; C) face mask with or without hand hygiene. Pooled estimates were not made if there was high heterogeneity (I^2 ≥75%). Squares indicate risk ratio for each of the included studies, horizontal lines indicate 95% CIs, dashed vertical lines indicate pooled estimation of risk ratio, and diamonds indicate pooled estimation of risk ratio. Diamond width corresponds to the 95% CI.

Effect of surface and object cleaning on prevention of laboratory-confirmed influenza 3 studies 2 RCT and 1 observational study	One RCT conducted in day care nurseries found that bi-weekly cleaning and disinfection of toys and linen reduced the detection of multiple viruses, including adenovirus, rhinovirus, and respiratory syncytial virus in the environment, but this intervention was not significant in reducing detection of influenza virus, and it had no major protective effect on acute respiratory illness Another RCT found that hand hygiene with hand sanitizer together with surface disinfection reduced absenteeism related to gastrointestinal illness in elementary schools, but there was no major reduction in absenteeism related to respiratory illness A cross-sectional study found that passive contact with bleach was associated with a major increase in self-reported influenza	There was a limited amount of evidence suggesting that surface and object cleaning does not have a substantial effect on influenza transmission

Additional comments

Authors conclusions:

Evidence from RCTs of hand hygiene or face masks did not support a substantial effect on transmission of laboratory-confirmed influenza, and limited evidence was available on other environmental measures.

STUDY DETAILS: Krishnaratne 2022			
Citation			
Krishnaratne S, Littlecott H, Sell K, Burns J, Rabe JE, Stratil JM, Litwin T, Kreutz C, Coenen M, Geffert K, Boger AH, Movsisyan A, Kratzer S, Klinger C, Wabnitz K, Strahwald B, Verboom B, Rehfuess E, Biallas RL, Jung-Sievers C, Voss S, Pfadenhauer LM. Measures implemented in the school setting to contain the COVID-19 pandemic. Cochrane Database of Systematic Reviews 2022, Issue 1. Art. No.: CD015029.			
Affiliation/Source of funds			
Author affiliations: Institute for Medical Information Processing, Biometry and Epidemiology - IBE, Chair of Public Health and Health Services Research, LMU Munich, Munich, Germany. Pettenkofer School of Public Health, Munich, Germany. Department of Disease Control, Faculty of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, London, UK. DECIPHer, School of Social Sciences, Cardiff University, Cardiff, UK. Institute of Medical Biometry and Statistics (IMBI), Freiburg Center for Data Analytics and Modeling (FDM), Faculty of Medicine and Medical Center, Albert-Ludwig-University, Freiburg, Germany			
Study design	**Level of evidence**	**Location**	**Setting**
SR	I	North America, South America, Europe and China	School
Prognostic factor		**Comparator**	
Measures reducing the opportunity for contacts Measures making contacts safer Surveillance and response measures Multicomponent measures			
Population characteristics			
those directly impacted in the school setting, such as students, their teachers, and other school staff. Other populations impacted less directly and outside of the school setting include carers, families and friends of students, as well as members of the wider community in which schools are embedded.			
Length of follow-up		**Outcomes measured**	
Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Embase, and the Educational Resources Information Center, as well as COVID-19-specific databases, including the Cochrane COVID-19 Study Register and the WHO COVID-19 Global literature on coronavirus disease (indexing preprints) were searched on 9 December 2020. Authors also conducted backward-citation searches with existing reviews.		Transmission related outcomes Healthcare utilisation Societal, economic and ecological outcomes	
INTERNAL VALIDITY			
Overall quality (AMSTAR)			
Rating: High No or one non-critical weakness – the systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest. *Risk of bias of included studies:* Included studies were assessed with the QUADAS-2 tool and ROBINS-I tool. Authors observed a general lack of external and internal validity across modelling studies. All quasi-experimental or observation studies had one or several moderate or serious risk of bias ratings in important domains, notably due to potential confounding, deviations from intended interventions, and missing data. One observational screening study was assessed as having high risk of bias.			
RESULTS: Results are presented for transmission related outcomes, study also included healthcare utilisation and societal, economic and ecological outcomes			
Measures reducing the opportunity for contacts			
Transmission related outcomes			
Number or proportion of cases (13 modelling studies)	Very low certainty of evidence		

STUDY DETAILS: Krishnaratne 2022	
	All studies except for one predicted that reducing the number of students and thus reducing the number of contacts between students led to a reduction in the number or proportion of cases. One study predicted mixed effects. The variation in the magnitude of effect might be explained by the level of community transmission, susceptibility of individuals to a SARS-CoV-2 infection as well as implementation of community-based interventions.
Risk of infection (2 modelling studies)	Very low certainty of evidence Both studies predicted that reducing the number of students and thus reducing the number of contacts between students led to a reduction in the risk of infection.
Reproduction number (6 modelling studies)	Very low certainty of evidence all but one study predicted that reducing the number of students and thus reducing the number of contacts between students led to a reduction in the reproduction number.
Number or proportion of deaths (5 modelling studies)	Very low certainty of evidence All studies predicted that reducing the number of students and thus reducing the number of contacts between students led to a reduction in the number or proportion of deaths when compared to schools operating without measures in place.
Risk of death (1 modelling study)	Very low certainty of evidence One study predicted that reducing the number of students and thus reducing the number of contacts between students led to a reduction in the risk of death in various populations (students, teachers, general population) when compared to operating schools without any measures.
Shift in pandemic development (5 modelling studies)	Very low certainty of evidence All studies predicted that reducing the number of students and thus reducing the number of contacts between students led to a positive shift in the pandemic development when compared to schools operating without measures in place.
Number or proportion of infected schools (1 modelling study)	Very low certainty of evidence One study predicted that reducing the number of students and thus reducing the number of contacts between students led to a reduction in the number of schools with at least one infected individual when compared to operating schools without any measures.
Risk of transmission to other schools (1 modelling study)	Very low certainty of evidence One study predicted that reducing the number of students and thus reducing the number of contacts between students led to a reduction in the risk of transmission to another school when compared to operating schools without measures in place
Measures making contacts safer (masks)	
Number or proportion of cases (3 modelling studies)	Very low certainty of evidence In the studies that al- low for drawing conclusions with regard to the effect of masks, wearing masks reduced the number of cases. Studies found that full school reopening with high-face-mask adherence/a mandatory mask policy, significantly reduced the increase in community infections due to school reopening
Reproduction number (1 modelling study)	Very low certainty of evidence One study showed the positive effect of a mask policy on the reproduction number.
Number or proportion of deaths (2 modelling studies)	Very low certainty of evidence Two studies examined impact of a mask policy on the number or proportion of deaths as an outcome, finding positive results
Measures making contacts safer (hand washing)	
Reproduction number (1 modelling study)	Very low certainty of evidence One study assessed the impact of handwashing on the repro- duction number and suggested no impact.
Measures making contacts safer (modification of activities)	
Reproduction number (1 modelling study)	Very low certainty of evidence One study assessed the impact of changing the length of the school day and found that keeping schools open with longer school hours (8 to 9 hours) each day would reduce R by 0.83 compared to a policy in which children go to school every other day for five hours.

STUDY DETAILS: Krishnaratne 2022	
Measures making contacts safer (ventilation)	
Concentration of aerosol particles containing RNA virus in the room and inhaled dose of RNA virus for a susceptible person (1 modelling study)	Very low certainty of evidence One study assessed the effect of four air purifiers equipped with HEPA filters in a high school classroom in Germany with an infected person in the room with regards to the inhaled dose of particles containing RNA virus. This dose is reduced by a factor of six. The density of people in the room can be considered an effect modifier.
Measures making contacts safer (combined measures)	
Number or proportion of deaths (4 modelling studies)	Very low certainty of evidence All studies looked at the impact of combined measures to make contacts safer on the number or proportion of cases and found positive results overall
Reproduction number (2 modelling study)	Very low certainty of evidence Two studies examined effective reproduction number as an outcome, with both studies finding a positive effect.
Number or proportion of deaths (2 modelling studies)	Very low certainty of evidence Two modelling studies assessed combined measures to make contacts safer on the number or proportion of deaths as an out- come, finding mixed results, one positive, and one unclear result.
Shift in pandemic development (1 modelling study)	Very low certainty of evidence One study assessing combined measures to make contacts safer compared high with low-transmission settings in primary schools. With results presented in a graphical way, they implied that the mean duration of the outbreak is shorter in low- transmission than high-transmission settings in all students to teacher ratios except for the 30:1 ratio
Surveillance and response measures – mass testing and isolation	
Number or proportion of cases (7 modelling studies)	Very low certainty of evidence The seven studies that looked at the impact of mass testing and isolation interventions on the number or proportion of cases all found positive results
Number of cases detected (1 observational/ experimental study)	Very low certainty of evidence One observational study looked at the impact of mass testing strategies on the number of cases detected due to the intervention. The main goal of the study was to evaluate the practical application of a self-performed, high-frequency antigen test in a school setting and 10,768 of these tests (99.37%) were record- ed to have been valid and 113 negative, 47 (0.43%) were record- ed as invalid and 21 (0.19%) as positive (either true or false). The study found that 0.15% of all antigen tests (16 tests) gave false-positive results.
Reproduction number (1 modelling study)	Very low certainty of evidence One study looked at two different testing strategies and found that test–trace–isolate strategies would need to test a sufficiently large proportion of the population with COVID-19 symptomatic infection and trace their contacts with sufficiently large coverage, for R to diminish below 1.
Number or proportions of deaths (2 modelling studies)	Very low certainty of evidence Two studies assessed the impact of testing and isolation strategies on the number and proportion of deaths. They showed positive results overall
Shift in pandemic development (4 modelling studies)	Very low certainty of evidence The four studies that assessed the impact of mass testing and isolation strategies on the timing and progression of the epidemic found that testing and isolation could slow or prevent a second wave of the epidemic.
Number or proportion of hospitalisations (1 modelling study)	Very low certainty of evidence One study found that reopening schools with a weekly or monthly testing strategy for teachers and students would lead to a higher number of hospitalisations compared to reopening under strategies to reduce contacts
Multicomponent measures	
Number or proportions of deaths (2 observational/ experimental studies)	Very low certainty of evidence

STUDY DETAILS: Krishnaratne 2022	
	These two studies showed mixed results on the effectiveness of multicomponent interventions to make contacts safer on the number or proportion of cases. One study found that the intervention reduced cumulative infection rate by 0.55 or 27% of a standard deviation while the other found that exposure to open rather than closed schools resulted in a small to moderate increase in the number of infections among parents and teachers, and their partners
Number or proportions of deaths (1 modelling studies)	Very low certainty of evidence One study compared a multicomponent intervention consisting of: i) reducing the number of students; ii) reducing the number of contacts; iii) universal masking; iv) alternating attendance schedules in high schools; and v) symptom-based isolation, to full school closures. The study found that there was an in- crease in the predicted number of infections when reopening with measures compared to a full school closure scenario

E2.1.2 Hand hygiene

STUDY DETAILS: Munn 2020			
Citation			
Munn Z, Tufanaru C, Lockwood C, Stern C, McAneney H, Barker TH. Rinse-free hand wash for reducing absenteeism among preschool and school children. Cochrane Database Syst Rev. 2020 Apr 9;4(4):CD012566. doi: 10.1002/14651858.CD012566.pub2. PMID: 32270476; PMCID: PMC7141998.			
Affiliation/Source of funds			
Details on funding or potential conflicts of interest not provided. Author affiliations: Joanna Briggs Institute, Faculty of Health Sciences, The University of Adelaide, Adelaide, Australia. Australian Institute of Health Innovation, Macquarie University, Sydney, Australia. Medicine, Dentistry and Biomedical Sciences, Queen's University Belfast, Belfast, UK			
Study design	**Level of evidence**	**Location**	**Setting**
Systematic review of RCTs	I	Eight studies were conducted in the USA, two were conducted in Spain, and one each in China, Colombia, Finland, France, Kenya, Bangladesh, New Zealand, Sweden, and Thailand	Six studies were conducted in preschools or day-care centres, with the remaining 13 conducted in elementary or primary schools
Intervention		**Comparator**	
Rinse free handwash		No rinse free handwashing program: No hand washing Conventional handwashing with soap and water, or other hand hygiene strategies.	
Population characteristics			
Children in preschools or day care centres (aged from birth to < 5 years) and children in elementary or primary schools (aged 5 to 14 years old)			
Length of follow-up		**Outcomes measured**	
CENTRAL, MEDLINE, Embase, CINAHL, 12 other databases and three clinical trial registries were searched in February 2020. Reference lists of included studies were also reviewed and contact was made with lead authors of studies to collect additional information as required. No date or language restrictions were applied.		Absenteeism for any reason (within the study period) Absenteeism due to any illness (within the study period) Adverse skin reactions (within the study period) Absenteeism due to acute respiratory illness (within the study period) Absenteeism due to acute gastrointestinal illness (within the study period)	

STUDY DETAILS: Munn 2020	
	Compliance with the intervention or program Perception of the hand hygiene strategy or stratification with the hand hygiene strategy

INTERNAL VALIDITY

Overall quality (AMSTAR)

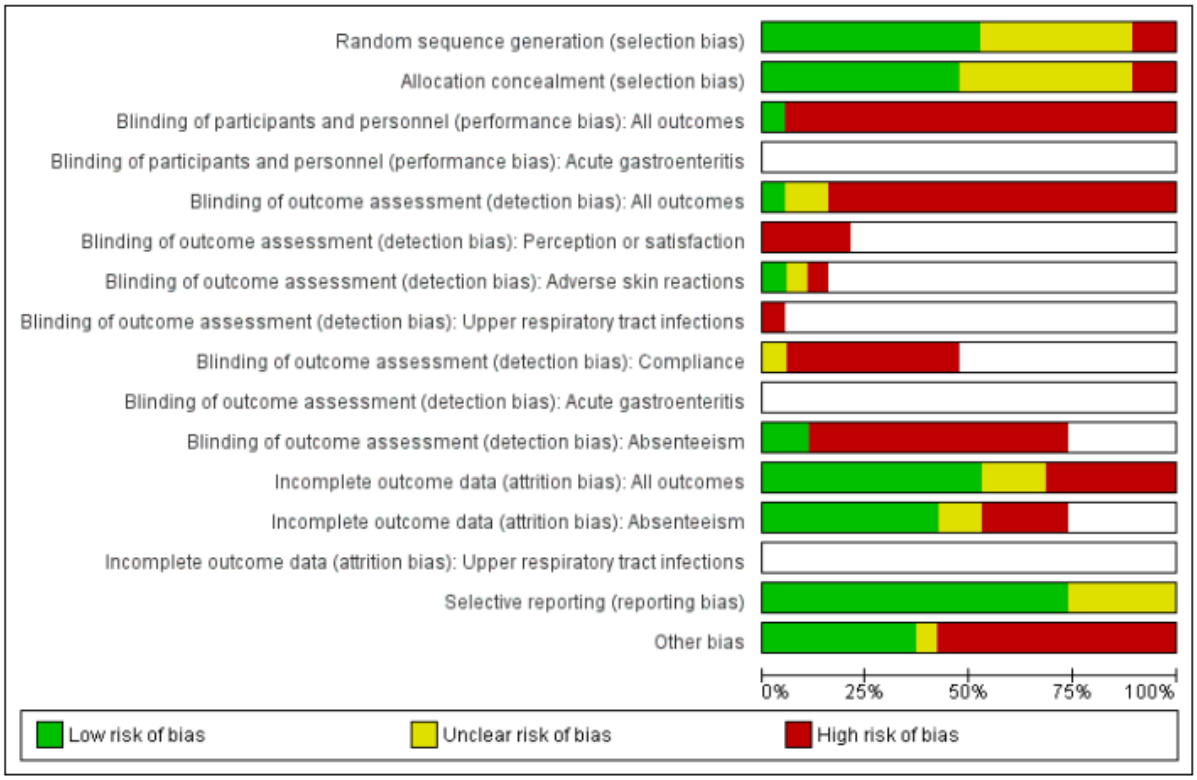
Rating: High

No or one non-critical weakness – the systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest.

Included studies:

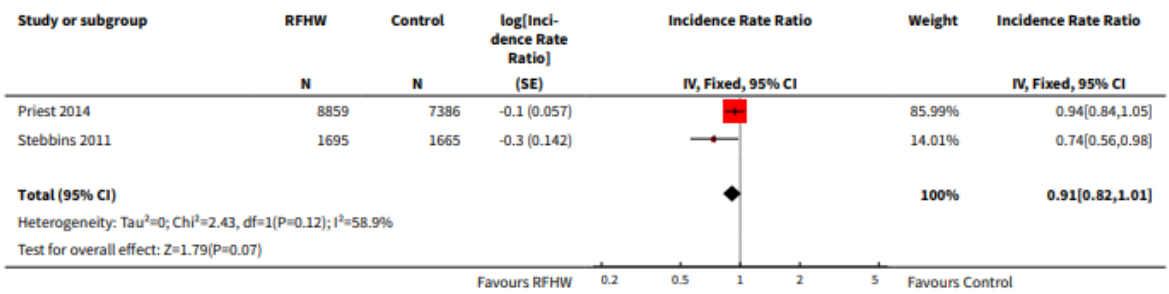
The included studies were judged to be at high risk of bias in several domains, most-notably across the domains of performance and detection bias due to the difficulty to blind those delivering the intervention orthose assessing the outcome.

Figure 2. 'Risk of bias' graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

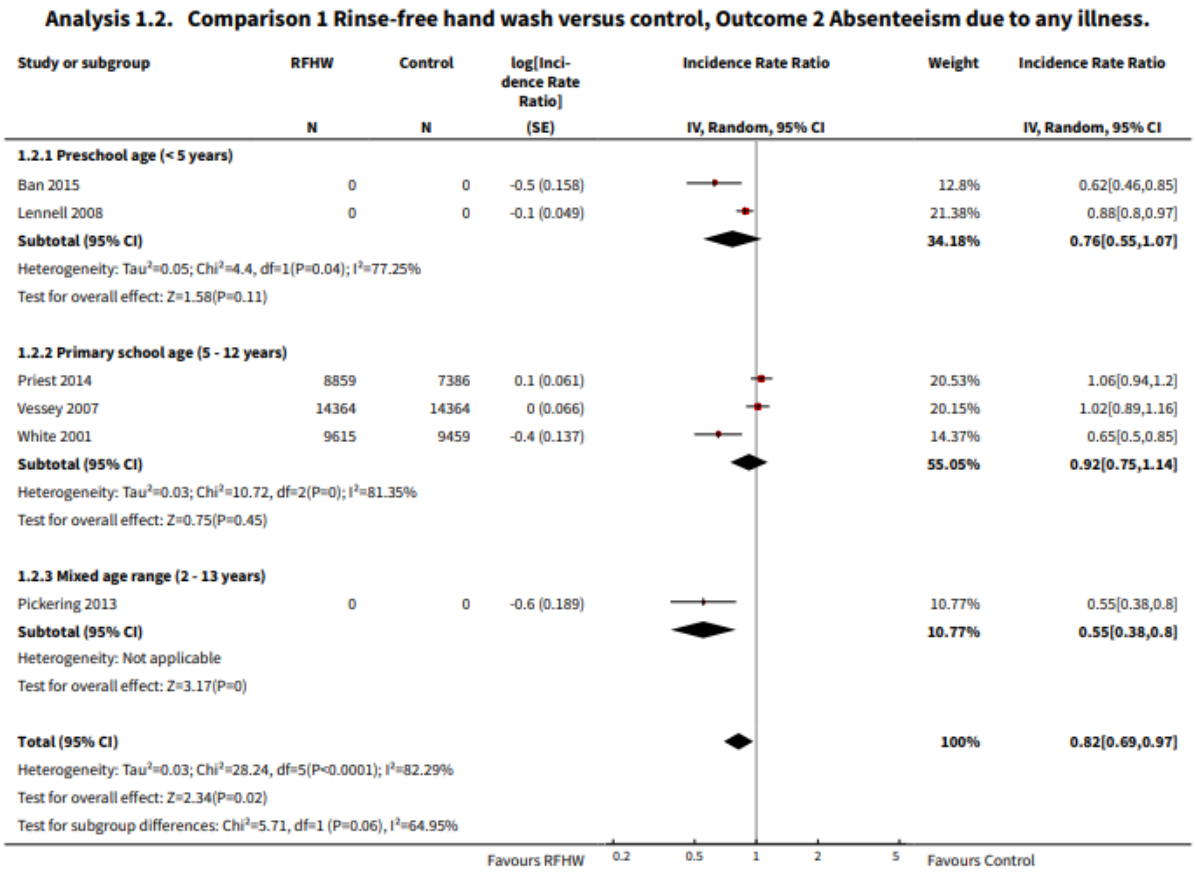


RESULTS:

Outcome No. participants (No. studies)	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	Comments
	Risk with control	Risk with rinse-free hand wash		
Rinse free hand wash versus control				
Absenteeism for any reason NR (2 RCTs)	29 days absent per 1000	32 days absent per 1000	IRR: 0.91, 95% CI 0.82 to 1.01	The provision of rinse-free hand wash was not effective at reducing the incidence rate of absenteeism for any reason

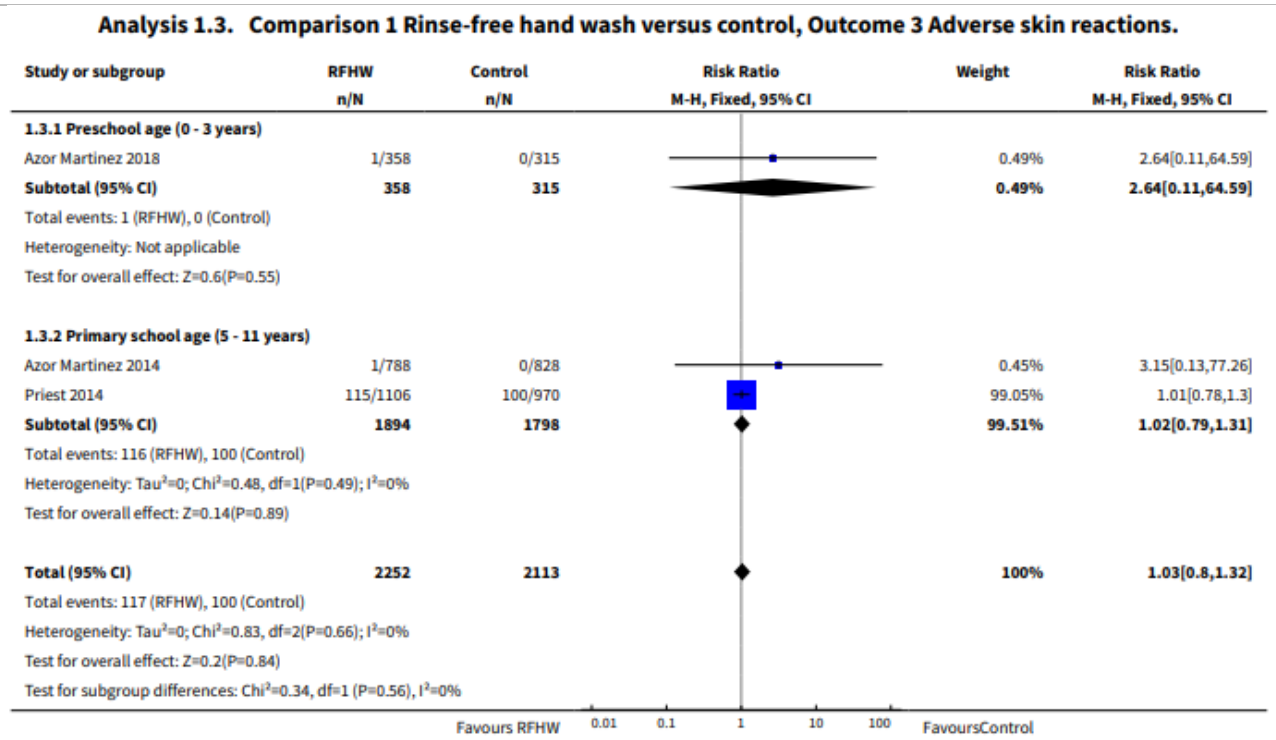
STUDY DETAILS: Munn 2020				
				Test for overall effect: Z=1.79 (p = 0.07) There may be some issues with heterogeneity b/w studies Heterogeneity: Tau^2=0; Chi^2=2.43, df=1(p = 0.12); I^2=58.9%
Analysis 1.1. Comparison 1 Rinse-free hand wash versus control, Outcome 1 Absenteeism for any reason.  				
Child or student absenteeism due to any illness NR (6 RCTs)	16 days absent per 1000	13 absent days per 1000	IRR 0.82, 95% CI 0.69 to 0.97	When considering all groups, the combined effects show that provision of rinse-free hand wash is effective in reducing the incidence of absenteeism because of any illness, p = 0.02 Substantial heterogeneity between studies: Chi^2 = 4.40, p = 0.04, I^2=77%
Child or student absenteeism due to any illness – younger than 5 NR (6 RCTs)			IRR 0.76, 95% CI 0.55 to 1.07	The provision of rinse-free hand wash was no more or less effective in reducing the incidence of absenteeism in students younger than five years, p = 0.11 Substantial heterogeneity between studies: Chi^2 = 10.72, p = 0.005, I^2 = 81%
Child or student absenteeism due to any illness – aged 5-12 NR (6 RCTs)			IRR 0.92, 95% CI 0.75 to 1.14	The provision of rinse-free hand wash was no more or less effective in reducing the incidence of absenteeism in students aged 5-12, p = 0.45 Substantial heterogeneity between studies: Chi^2 = 28.24, p < 0.001, I^2 = 82%

STUDY DETAILS: Munn 2020



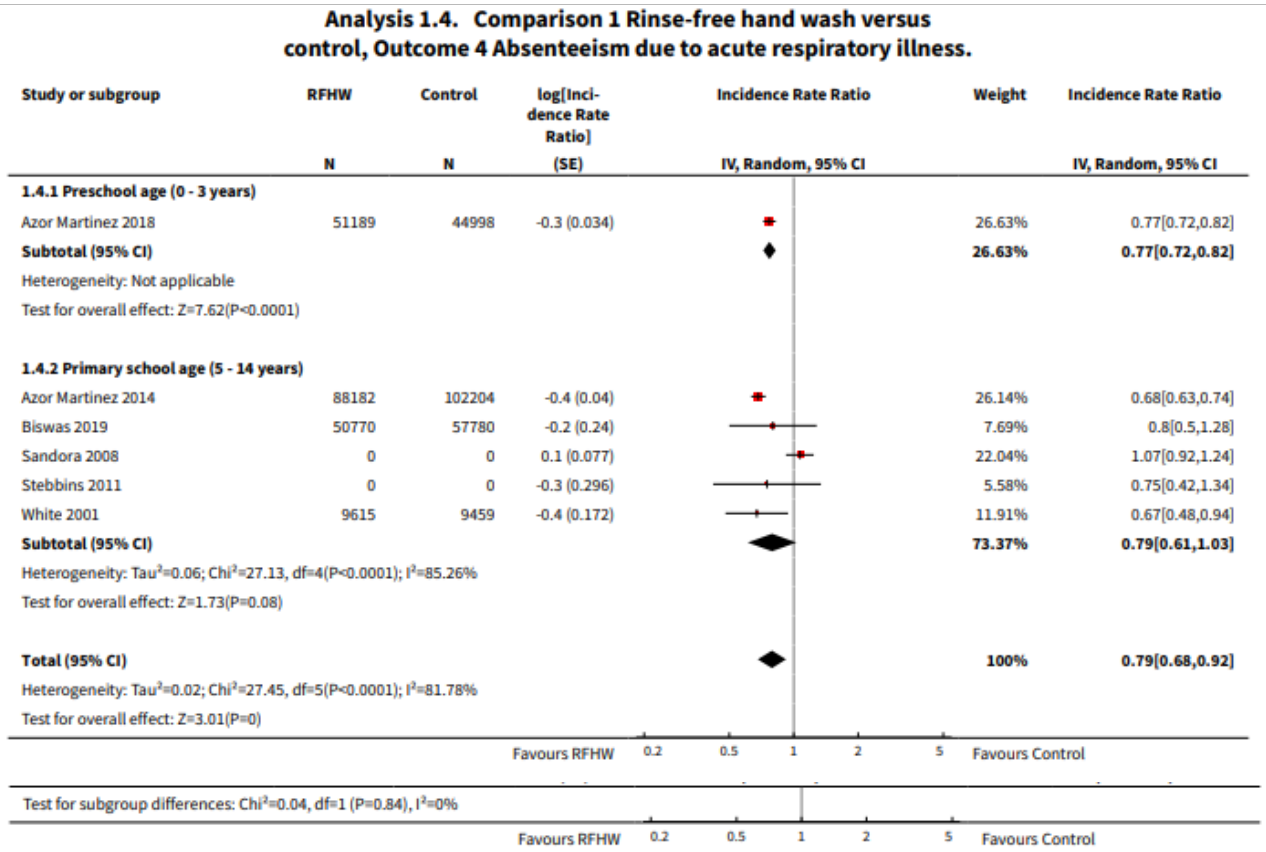
Adverse skin reactions (within the study period) N = 4365 (3 RCTs)	47 days absent per 1000	49 days absent per 1000	RR 1.03, 95% CI 0.80 to 1.32	No concern for heterogeneity between studies (Chi 2= 0.34, p = 0.56, I^2 = 0%)
Adverse skin reactions (within the study period) – birth to three years NR (3 RCTs)			RR 2.64, 95% CI 0.11 to 64.59	No important difference in the occurrences of adverse skin reactions for those assigned to rinse-free hand wash versus control, p = 0.55
Adverse skin reactions (within the study period) – 5 to 11 years NR (3 RCTs)			RR 1.02, 95% CI 0.79 to 1.31	No difference, p = 0.89

STUDY DETAILS: Munn 2020



Absenteeism due to acute respiratory illness (within the study period) NR (6 RCTs)	42 days absent per 1000	33 days absent per 1000	IRR 0.79, 95% CI 0.68 to 0.92	The overall effect shows that the provision of rinse-free hand wash reduces the incidence of absenteeism due to respiratory illness, $p = 0.005$ Some concerns of heterogeneity between all included studies Chi 2 = 27.45, $p < 0.0001$, $I^2 = 82\%$;
Absenteeism due to acute respiratory illness (within the study period) – preschool age (0-3 years) NR (6 RCTs)			IRR 0.77, 95% CI 0.72, 0.82	
Absenteeism due to acute respiratory illness (within the study period) – Primary school age 5-11 years NR (6 RCTs)			IRR 0.79, 95% CI 0.61, 1.03	

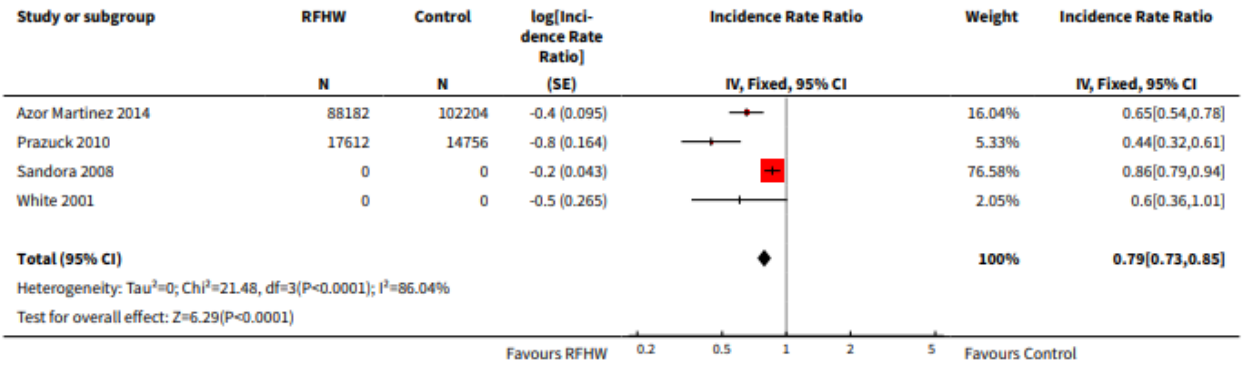
STUDY DETAILS: Munn 2020



Absenteeism due to acute gastrointestinal illness (within the study period) NR 4 RCTs	8 days absent per 1000	6 days absent per 1000	IRR 0.79, 95% CI 0.73 to 0.85	The provision of rinse-free hand wash resulted in reduced incidence of absenteeism, $p < 0.00001$) Some concerns over study heterogeneity ($Chi^2 = 21.48$, $p < 0.001$, $I^2 = 86\%$)

STUDY DETAILS: Munn 2020

Analysis 1.5. Comparison 1 Rinse-free hand wash versus control, Outcome 5 Absenteeism due to acute gastrointestinal illness.



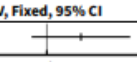
Compliance with the intervention or program N = 10749 (9 RCTs)	9 studies addressed compliance using diverse approaches. Broadly, compliance with the intervention appeared to range from moderate to high compliance. Narratively, no authors reported substantial issues with compliance.
Perception of the hand hygiene strategy or satisfaction with the hand hygiene strategy N = 1229 (3 RCTs)	3 studies addressed perception. Of these, 2 studies, Pickering 2013 and Vessey 2007, conducted semi-structured interviews with staff and students. No numerical data were reported by Pickering 2013; however, rinse-free hand wash was perceived favourably by the teaching staff. Vessey 2007 reported that 100% of interviewed staff would prefer rinse-free hand wash over soap at their school; 91% of students interviewed stated they would preferentially choose rinse-free hand wash over soap and water to wash their hands. 1 study, Correa 2012, reported that teachers of rinse-free hand wash-assigned schools perceived rinse-free hand wash positively and were willing to continue its use.

Comparison 2. Rinse-free hand wash with instruction versus rinse-free hand wash with no instruction

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Absenteeism for any reason	1		Incidence Rate Ratio (Fixed, 95% CI)	Totals not selected
2 Absenteeism due to any illness	1		Incidence Rate Ratio (Fixed, 95% CI)	Totals not selected

Analysis 2.1. Comparison 2 Rinse-free hand wash with instruction versus rinse-free hand wash with no instruction, Outcome 1 Absenteeism for any reason.

Study or subgroup	RFHW with instruction N	RFHW with no instruction N	log[Incidence Rate Ratio] (SE)	Incidence Rate Ratio IV, Fixed, 95% CI	Incidence Rate Ratio IV, Fixed, 95% CI
Lau 2012	56259	52734	0.1 (0.05)		1.07[0.97,1.18]



Favours RFHW instruct

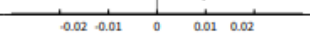
Favours RFHW no instruct

Comparison 5. Rinse-free hand wash every 60 minutes versus rinse-free hand wash before lunch

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Absenteeism due to acute respiratory illness	1		Risk Difference (Fixed, 95% CI)	Totals not selected

Analysis 5.1. Comparison 5 Rinse-free hand wash every 60 minutes versus rinse-free hand wash before lunch, Outcome 1 Absenteeism due to acute respiratory illness.

Study or subgroup	RFHW every 60 minutes N	RFHW before lunch N	Risk Difference (SE)	Risk Difference IV, Fixed, 95% CI	Risk Difference IV, Fixed, 95% CI
Pandejpong 2012	452	538	0 (0.003)		0.01[0,0.02]



Favours RFHW 60 minutes

Favours RFHW lunch

Analysis 2.2. Comparison 2 Rinse-free hand wash with instruction versus rinse-free hand wash with no instruction, Outcome 2 Absenteeism due to any illness.

Study or subgroup	RFHW with instruction N	RFHW with no instruction N	log[Incidence Rate Ratio] (SE)	Incidence Rate Ratio IV, Fixed, 95% CI	Incidence Rate Ratio IV, Fixed, 95% CI
Lau 2012	56259	0	-0 (0.055)		0.99[0.89,1.1]

Favours RFHWinstruct | 1 | Favours RFHW no instruct

Comparison 3. Rinse-free hand wash every 120 minutes versus rinse-free hand wash before lunch

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Absenteeism due to acute respiratory illness	1		Risk Difference (Fixed, 95% CI)	Totals not selected

Analysis 3.1. Comparison 3 Rinse-free hand wash every 120 minutes versus rinse-free hand wash before lunch, Outcome 1 Absenteeism due to acute respiratory illness.

Study or subgroup	RFHW every 120 minutes N	RFHW before lunch N	Risk Difference (SE)	Risk Difference IV, Fixed, 95% CI	Risk Difference IV, Fixed, 95% CI
Pandejpong 2012	447	538	0 (0)		0[0,0]

Favours RFHW 120 minutes | -0.01 -0.005 0 0.005 0.01 | Favours RFHW lunch

Comparison 4. Rinse-free hand wash every 60 minutes versus rinse-free hand wash every 120 minutes

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Absenteeism due to acute respiratory illness	1		Risk Difference (Fixed, 95% CI)	Totals not selected

Analysis 4.1. Comparison 4 Rinse-free hand wash every 60 minutes versus rinse-free hand wash every 120 minutes, Outcome 1 Absenteeism due to acute respiratory illness.

Study or subgroup	RFHW every 60 minutes N	RFHW every 120 minutes N	Risk Difference (SE)	Risk Difference IV, Fixed, 95% CI	Risk Difference IV, Fixed, 95% CI
Pandejpong 2012	452	447	0 (0.004)		0.01[0,0.02]

Favours RFHW 60 minutes | -0.02 -0.01 0 0.01 0.02 | Favours RFHW 120 minutes

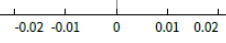
STUDY DETAILS: Munn 2020

Comparison 5. Rinse-free hand wash every 60 minutes versus rinse-free hand wash before lunch

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Absenteeism due to acute respiratory illness	1		Risk Difference (Fixed, 95% CI)	Totals not selected

Analysis 5.1. Comparison 5 Rinse-free hand wash every 60 minutes versus rinse-free hand wash before lunch, Outcome 1 Absenteeism due to acute respiratory illness.

Study or subgroup	RFHW every 60 minutes N	RFHW before lunch N	Risk Difference (SE)	Risk Difference IV, Fixed, 95% CI	Risk Difference IV, Fixed, 95% CI
Pandejpong 2012	452	538	0 (0.003)		0.01[0,0.02]



Favours RFHW 60 minutes — Favours RFHW lunch

Additional comments

Authors conclusions:

This review has found that there is a small but potentially beneficial effect of rinse-free hand washing on illness-related absenteeism, with a potentially large beneficial impact for younger children. However, results of this review were rated for all outcomes as low or very low certainty according to the GRADE approach

CI, confidence interval; IRR, incidence risk ratio; RCT, randomised controlled trial

STUDY DETAILS: Wang 2017

Citation

Wang, Z., Lapinski, M., Quilliam, E., Jaykus, L.-A., & Fraser, A. (2017). The effect of hand-hygiene interventions on infectious disease-associated absenteeism in elementary schools: A systematic literature review. American Journal of Infection Control, 45(6), 682–689. https://doi.org/10.1016/j.ajic.2017.01.018

Affiliation/Source of funds

Details on funding or potential conflicts of interest not provided.

All authors affiliated with tertiary institutions in the United States.

Study design	Level of evidence	Location	Setting
Systematic review – of RCTs, non-randomised and cross over design studies	I	12 were conducted in the United States and the remaining 7 were conducted in Denmark (n = 2), China (n = 1), Egypt (n = 1), New Zealand (n = 1), Spain (n = 1), or Thailand (n = 1)	Elementary schools

Prognostic factor	Comparator
Hand hygiene	N/A

Population characteristics

School age children between 4 and 15

STUDY DETAILS: Wang 2017	
Length of follow-up	**Outcomes measured**
The following databases were searched: ScienceDirect (1980-2015), Academic Search Complete (1980-2015), Academic OneFile (1980-2015), AgEcon Search (1980-2015), and Web of Science (1980-2015).	Absenteeism

INTERNAL VALIDITY

Overall risk of bias (descriptive)

Rating: Low

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

Included studies:

These authors used the median of the quality scores generated using the Downs and Black checklist to classify studies as "higher" or "lower" quality. The median quality score of studies in this studies sample was 18 (range, 10-20) of a possible high score of 28. As expected, the 10 cluster randomized-controlled studies had higher quality scores (score, 17-25) than those that did not use randomization (score, 10-18)

RESULTS:

Outcome **No. patients (No. trials)**	**Difference between groups in absenteeism Reduction**	**Key findings**
Hand sanitizer alone		
Absenteeism NR 2 studies	Days absent per student: 19.8% Absenteeism rate 60 min: 34.6% 120 min: 3.85%	Combined illness-related absenteeism significantly lower in the intervention group ($p < .05$) ARI-associated absenteeism significantly lower in the intervention group using hand sanitizer every 60 min compared with control group ($p = .002$); but not significantly lower in the group using hand sanitizer every 120 min compared with control group ($p = .743$)
Hand sanitizer and education		
Absenteeism NR 10 studies	Percentage of absent days‡: 29.5% — Percent AGI-associated absent days significantly lower in the intervention group ($P < .001$) Days of absence due to communicable illness: AGI: 37.5%, ARI: 30.9% — AGI-associated ($P < .001$) and ARI-associated ($P < .02$) absences significantly lower in the intervention group Absence episodes: 50.6% — Combined absenteeism significantly lower in the intervention group ($P < .001$) Number of children absent due to respiratory or gastrointestinal illness: 43% — Combined absenteeism significantly lower in the intervention group ($P = .0053$) Absence periods due to infectious illness§: 22.6% — Combined illness-related absenteeism significantly lower in the intervention group ($P = .018$) Absence episodes per 100 child-days‖: AGI: −7.1%, ARI: −5.0% — AGI-associated absence episodes not significantly lower in the intervention group ($P = .490$); ARI-associated absence episodes not significantly lower in the intervention group ($P = .439$) Absenteeism rate caused by respiratory or gastrointestinal illness¶: AGI: 36.1%, ARI: −7.9% — AGI-associated absenteeism significantly lower in the intervention group ($P < .01$); ARI-associated absenteeism not significantly lower in the intervention group ($P = .12$) Absence episodes associated with influenza A or B#: 6.3% — Absence episodes due to lab-confirmed influenza (both A and B; ARI-associated absenteeism) not significantly lower in the intervention group ($P = .33$) Absences due to communicable illness: 0% — Combined illness-related absences not significantly lower in the intervention group (no difference) Absence incidences**: AGI: 38.6%, ARI: 31.7% — AGI-associated ($P < .01$) and ARI-associated ($P < .01$) absence incidences significantly lower in the intervention group (continued on next page)	

STUDY DETAILS: Wang 2017			
Soap alone			
Absenteeism NR 3 studies	Unit of measure	Difference between groups in absenteeism Reduction*	Key findings
	Days of absence due to communicable illness	AGI: 57.1% ARI: 24.0%	AGI-associated days of absence significantly lower in the intervention group ($P = .0024$); ARI-associated days of absence not significantly lower in the intervention group ($P = .0756$)
	Absence periods§ due to infectious illness††	21.8%	Combined illness-related absence periods significantly lower in the intervention group ($P = .002$)
	Absences due to illness‡‡ per 100 student-weeks	AGI: 33% ARI: 40%	AGI-associated absenteeism ($P < .0001$) and ARI-associated absenteeism ($P < .0001$) significantly lower in the intervention group
Soap and education			
Absenteeism NR 1 study	Median absence episodes per 100 student-weeks	Expanded: 42% Standard: 44%	Combined illness-related absence episodes significantly lower in the expanded intervention group ($P = .03$), but not significantly lower in the standard intervention group ($P = .08$) compared with the control group
Education alone			
Absenteeism NR 3 studies	Percentage of students absent per day	1-2 mo post: 52.6% 3 mo post: 23.5%	ARI-related absenteeism significantly lower in intervention group during first and second months post-intervention ($P = .001$), but not significantly lower during third month postintervention ($P > .05$)
	Percent illness-related absent days during influenza season§§	26.8%	Percent of combined illness-related absent days significantly lower in the intervention group ($P < .01$)
	Percentage of absent days‡	34% (during second half of intervention)	Absenteeism rates (illness and/or nonillness-related) significantly lower in the intervention group ($P = .027$)
Additional comments			
Authors conclusions: Hand hygiene has an effect on acute gastrointestinal illness but not acute respiratory illness (consistent with Meadows 2004 and Jefferson 2009 SR) The use of hand sanitizers (ABHRs and alcohol-free) and soap was also associated with reducing nonspecific illness- and AGI-associated absenteeism, but not absences attributed to ARI. The effect of education only interventions is inconclusive.			
CI, confidence interval; MD, mean difference; RCT, randomised controlled trial; RR, relative risk; SD, standard deviation			

E2.1.3 Masks

STUDY DETAILS: Chou 2020			
Citation			
Chou R, Dana T, Jungbauer R, Weeks C, McDonagh MS. Masks for Prevention of Respiratory Virus Infections, Including SARS-CoV-2, in Health Care and Community Settings: A Living Rapid Review. Ann Intern Med. 2020 Oct 6;173(7):542-555. doi: 10.7326/M20-3213. Epub 2020 Jun 24. PMID: 32579379; PMCID: PMC7322812.			
Affiliation/Source of funds			
Funding provided by Agency for Healthcare Research and Quality Authors affiliated with the Pacific Northwest Evidence-based Practice Center and Oregon Health & Science University, Portland, Oregon Conflicts of interest: Dr. Jungbauer reports grants from Funded under Contract No. HHSA290201500009I, Task Order 75Q80119F32021, from the Agency for Healthcare Research and Quality (AHRQ), U.S. Department of Health and Human Services (HHS)., during the conduct of the study, Dr. Chou reports grants from Agency for Healthcare Research and Quality, during the conduct of the study; grants from World Health Organization, outside the submitted work and remaining authors declare no conflicts of interest			
Study design	**Level of evidence**	**Location**	**Setting**
Systematic review	I	4 trials were conducted in the United	Community or

STUDY DETAILS: Chou 2020			
		States, 1 in Canada, 1 in Australia, 2 in Europe, 2 in Saudi Arabia, and 8 in Asia	healthcare settings in all geographic areas
Prognostic factor		**Comparator**	
Effectiveness of N95, surgical, and cloth masks in community and health care settings for preventing respiratory virus infections, and effects of reuse or extended use of N95 masks.		N/A	
Population characteristics			
Healthcare workers (HCW) or community members at risk of contracting COVID-19 or other viral respiratory illnesses due to workplace or community-based exposure			
Length of follow-up		**Outcomes measured**	
A medical librarian searched PubMed, MEDLINE, and Elsevier Embase (from 2003 through 14 April 2020). Also searched the World Health Organization (WHO) COVID-19 database and the medRxiv preprint server and reviewed reference lists of relevant articles, including a living review on risk factors (including mask use) for coronavirus infections in health care workers (HCWs).		Q1: What is the effectiveness and comparative effectiveness of respirators (N95 or equivalent), face masks (surgical), and cloth masks in addition to standard precautions in community and health care (high- or non– high-risk) settings for prevention of: (a) SARS-CoV-2 infection? (b) SARS-CoV-1 or MERS-CoV infection? (c) influenza, influenza-like illness, and other viral respiratory infection? Q2: What is the evidence for extended or reuse of N95 respirators for prevention of SARSCoV-2, SARS-CoV-1, or MERS-CoV infection?	
INTERNAL VALIDITY			
Overall quality (AMSTAR)			
Rating: Moderate More than one non-critical weakness – the systematic review has more than one weakness but no critical flaws. It *may* provide an accurate summary of the results of the available studies that were included in the review. *Risk of bias of included studies:* Eleven RCTs were rated good-quality, and 7 were rated fair-quality. Limitations of the fair-quality trials included baseline between-group differences and high attrition; one cluster RCT did not adjust for cluster correlation. Blinding of participants to the mask and other interventions (for example, hand hygiene) was not possible. The observational studies had important limitations. All were retrospective and potentially susceptible to recall bias for determining mask use and other exposures. The studies were limited in their ability to measure and control for the amount and intensity of exposures. Six studies did not control for potential confounders. Of the 15 studies that did control for confounders, only 1 evaluated correlations between masks and other infection control measures (such as gloves, gowns, goggles, or handwashing) to inform variable selection for model building. In the other studies that reported results from multivariate models, correlations between infection control measures and potential collinearity were not addressed			
RESULTS:			
Study characteristics:			
39 studies (33867 participants), all addressing Q1 met the inclusion criteria: 12 RCTs and 3 observational studies were conducted in the community, and 6 RCTs and 18 observational studies were conducted in HCWs. There were no RCTs on risk for coronavirus infections. For SARS-CoV-2, there were 2 cohort studies. 18 observational studies addressed SARS-CoV-1 and 1 cohort study addressed MERS-CoV. The RCTs were usually conducted during influenza season and evaluated the risk for nonspecific clinical respiratory illness, influenza-like illness, and laboratory confirmed viral respiratory illness			
Outcome **No. patients** **(no. studies)**	**Narrative summary**	**Risk estimate (95% CI)**	**Statistical significance** ***p*-value**
SARS-CoV-2			
Efficacy of respirators (N95 or equivalent), face (surgical) and cloth masks N = 532 2 studies	Community settings: No study evaluated masks for preventions of SARS-CoV-2 infections in community settings	NR	NR
	Health care settings: Two cohort studies evaluated mask use and risk for SARS-CoV-2 One study of HCWs in higher- and lower-risk hospital units		

STUDY DETAILS: Chou 2020			
	found N95 respirators to be associated with decreased infection risk versus no mask. One small study evaluated HCWs with inadequate personal protective equipment during exposure to a patient with unrecognized SARS-CoV-2 infection. It reported 3 cases of SARS-CoV-2 infection in HCWs, resulting in very imprecise estimates.		
Data from eighth update of review (27 July 2022) – searches from December 3, 2021, to June 2, 2022			
Efficacy of respirators (N95 or equivalent), face (surgical) and cloth masks N = >34,000 7 studies	Community settings: Mask promotion intervention villages were associated with decreased symptomatic SARS-CoV-2 seroprevalence and prevalence of WHO COVID-19 symptoms (Cluster RCT). No statistically significant difference between surgical or cloth mask villages. Surgical masks use was most beneficial for ages 60 and older, no association between age and cloth masks. 5 additional observation studies consistently found mask use associated with reduced risk of SARS-CoV-2 infection, with adjusted risk estimates ranging from 0.04 to 0.6.	Prevalence ratio: SARS-CoV-2: 0.90 (95% CI 0.82 to 0.995) COVID-19: 0.88 (95% CI 0.83 to 0.93)	Favours intervention
	Health care settings: One new cohort study found healthcare workers who primarily used FFP2 (N95 equivalent) masks had decreased risk of SARS-CoV-2 infection or seroconversion versus healthcare workers who primarily used surgical masks.	Decrease risk of SARS-CoV-2: HR 0.80 (95% CI 0.64 to 1.00) Seroconversion: OR 0.73, 95% CI 0.53 to 1.00	
SARS-CoV-1 and MERS-CoV			
Efficacy of respirators (N95 or equivalent), face (surgical) and cloth masks Community settings: N = 2857 3 studies Healthcare settings: N = 4277 16 studies	Community settings: Wearing a mask was associated with decreased risk for infection in persons without known SARS-1 contacts in 1 study and in household contacts of patients with SARS-1 in 2 studies	NR	Favours intervention
	Health care settings: Twelve observational studies (2998 participants) consistently found mask use associated with decreased risk for SARS-CoV-1 infection versus no use, of these, 8 specifically evaluated N95 respirators or surgical masks. Masks were associated with decreased risk for SARS-CoV-1 infection in multivariate models in 5 studies		
Influenza, influenza-like illness, and other viral respiratory infection			
Efficacy of respirators (N95 or equivalent), face (surgical) and cloth masks Community settings: N = 16836 12 studies (RCTs) Healthcare settings: N = 9411 6 studies (RCTs)	Community settings: Compared with no masks, surgical masks were not associated with decreased risk for clinical respiratory illness, influenza-like illness, or laboratory-confirmed viral illness in household contacts when masks were worn by household contacts (some estimates were imprecise, mask wearing adherence was limited). This trend was consistent in studies with students living in university residence halls and Hagg pilgrims.	NR	No significant difference
	Healthcare settings: One trial (422 participants) found both N95 respirators and surgical masks to be associated with a very similar likelihood of a physician visit for acute respiratory illness (6.2% vs. 6.1%). Two trials (3110 participants) found an N95 respirator to be associated with decreased risk for clinical respiratory illness, with absolute differences that ranged from –2.8% to –7.7%.		

STUDY DETAILS: Chou 2020

Figure 2. Masks for prevention of respiratory virus infection: evidence map.

Comparison (Intervention A vs. Intervention B)	SARS-CoV-2 Infection*	SARS-CoV-1 or MERS-CoV Infection*	Influenza, ILI, and Other VRI (Excluding Pandemic Coronaviruses)†
Community setting			
Mask (type not specified) vs. no mask ($k = 3$ observational studies) (31, 51, 54)	–	◆	–
N95‡ vs. surgical mask in household contacts ($k = 1$ RCT) (37)	–	–	◆
N95‡ vs. no mask in household contacts ($k = 1$ RCT) (37)	–	–	◆
Surgical mask vs. no mask in households with an index case and other community settings ($k = 12$ RCTs) (19–21, 23, 24, 28–30, 37, 41, 48, 49)	–	–	●
Health care setting—moderate or higher risk (inpatient)			
Any mask vs. no mask ($k = 12$ observational studies) (33, 35, 36, 42–45, 47, 50, 53, 55, 57)	–	●	–
N95 vs. no mask ($k = 5$ observational studies) (33, 45, 47, 50, 52)	■	◆	–
Surgical mask vs. no mask ($k = 6$ observational studies) (33, 35, 42, 45, 47, 55)	–	■	–
N95 or surgical mask vs. no mask ($k = 1$ observational study)	–	■	–
Mask (type not specified) vs. no mask ($k = 5$ observational studies) (36, 43, 47, 53, 55)	–	◆	–
Cloth mask vs. no mask ($k = 3$ observational studies) (33, 44, 55)	–	■	–
Consistent/always mask use vs. inconsistent mask use ($k = 5$ observational studies) (22, 32, 35, 43, 56)	■	◆	–
N95 vs. surgical mask ($k = 3$ RCTs and 5 observational studies) (25, 33–35, 39, 40, 45, 57)	–	◆	●
N95 or surgical mask vs. cloth mask ($k = 3$ observational studies) (33, 36, 55)	–	■	–
Surgical mask vs. cloth mask ($k = 1$ RCT) (38)	–	–	◆
Health care setting—lower risk (outpatient)			
N95 vs. surgical mask ($k = 1$ RCT) (46)	–	–	●

Strength of Evidence
- ● Moderate
- ◆ Low
- ■ Insufficient
- – No evidence

Direction of Effect
- Favors intervention A
- Effects similar or no difference
- No evidence or unable to determine

ILI = influenza-like illness; MERS-CoV = Middle East respiratory syndrome coronavirus; RCT = randomized controlled trial; SARS-CoV = severe acute respiratory syndrome coronavirus; VRI = viral respiratory illness.
* Only observational evidence was included for these infections.
† Only RCT evidence was included for these infections.
‡ N95 respirator or equivalent (for example, P2 mask).

Setting	Comparison	Outcome	Number and Type of Studies	Number of Subjects	Directness	Precision	Study Limitations	Consistency	Findings	Strength of Evidence
Healthcare	N95 or surgical vs. cloth masks	SARS-CoV-1 infection	3 case-control (33, 36, 55)	n=175 cases, 1,032 controls	Direct	Imprecise	Moderate	Inconsistent	Unable to determine	Insufficient
Healthcare	N95 or surgical vs no mask	SARS-CoV-1 infection	1 cohort (57)	n=31	Direct	Imprecise	Moderate	Unable to assess	Unable to determine	Insufficient
Healthcare	N95 vs. no mask	SARS-CoV-1 infection	4 observational studies (1 cohort (45), 3 case-control (33, 47, 50)	Cohort: n=624 Case-control: n=100 cases, 717 controls	Direct	Imprecise	Moderate	Consistent	N95 associated with decreased risk	Low
Healthcare	Surgical vs. no mask	SARS-CoV-1 infection	6 observational studies (2 cohort (35, 45) 4 case-control (33, 42, 47, 55))	Cohort: n=667 Case-control: n=170 cases, 945 controls	Direct	Imprecise	Moderate	Inconsistent	Unable to determine	Insufficient
Healthcare	Cloth vs. no mask	SARS-CoV-1 infection	3 case-control studies (33, 44, 55)	n=275 cases, 902 controls	Indirect	Precise	Moderate	Consistent	Unable to determine	Insufficient
Healthcare	Mask (type not specified) vs. no mask	SARS-CoV-1 infection	5 observational studies (2 cohort (43, 53), 3 case-control) (36, 44, 55)	Cohort: n=183 Case-control: n=271 cases, 902 controls	Direct	Precise	Moderate	Consistent	Mask use associated with decreased risk	Low
Healthcare	Consistent mask use vs. inconsistent use	SARS-CoV-1 infection	4 observational studies (3 cohort (22, 35, 43), 1 case-control (32)	Cohort: n=411 Case-control: n=72 cases, 143 controls	Direct	Imprecise	Moderate	Consistent	Consistent mask use associated with decreased risk	Low

Setting	Comparison	Outcome	Number and Type of Studies	Number of Subjects	Directness	Precision	Study Limitations	Consistency	Findings	Strength of Evidence
Healthcare	N95 vs. surgical mask, higher risk settings	Clinical respiratory illness, influenzalike illness, laboratory-confirmed viral respiratory illness or laboratory-confirmed influenza	3 RCTs (34, 39, 40)	n=3,532	Direct	Imprecise (for influenzalike illness, laboratory-confirmed viral respiratory illness or laboratory-confirmed influenza)	Low	Inconsistent (for clinical respiratory illness)	No differences in risk for influenzalike illness, laboratory-confirmed viral respiratory illness or laboratory-confirmed influenza; inconsistent results for clinical respiratory illness	Moderate
Healthcare	N95 vs. surgical mask, lower risk settings	Clinical respiratory illness, influenzalike illness, laboratory-confirmed viral respiratory illness or laboratory-confirmed influenza	1 RCT (46)	n=2,862	Direct	Precise	Low	Unable to assess	No difference in risk	Moderate
Healthcare	Surgical vs. cloth mask, higher risk setting	Clinical respiratory illness, influenzalike illness, laboratory-confirmed viral respiratory illness	1 RCT (38)	n=1,868	Direct	Imprecise	Low	Unable to assess	Surgical mask associated with decreased risk	Low

STUDY DETAILS: Chou 2020

Supplement Table 10. Summary of Evidence

Setting	Comparison	Outcome	Number and Type of Studies	Number of Subjects	Directness	Precision	Study Limitations	Consistency	Findings	Strength of Evidence
Community	Mask vs. no mask	SARS-1 infection	3 observational studies (1 cohort (51) and 2 case-control (31, 54))	Cohort: n=212 Case-control: n=225 cases, 2,420 controls	Direct	Precise	Moderate	Consistent	Mask associated with decreased risk	Low
Community	N95 equivalent vs. surgical mask	Influenzalike illness, laboratory-confirmed viral respiratory illness	1 RCT (37)	n=290	Direct	Imprecise	Low	Unable to assess	No difference	Low
Community	N95 equivalent vs. no mask	Influenzalike illness, laboratory-confirmed viral respiratory illness	1 RCT (37)	n=290	Direct	Imprecise	Low	Unable to assess	No difference	Low
Community	Surgical mask vs. no mask	Clinical respiratory illness, influenzalike illness, laboratory-confirmed viral respiratory illness, or laboratory-confirmed influenza	12 RCTs (19-21, 23, 24, 28-30, 37, 41, 48, 49)	n=16,761	Direct	Precise	Moderate	Inconsistent	No differences overall	Moderate
Healthcare	N95 vs. no mask	SARS-CoV-2 infection	1 observational study (52)	n=493	Direct	Imprecise	High	Unable to assess	Unable to determine	Insufficient
Healthcare	Consistent mask use vs. inconsistent use	SARS-CoV-2 infection	1 observational study (56)	n=37	Direct	Imprecise	Moderate	Unable to assess	Unable to determine	Insufficient
Healthcare	N95 vs. surgical mask	SARS-CoV-1 infection	5 observational studies (4 cohort (25, 35, 45, 57) and 1 case-control(33))	Cohort: n=731 Case-control: n=51 cases, 426 controls	Direct	Imprecise	Moderate	Consistent	N95 associated with decreased risk	Low

Additional comments

Authors conclusions:

Evidence on mask effectiveness for respiratory infection prevention is stronger in health care than community settings. N95 respirators might reduce SARS-CoV-1 risk versus surgical masks in health care settings, but applicability to SARSCoV- 2 is uncertain.

CI, confidence interval; NR, not reported; OR, odds ratio; RCT, randomised controlled trial; RR, relative risk; SD, standard deviation

E2.1.4 Ventilation

STUDY DETAILS: Hammond 2021

Citation

Hammond, A., Khalid, T., Thornton, H.V., Woodall, C.A., Hay, A.D., 2021. Should homes and workplaces purchase portable air filters to reduce the transmission of SARS-CoV-2 and other respiratory infections? A systematic review. PLOS ONE 16, e0251049.. doi:10.1371/journal.pone.0251049

Affiliation/Source of funds

The study was funded by the National Institute for Health Research (NIHR) Senior Investigator Award for ADH (NIHR NIHR200151). The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

Author affiliations: University of Bristol, United Kingdom and Valahia University of Targoviste, Romania

The authors declared no conflicts of interest.

Study design	Level of evidence	Location	Setting
Systematic review	I	Beijing, USA	Office building

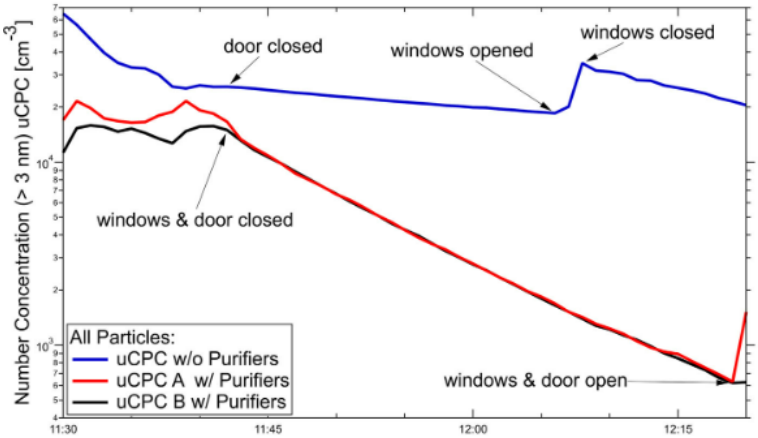
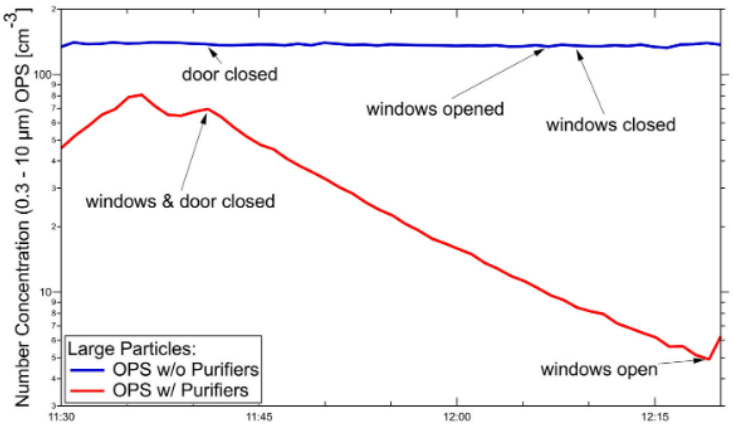
STUDY DETAILS: Hammond 2021			
			Emergency room
Intervention		**Comparator**	
Portable, commercially available air filters, including high efficiency particulate air (HEPA) filters.		No air filter use within the same setting (for example randomised controlled trial of air filters in a classroom or office) or not applicable if observational study	
Population characteristics			
Any population and age group, any country, indoor community setting, including but not limited to: households, care homes, schools, nurseries/day care, universities, workplaces (offices), public buildings, primary care practices, hospitals.			
Length of follow-up		**Outcomes measured**	
Searched Medline, Embase and Cochrane for articles published in any language between January 2000 and March 2021		Studies reporting effects of portable air filters on incidence of respiratory infection Studies reporting whether filters capture/ remove aerosolised bacteria and viruses from the air, including information of what is captured	
INTERNAL VALIDITY			
Overall quality (AMSTAR)			
Rating: High Description: No or one non-critical weakness – the systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest. *Included studies:* The overall risk of bias of included studies was assessed by the authors using the critical appraisal skills programme checklist. Study quality was assessed to be generally good and indicated a low bias overall, however neither study took into account any potential confounding factors, nor did they clearly indicate their study recruitment processes.			
RESULTS:			
The search did not identify any studies which investigated the effects of portable, commercially available air filters on incidence of respiratory infections. Search identified two papers which investigated whether portable filters placed in an indoor setting capture and/or reduce airborne bacteria, but not viruses, from the air			
Study	**Air filter system used**	**Capture/removal/reduction of airborne bacteria**	
Beijing study – placed air purifiers inside 12 independent administrative offices in three buildings	Not specified – air purifier with HEPA filter	The survival of bacteria in the filter samples were significantly higher than those in the dust samples. Also reported significant difference in taxanomic abundance and microbial composition of filter and dust samples. The authors conclude that the HEPA filter should represent a new ecological niche within indoor environments. The key sources of bacteria were soil for the HEPA filter, and human oral, indoor and outdoor air for the dust samples. No significant difference was found between the offices (p = 0.50)	
USA study – assessed the effectiveness of a portable filter in eliminating bacterial aerosols from emergency rooms	Aerobiotix Illuvia 500uv system (Aerobiotix, West Carrollton, OH) – no details on filter specification	Use of filter system led to a 41% reduction in the mean CFU of aerosol bacterial load compared to before the system ($p < 0.05$).	
Additional comments			
Authors conclusions: There is a considerable gap in evidence around whether portable air filters reduce the incidence of respiratory infections, including SARS-CoV-2. Two studies reported removal or capture of airborne bacteria only in indoor settings and demonstrated that the portable filters did capture airborne bacteria and reduced the amount of airborne bacteria in the air. No studies were identified that investigated the effects of portable, commercially available air filters on the incidence of respiratory infection in the community			

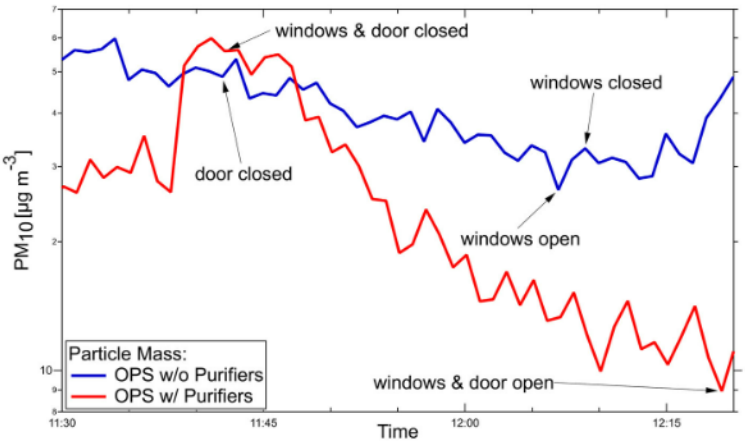
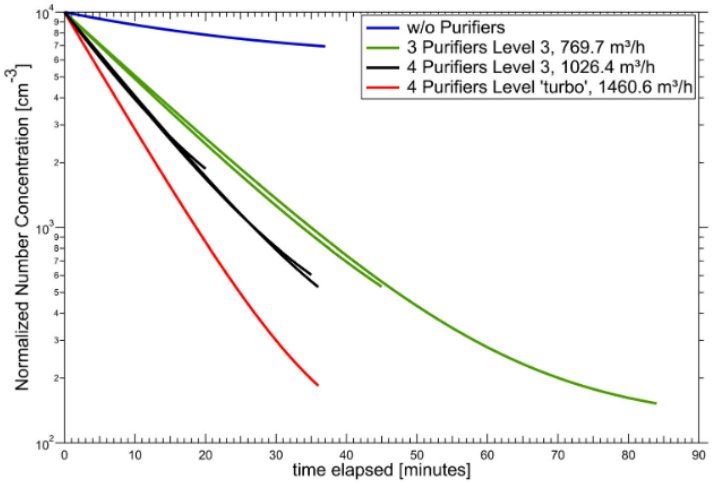
STUDY DETAILS: Hammond 2021
CI, confidence interval; ITT, intention-to-treat; MD, mean difference; PP, per-protocol; RCT, randomised controlled trial; RR, relative risk; SD, standard deviation

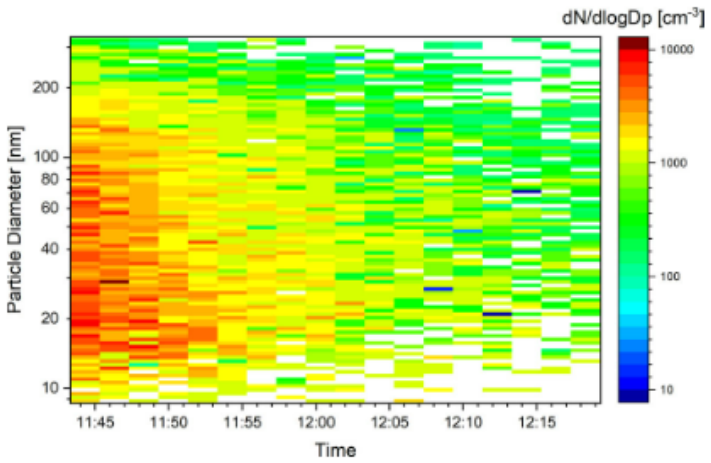
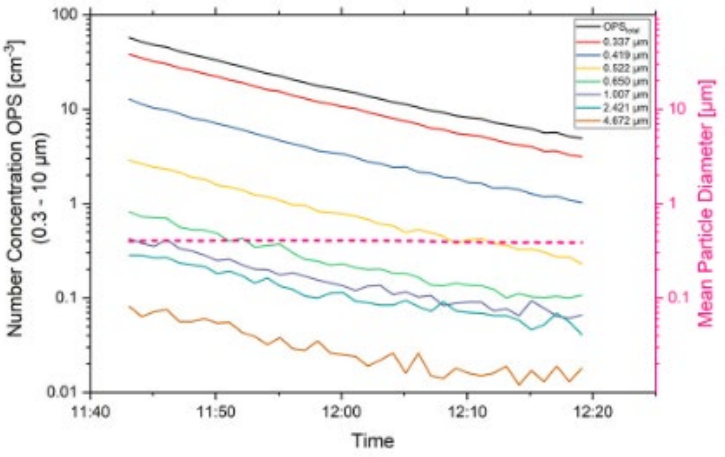
E2.2 Randomised Controlled trials

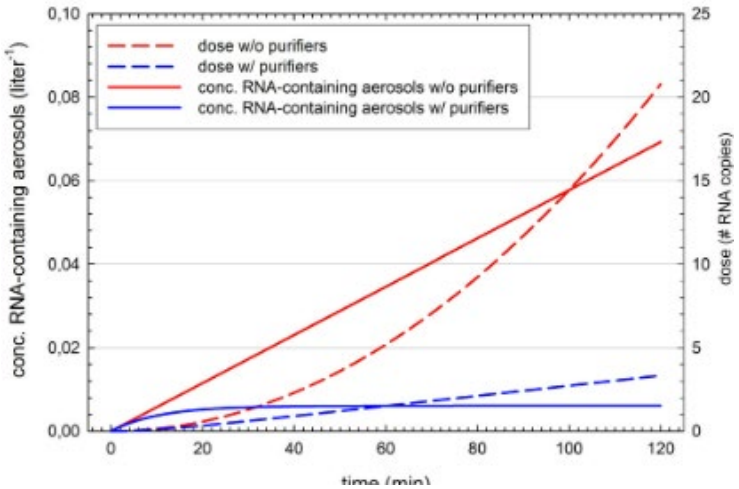
E2.2.1 Ventilation

STUDY DETAILS: Curtius 2020			
Citation			
Curtius, J., Granzin, M., Schrod, J., 2021. Testing mobile air purifiers in a school classroom: Reducing the airborne transmission risk for SARS-CoV-2. Aerosol Science and Technology 55, 586–599.. doi:10.1080/02786826.2021.1877257			
Affiliation/Source of funds			
The study was conducted without external financial support. Author affiliations: Institute for Atmospheric and Environmental Sciences, Goethe University Frankfurt am Main, Germany The authors declared no conflicts of interest.			
Study design	**Level of evidence**	**Location**	**Setting**
Cluster randomised control trial	II	Germany	School setting – Air filters in place Monday to Friday. During 8 single lessons (45 min each) and two double lessons (90min each). 18 lessons were held in the reference (control room)
Intervention		**Comparator**	
Operating 4 air purifiers equipped with HEPA filters in a high school classroom while classes are taking place.		Air purifiers without HEPA filters	
Population characteristics			
Classroom environment – typically with 27 students, one teacher and one scientist			
Length of follow-up		**Outcomes measured**	
The air purifiers were operated at the school from Monday, 14 September, until Friday, 18 September 2020.		Aerosol number concentration for particles >3nm at two locations in the room and aerosol size distribution in the range from 10 mm to 10 µm, PM_{10} and CO_2 concentration	
INTERNAL VALIDITY			
Overall risk of bias (descriptive)			
Rating: Moderate Description: The study has plausible bias that raises some doubt about the results.			

STUDY DETAILS: Curtius 2020		
RESULTS:		
Outcome	**Narrative summary**	**Representative summary**
Classroom with air purifiers vs no air purifiers		
Total aerosol number concentration (Ultra fine condensation particle counters - uCPC)	Decreased slowly over time and was reduced by about 30% when a window was opened and additional particles entered room. The aerosol concentration decreased considerably more in the room with the air purifiers. The aerosol concentration decreased by more than 95% within 37 min following an exponential decay rate	 Representative measurement of the total aerosol number concentration in the classroom with air purifiers(red and black line) and in the room without purifiers (blue line) during a lesson. Four air purifiers were operated at stage 3 during a lesson with windows and doors closed. A window was briefly opened in the room without purifiers at 12:06 for1 min, when additional particles flowed in from outside. Particle concentrations are averaged over 1 min intervals.
The number concentration of large particles (0.3 to 10 µm, optical particle sizer - OPS)	the number concentration of particles in the range 0.3 to10mm decreased exponentially with a similar time constant as the total number concentration measured by the uCPC. In the room without purifiers the number of particles remained constant.	 Number concentration of larger particles (0.3 to 10mm, OPS measurement) in the classrooms with (red) and without (blue) air purifiers.

STUDY DETAILS: Curtius 2020		
Total aerosol mass (PM_{10}, OPS)	The total aerosol mass was reduced from about 56 mg/m3 at the beginning of the lesson to about 9mg/m3 after about 37 min, while the total mass reduced to 30–40mg/m3	 The particle mass concentration PM_{10} in the rooms with and without air purifiers. Values are more scattered due to low counting statistics for the largest particles that contribute most to the derived mass concentration.
Composite uCPC measurements from various school lessons in a close classroom	The blue lines hows a typical slow decrease when no purifiers were used. A halving of the particle concentration was reached in 10.0, 7.0 or 5.4 min (green, black and red lines, respectively), depending on the total flow of the purifiers.	 Reduction in aerosol particle concentration in a closed classroom without air purifiers (blue line) and with 3 or 4 air purifiers operating at stage 3 (3257 m3/h per purifier, green lines; 4257 m3/h per purifier, black lines) or stage 'turbo'(4365 m3/h, red line). Data are normalized to a starting value of 10,000 particles cm3. Data are displayed for the time intervals until door or windows were opened again.

STUDY DETAILS: Curtius 2020		
Scanning mobility particle sizer (SMPS) for particles between 10 and 300 nm	The concentration levels (indicated by the colour coding) decreased markedly for all sizes over time	 Measurement of the particle size distribution in the size range 10-300 nm as a function of time in the room with air purifiers. Red and yellow colours indicate high concentrations while green and blue colours indicate low concentrations. Particles<300 nm are filtered effectively and homogeneously.
Particle concentration (OPS) applying different size bins	For all size bins measured with the OPS, the size resolved particle concentrations were decreasing evenly over time the homogeneous reduction with respect to all particle sizes was confirmed by the fact that the mean particle size stayed constant at a value of ~0.4mm (pink dashed line)	 Total (black line) and size resolved decrease of particle concentrations for seven aerosol size bins of the OPS in the size range 0.3 to 5mm. The mean particle diameter (dashed pink line) remains constant, indicating that all sizes decrease at the same rate.

STUDY DETAILS: Curtius 2020		
Concentration of virus-RNA containing aerosol particles for the case of a highly infective person	The steady state concentration of about 0.006 particles per liter is quickly reached when the air purifiers are switched on, while without purifiers the concentration increases steadily reaching 0.069-1 after 2 h. The inhaled dose for a susceptible person in the room increases over time. It reaches a value of 21 virus RNA units after 2 h. With the purifiers running, the inhaled dose is 3.3 particles after 2 h. After 2 h, the concentration of aerosol particles containing virus RNA in the room is more than 10times higher "without purifiers" compared to "with purifiers"	 Estimated concentration of aerosol particles containing virus-RNA in a closed classroom (180 m3), in which we assume that a highly infective person emits on average 0.6 particles cm3 of exhaled breath through loud speaking 50%of time and 0.06 cm3 by breathing (red line without purifiers, blue line with purifiers) with an air exchange rate of 5.7 h-1.The dashed lines show estimates of the inhaled dose of virus-RNA units that is taken up by a person in the same room for 2 h.
Additional comments		
Authors conclusions: Air purifiers can reduce the aerosol load in a classroom in a fast, efficient and homogeneous way. Overall it can be stated that the use of air purifiers with HEPA filters decreased the aerosol load strongly within the time intervals between venting by opening the windows. The homogeneous reduction of all particle sizes indicates that, in case of an infectious person being present in the room, also the virus containing aerosol particles emitted by this person from speaking or breathing will be reduced in the room air Staying for 2 h in a closed room together with a highly infective person, authors estimate that the inhaled dose via airborne transmission is reduced by a factor of six when using air purifiers with an air exchange rate of 5.7 h-1		
CI, confidence interval; MRA, magnetic resonance angiography; MRI, magnetic resonance imaging; NA, not applicable; NR, not reported; RBC, red blood cell; RCT, randomised controlled trial; TCD, transcranial Doppler		

E2.2.2 Surveillance

STUDY DETAILS: Young 2021
Citation
Young, B.C., Eyre, D.W., Kendrick, S., White, C., Smith, S., Beveridge, G., Nonnenmacher, T., Ichofu, F., Hillier, J., Oakley, S., Diamond, I., Rourke, E., Dawe, F., Day, I., Davies, L., Staite, P., Lacey, A., Mccrae, J., Jones, F., Kelly, J., Bankiewicz, U., Tunkel, S., Ovens, R., Chapman, D., Bhalla, V., Marks, P., Hicks, N., Fowler, T., Hopkins, S., Yardley, L., Peto, T.E.A., 2021. Daily testing for contacts of individuals with SARS-CoV-2 infection and attendance and SARS-CoV-2 transmission in English secondary schools and colleges: an open-label, cluster-randomised trial. The Lancet 398, 1217–1229.. doi:10.1016/s0140-6736(21)01908-5
Affiliation/Source of funds
The study was funded by the UK government Department of Health and Social Care All authors affiliated with tertiary institutions, hospitals, or the Department of Medicine in the United Kingdom DWE reports lecture fees from Gilead outside the submitted work. VB, RO, and DC are consultants employed by Department of Health and Social Care as part of Deloitte's broader project work supporting the delivery of NHS Test and Trace. TF reports honoraria from Qatar National Research Fund outside the submitted work. All other authors declare no competing interests.

STUDY DETAILS: Young 2021			
Study design	**Level of evidence**	**Location**	**Setting**
Open label, cluster-randomised controlled trial	II	England	Secondary schools and further education colleges in England.
Intervention		**Comparator**	
Voluntary daily later flow device testing for 7 days with LFD-negative contacts remaining at the school		Self-isolation of school-based COVID-19 contacts for 10 days	
Population characteristics			
Students aged ≤11 years			
Length of follow-up	**Outcomes measured**		
10 weeks	*Primary outcomes:* Number of COVID-19 related school absences among those otherwise eligible to be in school The extent of in-school SARS-CoV-2 transmission *Secondary outcomes*: Estimated rate of symptomatic and asymptomatic SARS-CoV-2 infection outside first order contacts Daily contact testing participation rates in the intervention group The proportion of contacts testing positive of asymptomatic study PCR tests and symptomatic routine PCR tests. Performance characteristics of LFD testing versus PCR testing Participation in weekly active COVID-19 case finding, Behavioural outcome for pupils, parents, and staff The estimated number of infections acquired in schools and transmission cluster sizes refined by genomic data		
INTERNAL VALIDITY			
Overall risk of bias (descriptive)			
Rating: Some concerns Description: The study has plausible bias that raises some doubt about the results.			
RESULTS			
Outcome	**Adjusted incidence rate ratio**	**Confidence interval**	***p-value***
Rate of COVID-19 related absence (aggregated data set)	0.8	0.62-1.03	0.085
Rate of symptomatic PCR confirmed infection	0.96	0.75-1.22	0.0.72
Rate of any absence	0.97	0.82-1.16	0.77
Rate of any community testing PCR confirmed infection	0.96	0.76-1.20	0.71
Proportion of asymptomatic contacts testing PCR-positive on a research PCR test	0.73	0.33-1.61	0.44
Proportion of contacts testing PCR positive while symptomatic on a routine community test	1.21	0.82-1.79	0.34
Additional comments			
Authors conclusions: This study shows that in secondary schools and colleges of further education, student and staff infection following contact with an individual with COVID-19 at school occurs in only around 2% of contacts. Switching from isolation at home to daily contact testing, at least in the setting of the school studies kept rates of symptomatic COVID-19 in students and staff at similar levels			
PCR, polymerase chain reaction			

E2.3 Nonrandomised studies

E2.3.1 Ventilation

STUDY DETAILS: Mendell 2013			
Citation			
Mendell, M.J., Eliseeva, E.A., Davies, M.M., Spears, M., Lobscheid, A., Fisk, W.J., Apte, M.G., 2013. Association of classroom ventilation with reduced illness absence: a prospective study in California elementary schools. Indoor Air 23, 515–528.. doi:10.1111/ina.12042			
Affiliation/Source of funds			
Funds for this project came from an award from the California Energy Commission (CEC) through their Public Interest Energy Research Program (PIER). The project was also supported by the Assistant Secretary for Energy Efficiency and Renewable Energy, Office of Building Technology, State, and Community Programs, of the US Department of Energy All authors affiliated with: Lawrence Berkeley National Laboratory, Berkeley, CA, USA The authors declare that they have no competing financial interests.			
Study design	**Level of evidence**	**Location**	**Setting**
Prospective cohort/ modelling study	III-3	California elementary schools over two school years	162 3rd-5th grade classrooms in 28 schools in three school districts: South Coast, Bay Area and Central Valley.
Intervention		**Comparator**	
Estimated relationship between daily illness absence (IA) and ventilation rates (VR) in zero-inflated negative binomial models. Authors also compared IA benefits and energy costs of increased VRs.		N/A	
Population characteristics			
Students and teachers in 3rd-5th grade classrooms			
Length of follow-up		**Outcomes measured**	
2 years		Daily illness absence count in each classroom CO_2 concentration Temperature Relative humidity Estimated VR per person (Vo) in l/s-person in each classroom for each school day during the study	
Method of analysis			
To estimate relationships between classroom VRs and illness absence, data was estimated from two year daily real-time carbon dioxide in each classroom from 28 schools in three climate zones within California. The associations of VRs with absence was quantified using statistical models that controlled for several potential confounding factors. The financial and energy costs for increasing classroom VRs above current levels, and financial benefits from reduced school illness absences were also estimated. Study included data only from eligible periods in each classroom (if single grade, 3rd-, 4th-, or 5th-grade classes, not dedicated special education), only plausible reported illness absence data (some periods in some schools were excluded) and only VR estimates based on plausible CO2 levels. Peak indoor CO2 levels between 600 ppm and 7000 ppm were considered plausible for equilibrium levels in occupied classrooms during a school day. The study used a zero-inflated negative binomial model to estimate the association between illness absence and ventilation rates.			
INTERNAL VALIDITY			
Overall risk of bias (descriptive)			
Rating: Moderate The study appears to provide sound evidence for a non-randomised study but cannot be considered comparable to a well-performed randomised trial.			

STUDY DETAILS: Mendell 2013			
RESULTS			
Association between classroom ventilation rate (VR) metrics and daily classroom proportion of illness absence			
Outcome	**n**	**IRR (95% CI)**	**P value**
VR averaging period (all districts)	3 days: 28396 7 days: 20180 14 days: 30892 21 days: 31208	3 days: 0.986 (0.975 – 0.997) 7 days: 0.984 (0.971 – 0.996) 14 days: 0.983 (0.969 – 0.997) 21 days: 0.982 (0.968 – 0.997)	3 days: p = 0.01 7 days: p = 0.01 14 days: = 0.02 21 days: p = 0.02

Table 4 Adjusted IRR estimates[a] and 95% confidence intervals (CI)[b] from zero-inflated negative binomial models for association between classroom ventilation rate (VR) metrics and daily classroom proportion of illness absence, per increase of 1 l/s-person VR in observed range of 1–20 l/s-person

	SC district			BA district			CV district			All districts		
VR averaging period	*n*	IRR	(95% CI[b]) *P* value	*n*	IRR	(95% CI[b]) *P* value	*n*	IRR	(95% CI[b]) *P* value	*n*	IRR	(95% CI[b]) *P* value
3 days[c]	13 363	0.990	(0.982–0.998) $P = 0.01$	5252	0.988	0.963–1.01 $P = 0.38$	9781	1.000	(0.980–1.02) $P = 1.0$	28 396	0.986	(0.975–0.997) $P = 0.01$
7 days[c]	14 318	0.988	(0.980–0.997) $P = 0.01$	5742	0.985	0.951–1.02 $P = 0.40$	10 120	0.990	(0.964–1.02) $P = 0.47$	30 180	0.984	(0.971–0.996) $P = 0.01$
14 days[c]	14 559	0.987	(0.978–0.997) $P = 0.008$	5955	0.988	0.945–1.03 $P = 0.61$	10 378	0.991	(0.962–1.02) $P = 0.54$	30 892	0.983	(0.969–0.997) $P = 0.02$
21 days[c]	14 664	0.987	(0.977–0.997) $P = 0.01$	6106	0.987	0.940–1.04 $P = 0.60$	10 438	0.980	(0.952–1.01) $P = 0.19$	31 208	0.982	(0.968–0.997) $P = 0.02$

CI, confidence interval; IRR, incidence rate ratio; L, liter; s, second, VR, ventilation rate.
[a]Estimates are the relative (multiplicative) change in the outcome for each increase of 1 l/s-person; models adjusted, in the main part of the model, for grade level, day of the week, proportion free lunch program, and proportion male; and in the zero-inflated part, for day of week, winter season, and total count (from demographics data).
[b]Bootstrapped.
[c]Ending on day prior to day on which illness absence assessed.

Situation	***Ventilation rate (l/s – person) Mean (SD)***
South Coast district	8.43 (5.53)
Bay Area district	6.17 (4.03)
Central Valley district	3.11 (2.01)
Building rate: portable classroom	6.77 (4.80)
Building rate: permanent classroom	4.98 (4.53)
Ventilation type: Natural	7.42 (4.91)
Ventilation type: Mechanical/No air conditioning	8.98 (5.31)
Ventilation type: Air conditioning	3.51 (2.50)

STUDY DETAILS: Mendell 2013

Table 2 Distribution of peak (estimated equilibrium) indoor CO_2 concentrations[a] and estimated ventilation rates by district, building type, and ventilation type

	Peak (estimated equilibrium) CO_2 concentration (ppm)[b]							VR (l/s-person)[b]						
	5th % ile	25th %ile	50th %ile	75th %ile	95th %ile	Mean	s.d.	5th %ile	25th %ile	50th %ile	75th %ile	95th %ile	Mean	s.d.
School district														
SC	654	853	1140	1700	2640	1350	652	2.31	3.98	7.01	11.40	20.30	8.43	5.53
BA	769	1040	1400	2040	3220	1630	770	1.83	3.15	5.14	8.08	14.00	6.17	4.03
CV	1200	1850	2380	3030	4170	2490	901	1.37	1.97	2.61	3.55	6.43	3.11	2.01
Building type														
Permanent	702	984	1390	2000	3020	1570	734	1.97	3.23	5.24	8.84	17.10	6.77	4.80
Portable	750	1260	2060	2880	4080	2160	1060	1.40	2.09	3.12	6.03	14.80	4.98	4.53
Ventilation type														
Natural	695	914	1270	1813	2760	1450	672	2.19	3.66	5.95	10.10	17.50	7.42	4.91
Mechanical/no AC	650	848	1080	1420	2230	1200	485	2.83	5.05	7.56	11.50	20.60	8.98	5.31
AC	1010	1700	2280	2950	3990	2370	916	1.44	2.03	2.75	3.99	8.50	3.51	2.50

AC, air-conditioning; BA, Bay Area; CV, Central Valley; SC, South Coast; s.d., standard deviation; VR, ventilation rate.

[a]Data in this table include all valid CO_2 measurements, without exclusion due to invalid associated illness absence data.

[b]Because peak indoor CO_2 concentrations below 600 ppm and above 7000 ppm were excluded, these constituted the potential minimum and maximum values across all districts for peak (estimated equilibrium) CO_2 concentrations, and the corresponding values for minimum and maximum VRs (0.8 and 25.9 l/s-person).

Association between classroom ventilation rate metric and daily classroom proportion of illness absence for each additional 1 l/s of VR

District	Estimated proportion of change (%)
Illness absences South Coast	Lower by 1.0-3.1%
Illness absences Bay Area	Lower by 1.2-1.5%
Illness absences Central valley	Lower by 0.0-2.0%

STUDY DETAILS: Mendell 2013

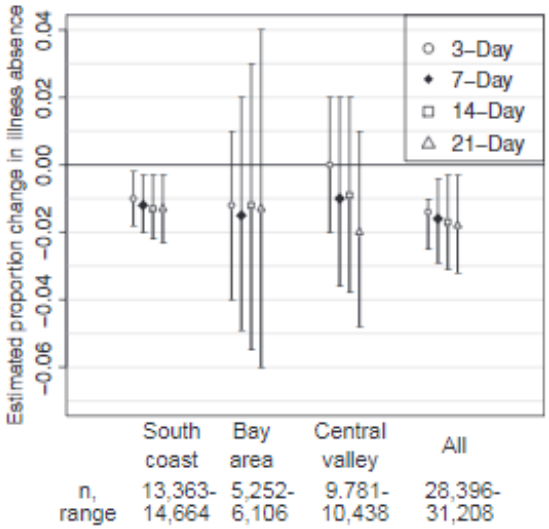
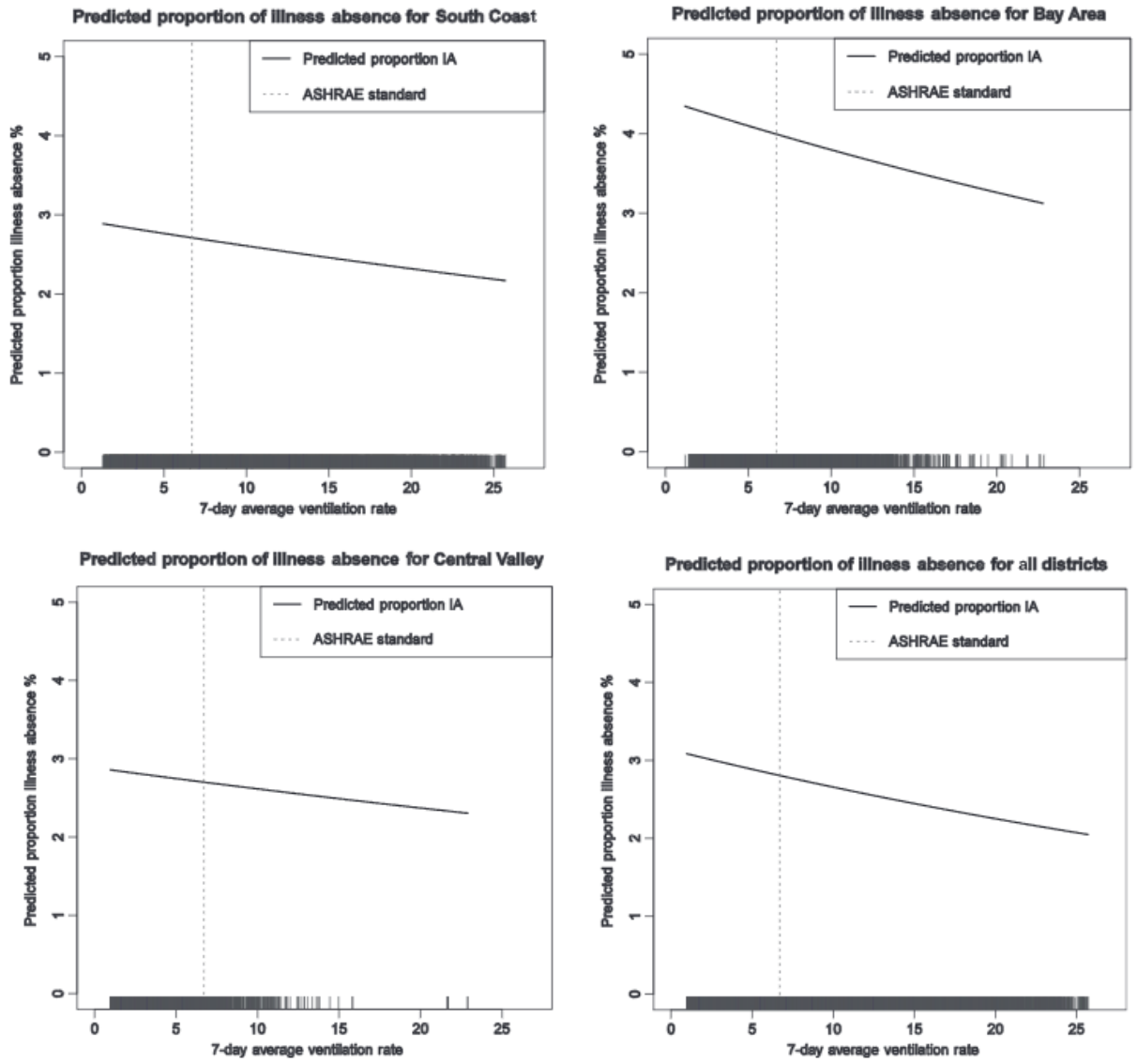


Fig. 2 Estimated proportion (%) change in illness absence with increase of 1 l/s-person of VR, within observed range 1–20 l/s-person, by district and for combined districts, for four VR-averaging metrics (ventilation-averaging metrics end on day prior to day of illness absence assessment)

STUDY DETAILS: Mendell 2013



Additional comments

Authors conclusions:

Higher VRs in classrooms were associated consistently with decreased illness absence, although small sample sizes made this association somewhat less certain in some school districts. Keeping VRs below recommended levels in classrooms saves energy and money but, if the associations seen here are causal, has unrecognized but much larger costs from increased health problems and illness absence among students. Increasing VRs above the recommended minimum levels, even up to 15 l/s-per-son or higher, may further substantially decrease ill-ness absence. The relationships found in this study are consistent with, but do not prove, a causal relationship between increased VRs in elementary school classrooms and decreased ill-ness absence

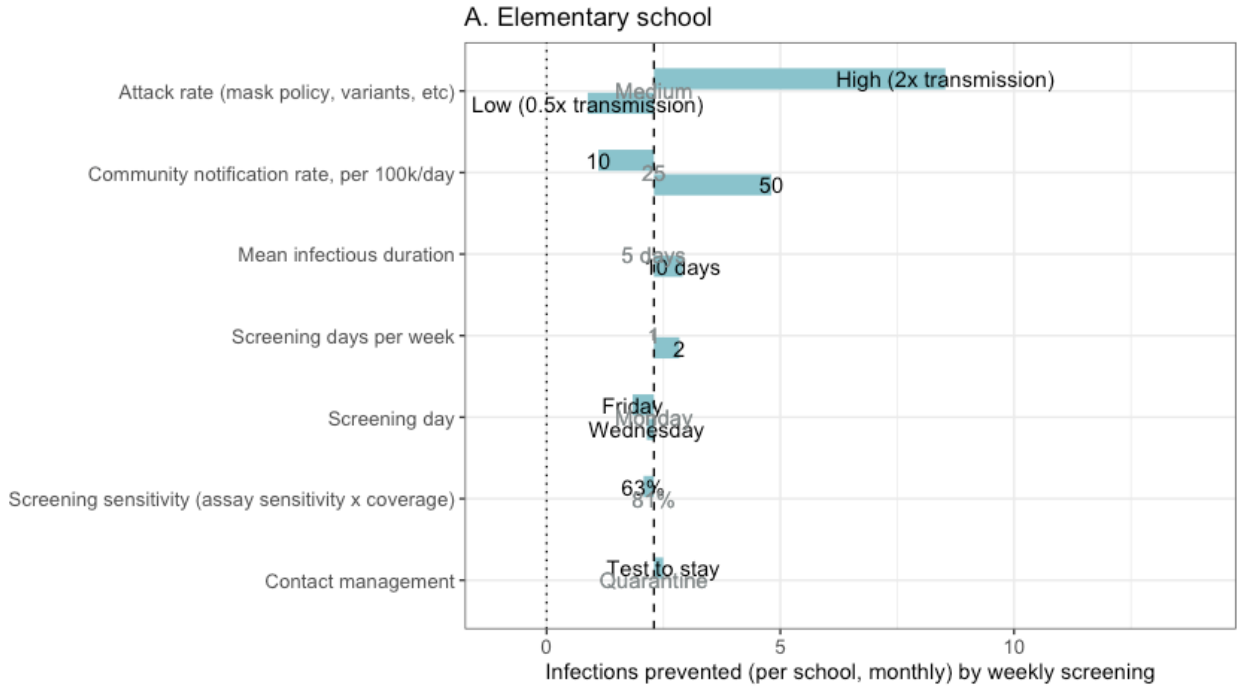
CI, confidence interval; IRR, incidence rate ratio; L, litre; s, second, VR, ventilation rate.

E2.3.2 Surveillance

STUDY DETAILS: Bilinski 2021			
Citation			
Bilinski A, Ciaranello A, Fitzpatrick MC, Giardina J, Shah M, Salomon JA, Kendall EA. SARS-CoV-2 testing strategies to contain school-associated transmission: model-based analysis of impact and cost of diagnostic testing, screening, and surveillance. medRxiv [Preprint]. 2021 Aug 10:2021.05.12.21257131. doi: 10.1101/2021.05.12.21257131. PMID: 34401893; PMCID: PMC8366814.			
Affiliation/Source of funds			
Details on funding or potential conflicts of interest not provided. All authors affiliated with Hospitals or tertiary institutions in America			
Study design	**Level of evidence**	**Location**	**Setting**
Modelling study	III	USA	Elementary and middle school communities
Intervention		**Comparator**	
Screening for COVID-19		No screening	
Population characteristics			
Children at elementary and middle schools in the US			
Length of follow-up		**Outcomes measured**	
NR		Cumulative incidence of SARS-CoV-2 infection; proportion of cases detected; proportion of planned and unplanned days out of school; and the cost of testing programs and of childcare costs associated with different strategies	
Method of analysis			
Implementation of a previously published SEIR model of COVID-19 transmission. The model drew stochastic outcomes assuming an average incubation period of three days prior to the onset of infectiousness, two days of pre-symptomatic transmission if symptoms develop, total infectious time of five days, and overdispersion of infectivity in adolescents and adults.			
INTERNAL VALIDITY			
Overall risk of bias (descriptive)			
Rating: Moderate The study has some important problems and cannot be considered comparable to a well-performed randomised trial.			
RESULTS			

Condition	**Infected (Proportion of school per month)**	**Difference in proportion of school infected, per month vs full-time without screening**	**Proportion of incremental Infections prevented**	**Proportion of cases detected**	**Proportion of in-person attendance**
With vs. without weekly screening for 5-day attendance					
5-day no screening, quarantine	0.01	0	0	0.23	0.989
5-day no screening, test-to-stay	0.01	0.0002	–0.06	0.23	0.999
5-day, 1x/week screening, quarantine	0.08	–0.0016	–0.57	0.66	0.97
5-day, 1x/week screening, test-to- stay	0.009	–0.0013	0.46	0.73	0.999
5-day, 2x/week screening, quarantine	0.008	–0.0019	0.69	0.77	0.968
5-day, 2x/week screening, test-to- stay	0.008	–0.0017	0.61	0.88	0.998

STUDY DETAILS: Bilinski 2021



Additional comments

Authors conclusions:

"Test to stay" policies and/or screening tests can facilitate consistent in-person school attendance with low transmission risk across a range of community incidence. Surveillance may be a useful reduced-cost option for detecting outbreaks and identifying school environments that may benefit from increased mitigation

STUDY DETAILS: Forster 2021

Citation

Forster J, Streng A, Rudolph P, Rücker V, Wallstabe J, Timme S, Pietsch F, Hartmann K, Krauthausen M, Schmidt J, Ludwig T, Gierszewski D, Jans T, Engels G, Weißbrich B, Romanos M, Dölken L, Heuschmann P, Härtel C, Gágyor I, Figge MT, Kurzai O, Liese J; Wü-KiTa-CoV Study Group. Feasibility of SARS-CoV-2 Surveillance Testing Among Children and Childcare Workers at German Day Care Centers: A Nonrandomized Controlled Trial. JAMA Netw Open. 2022 Jan 4;5(1):e2142057. doi: 10.1001/jamanetworkopen.2021.42057. PMID: 34982157; PMCID: PMC8728621.

Affiliation/Source of funds

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All authors affiliated with the University of Wuerzburg, Germany

Details on conflicts of interest provided in detail

Study design	Level of evidence	Location	Setting
Nonrandomised Trial	III-2	Wuerzburg, Germany	Multicentre: 9 daycare centres

STUDY DETAILS: Forster 2021	
Intervention	**Comparator**
Each participating day care centre was assigned nonrandomly to 1 of 4 testing approaches (modules 1-4) for 12 weeks. Continuous surveillance of asymptomatic children and childcare workers by SARS-CoV-2 polymerase chain reaction testing of either mid-turbinate nasal swabs twice weekly (module 1) or once weekly (module 2) or self-sampled saliva samples twice weekly (module 3).	Module 4 involved symptom-based, on-demand testing of children, childcare workers, and their household members by oropharyngeal swabs
Population characteristics	
Children and childcare workers in 9 day care centres in Wuerzbrug, Germany. The study enrolled 812 children and 182 CCWs.	
Length of follow-up	**Outcomes measured**
SARS-CoV-2 testing was continuous in the 9 day care centres from October 2020 to March. Questionnaires on attitudes and perception of the pandemic were administered in weeks 1, 6, and 12.	The primary outcomes were acceptance of the respective surveillance protocols (feasibility study) and the estimated number of secondary infections (ASI) (mathematical modelling).
Method of analysis	
To determine the module's association with consent into surveillance, we performed univariable and multivariable logistic regression analysis on the attitude of the parents toward SARS-CoV-2 variables and sociodemographic factors, such as age, sex, and school. Secondary end points included initial consent rates to respiratory surveillance (modules 1-4), dropout rates (modules 1-3), and acceptance of finger-prick blood sampling, stratified by children and CCWs. For the mathematical model, To estimate infection spread within the DCC for various scenarios, we simulated each scenario 40 000 times, calculated the average number of secondary infections (ASI), and compared those between different scenarios. A 1-sided permutation test was used to calculate significance, with the threshold set at $p < .001$	
INTERNAL VALIDITY	
Overall risk of bias (descriptive)	
Rating: Moderate The study appears to provide sound evidence for a non-randomised study but cannot be considered comparable to a well-performed randomised trial.	
RESULTS	

Outcome	**Intervention**	**Comparator**
***Continuous testing (modules 1, 2, 3) vs.* Testing of symptomatic participants (module 4)**		
Prevalence of SARS-CoV-2 N = 4755	No SARS-CoV-2 infection was detected in either asymptomatic children (3442 tests) or CCWs (1099 tests) during the regular 12-week study period	214 oropharyngeal swabs from 179 symptomatic participants were conducted, and SARS-CoV-2 was detected in 2 participants (1 CCW and 1 adult household member)
Testing vs. no testing		
Average number of secondary infections (ASI)	Mon testing: reduces ASI by 39.24% Mon-Wed testing: reduce ASI by 50.26% Mon-Wed-Fri testing: reduces ASI by 55.28%	
Testing vs. no testing for regular quarantine policy		
Average number of secondary infections (ASI)	Mon testing: reduces ASI by 70.11% Mon-Wed testing: reduce ASI by 87.01% Mon-Wed-Fri testing: reduces ASI by 94.06%	

Additional comments
Authors conclusions: In this nonrandomized controlled trial, surveillance for SARS-CoV-2- 2 in 9 German day care centres was feasible and well accepted. Mathematical modelling estimated that testing can minimize the spread of SARS-CoV-2 in day care centres. These findings enable setup of surveillance programs to maintain institutional childcare.
ASI, average number of secondary infections; CI, confidence interval

Appendix F Differences between protocol & review

F1 Methods not implemented

There were some methods that were not implemented in the review relating to the following sections:

Outcome measures

The protocol noted outcomes reported at different timepoints (across studies) will be grouped and considered as follows: short term, intermediate term, long-term, or not specified, however this was not relevant to the outcomes identified in the included studies.

We also noted that severity of illness, length of the illness and behaviour or practice change would be considered however no studies reporting these outcomes were identified.

Data collection and analysis

The protocol specified if a study used (and reported) different approaches to assess the effect of the intervention, data would be extracted based on full intention to treat analysis, modified intent to treat analysis and as treated or per-protocol analysis. No studies were identified which used different approached to assess the effect of the intervention.

F2 Changes from protocol

There were some differences between the protocol and review relating to the following sections:

Literature search

The protocol specified a text search of OpenGrey, clinical trial registries (ClinicalTrials.gov, WHO International Clinical Trials Registry Platform) and websites of suitable international and national agencies including WHO, CDC, NICE, CADTH, Agency for Healthcare Research Quality, State and Commonwealth Departments of Health. and Guideline databases (MAGICApp, Guidelines International Network), would be undertaken. Instead, the literature was supplemented with sources identified in SRs, including an umbrella review by Zhao, Jatana (6) and Epistemonikos.

Study setting

Studies set in aged care, tertiary hospitals and other acute health care settings were not eligible for inclusion, however evidence from some SRs included data from health care settings, this was highlighted, and GRADE certainty of evidence was downgraded where appropriate. For some outcomes, such as eye protection and ventilation, no evidence was available in a child-care setting and evidence from healthcare or workplace settings was included.

Types of interventions

The protocol specified interventions would not be bundled but stratified based on the type of intervention. An exception was made for the combined intervention of hand hygiene and face masks. Additionally, one SR review was identified that examined measures implemented in the school setting to contain the COVID-19 pandemic (24), grouped interventions into four broad categories. These were presented in a ‘combined interventions’ category in the evaluation report.

Comparators

There were no restrictions on comparators, the protocol noted that the review will stratify the evidence into three comparisons: (i) no intervention (inclusive of placebo or sham [if considered inactive]); (ii) less intense interventions; and (iii) alternative interventions (inclusive of sham if considered active). Instead, interventions were compared to pooled comparators, no or alternative, less intense intervention. There was inconsistency in the comparators between different studies examined by the SRs. For example, where hand hygiene was compared to control, this was unlikely to have been no hand hygiene, rather this was likely to have been compared to a less intense/ rigorous hand hygiene intervention.

The protocol also specified where an intervention was delivered as an adjunct to another intervention (i.e. mask wearing plus hand hygiene versus hand hygiene alone), the study will also be considered alongside those studies that use an inactive intervention (i.e. mask wearing versus no intervention). Instead, pooled interventions were considered separately.

Risk of bias

It was intended that eligible SRs that were assessed to have one or more critical flaw (i.e., Low or Critically Low methodological quality) would not included in the evidence synthesis because it was considered likely that eligibility criteria or other data would need to be verified from primary sources. Given the limited availability of evidence for some outcomes, SR assessed with more than one critical flaw were included in the evidence synthesis.

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The Research Protocol was written and developed by **HT**ANALYSTS in conjunction with the NHMRC.

Contributions of authors

The evidence evaluation report was written and developed by **HT**ANALYSTS, with evidence synthesis (statistical analysis and GRADE) conducted by the following lead reviewers: Margaret Jorgensen, Kate Nolan and Sinead McCraith.

Declarations of interest

All named authors declare they have no financial, personal or professional interests that could be construed to have influenced the conduct or results of this systematic review.

In line with the process to establish any NHMRC committee, each committee member was asked to disclose their interests. Potential conflicts of interest among NHMRC SHAC members are lodged with the NHMRC and are available online.

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