Impact of specialist care on clinical outcomes for medical emergencies

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ABSTRACT – General hospitals have commonly involved a wide range of medical specialists in the care of unselected medical emergency admissions. In 1999, the Royal Liverpool University Hospital, a 915-bed hospital with a busy emergency service, changed its system of care for medical emergencies to allow early placement of admitted patients under the care of the most appropriate specialist team, with interim care provided by specialist acute physicians on an acute medicine unit – a system we have termed 'specialty triage'. Here we describe a retrospective study in which all 133,509 emergency medical admissions from February 1995 to January 2003 were analysed by time-series analysis with correction for the underlying downward trend from 1995 to 2003. This showed that the implementation of specialty triage in May 1999 was associated with a subsequent additional reduction in the mortality of the under-65 age group by 0.64% (95% CI 0.11 to 1.17%; P=0.021) from the 2.4% mortality rate prior to specialty triage, equivalent to approximately 51 fewer deaths per year. No significant effect was seen for those over 65 or all age groups together when corrected for the underlying trend. Length of stay and readmission rates showed a consistent downward trend that was not significantly affected by specialty triage. The data suggest that appropriate specialist management improves outcomes for medical emergencies, particularly amongst younger patients.

KEY WORDS: acute medicine, mortality, outcome, specialism

Introduction

There is good evidence that patients with acute medical conditions may fare better in respect of a range of clinical outcomes if they are cared for by a medical team whose specialty interest is relevant to their complaint. This has been shown for myocardial infarction,[1] unstable angina,[2] asthma,[3–8] pneumothorax,[9] pleural effusion,[10–11] acute upper gastrointestinal haemorrhage,[12–14] diabetes[15] and stroke.[16] Indeed, it would be a strong indictment of the emphasis on specialty training over the past 20 years if there were no benefit in being looked after by a specialist. Nevertheless, it is common practice in the United Kingdom for patients who are ill enough to warrant emergency admission to be looked after by a specialty team that has been randomly selected according to the day of the week or week of the year, a system that might be termed 'calendar triage', even though less ill patients, referred to the same hospital for an outpatient opinion, are likely to be seen by the relevant specialists. This widely accepted anomaly has arisen partly as a result of perceived necessity driven by staffing constraints and partly by the need to provide training in general internal medicine. An alternative model, 'specialty triage', can be developed for the larger general hospital to allow patients admitted as medical emergencies to be placed under the care of the relevant specialty team with initial care directed by specialists in acute medicine.[17] We introduced this system at the Royal Liverpool University Hospital in 1999 and now describe its impact on clinical outcomes.

Methods

The setting

Data were evaluated retrospectively for all 133,509 emergency medical admissions over an 8-year period (February 1995 to January 2003 inclusive) at the Royal Liverpool University Hospital. Approximately 50% of medical admissions had been seen by members in the emergency unit before referral to the admitting medical team. The remainder were referred directly from primary care to the admitting medical team via the acute medicine unit (AMU).

The pre-existing system: 'calendar triage'

Prior to February 1999 the hospital used a traditional on-call schedule to care for all acute medical admissions. Teams from thoracic medicine, cardiology, gastroenterology, diabetes/endocrinology, clinical pharmacology, nephrology and rheumatology took turns in a daily rota. Patients were admitted to the first available medical bed, or coronary care unit if appropriate,

Table 1a. Category A conditions – given priority for specialty triage.

Specialty team	Principal problem on admission
Chest	Moderate/severe chronic airways limitation Asthma Pneumonia Pneumothorax Pleural effusion without evidence of heart failure Lung cancer
Cardiology	Acute myocardial infarction Unstable angina Acute arrhythmia Cardiac failure Pulmonary embolism with haemodynamic changes
Gastroenterology	Diarrhoea GI bleeding Jaundice Anaemia Non-surgical abdominal pain Ascites Chronic liver disease
Diabetes/endocrinology	Newly diagnosed diabetes mellitus Uncontrolled diabetes mellitus Diabetic complications, eg foot ulcers Acute endocrine problems, eg Addisons, hypercalcaemia DVT/pulmonary embolism* (see also clinical pharmacology)
Clinical pharmacology (plus infectious diseases)	Epilepsy Uncontrolled hypertension Overdose (excluding patients currently cared for by A&E on observation ward) Adverse drug reactions Acute infectious disease, eg PUO, meningitis and encephalitis, suspected septicaemia DVT/pulmonary embolism* (see also diabetes/endocrinol)
Nephrology	Renal failure (serum creatinine >250 umol/l)
Rheumatology	Acute arthritis, SLE, connective tissue disorders
Care of the elderly	Stroke Age >80 years (needs-related since April 2002)

DVT = deep vein thrombosis; GI = gastrointestinal; PUO = pyrexia of unknown origin; SLE = systemic lupus erythematosis.

and, throughout the duration of their hospital stay, they usually remained under the care of the team that had been on duty when they were admitted. Each team was therefore responsible for patients on several wards. Specialty consultations were available at the discretion of the treating physicians but patients were rarely transferred to a more relevant team after admission.

Table 1b. Category B conditions – non-triage, placed according to bed availability.

Cellulitis
Faints/dizziness
Social problems
Headaches
Indefinable illness/other condition not corresponding to any of the specialty teams listed in Category A.

Introduction of specialty triage

An assessment of the specialty distribution of our patient population was described in an earlier *Clinical Medicine* article.[17] It showed that consultant sessional allocations for each specialty bore little relationship to the specialty balance of emergency medical admissions. Indeed there had been no need for this to be the case since these admissions had been distributed approximately equally between all consultants, regardless of specialty. With the introduction of specialty triage, each of the medical specialties was allocated its own clearly defined bed base in whole or half ward units according to predicted demand and a ward-based system of clinical responsibility was introduced in which each team assumed care for all patients admitted into its bed base. The system of specialty triage was introduced in February 1999 and the ward changes associated with this had been implemented in full by May 1999. Additional specialists were recruited, particularly into thoracic medicine and cardiology, to redress the inequalities in specialist provision for acutely admitted patients.

We identified two categories of clinical problem:

- Category A: conditions that were thought most likely to benefit from targeted specialist care (Table 1a)
- Category B: other problems which did not fit readily into any of the specialty interests of the medical teams that had direct responsibility for acute medical admissions or for whom a principal problem could not be clearly identified (Table 1b).

Decisions regarding the appropriate specialty for each patient were made in accordance with this by a senior member of the nursing staff on the AMU. In cases where the most appropriate specialty was not readily apparent, this decision was made in consultation with one of the specialists in acute medicine. The specialist team selected to look after the patient during their stay in hospital also assumed responsibility for providing appropriate specialist outpatient follow-up care. Patients with a stroke were triaged, regardless of age but subject to bed availability, to an acute stroke unit within the Care of the Elderly Directorate which opened simultaneously with the introduction of specialty triage. For all other elderly patients there was an age-related (over 80) policy before April 2002 for referral to the Care of the Elderly Directorate but since April 2002 referral has been based on clinical need.

We needed an admitting ward base that would have sufficient beds to allow patients to be properly assessed and then transferred

to appropriate specialty wards on the basis of clinical need rather than being prioritised according to time of admission. This was accomplished by a stepwise expansion of an existing 20-bed admissions unit into a purpose-built 47-bed AMU adjacent to the emergency unit. Further expansion of this unit in February 2001 included an assessment area that allowed some patients to be discharged home without formal admission. There was a clear need to identify a medical team who would take responsibility for the supervision and development of the AMU and provide leadership and develop training in acute internal medicine. A single consultant specialist in acute medicine was appointed shortly before the introduction of specialty triage, followed by the appointment of four colleagues over the following four years. Interpretation of the consequences of specialty triage should take into account these changes which were essential for its implementation.

The current situation

The admitting team consists of a consultant specialist, between one and three specialist registrars depending on the time of day, two senior house officers (SHOs) and one house physician. The team provides 12-hour cover but with some changes of personnel during that period. All members of the team are free from conflicting clinical duties. The house physicians and SHOs rotate through different specialty units during their training. The consultants in acute medicine also take part in the on-call rota and at other times give advice and support for the admitting team. They also provide continuing care for patients who have not been transferred to a specialty ward by 9 am on the day following admission, including those patients who seem likely only to need a short period of hospital observation. These acute physicians are now supported during the daytime by SHOs. The AMU now accounts for 16% of the medical bed base (not including Care of the Elderly medicine). A team of bed managers, operational throughout the week, helps to ensure that patients are transferred to appropriate specialty wards on the basis of clinical need. Continuity of care from the admitting team to the acute physicians is maintained by a morning handover meeting. Acute admissions to the Care of the Elderly Directorate are admitted by a consultant-led team consisting of a house physician, SHO and specialist registrar.

Key Points

Most acute medical emergencies have a predominant problem that allows them to be allocated to an appropriate specialty

The introduction of specialty triage achieved an increase from 27% to 56% in the proportion of patients who were managed by appropriate specialist teams

This specialist management was associated with reduced mortality for those under 65 years but without significant impact on length of stay and readmission rate

Data analysis

In order to assess the appropriateness of specialty triage for each patient, the ICD-10 discharge codes[18] were each assigned to their most appropriate specialty by two of the authors (SA, SM) who were blinded with respect to the specialty team to whom these patients had actually been allocated. Mortality data were evaluated over the whole study period. It was speculated that specialty care might have a particularly beneficial effect on younger patients with fewer pathologies so a separate analysis was made of mortality in patients under 65 admitted as medical emergencies. Length of stay and readmission rates were evaluated from April 1997 to January 2003, as comparable data for these parameters were not available for the period before April 1997. Specialty triage only affected distribution of patients within the General Medical Directorate as there was no change in criteria for admission to the Care of the Elderly Directorate in 1999 nor in their bed base. Readmission and length of stay analyses were therefore performed on patients admitted within the General Medical Directorate but mortality data were analysed with and without inclusion of the Care of the Elderly patients. Discharges were used to define the study population so that analyses by primary diagnosis (which is defined at discharge or death) and of readmissions, mortality rates and lengths of total hospital stay would be consistent. Data were downloaded from the hospital's information system using Info Com (iSoft Inc®, UK) into an Excel spreadsheet for analysis. Clinical coding is subject to annual internal and external audits. No significant issues or discontinuities were experienced during the study period.

Monthly data sets were subjected to time-series methodology to assess the impact of the introduction of specialty triage on in-hospital mortality, length of stay and readmission rates. The data were modeled as a first order autoregressive process and the model included terms for trend over time, month of the year and a dummy variable that represented the full implementation of specialty triage in May 1999. This allowed measurement of any change occurring from this date onwards, after adjustment for other factors such as overall downward trend and seasonal variation. Time-series analysis was performed using Statistical Package for the Social Sciences.

Results

Effects of triage

The proportion of Category A patients cared for by an appropriate specialty team rose from 27% before specialty triage to 50% in the year after its introduction and has since risen further to 56% (Table 2). The proportion of patients appropriately allocated rose substantially in all the major medical specialties.

Formal discharges per year fell in 2001–2 and remained lower in 2002–3. This fall is largely a consequence of patients being discharged from the AMU assessment area without formal admission following the creation in 2001 of an assessment area inside the entrance to the unit (Table 3a). Patients sent home

from the AMU without formal admission have been included in all the time-series analyses.

Mortality

The implementation of specialty triage in May 1999 was associated with a significant reduction in the subsequent mortality of the under 65 age group, in excess of the underlying downward trend by a further 0.64% (95% CI 0.11 to 1.17%; P=0.021), equivalent to approximately 51 fewer deaths per year. There was no significant effect of specialty triage for those aged over 65 or all age groups combined when corrected for the underlying downward trend (Table 3a). Tables 3b and 3c describe the change in mortality rates between the two time periods for different specialties. Mortality fell within most groups except for stroke in those aged less than 65 years. Thrombolytic therapy was not used for treatment of stroke during the period of this survey.

Readmission rates

Seven day and 28 day readmission rates fell steadily from April 1997 to July 2003 but showed no significant effect of specialty triage over this downward trend (Table 4).

Table 2. Appropriate placement of patients by specialty as defined by retrospective allocation of discharge ICD–10 codes to appropriate specialty shown in Table 3.

	1998–9	1999–00	2000–1	2001–2	2002–3
Cardiology					
Eligible	3,862	3,677	3,663	3,006	3,246
To specialty	974	1,431	1,556	1,474	1,914
%	25.2	38.9	42.5	49.0	59.0
Chest					
Eligible	3,292	3,092	2,777	2,531	2,557
To specialty	605	1,066	1,310	1,199	1,220
%	18.4	34.5	47.2	47.4	47.7
Gastroenterology					
Eligible	1,850	1,997	1,941	1,597	1,681
To specialty	801	1,197	1,257	971	1,011
%	43.3	59.9	64.8	60.8	60.1
Diabetes/endocrinology					
Eligible	169	210	227	193	203
To specialty	83	144	147	125	153
%	49.1	68.6	64.8	64.8	75.4
Rheumatology					
Eligible	102	136	145	81	99
To specialty	59	91	104	42	56
%	57.8	66.9	71.7	51.9	56.6
Specialty total					
Eligible	9,275	9,112	8,753	7,408	7,786
To specialty	2,522	3,929	4,374	3,811	4,354
%	27.2	43.1	50.0	51.4	55.9

Table 3a. Mortality of acute medical admissions, 1995–2003.

		1995–6*	1996–7	1997–8	1998–9	1999–00	2000–1	2001–2	2002–3
Discharges per year	n	16,218	16,911	15,956	16,744	16,440	16,560	14,384	14,812
Sent home without formal admission	n	–	–	–	–	–	27	2,168	3,016
Average/day	n	44	46	44	46	45	45	39	41
Mortality									
General medicine <65	n	210	194	184	176	159	122	100	116
	%	3.1	2.7	2.6	2.4	2.1	1.6	1.6	1.8
General medicine all ages	n	909	897	831	888	816	765	704	708
	%	7.2	6.6	6.6	6.4	6.1	5.5	6.0	5.9
Care of elderly	n	558	538	482	469	440	427	464	524
	%	15.2	15.8	14.7	15.8	14.8	16.2	17.0	18.5
Total	n	1,467	1,435	1,313	1,357	1,256	1,192	1,168	1,232
General medicine + Care of elderly	%	9.0	8.5	8.2	8.1	7.6	7.2	8.1	8.3
Total mortality corrected for patients sent home without formal admission**	%	9.0	8.5	8.2	8.1	7.6	7.2	7.1	6.9

*Reliable data only available from April 1995, so 1995–6 calculated as April to March (other years calculated February to January).
**Adjusted for patients who were sent home from acute medicine unit after assessment but without formal admission.

Lengths of stay

Average length of stay also fell steadily from April 1997 to July 2003. There was an additional 0.73 day fall in length of stay following the introduction of specialty triage but this failed to reach significance (95% CI -0.04 to 1.50%; P=0.067) (Tables 5 and 6). Daily median length of stay on the AMU during the period of study ranged from 15 to 21 hours. The statistical analyses are summarised in Table 6.

Discussion

This study shows that initial care in an AMU followed by appropriate specialist management is achievable in a large district general hospital and may be associated with reduced mortality for patients under 65 years old admitted as medical emergencies.

Demonstrating that the reduced mortality following introduction of specialty triage was not just part of an underlying downward trend was not straightforward. Although the statistical modelling undertaken here does support this conclusion, an underlying change in mortality in the catchment population is a possible confounder. Mortality rates in north west England fell from 11.7 per thousand in 1995 to 11.1 per thousand in 2001[19] but the statistical modelling undertaken here was able to separate the effect of the introduction of specialty triage from the effect of the underlying trend. It is also possible, however, that there may have been a change in the average age of admitted patients during the study period but we do not have data on this.

It is conceivable but unlikely that some patients discharged from the AMU after the introduction of specialty triage might have died without our knowledge within the time frame in which they might have previously been expected to be hospital inpatients. The statistical analysis assesses changes after a single time point whereas the implementation of specialty triage, although introduced as a policy on a specific date, inevitably

Table 3b. Total mortality for acute medical admissions (all ages) by specialty before and after the introduction of specialty triage.

	Before specialty triage (1998–9)			After specialty triage (1999–2003)		
	Discharges	Deaths	Rate (%)	Discharges	Deaths	Rate (%)
Cardiology	3,862	181	5	14,332	580	4
Chest	3,292	339	10	11,361	1,229	11
Gastroenterology	1,850	108	6	7,485	364	5
Diabetes/endocrinology	169	3	2	854	21	2
Rheumatology	102	3	3	473	5	1
Infectious diseases	213	17	8	799	48	6
Other	3,943	144	4	15,159	512	3
Total	13,768	888	6.4	51,027	2,993	5.9
Stroke*	521	175	34	1,829	527	29

* Complete stroke data, including patients admitted via the Care of the Elderly Directorate which includes the stroke unit. Other data in this table do not include patients admitted into the Care of the Elderly Directorate.

Table 3c. Mortality (<65) of acute medical admissions by specialty before and after the introduction of specialty triage.

	Before specialty triage (1998–9)			After specialty triage (1999–2003)		
	Discharges	Deaths	Rate (%)	Discharges	Deaths	Rate (%)
Cardiology	2,045	18	1	7,276	75	1
Chest	1,451	66	5	4,942	192	4
Gastroenterology	1,153	42	4	4,591	100	2
Diabetes/endocrinology	113	1	1	582	4	1
Rheumatology	65	1	2	292	1	0
Infectious diseases	149	2	1	603	8	1
Other	2,314	35	2	9,479	86	1
Total	7,407	176	2.4	27,920	497	1.8
Stroke*	130	11	8.5	459	49	10.7

* Complete stroke data, including patients admitted via the Care of the Elderly Directorate which includes the stroke unit. Other data in this table do not include patients admitted into the Care of the Elderly Directorate.

involved changes in personnel and bed base that took longer to implement. Changes in primary care practitioners' contracts with consequent reduced provision of out-of-hours care might also have directed an increased proportion of patients with relatively less severe illness to the hospital for assessment. It is also possible that nursing and residential homes may have lowered their thresholds for transfer of ill patients to acute assessment. Nevertheless, these changes have arguably been taking place throughout the time period of this study and may have been largely corrected for by adjusting for the underlying downward trend within the time-series analysis.

The development of an AMU facility was an essential component of specialty triage. This provided the necessary flexibility to allow patient transfer to the other medical wards when an appropriate specialty bed was available rather than prioritising transfer according to time elapsed since admission. As a consequence of its relatively high nurse staffing levels, and location adjacent to the emergency department, it also allows relatively high intensity medical and nursing care for patients within the critical first 12–48 hours of their hospital stay. This is particularly important at weekends and out of hours when medical and nursing staff support for other parts of the hospital is relatively thin. Leadership of the AMU could not be provided appropriately by an ever-changing duty physician. The development of a team of consultants in acute medicine has provided this leadership as well as providing continuing care for patients without an appropriate bed by 9 am on the morning after admission. The acute medicine consultants also provide a stable resource for the training and supervision of the junior medical staff and contribute increasingly to the internal medicine training for all specialist trainees.[20–22]

The specialty triage system breaks continuity of care during the admission but allows subsequent outpatient follow-up by the same specialist team. It is of course essential that effective systems are in place for handover of care during the inpatient stay.[23] A move to single-specialty wards within which consultants have a defined bed base was an essential component of the specialty triage system. This brings three further advantages:

1 The patient is looked after by an appropriate specialist nursing team.
2 Each medical team has a relatively constant level of inpatient work within a constant ward base.
3 The medical and nursing workload consists mainly of patients whose principal conditions lie within their area of particular expertise.

This has been perceived to substantially increase morale amongst medical and nursing staff although this has not been formally assessed. The impact on patient satisfaction has also not been directly assessed but the introduction of ward-based teams avoids the problems of 'lost patients' that were an occasional event in the past as a consequence of the patients for any one team being spread across the hospital's bed base. It has also reduced the risk of medical or nursing staff attempting to deal with clinical situations for which they have not received adequate training.

There had been concern that many patients might either have multiple pathologies or such an unclear diagnosis that it would not be possible to identify their most appropriate specialty shortly after admission. There was, however, already evidence that this was potentially achievable for about 74% of medical admissions.[24]

Table 4. Admission and readmission rates.*

	1997–8	1998–9	1999–00	2000–1	2001–2	2002–3
7-day readmissions	521	526	532	519	454	509
%	4.0	3.9	3.8	3.7	3.3	3.3
28-day readmissions	1,333	1,351	1,307	1,325	1,200	1,266
%	10.2	10.0	9.5	9.5	8.8	8.3

* Data shown are for complete years from May to April. Time-series analysis was performed using monthly data from April 1997.

Table 5. Average length of hospital stay (days) before (1997–9) and after (1999–2003) introduction of specialty triage.

	1997–8	1998–9	1999–00	2000–1	2001–2	2002–3
No group	9.2	7.0	6.2	8.0	6.9	4.5
Cardiology	6.8	7.1	6.6	6.4	7.3	5.8
Chest	9.9	10.3	10.1	11.0	10.7	10.8
Gastroenterology	9.7	9.7	9.5	9.3	10.4	10.4
Diabetes/ endocrinology	6.4	9.0	8.6	9.7	12.6	14.7
Rheumatology	13.3	11.2	15.0	11.5	11.9	16.6
Infectious diseases	8.6	9.4	8.0	11.1	14.3	12.8
Dermatology	9.0	11.9	9.6	12.2	11.8	12.3
Renal	21.8	16.3	18.3	20.7	17.1	15.3
Haematology	12.7	13.9	13.9	14.1	13.0	15.3
Neurology	26.1	27.1	32.2	20.6	20.5	11.6
Epilepsy	5.5	6.7	6.0	7.6	7.9	7.3
Pulmonary embolism	10.6	10.1	10.4	10.6	12.7	10.8
Stroke*	24.9	30.1	37.1	32.2	20.9	11.2
Other	9.7	10.1	8.9	8.8	8.5	8.2
Total	9.3	9.9	9.2	9.3	9.5	8.8

Data shown are for complete years from May to April. Time-series analysis was performed using monthly data from April 1997 to July 2003.
* Data shown here are for all stroke patients whether admitted within the general medical directorate (18.5% of all stroke patients) or within the Care of Elderly directorate. All other data are for patients admitted within the general medical directorate, corrected for patients discharged to home from the acute medicine unit assessment area without formal admission.

Table 6. Summary of time-series analyses. These analyses assess the significance of any change in end point following introduction of specialty triage in May 1999 after adjustment for any underlying trend.

Outcome	Age group	change	95%CI	P-value
In-hospital mortality (%)	<65	-0.64	–1.17,-0.11	0.021
	65+	0.01	–1.75,1.76	0.995
	All	–0.53	–1.72,0.66	0.385
7-day readmission (n)	<65	0.41	–0.27,1.09	0.237
	65+	–0.68	–1.52,0.16	0.117
	All	–0.02	–0.07,0.03	0.365
28-day readmission (n)	<65	0.36	–0.67,1.39	0.494
	65+	–0.34	–1.46,0.78	0.558
	All	–0.04	–0.15,0.07	0.493
All readmissions (n)	<65	0.84	–0.68,2.37	0.283
	65+	–0.97	–2.61,0.68	0.255
	All	0.01	–1.23,1.25	0.988
LOS (days)	All	–0.73	–1.50,0.04	0.067

LOS = length of stay.

A significant minority of patients will either have problems affecting multiple systems or will not have any easily definable problem. Thus, although the proportion of the workload that is relevant to each team's specialty substantially increases, all medical and nursing staff continue to deal with a range of general problems and this helps to reduce deskilling in areas of medicine outside their specialty. There remains a system for easy cross-referral for another specialist opinion where necessary.

The introduction of specialty triage requires adequate staffing levels, including at least two and preferably three consultants in each of the main specialties allied to general internal medicine (cardiology, respiratory medicine, and gastroenterology). There is a lesser role for diabetology/endocrinology in the management of acute medical admissions and it may be appropriate for the balance of work within this specialty to move towards a higher proportion of outpatient work. A strong provision for care of the elderly medicine remains essential and needs to be well resourced. The system allows that stroke patients of any age can be triaged towards a specialist stroke unit that is led by a specialist team within the Care of the Elderly Directorate. It is also an important component of the system that specialist cardiologists receive relevant specialty-triaged patients direct from the medical take. There is a move to include more neurologists within general hospitals[25] and this is very much in keeping with the aims of the specialty triage model.

The placement of patients onto specialty-based wards according to their principal problem on admission brought into sharp focus inequalities in provision for the different acute medical specialties within our hospital. Specialty development had previously been driven by outpatient demands with little reference to the specialty distribution of emergency admissions and the attempt to retain continuity of care had also resulted in many patients being managed on wards away from their medical team's base. The introduction of specialty triage led directly to recruitment of additional respiratory physicians and cardiologists, with funding helped by the coincidental establishment of the National Service Frameworks that included targeted funding for coronary heart disease and cancer. The changes associated with implementation of specialty triage undoubtedly have other cost implications including unknown implications for the costs of diagnostic tests and therapy, but these are beyond the scope of this study.

Many hospitals do not currently have a sufficiently large medical and nursing base to allow separation of all acute medical admissions by specialty. Sometimes this may be the result of local need, for example a small hospital serving a remote and sparsely scattered community. In many cases, however, it is the result of hospital planning which has pre-dated medical specialisation by many decades. The argument can be strongly made that any community of 250,000 or more deserves to have a general hospital that is sufficiently well staffed to allow emergency medical admissions to be seen by the most relevant specialist.

The system that allocates specialist teams to look after a broad spectrum of medical emergencies outside their area of expertise is not best practice and should be avoided wherever possible.

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