So many unanswered questions: the emergency care system of the future

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All the pressures on the health service are converging on that part of the service that cannot say no. The buck stops with the emergency health care system. It is the first place that the media and the public sees the pressure and points the finger. The accident and emergency (A&E) department sits on the fault line where the “tectonic plates of primary and secondary care meet,”1 where the worlds of need, demand, and supply meet abruptly. It is one of the few places where all the dominant issues in the health service coexist: acute services configuration, patients’ charters, emergency admissions, general practitioner (GP) out of hours service, and medical staffing. The features of a good health service: effectiveness, efficiency, access, responsiveness, equity, are all traded around emergency health care.

An accident and emergency system should support a wide range of facilities and specialties including A&E departments, orthopaedics, coronary care units, intensive care units, ambulance services, primary health care teams, and minor injury units. Figure 1 emphasises the A&E department as the hub around which not only activity but also information and advice is coordinated, both within and outside the hospital.2

The forces driving change in A&E medicine

We are deluding ourselves if we think that the emergency health care system in 10 years time will be very similar to the system of today. A&E departments are one part of a much larger system; there are too many factors changing in that larger system to make maintaining the status quo a realistic option. Unfortunately, it is not entirely clear which is the most appropriate model for delivering emergency care in the 21st century.

It is the responsibility of those who are closely connected with, and committed to, high quality emergency care in the future to participate constructively in this debate. Many different reports, such as the Audit Commission report,1 the needs assessment document,3 or the work in the Anglia and Oxford Region7 substantiate the pressure on A&E departments.

The most important reasons driving change in the discipline are:

Population changes

- Increased public expectation from a more informed, prosperous, and demanding public
- Increasing relative social deprivation
- Better health care prolongs life, increases need for chronic health care needs (that is, prevalence increases faster than incidence decreases)
- Demographic change (but probably only likely to account for about 2% of increase)6
- Increase in incidence of acute disease (but probably only significant with childhood asthma and self poisoning).2

Changes in clinical practice

- Increasing pressure to centralise specialist services (such as cancer services or vascular surgery) in order to increase effectiveness and/or cost-effectiveness means that not even every large hospital will have every facility that may be needed in an emergency
- Changing staff mix and skill mix, for example nurse practitioners and paramedics
- Medical staffing issues
- Increased technology (for example, management of myocardial infarction, telephone advice)
- Increasing emphasis on primary care led NHS, with changing pattern of service delivery especially “out of hours”
- Decreased length of stay leading to multiple admissions (“revolving door”)
- Professional desire to offer best possible care
- Increased diseases detection rates
- Decreased referral threshold (self care to primary care, and primary care to secondary care)
- Fear of litigation increases referral patterns.

Direction of change—what are the issues, what is the evidence?

With the recognition that change is inevitable several new models of care have been proposed. Any new model should recognise that what is important is that the person in need gets the right treatment with the right urgency in the right place from the right person. The challenge is to have a pluralistic but coordinated and integrated service

Solutions such as approximately 30 major A&E departments serving the whole of
England and Wales,\(^6\) closing A&E departments seeing less than 50,000 per year and less than 10 miles from an alternative major centre,\(^7\) and the development of GP cooperatives with emergency nurse practitioner run minor injuries units forming local emergency centres have all been proposed.

These models, none of which are proven to solve the problems they seek to address, highlight many of the issues facing emergency care.

**PRIMARY CARE**

There is no doubt that the provision of out of hours primary care is changing quickly, with many different models developing.\(^8\) Fortunately, increasingly valid and reliable tools of assessing patient satisfaction with out of hours primary medical care are being developed.\(^9\) Evaluations are yielding useful results comparing out of hours services from deputising services both to cooperatives\(^10\) and to patients' own GPs (both in terms of process\(^11\) and outcome\(^12\)).

Some countries (for example, Denmark) have reorganised their out of hours primary health system on a more centralised system in the face of increasing demand. This involves a county coordinated system of emergency clinics, with GPs with mobile phones having telephone consultations, visiting, and seeing people in the clinics. Such reforms have reduced the out of hours workload, and have been acceptable to doctors, patients, and managers.\(^13\) The decrease in the number of GPs on call in Denmark has not increased the demand on the centralised A&E department, suggesting that the threshold for requesting emergency services has changed.\(^14\)

**TELEPHONE ADVICE**

Specially trained nurses can be used to staff a telephone advice service from within an A&E department,\(^15\) although this is rarely acknowledged in the United Kingdom.\(^16\) The Medical Defence Union still advises against hospital practitioners giving advice over the telephone.\(^17\) This is an area that urgently needs addressing to ensure that the benefits of evidence based medicine and explicit risk management are synergistic not counterproductive. Much work in general practice is already done over the telephone with no evidence that it is unsafe.\(^18\) Furthermore, there is evidence that telephone advice and triage lines run by A&E departments (for which guidelines exist\(^19\)) and by out of hours primary care\(^20\) have a useful and valued function\(^21\) as well as reducing the workload at A&E departments.\(^22\)

This assumes the staff are trained\(^23\) and the advice given is standardised.\(^24\) Otherwise poor quality, non-evidence-based information will be given by poorly trained staff from small non-specialist units.\(^25\) 26 27

The proposed development of a national "888" advice line in the chief medical officer's review of prehospital emergency care will need to address all of these issues.

**MINOR INJURIES UNITS**

It is important to clarify what a minor injuries unit is, and what potential there is for it to be a useful and safe part of the system.

Minor injuries units (MIUs) are often based in premises where there used to be an A&E department and usually see far fewer than 30,000 patients a year. They are usually staffed by GPs, medical assistants, associate specialists, staff grade doctors, or, increasingly, nurse practitioners\(^28\) (a recognition of the increasing skill mix that is developing in emergency health care).\(^29\) They are led either by local GPs or by the nearest consultant staffed A&E department.

There is evidence that minor injuries units have a potentially useful role in acute care, especially in terms of responsiveness and accessibility.\(^30\) Local people value local facilities like minor injuries units\(^31\) 32 and often support them through community events. Furthermore, such units can sometimes make good use of the time and skills of local nurses and GPs.\(^33\) This is especially true in more rural areas. It is likely that they can provide a service that is specially responsive to local need. For this reason, it is the local situation that is very important to assess when considering establishing a minor injuries unit.\(^34\) Minor injuries units certainly make health care more locally accessible. Although an early NHS Executive publication on minor injuries units\(^35\) paid little attention to evidence on how clinically effective or cost-effective they might be,\(^36\) there is increasing evidence that the public chose between such units and A&E departments appropriately,\(^36\) with little risk of inferior care.\(^37\) It is less clear how much this contributes to an increase in supply led demand. It is also unclear to some what the need for a dedicated GP run minor injuries unit is, when many GPs provide a similar quality service on their practice premises.

Unfortunately, much of the research on minor injuries units is retrospective. It has been claimed that "over 90% of patients attending

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**Figure 1** The department at the centre of a system.
district general hospital accident and emergency departments can be catered for in a nurse led minor injuries unit.  Although this might not be true in all DGH accident and emergency departments, it is knowing which 10% that need to be seen in a larger unit that is important.

The issue is about balancing safety and outcome against access, responsiveness, and local pressure.  Everyone would like an emergency service to be both highly accessible and effective. The situation usually demands a trade off between the two. In this increasingly mobile and litigious age, the dilemma continues.

ACCESS AND CATCHMENT AREAS

Probably the greatest public and professional concern is the distance people live from emergency health care. Does making people travel further increase their chances of dying?

Is it better to take an ill person in a well staffed and equipped ambulance to a specialist centre or down the road to a smaller department staffed by one resident sleepy SHO? Access to an emergency health care facility must be balanced against the need for specialist resources.  Anecdote and evidence both support the utilitarian argument that the most practical way of providing an effective emergency health care service is to design a system where care begins when the service reaches the patient (not vice versa).

Ideally, in a well trained population, good care would always begin before the formal service arrives, complementing the skills that GPs and paramedics bring to the scene. This highlights the importance of the role of the public in helping to provide prehospital emergency care, an issue currently being examined by the chief medical officer.

Another unresolved issue is that a 250 000 catchment population has been traditionally thought of as the appropriate size for a district general hospital. There is increasing concern that this might not be true. Evidence from both the USA and Holland support the view that larger hospitals seem to be able to offer better standards of care in some areas, for example trauma. Larger populations are needed to justify keeping a critical mass of professional skills together and emergency operating theatres fully staffed 24 hours a day on a cost-effective basis.

NURSE PRACTITIONERS

Despite the fact that A&E departments have suffered chronic underinvestment and understaffing, A&E has become a much more professional discipline with increasingly high standards of training and practice. Many activities (especially extended roles such as initial assessment and management according to agreed protocols, requesting radiographs, suturing, cannulation, phlebotomy) that have been traditionally done by doctors are now being increasingly performed by nurses.  Nurse practitioners are becoming increasingly common in British A&E departments, following the model of health care seen in North America and the rest of Europe. Although designated nurse practitioner schemes are rare (a postal survey of A&E departments has shown that 6% departments use designated nurse practitioners), approximately one third of all A&E departments use "unofficial" nurse practitioners.  The methodological difficulties in assessing their effectiveness persist, although there have been retrospective studies in the comparing nurse practitioners with middle grade doctors, with favourable results both in terms of clinical effectiveness and patient acceptability, although nurse practitioners tend to order more investigations than middle grade doctors.

In some parts of the country, it is becoming increasingly difficult to find junior doctors to work in A&E medicine (partly because of the junior doctors' hours initiative and partly because of the exclusion of A&E from larger training schemes). This makes nurse practitioners appear (to some people) increasingly attractive.

Emergency care inside the hospital

Although generalisable and valid evidence relating to emergency care in hospitals is limited, there are some key themes worth emphasising.

- How well staff in a hospital work as a team is vitally important.
- The most effective emergency care in hospitals occurs when 24 hour specialist teams are available to manage emergencies. Ideally, care should have begun before hospital, but not to such an extent that there is significant delay in reaching hospital facilities (for example, anaesthetists, surgeons, operating theatres, and so on).
- There is no evidence to support a simple linear relationship between volume and quality, though it appears that treating small numbers of patients is less likely to promote a good outcome. The quality of care appears more directly related to the size of the specialist workload of the team (and individuals within that team) than to the size of the hospital in which they work (although clearly the two factors are often directly related).
- Significant delays in treatment after the patient has reached hospital continue to occur, both in trauma and in medical emergencies. Senior, experienced clinicians need to see seriously ill people immediately. Systems of emergency care within hospitals work best with a 24 hour multiprofessional team of mutually respecting personnel available near the "front door," not dealing with elective operating lists and outpatient clinics. These people need to be available to communicate with professionals in the field who first attend an emergency.
- The evidence for developing US style trauma centres within a rural region is weak, though the evidence for improving the speed and coordination of the response to someone with life threatening needs is strong.
What next?

Despite the available evidence it is clear there are many unanswered questions. None of the proposed solutions has been proven to provide better quality and more cost-effective care. There is an urgent need to create, collect, and share the intelligence that will inform and guide the changes that need to be made. It is essential that each innovation or change in practice is systematically evaluated. Such evaluations will provide the evidence to inform a rational debate on how services should be provided in the future.

One model worth evaluating

Because emergency care needs are met by both primary and secondary care, there is a large overlap across this sometimes artificial divide. This is an overlap in structure, function, and personnel. It is proposed that the logical place where more integration could take place is at the entrance (or “atrium”) of a hospital, that is, the A&E department.51

The concept involves the atrium being as much a part of the primary health care system as it is of the secondary care system. Patients only enter the hospital on leaving the atrium through its connecting door to the rest of the hospital. There would be beds in the atrium (for example, for overnight observation) which can reduce delays and relieve pressure on inpatient beds.52

The main purpose of such a system is to concentrate a critical mass of skills and skill mix (including nurse practitioners and primary care professionals) to ensure patients receive the right care from the most appropriate professional, while avoiding inappropriate medical, psychiatric, and social admissions (and thus stop fragile social support systems in the community from irretrievably disintegrating).

There is a need for hospitals to look upstream in their attempts to concentrate resources on those admissions that will most benefit the individual and the population. This may involve an outreach service from the A&E department such as a telephone help line, not just for patients, but maybe exclusively for primary care professionals. The history of primary–secondary referrals is one of one way referral of people in a non-graded process rather than a two-way dialogue of information, experience, and explicit decision support.

Many of the pre-existing units in a hospital (admissions units, diagnostic equipment, coronary care unit, intensive therapy unit, short stay ward, on-take residential rooms, etc) are all placed together in and around the atrium, creating a focus in the hospital which contains a critical mass of skills and facilities available 24 hours a day. The atrium may also involve an emergency primary care centre where GPs could work for some of their time. There is good evidence that GPs work well and efficiently in A&E departments.49 The care they deliver benefits from nearby diagnostic tools and peer support, and hospital SHOs benefit from the contact with senior, experienced hospital clinicians and GPs.50 Secondly, there is increasing evidence that GPs can deliver more cost-effective health care in A&E with no drop in patient satisfaction.52 The atrium can support rural minor injuries units outside the hospital, through telephonic, electronic, and other links, as well as being the active filter into the hospital: an investigation and urgent treatment centre, with nearby patient testing and imaging facilities.

While integrating primary care and assessment roles into an A&E system, it is equally important to be able to respond efficiently and effectively to the needs of seriously ill and injured patients. Keeping a critical mass of professional skills together, and emergency operating theatres fully staffed 24 hours a day (often a cost-effective option), can reduce the number of emergency operations performed at night unsupervised by a consultant, a factor known to be associated with poor outcome.53 This has encouraged some major injury services (including Poxford, East London, Edinburgh) to provide a 24 hour on the spot consultant cover to serve a large population.54 Critical care facilities would also be close to hand, overcoming the problems seen in hospitals where A&E, ITU, and CCU are all in different parts of the hospital. Like trauma centres, it might be possible to adopt some elements of the system of the atrium without needing to construct a centre.

The atrium model develops the A&E department as the hub of emergency care, looking out into and supporting the community, with prehospital emergency care, advice lines, links to minor injuries units, and so on, while providing efficient integrated primary and secondary emergency care within the department and able to access, 24 hours a day, all the physical and human resources necessary to provide high quality care of the more seriously ill and injured.

Summary

There are many important and unavoidable reasons why change will occur. However, despite extensive work, there is no clear indication that there is one best way to proceed. There are certain realities, opportunities, and threats facing the service that must be acknowledged. The most appropriate change may well be radical rather than incremental, involving many people (including the public) with fundamental changes in the way that emergency health care is delivered. Professionals within A&E medicine must make a significant positive contribution towards helping the system evolve appropriately. The potential benefit is that A&E medicine can take a lead in developing new systems of health care delivery (telephone triage, outreach work, help lines, and so on) from which other, more conservative, disciplines can learn. The risk is that, by taking a reactive and negative approach to any change, regardless of its cause or consequence, A&E professionals will forced to cope
with the future patterns of emergency care rather than to shape them.


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