

notat

COVID-19-EPIDEMIEN:

Effekt av målrettede teststrategier for
å begrense smitte av covid-19
– en hurtigoversikt

Tittel	Effekt av målrettede teststrategier for å begrense smitte av covid-19 – en hurtigoversikt
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Hovedfunn

Målrettet testing eller screening kan være en aktuell strategi for å begrense smitte-spredning av SARS-CoV-2, særlig fordi mange kan være smittsomme uten å oppleve symptomer. Målsettingen med denne hurtigoversikten var å identifisere studier som sammenlignet ulike teststrategier med tanke på å vurdere effekt på smittespredning. Gjennom systematisk søk i Ovid Medline, Cochrane COVID-19 Study Register og Cochrane Central i november 2020 identifiserte vi 1485 unike referanser, men ingen av disse var egnet til å si noe om effekt av ulike teststrategier på smittespredning.

Gjennom søket identifiserte vi en lang rekke tverrsnittsstudier der pasienter og ansatte på sykehus og i pleieinstitusjoner ble screenet for SARS-CoV-2. Utvalgte studier ble listet og visuelt framstilt for å muligens kunne si noe om utbredelsen av smitte, men det er uklart i hvilken grad testingen påviser tilfeller som ikke er smitte-førende og i hvilken grad påvisningen skjer tidlig nok til å hindre smitte. Resultatene er også sensitive for endringer i det generelle smittetrykket. De identifiserte tverrsnittsstudiene egner seg derfor dårlig til å konkludere om effekt av ulike test- og screeningstrategier.

Key messages

Targeted testing or screening may be an appropriate strategy to limit the spread of SARS-CoV-2, especially as many people may be contagious without experiencing symptoms. The aim of this rapid overview was to identify studies comparing different test strategies aiming to assess the effectiveness of different test and screening strategies on the transmission of SARS-CoV-2. Through systematic searches in Ovid Medline, Cochrane COVID-19 study registers and Cochrane Central in November 2020, we identified 1485 unique references. None of identified publications compared the effect of different test strategies on virus transmission directly.

We identified many cross-sectional studies in which patients and staff in hospitals and nursing homes were screened for SARS-CoV-2. Selected studies were listed and visually displayed, as they may tell us something about the prevalence of infection. It is unclear to what extent the tests detect non-infectious cases and whether the detection takes place early enough to prevent infection. The identified cross-sectional studies are therefore not suited to conclude about the effect of different test and screening strategies.

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Bakgrunn

Screening kan være en aktuell strategi for å begrense smittespredning av SARS-CoV-2, særlig fordi mange kan være smittsomme uten å oppleve symptomer. Grovt sett kan man skille mellom universell screening og mer målrettede teststrategier der hensikten er å hindre at smitte får spre seg til spesielt sårbare omgivelser, for eksempel på sykehus eller i pleieinstitusjoner.

Målet med denne hurtigoversikten var å identifisere studier som sammenlignet smittespredning ved bruk av ulike test- og screeningstrategier.

Metode

Inklusjonskriteriene er oppsummert i tabell 1. Som det fremgår av tabellen ønsket vi primært å inkludere sammenlignende studier, og vi ønsket å skille mellom tre ulike settinger:

- Screening av gruppe for å hindre smitte inn på sårbare institusjoner, for eksempel gjennom screening av ansatte ved sykehjem eller sykehus
- Screening av en definert gruppe for å hindre smitte innad i gruppen, for eksempel gjennom jevnlig testing ved skoler, universiteter, arbeidsplasser, sykehjem
- Screening av større populasjoner for å hindre smitte i samfunnet, for eksempel massescreening i byer eller land

Ikke-sammenlignende studier og modelleringsstudier ble ekskludert, men ettersom vi ikke identifiserte noen relevante sammenlignende studier valgte vi likevel å liste tverrsnittsstudier som hadde målt og rapportert antall smittede og andel asymptomatisk smittede. De identifiserte tverrsnittsstudiene hadde benyttet ulike typer tester (antistoff, antigen og RT-PCR), men av arbeidsbegrensende hensyn listet vi bare studier som benyttet RT-PCR i relevante settinger.

Tabell 1 Inklusjonskriterier

Populasjon	Personer som kan være smittet av SARS-CoV-2 uavhengig av om de har symptomer eller ikke
Intervensjon	Screening eller målrettet testing med molekylære tester eller antigentester
Sammenligning	Ingen testing, andre typer tester (for eksempel temperaturscreening) eller andre teststrategier
Utfall	Smittespredning eller antall påviste smittede
Studiedesign	Sammenlignende studier

Litteratursøk

Forskningsbibliotekar Elisabet Hafstad utførte systematisk litteratursøk i Ovid MEDLINE, Cochrane COVID-19 study register, Cochrane Central Register of Controlled Trials. Søket baserte seg på å kombinere søkeord for tilstanden (for eksempel *coronavirus*) og søkeord for teststrategi (for eksempel *screening*, *PCR*, *antibody*, *antigen* eller *immunoassay*). Søkestrategiene ble utført 18. november og er nærmere beskrevet i Vedlegg 1.

Seleksjon

Én person gjennomgikk alle søker treff og vurderte disse opp mot seleksjonskriteriene. Ved tvil om inklusjon ble artiklene innhentet i fulltekst.

Risiko for skjevheter

Vi vurderte ikke kvaliteten til eller risiko for skjevheter i inkluderte studier

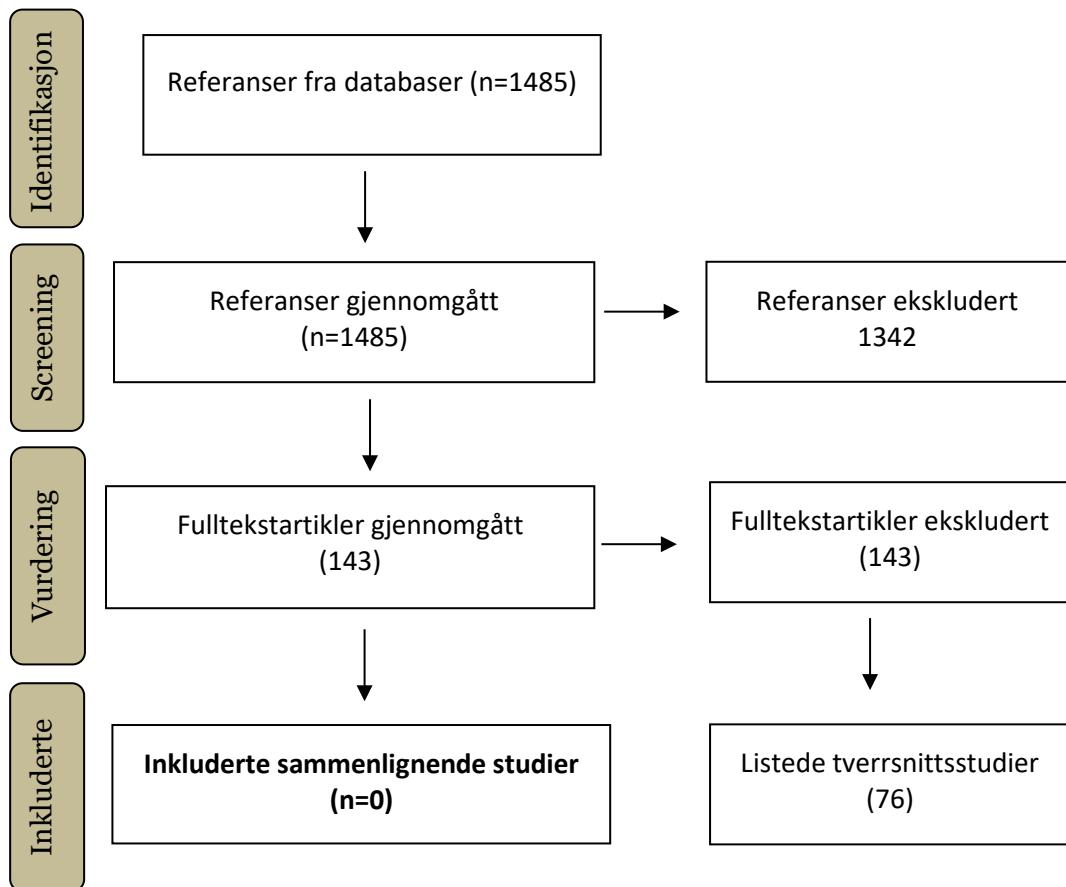
Kvalitetssikring

Joakim Øverbø (Smittevern, FHI) leste gjennom hurtigoversikten før publisering.

Resultat

Litteratursøket resulterte i 1485 unike treff. Etter gjennomgang av titler, sammandrag og fulltekst ble det klart at vi ikke hadde identifisert noen sammenlignende studier (Figur 1).

I mangel på studier som tilfredsstilte de forhåndsdefinerte inklusjonskriteriene har vi likevel valgt å liste noen tverrsnittsstudier der det ble benyttet tester for å identifisere personer med SARS-CoV-2 i relevante settinger. Vi valgte da å begrense rapporteringen til studer der smitte ble påvist ved hjelp av PCR-tester, det vil i alt si 76 studier (1-76).



Figur 1. Flytdiagram

Sammenlignende studier

Vi identifiserte ingen studier som sammenlignet effekt av ulike screeningstrategier.

Tverrsnittsstudier

I mangel på sammenlignende studier valgte vi å lage tabeller og visuelle plot av tverrsnittsstudier. Ulike studier hadde benyttet ulike typer tester (antistofftester, antigentester og PCR). Flertallet av studiene hadde benyttet PCR, og av arbeidsbegrensende hensyn begrenset vi oss til å gjengi resultatene i disse. Disse studiene gir ikke direkte svar på effekt av ulike screeningstrategier, men forteller hvor mange smittede som potensielt kan fanges opp. Antall smittetilfeller vil avhenge av det generelle smittetrykket i samfunnet, og hvor smitteutsatte den testede populasjonen er.

Det er mange forhold som påvirker smittespredningen i en populasjon og som bidrar til at tversnittstudier egner seg dårlig til å vurdere effekt av ulike teststrategier. For at testing for covid-19 skal ha effekt på smittespredning må smittede personer oppdages forholdsvis tidlig i infeksjonsforløpet og effektiv isolering og smittesporing iverksettes. Det er usikkerhet knyttet til graden av smitte fra personer som blir asymptomatiske gjennom hele infeksjonen. Ulike teststrategier implementeres ofte sammen med andre smitteverntiltak. Samlet gjør dette at man må være svært varslig med å trekke konklusjoner om effekt av teststrategier basert på tverrsnittsstudier.

Tverrsnittsstudiene som er listet i Vedlegg 2 (1-76), er sortert etter setting: Gravide pasienter på sykehus, pasienter på sykehus, ansatte på sykehus, beboere på pleieinstitusjon, ansatte på pleieinstitusjon og annet. Studiene var stort sett gjennomført i forbindelse med smittetoppen våren 2020, og de var utført i Australia, Belgia, Canada, Egypt, Frankrike, India, Italia, Japan, Kina, Kypros, Malaysia, Nederland, Portugal, Saudi-Arabia, Slovenia, Spania, Storbritannia, Sør-Afrika, Sør-Korea, Tyrkia, Tyskland og USA.

Diskusjon og oppsummering

Vårt litteratursøk ledet ikke til funn av sammenlignende studier som undersøkte effekt av ulike screeningstrategier. Dette er i overensstemmelse med en hurtigoversikt som ble publisert innen Cochrane-samarbeidet i september 2020 som heller ikke identifiserte sammenlignende studier (77). Oversikten fra Cochrane inkluderte to modelleringssstudier som kunne tyde på at symptomscreening på reiseknutepunkt og screening av personell på akuttmottak kan bidra til å redusere smittespredning i noen grad, men disse resultatene er svært usikre.

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Vedlegg 1

Søkestrategier

Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R) 1946 to November 18, 2020		
Søkegrensesnitt: Advanced Search		
1	((pneumonia or covid* or coronavirus* or corona virus* or ncov* or 2019-ncov or sars*).mp. or exp pneumonia/) and Wuhan.mp. or (2019-ncov or ncov19 or ncov-19 or 2019-novel CoV or sars-cov2 or sars-cov-2 or sarscov2 or sarscov-2 or Sars-coronavirus2 or Sars-coronavirus-2 or SARS-like coronavirus* or coronavirus-19 or covid19 or covid-19 or covid 2019 or ((novel or new or nouveau) adj2 (CoV or nCoV or covid or coronavirus* or corona virus or pandemi*2)) or ((covid or covid19 or covid-19) and pandemic*2) or (coronavirus* and pneumonia)).mp. or COVID-19.rx,px,ox. or severe acute respiratory syndrome coronavirus 2.os.	76390
2	mass screening/ or mandatory testing/ or (screen* or ((mandatory OR mass or population* or repeat* or specific or strateg* or targeted or universal) adj4 testing)).ti,ab,kf.	900251
3	"Diagnostic Techniques and Procedures"/ or exp Clinical Laboratory Techniques/ or ((lab or laborator*) adj (confirm* or diagnos* or screen* or test*)).ti,ab,kf	2667837
4	nucleic acid amplification techniques/ or exp polymerase chain reaction/ or (Polymerase Chain Reaction or PCR or qPCR or rtPCR).ti,ab,kf. or (nucleic acid adj (amplification or test*)).ti,ab,kf.	876638
5	exp Immunoassay/ or (immunoassay? or Enzyme-Linked Immunosorbent Assay? or ELISA or chemoluminescence assay? or CLIA or lateral flow assay?).ti,ab,kf. or ((detect* or identif* or test* or immuno* or assay?) adj2 (antibod* or anti bod* or antigen*).ti,ab,kf. or (IgM adj2 IgG).ti,ab,kf.	753839
6	"Clustered Regularly Interspaced Short Palindromic Repeats"/ or (CRISPR or "Clustered Regularly Interspaced Short Palindromic Repeats" or DTECTR).ti,ab,kf	20956
7	1 and 2 and (or/3-6)	1330

Cochrane COVID-19 Study Register https://covid-19.cochrane.org/		
1	"mandatory testing" OR "mass testing" OR "mass-testing" OR "population testing" OR "repeated testing" OR "specific testing" OR "strategic testing" OR "targeted testing" OR "testing strategy" OR "universal testing"	122 studier (133 referanser)

Cochrane Central Register of Controlled Trials (Wiley), Issue 11 of 12, November 2020
Søkegrensesnitt: Advanced search – Search manager

#1	(([mh pneumonia] OR (pneumonia OR covid* OR coronavirus* OR corona NEXT virus* OR ncov* OR "2019-ncov" OR sars*):ab,kw,ti) AND Wu-han:ab,kw,ti)	138
#2	("2019-ncov" OR ncov19 OR "ncov-19" OR "2019-novel CoV" OR "sars-cov2" OR "sars-cov-2" OR sarscov2 OR "sarscov-2" OR "sars-coronavirus2" OR "sars-coronavirus-2" OR SARS-like NEXT coronavirus* OR "coronavirus-19" OR covid19 OR "covid-19" OR "covid 2019"):ab,kw,ti	2801
#3	((novel OR new OR nouveau) near/2 (CoV OR nCoV OR covid OR coronavirus* OR "corona virus" OR pandemi*)):ab,kw,ti	413
#4	(coronavirus* AND pneumonia):ab,kw,ti	599
#5	(covid OR covid19 OR covid NEXT 19):ab,kw,ti AND pandemic*:ab,kw,ti	537
#6	[mh ^"Mass Screening"] OR [mh ^"Mandatory Testing"] OR (screen* OR ((mandatory OR mass OR population* OR repeat* OR specific OR strateg* OR targeted OR universal) NEAR/4 testing)):ti,ab,kw	74456
#7	[mh ^"Diagnostic Techniques and Procedures"] OR [mh "Clinical Laboratory Techniques"] OR ((lab OR laborator*) NEXT (confirm* OR diagnos* OR screen* OR test*)):ti,ab,kw	54810
#8	[mh ^"Nucleic Acid Amplification Techniques"] OR [mh "Polymerase Chain Reaction"] OR ("Polymerase Chain Reaction" OR PCR OR qPCR OR rtPCR):ti,ab,kw OR ("nucleic acid" NEXT (amplification OR test*)):ti,ab,kw	14971
#9	[mh Immunoassay] OR (immunoassay? OR Enzyme-Linked NEXT Immunosorbent NEXT Assay? OR ELISA OR chemoluminescence NEXT assay? OR CLIA OR lateral NEXT flow NEXT assay?):ti,ab,kw OR ((detect* OR identif* OR test* OR immuno* OR assay?)) NEAR/2(antibod* OR anti-bod* OR antigen*):ti,ab,kw OR (IgM NEAR/2 IgG):ti,ab,kw	23636
#10	[mh ^"Clustered Regularly Interspaced Short Palindromic Repeats"] OR (CRISPR OR "Clustered Regularly Interspaced Short Palindromic Repeats" OR DETECTR):ti,ab,kw	21
#11	{OR #1-#5} AND #6 AND {OR #7-#10}	114

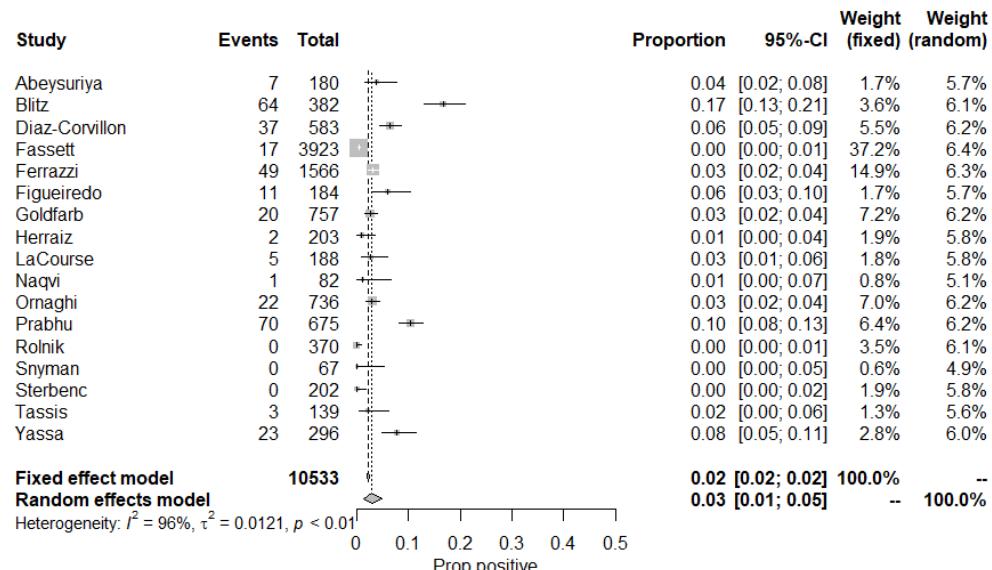
Vedlegg 2

Healthcare setting – hospital - pregnant women

Universal testing of pregnant women (symptomatic and asymptomatic cases)

Study	N*	Test period	Prevalence	Asymptomatics	Country
Abeyseuriya 2020 (1)	180	4 weeks after lockdown	3.9% (7/180)	85.7% (6/7)	UK (England)
Blitz 2020 (2)	375	2-9/4	17.1% (64/382)	70.3% (45/64)	USA
Diaz-Corvillon 2020 (3)	583	27/4-7/6	6.4% (37/583)	43.2% (16/37)	Chile
Fassett 2020 (4)	3923	6/4-11/5	0.43% (17/3923)	100% (17/17)	USA
Ferrazzi 2020 (5)	1566	10-26/4	3.1% (49/1566)	55% (27/49)	Italy
Figueiredo 2020 (6)	184	19/3-4/5	6% (11/184)	82% (9/11)	Portugal
Goldfarb 2020 (7)	757	18/4-5/5	2.6% (20/757)	45% (9/20)	USA
Herraiz 2020 (8)	203	8/4-2/5	1% (2/203)	50% (1/2)	Spain
LaCourse 2020 (9)	188	2/3-15/4	2.7% (5/188)	20% (1/5)	USA
Naqvi 2020 (10)	82	4/4- (1 week)	1.2% (1/82)	0%	USA
Ornaghi 2020 (11)	736	8/4- ?	3% (22/736)	59.1% (13/22)	Italy
Prabhu 2020 (12)	675	April (4 weeks)	10.4% (70/675)	78.6% (55/70)	USA
Rolnik 2020 (13)	350	6-19/5	0%	**	Australia
Snyman 2020 (14)	67	?	0%	**	South Africa
Sterbenc 2020 (15)	202	15/3-16/5	0%	**	Slovenia
Tassis 2020 (16)	139	1-9/4	2.2% (3/139)	33.3% (1/3)	Italy
Yassa 2020 (17)	296	27/4- (1 month)	7.8% (23/296)	52.2% (12/23)	Turkey

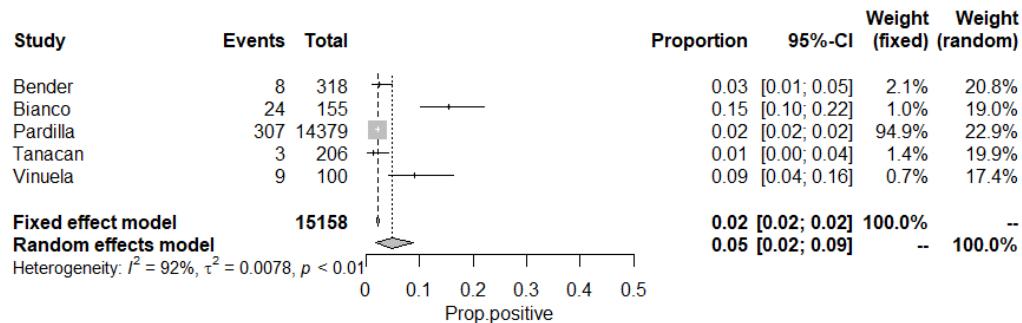
* Number of people tested. **All tests negative, so not possible to calculate



Testing of asymptomatic pregnant women

Study	N*	Test period	Prevalence	Country
Bender 2020 (18)	318	13/4-26/4	2.5% (8/318)	USA
Bianco 2020 (19)	155	4-15/4	15.5% (24/155)	USA
Pardilla 2020 (20)	14379	April-May	2.1% (307/14379)	Spain
Tanacan 2020 (21)	206	15/4-5/6	1.5% (3/206)	Turkey
Viñuela 2020 (22)	100	6/5-?	9% (9/100)	Spain

* Number of people actually tested.

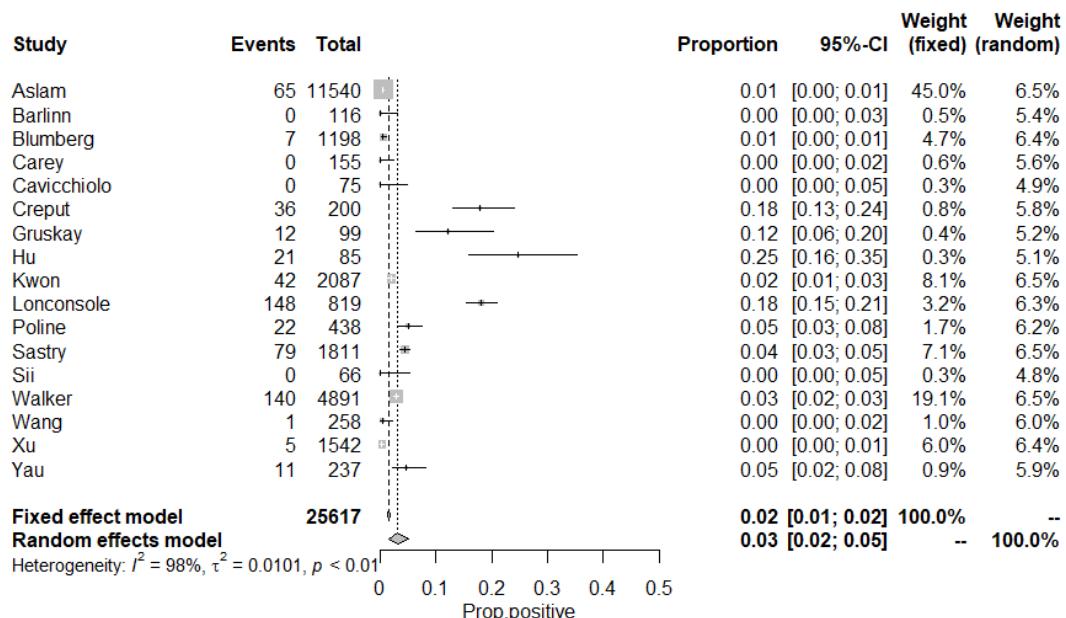


Healthcare setting – hospital – patients

Universal testing of patients (symptomatic and asymptomatic cases)

Study	N*	Test period	Prevalence	Asymptomatics	Country
Aslam 2020 (23)	11540	22/3-22/8	0.6% (65/11540)	58.5% (38/65)	USA
Barlinn 2020 (24)	116	Week 14-18	0%	**	Germany
Blumberg 2020 (25)	1198 children	March-June	0.58% (7/1198)	86% (6/7)	USA
Carey 2020 (26)	155	April-June	0%	**	USA
Cavicchiolo 2020 (27)	75 newborns	21/2-21/4	0%	**	Italy
Creput 2020 (28)	200	31/3-4/4	18% (36/200)	11.1% (4/36)	France
Gruskay 2020 (29)	99	5-24/4	12.1% (12/99)	58.3% (7/12)	USA
Hu 2020 (30)	85	March	25% (21/85)	43% (9/21)	USA
Kwon 2020 (31)	2087	2-21/3	2% (42/2087)	14.3% (6/42)	Japan
Lonconsole 2020 (32)	819	23/3-21/4	18.1% (148/819)	3.4% (5/148)	Italy
Poline 2020 (33)	438 children	15-30/4	5% (22/438)	45.5% (10/22)	France
Sastry 2020 (34)	1811	27/4-18/5	4.4% (79/1811)	15.2% (12/79)	USA
Sii 2020 (35)	66 children	18/3-31/3	0%	**	Malasya
Walker 2020 (36)	4891	6/4-18/5	2.9% (140/4891)	21% (29/140)	USA
Wang 2020 (37)	258 children	23/1-24/4	0.4% (1/258)	100% (1/1)	China
Xu 2020 (38)	1542	21/1-8/3	0.32% (5/1542)	80% (4/5)	China
Yau 2020 (39)	237	11-22/4	4.6% (11/237)	55% (6/11)	Canada

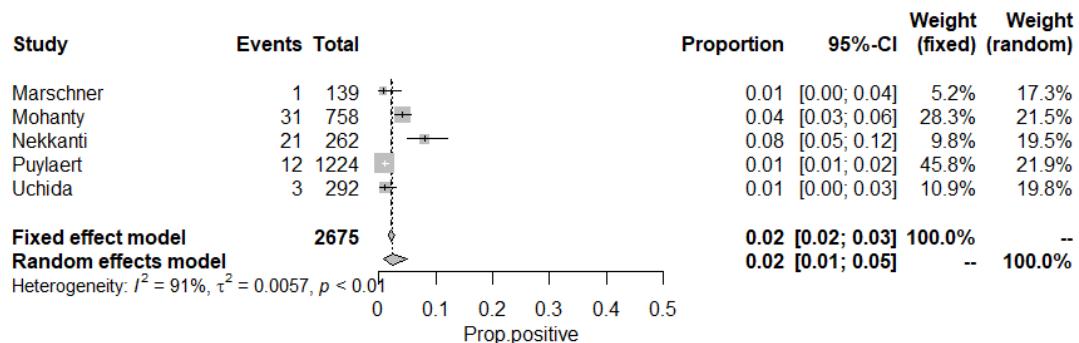
* Number of people tested. **All tests negative, so not possible to calculate



Testing of asymptomatic patients

Study	N*	Test period	Prevalence	Country
Marschner 2020 (40)	139	17/4-8/5	0.72% (1/139)	Germany
Mohanty 2020 (41)	758	April-June	4.1% (31/758)	USA
Nekkanti 2020 (42)	262	18/4-20/6	8% (21/262)	India
Puylaert 2020 (43)	1224	20/3-24/4	1.1% (14/1224)	Netherlands
Uchida 2020 (44)	292	6/4-29/5	1% (3/292)	Japan

* Number of people tested.

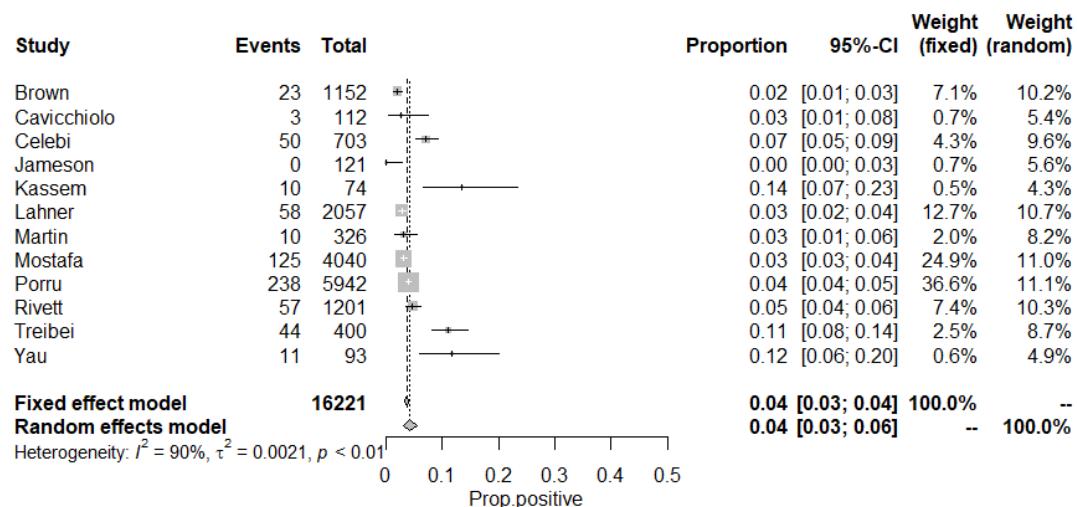


Healthcare setting – hospital – staff

Universal testing of hospital staff (symptomatic and asymptomatic cases)

Study	N*	Test period	Prevalence	Asymptomatics	Country
Brown 2020 (45)	1152	April-May	2% (23/1152)	17.4% (4/23)	England
Cavicchioli 2020 (46)	112	21/2-21/4	2.7% (3/112)	All, 100%	Italy
Celebi 2020 (47)	703	20/3-20/5	7.1% (50/703)	28% (14/50)	Turkey
Jameson 2020 (48)	121	2 weeks	0%	**	USA
Kassem 2020 (49)	74	1-14/6	13.5% (10/74)	40% (4/10)	Egypt
Lahner 2020 (50)	2057	18/3-27/4 (40 days)	2.8% (58/2057)	32.7% (19/58)	Italy
Martin 2020 (51)	326	15/4-18/5	3% (10/326)	70% (7/10)	Belgium
Mostafa 2020 (52)	4040	22/4-14/5	3.1% (125/4040)	68% (85/125)	Egypt
Porru 2020 (53)	5942	28/2-28/4	4% (238/5942)	45.8% (109/238)	Italy
Rivett 2020 (54)	1201	6-24/4	4.7% (57/1201)	54.4% (31/57)	Netherlands
Treibel 2020 (55)	400	23/3-20/4	11% (44/400)	27.3% (12/44)	UK
Yau 2020 (39)	93	11-22/4	12% (11/93)	55% (6/11)	Canada

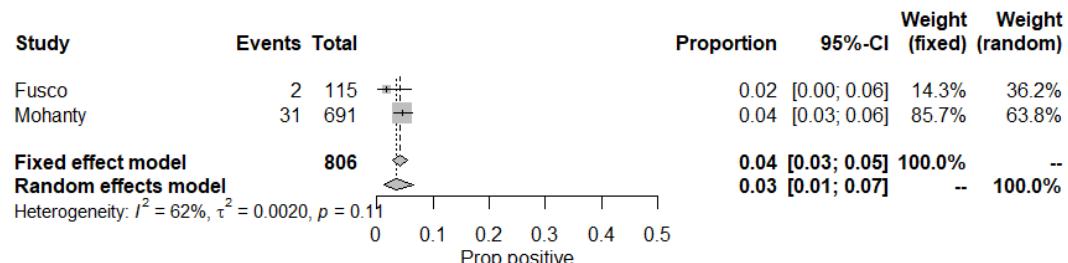
* Number of people tested. **All tests negative, so not possible to calculate



Testing of asymptomatic hospital staff

Study	N	Test period	Prevalence	Country
Fusco 2020 (56)	115	26/2-23/3	1.7% (2/115)	Italy
Mohanty 2020 (41)	691	April-June	4.5% (31/691)	USA

* Number of people tested.

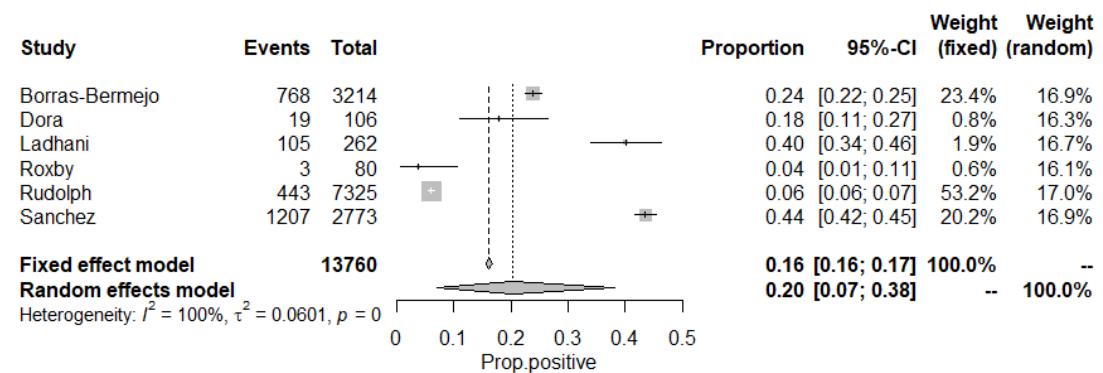


Health care setting – nursing home – residents

Universal testing of nursing home residents (symptomatic and asymptomatic cases)

Study	N*	Test period	Prevalence	Asymptomatics	Country
Borras-Bermejo 2020 (57)	3214	10-24/4	23.9% (768/3214)	69.7% (486/768)	Spain
Dora 2020 (58)	106	29/3-23/4	17.9% (19/106)	74% (14/19)	USA
Ladhani 2020 (59)	264	April	39.8% (105/264)	43.8% (46/105)	UK
Roxby (60)	80	March	3.8% (3/80)	100% (3/3)	USA
Rudolph 2020 (61)	7325	?	6% (443/7325)	20.3% (90/443)	USA
Sanchez 2020 (62)	2773	8-25/4	44% (1207/2773)	45% (461/1027)	USA

* Number of people tested.



Testing of asymptomatic nursing home residents

Study	N*	Test period	Prevalence	Country
Goldberg 2020 (63)	97	1/4	53.6% (52/97)	USA

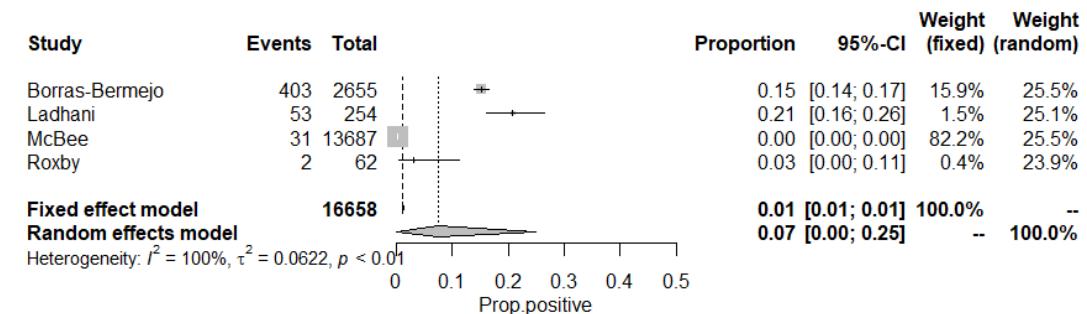
* Number of people tested.

Health care setting – nursing home – staff

Universal testing of nursing home staff (symptomatic and asymptomatic cases)

Study	N*	Test period	Prevalence	Asymptomatics	Country
Borras-Bermejo 2020 (57)	2655	10-24/4	15.2% (403/2655)	55.8% (144/403)	Spain
Ladhani 2020 (59)	254	April	20.9% (53/254)	56.9% (26/53)	UK
McBee 2020 (64)	13687	21/4-8/5	0.2% (31/13687)	54.8% (17/31)	USA
Roxby 2020 (60)	62 staff	March	3.2% (2/62)	0% staff	USA

* Number of people tested.



Testing of asymptomatic nursing home staff

Study	N*	Test period	Prevalence	Country
Goldberg 2020 (63)	97	1/4	37.1% (36/97)	USA

* Number of people tested.

Mixed setting and population

Testing of universal population (symptomatic and asymptomatic cases)

Study	N*	Test period	Prevalence	Setting	Population	Asymptomatics	Country
Jung 2020 (65)	19296	11/2-5/7	0.3% (56/19296)	Community	Population	32% (18/32)	Korea
Kutsuna 2020 (66)	566	28/1-13/2	1.9% (11/566)	Community (country)	Travellers from Wuhan	54.5% (6/11)	Japan
Martinez-Fierro 2020 (67)	81	June-July	42% (34/81)	Community	Close-contacts	14.7% (5/34)	Mexico
Njuguna 2020 (68)	98	7-21/5	72% (71/98)	Prison	Incarcerated	80.3% (57/71)	USA
Perico 2020 (69)	423	May (2 mo after the peak)	5.4% (23/423)	Workplace	Workers	0%	Italy
Quattrocchi 2020 (70)	64136	March-May	1.4% (873/64136)	Community (country)	Population	30.8 % (265/873)	Republic of Cyprus
Reisinger 2020 (71)	401	?	0%	Community	Mothers	**	Germany
Senok 2020 (72)	401	29/6-14/7	8.7% (35/401)	Community	Population	57.1% (20/35)	Saudi Arabia

* Number of people tested. **All tests negative, so not possible to calculate

Testing of an asymptomatic population

Study	N*	Test period	Prevalence	Setting	Population	Note	Country
Blaisdell 2020 (73)	1022	June-August Testing 1 week after camp arrival	0.3% 3/1022 (2 staff, 1 camper)	Camp	Children and staff	Strict infection control interventions at the same time	USA
Han 2020 (74)	29299	13/3-25/4	0.061% 18/29299	Diagnostic center	Workers		China
Kirshblum 2020 (75)	103	4-27/4	6.8% (7/103)	Rehabilitation centre	Patients		USA
Meyers 2020 (76)	2953	7/4-16/5	3.1% (91/2953)	Community	People		USA

* Number of people tested.

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