

# Chapter 17 GPs within or on the same site as emergency departments

Emergency and acute medical care in over 16s: service delivery and organisation

*NICE guideline 94*

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Chapter 17 GPs within or on the same site as emergency departments

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# 17 GPs within or on the same site as the Emergency Department

## 17.1 Introduction

Emergency departments (ED) continue to be under pressure and are experiencing greater volumes of patients, and increasing difficulties meeting targets. Around 11% of people who attend ED are discharged without requiring treatment, and a further 38% receive guidance or advice only.<sup>26</sup> It has been suggested that a significant proportion of patients presenting to ED could have been instead treated in primary care. Why this group of patients present to ED instead of their usual General Practitioner could be due to many reasons<sup>18</sup> including:

- Complex GP appointment systems and lack of GP appointment availability;
- Inconvenience of appointment offered;
- Perception that primary care is unable to deal with urgent problems
- Location of services;
- Inappropriate referral from signposting services (such as 111);
- Lack of understanding of the local health economy.

The Next steps on the NHS Five Year Forward view<sup>21</sup> states that every ED must put ‘comprehensive front-door clinical streaming’ in place by October 2017, one option of which includes GP streaming. The aim is to give ED more time to care for the sickest patients, including older people.

This review question seeks to explore whether the utilisation of a General practitioner within an emergency department, or closely located unit, could have a positive impact on clinical outcomes, and resource utilisation; as well as whether it could provide a cost effective solution to freeing up ED resource to treat more critically unwell patients presenting with an acute medical emergency.

## 17.2 Review question: Does the presence of GPs within or on the same site as the ED reduce the demand on ED and/or improve outcomes?

For full details see review protocol in Appendix A.

**Table 1: PICO characteristics of review question**

<b>Population</b>	Adults and young people (16 years and over) presenting to an emergency department with a suspected or confirmed acute medical emergency.
<b>Intervention</b>	Co-located GP led unit. GPs working within the ED.
<b>Comparison</b>	No GP led unit. No GPs working within the ED. Neither GP led unit or GPs working within the ED. Patients seen by ED staff.
<b>Outcomes</b>	Mortality (CRITICAL) Quality-of-life (CRITICAL) Patient and/or carer satisfaction (CRITICAL) Time to admission/discharge (number meeting A&E 4 hour waiting target) (process measure) (CRITICAL) Avoidable adverse events (including misdiagnosis) (CRITICAL) Diagnostic investigations (IMPORTANT)

	Readmission up to 30 days (IMPORTANT) Hospital admissions (IMPORTANT) ED demand (reduction in number presenting to ED) (IMPORTANT) Staff satisfaction (IMPORTANT)
<b>Study design</b>	Systematic reviews (SRs) of RCTs, RCTs, observational studies only to be included if no relevant SRs or RCTs are identified.

## 17.3 Clinical evidence

Two non-randomised studies were included in the review;<sup>6-8,32</sup> these are summarised in Table 2 below. Evidence from these studies is summarised in the clinical evidence summary below (Table 3). See also the study selection flow chart in Appendix B, study evidence tables in Appendix D, forest plots in Appendix C, GRADE tables in Appendix F and excluded studies list in Appendix G.

**Table 2: Summary of studies included in the review**

Study	Intervention and comparison	Population	Outcomes	Comments
Dale 1995 <sup>6-8</sup>  UK  Non-randomised study	GPs working within the ED.  Versus  Patients seen by ED staff. The medical staffing consisted of 9 senior house officers, 2 registrars, a senior registrar and a consultant.	n=4641  'Primary care' patients – self-referred, non-emergency problems that could have been managed in an 'average local general practice'.	Diagnostic investigations. Patient and/or carer satisfaction with assessment.  Patient and/or carer satisfaction with treatment.  Patient and/or carer satisfaction with doctor's manner.	Indirect population.  Three papers reporting on 1 study.  Satisfaction outcomes were based on a subsample of 567 patients measured 7-10 days after patients' visit.
Ward 1996 <sup>32</sup>  UK  Non-randomised study	GPs working within the ED.  Versus  Patients seen by ED staff.  The study reports that 'a triage decision' and a list of appropriate primary care conditions were compiled by the A&E sister and the 2 A&E consultants. For example, minor injuries considered less likely to require x-ray were triaged 'minor B/primary care' while those	n=970  Patients triaged 'minor B/primary care' – those who were considered to require minimal nursing, investigation and treatment before discharge and for whom a delay of several hours would not be detrimental to their condition.	Diagnostic investigations.	Indirect population.

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Study	Intervention and comparison	Population	Outcomes	Comments
	thought more likely to need investigation were triaged 'minor B' to be seen by A&E doctors who are more experienced in the interpretation of x-rays.			

**Table 3: Clinical evidence summary: GPs working within the ED versus patients seen by ED staff**

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with ED staff	Risk difference with GPs working within the ED (95% CI)
Diagnostic investigations (number of diagnostic investigations)	5601 (2 studies)	⊕⊖⊖⊖ VERY LOW <sup>a,b</sup> due to risk of bias, indirectness	RR 0.45 (0.41 to 0.5)	Moderate	
				340 per 1000	187 fewer per 1000 (from 170 fewer to 201 fewer)
Satisfaction with assessment (5 point Likert scale)	562 (1 study) 7-10 days	⊕⊖⊖⊖ VERY LOW <sup>a,b,c</sup> due to risk of bias, indirectness	RR 0.99 (0.9 to 1.09)	Moderate	
				768 per 1000	8 fewer per 1000 (from 77 fewer to 69 more)
Satisfaction with treatment (5 point Likert scale)	557 (1 study) 7-10 days	⊕⊖⊖⊖ VERY LOW <sup>a,b,c</sup> due to risk of bias, indirectness	RR 0.97 (0.88 to 1.07)	Moderate	
				759 per 1000	23 fewer per 1000 (from 91 fewer to 53 more)
Satisfaction with doctor's manner (5 point Likert scale)	492 (1 study) 7-10 days	⊕⊖⊖⊖ VERY LOW <sup>a,b,c</sup> due to risk of bias, indirectness	RR 1.03 (0.97 to 1.1)	Moderate	
				871 per 1000	26 more per 1000 (from 26 fewer to 87 more)
					-

(a) All non-randomised studies automatically downgraded due to selection bias. Studies may be further downgraded by 1 increment if other factors suggest additional high risk of bias, or 2 increments if other factors suggest additional very high risk of bias

(b) Downgraded by 1 increment because majority of evidence included an indirect population, and downgraded by 2 increments if the majority of the evidence included a very indirect population (patients presented with problems that could be treated in a primary care setting and therefore did not have a suspected or confirmed acute medical emergency –1 increment).

(c) Downgraded by 1 increment because majority of evidence had indirect outcomes, and downgraded by 2 increments if the majority of the evidence had very indirect outcomes (patient satisfaction with only 1 aspect of their experience –1 increment).

## 17.4 Economic evidence

### Published literature

No applicable economic evaluations were identified. One study was excluded because non-UK studies were not allowed in the review protocol.<sup>2</sup>

The economic article selection protocol and flow chart for the whole guideline can be found in the guideline's Appendix 41A and Appendix 41B.

In the absence of health economic evidence, unit costs were presented to the guideline committee – see Chapter 41 Appendix I.

## 17.5 Evidence statements

### Clinical

- Two studies comprising 5601 people evaluated the presence of GPs within or on the same site as the ED to reduce the demand on ED and/or improve outcomes in adults and young people at risk of an AME, or with a suspected or confirmed AME. The evidence suggested that GPs working within the ED may provide a benefit in reduced number of diagnostic investigations (2 studies, very low quality). However, the evidence suggested there was no effect on satisfaction with assessment, satisfaction with treatment or satisfaction with doctor's manner (1 study, very low quality).

### Economic

- No relevant economic evaluations were identified.

## 17.6 Recommendations and link to evidence

<b>Recommendation</b>	-
<b>Research recommendations</b>	<b>RR9. What is the clinical and cost effectiveness of having GPs within or adjoining emergency departments?</b>
Relative values of different outcomes	<p>Mortality, quality of life, patient and/or carer satisfaction, avoidable adverse events (including misdiagnosis) and time to admission/discharge (number meeting the ED 4-hour waiting time target) were considered by the committee to be critical outcomes.</p> <p>Diagnostic investigations, readmission, hospital admissions, ED demand (reduction in number presenting to ED) and staff satisfaction were considered by the committee to be important outcomes.</p>
Trade-off between benefits and harms	<p>No evidence was found for co-located GP-led units.</p> <p>Two studies on GPs working within the ED were considered in the review. The evidence suggested that GPs working within the ED may provide a benefit in reduced number of diagnostic investigations. However, the evidence suggested there was no effect on patient and/or carer satisfaction with assessment, satisfaction with treatment, and satisfaction with doctor's manner. No evidence was found for mortality, quality of life, time to admission/discharge, avoidable adverse events, readmission, hospital admissions, staff satisfaction or ED demand.</p> <p>The committee noted a shift in standard practice since 1995/1996, when the studies were published. A greater proportion of care is now directed and delivered by consultants rather than trainees, so comparisons may differ. It was noted that the expertise of GPs is different to that of an ED consultant. GPs in general have knowledge of the whole health system with a relevance to what can be delivered in the community, tolerance of appreciable risk and understanding of chronic disease management in the community.</p> <p>GPs may add value to EDs in a number of ways: through their knowledge of community-based services, their expertise in evaluating early-stage disease and managing uncertainty. GP-led units contiguous with EDs could help meet the ambition of 7-day services for extended-hours access to GPs. However, the exact location of GP services needs to be considered. The drive to increase access to GP services (practices trialling Saturday and Sunday working) may negate the need for a presence in the ED. The predicted shortfall in GP numbers by the Royal College of General Practitioners (RCGP) by 2020 may also make it difficult to provide the manpower for both services, thus the appropriate use of resources is paramount.</p> <p>The evidence suggested that GPs working within the ED ordered fewer diagnostic investigations. Although this indicated that resources may be used more efficiently and there may be further benefit to patient safety in terms of reduced radiation, the comparison in some cases was with ED junior doctors and thus may not be true of comparison with ED consultants. Even if the reduction in diagnostic tests was found to persist, the committee did not consider this benefit alone to be sufficient to justify a recommendation.</p> <p>Given the limited evidence, the committee decided not to make a recommendation for GPs to work within or on the same site as the ED. The committee noted that further research would be needed in order to make a definitive recommendation. The committee was aware that research on this topic had been funded by NIHR and hoped that these would inform an update to the guideline.</p>
Trade-off between net effects and costs	<p>The review focused on UK studies, no studies were included but an excluded before and after study from the Netherlands showed savings of €71 per patient<sup>2</sup>. One paper found in the review conducted a cost analysis in the UK however, was excluded as it was conducted before 1995 and the committee felt this evidence on resource use</p>

<b>Recommendation</b>	-
<b>Research recommendations</b>	<p><b>RR9. What is the clinical and cost effectiveness of having GPs within or adjoining emergency departments?</b></p> <p>and cost would be out-dated.</p> <p>The committee considered the cost of a GP conducting a consultation. The duration of a consultation is likely to have a large effect on the overall cost. It is unclear whether GPs might spend more or less time with each patient than ED staff although it is likely the GP would spend less time than ED doctors below a registrar level. The magnitude of cost savings will depend on the extent to which re-directing ED patients with primary care sensitive conditions to GP-delivered care can be translated into more efficient use of the ED, and whether the comparator for GP-delivered care is a consultant in emergency medicine, a trainee or another health care professional.</p> <p>Given these unknown factors, and the weakness of the evidence, the committee chose not to make a recommendation for practice.</p>
Quality of evidence	<p>For the outcomes of diagnostic investigations and patient and/or carer satisfaction, the evidence was considered to be of very low quality due to the study design (observational), risk of bias and indirectness of the study population and study outcome.</p> <p>An original cost analysis was conducted. This analysis should be considered partially applicable because QALYs were not estimated and to have potentially serious limitations because of the observational study design, lack of detail in resource use and limited follow-up. Furthermore, the age of the study on which it was based on, means that it does not account for more care being given directly by ED consultants.</p>
Other considerations	<p>The College of Emergency Medicine currently recommends consultant presence in the ED from 7am to 10pm, 7 days a week. The evidence for this came from a review of Hospital Episode Statistics by the College of Emergency Medicine. They found that up to 15% of patients could be managed in the community by a GP.<sup>4</sup> There are GPs who work locum sessions within EDs, but the regularity of this service is highly variable between hospitals.</p> <p>The committee discussed the definition of an acute medical emergency and appropriate ED attendance, which can range from comparatively mild to acute life-threatening problems. Those with primary care problems which they perceive to require emergency attention will often attend the ED, so diverting these patients to GP-delivered care is consistent with community practice. Two methods of streaming primary care patients to the on-site GP were identified. One was for patients to enter the ED and decide for themselves whether to see a GP or a member of ED staff. The other was for all patients to be triaged, although it was noted that there are some occasions where patients are triaged to primary care but on further investigation turn out to have a more severe and urgent problem that is more appropriately managed by ED staff.</p> <p>The committee also emphasised the importance of the content of the intervention. GPs may be present in or next to the ED specifically for the management of primary care patients, or they may be present within the ED, contributing the benefits of GP expertise to all AME patients. As there is a finite number of GPs, appropriate allocation of these resources (that is, GP practices with extended and weekend opening or located in or co-located in the ED) to deliver best value is essential.</p> <p>The committee considered prioritising this research recommendation but they were aware that the NIHR have already agreed to fund studies in this area (<a href="http://www1.uwe.ac.uk/hls/research/gpedproject/studysummary.aspx">http://www1.uwe.ac.uk/hls/research/gpedproject/studysummary.aspx</a>; GPs in EDs Study: Protocol May 2016: NIHR HS&amp;DR System ...). The committee hope that the</p>

<b>Recommendation</b>	-
<b>Research recommendations</b>	<b>RR9. What is the clinical and cost effectiveness of having GPs within or adjoining emergency departments?</b>
	findings from these studies will inform a future update to the guideline.

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## Appendices

### Appendix A: Review protocol

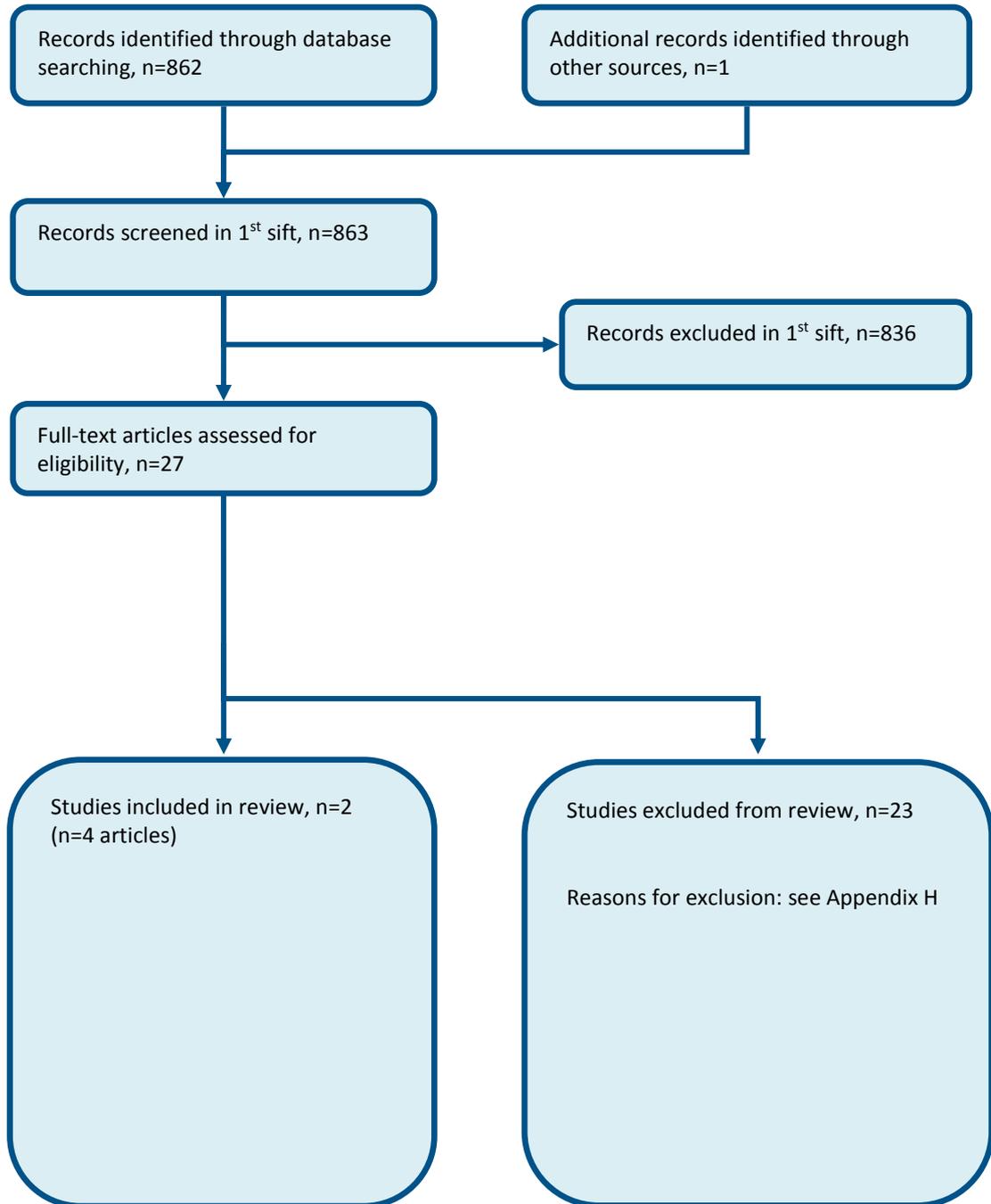
**Table 4: Review protocol: GPs within or on the same site as the ED**

Review question	GPs within or on the same site as the ED
Guideline condition and its definition	Acute Medical Emergencies. Definition: Acute medical emergencies.
Objectives	Does the presence of GPs within or on the same site as the ED reduce the demand on ED and/or improve outcomes?
Review population	Adults and young people (16 years and over) presenting to an emergency department with a suspected or confirmed acute medical emergency.
	Adults.
	Line of therapy not an inclusion criterion.
Interventions and comparators: generic/class; specific/drug  (All interventions will be compared with each other, unless otherwise stated)	GP co-located unit. GPs working within the ED. No GP led unit. No GPs working within the ED. Neither GP led unit or GPs working within the ED. Patients seen by ED staff.
Outcomes	<ul style="list-style-type: none"> <li>- Mortality (Dichotomous) CRITICAL</li> <li>- Quality of life (Continuous) CRITICAL</li> <li>- Patient and/or carer satisfaction (Dichotomous) CRITICAL</li> <li>- Avoidable adverse events (including misdiagnosis) (Dichotomous) (CRITICAL)</li> <li>- Time to admission/discharge (number meeting ED 4-hour emergency target) (Continuous) CRITICAL</li> <li>- Diagnostic investigations (Dichotomous) IMPORTANT</li> <li>-</li> <li>- Readmission up to 30 days (Dichotomous) IMPORTANT</li> <li>- Hospital admissions (Dichotomous) IMPORTANT</li> <li>- ED demand (Dichotomous) IMPORTANT</li> <li>- Staff satisfaction (Dichotomous) IMPORTANT</li> </ul>
Study design	Systematic Review RCT Quasi-RCT Non-randomised comparative study Prospective cohort study Retrospective cohort study Before and after study Case control study Controlled before and after study Interrupted Time series Historical controlled study
Unit of randomisation	Patient Cluster
Crossover study	Not permitted.
Minimum duration of study	Not defined.

Review question	GPs within or on the same site as the ED
Sensitivity/other analysis	Frail elderly. People with co-morbid mental illness. GP acting as triage officer within the ED.
Subgroup analyses if there is heterogeneity	<ul style="list-style-type: none"> <li>- Frail elderly (Frail elderly; Not frail elderly); Population differs</li> <li>- People with co-morbid mental illness (people with co-morbid mental illness; people without co-morbid mental illness); population differs.</li> <li>- GP acting as triage officer within the ED (GP acting as triage officer within ED; GP not acting as triage officer within ED); population differs.</li> </ul>
Exclusions	Non-UK studies.
Search criteria	Databases: Medline, Embase, the Cochrane Library. Date limits for search: None. Language: English only.

## Appendix B: Clinical article selection

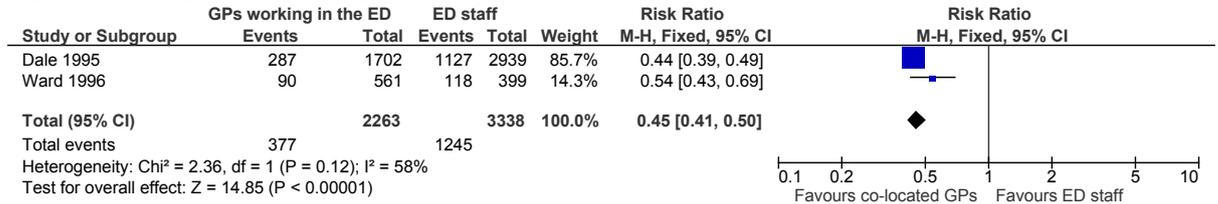
Figure 1: Flow chart of clinical article selection for the review of GPs within or on the same site as the ED



# Appendix C: Forest plots

## C.1 GPs working within the ED versus patients seen by ED staff

**Figure 2: Diagnostic investigations**



**Figure 3: Patient and/or carer satisfaction with assessment**



**Figure 4: Patient and/or carer satisfaction with treatment**



**Figure 5: Patient and/or carer satisfaction with doctor's manner**



## Appendix D: Clinical evidence tables

Study (subsidiary papers)	Dale 1995 <sup>7</sup> (Dale 1995 <sup>6</sup> , Dale 1996 <sup>8</sup> )
Study type	Non-randomised comparative study
Number of studies (number of participants)	(n=4641)
Countries and setting	Conducted in United Kingdom; setting: A&E department.
Line of therapy	Not applicable.
Duration of study	Intervention + follow up.
Method of assessment of guideline condition	Adequate method of assessment/diagnosis: nurses (with at least 6 months' experience of A&E and who had undergone training on GP expertise) carried out triage.
Stratum	Overall.
Subgroup analysis within study	Not applicable.
Inclusion criteria	Patients assessed at nurse triage as presenting with problems that could be treated in a primary care setting.
Exclusion criteria	Patients whose triage statuses were not recorded.
Recruitment/selection of patients	Random sample of sessions stratified by time of day and day of week using a table of random numbers.
Age, gender and ethnicity	Age - Other: 0-5yrs n=416 (9%); 6-16yrs n=497 (10.7%); 17-20yrs n=426 (9.2%); 21-25yrs n=839 (18.1%); 26-30yrs n=666 (14.4%); 31-50yrs n=1076 (23.2%); 51-60yrs n=312 (6.7%); >60yrs n=409 (8.8%). Gender (M:F): 2435/2192. Ethnicity.
Further population details	1. Frail elderly: Not applicable/Not stated/Unclear 2. GP acting as triage officer within the ED: GP not acting as triage officer within ED 3. People with co-morbid mental illness: Not applicable/Not stated/Unclear.
Indirectness of population	Serious indirectness: patients presented with problems that could be treated in a primary care setting and therefore do not have a suspected or confirmed acute medical emergency.
Interventions	(n=1702) Intervention 1: GPs working within the ED. Duration: 1 year. Concurrent medication/care: not applicable.  (n=2939) Intervention 2: Patients seen by ED staff. Patients were seen by ED staff in an ED department which was also staffed by GPs. Duration: 1 year. Concurrent medication/care: not applicable.
Funding	Other (Lambeth Inner City Partnership; King's Fund; SETRHA Primary Care Development).
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: GPs WORKING WITHIN THE ED versus PATIENTS SEEN BY ED STAFF	

Study (subsidiary papers)	Dale 1995 <sup>7</sup> (Dale 1995 <sup>6</sup> , Dale 1996 <sup>8</sup> )
	<p>Protocol outcome 1: Patient and/or carer satisfaction</p> <p>- Actual outcome: Satisfaction with assessment at 7-10 days after consultation; Group 1: 182/239, Group 2: 248/323; Comments: Data from a subsample of 567 patients; 240 had been seen by a GP and 327 by ED staff; Risk of bias: All domain - Very high, Selection - Very high, Blinding - Low, Incomplete outcome data - Very high, Outcome reporting - Low, Measurement - High, Crossover - Low; Indirectness of outcome: Serious indirectness, Comments: patient satisfaction with one aspect of their experience; Baseline details: age and an injury related problem were significantly different between groups; Group 1 Number missing: 1/240, Reason: not stated; Group 2 Number missing: 4/327, Reason: not stated</p> <p>- Actual outcome: Satisfaction with treatment at 7-10 days after consultation; Group 1: 176/238, Group 2: 242/319; Comments: Data from a subsample of 567 patients; 240 had been seen by a GP and 327 by ED staff; Risk of bias: All domain - Very high, Selection - Very high, Blinding - Low, Incomplete outcome data - Very high, Outcome reporting - Low, Measurement - High, Crossover - Low; Indirectness of outcome: Serious indirectness, Comments: patient satisfaction with one aspect of their experience; Baseline details: age and an injury related problem were significantly different between groups; Group 1 Number missing: 2/240, Reason: not stated; Group 2 Number missing: 8/327, Reason: not stated</p> <p>- Actual outcome: Satisfaction with Doctor's manner at 7-10 days after consultation; Group 1: 192/214, Group 2: 242/278; Comments: Data from a subsample of 567 patients; 240 had been seen by a GP and 327 by ED staff; Risk of bias: All domain - Very high, Selection - Very high, Blinding - Low, Incomplete outcome data - Very high, Outcome reporting - Low, Measurement - High, Crossover - Low; Indirectness of outcome: Serious indirectness, Comments: patient satisfaction with one aspect of their experience; Baseline details: age and an injury related problem were significantly different between groups; Group 1 Number missing: 26/240, Reason: not stated; Group 2 Number missing: 49/327, Reason: not stated</p> <p>Protocol outcome 2: Diagnostic investigations</p> <p>- Actual outcome: Use of radiology, haematology, chemical pathology microbiology and electrocardiography investigations at consultation; Group 1: 287/1702, Group 2: 1127/2939; Risk of bias: All domain - High, Selection - Very high, Blinding - Low, Incomplete outcome data - Very high, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: age and an injury related problem were significantly different between groups</p>
Protocol outcomes not reported by the study	Quality of life at end of follow-up; Mortality at end of follow-up; Avoidable adverse events at end of follow-up ;Readmission at end of follow-up; ED demand at end of follow-up; Staff satisfaction at end of follow-up; Hospital admissions at end of follow-up; Time to admission/discharge (number meeting ED 4-hour emergency target) at end of follow-up.

Study	Ward 1996 <sup>32</sup>
Study type	Non-randomised comparative study.
Number of studies (number of participants)	(n=970)
Countries and setting	Conducted in United Kingdom; setting: A&E department
Line of therapy	Not applicable.

Study	Ward 1996 <sup>32</sup>
Duration of study	Intervention + follow up.
Method of assessment of guideline condition	Adequate method of assessment/diagnosis: pilot study performed to assess the triage system and to ensure that triage was appropriate.
Stratum	Overall.
Subgroup analysis within study	Not applicable.
Inclusion criteria	Patients triaged 'Minor B/primary care' - those who were considered at triage to require minimal nursing, investigation and treatment before discharge and for whom a delay of several hours would not be detrimental to their condition.
Exclusion criteria	Patients triaged to non-primary care categories; patients triaged 'Major B/primary care' category; patients who did not wait to see a doctor; patients whose notes were unavailable.
Recruitment/selection of patients	Consecutive patients.
Age, gender and ethnicity	Age - Other: 35.6% of patients were aged between 21 and 30 years. Gender (M:F): not reported. Ethnicity.
Further population details	1. Frail elderly: Not applicable/Not stated/Unclear 2. GP acting as triage officer within the ED: GP not acting as triage officer within ED 3. People with co-morbid mental illness: Not applicable/Not stated/Unclear.
Indirectness of population	Serious indirectness: Patients who were considered at triage to require minimal nursing, investigation and treatment before discharge and for whom a delay of several hours would not be detrimental to their condition, therefore did not have a suspected or confirmed acute medical emergency.
Interventions	(n=566) Intervention 1: GPs working within the ED. Duration: 5 weeks. Concurrent medication/care: not applicable.  (n=404) Intervention 2: Patients seen by ED staff. Patients were seen by ED staff in an ED department which was also staffed by GPs. Duration: 5 weeks. Concurrent medication/care: not applicable.
Funding	Funding not stated.
<b>RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: GPs WORKING WITHIN THE ED versus PATIENTS SEEN BY ED STAFF</b>	
Protocol outcome 1: Diagnostic investigations - Actual outcome: Investigations (x-ray; haematology; biochemistry; microbiology) at consultation; Group 1: 90/561, Group 2: 118/399; Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness; Baseline details: patients seen by GPs and A&E doctors were similar in age, sex and case mix; Group 1 Number missing: 5, Reason: not stated; Group 2 Number missing: 5, Reason: not stated	
Protocol outcomes not reported by the study	Quality of life at end of follow-up; Patient and/or carer satisfaction at end of follow-up; Mortality at end of follow-up; Avoidable adverse events at end of follow-up; Readmission at end of follow-up; ED demand at end of follow-up; Staff

<b>Study</b>	<b>Ward 1996<sup>32</sup></b>
	satisfaction at end of follow-up; Hospital admissions at end of follow-up; Time to admission/discharge (number meeting ED 4-hour emergency target) at end of follow-up.

## Appendix E: Economic evidence tables

No economic studies were identified.

## Appendix F: GRADE tables

**Table 5: Clinical evidence profile: GPs working within the ED versus patients seen by ED staff**

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	GPs working within the ED	ED staff	Relative (95% CI)	Absolute		
<b>Diagnostic investigations (assessed with: number of diagnostic investigations)</b>												
2	observational studies	serious <sup>1</sup>	no serious inconsistency	serious <sup>2</sup>	no serious imprecision	None	377/2263 (16.7%)	34%	RR 0.45 (0.41 to 0.5)	187 fewer per 1000 (from 170 fewer to 201 fewer)	⊕○○○ VERY LOW	IMPORTANT
<b>Satisfaction with assessment (follow-up 7-10 days; assessed with: five point Likert scale)</b>												
1	observational studies	very serious <sup>1</sup>	no serious inconsistency	very serious <sup>2,3</sup>	no serious imprecision	None	182/239 (76.2%)	76.8%	RR 0.99 (0.9 to 1.09)	8 fewer per 1000 (from 77 fewer to 69 more)	⊕○○○ VERY LOW	CRITICAL
<b>Satisfaction with treatment (follow-up 7-10 days; assessed with: five point Likert scale)</b>												
1	observational studies	very serious <sup>1</sup>	no serious inconsistency	very serious <sup>2,3</sup>	no serious imprecision	None	176/238 (73.9%)	75.9%	RR 0.97 (0.88 to 1.07)	23 fewer per 1000 (from 91 fewer to 53 more)	⊕○○○ VERY LOW	CRITICAL
<b>Satisfaction with doctor's manner (follow-up 7-10 days; assessed with: five point Likert scale)</b>												
1	observational studies	very serious <sup>1</sup>	no serious inconsistency	very serious <sup>2,3</sup>	no serious imprecision	None	192/214 (89.7%)	87.1%	RR 1.03 (0.97 to 1.1)	26 more per 1000 (from 26 fewer to 87 more)	⊕○○○ VERY LOW	CRITICAL
<b>Mortality</b>												
0	No evidence available					None	-	0%	-	-		CRITICAL
<b>Quality of life</b>												

0	No evidence available					None	-	0%	-	-		CRITICAL
<b>Time to admission/discharge (number meeting A&amp;E 4 hour waiting target)</b>												
0	No evidence available					None	-	0%	-	-		CRITICAL

<sup>1</sup> All non-randomised studies automatically downgraded due to selection bias. Studies may be further downgraded by 1 increment if other factors suggest additional high risk of bias, or 2 increments if other factors suggest additional very high risk of bias

<sup>2</sup> Downgraded by 1 increment because the majority of evidence included an indirect population, and downgraded by 2 increments if the majority of the evidence included a very indirect population (patients presented with problems that could be treated in a primary care setting and therefore did not have a suspected or confirmed acute medical emergency –1 increment).

<sup>3</sup> Downgraded by 1 increment because majority of evidence had indirect outcomes, and downgraded by 2 increments if the majority of the evidence had very indirect outcomes (patient and/or carer satisfaction with only 1 aspect of their experience –1 increment).

## Appendix G: Excluded clinical studies

**Table 6: Studies excluded from the clinical review**

Study	Exclusion reason
Boeke 2010 <sup>1</sup>	Non-UK study
Bosmans 2012 <sup>2</sup>	Non-UK study
Chmiel 2016 <sup>3</sup>	Non-UK study. Inappropriate study design-prospective before and after study (RCT evidence available)
Colliers2016 <sup>5</sup>	no extractable outcomes
Daniele 2011 <sup>9</sup>	Qualitative review of a pilot scheme
Freeman 1999 <sup>10</sup>	Qualitative study
Gibney 1999 <sup>11</sup>	Non-UK study
Gnani 2013 <sup>12</sup>	Inappropriate comparison. (Descriptive article - no comparator)
Grol 2006 <sup>13</sup>	Inappropriate comparison. (Descriptive article - no comparator)
Hallam 1999 <sup>14</sup>	Qualitative study
Ismail 2013 <sup>15</sup>	Systematic review is not relevant to review question or unclear PICO
Khangura 2012 <sup>16</sup>	Systematic review is not relevant to review question or unclear PICO
Leibowitz 2003 <sup>17</sup>	Systematic review is not relevant to review question or unclear PICO
Murphy 1996 <sup>19</sup>	Non-UK study
Murphy 2000 <sup>20</sup>	Non-UK study
Ramlakhan 2016 <sup>22</sup>	Narrative review of primary care services located with EDs. Review included both RCTs and observational studies. Relevant UK studies in the review already included in our evidence review.
Roberts 1998 <sup>23</sup>	Systematic review is not relevant to review question or unclear PICO
Rogers 2011 <sup>24</sup>	Not review population (patients referred to an admissions unit by GP)
Sharma 2011 <sup>25</sup>	Statistical model
Thijssen 2016 <sup>27</sup>	Paper not in English
Vangilsvanrooij 2015 <sup>30</sup>	Non-UK study
Vandenheede 2016 <sup>28</sup>	Narrative review- screened for relevant references
Van der straten 2012 <sup>29</sup>	Non-UK study
Wang 2014 <sup>31</sup>	Non-UK study
Wells 1998 <sup>33</sup>	Inappropriate comparison. (Descriptive article – no comparator)

## Appendix H: Excluded economic studies

**Table 7: Studies excluded from the health economics review**

Study	Exclusion reason
Bosmans 2012 <sup>2</sup>	Non-UK studies were excluded for this question. This was conducted in the Netherlands.