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Supplementary Materials for

Determinants of vaccine hesitancy and interventions aimed at contrasting this issue in Europe: an overview of systematic reviews

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LIST OF SEARCH TERMS

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PUBMED

("systematic review*"[tiab] OR "meta-analysis"[tiab] OR "meta-analyses"[tiab] OR "Meta-Analysis" [Publication Type] OR "Systematic Review" [Publication Type]) AND (Vaccine*[tiab] OR Vaccination*[tiab] OR immuniz*[tiab] OR immunis*[tiab] OR shot*[tiab] OR jab[tiab] OR jabs[tiab] OR "Vaccines"[Mesh] OR "Immunization"[Mesh] OR "Vaccination"[Mesh]) AND (Intent*[tiab] OR willing*[tiab] OR attitud*[tiab] OR hesitanc*[tiab] OR accept*[tiab] OR hesitant[tiab] OR concern*[tiab] OR doubt*[tiab] OR criticis*[tiab] OR sceptic*[tiab] OR fear*[tiab] OR refus*[tiab] OR reject*[tiab] OR consen*[tiab] OR confidence[tiab] OR adherence[tiab] OR complian*[tiab] OR uptake[tiab] OR engagement[tiab] OR perception*[tiab] OR opinion*[tiab] OR belief*[tiab] OR behaviour*[tiab] OR behavior*[tiab] OR choice*[tiab] OR barrier*[tiab] OR delay[tiab] OR reluctant[tiab] OR comply[tiab] OR "Vaccination Refusal"[Mesh] OR "health communication"[tiab] OR "miscommunication"[tiab] OR"Health Communication"[Mesh])

EPISTEMONIKOS

(title:((title:((Vaccine* OR Vaccination* OR immuniz* OR immunis* OR shot* OR jab OR jabs) AND (Intent* OR willing* OR attitud* OR hesitanc* OR accept* OR hesitant OR concern* OR doubt* OR criticis* OR sceptic* OR fear* OR refus* OR reject* OR consen* OR confidence OR adherence OR complian* OR uptake OR engagement OR perception* OR opinion* OR belief* OR behaviour* OR behavior* OR choice* OR barrier* OR delay OR reluctant OR comply OR "health communication" OR "miscommunication")) OR abstract:((Vaccine* OR Vaccination* OR immuniz* OR immunis* OR shot* OR jab OR jabs) AND (Intent* OR willing* OR attitud* OR hesitanc* OR accept* OR hesitant OR concern* OR doubt* OR criticis* OR sceptic* OR fear* OR refus* OR reject* OR consen* OR confidence OR adherence OR complian* OR uptake OR engagement OR perception* OR opinion* OR belief* OR behaviour* OR behavior* OR choice* OR barrier* OR delay OR reluctant OR comply OR "health communication" OR "miscommunication")))) OR abstract:((title:((Vaccine* OR Vaccination* OR immuniz* OR immunis* OR shot* OR jab OR jabs) AND (Intent* OR willing* OR attitud* OR hesitanc* OR accept* OR hesitant OR concern* OR doubt* OR criticis* OR sceptic* OR fear* OR refus* OR reject* OR consen* OR confidence OR adherence OR complian* OR uptake OR engagement OR perception* OR opinion* OR belief* OR behaviour* OR behavior* OR choice* OR barrier* OR delay OR reluctant OR comply OR "health communication" OR "miscommunication")) OR abstract:((Vaccine* OR Vaccination* OR immuniz* OR immunis* OR shot* OR jab OR jabs) AND (Intent* OR willing* OR attitud* OR hesitanc* OR accept* OR hesitant OR concern* OR doubt* OR criticis* OR sceptic* OR fear* OR refus* OR reject* OR consen* OR confidence OR adherence OR complian* OR uptake OR engagement OR perception* OR opinion* OR belief* OR behaviour* OR behavior* OR choice* OR barrier* OR delay OR reluctant OR comply OR "health communication" OR "miscommunication")))))
Publication type: Systematic review
Cochrane review: All
PubMed central (PMC): All

EMBASE

#1
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#3
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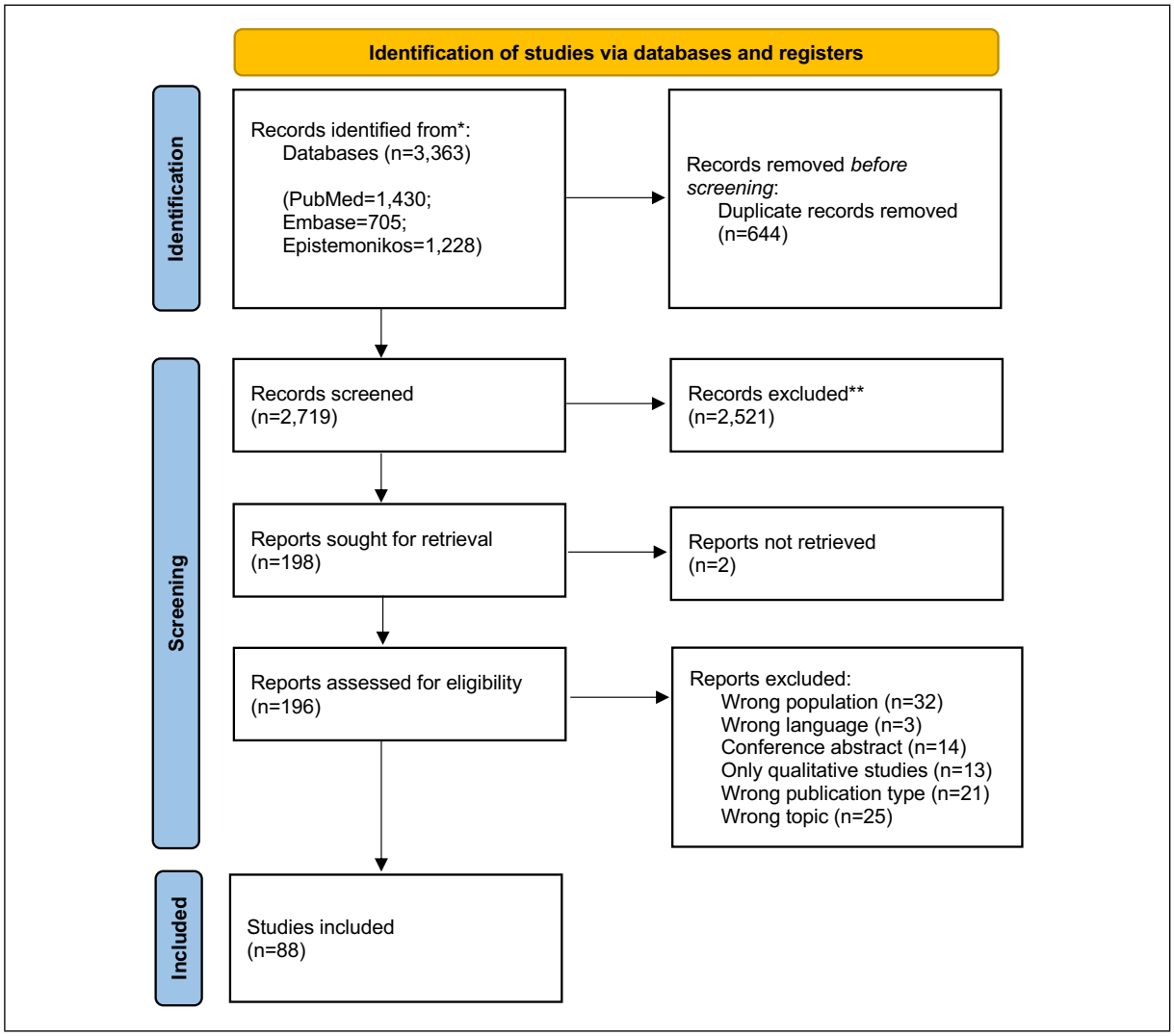

Figure S1
Flow diagram.

Supplementary Table S1
Characteristics of the reviews

Ref.	First author	Year of publication	Search dates	Databases	Total included studies	Continents of the included studies (number of studies)	Main population target of the review	Main vaccine target of the review	Study design (only studies from Europe)	Range year of publication (only studies from Europe)	Range sample size (only studies from Europe)
						CAP					
1	Abdullahi LH	2020	up to 2018	Africa-Wide information EBSCOhost, CENTRAL, CINAHL, Embase, Global Health Ovid, MEDLINE, Scopus, Web of Science Core Collection	16	Europe (2), Africa (1), America (12), Oceania (1)	Adolescents	Vaccines in adolescents (European studies: HPV)	2 RCT	2015-2016	390-500
2	Acampora A	2020	up to 2018	PubMed, Scopus, and Web of Science	38	Europe (6), America (31), Asia (1)	Adolescents	HPV	5 RCT, 1 Q-E	2011-2015	1,000-325,229
3	Ampofo AG	2022	up to 2020	Medline, EMBASE, CENTRAL, PsycINFO, CINAHL, Web of Science, and ERIC	13	Europe (3: only 2 on vaccinations); America (10)	Female adolescents	HPV	2 RCT	2013-2016	105-385
4	Wilder-Smith A	2020	2011-2019	PubMed, Medline, Embase, and Scopus	20	Europe (20)	Parents or guardians of children	MMR	20 observational	2011-2019	5-9,270
5	Cadeddu C	2021	up to 2020	PubMed, Scopus, Web of Science	19	Europe (9), Africa (1), America (7), Asia (1), Oceania (1)	Adolescents (10-19 years)	Vaccines with no restriction	9 observational	2010-2020	50-863
6	Chen F	2022	up to 2021	Embase, PubMed	24	Europe (4), America (5), Asia (13), multicontinental (2)	Parents or caregiver of children or adolescents	COVID-19	4 observational	2020-2021	612-4,993
7	Crocker-Burque T	2017	2008-2015	MEDLINE, Embase, ASSIA, The Campbell Collaboration, CINAHL, The Cochrane database of systematic reviews, Eppi Centre, Eric and PsychINFO	41	Europe (3), America (36), Oceania (2)	Parents of children and adolescents	Vaccines in children and adolescents	3 observational	2013-2015	32-1,000
8	de Cock C	2020	2008-2019	PubMed, Excerpta Medica Database (EMBASE), Web of Science, Cochrane Central Register of Controlled Trials, ClinicalTrials.gov, and Education Resources Information Center (ERIC)	28	Europe (5), Africa (2), America (12), Asia (8), worldwide (1)	Parents or guardians of children	Pediatric vaccines	1 RCT, 1 nRCT, 1 Q-E, 2 observational	2012-2014	55-464
9	Flood T	2020	2007-2019	Medline, EMBASE, Scopus, CINAHL, PsycInfo, PsycArticles, AMED and Cochrane Reviews.	15	Europa (5), Africa (2), America (3), Asia (4), Oceania (1)	Adolescents	HPV	2 RCTS, 3 Q-E	2008-2014	105-741
10	Forshaw J	2017	1990-2016	Cochrane Library, Medline Ovid, Embase	27	Europe (3), Africa (8), America (4), Asia (12)	Mothers with children under the age of 12 years	Pediatric vaccines	3 observational	2010-2014	519-3,609
11	Galanis P	2021	up to 2021	CINAHL, Medline, PubMed, ProQuest, Scopus, Web of Science	15	Europe (3), America (6), Asia (5), Oceania (1)	Parents or guardians of children under the age of 18 years	COVID-19	3 observational	2020-2021	612-5,054
12	Fisher H	2019	up to 2018	NA	23	Europe (11), Africa (1), America (10), Oceania (1)	Adolescents (10-18 years)	Vaccines in adolescents	11 observational	2005-2016	15-553
13	Hutchinson AF	2020	2005-2020	CINAHL, Medline, and Google Scholar	8	Europe (3), America (3), Oceania (2)	Parents or guardians of children under the age of 3 months	Bordetella Pertussis	2 observational, 1 Q-E	2008-2013	500-1,095

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Supplementary Table S1
Continued

Ref.	First author	Year of publication	Search dates	Databases	Total included studies	Continents of the included studies (number of studies)	Main population target of the review	Main vaccine target of the review	Study design (only studies from Europe)	Range year of publication (only studies from Europe)	Range sample size (only studies from Europe)
14	Iliadou M	2021	2016-2019	PubMed, Scopus, and Google Scholar	13	Europe (6), America (5), Asia (2)	Adolescents and young adults	HPV	6 observational	2017-2018	40-4,547
15	Karafillakis E	2019	2006-2016	MEDLINE, Embase, PsycINFO, Social Policy and Practice, Global Health, Open Grey, Web of Science, PsycEXTRA, and organisation websites	103	Europe (103)	Adolescents	HPV	103 observational-qualitative-mixed methods	2005-2015	NA
16	Karthigesu SP	2018	1990-2017	EBSCO (Medline, CINAHL Plus and PsychINFO), PubMed, Embase and Cochrane Library	6	Europe (1), America (3), Asia (2)	Parents or guardians of children	Pediatric vaccines	1 mixed methods	2007	37
17	Kurup L	2017	2005-2016	CINAHL, Cochrane, Joanna Briggs Institute (JBI), PsycINFO, PubMed, Scopus, ScienceDirect	20	Europe (4), America (10), Asia (5), Oceania (1)	Parents of children under the age of 6 years	Pediatric vaccines	4 observational	2010	6,611
18	Li D	2022	2015-2021	Cochrane Library, PubMed, Web of Science, EMBASE, Scopus and CINAHL	24	Europe (1) America (19) Asia (4)	Adolescents/ young adults	HPV	1 observational	2015-2021	21
19	Loke AY	2017	2006-2015	CINAHL, Cochrane Library, Medline, PsycInfo, PubMed	40	Europe (10), America (23), Asia (6), Oceania (1)	Parents of children and adolescents (9-21 years)	HPV	10 observational	2009-2017	121-1,204,588
20	Lopez N	2020	2006-2017	Cochrane Library, EMBASE, Google, Google Scholar, Popline, PubMed, World Bank Library	56	Europe (56)	Parents or guardians of children under the age of 19 years; adolescents	HPV	56 observational	2006-2017	317-20,000
21	Machado AA	2021	1990-2019	MEDLINE, EMBASE, CINAHL, EBMR, PsycInfo, Health Star, PubMed + Google Scholar	40	Europe (3), America (37)	Parents or guardians of children under the age of 5 years	Pediatric vaccines	3 observational	2009-2011	342-16,871
22	Mavundza EJ	2021	up to 2019	the Cochrane Central Register of Controlled Trials (CENTRAL), PubMed, Web of Science, and Scopus	35	Europe (2), America (32), Oceania (1)	Parents of children and adolescents	HPV	2 RCT	2010 and 2015	1000-8,062
23	Newman PA	2018	up to 2017	AgeLine, AIDSLINE, Applied Social Sciences Index and Abstracts, CINAHL, Cochrane Central Register of Controlled Trials Cochrane Library, CSA Social Services Abstracts, CSA Sociological Abstracts, Dissertation Abstracts International, EMBASE, Ovid MEDLINE, ProQuest Research, Library, PsycINFO, Scholars Portal, Social Sciences Abstracts, Social Sciences Citation Index	79	Europe (10), Africa (3), America (61), Asia (5)	Parents or guardians of children under the age of 18 years	HPV	10 observational	2011-2017	566-84,139

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Supplementary Table S1
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Ref.	First author	Year of publication	Search dates	Databases	Total included studies	Continents of the included studies (number of studies)	Main population target of the review	Main vaccine target of the review	Study design (only studies from Europe)	Range year of publication (only studies from Europe)	Range sample size (only studies from Europe)
24	Nour R	2019	2000-2019	ProQuest, Scopus (Elsevier), EBSCO, PubMed, and ScienceDirect (Elsevier)	9	Europe (3), America (6)	Parents or guardians of children	Pediatric vaccines	1 observational, 1 Q-E, 1 commentary	2012-2018	NA-134
25	Perman S	2017	2000-2015	MEDLINE and Health Management Information Consortium (HMIC — a bibliographic database of health management and policy); the National Institute for Health and Care Excellence (NICE) search platform	44	Europe (7), America (31), Oceania (4), worldwide (2)	School-related population	Pediatric vaccines	7 observational	2007-2013	33-528
26	Radisic G	2017	up to 2015	Cochrane, Informit, Ovid MEDLINE, PsychInfo, PubMed and Scopus	18	Europe (4), America (14)	Parents of male adolescents	HPV	4 observational	2010-2015	161-1,837
27	Smith LE	2017	up to 2016	Embase, Health Management information Consortium, Maternity and Infant Care, Medline, PsycINFO, Scopus, Social Policy and Practice through OvidSP	68	Europe (21), Other (47)	Parents or guardians of children under the age of 5 years	Pediatric vaccines	21 observational	1980-2006	110-18,468
28	Thanasas I	2020	2010-2019	Medline/PubMed and the Google Scholar databases	11	Europe (5), America (3), Asia (3)	Adolescents (13-20 years)	HPV	5 observational	2010-2016	435-2,224
29	Zheng L	2021	2006-2019	PubMed, Web of Science, Scopus, Medline (EBSCOhost), and PsycINFO (EBSCOhost)	13	Europe (2), Africa (1), America (4), Asia (6)	Parents of children and adolescents (9-26 years)	HPV	2 observational	2014-2016	632-1,161
						PW					
30	Adeyanju GC	2021	2009-2019	PubMed via Medline, Cochrane Central Register for Controlled Trials, PsycINFO, SAGE Journals, Taylor and Francis and Springer nature.	11	Europe (11)	Pregnant women	Flu	11 observational	2012-2019	198-11,752
31	Bisset KA	2018	2007-2016	Medline, Embase, PsychInfo, PubMed, CINAHL and Web of Science	22	Europe (2), America (17), Asia (1), Oceania (2)	Pregnant women	Flu/pertussis	2 observational	2012-2013	NA-1,011
32	Carbone L	2022	2020-2021	Medline (PubMed), Scopus, ISI Web of Science databases	15	Europe (5), Africa (2), America (3), Asia (4), multi-national (1)	Pregnant women	COVID-19	5 observational	2021	142-16,063
33	Faria APV	2021	up to 2020	Embase and Medline (PubMed)	31	Europe (2), Africa (4), America (17), Asia (5), Oceania (3)	Pregnant women	Tetanus	2 observational	2015-2016	250-823
34	Kilichl E	2020	up to 2018	Medline, Embase Classic & Embase, PsycINFO, CINAHL Plus, Web of Science, IBSS, LILACS, AfricaWideInfo, IMEMR, and Global Health	120	Europe (25), Africa (6), America (41), Asia (27), Oceania (21)	Pregnant women	Any pregnancy vaccination	23 observational, 2 qualitative	2010-2018	14 -14,355

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Supplementary Table S1
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Ref.	First author	Year of publication	Search dates	Databases	Total included studies	Continents of the included studies (number of studies)	Main population target of the review	Main vaccine target of the review	Study design (only studies from Europe)	Range year of publication (only studies from Europe)	Range sample size (only studies from Europe)
35	Nikpour M	2022	2020-2021	Scopus, Medline, and Web of Science	10	Europe (4), Africa (1), America (1), Asia (2), multi-national (2)	Pregnant women	COVID-19	4 observational	2021	160-6,661
36	Okoli GN	2021	2000-2020	Ovid MEDLINE by a health sciences librarian (CJN), PROSPERO, Ovid Embase and CINAHL with Full Text (EBSCO)	34	Europe (10), America (15), Asia (3), Oceania (6)	Pregnant women	Flu	10 observational	2016-2019	153-247,316
37	Patel KM	2021	2005-2020	MEDLINE, EMBASE, CINAHL, CENTRAL, MedRxiv and BioRxiv	25	Europe (1), America (21), Asia (1), Oceania (2)	Pregnant women	Bordetella Pertussis	1 observational	2011	762
38	Nindrea RD	2022	2021	PubMed, ProQuest, and EBSCO	12	Europe (2), Africa (2), America (3), Asia (4), multi-national (1)	Pregnant women	COVID-19	2 observational	2021	300-1,551
39	Rosso A	2020	up to 2019	Medline, Scopus, Web of Science	16	Europe (4), America (6), Asia (2), Oceania (4)	Pregnant women	Pediatric vaccines	4 observational	2018-2019	214-1,820
40	Januszek SM	2021	2020-2021	PubMed	9	Europe (4), America (1), Asia (3), multinational (1)	Pregnant women	COVID-19	4 observational	2021	161-16,063
						HCW					
41	Attwell K	2018	1995-2015	Medline, CINAHL, PsychInfo and Embase + Google Scholar	9	Europa (1), America (3), Oceania (5)	Midwives	Pediatric vaccines	1 Observational	2001	49
42	Bechini A	2020	1993-2019	Pubmed, Cochrane Database of Systematic Reviews, Health Evidence, Web of Science, CINAHL	27	Europa (9), America (17), Oceania (1)	Healthcare workers	Influenza	4 Observational, 5 RCT	1999-2015	50-36,556
43	Frascella B	2020	2014-2018	Medline, Embase and Cochrane Library	11	Europa (1), Africa (1), America (9)	Healthcare workers	Vaccines with no restriction	1 RCT	2016	122
44	Galanis P	2021	2020-2021	PubMed, Medline, Scopus, Web of Science, ProQuest, CINAHL and preprint services (medRxiv)	24	Europa (4), Africa (3), America (6), Asia (10), Multi-national (1)	Healthcare workers	COVID-19	4 Observational	2020-2021	461-2,047
45	Hill M	2018	1998-2017	CINAHL, Medline, PubMed, Google Scholar, Science Direct and Scopus	12	Europa (9), Oceania (3)	Nurses	Measles, mumps, and rubella vaccine	9 Observational	1998-2010	18-1,267
46	Leone Roberti Maggiore U	2017	2000-2016	PubMed/Medline, and Scopus	10	Europa (10)	Healthcare workers	HBV, measles, rubella, varicella and influenza	10 Observational	1998-2014	32-32,196
47	Li M	2021	2020-2021	PubMed, Embase, ScienceDirect, Web of Science and three Chinese databases (China National Knowledge Infrastructure, CNKI, VIP and Wanfang Data)	13	Europa (1), Africa (1), America (7), Asia (3), Multi-national (1)	Healthcare workers	COVID-19	1 Observational	2020	2,047
48	Lin C	2021	1997-2020	PubMed, Web of Science, Embase, CINAHL, and PsycINFO	96	Europa (32), Africa (1), America (43), Asia (17), Oceania (3)	Healthcare workers	Vaccines with no restriction	32 Observational	2000-2019	73-2,962

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Supplementary Table S1
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Ref.	First author	Year of publication	Search dates	Databases	Total included studies	Continents of the included studies (number of studies)	Main population target of the review	Main vaccine target of the review	Study design (only studies from Europe)	Range year of publication (only studies from Europe)	Range sample size (only studies from Europe)
49	Luo C	2021	2020-2021	PubMed, EMBASE, Web of Science and the Cochrane Library + Chinese database (Chinese National Knowledge Infrastructure (CNKI), the Chongqing VIP Chinese Science (VIP), Wanfang Database and China Biomedical Literature Database (CBM))	9	Europa (2), America (3), Asia (3), Multi-national (1)	Healthcare workers	COVID-19	2 Observational	2020	461-2,047
50	Pavlovic D	2022	2015-2020	OVID Medline, Embase and PsycINFO	89	Europa (82), Asia (7)	Healthcare workers	Vaccines with no restriction	82 Observational-qualitative-mixed methods	2011-2020	10-5,424
51	Riccò M	2020	2011-2019	PubMed and EMBASE	6	Europa (2), America (2), Asia (2)	Obstetrics/ gynecologists	Influenza, Tetanus-diphtheria acellular-pertussis	2 Observational	2015-2017	92-867
52	Silva MT	2021	2004-2020	CENTRAL, MEDLINE, Embase, and the Cochrane COVID-19 Study Register	14	Europa (9), America (2), Asia (3)	Healthcare workers	Respiratory disease vaccines	9 RCT	2005-2020	122-50,351
						GP					
53	Akumbom AM	2022	2012-2020	CINAHL Plus, PubMed, Embase	15	Europe (2) Africa (4) America (7) Oceania (1) Multi-national (1)	General population	HPV	1 observational, 1 RCT	2015-2016	1000-6,415
54	Al-Amer R	2022	2020	CINAHL, Cochrane Library, Google Scholar, ProQuest, PsycINFO, PubMed and Scopus	28	Europe (10) Africa (3) America (9) Asia (4) Multi-national (2)	General population	COVID-19	10 Observational	2020	527-5,114
55	Anderson LJ	2018	2004-2016	MEDLINE, Econlit, Centre for Reviews & Dissemination, Greylit, and Worldcat	18	Europe (5) America (11) Asia (2)	General population	Flu	3 RCT, 2 Q-E	2002-2016	NA
56	Bach AT	2019	NA	PubMed, Ovid Medline, and Cochrane Database of Systematic Reviews	39	Europe (4) Africa (1) America (29) Asia (3) Oceania (2)	General population	Vaccines with no restriction	3 Observational, 1 RCT	2006-2019	304-102,257
57	Schmid P	2017	2005-2016	MEDLINE, Embase, PsycInfo, CINAHL, Cochrane Library, Web of Science, LILACS, IBSS, and Global Index Medicus: IMEMR, IMSEAR, AIM, WPRIM	470	Europe (176) Africa (5) America (199) Asia (Asia and Oceania (90))	General population and risk groups	Flu	NA	2005-2016	NA
58	Bruel S	2020	up to 2018	MEDLINE and Cochrane Library	8	Europe (3) America (3) Oceania (2)	General population	Vaccines with no restriction	3 RCT	2011-2017	142-8,062
59	Cascini F	2021	up to 2021	PubMed and Web of Science	209	Europe (53) Africa (17) America (48) Asia (78) Oceania (5) Multi-national (8)	General population	COVID-19	53 Observational	2020-2021	104-5,018
60	Ergün A	2022	2020-2021	PubMed	14	Europe (3) America (4) Asia (6) Multi-national (1)	General population	COVID-19	3 Observational	2020	934-1,500

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Supplementary Table S1
Continued

Ref.	First author	Year of publication	Search dates	Databases	Total included studies	Continents of the included studies (number of studies)	Main population target of the review	Main vaccine target of the review	Study design (only studies from Europe)	Range year of publication (only studies from Europe)	Range sample size (only studies from Europe)
61	Hakim H	2019	2016-2018	PubMed, EMBASE, CINAHL, the Cochrane central register of controlled trials and Web of Science	11	Europe (1) America (7) Asia (1) Multi-national (1) NA (1)	General population	Vaccines with no restriction	1 Q-E	2018	63
62	Jacobson Vann JC	2018	2013-2017	CENTRAL, MEDLINE, Embase and CINAHL	75	Europe (4) Africa (3) America (64) Oceania (4)	General population	Vaccines with no restriction	4 RCT	1997-2012	511-2,402
63	Jain A	2017	up to 2016	MEDLINE and Embase	35	Europe (31) Asia (3) Multi-national (1)	Elderly individuals	Vaccines with no restriction	31 Observational	2010-2014	181-1,307,165
64	Kan T	2018	up to 2016	PubMed, Embase, Science Collection Index Expanded, CINAHL and Elsevier	36	Europe (13) America (12) Asia (10) Multi-national (1)	Elderly individuals	Flu	13 Observational-qualitative	2006-2016	20-2,600
65	Knight H	2021	2020	Medline, PsychInfo, Medrxiv, PsyAxiv	10	Europe (4) Africa (1) America (3) Asia (2)	General population	COVID-19	4 Observational	2020	350-5,028
66	Larson HJ	2018	up to 2017	Africa-Wide information, CINAHL Plus, Cochrane, Embase, IBSS, IMEMR, LILACS, Medline, PsychInfo, Web of Science	35	Europe (7) America (21), Asia (4), Oceania (3)	General population	Pediatric vaccines; general vaccines; HPV	5 Observational, 2 qualitative	2004-2014	601-8,060
67	Lazić A	2021	2015-2019	PubMed, Cochrane Library, Web of Science, and Google Scholar	17	Europe (2) America (12) Asia (2) Oceania (1)	General population	Vaccines with no restriction	2 RCT	2008-2011	118-311
68	Li L	2022	2011-2021	PubMed, Scopus, ACM, Cochrane, ProQuest, the Web of Science	20	Europe (6), America (12), Asia (2)	General population	Vaccines with no restriction	6 Observational	2012-2018	265-8,020,000
69	Lin C	2020	2020	PubMed, Embase, and PsycINFO	23	Europe (6) Africa (1) America (8) Asia (6) Multi-national (2)	General population	COVID-19	6 Observational	2020	1,002-7,664
70	Lorini C	2018	2007-2017	PubMed, Embase, PsycINFO, ERIC, Health Evidence, Centre for Reviews and Dissemination, Scopus, Web of Science, and Cochrane Library	9	Europe (1), America (6), Asia (2)	General population	Vaccines with no restriction	1 Observational	2015	467
71	Murfin J	2020	up to 2018	MEDLINE, CINAHL, PsychINFO, Science Citation Index and HMIC	10 (only 6 focused on vaccinations)	Europe (5 (only 2 focused on vaccinations)) America (5 (only 4 focused on vaccinations))	Women	HPV	2 Observational	2015-2016	1,906-90,842
72	Nehal KR	2021	2020-2021	PubMed	40	Europe (14) Africa (6) America (8) Asia (8) Oceania (2) Worldwide (2)	General population	COVID-19	14 Observational	2020	568-5,114
73	Nindrea RD	2021	2020-2021	ProQuest, PubMed, EBSCO	24	Europe (6) Africa (2) America (1) Asia (12) Oceania (2) Worldwide (1)	General population	COVID-19	6 Observational	2020-2021	1252-3,259
74	Okoli GN	2020	2000–2019	MEDLINE, Embase, CINAHL and Scopus	34	Europe (13) America (8) Asia (12) Oceania (1)	Elderly individuals	Flu	13 Observational	2004-2019	269-1,255,657
75	Parsons JE	2018	up to 2017	CINAHL, MEDLINE, PsycINFO, Scopus, and Web of Science	18	Europe (5) America (11) Asia (2)	General population	Vaccines with no restriction	5 RCT	2008-2016	118-1,424

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Supplementary Table S1
Continued

Ref.	First author	Year of publication	Search dates	Databases	Total included studies	Continents of the included studies (number of studies)	Main population target of the review	Main vaccine target of the review	Study design (only studies from Europe)	Range year of publication (only studies from Europe)	Range sample size (only studies from Europe)
76	Pires C	2021	2015-2020	PubMed, Cochrane Library, DOAJ, SciELO and b-on	36	Europe (2), America (31), Asia (2), worldwide (1)	General population	Vaccines with no restriction; Flu vaccination	1 Observational, 1 RCT	2016-2020	297-419
77	Reñosa MDC	2021	2008-2021	PubMed, Science Direct, ProQuest, Ebscohost, Oxford Journal, Access Science, JSTOR, Scopus, Google Scholar	48	Europe (7) America (31) Asia (8) Oceania (2)	General population	Vaccines with no restriction	5 Observational-qualitative-mixed methods, 2 RCT	2010-2021	55-18,855
78	Ripp T	2022	2020-2021	COVID-19 Data Portal, APA PsycArticles, Psychology and Behavioral Sciences, Scopus, and PubMed	12	Europe (6) America (3) Asia (1) Multi-national (2)	General population	COVID-19	6 Observational	2020	407-2,501
79	Robinson E	2021	2020	PubMed and Scopus	20	Europe (11) America (7) Asia (1) Oceania (1)	General population	COVID-19	11 Observational	2020	1000-5,018
80	Limaye RJ	2021	2004-2020	PubMed, CINAHL, Scopus e Inspec	46	Europe (10) Africa (1) America (23) Asia (5) Oceania (3) Worldwide (4)	General population	Vaccines with no restriction	5 Observational, 4 Q-E, 1 RCT	2014-2020	NA
81	Thomas RE	2018	2014-2017	Cochrane Acute Respiratory Infections Group's Specialised Register, MEDLINE, Embase, CINAHL, and ERIC for this update, as well as WHO ICTRP and ClinicalTrials.gov for ongoing studies	61	Europe (10) America (44) Asia (2) Oceania (5)	Elderly individuals	Flu	10 RCT	1997-2017	90-2,580
82	Truong J	2022	up to 2020	PsychINFO, MEDLINE, Global Health, and Embase	29	Europe (12) Africa (3) America (9) Asia (3) Oceania (2)	General population	Severe Acute Respiratory Syndrome, Influenza A/H1N1, Middle East Respiratory Syndrome, Ebola Virus Disease, and COVID-19	12 Observational	2011-2016	41-13,010
83	Veronese N	2021	2020-2021	PubMed, CINAHL via EBSCOHost, Psycinfo via EBSCOHost	15	Europe (5) America (4) Asia (5) Multi-national (1)	Elderly individuals	COVID-19	5 Observational	2021	64-1,387
84	Vujovich-Dunn C	2021	up to 2019	OVID Medline, OVID Embase, CINAHL, PsycINFO, the Cochrane Library and SCOPUS	5	Europe (1) America (3) Oceania (1)	General population	Vaccines with no restriction	1 RCT	2013	196
85	Vukovic V	2020	2004-2017	PubMed, ISI Web of Science (WoS), CINAHL and Scopus	12	Europe (8) America (2) Asia (2)	Risk groups (e.g., elderly individuals, population with chronic diseases, pregnant women, children from 6 months to 5 years old and health-care workers)	Flu	8 Observational	2004-2017	5572-2,808,428
86	Wang Q	2021	up to 2020	PubMed, Web of Science, Cochrane Library, and Embase	38	Europe (11) Africa (5) America (9) Asia (5) Oceania (2) Multi-national (6)	General population	COVID-19	11 Observational	2020	NA
87	Whisnant J	2020	up to 2019	MEDLINE, Embase, and CINAHL	18	Europe (7) America (9) Asia (2)	University students	Meningococcus	7 Observational	2001-2017	420-7,049

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Supplementary Table S1
Continued

Ref.	First author	Year of publication	Search dates	Databases	Total included studies	Continents of the included studies (number of studies)	Main population target of the review	Main vaccine target of the review	Study design (only studies from Europe)	Range year of publication (only studies from Europe)	Range sample size (only studies from Europe)
88	Zhou X	2020	up to 2019	PubMed, EBSCO, Elsevier, Springer, Wiley e Cochrane	8	Europe (2) America (5) Asia (1)	General population	Flu	2 RCT	2001-2012	2,132-2,402

CAP: children, adolescents, and parents; HPV: human papillomavirus; MMR: measles, mumps, and rubella; PW: pregnant women; HCW: healthcare worker; HBV: hepatitis B virus; GP: general population; RCT: randomized controlled trial; Q-E: quasi-experimental; NA: not available.

Supplementary Table S2
Determinants, barriers, and interventions

Ref.	First author	Year of publication	Determinants that favor vaccinations	Barriers that hinder vaccinations	Interventions with proven efficacy	Interventions with non-significant or conflicting results
				CAP		
1	Abdullahi LH	2020	–	–	Financial incentives (the financial incentive involved an offer of shopping vouchers worth GBP 45 upon completion of 3 HPV vaccination doses); health education: school-based education	–
2	Acampora A	2020	–	–	School-based interventions, active invitation letters, computer-tailored intervention	Financial incentives for population
3	Ampofo AG	2022	–	–	School-based health education; printed materials	–
4	Wilder-Smith A	2020	–	Lack of knowledge/information; fears of side effects; relying on information found in the web/social media; government info biased/distrust of the received information; option that children are too young; religious beliefs; preference for natural immunity	GPs patients management, monitoring and reminding; population education	–
5	Cadeddu C	2021	Different options to access the vaccination; higher socio-economic situation; parental knowledge and counseling	Vaccines are not important/not useful/unsafe/harmful	–	–
6	Chen F	2022	Trust in NHS and government policies	Disliking mandatory vaccination policies; economic reasons; relying on information found in the web/social media; vaccines are not important/not useful/unsafe/harmful	–	–
7	Crocker-Burque T	2017	–	–	School-based interventions; reminder call; using of the social media campaign for parents	–
8	de Cock C	2020	–	–	Mobile apps to promote and remind the vaccination	–
9	Flood T	2020	–	–	School-based interventions with targeted health education and usage of school-nurses	–
10	Forshaw J	2017	Mothers' higher education	Mothers/guardians' lower education	–	–
11	Galanis P	2021	Vaccines are important/useful	Disliking mandatory vaccination policies; mothers/guardians' age≤29 years old; mothers/guardians' lower education; relying on information found in the web/social media	–	–
12	Fisher H	2019	–	Lack of knowledge/information; fear of side effects; being immigrant/ethnic minority; not living in an urbanized area; economic reasons	Nurses' calls to parents	–
13	Hutchinson AF	2020	–	–	Promotion and administration of pertussis vaccine for new born parents in the maternity ward and during postpartum postcharges	–

Continues

Supplementary Table S2
Continued

Ref.	First author	Year of publication	Determinants that favor vaccinations	Barriers that hinder vaccinations	Interventions with proven efficacy	Interventions with non-significant or conflicting results
14	Iliadou M	2021	–	Lack of knowledge/information; fear of side effects; vaccines are not important/not useful/unsafe/harmful; mothers/guardians' lower education; not living in a urbanize area	–	–
15	Karafillakis E	2019	–	Adverse effects/not effectiveness of the vaccine; physical barriers to vaccination (e.g., costs; access to clinic, etc.); lack of knowledge/information; not susceptibility/non severity of VPD; perceiving that vaccines are too many; fear of injection/pain; having been dissuaded by HCWs, parents, or other influent people	–	–
16	Karthigesu SP	2018	Influence of grand parents	.	–	–
17	Kurup L	2017	Vaccines are important/useful	Disagreement between experts on the safety of vaccines Fear of side effects Lack of knowledge/information Vaccines are not important/not useful/unsafe/harmful	–	–
18	Li D	2022	.	.	.	Social media campaigns
19	Loke AY	2017	Physician recommendation, parental acceptance, peer encouragement, health insurance coverage	Cost of vaccine; parental concerns (child not sexually active, concern about the safety of the vaccine, think that vaccination will encourage sexual activity); lack of information; prefer to wait till their children are older	–	–
20	Lopez N	2020	Vaccines are important/useful Mothers' higher education Willingness to protect own child	Lack of knowledge/information; vaccines are not important/not useful/unsafe/harmful	–	–
21	Machado AA	2021	–	–	Financial incentives for general practices including employment of managers and coordinators; promotion of importance of high levels of vaccination; centralized monthly monitoring of vaccination rates, active patient management including robust call and recall processes with direct contact	–
22	Mavundza EJ	2021	–	–	Combination of financial incentives and reminder text messages. Web-based tailored intervention	–
23	Newman PA	2018	Advised to get vaccinated; advised to get vaccinated by physicians; child's age (older); higher socio-economic situation; insurance/cost-health insurance coverage; mothers' higher education; mothers' intention; parents' history of infection (HPV, genital warts, abnormal PAP smear); perceived HPV vaccine benefits and anticipatory regret if child is not vaccinated; trust in NHS and government policies; vaccines are important/useful	Being immigrant/ethnic minority; economic reasons; fear of side effects; five or more siblings; government info biased/distrust of the received information; lack of knowledge/information; mothers/guardians' lower education; opinion that children are too young	–	–
24	Nour R	2019	–	–	–	Website with storytelling approach; leaflet contrasting popular erroneous beliefs about vaccination; tables comparing the potential problems caused by measles, mumps, and rubella with the potential side effects caused by the MMR vaccine; pictures of unvaccinated children with measles, mumps, and rubella, along with the description of the symptoms of each disease and a brief warning about the importance of vaccinating one's own child

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Supplementary Table S2
Continued

Ref.	First author	Year of publication	Determinants that favor vaccinations	Barriers that hinder vaccinations	Interventions with proven efficacy	Interventions with non-significant or conflicting results
25	Perman S	2017	–	–	School-based interventions with targeted health education, usage of school-nurses, administration in school setting	–
26	Radisic G	2017	Parental perception about the importance of future partner protection; perceived HPV benefits by parents	Vaccines are not important/not useful/unsafe/harmful; economic reasons; fear of side effects	–	–
27	Smith LE	2017	Advised to get vaccinated by physicians; mothers' higher education; peer encouragement; vaccines are important/useful willingness to protect own child	Administrative errors/difficulties; discouraged to get vaccinated; fear of side effects; lack of knowledge/information; vaccines are not important/not useful/unsafe/harmful	–	–
28	Thanasas I	2020	Higher socio-economic situation; parents' higher education; sexual habit (sexually active and homosexuality); parents' history of infection (HPV, genital warts, abnormal PAP smear); financial incentives; parental knowledge and counseling; role of media and social media that encourage to the vaccination	Religious beliefs	Comprehensive social media strategies; communication campaigns on television and magazines; school-based interventions	–
29	Zheng L	2021	–	Receipt of recommendations against the vaccination (also by physicians); negative experience with vaccinations in general; fear of injections; lack of knowledge/information; fears of side effects; economic reasons; busy schedule; vaccines are not important; religious beliefs	–	–
				PW		
30	Adeyanju GC	2021	–	Safety concerns; lack of information and adequate recommendations by health care providers; having a lower education; fear of harm to the fetus and the occurrence of side effects could negatively affect the fetus; previous pregnancies; vaccine side effects; anti-vaccine attitude; lack of trust in vaccine; belief that vaccine is not necessary; lack of knowledge about the importance during pregnancy; fear of adverse effect for the mother; no risk perception; doubts about effectiveness	–	–
31	Bisset KA	2018	–	–	Midwives providing vaccination	Community awareness campaign: including media, leaflets, posters, online, digital and social media, GP communications, direct contact made with those most at risk; community pharmacy programme; GP incentive
32	Carbone L	2022	Personal vaccination history (i.e., the participant has already been vaccinated for other); advanced maternal age (>30 years or higher); mothers' higher education; proximity of childbirth; living with someone older than 65 years old (for COVID-19); having had COVID-19 (for COVID-19); obstetrician following their pregnancy; being in the third trimester	Having a lower education; previous pregnancy; pregnant women working in healthcare; unemployment; being during pregnancy (for COVID-19); anxiety status	–	–
33	Faria APV	2021	No significant determinants nor barriers in European studies according to the meta-analysis	–	–	–

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Supplementary Table S2
Continued

Ref.	First author	Year of publication	Determinants that favor vaccinations	Barriers that hinder vaccinations	Interventions with proven efficacy	Interventions with non-significant or conflicting results
34	Kilichl E	2020	Awareness of information regarding the specific vaccine or disease of focus; perceptions of vaccine benefit/vaccines are important/useful; personal vaccination history (i.e., the participant has already been vaccinated for other); influenza risk perception; healthcare professional recommendation	Safety concerns; Fear of harm to the fetus and the occurrence of side effects could negatively affect the fetus	–	–
35	Nikpour M	2022	Personal vaccination history (i.e., the participant has already been vaccinated for other); advanced maternal age (>30 years or higher); mothers' higher education; proximity of childbirth; living with someone older than 65 years old (for COVID-19); having had COVID-19 (for COVID-19); obstetrician following their pregnancy; being in the third trimester	Having a lower education; previous pregnancy; pregnant women working in healthcare; unemployment; being during pregnancy (for COVID-19); anxiety status	–	–
36	Okoli GN	2021	Personal vaccination history (i.e., the participant has already been vaccinated for other); having a chronic disease	Previous pregnancies	–	–
37	Patel KM	2021	–	–	Proper communication tools and enough skilled HCPs engagement	–
38	Nindrea RD	2022	Personal vaccination history (i.e., the participant has already been vaccinated for other); advanced maternal age (>30 years or higher); mothers' higher education; proximity of childbirth; living with someone older than 65 years old (for covid-19); having had COVID-19 (for COVID-19); obstetrician following their pregnancy; being in the third trimester	–	–	–
39	Rosso A	2020	Favor of compulsory vaccination; vaccines are important/useful	Emotional reasons; fear of side effects; government info biased/distrust of the received information; lack of knowledge/information; opinion that children are too young; preference for natural immunity	–	–
40	Januszek SM	2021	Personal vaccination history (i.e., the participant has already been vaccinated for other); advanced maternal age (>30 years or higher); mothers' higher education; proximity of childbirth; living with someone older than 65 years old (for COVID-19); having had COVID-19 (for COVID-19); obstetrician following their pregnancy; being in the third trimester	Having a lower education; previous pregnancy; pregnant women working in healthcare; unemployment; being during pregnancy (for COVID-19); anxiety status	–	–
				HCW		
41	Attwell K	2018	–	Lack of knowledge/information; lack of training; lack of guidelines/official recommendations; professional figure/role less involved in vaccination workload/organizational/logistic issues; being uncomfortable administering more injections during the same consultation	–	–

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Supplementary Table S2
Continued

Ref.	First author	Year of publication	Determinants that favor vaccinations	Barriers that hinder vaccinations	Interventions with proven efficacy	Interventions with non-significant or conflicting results
42	Bechini A	2020	Good vaccines knowledge	Lack of guidelines/clear official recommendations	Implementing an influenza vaccination campaign with dedicated sessions and easy access to the vaccine, offering vaccine free of charge and at the workplace; active participation in the campaign through training leaders, addressing concerns, and formally inviting staff to participate; policy emphasizing staff vaccination	–
43	Frascella B	2020	–	–	–	Opt-out approach
44	Galanis P	2021	being physician; previously vaccinated (for the flu or other); older age; perceived risk of contracting VPDs; perceived severity of VPD; male gender; less years of work experience; higher educational level	–	–	–
45	Hill M	2018	–	Lack of knowledge/information; vaccines are unsafe; vaccines do not work	–	–
46	Leone Roberti Maggiore U	2017	Younger age; less years of work experience; Working in intensive care units; receiving the proposal by an occupational health physician and a general practitioner or from the Vaccination Service	–	–	Multifaceted intervention project based on education, active promotion, and easy access to influenza vaccination
47	Li M	2021	Being physician; previously vaccinated (for the flu or other)	Vaccines are unsafe. Vaccines do not work	–	–
48	Lin C	2021	Vaccines are important/useful; good vaccines knowledge; being midwife; positive attitude towards vaccination; trust in government policies; previously vaccinated (for the flu or other); having seen VPDs; responsibility perception; patients' clinical status; willingness to vaccinate own child; routine recommendation of vaccinations; working alone; older age; being ready to discuss sexuality with patients (HPV vaccine)	Lack of knowledge/information; vaccines are unsafe; vaccines do not work; lack of training; lack of guidelines/ clear official recommendations; workload/organizational/logistic issues; absence of explicit recommendation; practicing alternative medicine; older age; not being vaccinated/ not vaccinating own children	–	–
49	Luo C	2021	Previously vaccinated (for the flu or other)	Vaccines are unsafe; Vaccines do not work	–	–
50	Pavlovic D	2022	Responsibility perception; perceived risk of contracting VPDS; perceived severity of VPD; supporting mandatory vaccination	Vaccines are unsafe; vaccines do not work; lack of trust in health authorities and the reliability of information provided by authorities; perception that vaccination should be an autonomous decision	–	–
51	Riccò M	2020	Good vaccines knowledge; previously vaccinated (for the flu or other); not having false beliefs about vaccines; perceived risk of contracting VPDs	Lack of knowledge/information; vaccines are unsafe; vaccines do not work; lack of training; workload/ organizational/logistic issues; absence of explicit recommendation; underestimate VPDs	–	–
52	Silva MT	2021	–	–	Active participation in the campaign through training leaders, addressing concerns, and formally inviting staff to participate; Information and educational programs, such as training sessions and materials; reminders and feedback, like periodic messages and coverage updates	Reminders based on social norms; opt-out approach
				GP		
53	Akumbom AM	2022	–	–	Easier access to vaccines	–

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Supplementary Table S2
Continued

Ref.	First author	Year of publication	Determinants that favor vaccinations	Barriers that hinder vaccinations	Interventions with proven efficacy	Interventions with non-significant or conflicting results
54	Al-Amer R	2022	vaccines are effective; having chronic diseases; previously vaccinated (for the flu or other); perceived severity/likelihood of VPD; vaccination advised by HCWs; being male; being white; older age; trust in government	Age <75/too young; adverse effects/ not effectiveness of the vaccine; lack of knowledge/information; false beliefs about vaccines; socio-economics and cultural barriers (e.g., low education, low income, living in poor areas); no trust in medicine/research and health system; being immigrants/non white; being female	–	–
55	Anderson LJ	2018	–	–	Phone appointment to get vaccinated; phone reminder/invitation to get vaccinate; informational/training material for HCWs; health risk assessment and counseling	City-wide vaccination program administered by pharmacists
56	Bach AT	2019	Previously vaccinated (for the flu or other); knowledge of vaccines/ VPD	Adverse effects/not effectiveness of the vaccine; Physical barriers to vaccination (e.g., costs; access to clinic, etc.); not susceptibility/non severity of VPD	Free vaccination; Informational material for patients	–
57	Schmid P	2017	Having chronic diseases; previously vaccinated (for the flu or other); social norms/social pressure; being white; having given up smoking	Adverse effects/not effectiveness of the vaccine; perceived good health; Never experienced VPD; lack of knowledge/information; false beliefs about vaccines; having not received vaccination recommendations; being not married; being female; living alone; not acknowledging social benefits; older age; alcohol consumption; lower body mass index; not having a regular source of care	–	–
58	Bruel S	2020	–	–	Informational material for patients	Web based intervention with virtual assistant
59	Cascini F	2021	Vaccines are effective; perceived severity/likelihood of VPD; social norms/social pressure	Adverse effects/not effectiveness of the vaccine; Lack of knowledge/ information; socio-economics and cultural barriers (e.g., low education, low income, living in poor areas); no trust in medicine/research and health system; no trust in government; being immigrants/non-white; low confidence in the COVID 19 vaccine	–	–
60	Ergün A	2022	–	Adverse effects/not effectiveness of the vaccine; lack of knowledge/information; false beliefs about vaccines; socio-economics and cultural barriers (e.g., low education, low income, living in poor areas); no trust in medicine/ research and health system	–	–
61	Hakim H	2019	–	–	–	PowerPoint lessons nor digital game-based interactive simulations
62	Jacobson Vann JC	2018	Previously vaccinated (for the flu or other)	–	Phone appointment to get vaccinated; letter/postcard reminder/invitation to get vaccinated; free vaccination; informational material for patients	Mailed education programs aiming to inform individuals about vaccine efficacy and safety
63	Jain A	2017	Living with other people/large household; high income/social class; high education level; urban residence	Socio-economics and cultural barriers (e.g. low education, low income, living in poor areas); Being not married; Living with children	–	–
64	Kan T	2018	Vaccines are important/useful; vaccines are effective; having chronic diseases; previously vaccinated (for the flu or other); perceived severity/likelihood of VPD; living with other people/ large household; vaccination advised by HCWs; perceived poor health; vaccination advised by friends/family; side effects less risky than VPD; belief every elderly person should be vaccinated; social norms/social pressure; anticipated regrets; being male; low risk of side effects; knowledge of vaccines/VPD; concerned about their health/getting VPD; trust in medicine/health system	Age <75/too young; Adverse effects/ not effectiveness of the vaccine; perceived good health; physical barriers to vaccination (e.g., costs; access to clinic, etc.); never being vaccinated before; never experienced VPD; lack of knowledge/information; previous negative experience (oneself or others); false beliefs about vaccines	–	–

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Supplementary Table S2
Continued

Ref.	First author	Year of publication	Determinants that favor vaccinations	Barriers that hinder vaccinations	Interventions with proven efficacy	Interventions with non-significant or conflicting results
65	Knight H	2021	Vaccines are effective; social norms/social pressure; concerned about their health/getting VPD; Trust in medicine/health system	Adverse effects/not effectiveness of the vaccine; Perceived good health; Lack of knowledge/information	Informational material for patients	–
66	Larson HJ	2018	Trust in NHS and government policies; vaccines are important/useful	Being immigrant/ethnic minority, vaccines are not important/not useful/unsafe/harmful	–	–
67	Lazić A	2021	–	–	Informational material for patients	–
68	Li L	2022	–	–	Comprehensive social media strategies (educational posts; dialogue-based social media interventions) that could also involve physicians messages lead to increasing trust in vaccine if they are correctly planned and launched	–
69	Lin C	2020	Perceived severity/likelihood of VPD; being male; concerned about their health/getting VPD; older age; being HCW; young age (<35); female; feeling close to radical parties or not feeling close to any party; health engagement	Adverse effects/not effectiveness of the vaccine; Physical barriers to vaccination (e.g., costs; access to clinic, etc.); not susceptibility/non severity of VPD; false beliefs about vaccines	–	–
70	Lorini C	2018	–	When vaccines are offered on the free market, parents with higher health literacy may be less likely to vaccinate their new born against rotavirus than parents with lower health literacy	–	–
71	Murfin J	2020	Previously vaccinated (for the flu or other); high income/social class; high education level; older age	–	–	–
72	Nehal KR	2021	Vaccines are important/useful; having chronic diseases; perceived severity/likelihood of VPD; being male; high income/social class; high education level; being white; private work; older age; trust in government; being HCW	Age <75/too young; Lack of knowledge/information; Not susceptibility/non severity of VPD; socio-economics and cultural barriers (e.g. low education, low income, living in poor areas); religious beliefs; no trust in government; being immigrants/non white; being female; not employed/retired	–	–
73	Nindrea RD	2021	Vaccines are important/useful; vaccines are effective; having chronic diseases; previously vaccinated (for the flu or other); perceived severity/likelihood of VPD; side effects less risky than VPD; being male; trust in medicine/health system; high income/social class; high education level; being married; older age; being HCW	–	–	–
74	Okoli GN	2020	Having chronic diseases; perceived poor health; being male; high income/social class; being white; being married	Socio-economics and cultural barriers (e.g. low education, low income, living in poor areas); being immigrants/non white; being female; living alone	–	–
75	Parsons JE	2018	–	–	Informational material for patients	–
76	Pires C	2021	–	Fear of side effects	Communication tools provided by skilled HCPs; GPs patients management, monitoring and reminding; reminding e-mail	–
77	Reñosa MDC	2021	–	–	Letter/postcard reminder/invitation to get vaccinated; personalized recommendations; informational material for patients	Opt-out policies; reminder postcards to motivate elderly adults
78	Ripp T	2022	–	False beliefs about vaccines	–	–
79	Robinson E	2021	Having chronic diseases; being male; high income/social class; high education level; being white; older age	–	–	–
80	Limaye RJ	2021	Trust in medicine/health system; Trust in government	–	–	–

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Supplementary Table S2
Continued

Ref.	First author	Year of publication	Determinants that favor vaccinations	Barriers that hinder vaccinations	Interventions with proven efficacy	Interventions with non-significant or conflicting results
81	Thomas RE	2018	–	–	Phone reminder/invitation to get vaccinate; letter/postcard reminder/ invitation to get vaccinated; free vaccination; informational material for patients	–
82	Truong J	2022	Having chronic diseases; previously vaccinated (for the flu or other); perceived severity/ likelihood of VPD; vaccination advised by HCWs; social norms/ social pressure; being male; knowledge of vaccines/VPD; concerned about their health/ getting VPD; trust in medicine/ health system; high income/social class; high education level; being white; older age	Adverse effects/not effectiveness of the vaccine; perceived good health; lack of knowledge/information; not susceptibility/non severity of VPD; socio-economics and cultural barriers (e.g., low education, low income, living in poor areas); no trust in medicine/ research and health system	–	–
83	Veronese N	2021	–	Socio-economics and cultural barriers (e.g., low education, low income, living in poor areas); Complications from previous diseases/immune system too weak/poor health; being immigrants/ non white; being female	–	–
84	Vujovich-Dunn C	2021	–	.	Informational material for patients	–
85	Vukovic V	2020	High income/social class	Socio-economics and cultural barriers (e.g. low education, low income, living in poor areas)	–	–
86	Wang Q	2021	Perceived severity/likelihood of VPD; being male; high income/ social class; high education level; being white; older age	Age <75/too young; adverse effects/ not effectiveness of the vaccine; no trust in medicine/research and health system; being immigrants/non white; being female	–	–
87	Whisnant J	2020	Vaccines are important/useful; social norms/social pressure; knowledge of vaccines/VPD; high income/social class; older age; young age (<35); female; vaccination offered in school	Physical barriers to vaccination (e.g., costs; access to clinic, etc.); lack of knowledge/information; not susceptibility/non severity of VPD; being too busy	–	–
88	Zhou X	2020	–	–	Phone reminder/invitation to get vaccinate; letter/postcard reminder/ invitation to get vaccinated	–

CAP: children, adolescents, and parents; GBP: British pounds; NHS: National Health Service; HPV: human papillomavirus; MMR: measles, mumps, and rubella; PW: pregnant women; GP: general population; HCW: healthcare worker; HCPs: healthcare professionals; VPD: vaccine-preventable disease.

Supplementary Table S3
Risk of bias: AMSTAR 2

Ref.	First author	Year of publication	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Abdullahi LH	2020	Yes	Yes	Yes	Partial Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
2	Acampora A	2020	Yes	No	No	Partial Yes	Yes	Yes	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
3	Ampofo AG	2022	Yes	Yes	Yes	Partial Yes	Yes	NA	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
4	Wilder-Smith A	2020	Yes	No	No	Partial Yes	Yes	Yes	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	No
5	Cadeddu C	2021	Yes	No	No	Partial Yes	Yes	No	No	Yes	No	Yes	No meta-analysis conducted	No meta-analysis conducted	No	Yes	No meta-analysis conducted	Yes
6	Chen F	2022	Yes	Yes	No	Partial Yes	Yes	Yes	No	Partial Yes	Partial Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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Supplementary Table S3
Continued

Ref.	First author	Year of publication	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
7	Crocker-Burque T	2017	Yes	No	No	Partial Yes	Yes	NA	No	No	No	Yes	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
8	de Cock C	2020	Yes	Yes	No	Partial Yes	Yes	No	No	Partial Yes	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	No
9	Flood T	2020	Yes	No	No	Partial Yes	No	No	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
10	Forshaw J	2017	Yes	Yes	No	Partial Yes	Yes	No	No	Partial Yes	Partial Yes	No	Yes	No	No	No	No	Yes
11	Galanis P	2021	Yes	Yes	No	Partial Yes	Yes	Yes	No	Partial Yes	Partial Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	Fisher H	2019	Yes	No	No	Partial Yes	Yes	No	No	Partial Yes	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
13	Hutchinson AF	2020	Yes	Yes	No	Partial Yes	NA	No	No	No	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
14	Iliadou M	2021	Yes	Partial Yes	No	Partial Yes	No	NA	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
15	Karafillakis E	2019	No	No	No	Partial Yes	Yes	No	No	Partial Yes	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	Yes	No	No meta-analysis conducted	Yes
16	Karthigesu SP	2018	No	No	No	No	NA	NA	No	No	No	No	NA	NA	No	No	NA	Yes
17	Kurup L	2017	Yes	No	No	Partial Yes	No	No	No	Partial Yes	No	Yes	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
18	Li D	2022	No	No	No	Partial Yes	Yes	No	No	Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
19	Loke AY	2017	Yes	Partial Yes	No	Partial Yes	No	Yes	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
20	Lopez N	2020	Yes	Yes	No	Partial Yes	Yes	Yes	Yes	Partial Yes	Yes	Yes	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
21	Machado AA	2021	Yes	No	No	Partial Yes	Yes	No	No	Partial Yes	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
22	Mavundza EJ	2021	Yes	Yes	No	Yes	Yes	Yes	Yes	Partial Yes	Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
23	Newman PA	2018	Yes	No	Yes	Partial Yes	Yes	Yes	No	Partial Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24	Nour R	2019	No	No	No	No	No	No	No	No	No	No	NA	NA	No	No	NA	Yes
25	Perman S	2017	Yes	No	No	Partial Yes	No	No	No	Partial Yes	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	Yes	No	No meta-analysis conducted	Yes
26	Radisic G	2017	No	No	No	No	NA	Yes	No	No	No	No	No	No	Yes	No	No	Yes
27	Smith LE	2017	Yes	Partial Yes	No	Partial Yes	No	No	No	No	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
28	Thanasas I	2020	Yes	Partial Yes	No	Partial Yes	NA	NA	No	Partial Yes	Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	No
29	Zheng L	2021	No	No	No	No	Yes	Yes	No	No	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes

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Supplementary Table S3
Continued

Ref.	First author	Year of publication	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
30	Adeyanju GC	2021	Yes	Partial Yes	No	Partial Yes	Yes	No	No	Partial Yes	No	Yes	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
31	Bisset KA	2018	Yes	Partial Yes	No	Partial Yes	No	No	No	Partial Yes	Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	Yes	No meta-analysis conducted	Yes
32	Carbone L	2022	Yes	No	No	Partial Yes	Yes	Yes	No	Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	No
33	Faria APV	2021	Yes	Partial Yes	No	Partial Yes	Yes	No	No	Yes	No	No	Yes	Yes	No	Yes	No	Yes
34	Kilichl E	2020	Yes	Yes	No	Partial Yes	Yes	No	Partial Yes	Partial Yes	Yes	No	No	Yes	Yes	Yes	No	Yes
35	Nikpour M	2022	Yes	Partial Yes	Yes	Partial Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes
36	Okoli GN	2021	Yes	No	No	No	Yes	No	No	Partial Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes
37	Patel KM	2021	Yes	No	No	Partial Yes	No	No	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	No
38	Nindrea RD	2022	Yes	Partial Yes	No	No	No	Yes	No	Yes	Yes	No	Yes	No	No	No	Yes	Yes
39	Rosso A	2020	Yes	Partial Yes	Yes	Partial Yes	Yes	Yes	No	Partial Yes	Yes	No	No meta-analysis conducted	No meta-analysis conducted	Yes	No	No meta-analysis conducted	Yes
40	Januszek SM	2021	Yes	No	No	No	No	Yes	No	Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	Yes	No meta-analysis conducted	Yes
41	Attwell K	2018	No	No	No	Partial Yes	No	No	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	Yes	No meta-analysis conducted	Yes
42	Bechini A	2020	Yes	No	No	Yes	Yes	NA	No	Partial Yes	Yes	No	No meta-analysis conducted	No meta-analysis conducted	Yes	Yes	No meta-analysis conducted	Yes
43	Frascella B	2020	No	Yes	Yes	Partial Yes	Yes	Yes	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
44	Galanis P	2021	No	No	No	Partial Yes	Yes	NA	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes
45	Hill M	2018	No	Partial Yes	No	Partial yes	Yes	No	No	Partial Yes	Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
46	Leone Roberti Maggiore U	2017	Yes	Yes	No	Partial Yes	Yes	Yes	No	Partial Yes	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
47	Li M	2021	No	No	No	Partial Yes	Yes	Yes	No	Partial Yes	Yes	No	No meta-analysis conducted	No meta-analysis conducted	Yes	No	No meta-analysis conducted	Yes
48	Lin C	2021	Yes	Yes	No	Yes	Yes	Yes	No	Partial Yes	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
49	Luo C	2021	Yes	Yes	No	Partial Yes	Yes	Yes	No	Partial Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
50	Pavlovic D	2022	No	Partial Yes	No	Partial yes	No	NA	No	Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	Yes	No meta-analysis conducted	Yes
51	Riccò M	2020	Yes	No	No	Yes	Yes	NA	No	Partial Yes	No	No	Yes	No	No	No	Yes	Yes
52	Silva MT	2021	Yes	Yes	No	Yes	Yes	Yes	Yes	Partial Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
53	Akumbom AM	2022	No	Partial Yes	Yes	Partial Yes	No	No	Yes	No	No	Yes	No meta-analysis conducted	No meta-analysis conducted	No	Yes	No meta-analysis conducted	Yes

Continues

Supplementary Table S3
Continued

Ref.	First author	Year of publication	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
54	Al-Amer R	2022	No	Partial Yes	No	Partial Yes	NA	NA	No	Partial Yes	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	Yes	No meta-analysis conducted	Yes
55	Anderson LJ	2018	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No meta-analysis conducted	No meta-analysis conducted	Yes	No	No meta-analysis conducted	Yes
56	Bach AT	2019	No	No	No	Partial Yes	No	NA	No	No	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	No
57	Schmid P	2017	No	No	No	Partial Yes	No	No	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
58	Bruel S	2020	No	No	No	No	NA	No	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
59	Cascini F	2021	No	No	No	Partial Yes	Yes	Yes	No	No	No	Yes	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
60	Ergün A	2022	No	No	No	No	No	No	No	Partial Yes	Yes	Yes	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
61	Hakim H	2019	Yes	Yes	No	Partial Yes	Yes	Yes	No	No	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
62	Jacobson Vann JC	2018	Yes	No	No	Yes	Yes	Yes	No	Partial Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
63	Jain A	2017	No	No	No	Partial Yes	No	No	No	Partial Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
64	Kan T	2018	No	No	No	Partial Yes	No	No	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
65	Knight H	2021	No	No	No	Partial Yes	Yes	No	No	Partial Yes	No	Yes	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
66	Larson HJ	2018	Yes	No	No	Partial Yes	No	No	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
67	Lazić A	2021	No	No	No	Partial Yes	No	No	Yes	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	No
68	Li L	2022	No	Partial Yes	No	Partial Yes	No	No	No	No	Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
69	Lin C	2020	No	No	No	Partial Yes	NA	Yes	No	No	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
70	Lorini C	2018	No	No	No	Partial Yes	Yes	NA	No	No	Yes	No	NA	NA	Yes	No	NA	Yes
71	Murfin J	2020	Yes	No	Yes	Partial Yes	No	No	No	Partial Yes	Partial Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
72	Nehal KR	2021	No	No	No	No	No	Yes	No	Partial Yes	Partial Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
73	Nindrea RD	2021	No	No	No	Partial Yes	No	No	No	Partial Yes	Partial Yes	Yes	Yes	Yes	No	Yes	Yes	No
74	Okoli GN	2020	Yes	Yes	No	Partial Yes	Yes	Yes	No	Partial Yes	Yes	No	Yes	No	No	Yes	Yes	Yes
75	Parsons JE	2018	Yes	Partial Yes	No	Partial Yes	No	No	No	No	Yes	No	No	No	No	No	Yes	Yes
76	Pires C	2021	Yes	Partial Yes	No	Partial Yes	No	No	No	Partial Yes	No	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes

Continues

Supplementary Table S3
Continued

Ref.	First author	Year of publication	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
77	Reñosa MDC	2021	Yes	Yes	No	Partial Yes	Yes	Yes	No	Partial Yes	Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
78	Ripp T	2022	No	Partial Yes	No	Partial Yes	No	No	No	Partial Yes	No	Yes	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
79	Robinson E	2021	Yes	Partial Yes	No	Partial Yes	No	No	No	No	No	No	Yes	No	No	No	Yes	Yes
80	Limaye RJ	2021	No	Partial Yes	No	Partial Yes	No	No	No	Partial Yes	No	Yes	No meta-analysis conducted	No meta-analysis conducted	Yes	No	No meta-analysis conducted	Yes
81	Thomas RE	2018	Yes	No	No	Yes	Yes	Yes	Yes	Partial Yes	Yes	Yes	Yes	Partial Yes	Yes	Yes	Yes	Yes
82	Truong J	2022	No	No	No	Partial Yes	No	No	No	Partial Yes	No	Yes	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
83	Veronese N	2021	No	Yes	No	Partial Yes	Yes	Yes	Yes	No	Partial Yes	No	Yes	Yes	Yes	No	Yes	No
84	Vujovich-Dunn C	2021	Yes	Yes	No	Partial Yes	No	No	Yes	Partial Yes	Partial Yes	No	Yes	Yes	Yes	No	No	Yes
85	Vukovic V	2020	No	No	No	Partial Yes	Yes	Yes	No	Partial Yes	Yes	No	No meta-analysis conducted	No meta-analysis conducted	No	No	No meta-analysis conducted	Yes
86	Wang Q	2021	No	No	No	Partial Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	Yes	No	Yes
87	Whisnant J	2020	Yes	Partial Yes	No	Partial Yes	Yes	Yes	No	No	Partial Yes	No	No	No	No	No	No	Yes
88	Zhou X	2020	No	No	No	Partial Yes	No	No	No	Partial Yes	Partial Yes	Yes	Yes	Yes	No	Yes	Yes	Yes

NA: not available.

AMSTAR-2:

1. Did the research questions and inclusion criteria for the review include the components of PICO? (adapted: if it was not a systematic review of interventions, the Authors might have used another framework, as long as they explained it)
2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?
3. Did the review authors explain their selection of the study designs for inclusion in the review? (adapted: if it was not a systematic review of interventions, the Authors might have used other designs, as long as they explained it)
4. Did the review authors use a comprehensive literature search strategy?
5. Did the review authors perform study selection in duplicate?
6. Did the review authors perform data extraction in duplicate?
7. Did the review authors provide a list of excluded studies and justify the exclusions?
8. Did the review authors describe the included studies in adequate detail?
9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?
10. Did the review authors report on the sources of funding for the studies included in the review?
11. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?
12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?
13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?
15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?
16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?

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