APPENDIX A. SEARCH STRATEGIES

Database: MEDLINE (via Ovid)
Search Date: 2/13/2020
Note: Searching Ovid MEDLINE® ALL, 1946 to February 12, 2020

#1	Telephone/ OR exp Cell Phone/ OR exp Text Messaging/ OR exp Computers, Handheld/ OR exp Telemedicine/ OR exp Remote Consultation/ OR exp Mobile Applications/ OR exp Call Centers/	54357
#2	(telehealth OR tele-health OR Telemedicine OR tele-medicine OR Telecare OR tele-care OR Teleconsultation OR teleconsultations OR tele-consultation OR tele-consultations OR "remote consultation" OR "remote consultations" OR telenurse OR telenurses OR telenursing OR tele-nurse OR tele-nurses OR tele-nursing OR telephone OR telephones OR phone OR phones OR Cellphone OR cellphones OR "cell phone" OR "cell phones" OR smartphone OR smartphones OR "smart phone" OR "smart phones" OR "Mobile application" OR "mobile applications" OR "mobile apps" OR iPhone OR Android OR iPad OR Blackberry OR eHealth OR e-health OR mHealth OR m-health OR "video consultation" OR "video consultations" OR "web consultation" OR "web consultations" OR "online consultation" OR "online consultations" OR "internet consultation" OR "internet consultations" OR "video conference" OR "video conferences" OR "video conferencing" OR videoconference OR videoconferences OR videoconferencing OR "web conference" OR "web conferences" OR "web conferencing" OR webconference OR webconferences OR "online conference" OR "online conferences" OR "online conferencing" OR "internet conference" OR "internet conferences" OR "internet conferencing" OR "video chat" OR "video chats" OR webchat OR "web chat" OR webchats OR "web chats" OR "online chat" OR "online chats" OR "internet chat" OR "internet chats" OR "video meeting" OR "video meetings" OR "web meeting" OR "web meetings" OR "online meeting" OR "online meetings" OR "internet meeting" OR "internet meetings" OR "chat room" OR "chat rooms" OR "live chat" OR "health chat" OR "video message" OR "video messages" OR "video messaging" OR "video call" OR "video calls" OR teleconference OR teleconferences OR teleconferencing OR tele-conference OR tele-conferences OR tele-conferencing OR webex OR zoom OR skype OR ooVoo OR FaceTime OR Tango OR GoToMeeting OR "interactive voice response" OR IVR OR SMS OR "short message service" OR Virtual OR "web based" OR "call center" OR "call centers" OR "call centre" OR "call centres" OR "communication technology" OR "communication technologies").ti,ab.	203614
#3	("face to face" OR "in person" OR inperson OR in-person).ti,ab. AND (alternative OR alternatives).ti,ab.	1427
#4	(text OR texts).ti,ab. AND (message OR messages OR messaging).ti,ab.	4865
#5	(mobile OR cellular OR cell).ti,ab. ADJ3 (device OR devices OR app OR apps OR applications OR applications).ti,ab.	16020
#6	1 or 2 or 3 or 4 or 5	234615
#7	exp After-Hours Care/	1825
#8	(exp Ambulatory Care/ OR exp Ambulatory Care Facilities/ OR exp Triage/ OR exp Outpatients/ OR exp Outpatient Clinics, Hospital/) AND (urgent OR acute).ti,ab.	7696
#9	("walk in" OR walk-in).ti,ab. AND (clinic OR clinics).ti,ab.	638
#10	("low acuity" OR "same day" OR "urgent care" OR "urgent visit" OR "urgent visits" OR "urgent health care" OR "urgent healthcare" OR "acute care" OR "acute visit" OR "acute visits" OR "acute health care" OR "acute healthcare" OR (("after hours" OR "out of hours") AND (care OR urgent OR clinic OR clinics)) OR "unscheduled	53128

	care" OR "on demand" OR "direct to consumer" OR fast-track OR fast-tracked OR "fast track" OR "fast tracked").ti,ab.	
#11	7 or 8 or 9 or 10	61210
#12	6 and 11	2996
#13	exp Cohort Studies/ OR exp Follow-Up Studies/ OR exp Longitudinal Studies/ OR exp Prospective Studies/ OR exp Cross-Sectional Studies/ OR exp Controlled Before-After Studies/ OR exp Interrupted Time Series Analysis/ OR exp Evaluation studies as topic/	3112810
#14	"Randomized Controlled Trial".pt. OR "Controlled Clinical Trial".pt. OR "Clinical Trial".pt. OR "Observational Study".pt. OR "Evaluation Studies".pt. OR "Comparative Study".pt.	2733303
#15	(randomized OR randomised OR randomization OR randomisation OR placebo OR randomly OR trial OR trials OR groups OR "evaluation study" OR "evaluation studies" OR "intervention study" OR "intervention studies" OR cohort OR cohorts OR longitudinal OR longitudinally OR prospective OR prospectively OR follow-up OR "follow up" OR followup OR cross-sectional OR "cross sectional" OR "comparative study" OR "comparative studies"OR nonrandom OR "non-random" OR nonrandomized OR "non-randomized" OR nonrandomised OR "non-randomised" OR quasi-experiment* OR quazi-experiment* OR quasiexperiment* OR quaziexperiment* OR quasirandom* OR quazirandom* OR quasi-random* OR quazi-random* OR quasi-control* OR quazi-control* OR quasicontrol* OR quazicontrol*).ti,ab.	4862228
#16	controlled.ti,ab. AND (trial OR study).ti,ab.	427927
#17	("pre-post" OR "pre post" OR "posttest" OR "post-test" OR "post test" OR pretest OR "pre-test" OR "pre test" OR "repeated measure" OR "repeated measures").ti,ab.	71333
#18	(before.ti,ab. AND after.ti,ab.) OR (before.ti,ab. AND during.ti,ab.)	862396
#19	"time series".ti,ab. AND interrupt*.ti,ab.	2997
#20	"time points".ti,ab. AND (multiple OR one OR two OR three OR four OR five OR six OR seven OR eight OR nine OR ten OR month OR monthly OR day OR daily OR week OR weekly OR hour OR hourly).ti,ab.	62653
#21	13 or 14 or 15 or 16 or 17 or 18 or 19 or 20	8166940
#22	12 and 21	1840

EMBASE (via Elsevier)

Search date: 2/13/2020

Note: Search EMBASE from the Results page

#1	'telephone'/exp OR 'mobile phone'/exp OR 'smartphone'/exp OR 'text messaging'/exp OR 'text message'/exp OR 'personal digital assistant'/exp OR 'telemedicine'/exp OR 'teleconsultation'/exp OR 'mobile application'/exp OR 'mobile health application'/exp OR 'call center'/exp	107,474
#2	(telehealth OR Telemedicine OR Telecare OR Teleconsultation OR teleconsultations OR 'remote consultation' OR 'remote consultations' OR telenurse OR telenurses OR telenursing OR telephone OR telephones OR phone OR phones OR Cellphone OR cellphones OR 'cell phone' OR 'cell phones' OR smartphone OR smartphones OR 'smart phone' OR 'smart phones' OR 'Mobile application' OR 'mobile applications' OR 'mobile apps' OR iPhone OR Android OR iPad OR Blackberry OR eHealth OR mHealth OR 'video consultation' OR 'video consultations' OR 'web consultation' OR 'web consultations' OR 'online consultation' OR 'online consultations' OR 'internet consultation' OR 'internet consultations' OR 'video conference' OR 'video conferences' OR 'video	282,025

	conferencing' OR videoconference OR videoconferences OR videoconferencing OR 'web conference' OR 'web conferences' OR 'web conferencing' OR webconference OR webconferences OR 'online conference' OR 'online conferences' OR 'online conferencing' OR 'internet conference' OR 'internet conferences' OR 'internet conferencing' OR 'video chat' OR 'video chats' OR webchat OR 'web chat' OR webchats OR 'web chats' OR 'online chat' OR 'online chats' OR 'internet chat' OR 'internet chats' OR 'video meeting' OR 'video meetings' OR 'web meeting' OR 'web meetings' OR 'online meeting' OR 'online meetings' OR 'internet meeting' OR 'internet meetings' OR 'chat room' OR 'chat rooms' OR 'live chat' OR 'health chat' OR 'video message' OR 'video messages' OR 'video messaging' OR 'video call' OR 'video calls' OR teleconference OR teleconferences OR teleconferencing OR webex OR zoom OR skype OR ooVoo OR FaceTime OR Tango OR GoToMeeting OR 'interactive voice response' OR IVR OR SMS OR 'short message service' OR Virtual OR 'web based' OR 'call center' OR 'call centers' OR 'call centre' OR 'call centres' OR 'communication technology' OR 'communication technologies'):ti,ab	
#3	('face to face' OR 'in person' OR inperson):ti,ab AND (alternative OR alternatives):ti,ab	2037
#4	(text OR texts):ti,ab AND (message OR messages OR messaging):ti,ab	6466
#5	((mobile OR cellular OR cell) NEAR/3 (device OR devices OR app OR apps OR applications OR applications)):ti,ab	18753
#6	1 or 2 or 3 or 4 or 5	325,982
#7	'out-of-hours care'/exp	390
#8	('ambulatory care'/exp OR 'outpatient department'/exp OR 'emergency health service'/exp OR 'outpatient'/exp) AND (urgent OR acute):ti,ab	34390
#9	('walk in' OR walk-in):ti,ab AND (clinic OR clinics):ti,ab	1007
#10	('low acuity' OR 'same day' OR 'urgent care' OR 'urgent visit' OR 'urgent visits' OR 'urgent health care' OR 'urgent healthcare' OR 'acute care' OR 'acute visit' OR 'acute visits' OR 'acute health care' OR 'acute healthcare' OR (('after hours' OR 'out of hours') AND (care OR urgent OR clinic OR clinics)) OR 'unscheduled care' OR 'on demand' OR 'direct to consumer' OR fasttrack OR fasttracked OR 'fast track' OR 'fast tracked'):ti,ab	81252
#11	7 or 8 or 9 or 10	112287
#12	6 and 11	6104
#13	'randomized controlled trial'/exp OR 'crossover procedure'/exp OR 'double blind procedure'/exp OR 'single blind procedure'/exp OR 'clinical study'/exp OR 'controlled study'/exp OR 'evaluation study'/exp OR 'intervention study'/exp OR 'cohort analysis'/exp OR 'follow up'/exp OR 'comparative effectiveness'/exp OR 'longitudinal study'/exp OR 'evaluation study'/exp OR 'prospective study'/exp OR 'time series analysis'/exp OR 'cross-sectional study'/exp	14,686,160
#14	(randomized OR randomised OR randomization OR randomisation OR placebo OR randomly OR trial OR trials OR groups OR 'evaluation study' OR 'evaluation studies' OR 'intervention study' OR 'intervention studies' OR cohort OR cohorts OR longitudinal OR longitudinally OR prospective OR prospectively OR follow-up OR 'follow up' OR followup OR cross-sectional OR 'cross sectional' OR 'comparative study' OR 'comparative studies' OR nonrandom OR 'non-random' OR nonrandomized OR 'non-randomized' OR nonrandomised OR 'non-randomised' OR quasiexperiment* OR quaziexperiment* OR quasirandom* OR quazirandom* OR quasicontrol* OR quazicontrol*):ti,ab	7030637
#15	controlled:ti,ab AND (trial OR study):ti,ab	586,417

#16	('pre-post' OR 'pre post' OR 'posttest' OR 'post-test' OR pretest OR 'pre test' OR 'repeated measure' OR 'repeated measures'):ti,ab	105841
#17	(before:ti,ab AND after:ti,ab) OR (before:ti,ab AND during:ti,ab)	1277121
#18	'time series':ti,ab AND interrupt*:ti,ab	3742
#19	'time points':ti,ab AND (multiple OR one OR two OR three OR four OR five OR six OR seven OR eight OR nine OR ten OR month OR monthly OR day OR daily OR week OR weekly OR hour OR hourly):ti,ab	101872
#20	13 or 14 or 15 or 16 or 17 or 18 or 19	17,216,081
#21	12 and 20	4,363
#22	#21 NOT [conference abstract]/lim	2,233

CINAHL Complete (via EBSCO)

Search date: 2/13/2020

#1	(MH "Telephone+") OR (MH "Cellular Phone+") OR (MH "Text Messaging") OR (MH "Smartphone") OR (MH "Videoconferencing+") OR (MH "Webcasts") OR (MH "Computers, Hand-Held+") OR (MH "Telemedicine+") OR (MH "Remote Consultation") OR (MH "Telenursing") OR (MH "Mobile Applications")	45381
#2	Tl(telehealth OR tele-health OR Telemedicine OR tele-medicine OR Telecare OR tele-care OR Teleconsultation OR teleconsultations OR tele-consultation OR tele-consultations OR "remote consultation" OR "remote consultations" OR telenurse OR telenurses OR telenursing OR tele-nurse OR tele-nurses OR tele-nursing OR telephone OR telephones OR phone OR phones OR Cellphone OR cellphones OR "cell phone" OR "cell phones" OR smartphone OR smartphones OR "smart phone" OR "smart phones" OR "Mobile application" OR "mobile applications" OR "mobile apps" OR iPhone OR Android OR iPad OR Blackberry OR eHealth OR e-health OR mHealth OR m-health OR "video consultation" OR "video consultations" OR "web consultation" OR "web consultations" OR "online consultation" OR "online consultations" OR "internet consultation" OR "internet consultations" OR "video conference" OR "video conferences" OR "video conferencing" OR videoconference OR videoconferences OR videoconferencing OR "web conference" OR "web conferences" OR "web conferencing" OR webconference OR webconferences OR "online conference" OR "online conferences" OR "online conferencing" OR "internet conference" OR "internet conferences" OR "internet conferencing" OR "video chat" OR "video chats" OR webchat OR "web chat" OR webchats OR "web chats" OR "online chat" OR "online chats" OR "internet chat" OR "internet chats" OR "video meeting" OR "video meetings" OR "web meeting" OR "web meetings" OR "online meeting" OR "online meetings" OR "internet meeting" OR "internet meetings" OR "chat room" OR "chat rooms" OR "live chat" OR "health chat" OR "video message" OR "video messages" OR "video messaging" OR "video call" OR "video calls" OR teleconference OR teleconferences OR teleconferencing OR tele-conference OR tele-conferences OR tele-conferencing OR webex OR zoom OR skype OR ooVoo OR FaceTime OR Tango OR GoToMeeting OR "interactive voice response" OR IVR OR SMS OR "short message service" OR Virtual OR "web based" OR "call center" OR "call centers" OR "call centre" OR "call centres" OR "communication technology" OR "communication technologies") OR AB(telehealth OR tele-health OR Telemedicine OR tele-medicine OR Telecare OR tele-care OR Teleconsultation OR teleconsultations OR tele-consultation OR tele-consultations OR "remote consultation" OR "remote consultations" OR telenurse OR telenurses OR telenursing OR tele-nurse OR tele-nurses OR tele-nursing OR telephone OR telephones OR phone OR phones OR Cellphone OR cellphones OR "cell phone" OR "cell phones" OR smartphone OR smartphones OR "smart phone" OR "smart	103446

	phones" OR "Mobile application" OR "mobile applications" OR "mobile apps" OR iPhone OR Android OR iPad OR Blackberry OR eHealth OR e- health OR mHealth OR m-health OR "video consultation" OR "video consultations" OR "web consultation" OR "web consultations" OR "online consultation" OR "online consultations" OR "internet consultation" OR "internet consultations" OR "video conference" OR "video conferences" OR "video conferencing" OR videoconference OR videoconferences OR videoconferencing OR "web conference" OR "web conferences" OR "web conferencing" OR webconference OR webconferences OR "online conference" OR "online conferences" OR "online conferencing" OR "internet conference" OR "internet conferences" OR "internet conferencing" OR "video chat" OR "video chats" OR webchat OR "web chat" OR webchats OR "web chats" OR "online chat" OR "online chats" OR "internet chat" OR "internet chats" OR "video meeting" OR "video meetings" OR "web meeting" OR "web meetings" OR "online meeting" OR "online meetings" OR "internet meeting" OR "internet meetings" OR "chat room" OR "chat rooms" OR "live chat" OR "health chat" OR "video message" OR "video messages" OR "video messaging" OR "video call" OR "video calls" OR teleconference OR teleconferences OR teleconferencing OR tele-conference OR tele-conferences OR tele-conferencing OR webex OR zoom OR skype OR ooVoo OR FaceTime OR Tango OR GoToMeeting OR "interactive voice response" OR IVR OR SMS OR "short message service" OR Virtual OR "web based" OR "call center" OR "call centers" OR "call centre" OR "call centres" OR "communication technology" OR "communication technologies")	
#3	(TI("face to face" OR "in person" OR inperson OR in-person) OR AB("face to face" OR "in person" OR inperson OR in-person)) AND (TI(alternative OR alternatives) OR AB(alternative OR alternatives))	3192
#4	(TI(text OR texts) OR AB(text OR texts)) AND (TI(message OR messages OR messaging) OR AB(message OR messages OR messaging))	2932
#5	(TI(mobile OR cellular OR cell) OR AB(mobile OR cellular OR cell)) AND (TI(device OR devices OR app OR apps OR applications OR applications) OR AB(device OR devices OR app OR apps OR applications OR applications)	158403
#6	1 or 2 or 3 or 4 or 5	274227
#7	((MH "Ambulatory Care") OR (MH "Ambulatory Care Facilities") OR (MH "Outpatient Service") OR (MH "Outpatients") OR (MH "Triage") OR (MH "Acute Care")) AND (TI(urgent) OR AB(urgent))	990
#8	(TI("walk in" OR walk-in) OR AB("walk in" OR walk-in)) AND (TI(clinic OR clinics) OR AB(clinic OR clinics))	744
#9	TI("low acuity" OR "same day" OR "urgent care" OR "urgent visit" OR "urgent visits" OR "urgent health care" OR "urgent healthcare" OR "acute care" OR "acute visit" OR "acute visits" OR "acute health care" OR "acute healthcare" OR "unscheduled care" OR "on demand" OR "direct to consumer" OR fast-track OR fast-tracked OR "fast track" OR "fast tracked") OR AB("low acuity" OR "same day" OR "urgent care" OR "urgent visit" OR "urgent visits" OR "urgent health care" OR "urgent healthcare" OR "acute care" OR "acute visit" OR "acute visits" OR "acute health care" OR "acute healthcare" OR "unscheduled care" OR "on demand" OR "direct to consumer" OR fast-track OR fast-tracked OR "fast track" OR "fast tracked")	48425
#10	(TI("after hours" OR "out of hours") OR AB("after hours" OR "out of hours")) AND (TI(care OR urgent OR clinic OR clinics) OR AB(care OR urgent OR clinic OR clinics))	1070
#11	7 or 8 or 9 or 10	50479
#12	6 and 11	5400

#13	(MH "Randomized Controlled Trials+") OR (MH "Intervention Trials") OR (MH "Double-Blind Studies") OR (MH "Clinical Trials+") OR (MH "Single-Blind Studies") OR (MH "Therapeutic Trials") OR (MH "Triple-Blind Studies") OR (MH "Prospective Studies+") OR (MH "Cross Sectional Studies") OR (MH "Interrupted Time Series Analysis") OR (MH "Controlled Before-After Studies") OR (MH "Nonrandomized Trials") OR (MH "Pretest-Posttest Design+") OR (MH "Comparative Studies+") OR (MH "Evaluation Research+")	966101
#14	TI(randomized OR randomised OR randomization OR randomisation OR placebo OR randomly OR trial OR trials OR groups OR "evaluation study" OR "evaluation studies" OR "intervention study" OR "intervention studies" OR cohort OR cohorts OR longitudinal OR longitudinally OR prospective OR prospectively OR follow-up OR "follow up" OR followup OR cross-sectional OR "cross sectional" OR "comparative study" OR "comparative studies"OR nonrandom OR "non-random" OR nonrandomized OR "non-randomized" OR nonrandomised OR "non-randomised" OR quasi-experiment* OR quazi-experiment* OR quasiexperiment* OR quaziexperiment* OR quasirandom* OR quazirandom* OR quasi-random* OR quazi-random* OR quasi-control* OR quazi-control* OR quasicontrol* OR quazicontrol*) OR AB (randomized OR randomised OR randomization OR randomisation OR placebo OR randomly OR trial OR trials OR groups OR "evaluation study" OR "evaluation studies" OR "intervention study" OR "intervention studies" OR cohort OR cohorts OR longitudinal OR longitudinally OR prospective OR prospectively OR follow-up OR "follow up" OR followup OR cross-sectional OR "cross sectional" OR "comparative study" OR "comparative studies"OR nonrandom OR "non-random" OR nonrandomized OR "non-randomized" OR nonrandomised OR "non-randomised" OR quasi-experiment* OR quazi-experiment* OR quasiexperiment* OR quaziexperiment* OR quasirandom* OR quazirandom* OR quasi-random* OR quazi-random* OR quasi-control* OR quazi-control* OR quasicontrol* OR quazicontrol*)	1332548
#15	(TI(controlled) OR AB(controlled) AND (TI(trial OR study) OR AB(trial OR study))	168527
#16	TI("pre-post" OR "pre post" OR "posttest" OR "post-test" OR "post test" OR pretest OR "pre-test" OR "pre test" OR "repeated measure" OR "repeated measures") OR AB("pre-post" OR "pre post" OR "posttest" OR "post-test" OR "post test" OR pretest OR "pre-test" OR "pre test" OR "repeated measure" OR "repeated measures")	36293
#17	(TI(before AND after) OR AB(before AND after)) OR (TI(before AND during) OR AB(before AND during))	149392
#18	(TI("time series") OR AB("time series") AND (TI(interrupt*) OR AB(interrupt*))	2311
#19	(TI("time points") OR AB("time points")) AND (TI(multiple OR one OR two OR three OR four OR five OR six OR seven OR eight OR nine OR ten OR month OR monthly OR day OR daily OR week OR weekly OR hour OR hourly) OR AB(multiple OR one OR two OR three OR four OR five OR six OR seven OR eight OR nine OR ten OR month OR monthly OR day OR daily OR week OR weekly OR hour OR hourly))	15792
#20	13 or 14 or 15 or 16 or 17 or 18 or 19	1757703
#21	12 and 20	2,622
#22	21 NOT PT (Abstract OR Book OR Book Chapter OR Book Review OR Case Study OR Commentary OR Editorial OR Letter OR Masters Thesis OR Pamphlet OR Pamphlet Chapter OR Poetry) AND Academic Journals	2,401

APPENDIX B. STUDY CHARACTERISTICS

Study Design Country # Enrolled/Units # of Arms Funding Key Question	Eligibility	Delivery Mode	Intervention Description	Population Mean Age (SD) Female % Race %	Outcomes Reported Outcome Timing	ROB
Ashwood, 2017[21] Cohort USA 2,943 patients 2 arms California Health Care Foundation KQ 1	Enrollees of CalPERS Blue Shield of California HMO who had an acute respiratory infection visit at any time in the period April 2012 and November 2013	Telephone; Video; Application	Comparison of per episode spending for direct-to-consumer telehealth visits via Teledoc for acute respiratory infections versus in-person care settings.	Mean age: NR Sex: 61% Race: NR	Cost Health care utilization Timepoint not reported	Moderate
Cragg, 1997[22] RCT United Kingdom 2,152 patients 2 arms MRC Health Services Research Board KQ 1 Companion: McKinley, 1997 [33]	Patients calling out of hours within the area of Manchester, Stockport, Leicester, and Salford	Telephone	This study compared out-of-hours care provided by a patient's own practice co-operative and care provided by a commercial deputizing service with providers unfamiliar to the patient. Patients were offered telephone advice, home visits, or an in-person visit at the primary care center.	Mean age: NR Sex: NR Race: NR	Patient satisfaction 24-120 hours Case resolution 1 year Heath care utilization 1 year Cost 1 year Health care access 1 year	Some concerns
Gordon, 2017[23] Cross-sectional USA	Patients aged 65 years and younger, commercially insured, without	Video	Virtual health care for acute, non-urgent conditions (*eg*, colds, allergies, urinary tract	Median age adults: 39.3	Health care utilization 3 week period	Fair

Study Design Country # Enrolled/Units # of Arms Funding Key Question	Eligibility	Delivery Mode	Intervention Description	Population Mean Age (SD) Female % Race %	Outcomes Reported Outcome Timing	ROB
59,945 patients 5 arms Anthem KQ 1	serious/expensive comorbidities, with virtual visits for specific conditions (sinusitis, upper respiratory infection, urinary tract infection, conjunctivitis, bronchitis, pharyngitis, influenza, cough, dermatitis, digestive symptom, or ear pain) matched to those receiving care for similar conditions in other settings (retail clinic, urgent care, ED, PCP)		infections) provided by physicians via a live video visit platform. Data were collected from an insurance claims database. Virtual visits were compared to care delivered in person through retail health clinics, urgent care centers, and emergency departments.	Median age children: 8.4 Sex: 56% Race: NR	Cost 3-week period At index visit	
Knowles, 2016[24] Controlled before and after United Kingdom 2,8071 survey respondents 2 arms UK NHS KQ 1	Population survey sent to all residents (or their proxies) of 7 areas in pilot/control regions in the UK	Telephone	The UK National Health System (NHS) 111 telephone urgent care triage service. This service was introduced in 4 regions of England in 2010 and intended for people having a non-life-threatening health care episode. Non-clinical call handlers direct patients to appropriate in-person medical services or advice over the phone. The predecessor system (NHS Direct) included a nurse helpline and triage for some practices and was	Mean age: NR Sex: 49% Race: 86% White; 14% Other	Patient satisfaction Time point not reported	Moderate

Study Design Country # Enrolled/Units # of Arms Funding Key Question	Eligibility	Delivery Mode	Intervention Description	Population Mean Age (SD) Female % Race %	Outcomes Reported Outcome Timing	ROB
			accessible at the time of the study.			
Lattimer, 1998[36] Cluster RCT 14,492 visits England 2 arms BT and South and West Regional Health Authority KQ 2	Patient calls were included if they were made by registered patients who contacted the out of hours telephone consultation service for a general practice cooperative consisting of 19 practices (55 general practitioners) in Wiltshire, England during the trial period (Jan 1997 - Jan 1998).	Telephone	Patients in the intervention arm called the after-hours consultation service, gave their details to a receptionist, and then were directed to a nurse. The nurse conducted a systematic assessment of the caller's problem and recommended an appropriate course of action which included either management with nurse advice alone, contact with the general practitioner, or direct contact with emergency services. The control arm patient calls were directed by the receptionist directly to the GP who recommended telephone management or in-person care.	Mean age: <4 years old: 25% -24 years old: 21% -44 years old: 20% -64 years old: 12% -75 years old: 19% years old: Unknown 2% Sex: 58% Race: NR	Patient safety 7 days of call Increased resource cost Time point not reported	Some concerns
Lovell, 2019[25] Cross-sectional USA 12,581 visits	All virtual care claims and matched (1:4) ratio urgent care, primary care, and emergency department claims for patients under 65	Web-based; Video	Any Intermountain Health patient with access to high-speed internet can access the virtual visit program, which utilizes protocols.	Mean age: NR Sex: 66% Race: NR	Cost Over 21 days	Good

Study Design Country # Enrolled/Units # of Arms Funding Key Question	Eligibility	Delivery Mode	Intervention Description	Population Mean Age (SD) Female % Race %	Outcomes Reported Outcome Timing	ROB
4 arms Stated as unfunded KQ 1	years of age presenting with the 9 most common diagnoses addressed in virtual care, for patients covered by SelectHealth insurance company and occurring in April and March 2016		This is an on-demand direct-to-consumer video or telephone care service.			
McKinley, 2002[26] Cross-sectional England 2,263 patients 6 arms Consumers Association KQ 1	Patients who requested care after practice hours on weekdays and weekends during 9/29/97-12/6/97 were included. Exclusion criteria included 12 to 16-year-old patients, if the reason for the visit was to certify death, or if they were known to have died subsequently.	Telephone	Intervention arms included out-of-hours care provided by practices providing their own services, GP cooperatives, and a deputizing service. These 3 systems offered home visits, care at the primary care center, or telephone advice.	Age: Less than 12 years old: 45% Older than 65 years old: 17% Sex: 55% Race: NR	Patient satisfaction After requested care	Good
Poon, 2018[3] Cohort USA 20.6 million visits 4 arms Funding NR KQ 1	All insured members of Aetna under age 65 with coverage in all study years 2008-2015	Mode NR	This study describes the changes in utilization and cost trends over 8 years during the advent of direct-to-consumer telemedicine for unscheduled low-acuity care.	Median age: 31.75 Sex: 58.5% Female Race: NR	Health care utilization Cost 8 years	Serious
Salisbury, 1997[27] Cohort England	Contacts with patients who requested out of hours care over an 8-week period	Telephone	Patients called for care through either their primary care co-operative or a	Mean age: NR Sex: NR Race: NR	Patient satisfaction	Serious

Study Design Country # Enrolled/Units # of Arms Funding Key Question	Eligibility	Delivery Mode	Intervention Description	Population Mean Age (SD) Female % Race %	Outcomes Reported Outcome Timing	ROB
1,555 visits 3 arms Kensington, Chelsea, and Westminster Medical Audit Advisory Group and Healthcall KQ 1	starting September 1, 1995, in a section of London served by a general practice out of hours cooperative or a commercial service		commercial "deputizing" service, which is a contracted service to handle out-of-hours calls for the primary care group. After requesting care, patients would have either a phone visit, a clinic visit, or an in-home visit.		Time point not reported	
Sen, 2019[28] Cross-sectional United Kingdom 10,315 patients 1 arm Funding none KQ 1	All callers to 111 service during study times excluding acute conditions such as assaults, foreign bodies, or penetrating trauma.	Telephone	The UK National Health Service 111 center call handlers triaged out of hours calls to in-person care or on-call consultation by a practitioner. For this study, patients who would have been advised to go to the ED by the clinical support software were passed to a clinical assessment service (CAS) and reviewed by either an EP (July to November 2016) or an NPCA (December 2016 to February 2017).	Mean age: NR Sex: NR Race: NR	Case resolution 7 months	Fair
Shi, 2018[37] Cohort USA 1,167,468 visits	Adults seeking care for acute respiratory infections between 18 to 64 years old who had pharmaceutical	Telephone	Claims data from a national insurer was used to compare care received via direct-to-consumer telemedicine visits to in-	Mean age: 18–34 years old: 33%	Inappropriate treatment At index	Moderate

Study Design Country # Enrolled/Units # of Arms Funding Key Question	Eligibility	Delivery Mode	Intervention Description	Population Mean Age (SD) Female % Race %	Outcomes Reported Outcome Timing	ROB
3 arms Funding none KQ 2	coverage at the time of their visit		person primary care and urgent care visits for respiratory infections. Telemedicine visits are usually video but may be limited to telephone audio-only.	35–44 years old: 32% 45–54 years old: 23% 55–64 years old: 13% Sex: 63% Female Race: NR		
Shipman, 2000[29] Cross-sectional England 1,288 patients 3 arms District Health Authority of NHS KQ 1	Surveyed patients were sampled from the GP co-operative and deputizing company from April 21, 1997, to May 25, 1997. Excluded patients included those who were very ill, patients with a second contact made during the study period, temporary residents, and, with the exception of children, patients whose contact was through a third party. Only those patients sampled from the GP co-operative have been included in the data extracted for this meta-analysis.	Telephone	This study evaluated patient satisfaction for care received via telephone and in-person by a GP co-operative, deputizing service, and practice-based GPs between 4/21/97 and 5/25/97. The co-operative consisted of 290 GPs. Of these, 110 used both a deputizing doctor service and a rotating GP co-operative.	Mean age: NR Sex: NR Race: NR	Patient satisfaction 1 week after out-of-hours consultation	Fair

Study Design Country # Enrolled/Units # of Arms Funding Key Question	Eligibility	Delivery Mode	Intervention Description	Population Mean Age (SD) Female % Race %	Outcomes Reported Outcome Timing	ROB
Tranberg, 2018 [30] Cross-sectional Denmark 7213 contacts 3 arms Funded by Danish foundation TrygFonden KQ 1	Exclusion criteria included protection against research participation, previous inclusion of same patient, unknown postal, sensitive matters (*eg*, attempted suicide or terminal illness), and death.	Telephone	GP cooperatives provide out-of-hours primary care on a rotating basis. Calls are answered by GPs who can provide advice, write prescriptions, or triage patients to in person care at home, at a clinic, or at a hospital.	Percent of contacts per age category: 0–4 years old: 22% 5–18 years old: 16% 19–50 years old: 27% 51–75 years old: 24% > 75 years old: 12% Sex: 52% Female Race: NR	Patient satisfaction	Good
Turner, 2013[31] Controlled before and after United Kingdom 277,163 calls 2 arms UK Department of Health KQ 1	Participants were all users of the emergency and urgent care systems in the intervention (Durham & Darlington, Nottingham, Lincolnshire, Luton) sites recorded in routine service activity data as having accessed and used a range of emergency or urgent care services during 2010-11 after the initiation of NHS 111 at those sites. The comparison rates of service use at the	Telephone	The United Kingdom National Health Service 111 program is a telephone triage service designed to manage all requests for urgent help by routing patient calls to the correct type of medical service (*ie*, on-call advice, ambulance services, health information, urgent care, primary care appointments) with 1 call.	Mean age: NR Sex: NR Race: NR	Health care utilization 12 months	Moderate

Study Design Country # Enrolled/Units # of Arms Funding Key Question	Eligibility	Delivery Mode	Intervention Description	Population Mean Age (SD) Female % Race %	Outcomes Reported Outcome Timing	ROB
	control sites (North of Tyne, Norfolk, Leicester City) and the intervention sites were rates of use of these same services in the 2008-2010 period (for the intervention site comparisons) and 2008-2011 for the control site comparisons.					
Wallace, 2018[38] Cross-sectional Ireland 298 visits 1 arm Health Research Board of Ireland KQ 2	After-hours patients (all ages; 53% adults) seen by one of 5 practices in the past 5 years	Telephone	Callers to the out-of-hours service in Dublin were triaged by nurses to receive home visits or center care with a GP. The study characterized patient complaints over a 5-year period.	Mean age: NR Sex: 58% Female Race: NR	Inappropriate treatment 7 years	Fair
Wilson, 2001[32] Cross-sectional United Kingdom 1,115 patients 1 arm University of Glasgow, Scottish Office Department of Health KQ 1	Patients (or their care givers requesting on behalf) calling to request out of hours medical care in Glasgow	Telephone	This out-of-hours cooperative via Glasgow Emergency Medical Service served 952,000 patients across 6 locations. Callers received telephone advice, were offered a home visit, or received care at the primary care center (with free transport if required).	Mean age: NR Sex: NR Race: NR	Patient satisfaction Week after call	Good

APPENDIX C. INTERVENTION CHARACTERISTICS

Study N # of Arms	Intervention Delivery Method (*eg*, Phone, Internet)	How Patient Enters Tele-urgent System	Type of System (*eg*, National, Private)	Who Answered Call? Delivered Care?	Intervention Components	Comparator Category
Ashwood, 2017[21] 2,943 patients 2 arms	Telephone; Video; Application	Self-referred	Private Direct-to-consumer	Not reported MD providers	Comparison of per episode spending for direct-to-consumer telehealth visits via Teledoc for acute respiratory infections versus in-person care settings.	In-person care
Cragg, 1997[22] 2,152 patients 2 arms	Telephone	Patient-initiated	Community/ regional health system; private	General Practitioner; deputizing doctor Practice doctors; deputizing doctor	This study compared out-of-hours care provided by a patient's own practice co-operative and care provided by a commercial deputizing service with providers unfamiliar to the patient. Patients were offered telephone advice, home visits, or an in-person visit at the primary care center.	Deputizing doctors
Gordon, 2017[23] 59,945 patients 5 arms	Video	Self-referred	Private Direct-to-consumer	Not reported Provider not reported	Virtual health care for acute, non-urgent conditions (*eg*, colds, allergies, urinary tract infections) provided by physicians via a live video visit platform. Data were collected from an insurance claims database. Virtual visits were compared to care delivered in person through retail health clinics, urgent care centers, and emergency departments.	ED, urgent care, retail clinics, PCP
Knowles, 2016[24] 2,8071 survey respondents 2 arms	Telephone	Triage	National health system	Non-clinical call handler General practitioner	The UK National Health System (NHS) 111 telephone urgent care triage service. This service was introduced in 4 regions of England in 2010 and intended for people having a non-life-threatening health care episode. Non-clinical call handlers direct patients to appropriate in-person medical services or advice over the phone. The predecessor system	The comparator was regions not participating in NHS 111

Study N # of Arms	Intervention Delivery Method (*eg*, Phone, Internet)	How Patient Enters Tele-urgent System	Type of System (*eg*, National, Private)	Who Answered Call? Delivered Care?	Intervention Components	Comparator Category
					(NHS Direct) included a nurse helpline and triage for some practices and was accessible at the time of the study.	
Lattimer, 1998[36] 14,492 visits 2 arms	Telephone	Triage	National health system and Community/ regional health system	Non-clinical call handler General practitioner; nurse	Patients in the intervention arm called the after-hours consultation service, gave their details to a receptionist, and then were directed to a nurse. The nurse conducted a systematic assessment of the caller's problem and recommended an appropriate course of action which included either management with nurse advice alone, contact with the general practitioner, or direct contact with emergency services. The control arm patient calls were directed by the receptionist directly to the GP who recommended telephone management or in-person care.	During the control periods, the receptionist who answered the initial call took down patient details and then passed the call on to a GP.
Lovell, 2019[25] 12,581 visits 4 arms	Web-based; Video	Not reported	Direct-to-consumer Community/ regional health system	Not reported Provider not reported	Any Intermountain Health patient with access to high-speed internet can access the virtual visit program, which utilizes protocols. This is an on-demand direct-to-consumer video or telephone care service.	The first comparator arm is care in urgent care centers. Comparators were selected for each of the three categories (*ie*, urgent care, primary care, or emergency department)
McKinley, 2002[26] 2,263 patients	Telephone	Not reported	Not reported	Not reported	Intervention arms included out-of-hours care provided by practices providing their own services, GP cooperatives, and a deputizing service. These 3 systems	Comparators included in-person care at practice, co-

Study N # of Arms	Intervention Delivery Method (*eg*, Phone, Internet)	How Patient Enters Tele-urgent System	Type of System (*eg*, National, Private)	Who Answered Call? Delivered Care?	Intervention Components	Comparator Category
6 arms				Provider not reported	offered home visits, care at the primary care center, or telephone advice.	operative, and hybrid co-operatives services.
Poon, 2018[3] 20.6 million visits 4 arms	Mode not reported	Not reported	Private Direct-to-consumer	Not reported Provider not reported	This study describes the changes in utilization and cost trends over 8 years during the advent of direct-to-consumer telemedicine for unscheduled low-acuity care.	Emergency department use
Salisbury, 1997[27] 1,555 visits 3 arms	Telephone	Not clear	Community/regional health system; private	Not reported General practitioner	Patients called for care through either their primary care co-operative or a commercial "deputizing" service, which is a contracted service to handle out-of-hours calls for the primary care group. After requesting care, patients would have either a phone visit, a clinic visit, or an in-home visit.	Home visit or attending the primary care clinic
Sen, 2019[28] 10,315 patients 1 arm	Telephone	Triage	National health system	Non-clinical call handler Provider not reported	The UK National Health Service 111 center call handlers triaged out-of-hours calls to in-person care or on-call consultation by a practitioner. For this study, patients who would have been advised to go to the ED by the clinical support software were passed to a clinical assessment service (CAS) and reviewed by either an EP (July to November 2016) or an NPCA (December 2016 to February 2017).	NHS 111 telephone triage by non-clinicians using decision support tool (data from year prior to intervention using clinician triage and no decision support tool)
Shi, 2018[37] 1,167,468 visits	Video; Telephone	Patient-initiated	Private	Not reported Physician	Claims data from a national insurer was used to compare care received via direct-to-consumer telemedicine visits to in-person primary care and urgent care	Urgent care and primary care

Study N # of Arms	Intervention Delivery Method (*eg*, Phone, Internet)	How Patient Enters Tele-urgent System	Type of System (*eg*, National, Private)	Who Answered Call? Delivered Care?	Intervention Components	Comparator Category
3 arms			Direct-to-consumer		visits for respiratory infections. Telemedicine visits are usually video but may be limited to telephone audio-only.	
Shipman, 2000[29] 1,288 patients 3 arms	Telephone	Patient-initiated	National health system	Not reported General practitioner	This study evaluated patient satisfaction for care received via telephone and in-person by a GP co-operative, deputizing service, and practice based-GPs between 4/21/97 and 5/25/97. The co-operative consisted of 290 GPs. Of these, 110 used both a deputizing doctor service and a rotating GP co-operative.	Comparator groups included co-operative base and co-operative home
Tranberg, 2018[30] 7213 contacts 3 arms	Telephone	Triaged by GPs	National health system	General practitioners General practitioners	GP cooperatives provide out-of-hours primary care on a rotating basis. Calls are answered by GPs who can provide advice, write prescriptions, or triage patients to in-person care at home, at a clinic, or at a hospital.	Clinic consultation and home visits
Turner, 2013[31] 277, 163 calls 2 arms	Telephone	Triage	National health system	Non-clinical call handler General practitioner	The United Kingdom National Health Service 111 program is a telephone triage service designed to manage all requests for urgent help by routing patient calls to the correct type of medical service (*ie*, on-call advice, ambulance services, health information, urgent care, primary care appointments) with one call.	Usual care without NHS 111 triage in non-participating regions with access to NHS Direct
Wallace, 2018[38] 298 visits 1 arm	Telephone	Triage	Community/regional health system	Nurse; general practitioner General practitioner	Callers to the out-of-hours service in Dublin were triaged by nurses to receive home visits or center care with a GP. The study characterized patient complaints over a 5-year period.	Not applicable

Study N # of Arms	Intervention Delivery Method (*eg*, Phone, Internet)	How Patient Enters Tele-urgent System	Type of System (*eg*, National, Private)	Who Answered Call? Delivered Care?	Intervention Components	Comparator Category
Wilson, 2001[32] 1,115 patients 1 arm	Telephone	Self-referred	Community/ regional health system	Not reported General Practitioners	This out-of-hours cooperative via Glasgow Emergency Medical Service served 952,000 patients across 6 locations. Callers received telephone advice, were offered a home visit, or received care at the primary care center (with free transport if required).	No comparator

APPENDIX D. EXCLUDED STUDIES

	Exclusion Reason					
Study	**Not OECD**	**Population**	**Intervention**	**Comparator**	**Outcomes**	**Design**
Adriaenssens, 2017[1]		X				
Akhtar, 2018[2]			X			
Albert, 2015[3]				X		
Allan, 2019[4]			X			
Allen-Davis, 1998[5]						X
Amarenco, 2007[6]			X			
Anderson, 2019[7]			X			
Anonymous, 1997[8]				X		
Atiyeh, 2014[9]	X					
Balas, 1997[10]						X
Ball, 2008[11]			X			
Beard, 2017[12]			X			
Beech, 2000[13]			X			
Benger, 2004[14]			X			
Bhandari, 2014[15]			X			
Bjerring, 2012[16]			X			
Bladin, 2015[17]		X				
Blank, 2012[18]						X
Bolli, 2005[19]		X				
Brogan, 1998[20]				X		
Brunett, 2015[21]					X	
Brunetti, 2013[22]						X
Brunner, 2018[23]			X			
Buja, 2015[24]				X		
Bunn, 2005[25]						X

	Exclusion Reason					
Study	**Not OECD**	**Population**	**Intervention**	**Comparator**	**Outcomes**	**Design**
Bury, 2006[26]		X				
Calitri, 2015[27]			X			
Campbell, 2013[28]		X				
Campbell, 2015[29]			X			
Campbell, 2009[30]				X		
Cherry, 2009[31]			X			
Chess, 2018[32]		X				
Cheung, 2019[33]		X				
Cook, 2015[34]			X			
Cook, 2010[35]			X			
Cooper, 2005[36]				X		
Costa, 2018[37]	X					
Custer, 2003[38]			X			
Dahlgren, 2017[39]				X		
Dale, 1998[40]		X				
Dale, 1997[41]				X		
Davis, 2019[42]					X	
Derkx, 2008[43]		X				
Dhruva, 2007[44]		X				
Donaghy, 2019[45]						X
Donley, 2017[46]			X			
Duke, 2012[47]		X				
Dunt, 2005[48]						X
Dunt, 2006[49]						X
Dunt, 2007[50]						X
Eastwood, 2015[51]			X			
Eastwood, 2017[52]			X			

	Exclusion Reason					
Study	**Not OECD**	**Population**	**Intervention**	**Comparator**	**Outcomes**	**Design**
Ebert, 2019[53]			X			
Ekeland, 2018[54]						X
Elliott, 2015[55]				X		
Eminovic, 2004[56]			X			
Evens, 1985[57]		X				
Flynn, 1998[58]				X		
Foster, 2019[59]		X				
Foster, 2001[60]			X			
Gallagher, 1998[61]					X	
Giesen, 2006[62]			X			
Giesen, 2005[63]						X
Giesen, 2011[64]						X
Gillespie, 2016[65]			X			
Glynn, 2004[66]				X		
Goodyear-Smith, 2005[67]			X			
Gould, 2009[68]			X			
Gray, 2012[69]		X				
Greenhalgh, 2018[70]						X
Greenwald, 2019[71]				X		
Grol, 2006[72]						X
Grove, 2019[73]			X			
Halter, 2007[74]				X		
Handy, 2005[75]			X			
Hansen, 2011[76]		X				
Hansen, 2011[77]						X
Hansen, 2008[78]					X	
Heidet, 2019[79]					X	

	Exclusion Reason					
Study	**Not OECD**	**Population**	**Intervention**	**Comparator**	**Outcomes**	**Design**
Heravian, 2018[80]						X
Hertzog, 2019[81]			X			
Holt, 2016[82]			X			
Howard, 2007[83]			X			
Howell, 2016[84]						X
Hsu, 2010[85]	X					
Huibers, 2012[86]				X		
Huibers, 2013[87]			X			
Huibers, 2014[88]			X			
Huibers, 2011[89]			X			
Huilgol, 2019[90]			X			
Hulland, 1999[91]		X				
Infinger, 2013[92]				X		
Jansen, 2019[93]					X	
Jerant, 2005[94]						X
Jiwa, 2002[95]			X			
Jongeling, 2009[96]			X			
Kahn, 2016[97]						X
Keatinge, 2005[98]		X				
Keizer, 2016[99]						X
Kelly, 2010[100]			X			
Killip, 2007[101]						X
Kinnersley, 2010[102]					X	
Klaassen, 2016[103]		X				
Kleinknecht-Dolf, 2015[104]		X				
Knight, 2010[105]						X
Krumperman, 2015[106]			X			

	Exclusion Reason					
Study	**Not OECD**	**Population**	**Intervention**	**Comparator**	**Outcomes**	**Design**
Kumar, 2006[107]			X			
Lambert, 2016[108]		X				
Landrey, 2018[109]			X			
Langabeer, 2016[110]			X			
Langabeer, 2017[111]			X			
Lattimer, 2000[112]					X	
Lattimer, 2005[113]			X			
LaVela, 2013[114]			X			
Leask, 2019[115]			X			
Lee, 2019[116]			X			
Lee, 2003[117]		X				
Lee, 2002[118]		X				
Lessard, 2000[119]		X				
Mann, 2002[120]						X
Manojlovich, 2015[121]						X
Martinez, 2018[122]			X			
Matar, 2015[123]		X				
McAfee, 2020[124]	X					
McConnochie, 2006[125]		X				
McDonnell, 2007[126]				X		
McKinstry, 2002[127]			X			
McKinstry, 2002[128]	X					
McKinstry, 2009[129]						X
McLean, 2019[130]			X			
Mendenhall, 2018[131]			X			
Meng, 2015[132]			X			
Meyer, 2020[133]			X			

	Exclusion Reason					
Study	**Not OECD**	**Population**	**Intervention**	**Comparator**	**Outcomes**	**Design**
Miller, 2019[134]						X
Mira, 1995[135]			X			
Mohammed, 2012[136]					X	
Montalto, 1998[137]		X				
Moreno, 1989[138]			X			
Morimura, 2011[139]						X
Mukamel, 2019[140]		X				
Mulcahy, 2017[141]				X		
Munro, 2000[142]			X			
Munroe, 1982[143]			X			
Murdoch, 2015[144]						X
Navratil-Strawn, 2014[145]			X			
Neimanis, 2009[146]			X			
Nord, 2019[147]				X		
Noroxe, 2017[148]					X	
North, 2010[149]			X			
North, 2011[150]						X
O'Cathain, 2007[151]			X			
O'Cathain, 2014[152]					X	
Palen, 2012[153]			X			
Pallawala, 2001[154]	X					
Pathipati, 2016[155]			X			
Payne, 2001[156]		X				
Perry, 1990[157]			X			
Philips, 2015[158]			X			
Player, 2018[159]				X		
Pope, 2017[160]						X

	Exclusion Reason					
Study	**Not OECD**	**Population**	**Intervention**	**Comparator**	**Outcomes**	**Design**
Rahmqvist, 2011[161]						X
Rastogi, 2019[162]			X			
Ray, 2019[163]		X				
Reitz, 2007[164]						X
Richards, 2004[165]			X			
Richards, 2004[166]						X
Richards, 2002[167]			X			
Richards, 2007[168]				X		
Ricke, 1995[169]		X				
Ritter, 2010[170]				X		
Rogove, 2012[171]					X	
Roivainen, 2020[172]					X	
Rudin, 2019[173]			X			
Sabin, 1998[174]						X
Sandvik, 2010[175]		X				
Schlachta, 2016[176]	X					
Schmid, 2017[177]			X			
Scott-Jones, 2008[178]				X		
Shah, 2013[179]					X	
Simpson, 2000[180]		X				
Smith, 2001[181]				X		
Smits, 2019[182]			X			
Smits, 2016[183]			X			
Smits, 2018[184]					X	
Stoves, 2010[185]			X			
Stuart, 2000[186]			X			
Studnek, 2012[187]			X			

	Exclusion Reason					
Study	**Not OECD**	**Population**	**Intervention**	**Comparator**	**Outcomes**	**Design**
Thilsted, 2018[188]					X	
Turnbull, 2008[189]				X		
Uscher-Pines, 2018[190]					X	
Uscher-Pines, 2015[191]	X					
Valero, 1999[192]		X				
Van Donk, 2017[193]			X			
Van Uden, 2005[194]			X			
Varley, 2016[195]					X	
Verzantvoort, 2018[196]			X			
Walker, 2000[197]	X					
Wallace, 2008[198]			X			
Warren, 2015[199]			X			
Westall, 2015[200]	X					
Win, 2016[201]						X
Woods, 2013[202]			X			
Wootton, 2000[203]				X		
Zinger, 2019[204]			X			

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APPENDIX E. PEER REVIEW DISPOSITION

Question Text	Reviewer Number	Comment	Response
Are the objectives, scope, and methods for this review clearly described?	3	Yes	Thank you
	5	Yes	Thank you
	7	Yes	Thank you
	8	Yes	Thank you
	9	Yes	Thank you
Is there any indication of bias in our synthesis of the evidence?	3	No	Thank you
	5	No	Thank you
	7	No	Thank you
	8	No	Thank you
	9	No	Thank you
Are you aware of any published or unpublished studies that we may have overlooked?	3	No	Thank you
	5	No	Thank you
	7	No	Thank you
	8	No	Thank you
	9	No	Thank you
Additional suggestions or comments can be provided below. If applicable, please indicate the page and line numbers from the draft report.	3	An impressive review and critique of current literature evaluating the impact of virtual care strategies. It is not surprising that many of the outstanding questions were either not directly addressed or did not yield consistent answers given the heterogeneity of the systems evaluated. One topic of special interest is comparing video vs. telephone for clinical effectiveness, patient satisfaction, etc. The lack of data on this subject is not surprising. I have gathered unpublished data suggesting that patient confidence in the provider is enhanced by video BUT the video appointments were targeted to conditions that most benefit from video (skin and eye concerns mostly). The same data set showed better clinical resolution with video for these problems. Data on Video vs. phone for more general clinical problems would be most interesting but the demographics of patients electing each modality can be quite different limiting the accuracy of any conclusions that might be drawn. VA has the opportunity to make a valuable contribution to the literature on this subject in the future.	Thank you

	7	The objectives, scope and methods are clearly described and appropriate reporting guidelines followed. Appropriate methods were used to reduce bias in the study selection process, e.g. piloting and selection by two independent reviewers. Excluded studies and reasons were included in an appendix. For extra transparency, you could have reported how disagreements between reviewers were resolved and a measure of agreement, e.g. kappa (unless I missed this). Synthesis of the included studies was guided by a pre-determined analytical framework and a publicly available protocol. You searched three relevant databases and reference lists of related systematic reviews. The search strategies reported appear thorough and overall you should have good coverage of the published literature (although the search could have been strengthened by looking at sources such as the Cochrane Library). You don't report any search for unpublished studies or grey literature so it's certainly possible some could have been overlooked, though I don't know of any specific examples. In summary: I haven't read the whole report in detail but it is methodologically strong and the conclusions follow from the evidence presented. The use of GRADE to assess certainty of evidence increases confidence in the findings, and applicability to the VHA system is explicitly considered	Thank you. We have augmented out Methods description to explicate how reviewer disagreement were resolved.
	8	Well-conceived, systematically conducted review of important emerging topic area.	Thank you.
	9	Thank you for the opportunity to review this evidence review on a very important and timely topic. I found this review to be informative, well-organized, and well-written. I think it will make a significant contribution and lay foundation for future work. I have a handful of minor comments for the authors to consider. page 1, lines 26-27 paragraph 2 – the phrase "underutilization on non-physician providers" is somewhat vague. Do you mean underutilization of non-physician providers in primary care? I am wondering if your point is best made by saying there is a "shortage of primary care providers" as the composition of PCPs being physicians	We have edited this wording to improve clarity.

		or non-physicians may be distracting and tangential, I think, to your main point.	
	9	page 4 line 8- uses abbreviation COE which I don't think was previously defined.	We have clarified with adding low *certainty of evidence* (COE).
	9	page 4 line 38 - there is a misplaced period after "health care" and I think there is a missing word. Also, I am not sure about the intended meaning of the phrase "deputizing physicians" and how that differs from "cooperative physicians."	We have defined "deputizing" in the text. Deputized physicians differ from cooperative physicians as they are non-affiliated physicians who take the afterhours calls and cooperative physicians are those part of an established provider network.
	9	I am also unsure about why satisfaction with provider communication is included with "health care access" rather than "patient satisfaction".	We conceptualized "heath care access" as informed by the U.S. Office of Disease Prevention and Health Promotion's Healthy People 2020 objectives. They defined health care access as the ability to provide health care when the need is recognized (*ie*, timeliness) and satisfaction with provider services and communication (*ie*, services).
	9	page 4 lines 49-53 - I am perplexed by the sentence "An additional study of calls to telephone-based urgent care services originally triaged to the ED by either a physician advisor or a non-physician clinical advisor produced more case resolution on the first contact than calls assessed by a non-clinical call handler". I think the problem is the phrase "originally triaged to the ED" – so, the patient was seen in the ED, or diverted from the ED? (but if seen in the ED, then it was resolved there?) I think there is some information missing that is making this confusing.	This wording has been revised as "An additional study examined calls to a telephone-based urgent care where calls were triaged to the ED by the clinical support software. These same calls were then passed to an assessment service (prescribing provider: physician advisor or a non-physician clinical advisor) and produced more case resolution on the first contact than calls assessed initially by a non-clinical call handler then moved to a prescribing provider." From the study description, patients that would have been advised to go to the ED by the clinical support software were

			passed to a clinical assessment service.
	9	page 5 – line 12 – typo – I think “them” should be “that”	Revised to “that.”
	9	page 5 – line 14 – suggest changing “inappropriate care outcomes” to “inappropriate treatment outcomes” to stay consistent with language used elsewhere in the report	Changed to inappropriate “treatment” throughout
	9	page 12 – use of Distiller. I am confused by the numbers- your results show that you identified 4, 311 unique articles which you then applied inclusion and exclusion criteria. From the methods on page 12 it looks like you used 2765 articles to train Distiller, and then used Distiller to review 2,357 articles – which adds up to 5,122. And, you report that Distiller SR was a “second reviewer” – but wasn’t it the only reviewer for the “remaining titles and abstracts” that had <50% probability of relevance?	Thank you, we updated the language to clarify that the AI reviewed references as the second reviewer after it was trained on almost the full database reviewed by one person. The references that the AI included were reviewed by two people at the full-text review level.
	9	page 22 – title “Effects on Outpatient Care Utilization” might be better titled “Effects on Subsequent Outpatient Care Utilization” – as the initial telehealth utilization is outpatient care.	This was revised to “*Effects on Subsequent Outpatient Care Utilization.”*
	9	Page 23- similarly, suggest section title be “Effects on Subsequent Emergency Department Utilization”	“Subsequent” was added.
	9	page 23 – line 37 - extra work “in” and did you mean “NHS 111”?	Revised.
	9	page 35 – As in executive summary, I am perplexed by the inclusion of patient satisfaction with communication in the section on access rather than in the patient satisfaction section.	We have revised this for clarity.
	9	Figure 4B – needs better labels on the x axis – it took me a bit to realize that this represented % of studies. Figure 6 – also needs better label on the x axis	Thank you. These are standard figures for risk of bias in systematic reviews and the x axis is explained in the figure title.
	9	page 42 – line 28 – “ adverse effects prioritized by operations partners” – do you	We have deleted this phrase from the results section for

		mean those listed in the i.e. part of KQ2A? Would specify as it is not immediately obvious	adverse events to improve clarity.
	9	page 42 – line 51 “subgroups of interest” – is this the same thing as “adverse effects prioritized by operations partners”, or something else?	We have clarified that these are from the key questions of the review.
	9	page 42 – line 52 – “adverse clinical outcome (i.., deaths)” – death is not listed in the i.e. for the question	Thank you. The key question includes this outcome of interest
	9	page 42 – lines 53-56 – you don’t comment on whether there were any studies showing adverse effects of delayed diagnosis. Also, how is the distinction between misdiagnosis v. delayed diagnosis being made (since delayed diagnosis usually starts with a misdiagnosis and a misdiagnosis is usually only detected when the true diagnosis is found, delayed from the initial presentation)	We agree these are aligned outcomes and that misdiagnosis can lead to delayed diagnosis. In general, we seek conceptualize outcomes as defined by study authors, when possible. We only identified one study that defined misdiagnosis. We did not find any studies that reported on delayed diagnosis and have clarified this this in the report results.
	9	page 43- line 24 – need to define/describe what is meant by “direct-to-consumer care”, and specify if the comparison is being made to in-person primary care v. primary care via telehealth v. both	Thank you. We have revised this description to improve clarity and removed “direct-to-consumer” language.
	9	page 43 - lines 32-43 – was there a comparison group for this study (if not, I suggest noting this)	There was no comparison group and we have now noted this in the text.