Accident and emergency care at the primary-secondary interface: a systematic review of the evidence on substitution

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Authors' objectives
To assess whether, and to what extent, primary care based emergency services can substitute for the traditional hospital accident and emergency department model of emergency services.

Searching
Systematic searches were made of the following databases: MEDLINE (1970-), HealthSTAR (1975-), DHSS-Data, the King's Fund library database, the NHS Research and Development database, the National Primary Care Research and Development Centre's database of publications and ongoing research at the primary-secondary interface and the Global Emergency Medicine Archives internet site. There were no language restrictions. The bibliographies of identified studies were checked and letters sent to all NHS Regional Directors of Research and Development requesting information on local research. Other recent publications were identified through scanning of contents pages of relevant journals: New England Medical Journal from 1991, BMJ from 1995. Subject area experts were also contacted for advice on ongoing research.

Study selection

Study designs of evaluations included in the review
Randomised controlled trials (RCTs), quasi-experimental studies (interrupted time series, controlled before and after studies, one-group or uncontrolled before-after studies, non-random group comparison) and retrospective studies with comparative analysis.

Specific interventions included in the review
Non-hospital emergency care, defined as any service which provides first contact urgent care other than that available in the traditional hospital-based accident and emergency (A&E) department and has the following characteristics: open access; immediate advice, assessment, examination or treatment; therapeutic capacity; staffed by primary care professionals or specialists in a planned generalist community setting; and attendance driven by lay perceptions of the need for urgent care.

Interventions falling into the definition: primary care teams in A&E departments; community services in A&E departments (e.g. 10 local general practitioners were recruited to work in the A&E department on a sessional basis); nurse-practitioner services (e.g. nurse practitioner performance or effectiveness in comparison to other professional groups); minor injuries units (e.g. free-standing emergency centres); general practitioner out-of-hours co-operatives; flexible hours/open access primary care schemes (e.g. introduction of an emergency primary care centre); and telephone consultation services (e.g. patients given an 'after-hours' primary care telephone number on utilisation of a hospital emergency department).

Participants included in the review
Patients presenting with 'minor' (however defined) acute illness or injury for urgent care, including: children with 'non-emergency' health problems; emergency department attenders with chronic or non-urgent medical conditions; patients with minor trauma; outpatient department attenders predominantly with chronic diseases and complications; non-urgent emergency department attenders (children and adults); A&E attenders with 'primary care' needs.

Outcomes assessed in the review
Various outcome measures are reported by the included studies. For each study the following outcomes data were extracted if available: evidence of substitution (number of accidents and emergency attendances and hospital admissions); acute resource consumption (e.g. numbers of diagnostic tests carried out, inpatient bed days avoided)); effectiveness of intervention (health outcomes (using proxies if necessary, e.g. comparative rates of unplanned reattendances), self-reported patient satisfaction); costs and cost-effectiveness data. The majority of studies included a
measure of change in emergency department utilisation, other reported outcomes included: perceived quality of health care; number of primary care appointments, mean annual emergency department visits, number of patients referred out of the emergency department for primary care or self-treatment; patient compliance; number of new attendances to A&E departments following consultation with deputising services.

How were decisions on the relevance of primary studies made?
One observer reviewed all studies for relevance. A second observer was available to check consistency and resolve ambiguous cases.

Assessment of study quality
Methodological quality was assessed using criteria adapted from that used by the Cochrane Collaboration's Effective Professional Practice Review Group. Criteria reported in the data extraction forms included: inclusion criteria (study design); methodological inclusion criteria (study evaluates an intervention against a control activity/practice, is the control practice/activity comparable with respect to the targeted outcome variable, objective measurement of primary outcome measures i.e. substitution, effectiveness); review scope; quality criteria (power calculation, unit of allocation/analysis, response/follow-up of subjects, likelihood of contamination (group comparison), likelihood of contamination (before and after/repeated studies), baseline measurement, data collection is identical before and after the intervention (baseline/before and after studies/repeated studies)); randomised controlled trials (type of RCT, concealment of allocation); interrupted time series (protection against secular changes, completeness of data set); studies using second site as control (comparability of study and control sites); survey studies (random sampling method, non-response bias); static group comparison (appropriate analysis controlling for likely confounding). Each question was scored A, B or C depending on whether a yes, not clear or no answer was achieved, respectively. One observer reviewed all studies for quality and a second observer was available to check consistency and resolve ambiguous cases.

Data extraction
A standardised form was used to extract data from each study. Data were extracted on: study aims, context/setting, study population, research design, sample size, quality criteria, intervention, outcomes measured, results, comments and conclusions. The authors do not state how many reviewers performed the data extraction.

Methods of synthesis
How were the studies combined?
A narrative approach was adopted to summarise and synthesise study results.

How were differences between studies investigated?
Study differences and difficulties in generalising results are discussed within each section.

Results of the review
Thirty-three studies were included and were analysed within five sections.

1. Expanding primary care services: eight studies (three controlled before-and-after studies, one controlled study, three uncontrolled before-and-after studies, and one comparative observational study).

2. Reorganising primary care: nine studies (two systematic reviews, one randomised controlled trial (RCT), one uncontrolled before-and-after study, and five comparative observational studies).

3. Integration of primary and hospital care: three studies (one RCT and two controlled studies).


5. Barriers to hospital access: ten studies (one RCT, four controlled before-and-after studies, and five uncontrolled before-and-after studies).
The number of participants is not stated for all studies.

1. Expanding primary care services: the majority of studies identified marked reductions in emergency department utilisation following an expansion in primary care provision.

2. Reorganising primary care: concerns that certain aspects of primary care organisation (such as appointment systems, deputising services, single-handed practitioners, or primary care emergency centres) may be unpopular with patients and may inadvertently have increased pressure on A&E departments seem largely unfounded.

3. Integration of primary and hospital care: results seem to confirm that substitution can occur. All studies found lower general use of diagnostic investigations by the general practitioners and fewer referrals to secondary services. 4. Reorganising acute care: minor injuries units - covariance analysis revealed no significant difference between the study and comparison group over the study period. There was a small non-significant increase in emergency department attendance in the study group. The free-standing emergency centres (FECs) in the study group opened in different years. Controlling for the year of opening did not reveal any significant difference between the study and control group of hospitals.

FECs tended to open near much larger than average hospitals but mean emergency department attendance rates were stable in the study sample of hospitals before the FECs opened.

Telephone triage - During the study period there was a 6% decrease (n=9010) in emergency department attendance and 9% decrease (n=1435) in emergency department admissions (p<0.05).

The average daily number of calls (first 12 weeks in 1977 compared with last 12 weeks in 1978) for general information fell between 1977 (n=14.6) and 1978 (n=11.8). Calls for medical advice rose between 1977 (n=13.8) and 1978 (n=32.8).

If the Medical Information Centre was unavailable, 231 (54%) callers said they would have attended the emergency department. Fifty-three of these callers were advised to attend the emergency department over the telephone.

5. Barriers to hospital access: the studies evaluating referral schemes revealed variation in the direct impact of the intervention, that is the proportion of all patients referred away from the emergency department (range 5-36%). Studies of co-payments provide evidence that cost sharing significantly reduces hospital emergency department attendance.

Cost information
1. Expanding primary care services: No.
2. Reorganising primary care: No.
3. Integration of primary and hospital care: two studies provided evaluations of the cost-effectiveness of employing general practitioners.
4. Reorganising acute care: No.
5. Barriers to hospital access: No.

Authors' conclusions
Access to primary care is an important influence on patient demand for accident and emergency care. However, whether the way in which primary care is organised makes any difference to patient behaviour is more difficult to answer. It may be that the focus on substitution as a means of providing cost-effective emergency care is not particularly helpful in planning the health care delivery for Londoners.

CRD commentary
Overall, the methodological quality of this systematic review was high. It had good inclusion/exclusion criteria which addressed a focused review question. The literature search was excellent and comprehensive. Validity assessment was carried out appropriately although the authors could have discussed study quality in more detail. A standardised form was used to extract data and study details were well reported. Pooling of results was narrative but appropriate, as outcome measures frequently differed between individual studies.

Limitations of the findings were addressed in the conclusions reported at the end of the review.

**Implications of the review for practice and research**

Practice: The authors state that it may be that the focus of substitution as a means of providing cost-effective emergency care is not particularly helpful in planning the health care delivery for Londoners.

Research: The authors state that there is a real gap in rigorous UK-based research evaluating the costs and benefits of service developments in this field on the health care system as a whole. Research which focuses on the impact of options for care across both the primary and acute sectors is required.

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