# APPENDIX A. SEARCH STRATEGIES

### PubMed: July 27, 2018

| | | |
|---|---|---|
| #1 | "Triage"[Mesh] OR triage[tiab] OR triages[tiab] OR triaged[tiab] OR triaging[tiab] OR teletriage[tiab] OR "Referral and Consultation"[Mesh:NoExp] OR "Remote Consultation"[Mesh] OR consultation[ti] OR consultation[ot] OR consultations[ti] OR consultations[ot] OR teleconsultation[tiab] OR teleconsultations[tiab] OR telenursing[tiab] OR telenurse[tiab] OR telenurses[tiab] OR "After-Hours Care"[Mesh] OR "out-of-hours"[tiab] OR "after-hours"[tiab] OR "unscheduled care"[tiab] | 95,358 |
| #2 | "Telephone"[Mesh:NoExp] OR telephone[tiab] OR "Hotlines"[Mesh] OR hotline[tiab] OR hotlines[tiab] OR "hot line"[tiab] OR "hot lines"[tiab] OR helpline[tiab] OR helplines[tiab] OR "help line"[tiab] OR "help lines"[tiab] OR "Call Centers"[Mesh] OR "call center"[tiab] OR "call centers"[tiab] OR "call centre"[tiab] OR "call centres"[tiab] OR "communication technologies"[tiab] OR "communication technology"[tiab] OR telehealth[tiab] OR eHealth[tiab] OR mhealth[tiab] OR ("face-to-face"[tiab] AND (alternative[tiab] OR alternatives[tiab])) OR ("communication"[tiab] AND (alternative[tiab] OR alternatives[tiab])) OR ("in-person"[tiab] AND (alternative[tiab] OR alternatives[tiab])) OR ("inperson"[tiab] AND (alternative[tiab] OR alternatives[tiab])) OR virtual[ti] OR (("After-Hours Care"[Mesh]) AND "Primary Health Care"[Mesh]) OR (("after hours"[ti] OR "out of hours"[ti]) AND ("primary medical care"[ti] OR "primary care"[ti] OR "general medicine"[ti])) | 91,636 |
| #3 | #1 AND #2 | 5,274 |
| #4 | #3 AND English[lang] | 4,970 |
| #5 | #4 AND ("1990/01/01"[Date - Publication] : "3000"[Date - Publication]) | 4,711 |
| #6 | #5 NOT (animals[mh] NOT humans[mh]) | 4,707 |
| #7 | #6 NOT (("Adolescent"[Mesh] OR "Child"[Mesh] OR "Infant"[Mesh]) NOT "Adult"[Mesh]) | 4,311 |
| #8 (KQ1) | #7 AND (("randomized controlled trial"[ptyp] OR "controlled clinical trial"[ptyp] OR randomized[tiab] OR randomised[tiab] OR randomization[tiab] OR randomisation[tiab] OR placebo[tiab] OR randomly[tiab] OR trial[tiab] OR groups[tiab] OR "Comparative Study"[ptyp] OR "clinical trial"[pt] OR "clinical trial"[tiab] OR "clinical trials"[tiab] OR "evaluation studies"[ptyp] OR "evaluation studies as topic"[MeSH] OR "evaluation study"[tiab] OR "evaluation studies"[tiab] OR drug therapy[sh] OR "intervention study"[tiab] OR "intervention studies"[tiab] OR "cohort studies"[MeSH] OR cohort[tiab] OR "longitudinal studies"[MeSH] OR longitudinal[tiab] OR longitudinally[tiab] OR prospective[tiab] OR prospectively[tiab] OR "follow up"[tiab] OR "comparative study"[pt] OR "comparative studies"[tiab] OR nonrandom[tiab] OR "non-random"[tiab] OR nonrandomized[tiab] OR "non-randomized"[tiab] OR nonrandomised[tiab] OR "non-randomised"[tiab] OR quasi-experiment*[tiab] OR quasiexperiment*[tiab] OR quasirandom*[tiab] OR quasi-random*[tiab] OR quasi-control*[tiab] OR quasicontrol*[tiab] OR (controlled[tiab] AND (trial[tiab] OR study[tiab])) OR "pre-post"[tiab] OR "posttest"[tiab] OR "post-test"[tiab] OR pretest[tiab] OR pre-test[tiab] OR (before[tiab] AND after[tiab]) OR (before[tiab] AND during[tiab])) NOT (Editorial[ptyp] OR Letter[ptyp] OR Comment[ptyp])) | 2,289 |
| #9 (KQ2) | #7 NOT (Editorial[ptyp] OR Letter[ptyp] OR Comment[ptyp]) | 4,108 |

### Embase: July 27, 2018

| | | |
|---|---|---|
| #1 | triage:ti,ab OR triages:ti,ab OR triaged:ti,ab OR triaging:ti,ab OR teletriage:ti,ab OR consultation:ti OR consultation:kw OR consultations:ti OR consultations:kw OR 'teleconsultation'/exp OR teleconsultation:ti,ab OR teleconsultations:ti,ab OR telenursing:ti,ab OR telenurse:ti,ab OR telenurses:ti,ab OR 'out-of-hours care'/exp OR 'out-of-hours':ti,ab OR 'after-hours':ti,ab OR 'unscheduled care':ti,ab | 56,847 |
| #2 | 'telephone'/exp OR telephone:ti,ab OR 'hotline'/exp OR hotline:ti,ab OR hotlines:ti,ab OR 'hot line':ti,ab OR 'hot lines':ti,ab OR helpline:ti,ab OR helplines:ti,ab OR 'help line':ti,ab OR 'help lines':ti,ab OR 'call center'/exp OR 'call center':ti,ab OR 'call centers':ti,ab OR 'call centre':ti,ab OR 'call centres':ti,ab OR 'communication technologies':ti,ab OR 'communication technology':ti,ab OR telehealth:ti,ab OR ehealth:ti,ab OR mhealth:ti,ab OR ((('face-to-face' OR 'communication' OR 'in-person' OR 'inperson') NEAR/4 (alternative OR alternatives)):ti,ab) OR ((('after hours' OR 'out of hours') NEAR/3 ('primary' OR 'general')):ti,ab) | 92,056 |
| #3 | #1 AND #2 | 6,891 |
| #4 | #3 AND [humans]/lim AND [english]/lim AND [1990-2018]/py | 5,961 |

| | | |
|---|---|---|
| #5 | #4 NOT (([embryo]/lim OR [fetus]/lim OR [newborn]/lim OR [infant]/lim OR [child]/lim OR [preschool]/lim OR [school]/lim) NOT ([young adult]/lim OR [adult]/lim OR [middle aged]/lim OR [aged]/lim OR [very elderly]/lim)) | 5,442 |
| #6 (KQ1) | #5 AND ('randomized controlled trial'/exp OR 'crossover procedure'/exp OR 'double blind procedure'/exp OR 'single blind procedure'/exp OR random*:ti,ab OR factorial*:ti,ab OR crossover*:ti,ab OR ((cross NEAR/1 over*):ti,ab) OR placebo*:ti,ab OR ((doubl* NEAR/1 blind*):ti,ab) OR ((singl* NEAR/1 blind*):ti,ab) OR assign*:ti,ab OR allocat*:ti,ab OR volunteer*:ti,ab OR 'clinical study'/exp OR 'clinical trial':ti,ab OR 'clinical trials':ti,ab OR 'controlled study'/exp OR 'evaluation'/exp OR 'evaluation study':ti,ab OR 'evaluation studies':ti,ab OR 'intervention study':ti,ab OR 'intervention studies':ti,ab OR 'case control':ti,ab OR 'cohort analysis'/exp OR cohort:ti,ab OR longitudinal*:ti,ab OR prospective:ti,ab OR prospectively:ti,ab OR retrospective:ti,ab OR 'follow up'/exp OR 'follow up':ti,ab OR 'comparative effectiveness'/exp OR 'comparative study'/exp OR 'comparative study':ti,ab OR 'comparative studies':ti,ab OR 'evidence based medicine'/exp) NOT ('case report'/exp OR 'a case report':ti OR ': case report':ti OR 'case study'/exp OR 'editorial'/exp OR 'letter'/exp OR 'note'/exp OR [editorial]/lim OR [letter]/lim OR [note]/lim OR [conference abstract]/lim) | 2,662 |
| #7 (KQ2) | #5 NOT ('editorial'/exp OR 'letter'/exp OR 'note'/exp OR [editorial]/lim OR [letter]/lim OR [note]/lim OR [conference abstract]/lim) | 3,750 |

## CINAHL: July 27, 2018

| | | |
|---|---|---|
| S1 | (MH "Triage") OR (MH "Remote Consultation") OR TI ( triage OR triages OR triaged OR triaging OR teletriage OR consultation OR consultations OR teleconsultation OR teleconsultations OR telenursing OR telenurse OR telenurses OR "out-of-hours" OR "after-hours" OR "unscheduled care" ) OR AB ( triage OR triages OR triaged OR triaging OR teletriage OR consultation OR consultations OR teleconsultation OR teleconsultations OR telenursing OR telenurse OR telenurses OR "out-of-hours" OR "after-hours" OR "unscheduled care" ) | 40,009 |
| S2 | (MH "Telehealth+") OR (MH "Remote Access to Information") OR TI ( telephone OR telephones OR hotline OR hotlines OR "hot line" OR "hot lines" OR helpline OR helplines OR "help line" OR "help lines" OR "call center" OR "call centers" OR "communication technologies" OR "communication technology" OR telehealth OR eHealth OR mhealth ) OR AB ( telephone OR telephones OR hotline OR hotlines OR "hot line" OR "hot lines" OR helpline OR helplines OR "help line" OR "help lines" OR "call center" OR "call centers" OR "communication technologies" OR "communication technology" OR telehealth OR eHealth OR mhealth ) | 44,713 |
| S3 | S1 AND S2<br>*Limiters - English Language; Peer Reviewed; Published Date: 19900101-20180731; Exclude MEDLINE records* | 961 |

# APPENDIX B. INTERVENTION CHARACTERISTICS TABLES

For full study citations in this appendix, please refer to the report's main reference list.

## KQ 1 STUDIES

| Study<br># Enrolled | Comparison Type<br><br>Description of Triage System | Type/Number of Professionals[a]<br><br>Dedicated Staff for Triage?[b]<br><br>Access to Medical Records? | Co-located Staff?<br><br>Special Training? | Decision Support Protocol[c]<br><br>Scope of Practice Described?[d]<br><br>Handoff to PCP?[e] | Mode of Delivery<br><br>Hours of Operation<br><br>Caller Identified?[f] |
|---|---|---|---|---|---|
| *RCTs (Individual and Cluster)* | | | | | |
| Campbell, 2014[38]<br>N=20990 patients | Comparison: Mode; professional type<br><br>Primary care practices across 4 centers in the UK. Callers in either intervention arm who had requested a same-day appointment would receive a call back and triage by a GP triage or a nurse with software support. | MD: Varies per arm<br>RN: Varies per arm<br>Admin/reception: Varies per arm<br><br>Dedicated staff: Yes<br><br>Access: Yes | Co-location: NR<br><br>Special training: 4-5 weeks, included commercial providers who trained staff and organization in triage practice and software; appointment request audit provided guidance in organizing the triage system; GP triage skills; and professional issues and telephone consult. | Decision support: Odyssey Patient Assess Software, Stour access system<br><br>Scope of practice described: Yes<br><br>Handoff to PCP: NR | Telephone contact<br><br>Regular clinic daytime hours<br><br>Caller ID: No |
| Cragg, 1997[44]<br>N=2,152 patients | Comparison: Local vs regional/national<br><br>Practices were randomized to have their own physicians cover out-of-hours calls vs a regional deputizing physician service within four communities. | MD: 49 practice GPs and 183 Deputizing<br><br>Dedicated staff: Yes, in practice arm<br><br>Access: NR | Co-location: NR<br><br>Special training NR | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>After hours<br><br>Caller ID: No |

| Study<br># Enrolled | Comparison Type<br><br>Description of Triage System | Type/Number of Professionals[a]<br><br>Dedicated Staff for Triage?[b]<br><br>Access to Medical Records? | Co-located Staff?<br><br>Special Training? | Decision Support Protocol[c]<br><br>Scope of Practice Described?[d]<br><br>Handoff to PCP?[e] | Mode of Delivery<br><br>Hours of Operation<br><br>Caller Identified?[f] |
|---|---|---|---|---|---|
| Lattimer, 1998[43]<br>N=14,492 calls | Comparison: Professional type<br><br>Nurse telephone triage offered to out-of-hours callers compared to a local GP out-of-hours cooperative. | Nurse (unspecified credentials): 6<br><br>Admin/reception: NR<br><br>Dedicated staff: NR<br><br>Access: NR | Co-location: Yes<br><br>Special training: 6-week training program prior to start of intervention | Decision support: Telephone advice system, interactive<br><br>Scope of practice described: no<br><br>Handoff to PCP: Yes | Telephone contact<br><br>After hours<br><br>Caller ID: No |
| McKinstry, 2002[42]<br>N=388 patients | Comparison: Mode<br><br>Telephone advice dispensed by a general practitioner that was initiated by a patient from a practice requesting a same-day appointment. Comparison group was in-person visit. | MD: NR<br><br>Dedicated staff: Yes<br><br>Access: Yes | Co-location: Yes<br><br>Special training: NR | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: No | Telephone contact<br><br>Regular hours<br><br>Caller ID: No |
| Richards, 2004[40]<br>N=4,718 patients | Comparison: Local vs regional/national<br><br>The intervention was NHS Direct compared to in-practice nurse triage. NHS Direct is a regional nurse-led telephone triage system supported by computerized algorithms. Nurses telephoned the patient back after request for same-day appointment. | Nurse (unspecified credentials): NR<br><br>Dedicated staff: No<br><br>Access: No | Co-location: No<br><br>Special training: NR | Decision support: NHS Direct<br><br>Scope of practice described: no<br><br>Handoff to PCP: No | Telephone contact<br><br>Regular hours<br><br>Caller ID: No |

| Study<br># Enrolled | Comparison Type<br><br>Description of Triage System | Type/Number of Professionals[a]<br><br>Dedicated Staff for Triage?[b]<br><br>Access to Medical Records? | Co-located Staff?<br><br>Special Training? | Decision Support Protocol[c]<br><br>Scope of Practice Described?[d]<br><br>Handoff to PCP?[e] | Mode of Delivery<br><br>Hours of Operation<br><br>Caller Identified?[f] |
|---|---|---|---|---|---|
| *Controlled Before-After* | | | | | |
| Knowles, 2016[37]<br>N=2,237 patients | Comparison: professional type<br><br>The study compared a new telephone triage service (NHS 111) with the existing telephone triage service (NHS Direct). NHS 111 is staffed by non-clinician call-handlers who use computerized triage software with clinician back-up to direct callers to the appropriate service or self-management advice; NHS Direct is staffed by nurses. | Nonclinical call handlers: NR<br><br>Dedicated staff: No<br><br>Access: NR | Co-located: Yes<br><br>Special training: Varied by site but generally NHS pathways training, transfer processes, communication skills, record keeping | Decision support: NHS Pathways software<br><br>Scope of practice: No<br><br>Handoff to PCP: No | Telephone contact<br><br>Regular and after hours<br><br>Caller ID: No |
| Munro, 2000[45]<br>N= 68,500 | Comparison: Local vs regional/national<br><br>NHS Direct Nurse-led telephone triage compared to local GP cooperatives. | Nurse (unspecified credentials): NR<br><br>Dedicated staff: No<br><br>Access: No | Co-location: Yes<br><br>Special training: NHS nurses were "trained to triage." | Decision support: NHS Clinical Assessment System<br><br>Scope of practice: Yes<br><br>Handoff to PCP: Yes | Telephone contact<br><br>Regular and after hours<br><br>Caller ID: Yes |
| Turner, 2013[39]<br>N=1,802,000 calls | Comparison: Professional type<br><br>Study compared NHS 111, a 24-hour telephone triage system staffed by non-clinician call-handlers, to NHS Direct which employs nurse triage professionals. | Nurse (unspecified credentials): NR<br>Nonclinical call handler: NR<br><br>Dedicated staff: No<br><br>Access: No | Co-location: Yes<br><br>Special training: NR | Decision support: NHS Pathways software<br><br>Scope of practice described: Yes<br><br>Handoff to PCP: No | Telephone contact<br><br>Regular and after hours<br><br>Caller ID: No |

| Study<br># Enrolled | Comparison Type<br><br>Description of Triage System | Type/Number of Professionals[a]<br><br>Dedicated Staff for Triage?[b]<br><br>Access to Medical Records? | Co-located Staff?<br><br>Special Training? | Decision Support Protocol[c]<br><br>Scope of Practice Described?[d]<br><br>Handoff to PCP?[e] | Mode of Delivery<br><br>Hours of Operation<br><br>Caller Identified?[f] |
|---|---|---|---|---|---|
| *Interrupted Time Series* | | | | | |
| Richards, 2002[41]<br>N=4,685 patients | Comparison: Local vs regional/national<br><br>This study randomized callers to either a small nurse triage of 6 nurses or a same-day primary care visit. Receptionists in control group were told "not to attempt any triage". | Nurse (unspecified credentials): 6<br><br>Dedicated staff: No<br><br>Access: NR | Co-location: NR<br><br>Special training: 30 hours of minor illness management training | Decision support: protocol internally developed<br><br>Scope of practice described: no<br><br>Handoff to PCP: Yes | Telephone contact<br><br>Regular hours<br><br>Caller ID: No |

[a] Type of professional involved in delivering the triage system.
[b] Dedicated triage staff are professionals whose primary job responsibility is to triage patients. This differs from staff who may have triage responsibilities in addition to their primary role.
[c] Decision support protocol is any tool or algorithm used to support clinical decision making or provide guidance for triage decisions.
[d] Scope of practice is any specific guidance about a particular staff member's role and potential limits to their clinical discretion.
[e] Handoff to primary care practitioner refers to the ability for triage staff to communicate with a patient's primary care team synchronously or asynchronously.
[f] Caller identification refers to the capacity to verify the identify the caller.
Abbreviations: CAS=computerized clinical assessment system; CDSS=clinical decision support system/software; CeCC=CareEnhance Call Centre software; GP=general practitioner; MD=medical doctor; NHS=National Health Service; PCP=primary care provider; RN=registered nurse

## KQ 2 STUDIES

| Study<br># Enrolled | Description of Triage System | Type/Number of Professionals[a]<br><br>Dedicated Triage Staff?[b] | Co-located Staff?<br><br>Special Training? | Decision Support Protocol[c]<br><br>Scope of Practice Described?[d]<br><br>Handoff to PCP?[e] | Mode of Delivery<br><br>Hours of Operation<br><br>Caller Identified?[f] |
|---|---|---|---|---|---|
| *Qualitative studies* | | | | | |
| Banks, 2018[81]<br>N=23 | Interviews with practice staff about eConsult, an online platform, which gives patients access to advice via their GP practice website. Patients can use a symptom checker, find pharmacy advice, link to the NHS 111 service, and use an administrative service to submit an e-consultation. | MD: 10<br>Nurse practitioner: 1<br>admin/reception: 6<br>Practice manager: 6<br><br>Dedicated staff: No | Co-location: NR<br><br>Special training: NR | Decision support: eConsult; online; interactive<br><br>Scope of practice described: No<br><br>Handoff to PCP: Yes | Internet contact<br><br>Hours of operation: NR<br><br>Caller ID: No |
| Derkx, 2007[80]<br>N=8 | Study assessed communication skills of clinical nurse call-handlers in an out-of-hours call center in the Netherlands. | Nurse (unspecified credentials): NR<br>Other staff: NR<br><br>Dedicated staff: Yes | Co-location: NR<br><br>Special training: NR | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>After hours<br><br>Caller ID: No |
| Eccles, 2015[62]<br>N=55 | A health care system in Wales changed their out-of-hours staffing system from call-handlers using protocols to a system that used call-handlers to obtain information and GPs who called patients back. Interviews with GPs and patients about perceptions. | MD: at least 40<br>Call Handlers: NR<br><br>Dedicated staff: Yes | Co-location: Yes<br><br>Training workshops were provided to improve triage productivity, communication skills and appropriate use of triage outcomes and telephone advice. | Decision support: protocol internally developed<br><br>Scope of practice described: Yes<br><br>Handoff to PCP: NR | Telephone contact<br><br>After hours<br><br>Caller ID: No |
| Edwards, 1996[67]<br>N=8 | Qualitative interviews with nurses from community hospitals with walk-in minor injury service that also handled phone inquiries. | Nurse (unspecified credentials): NR<br><br>Dedicated staff: Yes | Co-location: No<br><br>Special training: NR | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Hours of operation: NR<br><br>Caller ID: No |

| Study<br># Enrolled | Description of Triage System | Type/Number of Professionals[a]<br><br>Dedicated Triage Staff?[b] | Co-located Staff?<br><br>Special Training? | Decision Support Protocol[c]<br><br>Scope of Practice Described?[d]<br><br>Handoff to PCP?[e] | Mode of Delivery<br><br>Hours of Operation<br><br>Caller Identified?[f] |
|---|---|---|---|---|---|
| Foster, 1999[63]<br>N=38 | Out-of-hours cooperative in South London where they handle 62% of calls by telephone alone. This particular paper documents interviews with GPs before they attended a course on how to provide advice over the phone. | MD : 38<br><br>Dedicated staff: Yes | Co-location: NR<br><br>Special training: NR | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>After hours<br><br>Caller ID: No |
| Gamst-Jensen, 2017[68]<br>N=19 | Out-of-hours phone hotline for region in Denmark answered by nurse or MD. Interviews conducted with staff about under-triaged calls. | MD: NR<br>Nurse (unspecified credentials): NR<br><br>Dedicated staff: NR | Co-location: NR<br><br>Special training: NR | Decision support: internally developed; online; expertise based<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>After hours<br><br>Caller ID: No |
| Greatbatch, 2005[82]<br>N= 60 | Qualitative study of the use of the CAS system, which mediates interactions between callers to the NHS Direct and nurses. Nurses address calls based on priority set by call-handlers. CAS then recommends a disposition. Nurse can recommend alternate dispositions if rationale are documented. | Nurse (unspecified credentials): NR<br>Call handlers: NR<br><br>Dedicated staff: Yes | Co-location: NR<br><br>Special training: NR | Decision support: NHS Direct CAS system<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Regular hours and after hours<br><br>Caller ID: No |
| Holmström, 2007[76]<br>N=12 | Telephone nursing in Sweden in the early 2000s was de-centralized and not operational for 24/hrs a day. This study interviewed nurses at 1 specific call center about ethical dilemmas. | Registered Nurse: NR<br><br>Dedicated staff: Yes | Co-location: Yes<br><br>Special training: NR | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Regular hours<br><br>Caller ID: Yes |
| Holmström, 2016[75]<br>N=10 | The national phone service in Sweden is available 24/7 but patients are instructed to call their primary health care center during regular business hours. This study | Nurse (unspecified credentials): NR<br><br>Dedicated staff: NR | Co-location: NR<br><br>Special training: NR | Decision support: NR<br><br>Scope of practice described: No | Telephone contact<br><br>Regular hours<br><br>Caller ID: No |

| Study<br># Enrolled | Description of Triage System | Type/Number of Professionals[a]<br><br>Dedicated Triage Staff?[b] | Co-located Staff?<br><br>Special Training? | Decision Support Protocol[c]<br><br>Scope of Practice Described?[d]<br><br>Handoff to PCP?[e] | Mode of Delivery<br><br>Hours of Operation<br><br>Caller Identified?[f] |
|---|---|---|---|---|---|
| | looked at how elder adults perceived their experiences with local primary care nurse advice/triage lines. | | | Handoff to PCP: NR | |
| Lopriore, 2017[83]<br>N= 196 calls | Qualitative analysis of health care triage telephone calls into HealthDirect Australia to explore health care managed over the phone. Calls were placed by patients and received by nurses using CDSS. | Registered Nurse: NR<br><br>Dedicated staff: No | Co-location: NR<br><br>Special training: NR | Decision support: computer decision support software; HealthCare Direct policy<br><br>Scope of practice described: Yes<br><br>Handoff to PCP: NR | Telephone contact<br><br>Hours of operation: NR<br><br>Caller ID: Yes |
| O'Cathain, 2004[79]<br>N=24 | Description of nurse characteristics and perceptions that may lead to different triage resolution in the NHS Direct service. 24 nurses were interviewed. | Registered Nurse: 296<br><br>Dedicated staff: NR | Co-location: NR<br><br>Special training: NR | Decision support: 3 different decision support softwares used by the interviewed nurses; Yes/No protocols; general guidance; and expertise based<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Regular hours and after hours<br><br>Caller ID: No |
| Pettinari, 2001[69]<br>N=14 | NHS Direct 24-hour nurse phone triage and helpline. Focus of study was to describe nurses' perceptions of skills they use to manage calls without visual cues. | Nurse (unspecified credentials): NR<br><br>Dedicated staff: No | Co-location: NR<br><br>12 weeks of training | Decision support: NHS CDSS<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Regular hours and after hours<br><br>Caller ID: No |

| Study<br># Enrolled | Description of Triage System | Type/Number of Professionals[a]<br><br>Dedicated Triage Staff?[b] | Co-located Staff?<br><br>Special Training? | Decision Support Protocol[c]<br><br>Scope of Practice Described?[d]<br><br>Handoff to PCP?[e] | Mode of Delivery<br><br>Hours of Operation<br><br>Caller Identified?[f] |
|---|---|---|---|---|---|
| Pope, 2013[72]<br>N=64 | Ethnographic study of computer support systems using the Normalization Process Theory. Investigators observed for 500 hours at multiple triage sites (emergency line, urgent care line, out-of-hours line). | Call handlers: 10-12 hour shifts<br>Supervisors: NR<br><br>Clinical support staff: NR<br><br>Dedicated staff: NR | Co-location: Yes<br><br>Emergency phone line staff received 12 days training on computer system | Decision support: Clinical Decision Support (CDS); interactive<br><br>Scope of practice described: Yes<br><br>Handoff to PCP: NR | Telephone contact<br><br>Regular and after hours<br><br>Caller ID: No |
| Purc-Stephenson, 2010[64]<br>N=16 studies | Meta-ethnography. Reviewed qualitative studies of telephone triage nurses, with aim to explore nurses' experiences with telephone triage and advice within the primary-care sector and to understand the factors that facilitate or impede their decision making process. | Nurse (unspecified credentials): NR<br><br>Dedicated staff: NR | Co-location: NR<br><br>Special training: NR | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Hours of operation: NR<br><br>Caller ID: No |
| Richards, 2007[74]<br><br>N=27 | Three out-of-hours primary care services from different regions in England. The call is taken by a nonclinical call handler who uses a protocol to call an ambulance or provide health professional call-back. Interviews were done to explore caller experience. | MD: NR<br>NP: NR<br>Call handler: NR<br>Paramedic: NR<br><br>Dedicated staff: NR | Co-location: NR<br><br>Special training: NR | Decision support: standardized protocol<br><br>Scope of practice described: No<br><br>Handoff to PCP: Yes | Telephone contact<br><br>After hours<br><br>Caller ID: No |
| Roberts, 2009[77]<br>N=35 | This study was conducted in NHS 24 (Scotland). It is "integrated as a central part of the NHS". It is the first and only point of contact for after-hours GPs. The study's focus was to describe stakeholder and partner views on remote and rural communities. | Nurse (unspecified credentials): NR<br><br>Dedicated staff: No | Co-location: NR<br><br>Special training: NR | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Regular hours and after hours<br><br>Caller ID: No |
| Roing, 2015[65]<br>N=11 | Qualitative interviews with 6 telenurses and 5 call center managers who had been involved | Registered Nurse: 6<br>Call managers: 5 | Co-location: Yes<br>Special training: NR | Decision support: Decision Support Tool (DST), online | Telephone contact |

| Study<br># Enrolled | Description of Triage System | Type/Number of Professionals[a]<br><br>Dedicated Triage Staff?[b] | Co-located Staff?<br><br>Special Training? | Decision Support Protocol[c]<br><br>Scope of Practice Described?[d]<br><br>Handoff to PCP?[e] | Mode of Delivery<br><br>Hours of Operation<br><br>Caller Identified?[f] |
|---|---|---|---|---|---|
| | in malpractice claims within the Swedish Healthcare Direct, the national telenursing helpline. | Dedicated staff: NR | | Scope of practice described: No<br><br>Handoff to PCP: NR | Regular hours and after hours<br><br>Caller ID: No |
| Tariq, 2017[73]<br>N=9 | Qualitative interviews with nurses about the usability of the decision support system (CeCC), which provides clinical guidelines for triage nurses. | Nurse (unspecified credentials): 9<br><br>Dedicated staff: NR | Co-location: NR<br><br>Special training: NR | Decision support: CeCC, online, interactive<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Regular hours and after hours<br><br>Caller ID: No |
| Timpka, 1990[70]<br>N=5 | Health center receptionist-nurse in a town with 30,000 people in Sweden. Qualitative analysis completed on the content of the calls between receptionist nurse & patient to describe decision-making process and communication. | Nurse (unspecified credentials): 5<br><br>Dedicated staff: No | Co-location: Yes<br><br>Special training: No | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Hours of operation: NR<br><br>Caller ID: No |
| Turnbull, 2012[78]<br>N=61 | Interviews to examine skills required by nonclinical call-handlers for telephone triage supported by CDSS. Call-handlers involved in triage at 999 emergency line, urgent care line, out-of-hours line. | Type of staff NR<br><br>Dedicated staff: NR | Co-location: Yes<br><br>Special training: NR | Decision support: CDSS; interactive; general guidance<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Hours of operation: NR<br><br>Caller ID: No |
| Turnbull, 2014 & 2017[71]<br>N=47 | 111 phone services for urgent calls that are 'not emergent' that are available to NHS patients 24 hrs a day. Ethnography aimed to describe work, workforce, technology, and organizational implications. | MD: NR<br>Registered Nurse : NR<br>Call advisers: 70, 30, 31, 113, 54 FT & PT depending on cite.<br>Other: NR<br><br>Dedicated staff: Varied by site | Co-location: Yes<br><br>Special training: 2-week training program in addition to 2 more weeks of training at the site as well as call observation and coaching. | Decision support: NHS Pathways, documented, online, interactive, Yes/No protocol<br><br>Scope of practice described: Yes<br><br>Handoff to PCP: Yes | Telephone contact<br><br>Regular hours and after hours<br><br>Caller ID: No |

| Study<br># Enrolled | Description of Triage System | Type/Number of Professionals[a]<br><br>Dedicated Triage Staff?[b] | Co-located Staff?<br><br>Special Training? | Decision Support Protocol[c]<br><br>Scope of Practice Described?[d]<br><br>Handoff to PCP?[e] | Mode of Delivery<br><br>Hours of Operation<br><br>Caller Identified?[f] |
|---|---|---|---|---|---|
| Wahlberg, 2018[61]<br>N=24 | The remote triage was completed by nurses using CDSS at Swedish Healthcare Direct. The calls were not prescreened by a call-handler. 24 interviews were completed between March and May 2015. The goal was to understand the work environment at the call center. | Nurse (unspecified credentials): 24<br><br>Dedicated staff: No | Co-location: No<br><br>Special training: NR | Decision support: Clinical Decision Support Software (CDSS)<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Hours of operation: NR<br><br>Caller ID: No |
| *Systematic reviews* | | | | | |
| Blank, 2012[66]<br>N=54 papers | This systematic review included studies about telephone triage. Twenty-six studies reported appropriateness of triage decisions and 26 papers reported on compliance with triage decision. Two studies reported both. | Varied by cite but included:<br>MD: NR<br>Nurse (unspecified credentials): NR<br>Lay operator: NR<br><br>Dedicated staff: NR | Co-location: NR<br><br>Special training: NR | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Regular hours and after hours<br><br>Caller ID: No |
| Bunn, 2004[21]<br>N=9 studies | Systematic review assessed the effects of telephone triage on safety, service usage, and patient satisfaction and compared telephone triage by different health care professionals. | Type of staff NR<br><br>Dedicated staff: NR | Co-location: NR<br><br>Special training: NR | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Hours of operation: NR<br><br>Caller ID: No |
| Carrasqueiro, 2011[36]<br>N=55 studies | This systematic review included studies on telephone triage to review evaluation studies and compile methodologies and metrics used as well as compare results. | Type of staff NR<br><br>Dedicated staff: NR | Co-location: NR<br><br>Special training: NR | Decision support: NR<br><br>Scope of practice described: No<br><br>Handoff to PCP: NR | Telephone contact<br><br>Hours of operation: NR<br><br>Caller ID: No |
| Lake, 2017[23]<br>N=10 systematic reviews | Review of systematic reviews focused on telephone-based triage and advice services; published since 1990; not targeting specific condition, population, medical specialty, or chronic conditions; | MD: NR<br>Nurse (unspecified credentials): NR<br>Admin/reception: NR<br>Health assistant: NR | Co-location: NR<br><br>Special training: NR | Decision support: Varied by cite<br><br>Scope of practice described: No | Telephone contact<br><br>Regular hours and after hours<br><br>Caller ID: No |

| Study # Enrolled | Description of Triage System | Type/Number of Professionals[a] Dedicated Triage Staff?[b] | Co-located Staff? Special Training? | Decision Support Protocol[c] Scope of Practice Described?[d] Handoff to PCP?[e] | Mode of Delivery Hours of Operation Caller Identified?[f] |
|---|---|---|---|---|---|
| | and not related to general health education. | Dedicated staff: other | | Handoff to PCP: NR | |

[a] Type of professional involved in delivering the triage system.
[b] Dedicated triage staff are professionals whose primary job responsibility is to triage patients. This differs from staff who may have triage responsibilities in addition to their primary role.
[c] Decision support protocol is any tool or algorithm used to support clinical decision making or provide guidance for triage decisions.
[d] Scope of practice is any specific guidance about a particular staff member's role and potential limits to their clinical discretion.
[e] Handoff to primary care practitioner refers to the ability for triage staff to communicate with a patient's primary care team synchronously or asynchronously.
[f] Caller identification refers to the capacity to verify the identify the caller.
Abbreviations: CAS=computerized clinical assessment system; CDSS=clinical decision support software/system; CeCC=CareEnhance Call Centre software; GP-general practitioner; NHS=National Health Service; NR=not reported; PCP=primary care provider

# APPENDIX C. STUDY CHARACTERISTICS TABLES

## KQ 1 STUDIES

| Study<br>Country<br># Enrolled<br># Arms<br>Relevant KQ<br>(Companion Papers) | Key Components (Staff, Mode, Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Reported Outcomes<br>Timing<br>Primary Outcome | Risk of Bias for Objective and Patient-Reported Outcomes |
|---|---|---|---|---|---|
| *RCT: Individual randomization* | | | | | |
| McKinstry, 2002[42]<br>Scotland<br>N=388 patients<br>2 arms<br>KQs 1, 3 | MD<br>Telephone<br>Protocol NR<br>Regular hours | Patients of 2 general medical practices calling to request a same-day appointment | Age: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: National Health Service | Outcomes:<br>- Patient satisfaction<br>- Utilization:<br>ED visit<br>Primary care visit<br><br>Timing: Study based on single point of telephone contact; use of service 2 weeks after randomization<br><br>Primary outcome: Physician time spent on telephone advice vs face-to-face care | Objective: Low<br>Patient reported: High |
| *RCT: Cluster randomization* | | | | | |
| Campbell, 2014[38]<br>ESTEEM Trial<br>UK<br>N=20,990 patients<br>3 arms<br>KQs 1, 2, 3<br><br>*Primary study for KQ 2*: Campbell, 2015[92]<br>(Holt, 2016[93]<br>Warren, 2015[94]<br>Calitri, 2015[95]<br>Murdoch, 2015[96]<br>Varley, 2016[97]<br>Holt, 2016[98] | (1) MD<br>Telephone<br>Protocol: Stour access system<br>Hours NR<br><br>(2) Nurse (NP, RN)<br>Telephone<br>Protocol: Plain Healthcare Odyssey Patient Access<br>Hours NR | Practices in 1 of 4 UK "centers" linked to university medical school; recruitment run through a primary care research network without an existing remote triage system (defined as a telephone-based system to manage more than 75% of same-day requests) | MD Triage:<br>Age: 43.08 (24.32)<br>Female: 59.54%<br>White: 56.03%<br>Black: <1%<br>Hispanic: NA<br>Asian: 1.15%<br>Other: <1%<br>Top 3: NR<br>Insurance type: NR<br><br>Nurse Triage:<br>Age: 41.5 (25.2)<br>Female: 60%<br>White: 51.0% | Outcomes:<br>- Patient satisfaction<br>- Patient safety<br>Deaths<br>Hospitalization<br>ED visit<br>- Total cost<br>- Utilization:<br>ED visit<br>Primary care visit<br><br>Timing: 28 days<br><br>Primary outcome: Workload - total number of primary care | Objective: Unclear<br>Patient reported: Unclear |

| Study<br>Country<br># Enrolled<br># Arms<br>Relevant KQ<br>(Companion Papers) | Key Components (Staff, Mode, Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Reported Outcomes<br>Timing<br>Primary Outcome | Risk of Bias for Objective and Patient-Reported Outcomes |
|---|---|---|---|---|---|
| Anonymous, 2014[99]<br>Mayor, 2014[100]) | | | Black: <1%<br>Hispanic: NA<br>Asian: 1.57%<br>Other: <1%<br>Top 3: NR<br>Insurance type: National Health Service | contracts taking place in 28 days after index appointment request | |
| Cragg, 1997[44]<br>UK<br>N=2152 patients<br>2 arms<br>KQs 1, 2, 3<br>(McKinley, 1997[101]) | MD<br>Telephone<br>Protocol NR<br>After hours | Patients at 1 of 14 practices in Manchester, Salford, Stockport, or Leicester who were resident in that practice for more than 2 weeks and placed an out-of-hours phone call to the practice during the study period | Age: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: National Health Service | Outcomes:<br>- Call resolution<br>On-call resolution<br>Primary care visit<br>ED visit<br>- Patient satisfaction<br>- Utilization:<br>Primary care visit<br><br>Timing: 24-120 hours after call<br><br>Primary outcome: NR | Overall-objective: High<br>Overall-patient reported: High |
| Lattimer, 1998[43]<br>UK<br>N=14492 calls<br>2 arms<br>KQs 1, 2, 3<br>(Lattimer, 2000[102]<br>Anonymous, 2000[103]) | NP,<br>unspecified/admin, receptionist<br>Telephone<br>Protocol: telephone advice system<br>After hours | Patients registered with any of the 19 GP practices in South Wiltshire | Age: NR<br>Female: 52%<br>Race: NR<br>Top 3: NR<br>Insurance type: National Health Service | Outcomes:<br>- Call resolution<br>On-call resolution<br>Primary care visit<br>ED visit<br>- Utilization<br>ED visit<br>Patient safety<br><br>Timing: 12 months<br><br>Primary outcome: Safety and effectiveness of intervention | Overall-objective: Low<br>Overall-patient reported: NA |
| Richards, 2004[40]<br>England<br>N=4718 patients<br>2 arms | NP unspecified<br>Telephone<br>Protocol: documented | Patients part of a general practice in York, England making a phone call to | Age: 7 age categories<br>Female: 62.7%<br>Race: NR<br>Top 3: | Outcomes:<br>- Call resolution<br>On-call resolution<br>Primary care visit | Overall-objective: Low<br>Overall-patient reported: NA |

| Study<br>Country<br># Enrolled<br># Arms<br>Relevant KQ<br>(Companion Papers) | Key Components (Staff, Mode, Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Reported Outcomes<br>Timing<br>Primary Outcome | Risk of Bias for Objective and Patient-Reported Outcomes |
|---|---|---|---|---|---|
| KQs 1, 2, 3 | Regular hours | that practice for a same-day appointment | - Respiratory system: 38.5%<br>- Digestive system: 14.5%<br>- Musculoskeletal: 13.9%<br>Insurance type: National Health Service | -Utilization:<br>ED visit<br>Primary care visit<br>- Total cost<br><br>Timing: Index consultations; follow-up care 1 month after index<br><br>Primary outcome: Type of consultation after "final point of contact" | |
| *Controlled before-after* | | | | | |
| Knowles, 2016[37]<br>England<br>N=2237 patients<br>4 arms<br>KQs 1, 3<br>(Southard, 2014[104]<br>O'Cathain, 2014[105]) | Nonclinical call handlers<br>Telephone<br>NHS Pathways software<br>Regular and after hours | Partitioned by locations served by NHS trusts;<br>English language;<br>age ≥16 for respondent but user of service could be a child;<br>other: recent user of urgent care | Age: 5 age categories<br><br><u>NHS 111 before arm</u><br>Female: 45.9%<br>White: 86.2%<br>Black: NA<br>Hispanic: NA<br>Asian: NA<br>Other: 13.7%<br><br><u>NHS 111 after arm</u><br>Female: 51.2%<br>White: 86.7%<br>Black: NA<br>Hispanic: NA<br>Asian: NA<br>Other: 13.3%<br><br>Top 3: NR<br>Insurance type: National Health Service | Outcomes:<br>- Patient satisfaction<br><br>Timing: 9 or 12 months<br><br>Primary outcome: Change in satisfaction with telephone triage 9 months (or 12 months) after the launch of NHS 111 | Overall-objective: NA<br>Overall-patient reported: High |
| Munro, 2000[45]<br>UK<br>N=68,500 calls | NP<br>Telephone | Population receiving health care in Preston and Corley, Milton Keynes, | Age: NR<br>Female: NR<br>Race: NR | Outcomes:<br>- Utilization<br>ED visit | Overall-objective: High |

| Study<br>Country<br># Enrolled<br># Arms<br>Relevant KQ<br>(Companion Papers) | Key Components (Staff, Mode, Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Reported Outcomes<br>Timing<br>Primary Outcome | Risk of Bias for Objective and Patient-Reported Outcomes |
|---|---|---|---|---|---|
| 1 arm<br>KQs 1, 3 | Protocol: NHS Clinical Assessment System<br>Regular and after hours | and Northumbria regions in the United Kingdom | Top 3: NR<br>Insurance type: NR | Primary care visit<br><br>Timing: 24 months<br><br>Primary outcome: Changes in trends in use of health care system after introduction of nurse-led triage | Overall-patient reported: NA |
| Turner, 2013[39]<br>England<br>N=1,802,000 calls<br>2 arms<br>KQs 1, 2, 3<br>(Southard, 2014[104]<br>O'Cathain, 2014[105]) | NP, unspecified/admin receptionist<br>Telephone<br>Protocol: NHS Pathways Assessment System<br>Regular and after hours | Community user in different geographic areas placing a triage telephone call; no N reported for control arm (NHS Direct); different cities/regions compared | Age: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: National Health Service | Outcomes:<br>Utilization<br>ED visit<br>Primary care visit<br><br>Timing: 12 months<br><br>Primary outcome: Changes in use of emergency and urgent care services | Overall-objective: Unclear<br>Overall-patient reported: NA |
| *Interrupted time series* | | | | | |
| Richards, 2002[41]<br>UK<br>N=4685 patients<br>2 arms<br>KQs 1, 2, 3<br>(Richards, 2004[106]) | RN<br>Telephone<br>Protocol: Internally developed<br>Regular hours | Consecutive patients in 1 of 3 practices around York, England, who called requesting a same-day appointment; member of general practice group | Age: 0 to ≥75<br>Female: 61.3%<br>Race: NR<br>Top 3:<br>- Respiratory, 37.8%<br>- Dermatological, 15.2%<br>- Musculoskeletal, 13.3%<br><br>Insurance type: National Health Service | Outcomes:<br>-Call resolution<br>On call resolution<br>Primary care visit<br>Utilization:<br>ED visit<br>Primary care visit<br>- Total cost<br><br>Timing: Time of call through 1 month thereafter<br><br>Primary outcome: NR | Overall ROB rating for interrupted time series: Low |

Abbreviations: CDSS=clinical decision support software/system; CeCC=CareEnhance Call Centre software; ED=emergency department; GP=general practitioner; MD=medical doctor; NA=not applicable; NHS=National Health Service; NP=nurse practitioner; NR=not reported; PEE=planning, execution, evaluation (phases); PPT=people, process, technology (aspects); ROB=risk of bias; SD=standard deviation

## KQ 2 STUDIES

| Study<br>Country<br># Enrolled<br>Study Design<br>(Companion) | Key Components<br>(Staff, Mode,<br>Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Adult<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Outcome<br>Description<br>Level (PEE)<br>Aspect (PPT) | Risk of Bias |
|---|---|---|---|---|---|
| *Qualitative studies* | | | | | |
| Banks, 2018[81]<br>UK<br>23<br>Qualitative | MDs, NPs, Admins, Practice Managers<br>Internet-based eConsult<br>Hours NR | Practice staff including reception and administrative staff, practice managers, and GPs from 6 practices in the west of England. | Age: NR<br>Adult: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Evaluation: Process<br>Evaluation: People | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Derkx, 2007[80]<br>Netherlands<br>8<br>Qualitative | Focus group members (patients, call handlers, GPs, management)<br>Telephone<br>Protocol NR<br>After hours | Patients were members of patient groups; call handlers worked at after-hours call centers as supervisors or call handlers; GPs worked at after-hours centers and were involved in ensuring quality of care; and members of the management team were involved with general issues of management at after-hours centers. | Age: NR<br>Adult: 100%<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Evaluation: People | Appropriate approach? Yes<br>Adequate data collection? Can't tell<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |

| Study<br>Country<br># Enrolled<br>Study Design<br>(Companion) | Key Components<br>(Staff, Mode,<br>Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Adult<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Outcome<br>Description<br>Level (PEE)<br>Aspect (PPT) | Risk of Bias |
|---|---|---|---|---|---|
| Eccles, 2015[62]<br>UK<br>55<br>Qualitative | MD, call handlers<br>Telephone<br>Internally developed protocol<br>After hours | Patients who called Cardiff and Vale after-hours service both before and after an "expert triage" service was implemented in April 2013. GP triage practitioners who practiced under either the "previous" or "expert triage" models or both. | Age: NR<br>Adult: 100%<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: National Health Service | Planning: People<br>Planning: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Edwards, 1998[67]<br>UK<br>8<br>Qualitative | Nurse<br>Telephone<br>Simulated calls for triage<br>Hours NR | Qualified nurses working in community hospitals with walk-in minor injury service that also handled phone inquiries. | Age: 23-50<br>Adult: 100%<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: Process<br>Execution: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Foster, 1999[63]<br>UK<br>38<br>Qualitative | MD<br>Telephone<br>Protocol NR<br>After hours | GPs recruited from one health authority in south London. | Mean Age: 42<br>Adult: 100%<br>Female: 71%<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: People<br>Planning: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Gamst-Jensen, 2017[68]<br>Denmark<br>19<br>Mixed methods | Nurse, MD<br>Telephone<br>Internally developed protocol<br>After hours | Patients who called the after-hours hotline in Copenhagen. | Age: <1 to 79<br>Adult: 84%<br>Female: 58%<br>Race: NR<br>Top 3: abdominal pain<br>Insurance type: NR | Execution: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |

| Study<br>Country<br># Enrolled<br>Study Design<br>(Companion) | Key Components<br>(Staff, Mode,<br>Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Adult<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Outcome<br>Description<br>Level (PEE)<br>Aspect (PPT) | Risk of Bias |
|---|---|---|---|---|---|
| Greatbatch, 2005[82]<br>UK<br>60<br>Qualitative | Nurse, call handlers<br>Telephone<br>NHS Direct computerized clinical assessment system (CAS)<br>Regular hours and after hours | 60 calls were selected from one site within NHS. No specific criteria identified. | Age: NR<br>Adult: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: Technology<br>Evaluation: Technology | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Holmström, 2007[76]<br>Sweden<br>12<br>Qualitative (Ernesater, 2009[107]) | Nurse<br>Telephone<br>Protocol NR<br>Regular hours | Nurses were recruited from 1 call center in mid-Sweden between 2004-2005. | Age: 35-63<br>Adult: 100%<br>Female: 0%<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: People<br>Planning: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Holmström, 2016[75]<br>Sweden<br>10<br>Qualitative | Nurse<br>Telephone<br>Protocol NR<br>Regular hours | Inclusion criteria were that the participants were older than 65 and have experience calling telephone advise nursing services seeking advice for a health-related problem. Patients were excluded who only called to make an appointment to see a clinician. | Age: 68-95<br>Adult: 100%<br>Female: 60%<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Lopriore, 2017[83]<br>Australia<br>196<br>Qualitative | RN<br>Telephone<br>Computer decision support software and HealthCare Direct policy | Patients calling in on the triage health care phone line. | Age: NR<br>Adult: 100%<br>Female: 100%<br>Race: NR<br>Top 3: NR | Planning: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |

| Study<br>Country<br># Enrolled<br>Study Design<br>(Companion) | Key Components<br>(Staff, Mode,<br>Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Adult<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Outcome<br>Description<br>Level (PEE)<br>Aspect (PPT) | Risk of Bias |
|---|---|---|---|---|---|
| | Hours NR | | Insurance type:<br>National health insurance | | |
| O'Cathain, 2004[79]<br>UK<br>24<br>Mixed methods (O'Cathain, 2004[108]) | RN<br>Telephone<br>3 different decision support programs used by the interviewed nurses<br>Regular hours, after hours | Triage nurse in one of 12 sites for NHS Direct for the interview (qualitative) portion or in one of 14 sites and who had received more than 10 triage calls for the abstracted (quantitative) portion. | Age: NR<br>Adult: 100%<br>Female: 90%<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: People<br>Planning: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Pettinari, 2001[69]<br>UK<br>14<br>Qualitative | Nurse<br>Telephone<br>NHS CDSS "Clinical Decision Support Software"<br>Regular hours, after-hours | None explicitly stated | Age: NR<br>Adult: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Execution: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Pope, 2013[72]<br>UK<br>64<br>Qualitative | Call handlers<br>Telephone<br>Clinical Decision Support (CDS)<br>Regular hours, after hours | Call handlers were purposely sampled. Stakeholders, system developers, corporate/operational managers were also considered. Sampled participants worked in 1 of 3 settings within the NHS: for 999 emergency care, a GP after-hours urgent care service, or a single point of access service. | Age: NR<br>Adult: 100%<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Execution:<br>Technology<br>Evaluation:<br>Technology | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |

| Study<br>Country<br># Enrolled<br>Study Design<br>(Companion) | Key Components<br>(Staff, Mode,<br>Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Adult<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Outcome<br>Description<br>Level (PEE)<br>Aspect (PPT) | Risk of Bias |
|---|---|---|---|---|---|
| Purc-Stephenson, 2010[64]<br>Multiple<br>16 studies<br>Meta-ethnography | Nurse<br>Telephone<br>Protocol NR<br>Hours NR | Studies meeting following criteria: include an evaluation of telephone triage and advice; use qualitative methodology; include nurses in the sample; provide primary-care services. Excluded reviews or discussion papers, and studies in which telephone service was for specialized services, chronic conditions, or mental health. | Age: NR<br>Adult: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: People<br>Planning: Process<br>Execution: Process | Overall ROB rating: Good |
| Richards, 2007[74]<br>UK<br>27<br>Qualitative | MD, nurse, unspecified, admin, paramedic<br>Telephone<br>Protocol used (no information)<br>After-hours | Users of after-hours primary care services in 3 regions in England over a 2-week period, with sampling strategy to include heterogeneity in terms of affluence, deprivation, and ethnic diversity, and equal numbers of service users from each area, parents of children aged 11 or younger and people in the age groups 17-49 and 50 plus, and individuals receiving different management options (telephone advice, | Age: 55.4<br>Adult: 74%<br>Female: 48<br>Race:<br>White: 96%<br>Black: 4%<br>Top 3: NR<br>Insurance type: NR | Planning: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |

| Study<br>Country<br># Enrolled<br>Study Design<br>(Companion) | Key Components<br>(Staff, Mode,<br>Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Adult<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Outcome<br>Description<br>Level (PEE)<br>Aspect (PPT) | Risk of Bias |
|---|---|---|---|---|---|
| | | treatment center, or home visit).<br><br>Exclusions: ages 12-16; person too unwell to participate in focus group/interview (*eg*, end-stage terminal illness, recent hospital admission, nursing home resident); contact details omitted; person flagged on system as aggressive or violent or and requiring special procedures. | | | |
| Roberts, 2009[77]<br>UK<br>35<br>Qualitative | Nurse<br>Telephone<br>Protocol NR<br>Regular hours, after hours | Stakeholders=senior level individuals working on the design and implementation of NHS24<br><br>Partners=individuals with responsibility for the delivery of care within one of the partner organizations. | Age: NR<br>Adult: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: Process<br>Execution: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |

| Study<br>Country<br># Enrolled<br>Study Design<br>(Companion) | Key Components<br>(Staff, Mode,<br>Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Adult<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Outcome<br>Description<br>Level (PEE)<br>Aspect (PPT) | Risk of Bias |
|---|---|---|---|---|---|
| Röing, 2015[65]<br>Sweden<br>11<br>Qualitative | RN, Call Managers<br>Telephone<br>Decision Support Tool (DST)<br>Regular hours, after hours | Telenurses involved in one of 33 malpractice claims filed between 2003-2010 or managers of one of the 23 call centers throughout Sweden for the national healthcare hotline. | | Planning: Process<br>Evaluation: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Tariq, 2017[73]<br>Australia<br>9<br>Mixed methods | Nurse<br>Telephone<br>CeCC<br>Regular hours, after hours | The national remote triage system, Healthdirect Australia, assisted in the identification of the nine nurses interviewed about the usability of the CeCC decision support system. | Age: NR<br>Adult: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: Technology | Appropriate approach? Yes<br>Adequate data collection? Can't tell<br>Findings derived from data? Can't tell<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Can't tell |
| Timpka, 1990[70]<br>Sweden<br>5<br>Qualitative | Nurse<br>Telephone<br>Protocol NR<br>Hours NR | Eligible nurses were those who were receptionist nurses at the only HC in town. No other eligibility criteria were provided. | Age: 37<br>Adult: 100%<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Execution: Process | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |

| Study<br>Country<br># Enrolled<br>Study Design<br>(Companion) | Key Components<br>(Staff, Mode,<br>Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Adult<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Outcome<br>Description<br>Level (PEE)<br>Aspect (PPT) | Risk of Bias |
|---|---|---|---|---|---|
| Turnbull, 2012[78]<br>UK<br>61<br>Mixed methods | NR<br>Telephone<br>CDSS<br>Hours NR | Method 1 Interviews: purposive sample of call-handlers and "stakeholders."<br><br>Method 2 Observation: 491 hours.<br><br>Method 3 Survey: all call-handlers. | Age: NR<br>Adult: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: People | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Turnbull, 2017[71]<br>UK<br>47<br>Organizational case study (Turnbull, 2014[109]) | MD, RN, call advisers, unspecified/admin<br>Telephone<br>NHS Pathways<br>Regular hours, after hours | Employee at one of 5 NHS sites performing 111 services during 2011-12. | Age: NR<br>Adult: 100%<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: People<br>Execution: Process<br>Planning: Technology | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Yes<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Yes |
| Wahlburg, 2018[61]<br>Sweden<br>24<br>Qualitative (Bjorkman, 2017[110]) | Nurse<br>Telephone<br>CDSS<br>Hours NR | Worked in 1 of 6 chosen current call center for at least 6 months at the time of the interview. | Age: 55 (1.7)<br>Adult: 100%<br>Female: 100%<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Planning: People<br>Planning: Process<br>Planning: Technology | Appropriate approach? Yes<br>Adequate data collection? Yes<br>Findings derived from data? Can't tell<br>Results substantiated by data? Yes<br>Coherence between data and interpretation? Can't tell |

| Study<br>Country<br># Enrolled<br>Study Design<br>(Companion) | Key Components<br>(Staff, Mode,<br>Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Adult<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Outcome<br>Description<br>Level (PEE)<br>Aspect (PPT) | Risk of Bias |
|---|---|---|---|---|---|
| Systematic reviews | | | | | |
| Blank, 2012[66]<br>Multiple<br>54 papers | MD, Nurse, Lay operator<br>Telephone<br>Protocol NR<br>Regular hours, after hours | This systematic review included studies about telephone triage. Twenty-six studies reported appropriateness of triage decisions and 26 papers reported on compliance with triage decision. Two studies reported both. | Age: NR<br>Adult: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Execution: People<br>Evaluation: People<br>Execution: Process<br>Evaluation: Process | Overall ROB: Poor |
| Bunn, 2004[21]<br>NR<br>9 studies | NR<br>Telephone<br>Protocol NR<br>Hours NR | Systematic review assessed the effects of telephone triage on safety, service usage, and patient satisfaction and compare telephone triage by different health care professionals. | Age: NR<br>Adult: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Evaluation: Process<br>Evaluation: Technology | Overall ROB: Good |
| Carrasqueiro, 2011[36]<br>Multiple<br>55 studies | NR<br>Telephone<br>Protocol NR<br>Hours NR | This systematic review included studies on telephone triage to review evaluation studies and compile methodologies and metrics used as well as compare results. | Age: NR<br>Adult: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Evaluation: Process | Overall ROB: Poor |

| Study<br>Country<br># Enrolled<br>Study Design<br>(Companion) | Key Components (Staff, Mode, Protocol, Hours) | Eligibility | Mean Age (SD)<br>% Adult<br>% Female<br>% Race<br>Top 3 Health Issues<br>Insurance Type | Outcome<br>Description<br>Level (PEE)<br>Aspect (PPT) | Risk of Bias |
|---|---|---|---|---|---|
| Lake, 2017[23]<br>Multiple<br>10 systematic reviews | MD, Nurse, Admin/receptionist, Health assistant<br>Telephone<br>Protocol varies<br>Regular hours, after hours | Overview of systematic reviews focused on telephone-based triage and advice services; available in English; published since 1990; not targeting specific condition, population, medical specialty, or chronic conditions; and not related to general health education. | Age: NR<br>Adult: NR<br>Female: NR<br>Race: NR<br>Top 3: NR<br>Insurance type: NR | Execution: People<br>Evaluation: Process<br>Execution: Technology | Overall ROB: Fair |

Abbreviations: CDSS=clinical decision support software/system; CeCC=CareEnhance Call Centre software; GP=general practitioner; MD=medical doctor; NHS=National Health Service; NP=nurse practitioner; NR=not reported; PEE=planning, execution, evaluation (phases); PPT=people, process, technology (aspects); ROB=risk of bias; SD=standard deviation

# APPENDIX D. EXCLUDED STUDIES

## KQ 1 EXCLUDED STUDIES

| Exclusion reason<br>Study | Not full publication | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|
| Albahri, 2018[1] | | | | | X | |
| Andrews, 2014[2] | X | | | | | |
| Anonymous, 1997[3] | | X | | | | |
| Anonymous, 2015[4] | X | | | | | |
| Anonymous, 2015[5] | X | | | | | |
| Anonymous, 2015[6] | X | | | | | |
| Anonymous, 2014[7] | X | | | | | |
| Bearden, 2008[8] | | | | | X | |
| Bergmo, 2005[9] | | | | X | | |
| Biermann, 2002[10] | | | | X | | |
| Blank, 2012[11] | X | | | | | |
| Campbell, 2015[12] | X | | | | | |
| Carrasqueiro, 2011[13] | | | | | X | |
| Castro, 2014[14] | | | | X | | |
| Chmiel, 2011[15] | | | | | X | |
| Cronin, 2017[16] | | X | | | | |
| Dale, 2011[17] | X | | | | | |
| de Coster, 2010[18] | | | | | X | |
| Downes, 2017[19] | | | | | X | |
| Dunt, 2006[20] | | | | | X | |
| Dunt, 2007[21] | | | | | X | |
| Eccles, 2015[22] | | | | | X | |
| Eppes, 2012[23] | | | X | | | |
| Garratt, 2007[24] | | | | | X | |
| Godfrey, 2006[25] | X | | | | | |
| Gulacti, 2017[26] | | | | X | | |
| Gulacti, 2017[27] | | | | X | | |
| Hansen, 1998[28] | | | | | X | |

| Exclusion reason<br>Study | Not full publication | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|
| Holroyd, 2007[29] | | | | X | | |
| Howard, 2007[30] | | | | | X | |
| Howell, 2016[31] | | X | | | | |
| Huber, 2011[32] | | | | X | | |
| Huibers, 2011[33] | | | | X | | |
| Huibers, 2012[34] | | | | | X | |
| Jackman, 1998[35] | | X | | | | |
| Jones, 2018[36] | | | | X | | |
| Katz, 2003[37] | | | | | | X |
| Kim, 2013[38] | | | | X | | |
| Klasner, 2006[39] | | X | | | | |
| Knight, 2010[40] | | X | | | | |
| Krumperman, 2015[41] | | | | | X | |
| Liedberg, 2016[42] | | | X | | | |
| Lin, 2005[43] | | | | X | | |
| Mallett, 2014[44] | | | | X | | |
| Manzo-Silberman, 2015[45] | | | | X | | |
| Marsh, 2014[46] | | | X | | | |
| Mayor, 2014[47] | | X | | | | |
| Melnyk, 2008[48] | | X | | | | |
| Morrissey, 1997[49] | | X | | | | |
| Murdoch,2015[50] | | | | | X | |
| Nagle, 1992[51] | | | | | X | |
| Navratil-Strawn, 2014[52] | | | | | X | |
| O'Keeffe, 2008[53] | | | | X | | |
| O'Malley, 2013[54] | | | | X | | |
| Ong, 2008[55] | | | | | X | |
| Philips, 2010[56] | | | | X | | |
| Philips, 2012[57] | | | X | | | |
| Purc-Stephenson, 2012[58] | | | | | X | |
| Rahmqvist, 2011[59] | | | | X | | |
| Richards, 2008[60] | | | X | | | |
| Roberts, 2007[61] | X | | | | | |

| Exclusion reason<br>Study | Not full publication | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|
| Roberts, 2007[62] | X | | | | | |
| Roth, 2006[63] | | | | X | | |
| Rouse, 2007[64] | | X | | | | |
| Salk, 1998[65] | | | | X | | |
| Shannon, 2006[66] | | | | X | | |
| Shekelle, 1999[67] | | X | | | | |
| Smits, 2012[68] | | | | X | | |
| Smits, 2017[69] | | X | | | | |
| Smitsa, 2016[70] | | X | | | | |
| Somers, 1994[71] | | X | | | | |
| Soulleihet, 2014[72] | | | | X | | |
| Spaulding, 2012[73] | | | | X | | |
| Stacey, 2014[74] | | | | X | | |
| Stuart, 2000[75] | | | | | X | |
| Takala, 1997[76] | | | | X | | |
| Thompson, 1999[77] | | X | | | | |
| Turner, 2009[78] | | | | X | | |
| Valsangkar, 2017[79] | | | X | | | |
| van Ierland, 2011[80] | | | | X | | |
| Van Uden, 2005[81] | | | | | X | |
| Villarreal, 2017[82] | | | | | X | |
| Westra, 2015[83] | | | | X | | |
| Willekens, 2011[84] | | | | | X | |

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## KQ 2 EXCLUDED STUDIES

| Exclusion reason<br>Study | Not full publication | Not eligible country | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|---|
| Allan, 2014[1] | | | | | | | X |
| Allen, 2008[2] | X | | | | | | |
| Allen, 2008[3] | | | | X | | | |
| Anderson, 2015[4] | | | | | | | X |
| Andreao, 2015[5] | | X | | | | | |
| Anonymous, 1997[6] | | | | | | X | |
| Anonymous, 1997[7] | | | | | X | | |
| Anonymous, 1998[8] | | | X | | | | |
| Anonymous, 2001[9] | X | | | | | | |
| Anonymous, 2003[10] | X | | | | | | |
| Anonymous, 2005[11] | | | | | | | X |
| Anonymous, 2006[12] | X | | | | | | |
| Anonymous, 2014[13] | | | | | | X | |
| Anonymous, 2015[14] | X | | | | | | |
| Anonymous, 2015[15] | | | | | | | X |
| Aranda, 2001[16] | | | | X | | | |
| Arioto, 2000[17] | X | | | | | | |
| Arioto, 2000[18] | X | | | | | | |
| Atherton, 2018[19] | | | | | X | | |
| Atherton, 2018[20] | | | | | X | | |
| Bagayoko, 2014[21] | | X | | | | | |
| Barrett, 2017[22] | | | | | X | | |
| Baylis, 2012[23] | | | | | | X | |
| Bjorkman, 2018[24] | | | X | | | | |
| Blanchfield, 1997[25] | | | | | | X | |
| Blinkenberg, 2013[26] | X | | | | | | |
| Boidron, 2016[27] | | | | | | | X |
| Bolton, 2002[28] | | | | | | X | |
| Boxer, 2008[29] | X | | | | | | |
| Brant, 2018[30] | | | | | X | | |

| Exclusion reason<br>Study | Not full publication | Not eligible country | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|---|
| Brennan, 1992[31] | | | | | | X | |
| Britnell, 2005[32] | X | | | | | | |
| Brown, 2012[33] | | | | | | | X |
| Brunett, 2015[34] | | | | | | X | |
| Buja, 2015[35] | | | | | | | X |
| Bunn, 2005[36] | | | | | | | X |
| Buppert, 2009[37] | X | | | | | | |
| Busk Nørøxe, 2017[38] | | | | | | | X |
| Busk Nørøxe, 2017[39] | | | | | | X | |
| Cady, 1999[40] | X | | | | | | |
| Cady, 1999[41] | X | | | | | | |
| Car, 2003[42] | | | | | X | | |
| Car, 2004[43] | | | | | | X | |
| Caralis, 2010[44] | | | | | | | X |
| Castellote, 2016[45] | X | | | | | | |
| Chang, 2001[46] | | | | | | X | |
| Charles-Jones, 2003[47] | | | | | | | X |
| Chow, 2008[48] | | X | | | | | |
| Christensen, 1998[49] | | | | | | | X |
| Clawson, 2001[50] | | | | X | | | |
| Clay-Williams, 2017[51] | | | | | X | | |
| Coleman, 1997[52] | X | | | | | | |
| Comino, 2007[53] | | | | | X | | |
| Connechen, 2006[54] | | | | | | X | |
| Cook, 2015[55] | | | | | | | X |
| Coombes, 2016[56] | X | | | | | | |
| Cosford, 2010[57] | X | | | | | | |
| Cragg, 1994[58] | | | | | | | X |
| Craig, 2015[59] | | | | | | | X |
| Crouch, 1999[60] | | | | | | | X |
| Cunningham, 2012[61] | | | | | X | | |
| Custer, 2003[62] | | | | | | X | |

| Exclusion reason<br>Study | Not full publication | Not eligible country | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|---|
| Dahlgren, 2017[63] | | | | | X | | |
| Dale, 1998[64] | | | | | | X | |
| Dale, 2011[65] | | | | | | | X |
| de Almeida Barbosa, 2016[66] | | | | | | X | |
| Demiris, 2004[67] | | | | | X | | |
| Derkx, 2009[68] | | | | | | X | |
| Derkx, 2008[69] | | | | | | X | |
| DeVore, 1999[70] | | | | | | X | |
| Doughty, 2008[71] | | | | | | X | |
| Downes, 2017[72] | | | | | X | | |
| Drennan, 2015[73] | X | | | | | | |
| Dundas, 1998[74] | X | | | | | | |
| Dunt, 2006[75] | | | | | | X | |
| Dunt, 2005[76] | | | | | | X | |
| Eastwood, 2018[77] | | | | | | | X |
| Eastwood, 2017[78] | | | | | | | X |
| Edmonds, 1997[79] | | | | | | | X |
| Edwards, 2017[80] | | | | | | X | |
| Ek, 2015[81] | | | X | | | | |
| Elnicki, 2000[82] | | | | | X | | |
| Eminovic, 2004[83] | | | | | | X | |
| Erdman, 2001[84] | | | | | X | | |
| Ernesäter, 2010[85] | | | | | | X | |
| Fletcher, 1999[86] | | | | | X | | |
| Flynn, 1998[87] | | | | | | | X |
| Foels, 2004[88] | | | | | | X | |
| Fortune, 2001[89] | | | | | | | X |
| Gaffney, 2001[90] | | | X | | | | |
| Gallagher, 1998[91] | X | | | | | | |
| Gardner, 2010[92] | | | | | | X | |
| George, 1995[93] | | | | | | X | |

| Exclusion reason<br>Study | Not full publication | Not eligible country | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|---|
| George, 1995[94] | | | | | | X | |
| Gerard, 2006[95] | | | | | | | X |
| Giesen, 2007[96] | | | | | | | X |
| Giesen, 2007[97] | | | | | | X | |
| Gill, 1999[98] | X | | | | | | |
| Gillen, 2010[99] | | | | | | X | |
| Gobis, 1997[100] | X | | | | | | |
| Godden, 2011[101] | | | | | | X | |
| Godfrey, 2006[102] | | | | | | | X |
| Gonzalez, 2015[103] | | | | | X | | |
| Goode, 2004[104] | | | | | X | | |
| Goransson, 2003[105] | | | | | X | | |
| Göransson, 2005[106] | | | | | | X | |
| Graber, 2003[107] | X | | | | | | |
| Grady, 2007[108] | | | | | X | | |
| Grenier, 2000[109] | | | | | | X | |
| Griffin, 2017[110] | | | | | | X | |
| Gustafsson, 2016[111] | X | | | | | | |
| Hagan, 2000[112] | X | | | | | | |
| Healy, 2000[113] | | | | | X | | |
| Heath, 2007[114] | | | | | | X | |
| Hildebrandt, 2006[115] | | | | | | X | |
| Hildebrandt, 2003[116] | | | | | | | X |
| Hoare, 1999[117] | | | | | | | X |
| Hogenbirk, 2005[118] | | | | | X | | |
| Holmstrom, 2002[119] | | | | | | X | |
| Holt, 2016[120] | X | | | | | | |
| Huibers, 2012[121] | | | | | X | | |
| Jackman, 1998[122] | | | | | | | X |
| Jang-Jaccard, 2014[123] | | | | | | | X |
| Jayaraman, 2008[124] | | | | | X | | |
| Jiwa, 2002[125] | | | | | | X | |

| Exclusion reason<br>Study | Not full publication | Not eligible country | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|---|
| Johansson, 2014[126] | | | | | | X | |
| Johnson, 2015[127] | | | | | | X | |
| Johnson, 2015[128] | | | | | X | | |
| Johnson, 1995[129] | | | | | X | | |
| Jones, 2017[130] | | | | | | | X |
| Jones, 2003[131] | | | | | | | X |
| Jones, 1998[132] | | | | | | X | |
| Jones, 2012[133] | | | | | X | | |
| Jung, 2015[134] | | | | | | | X |
| Kaakinen, 2016[135] | | | X | | | | |
| Kaakinen, 2016[136] | | | | | | X | |
| Kaminsky, 2017[137] | | | | | | X | |
| Katz, 2003[138] | X | | | | | | |
| Khan, 2013[139] | X | | | | | | |
| Kiddy, 2005[140] | | | | | X | | |
| Kishner, 1997[141] | | | | | | X | |
| Knight, 2015[142] | | | | | X | | |
| Knowles, 2014[143] | | | | | | X | |
| Koivunen, 2018[144] | | | | | | X | |
| Kwon, 2007[145] | | | | | | X | |
| Labarere, 2003[146] | | | | | | X | |
| Lake, 2016[147] | X | | | | | | |
| Langabeer, 2017[148] | | | | | X | | |
| Larson-Dahn, 2001[149] | | | | | | X | |
| Lattimer, 2005[150] | | | | | X | | |
| Lattimer, 2000[151] | | | | | X | | |
| Leclerc, 2003[152] | | | | | X | | |
| Leibowitz, 2003[153] | | | | | | X | |
| Leng, 2016[154] | | | | | | X | |
| Leshem-Rubinow, 2015[155] | | | | | X | | |
| Leutgeb, 2014[156] | | | | | | | X |

| Exclusion reason<br>Study | Not full publication | Not eligible country | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|---|
| Liederman, 2005[157] | | | | | | X | |
| Lin, 2005[158] | | | | | X | | |
| Ling, 2016[159] | | | | | | X | |
| Loane, 2002[160] | | | | | X | | |
| Locatis, 2010[161] | X | | | | | | |
| Lowes, 1997[162] | | | | | X | | |
| Madlon-Kay, 1991[163] | | | | | | X | |
| Manuel, 1993[164] | | | | | | X | |
| Marklund, 2007[165] | | | | | | X | |
| Marklund, 1991[166] | | | | | X | | |
| Marklund, 1990[167] | | | X | | | | |
| Martin, 1995[168] | X | | | | | | |
| Martinsson, 2018[169] | X | | | | | | |
| Marvicsin, 2015[170] | X | | | | | | |
| Maynard, 2004[171] | | | | | X | | |
| Mayor, 2014[172] | | X | | | | | |
| McCarthy, 1995[173] | | | | | | | X |
| McKenzie, 2016[174] | X | | | | | | |
| McKenzie, 2016[175] | X | | | | | | |
| McKenzie, 2016[176] | X | | | | | | |
| McKenzie, 2016[177] | | | | | X | | |
| McKinstry, 2002[178] | | | | | | | X |
| McNeil, 2007[179] | | | | | X | | |
| McNicholas, 2018[180] | | | | | | X | |
| Meng, 2015[181] | | | | | | X | |
| Midtbo, 2017[182] | | | | | | | X |
| Moffatt, 2011[183] | X | | | | | | |
| Mohammed, 2012[184] | | | | | | X | |
| Moll van Charante, 2006[185] | | | | | | | X |
| Moll van Charante, 2006[186] | | | | | X | | |

| Exclusion reason<br>Study | Not full publication | Not eligible country | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|---|
| Monsuez, 2009[187] | X | | | | | | |
| Montalto, 2010[188] | | | | | | | X |
| Moore, 2002[189] | | | | | | | X |
| Moriarty, 2003[190] | | | | | X | | |
| Morimura, 2005[191] | | | | | | X | |
| Morrow, 2005[192] | X | | | | | | |
| Moth, 2014[193] | | | X | | | | |
| Moth, 2013[194] | X | | | | | | |
| Mounce, 2016[195] | | | | | | | X |
| Munro, 2003[196] | | | | | | X | |
| Murphy, 2000[197] | | | | | | | X |
| Narasimha, 2017[198] | | | | | X | | |
| Nemes, 2011[199] | X | | | | | | |
| Newbould, 2017[200] | X | | | | | | |
| Newton, 2006[201] | X | | | | | | |
| Niemann, 2004[202] | X | | | | | | |
| Niv, 2018[203] | X | | | | | | |
| North, 2014[204] | | | | | X | | |
| O'Cathain, 2014[205] | | | | | X | | |
| O'Cathain, 2003[206] | | | | | X | | |
| Olesen, 1994[207] | | | | | | X | |
| O'Malley, 2012[208] | | | | | | | X |
| Ong, 2008[209] | | | | | X | | |
| Onubogu, 2013[210] | | | | | | | X |
| Owens, 2017[211] | | | | | | | X |
| Palma, 2014[212] | | | | | | X | |
| Pancer, 2018[213] | X | | | | | | |
| Philips, 2015[214] | | | | | | | X |
| Poole, 2011[215] | | | | | | X | |
| Pooley, 2003[216] | | | | | X | | |
| Pope, 2017[217] | | | | | X | | |
| Posocco, 2018[218] | | | | | | X | |

| Exclusion reason<br>Study | Not full publication | Not eligible country | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|---|
| Proctor, 2002[219] | | | | | | X | |
| Quallich, 2003[220] | | | | | | X | |
| Reisinger, 1998[221] | | | X | | | | |
| Richards, 2000[222] | | | | | | | X |
| Ritter, 2010[223] | | | | | | | X |
| Roberts, 1998[224] | X | | | | | | |
| Roberts, 2007[225] | | | | | | X | |
| Roberts, 2007[226] | | | | | | X | |
| Robinson, 1996[227] | | | | | | X | |
| Rodway, 2013[228] | | | | | | X | |
| Roing, 2015[229] | | | | | X | | |
| Rortveit, 2013[230] | | | | | | X | |
| Rosenblatt, 2001[231] | | | | | | | X |
| Rutenberg, 2000[232] | | | | | | | X |
| Rutenberg, 2000[233] | | X | | | | | |
| Rutenberg, 2008[234] | | | | | X | | |
| Sagrillo, 2002[235] | | | | | X | | |
| Sakurai, 2014[236] | | | | | | | X |
| Salisbury, 2005[237] | X | | | | | | |
| Salisbury, 2000[238] | | | | | | X | |
| Salisbury, 1997[239] | | | | | | X | |
| Salk, 1998[240] | | | | | X | | |
| Salman, 2014[241] | | X | | | | | |
| Sanderson, 2008[242] | | | X | | | | |
| Sands, 2013[243] | | | | | | X | |
| Sandvik, 2018[244] | | | | | | X | |
| Sapien, 2000[245] | | | | X | | | |
| Schlachta-Fairchild, 2010[246] | | | | | | X | |
| Schoenfeld, 2016[247] | | | | | X | | |
| Scott-Jones, 2008[248] | | | | | | X | |
| Shani, 2015[249] | | | | | | X | |

| Exclusion reason<br>Study | Not full publication | Not eligible country | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|---|
| Shekelle, 1999[250] | | | | | | | X |
| Simonsen-Anderson, 2002[251] | | | | | | X | |
| Simpson, 2000[252] | | | | | X | | |
| Singh, 2013[253] | X | | | | | | |
| Skorin-Kapov, 2010[254] | | | | | | X | |
| Smith, 2001[255] | | | | X | | | |
| Smits, 2017[256] | | | X | | | | |
| Smits, 2017[257] | | | | | X | | |
| Smits, 2016[258] | | | | | X | | |
| Smitsa, 2016[259] | | | | | | X | |
| Snooks, 2009[260] | X | | | | | | |
| Spence, 2012[261] | X | | | | | | |
| Sprivulis, 2004[262] | | | | | X | | |
| Srámek, 1994[263] | | | | | | | X |
| Stern, 2017[264] | X | | | | | | |
| Storhaug, 2017[265] | | | | | | X | |
| Stowe, 2010[266] | | | | | | X | |
| Ström, 2011[267] | | | | | X | | |
| Swage, 2013[268] | | | | | X | | |
| Thompson, 1999[269] | X | | | | | | |
| Tran, 2017[270] | | | | | | | X |
| Tranberg, 2018[271] | | | | | | X | |
| Tuckson, 2017[272] | | | | | | X | |
| Tuden, 2017[273] | | | | | X | | |
| Turner, 2002[274] | | | | | X | | |
| van der Biezen, 2017[275] | | | | | | | X |
| Van Der Biezen, 2016[276] | X | | | | | | |
| van Galen, 2018[277] | | | | | | X | |
| van Ierland, 2011[278] | X | | | | | | |
| van Uden, 2006[279] | | | | | X | | |

| Exclusion reason<br>Study | Not full publication | Not eligible country | Not population of interest | Not eligible setting | Not eligible intervention | Not eligible design | Not eligible outcome |
|---|---|---|---|---|---|---|---|
| Verzantvoort, 2018[280] | X | | | | | | |
| Vitacca, 2009[281] | | | | | X | | |
| Wallace, 2002[282] | | | | X | | | |
| Warren, 2015[283] | | | | | | | X |
| Wheeler, 2015[284] | | | | | | X | |
| Wheeler, 2000[285] | X | | | | | | |
| Willson, 2003[286] | X | | | | | | |
| Wootton, 2001[287] | | | | | X | | |
| Wouters, 2016[288] | X | | | | | | |
| Youssef, 2000[289] | | | | | X | | |
| Zummo, 2015[290] | | | | X | | | |

## References to Appendix D: KQ 2 Excluded Studies


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# APPENDIX E. PEER REVIEW COMMENTS AND RESPONSE TABLE

| Question Text | Reviewer Number | Comment | Response |
|---|---|---|---|
| Are the objectives, scope, and methods for this review clearly described? | 1 | Yes | Acknowledged |
| | 3 | Yes | Acknowledged |
| Is there any indication of bias in our synthesis of the evidence? | 1 | No | Acknowledged |
| | 3 | No | Acknowledged |
| Are there any published or unpublished studies that we may have overlooked? | 1 | No | Acknowledged |
| | 3 | No | Acknowledged |
| Additional suggestions or comments can be provided below. If applicable, please indicate the page and line numbers from the draft report. | 1 | Executive Summary should be heavily revised as program partners are unlikely to have time to read the detailed report (which is well written, well organized, insightful, and solid). The Executive Summary has many typos (words that need to be pluralized, missing words, etc.) and does a somewhat poor job of melting down the main report's solid introduction to the point where I was puzzled by the points being made. (e.g., limited provider time, transportation and financial burden are NOT the only other barriers to receiving timely primary care). | Thank you, we have addressed the typos and refined the background information pulled from our main report introduction into the Executive Summary. |
| | | The purpose of triage systems is not clearly enough made in the executive summary either, though in the main report it is well explicated and logical. Technology-based systems are not explained and high-demand for services is not the crux (paragraph 1). | We have expanded on the context for this project in the Executive Summary introduction. |
| | | The executive summary is also not anchored in VA relevance other than a program office partner request -- instead, this report is extremely important to the next steps of the Office of Connected Care, which itself is linked to MISSION Act and EHRM initiatives. | We have added a description of the VA-specific policy context in the executive summary. |

| Question Text | Reviewer Number | Comment | Response |
|---|---|---|---|
| | | The key takeaway points in the summary are lost in the mix of narrative and should be brought forward to make it easier for partners to understand. For example, page 4 top lines: "Evidence suggested that local, practice-based phone triage services have higher case resolution outcomes and refer fewer patients to emergency or primary care services compared with regional/national telephone-based remote triage." This is HUGE! | Thank you, we have created bullet points to highlight the key points in the Executive Summary. |
| | | Same thing with moderate quality of evidence for not managing to decrease ED use (double negatives in sentences around lines 23-26 needs help -- I had to read them a couple of times to understand what was being said). | Thank you for this comment. We have addressed this sentence structure in the final draft. |
| | | And there is no context for the statement -- OCC is hoping/assuming/trusting that the VA telephone triage work is going to reduce PC and ED visit rates. It is implied but never stated clearly. If there's not a lot of evidence this is the case, that's again HUGE. | Thank you. We have added more context and clarity to this finding in the final report. |
| | | I don't understand the last sentence on page 4 lines 26-27 either and does not seem to be of the same value as the other findings included in the executive summary. | We have addressed the wording of this statement in the final report in order to highlight that there is limited high-quality evidence that reported on these prioritized outcomes (n=3). |
| | | In the certainty of evidence table, which is very helpful, there is a missing "to" in line 38 (0.34 fewer to 2.5 more). And there is no information to anchor readers on what ROB means, so recommend the table include not just an explanation of ROB = risk of bias but at least a broad-stroke notion of what fits in that so program partners can better understand why it is a problem/issue. Remember they may never read the report itself, so the executive summary is perhaps the most important part of this report and has to be able to stand on its own. | Thank you for this comment. We have addressed the typo in the certainty of evidence table. We have also added further information about the risk of bias rating to the executive summary under the data abstraction and quality assessment heading. |
| | | Page 5, line 13, we need to know the 11 themes. Operations partners are not going to have time to go through the rest of the report to find them (or at least give them a cross-reference to make it easy or better yet add a table here to go through them like the confidence table). | A table describing the KQ 2 11 themes has been added to the executive summary. |

| Question Text | Reviewer Number | Comment | Response |
|---|---|---|---|
| | | Do not understand the statement on page 5 line 52 around "protocols that undermine nurse clinical judgment." | Thank you, we have significantly revised the summary of KQ 2 and this sentence no longer appears in the Executive Summary. |
| | | Recommendations in the executive summary also need to be bolded or underlined or something to help them come forward (e.g., page 5, lines 43-49) so there is more of a roadmap feel here for adding value to partners trying to extract some key knowledge from the report. | We have added a structure to the KQ 2 section of the Executive Summary to highlight findings. |
| | | Page 6 reference to this as a "meticulous" review was a little off putting -- your operational partners will not know either way, and while it is my sense that the ESP team did an extraordinary job here, this self pat on the back in a summary that did not make it easy to grasp takeaways did not add value. | Thank you for your comment; we have addressed this issue in the final report. |
| | | In the Key Findings section, I really wanted to see more about the hypothesized impacts up front so contextualize what the team found (noted partly above). What does telephone triage aim to accomplish? That needs to be up front so that the frame is set for readers. | We have added more context to the Key Findings section of the discussion to ground our results. |
| | | Under applicability, page 6 line 57, should be findings (not finding) -- there are a lot of places where the grammar needs some help. | Thank you; we have addressed this typo in the final report. |
| | | I suspect given the magnitude of the tasks underlying this report that the executive summary was the last piece added, so I get that, and applaud the ESP team for an exceptional heavy lift on the report that may have contributed to less time on the summary, but I would urge the team to rework the summary, tighten the frame (what triage systems are supposed to accomplish in theory/hope)/rationale for its conduct, tighten the language/writing, and ensure that the main messages are brought forward in a clearer way through formatting or other revisions. | Acknowledged. We have addressed this in the final report. |

| Question Text | Reviewer Number | Comment | Response |
|---|---|---|---|
| | | Under research gaps, line 7 make it delivery (not deliver). Too many of these to list them all here, so needs a word-by-word read/edit up front. | Thank you, we have addressed this and similar issues in the final report. |
| | | In sum, exceptional report, solid writing of the main body of the report, anticipate that this report will have major impacts and contributions to practice and policy improvements, with the proviso that if partners really do only read the executive summary, it needs a major revision to cogently and clearly deliver its main messages/takeaways and to do the rest of the report justice | Acknowledged |
| | 3 | Tremendous amount of work went into this. Very disappointing there was not more evidence to evaluate and give policymakers more information about the effectiveness of remote triage but no negative comments about the work. It's a rigorous and comprehensive review of existing literature. | Acknowledged |
| | | Typos<br>Page 1, line 7. Do you “an uneven distribution of providers” | Thank you, this has been fixed in the final report. |

# APPENDIX F. GLOSSARY

For full study citations in this appendix, please refer to the report's main reference list.

<table>
<tr><th>Term</th><th>Definition</th></tr>
<tr><td>After-hours</td><td>Hours of operation outside of regular business hours, typically between 5:00pm and 7:00am, weekends, and business holidays; also referred to as out-of-hours.</td></tr>
<tr><td>Best practices</td><td>Processes that are accepted or proven to be most effective in optimizing positive outcomes.</td></tr>
<tr><td>Case resolution</td><td>When a remote triage telephone call is managed on the first contact without triage to other services, or when a caller is connected with the appropriate individual with only 1 call transfer.</td></tr>
<tr><td>Certainty of evidence (COE)</td><td>We assessed COE using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach[111] for 4 domains:
<table>
<tr><th>Domain</th><th>Rating</th><th>How Assessed</th></tr>
<tr><td>Risk of bias</td><td>Low<br>Unclear<br>High</td><td>Assessed primarily through study design and aggregate study quality</td></tr>
<tr><td>Consistency</td><td>Not serious inconsistency<br>Serious inconsistency<br>Very serious inconsistency</td><td>Assessed primarily through whether effect sizes are generally on the same side of “no effect,” the overall range of effect sizes, and statistical measures of heterogeneity</td></tr>
<tr><td>Directness</td><td>Not indirect<br>Serious indirectness<br>Very serious indirectness</td><td>Assessed by whether the evidence involves direct comparisons or indirect comparisons through use of surrogate outcomes or use of separate bodies of evidence</td></tr>
<tr><td>Precision</td><td>Not serious imprecision<br>Serious imprecision<br>Very serious imprecision</td><td>Based primarily on the size of the confidence intervals of effect estimates, the optimal information size and considerations of whether the confidence interval crossed a clinical decision threshold</td></tr>
</table>
Summary COE ratings for a body of evidence:<br>· High—High confidence that the true effect lies close to that of the estimate of the effect.<br>· Moderate—Moderate confidence in the effect estimate. The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.<br>· Low—Limited confidence in the effect estimate. The true effect may be substantially different from the estimate of the effect.</td></tr>
</table>

| Term | Definition |
|---|---|
| | · Very low—Very little confidence in the effect estimate. The true effect is likely to be substantially different from the estimate of effect.<br>· Insufficient—Impossible or imprudent to rate. In these situations, a rating of insufficient is assigned. |
| **Commercial deputizing service** | A service provided by a commercial external agency that has been delegated to cover care for general practitioners. |
| **General practitioner (GP)** | A general physician who provides care to a broad population without regard to specific medical specialty. Typically, GPs train and practice in the UK and similar health systems. |
| **Objective outcomes (*ie*, non–patient-reported outcomes)** | Measures that are not subject to a large degree of individual interpretation and are likely to be reliably measured across patients in a study, by different health care providers, and over time. |
| **Patient-reported outcomes** | Outcomes that are directly reported by the patient without interpretation of the patient's response by a clinician or anyone else and pertains to the patient's health, quality of life, or functional status associated with health care or treatment. |
| **Risk of bias (ROB)** | An assessment of study quality. We used the following guidance in this report.<br>(1) For all KQs, we used the Cochrane EPOC ROB tool, which is applicable to randomized and nonrandomized studies[27]:<br>· Randomization and allocation concealment<br>· Comparability of groups at baseline<br>· Blinded outcomes assessment<br>· Completeness of follow-up and differential loss to follow-up<br>· Whether incomplete data were addressed appropriately<br>· Protection against contamination<br>· Selective outcomes reporting<br>· Intervention independent from other changes (specific to interrupted time series)<br>· Intervention pre-specified (specific to interrupted time series)<br>· Intervention affect on data collection (specific to interrupted time series)<br>Summary ROB ratings for a study:<br>· Low ROB—Bias, if present, is unlikely to alter the results seriously<br>· Unclear ROB—Bias that raises some doubts about the results<br>· High ROB—Bias that may alter the results seriously<br>(2) For KQ 2, we used the Mixed Methods Appraisal Tool (MMAT) 5-item criteria to evaluate the ROB for qualitative study designs[29]<br>· Appropriate qualitative approach<br>· Adequacy of data collection methods<br>· Findings derived from the data<br>· Results supported by the data<br>Coherence between qualitative data sources, collection, analysis and interpretation<br>No summary ROB was possible for the MMAT. |

| Term | Definition |
|---|---|
| | (3) For KQ 2, we used the AMSTAR critical appraisal tool to evaluate eligible systematic review studies[30]:<br>· *A priori* design<br>· Specified eligibility criteria<br>· Appropriateness of eligibility restrictions<br>· Comprehensive literature search strategy and search terms<br>· Appropriate search strategy restrictions<br>· Selection bias avoided<br>· Duplicate study selection and data abstraction<br>· Characteristics of included studies reported<br>· Quality of included studies assessed<br>· Conclusions supported by data<br>· Conflict of interest stated<br>Summary ROB ratings for a study:<br>· Good— if present, none of the limitations are thought to decrease the validity of the conclusions<br>· Fair—some uncertainty about the validity of the conclusions<br>· Poor— serious uncertainty about the validity of the conclusions |
| **Standardized mean difference (SMD)** | The difference in outcomes between the intervention and comparator, divided by the pooled standard deviation. |