

## REVIEWS

# Appropriateness of use of emergency ambulances

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Recent years have seen a change in the role of emergency ambulance crews, from essentially providing transport to hospital for sick and injured people, to delivering basic and advanced life support skills to patients before they reach hospital. This has involved an expansion in training and in the range of skills that all emergency ambulance personnel, and in particular paramedics, now hold. All UK ambulance services aimed to place a paramedic on every front line vehicle by the end of 1996, although some services did not meet this. Nevertheless, most 999 calls across the UK are now responded to by the dispatch of a paramedically crewed vehicle.

Alongside this expansion in training and skills, there has been a consistent rise in the number of 999 calls received by ambulance services throughout the country, with an overall increase for England of 4.8% between 1995-96 and 1996-97. Comparable figures for the few previous years were 7.1% (1992-93 to 1993-94), 8.2% (1993-94 to 1994-95), and 9.4% (1994-95 to 1995-96).<sup>1</sup> There has been increasing concern that the needs of many callers may be more appropriately met in ways other than the dispatch of an emergency ambulance with paramedic crew, travelling at high speed with lights and sirens. This paper reviews the literature concerning the appropriateness of use of 999 vehicles.

## Question of appropriateness of emergency service use

Alongside the increasing, and possibly inappropriate, use of emergency ambulances, similar concerns have been expressed about the use of accident and emergency (A&E) departments. Several studies have been published which examine A&E usage and reasons for patient attendance. These findings may be of help in understanding why people use emergency ambulances.

It has been found that many patients choose A&E as their main source of out of hours care. Williams *et al* found that 42% of primary care cases went straight to the A&E department outside general practitioner (GP) surgery hours.<sup>2</sup> It has been reported that primary care patients who choose to attend A&E often do so because they consider their condition unsuitable for treatment in general practice. Some specific problems, mainly minor injuries, are more likely to be taken to the A&E.<sup>3,4</sup> In addition, the average duration of problems tends to be shorter than for those patients who go to their GP and it is less likely that the patient will have experienced the problem before.<sup>4</sup> There may also be a public perception that the A&E department is quicker and more convenient. This has been borne out by several studies, even when care is not in fact quicker and the service may be less appropriate, with more interventions performed and less follow up given than in primary care.<sup>5</sup>

Several attempts have been made to assess the proportion of inappropriate A&E department usage, although authors have used various methodologies. An attempt to validate different methods was made by Lowy *et al*.<sup>6</sup> In this study, three means of identifying inappropriate users of A&E services were compared with the judgment of a panel of GPs. Judgment of appropriateness was based on the final diagnosis in two of the methods, and in the other on the processes of care. The method which corresponded most closely with the opinion of GPs was the process of care model, which defined appropriateness of attendance on the basis of the investigations and treatments each patient underwent, irrespective of final diagnosis. The authors concluded that there is not enough information in the diagnostic label alone to judge whether or not a patient could have been treated in general practice.

In the above studies the judgment of appropriateness is based on health professionals' perception of need. However, patients may

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## Sources of material

For this review, the search strategy used was a search of Medline (1989-97), Healthplan (1983-95), Helms (1983-95), and BIDS Embase (1983-97).

Keywords entered into these databases of health related references were explode "ambulances/utilisation or ambulance\* and (inappropriate\* or appropriate\* or abuse or misuse)"; "health care and (utilis/zation or delivery or need or planning)"; "emergency and (ambulance or health service or treatment or medicine)", "pre-hospital care", and "out of hours".

Further references were followed up from the citations at the end of papers obtained from these initial searches. This review covers all major papers published in English over the last 15 years, as well as some foreign language papers and some work which has not yet been formally published in full.

Table 1 Studies published concerning appropriateness of use of ambulances

Date	Author	Location	Language of publication	Type of cases included	Focus of paper	Methodology	% Assessed as inappropriate users
1996	Billitier <i>et al</i> <sup>9</sup>	New York State, USA	English	All patients arriving at the emergency department by ambulance	Quantification of calls judged medically unnecessary and determination of associated social and demographic factors	Judgment of receiving doctors at the emergency department, based on broad criteria of medical need	11.3%
1995	McLeay <i>et al</i> <sup>10</sup>	Greenock, Scotland	English	All patients brought to A&E	Audit of use of ambulances to reach hospital and mode of transport used following discharge	No assessment of appropriateness of use: quantification of discharge only	43% discharged home from A&E
1993	Brown <i>et al</i> <sup>11</sup>	Connecticut, USA	English	A&E patients who arrived by emergency ambulance	Assessment of misuse of ambulance services by type of health insurance	According to criteria defined and published by Schumann <i>et al</i> <sup>8</sup>	44.6%
1991	Pennycook <i>et al</i> <sup>12</sup>	Glasgow, Scotland	English	999 and GP calls	Comparison of 999 calls with GP calls	No assessment of inappropriateness of use, quantification of discharge only	49.8% discharged from A&E with no follow up
1990	Gardner <sup>13</sup>	Chester, England	English	Patients in A&E who arrived by emergency ambulance	Investigation of incidence of unnecessary ambulance use and exploration of contributory factors	Assessment by doctor attending patient according to medical urgency. Only broad guidelines used for justified/unjustified categorisation	38%
1989	Kongelf <i>et al</i> <sup>14</sup>	Trondheim, Norway	Norwegian	Emergency ambulance missions	Evaluation of medical justification of emergency ambulance usage, and factors associated with higher rates of misuse	No details of methodology of assessment given in the English language abstract	40%
1987	O'Leary <i>et al</i> <sup>15</sup>	Dublin, Eire	English	A&E patients who arrived by emergency ambulance	Examination of abuses of the emergency ambulance system, by complaint	Internally generated scoring system, based on severity of illness or injury and placement from A&E. Group review used to minimise subjectivity, although no results of this review published	34%
1987	Rademaker <i>et al</i> <sup>16</sup>	Alberta, Canada	English	Emergency patients arriving at A&E by ambulance	Comparison of inappropriate use and unmet need in paramedic and non-paramedic systems	Assessment by nurse research assistant (NRA) according to specific criteria defined and published by Schumann <i>et al</i> . <sup>8</sup> Agreement between NRAs and physician tested, although results of test not published	42%
1980	Morris <i>et al</i> <sup>17</sup>	Birmingham, England	English	Patients in A&E following 999 call	Quantification of justified and unjustified calls, analysed by complaint and age of patient	Subjective assessment of doctors from retrospective review of casualty cards. No details given of criteria by which judgment made	51.7%
1977	Gibson <sup>18</sup>	Baltimore, USA	English	All 999 ambulance journeys	Measuring unmet need and inappropriate use of emergency ambulances	Assessment by research nurse on the basis of casualty cards and patient interviews. No explicit criteria for making judgment	30%

have very different perceptions of the urgency of need for care. Gill and Riley, for example, reported that of 268 patients rated as "non-urgent" by a triage nurse at the emergency department, 82% rated their own condition as urgent.<sup>7</sup> In another American study 45% of ambulatory patients attending a hospital emergency department considered themselves too sick to go elsewhere, although 49% of these were triaged as non-urgent.<sup>8</sup> This is clearly of relevance to the understanding of ambulance service workload.

There have been several studies published over the last 20 years both in the UK and international academic press concerning specifically the appropriateness of use of ambulances. These studies are summarised in table 1.

### Measuring appropriateness of use of emergency ambulances

Some of these studies used explicit criteria to quantify the inappropriate use of emergency ambulances, while others attempted only to start work on the problem, by quantifying

those discharged home from A&E without follow up. In both the studies of the second type,<sup>10 12</sup> it is recognised that this quantification does not directly measure inappropriate use of ambulances.

Of the eight studies summarised here which did attempt to directly quantify inappropriate emergency ambulance usage, only three used a method of assessment according to explicit criteria and definitions.<sup>11 15 16</sup> Of the others, one, a study by Kongelf *et al*, is published only in Norwegian and no details of the methodology are reported in the English language abstract obtained.<sup>14</sup> The remaining four studies used subjective assessment by medical and nursing staff in A&E without any attempt to validate assessments made.<sup>9 13 17 18</sup> In two studies broad guidelines were used for this exercise. In Gardner's 1990 study, use of an emergency ambulance was justified if there was "any life threatening illness (for example angina); any condition which was expected to produce severe pain; any condition which produced immobility or required treatment before transfer; and most road traffic accidents (because of the possibility of spinal injury)".<sup>13</sup> In the study by Billitier *et al* ambulance transport was considered medically necessary if, according to the receiving physician, "the patient required or could have required out of hospital emergency care; the patient required or could have required expedient transport to an A&E; the patient had imminent potential for harm to self or others, or transport was medically appropriate for some other reason".<sup>9</sup>

Clearly these guidelines are all different and allow for considerable variation in assessment by the participating medical staff member. In the other two studies, by Morris and Cross<sup>17</sup> and Gibson,<sup>18</sup> no details are given of the criteria by which the judgment was made.

Of the three studies that used explicit criteria, two used the same definitions, published by Schumann *et al* in 1977,<sup>19</sup> although not in exactly the same way. Brown and Sindelar considered use as appropriate if the patient was admitted to the hospital, if the patient was non-ambulatory, or if the presenting complaint would be categorised as non-routine.<sup>11</sup> Non-routine complaints, according to the Schumann *et al* definitions, included "urgent" (requiring treatment within one hour) or "emergent" (requiring care within several hours). Unclear cases were categorised as non-routine. By contrast, the 1987 study of Rademaker *et al* included as appropriate, "emergency" (confusingly corresponding to urgent in the Brown and Sindelar study) and "urgent A" calls—Schumann's category of those requiring treatment within several hours having been broken down further for the purpose of this study.<sup>16</sup> This further categorisation was made by the nurse research assistant and depended on whether she/he assessed that an ambulance was appropriate and required for the transportation of the patient. In this case, an objective decision making tool was rendered subjective in its adaptation. The third study in this group used an internally gener-

ated scoring system based on severity of illness or injury and placement from A&E.<sup>15</sup>

In only two of the 10 studies was any attempt made to test the validity of assessments made by health professionals involved. In neither of these studies were the results reported in terms of measures of agreement, although Brown and Sindelar commented that significant agreement was found between the nurse research assistants and physician in the coding of ambulance need,<sup>10</sup> and O'Leary *et al* commented that "any subjectivity was minimised by group review of each patient".<sup>15</sup>

Although a wide range of methodologies have been used to estimate the appropriateness of use of ambulances (including subjective judgment by A&E doctors), there is surprisingly little variation in the range of estimates of inappropriate use. In fact, nine of the 10 studies for emergency ambulances give figures of between 30% and 52%, with the relatively low percentage of inappropriate users (11.3%) in the 10th study explained by its relatively conservative criteria.<sup>9</sup> These figures, ascertained by whatever method, indicate that a large and concerning proportion of all emergency calls are unnecessary or inappropriate.

Some of the papers reviewed attempt to explain factors related to inappropriate use (also labelled misuse, unjustified use, and abuse). Factors examined include type of health insurance,<sup>9 11</sup> type of person who made the call, for example: shopkeeper, teacher, relative, etc,<sup>9 13</sup> age of patient,<sup>9 13 15</sup> and pain.<sup>13</sup> The exploration of these factors is interesting and may provide a starting point for understanding influences on service usage. However, the finding of significant relationships between any of these variables and the appropriateness of use of ambulances is highly dependent on the assessment criteria used for categorisation of calls. As these methods are often not explicit, lack any measure of validity or replicability, and vary between studies from subjective evaluations based on unknown criteria to relatively formalised scoring systems, the results reported must be viewed with caution and are of limited value.

## Discussion

A method of assessing appropriateness of use based on information only available after the patient has been assessed in a hospital setting (diagnosis, discharge from A&E) has limitations and will tend to overestimate inappropriate use. With the benefit of hindsight transportation may not have been necessary, but investigations may have been needed to exclude a serious diagnosis.<sup>6</sup> The lay person lacks medical knowledge and the ability to assess the seriousness of their own condition. In addition, need is not simply related to clinical condition but is influenced by other factors such as the availability or accessibility of other more appropriate help—for instance an informal carer, first aider, or primary care team.

In order to plan the future delivery of emergency care, an understanding of the factors which influence the public to call 999 must be gained.<sup>20</sup> As the way in which ambulance performance standards are measured changes,

and the prioritisation of calls according to the urgency of patient need is introduced, the opportunity exists to improve care across the spectrum of 999 callers. At the most urgent end, appropriately skilled and staffed ambulances can be dispatched without delay. At the less urgent end, there is the opportunity to explore other, possibly more appropriate responses than the current obligatory "lights and sirens" paramedic vehicle. The question of appropriateness of use recedes as not only difficult to measure but also of little relevance. The question becomes: "how can ambulance services best plan the cost effective provision of pre-hospital care so that varied healthcare needs expressed by the general public through 999 calls receive an appropriate response?" This requires ambulance services to understand their workload and factors which affect all types of demand, not in terms of appropriateness or otherwise, but in terms of patient type and condition, and social as well as clinical need.

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## Review of a general practice attachment for accident and emergency training

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### Abstract

**General practice secondments are being increasingly undertaken by specialist registrars in accident and emergency (A&E) medicine. This paper describes how two A&E trainees arranged general practice secondments and the experiences gained. There follows a discussion of the benefits to the general practice and trainees involved, together with a contemporary consideration of the interaction between general practice and A&E services in the UK.**

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Keywords: general practice attachment; training

To date, training in general practice or family medicine is not a formal requirement for accident and emergency (A&E) or emergency medicine training in the UK, North America, or Australasia. However, in view of the considerable areas of overlap between A&E medicine and general practice, an increasing number of trainees in A&E medicine are arranging general practice attachments. We are the first

to describe the sort of programme which can be arranged to match the needs of a busy general practice and an experienced A&E doctor. Each A&E trainee spent a month with the practice; KJ in 1995 and MAH in 1997.

The general practitioner involved (SPC) had not previously encountered practices which had organised such attachments. General practice training practices use a variety of well established teaching and assessment tools for their registrars; SPC turned to some of these in order to plan the attachments.

### Aims of attachment

Each party began by writing down their own aims for the attachment.

### Aims of attachment (SPC)

- To demonstrate the life of a busy inner city practice (some of whose patients are frequent A&E attenders) and how the primary health care team works. In particular to show the A&E trainees aspects of patients' lives invisible to an A&E department (for example, medicine of families).

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