

Effect of requiring a general practitioner at scenes of serious injury: a systematic review

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Short title: Requiring a GP at scenes of injury

Word count: 1993 excl. references and illustrations. Abstract word count: 225 words.

Conflict of interest: The authors declare no conflicts of interest

Abstract

Background:

In Norway, each municipality is responsible for providing first line emergency healthcare, and it is mandatory to have a primary care physician/general practitioner on call continuously. This mandate ensures a physician can assist patients and ambulance personnel at the site of severe injuries or illnesses. The compulsory presence of the general practitioner at the scene could affect different parts of patient treatment, and it might save resources by obviating resources from secondary health care, like prehospital anaesthesiologists and other specialised resources. This systematic review aimed to examine how survival, time spent at the scene, the choice of transport destination, assessment of urgency, the number of admissions, and the number of cancellations of specialized prehospital resources were affected by the presence of a general practitioner at the scene of a suspected severe injury.

Methods:

We searched for published and planned systematic reviews and primary studies in the Cochrane Library, Medline, Embase, OpenGrey, GreyLit and trial registries. The search was completed in December 2017. Two individuals independently screened the references and assessed the eligibility of all potentially relevant studies.

Results:

The search for systematic reviews and primary studies identified 5981 articles. However, no studies met the predefined inclusion criteria.

Conclusion:

No studies met our inclusion criteria; consequently, it remains uncertain how the presence of a general practitioner at the injury scene might affect the selected outcomes.

Background

In Norway, each municipality is responsible for providing first line emergency healthcare, and it is mandatory to have a general practitioner (GP) on call continuously.¹ The term general practitioner designates specialists in or physicians training to become family medicine specialist. In an emergency, the GP is notified by the emergency dispatch centre; at the scene, the GP assists the patient and the ambulance personnel. However, the GP may decide to hand over the management of some situations to the ambulance or pre-hospital specialist personnel (such as an anaesthesiologist), when it is considered appropriate. This GP is responsible for medical follow-up and treatment for all inhabitants and visitors of the municipality, and the GP decides whether the patient should be cared for by a hospital or primary healthcare service. Ambulances and specialized prehospital health care, like helicopters and ambulance airplanes, are managed from the secondary (hospital) health care level, by Regional Health Care Trusts.

Compulsory presence of the GP at the scene of injuries is unique in Europe. This practice could affect different parts of patient treatment, because the GP may be more qualified than emergency personnel for assessing how and where the patient should be treated. An expert assessment on the scene might save resources by obviating secondary health care resources, like prehospital anaesthesiologists and other intensive care specialists. On the other hand, it might also prolong the time spent at the scene, and the GP might initiate procedures that are deemed unnecessary afterwards. Recent studies conducted in Norway have investigated different aspects of the mandate of compelling GP presence at the scene of injuries, like road traffic injuries and work-place injuries. However, to our knowledge, no conclusive evidence has demonstrated the benefits or harm caused by this investment in GP time.²⁻⁵

The purpose of this systematic review was to examine how survival, time spent at the accident scene, choice of transport destination, assessment of urgency, the number of admissions, and the number of cancellations of specialized prehospital resources were affected by the presence of a

GP at the scene of a suspected severe injury. We considered it appropriate to investigate the effect of the presence of the GP, irrespective of which other personnel were present.

This systematic review was originally commissioned by the Norwegian National Advisory Unit on Trauma, and preliminary results were presented in a report in June 2017.⁶

Methods

This systematic review utilised systematic, transparent methods.⁷

We identified studies that investigated the effect of sending a GP to accident scenes. We included experimental trials, with or without randomisation; controlled before-and-after studies; interrupted time series studies; and repeated-measures studies. All studies had at least three data points before and three after the introduction of the intervention. For inclusion, studies had to meet the following criteria:

Population: Individuals with a suspected severe injury

Intervention: GP present at the scene of a suspected severe injury

Comparison: No GP present at the scene of a suspected severe injury

Outcome: Survival, time spent at the scene, the choice of transport destination, assessment of urgency, the number of admissions, or the number of cancellations of specialised ambulance services.

Study setting

Our objective was to evaluate the effect of sending a GP to the injury scene compared to sending only ambulance personnel and/or a specialized prehospital resource, like an anaesthesiologist (no GP at the accident scene).

In Norway, the GP on call in a given municipality is notified by the emergency dispatch centre in cases of suspected severe injury or illness, determined based on the Norwegian Index for Medical Emergency Assistance.⁸ The GPs are free to use their own discretion in deciding whether to participate in the ambulance mission and assist at the scene of injury; they make this decision, either on their own or after consulting with the ambulance personnel.

We planned to group all studies according to the skills of ambulance staff and the equipment present in the ambulance. We excluded studies that included physicians that were not GPs, but had a specialist background in advanced interventions (such as anaesthesiologist). Moreover, when specialized services are dispatched, procedures beyond the GP's capabilities are often performed; those procedures were not investigated in the present study.

Literature search

Before searching for primary studies, we conducted a thorough search for systematic reviews that had been published, were ongoing, or were planned in the five years prior to June 2016. This search included all relevant published systematic reviews in the Cochrane Database of Systematic Reviews, the Centre for Reviews and Dissemination, the Database of Abstracts of Reviews of Effect, the Health Technology Assessment Database, Medline, and Embase. We also searched for planned or ongoing systematic reviews in the Cochrane Database of Systematic Reviews, PROSPERO, and the POP database. We found no systematic reviews that met our inclusion criteria.

In December 2017, we searched for published primary studies in the Cochrane Central Register of Controlled Trials, Medline, and Embase. We also searched for ongoing studies in ClinicalTrials.gov and the WHO International Clinical Trials Registry Platform (ICTRP). We searched for grey literature in OpenGrey and GreyLit. In addition, we screened reference lists in selected studies. The complete list of search strategies is shown in Appendix 1.

Two individuals independently collected titles and abstracts from the search results, and two individuals read all potentially relevant articles in full text.

We planned that two individuals would independently assess the risk of bias in the included studies. The risk of bias was to be assessed with the Suggested Risk of Bias criteria for EPOC reviews.⁹ We also planned that the project manager would extract information from the studies and consider the quality of the documentation; then, one other individual would double check the quality assessments. The quality of documentation was to be assessed with GRADE¹⁰.

Results

The search for systematic reviews identified 1302 references. None of those articles fulfilled our inclusion criteria. The search for primary studies identified 4653 references. Of those, 47 were potentially relevant (Figure 1), and we examined the full text.¹¹⁻⁵⁷ However, none fulfilled our inclusion criteria. Finally, no studies were included from the search of ongoing studies.

Reasons for exclusion

Overall, we excluded 4679 papers, and of these, we assessed the full text of 47. Five studies were excluded because they did not meet the criteria for the target population. 26 studies were excluded because they did not meet the criteria for the intervention. 16 studies were excluded because they did not meet the inclusion criteria for the study design. The reasons for excluding these studies are listed in Table 1. Some of the studies that are marked with another study design as exclusion criteria are not empirical studies, but rather commentary articles.

Discussion

We employed systematic, transparent methods, but we could not identify any relevant studies for assessing the effects of mandating the presence of a GP at the scene of a suspected severe injury. The most common reasons for exclusion were: (1) the study did not investigate the effect of a medical practitioner (i.e., a GP) sent to the scene of injury; and (2) the study was conducted with a design that was not suitable for assessing the effect. Many studies assessed doctors with different competences compared to a Norwegian GP. Those physicians often had different skills and specialist education, which provided the ability to perform procedures that Norwegian GPs do not typically perform; for example, endotracheal intubation.

Furthermore, we excluded studies because they did not meet our requirements for the study design. Most studies took advantage of natural study groups, where the measure (i.e., the emergency medical practitioner) was not determined before the study. In several instances,

there was no historical control, i.e., where one period that included GP activity was compared to another period without a GP. One major risk of those studies was that the comparison might be inappropriate or misleading. Indeed, in many contexts, the GP is only sent to events that are suspected to be particularly serious. In the absence of good controls over time (interrupted time series) or between places, even with otherwise comparable populations (experimental studies), the results may indicate that the GPs provided worse treatment than the ambulance staff. However, in that type of comparison, the difference would not be due to differences between interventions, but due to differences in the severity of patient conditions.

The Norwegian society invests substantial resources into emergency care. This care includes highly trained ambulance personnel, access to specialised care (such as emergency services by air), and a GP on call at all times. Currently, there is no available evidence on the effect of requiring a GP present at the scene of a suspected severe injury. Consequently, decisions about the organisation of emergency care currently rest on the remaining pillars of evidence, which are based on practical or clinical expertise, and on patient values and preferences.

Unfortunately, when Norwegian regulations set such a specific standard as to who should be called out, it leaves little room to consider all the aspects of evidence based medicine, and for the different municipalities to make full use of available resources.

We hope that by revealing this uncertainty about the evidence, researchers and those who fund research will see this as an opportunity for new research initiatives that aim to bridge this knowledge gap. If possible, the effects of requiring the presence of a GP at the injury scene should be evaluated with randomised trials or other experimental or observational studies that include appropriate comparison groups. Due to the regulations, it would be difficult to conduct new studies in a Norwegian setting. Still, international studies can be included in a future update of this systematic review and then inform the Norwegian practice.

In the meantime, Norwegian authorities could be asked to clarify what their decision is based on when the effects on the presented outcomes are unknown.

Strengths and weaknesses

The strengths of this study were that we used systematic and explicit methods in the preparation of this systematic overview. We performed an extensive search in relevant databases and reviewed reference lists of existing review articles.^{12,58} In research endeavours that evaluate how to best organize health services, it is often difficult or impossible to carry out randomised controlled studies. Against this background, we considered it appropriate to include other types of controlled studies, based on recommendations on the inclusion of study design provided by the Cochrane Effective Practice and Organization of Care Group (EPOC).⁵⁹ Our literature search was terminated in December 2017. At that time, we did not identify any ongoing studies that aimed to investigate our question of interest.

The main limitation of this study was that, despite our extensive search, we may have missed relevant studies. When searching for systematic reviews regarding organizational topics, it is often difficult to find meaningful search terms that emphasize exactly what aspects we are looking for without having to read through an overwhelmingly amount of irrelevant references. In this case we searched quite wide for physicians, and we depended on the full-text to disclose exactly what competence and role the different physicians had. By searching for systematic reviews and grey literature we tried to broaden the approach to the literature on this topic.

The major issue in this systematic review was that it was difficult to make sure that the physician in the intervention played a similar role compared to the Norwegian GP in charge of first line emergency healthcare.

Conclusion

We performed a thorough review of the literature to identify published and planned studies that investigated the impact of mandating the presence of a GP at the scene of a suspected serious injury. We intended to evaluate the effects on survival, time spent at the scene of injury, choice of place of transport, rate of assessment, the number of admissions, and the number of

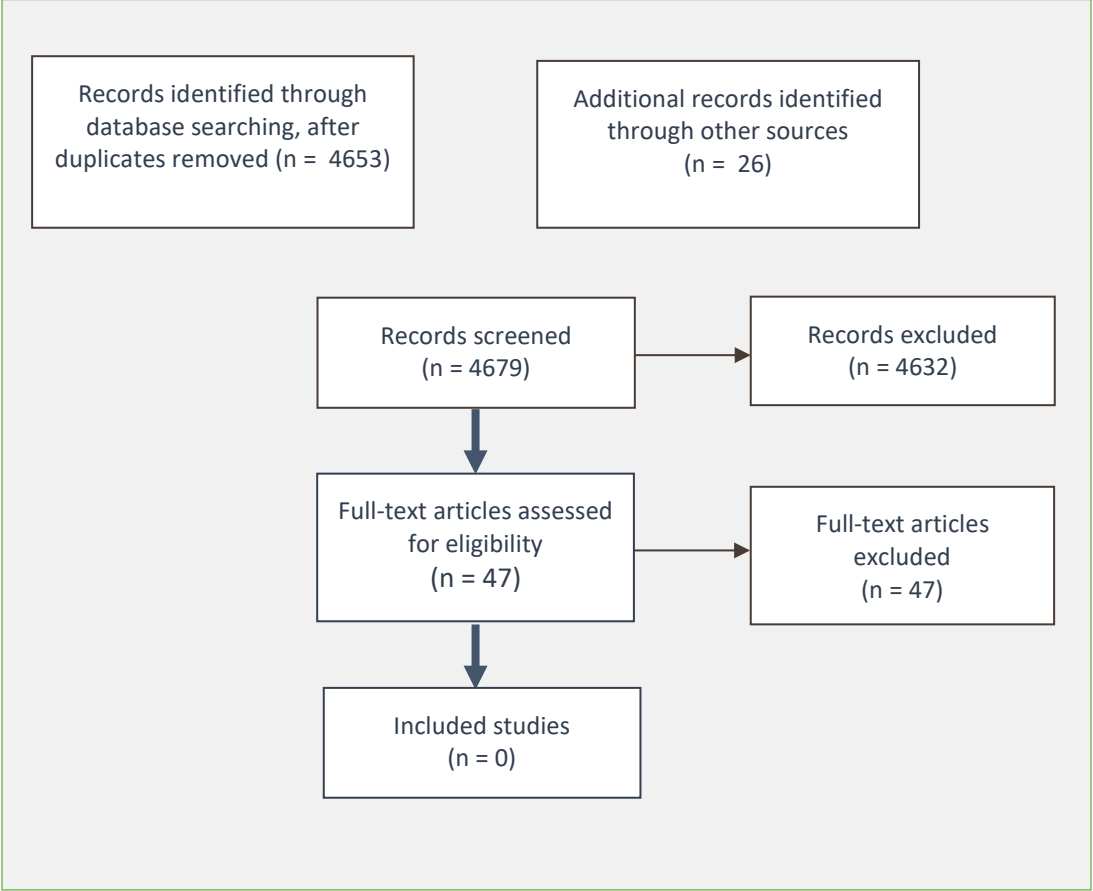
cancellations of support from specialist health care (personnel with intensive skills). We found no studies that met our inclusion criteria. Consequently, the effects of requiring the presence of a GP at the injury scene remain uncertain.

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Study Reason for exclusion

Applebaum D11 Another intervention.
Botker MT12 Another study design.
Brandstorp H13 Another study design.
Bullock KA14 Another study design.
Cameron S15 Another intervention.
Carrier E16 Another study design.
Christensen EF17 Another intervention.
Di Bartolomeo S18 Another intervention.
Di Bartolomeo S19 Another intervention.
Dickinson ET20 Another population.
Easton KC21 Another study design.
Elkis IS22 Another study design.
Evans R 23 Another intervention.
Flores-Mateo G24 Another intervention.
Frandsen F25 Another population.
Frankema SP26 Another intervention.
Garner A27 Another intervention.
Garner AA28 Another intervention.
Gerard WA29 Another study design.
Graf M30 Another intervention.
Grange JT31 Another intervention.
Hamman BL32 Another intervention.
Hogan C33 Another study design.
Hotvedt R34 Another study design.
Iirola TT35 Another intervention.
Lechleuthner A36 Another intervention.
Lee A37 Another intervention.
Lieberman M38 Another intervention.
Mitchell RG39 Another population.
Nardi G40 Another intervention.
Nicholl JP41 Another intervention.
Olesen F42 Another study design.
Oppe S43 Another intervention.
Osterwalder JJ44 Another intervention.
Pacy H45 Another study design.
Reith MW46 Another study design.
Ringburg AN47 Another intervention.
Roudsari BS48 Another study design.
Schmidt U49 Another intervention.
Schwartz RJ50 Another intervention.
Sipria A51 Another intervention.
Soo LH52 Another population.
Suominen P53 Another intervention.
Villarreal M54 Another population.

Wilson SL55 Another intervention.

Zakariassen E (2010)56 Another study design.

Zakariassen E (2016)57 Another study design.

Search for systematic reviews

Database: Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R)
Daily and Ovid MEDLINE(R) 1946 to Present

Search date: 2016-06-17

- 1 general practitioners/ or physicians, family/ or physicians, primary care/ (22066)
- 2 Primary Health Care/ (60804)
- 3 Physician's Role/ (27606)
- 4 (general pract* or family pract* or primary care or primary health* or family doctor* or family physic* or gp or gps).ti,ab. (206391)
- 5 or/1-4 (253869)
- 6 allied health personnel/ or emergency medical technicians/ or exp Emergency Treatment/ or Traumatology/ (118798)
- 7 (paramedic* or ambulanc*).ti,ab. (13431)
- 8 ((emergenc* or trauma* or pre hospital or prehospital) adj3 (practi* or doctor* or crew* or staff or team* or personnel* or physic*).ti,ab. (20716)
- 9 ((accident* or acute or critical* or sever* or emergenc* or trauma*) adj8 (scene or site*).ti,ab. (37792)
- 10 (early management adj3 trauma*).ti,ab. (81)
- 11 red response*.ti,ab. (48)
- 12 response team*.ti,ab. (889)
- 13 ((critical* or sever*) adj2 (trauma* or injur* or wound*).ti,ab. (45869)
- 14 or/6-13 (223338)
- 15 5 and 14 (4706)
- 16 limit 15 to (yr="2011 -Current" and "reviews (maximizes sensitivity)") (455)

Database: Embase 1974 to 2016 June 16

Search date: 2016-06-17

- 1 *general practitioner/ (17259)
- 2 exp *primary health care/ (46422)
- 3 (general pract* or family pract* or primary care or primary health* or family doctor* or family physic* or gp or gps).ti,ab. (261412)
- 4 or/1-3 (274920)
- 5 *paramedical personnel/ or *paramedical profession/ (7004)
- 6 *emergency health service/ (40844)
- 7 *emergency care/ (8410)
- 8 *emergency treatment/ (5115)
- 9 *traumatology/ (5460)
- 10 exp *ambulance/ (3763)
- 11 (paramedic* or ambulanc*).ti,ab. (18620)
- 12 ((emergenc* or trauma* or pre hospital or prehospital) adj3 (practi* or doctor* or crew* or staff or team* or personnel* or physic*).ti,ab. (29036)
- 13 ((accident* or acute or critical* or sever* or emergenc* or trauma*) adj8 (scene or site*).ti,ab. (45759)
- 14 (early management adj3 trauma*).ti,ab. (89)
- 15 red response*.ti,ab. (46)

- 16 response team*.ti,ab. (1318)
- 17 ((critical* or sever*) adj2 (trauma* or injur* or wound*)):ti,ab. (56491)
- 18 or/5-17 (200700)
- 19 4 and 18 (5615)
- 20 limit 19 to ("reviews (maximizes sensitivity)" and yr="2011 -Current") (1012)

Database: CDSR

Search date: 2016-06-17

- #1 MeSH descriptor: [General Practitioners] explode all trees 145
- #2 MeSH descriptor: [Physicians, Family] explode all trees 475
- #3 MeSH descriptor: [Physicians, Primary Care] explode all trees 103
- #4 MeSH descriptor: [Primary Health Care] explode all trees 5831
- #5 MeSH descriptor: [Physician's Role] explode all trees 201
- #6 ((general next pract*) or (family next pract*) or (primary next care) or (primary next health*) or (family next doctor*) or (family next physic*) or gp or gps):ti,ab,kw 18501
- #7 #1 or #2 or #3 or #4 or #5 or #6 20581
- #8 MeSH descriptor: [Allied Health Personnel] explode all trees 927
- #9 MeSH descriptor: [Emergency Medical Technicians] explode all trees 138
- #10 MeSH descriptor: [Emergency Treatment] explode all trees 4552
- #11 MeSH descriptor: [Traumatology] explode all trees 33
- #12 (paramedic* or ambulanc*):ti,ab,kw 894
- #13 ((emergenc* or trauma* or "pre hospital" or prehospital) near/3 (practi* or doctor* or crew* or staff or team* or personnel* or physic*)):ti,ab,kw 1086
- #14 ((accident* or acute or critical* or sever* or emergenc* or trauma*) near/8 (scene or site*)):ti,ab,kw 1174
- #15 ("early management") near/3 trauma*):ti,ab,kw 0
- #16 (red next response*):ti,ab,kw 0
- #17 (response next team*):ti,ab,kw 33
- #18 ((critical* or sever*) near/2 (trauma* or injur* or wound*)):ti,ab,kw 2693
- #19 #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 10802
- #20 #7 and #19 Publication Year from 2011 to 2016, in Cochrane Reviews (Reviews only) 20

Database: DARE, HTA, CDSR (Protocols only)

Search date: 2016-06-17

- #1 MeSH descriptor: [General Practitioners] explode all trees 145
- #2 MeSH descriptor: [Physicians, Family] explode all trees 475
- #3 MeSH descriptor: [Physicians, Primary Care] explode all trees 103
- #4 MeSH descriptor: [Primary Health Care] explode all trees 5831
- #5 MeSH descriptor: [Physician's Role] explode all trees 201
- #6 ((general next pract*) or (family next pract*) or (primary next care) or (primary next health*) or (family next doctor*) or (family next physic*) or gp or gps) 31052
- #7 #1 or #2 or #3 or #4 or #5 or #6 33002
- #8 MeSH descriptor: [Allied Health Personnel] explode all trees 927
- #9 MeSH descriptor: [Emergency Medical Technicians] explode all trees 138
- #10 MeSH descriptor: [Emergency Treatment] explode all trees 4552

- #11 MeSH descriptor: [Traumatology] explode all trees 33
- #12 (paramedic* or ambulanc*) 1232
- #13 ((emergenc* or trauma* or "pre hospital" or prehospital) near/3 (practi* or doctor* or crew* or staff or team* or personnel* or physic*)) 1590
- #14 ((accident* or acute or critical* or sever* or emergenc* or trauma*) near/8 (scene or site*)) 1615
- #15 ("early management") near/3 trauma*) 2
- #16 (red next response*) 0
- #17 (response next team*) 45
- #18 ((critical* or sever*) near/2 (trauma* or injur* or wound*)) 3193
- #19 #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 1998
- #20 #7 and #19 Publication Year from 2011 to 2016, in Cochrane Reviews (Protocols only), Other Reviews and Technology Assessments 46

Search for primary studies

Database: Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) <1946 to Present

Search date: 2017-12-18

- 1 general practitioners/ or physicians, family/ or physicians, primary care/ (25527)
- 2 Primary Health Care/ (71215)
- 3 Physician's Role/ (29832)
- 4 (general pract* or family pract* or primary care or primary health* or family doctor* or family physic* or rural practitioner* or gp or gps).ti,ab. (241246)
- 5 or/1-4 (292744)
- 6 allied health personnel/ or emergency medical technicians/ or exp Emergency Treatment/ or Traumatology/ (133967)
- 7 (paramedic* or ambulanc*).ti,ab. (15600)
- 8 ((emergenc* or trauma* or pre hospital or prehospital) adj3 (practi* or doctor* or crew* or staff or team* or personnel* or physic*).ti,ab. (25044)
- 9 ((accident* or acute or critical* or sever* or emergenc* or trauma*) adj8 (scene or site*).ti,ab. (43815)
- 10 (early management adj3 trauma*).ti,ab. (92)
- 11 red response*.ti,ab. (52)
- 12 response team*.ti,ab. (1170)
- 13 ((critical* or sever*) adj2 (trauma* or injur* or wound*).ti,ab. (54209)
- 14 or/6-13 (257048)
- 15 5 and 14 (5400)
- 16 ((rural or pre-hospital or prehospital) adj practitioner*).ti,ab,kw. (225)
- 17 or/15-16 (5611)
- 18 non-randomized controlled trials as topic/ or interrupted time series analysis/ or controlled before-after studies/ or (randomized controlled trial or controlled clinical trial or multicenter study or pragmatic clinical trial).pt. or ((randomis* or randomiz* or randomly).ti,ab. or groups.ab. or (trial or multicenter or multi center or multicentre or multi centre).ti. or (intervention? or effect? or impact? or controlled or control group? or compared or (before adj5

after) or (pre adj5 post) or ((pretest or pre test) and (posttest or post test)) or quasiexperiment* or quasi experiment* or pseudo experiment* or pseudoexperiment* or evaluat* or time series or time point? or repeated measur*).ti,ab.) (11222799)
19 17 and 18 (2582)

Database: Embase <1980 to 2017 Week 51>

Search date: 2017-12-18

- 1 *general practitioner/ (18647)
- 2 exp *primary health care/ (51191)
- 3 (general pract* or family pract* or primary care or primary health* or family doctor* or family physic* or rural practitioner* or gp or gps).ti,ab. (284843)
- 4 or/1-3 (298497)
- 5 *paramedical personnel/ or *paramedical profession/ (6693)
- 6 *emergency health service/ (42139)
- 7 *emergency care/ (10781)
- 8 *emergency treatment/ (5405)
- 9 *traumatology/ (5299)
- 10 exp *ambulance/ (3618)
- 11 (paramedic* or ambulanc*).ti,ab. (20205)
- 12 ((emergenc* or trauma* or pre hospital or prehospital) adj3 (practi* or doctor* or crew* or staff or team* or personnel* or physic*).ti,ab. (33046)
- 13 ((accident* or acute or critical* or sever* or emergenc* or trauma*) adj8 (scene or site*).ti,ab. (49545)
- 14 (early management adj3 trauma*).ti,ab. (95)
- 15 red response*.ti,ab. (50)
- 16 response team*.ti,ab. (1668)
- 17 ((critical* or sever*) adj2 (trauma* or injur* or wound*).ti,ab. (62726)
- 18 or/5-17 (218354)
- 19 4 and 18 (6158)
- 20 ((rural or pre-hospital or prehospital) adj practitioner*).ti,ab,kw. (222)
- 21 or/19-20 (6365)
- 22 random:.tw. or clinical trial:.mp. or exp health care quality/ or Randomized controlled trial/ or Quasi Experimental Study/ or Pretest Posttest Control Group Design/ or Time Series Analysis/ or Experimental Design/ or Multicenter Study/ or (effect or impact or trial or intervention).ti. or (pre-post or "pre test*" or pretest* or posttest* or "post test*" or (pre adj5 post)).ti,ab. or ("quasi-experiment*" or quasiexperiment* or "quasi random*" or quasirandom* or "quasi control*" or quasicontrol* or ((quasi* or experimental) adj3 (method* or study or trial or design* or controlled))).ti,ab,hw. or ("time series" or "time points").ti,ab,hw. or repeated measure*.ti,ab. or ((before adj5 after) or control group*).ti,ab. or (pretest-posttest study or pretesting or pre-post tests or quasi experimental design or quasi experimental study or quasi experimental study design or repeated measurement or repeated measurements or repeated measures or time series).kw. (6322764)
- 23 21 and 22 (2805)

Database: Central

Search date: 2017-12-18

- #1 MeSH descriptor: [General Practitioners] explode all trees 198
- #2 MeSH descriptor: [Physicians, Family] explode all trees 485
- #3 MeSH descriptor: [Physicians, Primary Care] explode all trees 135
- #4 MeSH descriptor: [Primary Health Care] explode all trees 7071
- #5 MeSH descriptor: [Physician's Role] explode all trees 210
- #6 ((general next pract*) or (family next pract*) or (primary next care) or (primary next health*) or (family next doctor*) or (family next physic*) or (rural next practitioner*) or gp or gps) 35487
- #7 #1 or #2 or #3 or #4 or #5 or #6 38124
- #8 MeSH descriptor: [Allied Health Personnel] explode all trees 1034
- #9 MeSH descriptor: [Emergency Medical Technicians] explode all trees 155
- #10 MeSH descriptor: [Emergency Treatment] explode all trees 5088
- #11 MeSH descriptor: [Traumatology] explode all trees 38
- #12 (paramedic* or ambulanc*) 1516
- #13 ((emergenc* or trauma* or "pre hospital" or prehospital) near/3 (practi* or doctor* or crew* or staff or team* or personnel* or physic*)) 2322
- #14 ((accident* or acute or critical* or sever* or emergenc* or trauma*) near/8 (scene or site*)) 2016
- #15 ("early management") near/3 trauma*) 3
- #16 (red next response*) 1
- #17 (response next team*) 86
- #18 ((critical* or sever*) near/2 (trauma* or injur* or wound*)) 3193
- #19 #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 14515
- #20 #7 and #19 1265
- #21 ((rural or pre-hospital or prehospital) next practitioner*) 6
- #22 #20 or #21 in Trials 516

Database: clincialtrials.gov

Search date: 2017-12-18

("general practitioner" OR "rural practitioner" OR gp) AND (accident* OR trauma): 52

Database: WHO ICTRP

Search date: 2017-12-18

General practitioner AND accident* : 9

General practitioner AND trauma* : 3

Rural practitioner : 0

Gp AND trauma* : 11

Gp and accident* : 12

Database: GreyLit

Search date: 2018-04-24

General practitioner accident : 1

General practitioner trauma : 0

Rural practitioner: 2

Gp trauma: 0
Gp accident: 0

Database: OpenGrey
Search date: 2018-04-24
General practitioner accident : 9
General practitioner trauma : 2
Rural practitioner : 28
Gp trauma : 3
Gp accident : 9