SURE Rapid Response

Are Hospital-based Emergency Medical Services effective and efficient?

September 2010

This rapid response was prepared by the Uganda country node of the Regional East African Community Health (REACH) Policy Initiative.

Key messages

- The goal of effective Emergency Medical Services (EMS) is to provide timely emergency medical care to all who need it
- Resolution WHA57.10 of the World Health Organization recommended member states to strengthen emergency and rehabilitation services
- Uganda has to date not had a formal policy or guidelines regarding medical emergencies
- It is estimated that improved trauma systems in low- and middle income countries could avert one to two million deaths in severely injured patients.

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SURE
Supporting the Use of Research Evidence

REACH
Regional East African Community Health Policy Initiative

EVIPNet
EVIDENCE-INFORMED POLICY NETWORK

Who requested this rapid response?

This document was prepared in response to a specific question from a policy maker in Uganda.

! This rapid response includes:

- **Key findings** from research
- **Considerations about the relevance** of this research for health system decisions in Uganda

X Not included:

- Recommendations
- Detailed descriptions

What is the SURE Rapid Response Service?

SURE Rapid Responses address the needs of policymakers and managers for research evidence that has been appraised and contextualised in a matter of hours or days, if it is going to be of value to them. The Responses address questions about arrangements for organising, financing and governing health systems, and strategies for implementing changes.

What is SURE?

SURE – Supporting the Use of Research Evidence (SURE) for policy in African health systems - is a collaborative project that builds on and supports the Evidence-Informed Policy Network **(EVIPNet) in** Africa and the Regional East African Community Health **(REACH)** Policy Initiative (see back page). SURE is funded by the European Commission's 7th Framework Programme.
www.evipnet.org/sure

Glossary

of terms used in this report:
www.evipnet.org/sure/rr/glossary

- A difficulty for low- and middle-income countries is that most documented experience on strengthening systems of trauma and emergency care comes from high-income countries and so raises questions on applicability.

- In comparison to the available options for arrangements for emergency services in Uganda, hospital-based emergency care is a leading option because of the already established infrastructure, personnel, and equipment.

- Despite the availability and presence of skilled and trained personnel, advanced technology, hospital based EMS (in Uganda?) have increasingly become inefficient, with much of the blame for this inefficiency being placed on overwhelming numbers.

- Some of the many challenges confronting hospital-based emergency care include:
    - demand outpacing capacity,
    - emergency department crowding,
    - boarding,
    - ambulance diversion,
    - inefficient use of resources,
    - inadequate surge capacity,
    - medical liability, fragmented systems,
    - lack of performance measurement and accountability,
    - inadequate research and infrastructure.

- Efforts to improve efficiency and effectiveness include:
    - reducing demand for expensive secondary care by broadening access to lower facilities while introducing barriers to major hospital accident and emergency departments;
    - use of emergency observation and assessment wards to ease the burden on emergency departments.

How this Response was prepared
After clarifying the question being asked, we searched for systematic reviews, local or national evidence from Uganda, and other relevant research. The methods used by the SURE Rapid Response Service to find, select and assess research evidence are described here:
A computerized search of the literature undertaken using Cochrane, Pubmed, McMaster Health Forum and Google scholar. Articles were searched for the text words among others emergency medical care. The medical sub heading (MESH) “emergency” was also searched. The related topics facility on PubMed was also used. A web search of the grey literature was also done and included

Background

Medical emergencies typically occur through a sudden insult to any part of the body due to an acute attack or an exacerbation of an already existing chronic condition. They usually occur unexpectedly, and thus rapid and responsive services to arrest the ensuing potentially fatal process can greatly increase one's chances of survival. The goal of effective Emergency Medical Services (EMS) is to provide timely emergency medical care to all who need it; this includes pre-hospital or pre-facility care, transfer and/or transport, and actual in-hospital treatment.

Setting up and running a responsive emergency medical care system that ably meets a wide range of needs for urgent care requires innovative thinking, planning, and adaptation. The needs include rapid assessment, timely provision of appropriate interventions, and prompt transportation to the nearest appropriate health facility by the best possible means; this controls morbidity and mortality, and prevents disability.

Emergency medical care is typically delivered in the first few hours after the onset of the acute medical condition. Common emergency conditions in Uganda, according to personnel working in the casualty unit of the national referral hospital include among others, obstetric complications, cardiac emergencies like heart attacks, accidental injury such as road traffic crashes and assault, acute onset or complication of infections due to conditions such as cerebral malaria, as well as acute phases of chronic illnesses like hypoglycaemia from diabetes. While most people will encounter emergency services only rarely in their lifetime, they would like to be able to count on them to be there when they need them.

The type of interventions required depend on the condition, its severity, the patient and the setting in which they are. The services to provide these interventions must be well coordinated, well designed, and locally appropriate, if they are going to be timely, relevant and of help for one to receive the life-saving care they need. The services begin with first responders—those who are first to assess a condition and apply care when an emergency occurs, and may end with these or with further and prolonged care in a facility, depending on the condition. While all medical emergencies require first-response care, not all patients would need to be transferred to a specialized hospital for treatment.

Emergency care services are generally receiving low priority in low income countries, for a number of reasons; in some cases health planners believe that emergency care requires sophisticated expensive equipment with high-technology interventions; other health organizers believe that having emergency departments in hospitals is sufficient and do not pay attention to the pre-hospital care that is as critical. In many countries, few resources are

set aside for emergency care, and when emergencies do occur, poorly organized responses are hastily put together, at times leading to more fatalities than would probably have been (1).

The initial care and stabilization of patients can be done in several locations including mobile services such as ambulances, emergency areas referred to as emergency wards, in clinics and small hospitals or in the emergency room of any health care facility. What is important is for these areas to have the necessary skilled personnel and equipment.

Many deaths and long-term disabilities can be prevented through strengthening trauma and emergency care. Resolution WHA57.10 of the World Health Organization recommended member states to strengthen emergency and rehabilitation services (2). Uganda has to date not had a formal policy or guidelines regarding medical emergencies. Strengthening trauma and emergency care has an important public health benefit. Trauma system development in high-income countries has reduced preventable deaths, by 50% in recent decades (3, 4), and it is estimated that improved trauma systems in low- and middle income countries could avert one to two million deaths in severely injured patients (5).

Strengthening these services is necessary in low income countries because currently available research shows that similarly injured people are nearly twice as likely to die in a low-income setting as in a high-income setting (2). This observation may fuel the common misperception that emergency care services are too costly and could possibly only be managed in high-income countries. In fact, in numerous settings improvements have been made with low-cost interventions. Cost-effectiveness studies have shown that many elements of trauma and emergency care are among the most cost-effective public health interventions (2). In addition, it has in fact been shown that emergency care does not necessarily increase operational costs; good organization and planning can be done at reasonable costs and can lead to a better use of resources, better care of patients, and thus better health outcomes (1). Furthermore, aside from the day to day need for emergency care, strengthening trauma and emergency care is a prerequisite for better preparedness for mass-casualty incidents, and is an important priority, particularly in major emergencies of abrupt onset.

Elements that need to be taken care of among others are the first-line responders, communication, transport and transfer mechanisms, equipment and skills. In the Ugandan context, several options for arrangement exist but attention has to be paid to the number and distribution of facilities under each arrangement and the associated distance for the majority of the community before a decision is made on whether to depend on health facility based emergency services or other arrangements.

A difficulty for low- and middle-income countries is that most documented experience on strengthening systems of trauma and emergency care comes from high-income countries. Information relevant to low income countries is limited. This paper presents findings from the literature on hospital based emergency medical services, especially issues that may reduce its effectiveness and efficiency. It also points out evidence on facts about substituting or complementing traditional hospital based accident and emergency departments, ways that have been used to enhance the efficiency of these hospital based A&E facilities.

What we found

Considering the options that Uganda has in terms of organization of trauma and emergency services, hospital based services is a leading option, because of the already established infrastructure, personnel, equipment. Most of these however need revamping. For a new independent entity to take over the provision of emergency services, it is likely that they would still have to use the present infrastructure - hospitals and lower facilities, to reach the majority of the population in various locations, at least for a while before they can have their own facilities up and running smoothly which could take a while. The public safety departments (police and fire) are a viable substitute but do not have emergency centres of their own in Uganda. They are a good first line of response and transfer agent especially for trauma but may have limited capacity to deal with conditions other than trauma. Therefore for the Ugandan case, the more effective and efficient system to use under the current conditions would be the hospital-based EMS. These are commonly used worldwide and are well established in many of the hospitals.

Hospital-based EMS in many countries is generally effective with the presence of skilled and trained personnel, advanced technology and necessary equipment (6). Despite this however, these facilities have increasingly become inefficient and much of the inefficiency has been blamed on overwhelming numbers among other things (6). This is important to note for a country like Uganda whose population is growing rapidly, and is fast embracing modernization and many other things that lead to the growing use of the available services. It is also important to note for a country in which majority of the hospitals and especially peripheral ones may not have the capacity to handle emergencies on a day to day basis, not to mention mass casualties. The number of emergency visits increases dramatically as society grows and most emergency visits and hospital admissions will increasingly tend to be unscheduled. In addition the patient population also tends to get much sicker. At the same time, the route of entry into the hospitals has shifted, with the majority of patients entering the hospitals through the emergency department, and with most coming in the afternoons

and evenings. Despite this significant shift, hospitals have not adapted to the changes and continue to function as '9 to 5', 'Monday through Friday' institutions with skeleton staff in the evenings, nights, and weekends. This results in a mismatch of demand versus resources, generating serious lack of capacity issues.
In addition, contrary to the conventional wisdom that emergency patient volume is highly unpredictable, the number of admissions per day can be predicted with remarkable accuracy.

Many challenges confront hospital-based emergency care including the following which stand out for their complexity, gravity, and urgency (7):

- **Demand outpacing capacity**—hospital-based emergency departments (ED) have become frequently crowded environments, with patients sometimes lining hallways waiting for hours or even days to be admitted to inpatient beds (8). With a rapidly growing population in Uganda and the (public) medical service providers not growing in proportion, many of the facilities that can handle emergency care would soon be overwhelmed with the demand for services. This is also fueled by the growing number of medical emergencies in turn fueled by increasing technology, modernization, overcrowding, conflict and many other factors. The result of this growing imbalance between demand and capacity is a nationwide epidemic of emergency departments getting overcrowded.
- **ED crowding**—crowding is the most obvious manifestation of the imbalance between emergency department demand and capacity. It occurs when patient volume swells up in the ED with many patients coming in to the department, but not enough being admitted to the inpatient facility in a timely manner to make room for more incoming patients. As admitted patients back up in the emergency room, crowding becomes severe. Emergency Department overcrowding blocks access to emergency care, induces stress in providers and patients alike, and can lead to errors and impaired quality of care.
- **Boarding**—a consequence of crowded emergency rooms is the practice of boarding that is, holding a patient who needs to be admitted in the ED until an inpatient bed becomes available. Boarding not only is frustrating and at times unsafe for the patient, but also adds to an already stressful work environment for physicians and nurses and enhances the potential for errors, delays in treatment, and diminished quality of care.
- **Ambulance diversion**—when emergency departments become saturated to the point that patient safety is compromised, inbound ambulances may be diverted to alternative hospitals. This used to be a safety valve to be used in extreme situations, however ambulance diversion has now become a commonplace event in many cities (7, 9) A recent federal study done in the USA reported that 501,000 ambulances were diverted in 2003, an average of 1 per minute, and according to the American Hospital Association, nearly half of all hospitals, and close to 70%, reported time on diversion in 2004 (7). Ambulance diversions can lead to catastrophic delays in treatment for seriously ill or injured patients.

This is an issue that all hospital and facility based emergency medical services need to pay attention to.

- **Inefficient use of resources**—Emergency departments in low income countries are misused as first points for all kinds of patients even those in stable condition. This is a misuse of much needed resources and may result in the inefficiency of the department. Misuse of the emergency department could lead to delays with fatal consequences for patients who would have genuinely benefitted from the emergency room services.
- **Inadequate surge capacity**—many major hospitals in Uganda are already operating at or over capacity. Because major hospital emergency departments are already crowded with patients and may even be boarding large numbers of inpatients, there is little or no surge capacity to absorb a large influx of patients from a significant mass casualty event. Furthermore, supplies of specialized equipment, such as personal protective equipment, negative pressure rooms, and ventilators, are inadequate to meet the demands of a major disaster or an epidemic.

Other factors to pay attention to include:

- **Medical liability**—Emergency and trauma care providers, including hospitals, emergency and trauma physicians, and on-call specialists, face extraordinary liability exposure. This has led to many limiting the scope of their practice or stop assuming emergency room call. This has resulted in i**nadequate supply of on-call specialists** and this is particularly true for highly skilled specialties such as neurosurgery, interventional cardiology, and orthopedic surgery. This is made worse in a low income country where these specialists are already too few.
- **Fragmented systems**—Emergency care systems are highly fragmented. EMS agencies, hospitals, trauma centers, public safety services (e.g. police and fire), and public health agencies often lack effective communications and fail to coordinate well across the continuum of emergency care. Coordinating the flow of patients is critical to ensuring that each patient is directed to the most appropriate setting for care, yet effective coordination between EMS and hospital EDs and trauma centers has been found to be lacking in many systems.
- **Lack of performance measurement and accountability**—there is no standardized measurement or reporting of the performance of emergency and trauma care providers and systems. As a result, few people have any real understanding of the quality of care they can expect to receive from their local emergency providers.
- **Inadequate research and infrastructure**— despite the importance of emergency and trauma care, research in the field lags well behind that in other fields. This is not seen in Uganda or low income countries alone but it has also been noted to lack a strong and stable research base within the National Institutes of Health and other agencies.

The above issues end up impacting on quality, safety, timeliness, effectiveness, efficiency and equity. For example, a study of hospitalized patients in the USA found that although the ED was the site of only 3% of adverse events, it was the site of 70% of those events attributed to negligence (10).

Major tertiary hospitals, emergency and trauma care brings together the best of medicine—highly trained, interdisciplinary teams of dedicated specialists armed with advanced medical technology. Beyond these large tertiary centres, however, the effectiveness of the system is less certain, worse still in a low income country where the lower primary and secondary facilities are still weak in many ways. Many community hospitals, especially in rural areas, do not have emergency physicians on staff. Many lack key specialists to back up their emergency officers. If these facilities were well equipped to handle emergencies, they would easily ease the burden off of the tertiary hospitals. Evidence from a systematic review to assess the extent to which primary-secondary substitution is possible in the field of emergency care, suggested that broadening access to primary care or lower facilities in this case and introducing user charges or other barriers to the major hospital accident and emergency department can reduce demand for expensive secondary care (See table 1 and 3 in appendices) (11). It also showed that on a smaller scale, employing primary care professionals in the hospital A & E department to treat patients attending with minor illness or injury seems to be a cost-effective method of substituting primary for secondary care resources (See table 2 in appendices). For example, of the nine studies concerned with access to primary care, eight demonstrated large reductions in demand for accident and emergency care following an expansion in the provision of local primary care services. Interventions that addressed both sides of the primary-secondary interface and recognized the importance of patient preferences in the largely demand-driven emergency service were more likely to succeed in complementing rather than duplicating existing services. These interventions may be use to increase effectiveness in a hospital emergency department.

Another option that has been used to boost the efficiency of the hospital based ED is the use of emergency observation and assessment wards to ease on the burden. Observation and assessment wards allow patients to be observed on a short-term basis and permit patient monitoring and/or treatment for an initial 24–48 hour period. In a systematic review whose aim was to evaluate the current literature and discuss assessment/admission ward functionality in terms of organization, admission criteria, special patient care, and cost effectiveness, most articles suggest that these wards improve patient satisfaction, are safe, decrease the length of stay, provide earlier senior involvement, reduce unnecessary admissions, and may be particularly useful in certain diagnostic groups (See table IV in appendices) (12). They were also found to be generally cost effective (See table V in appendices).

Conclusion

Strengthening emergency and trauma systems in Uganda is likely to lead to improved survival in emergency situations as has already been shown in other countries. Uganda has a number of options to choose from in the process, however the current context - infrastructure and personnel, favours the hospital based emergency services. These have been shown to work effectively however are compromised by a number of factors which lead to reduced quality of services and inefficiency. Several efforts have been suggested to help improve this situation, and include making use of observation wards and increasing the involvement of primary or lower level facilities in the area of emergency care. It is however acknowledged that the area of emergency and trauma care is quite under-researched in low income countries including Uganda.

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SURE collaborators:

REACH
Regional East African Community Health Policy Initiative

The **Regional East African Community Health-Policy Initiative (REACH)** links health researchers with policy-makers and other vital research-users. It supports, stimulates and harmonizes evidence-informed policymaking processes in East Africa. There are designated Country Nodes within each of the five EAC Partner States.
www.eac.int/health

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The **Evidence-Informed Policy Network (EVIPNet)** promotes the use of health research in policymaking. Focusing on low and middle-income countries, EVIPNet promotes partnerships at the country level between policymakers, researchers and civil society in order to facilitate policy development and implementation through the use of the best scientific evidence available.
www.evipnet.org

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Appendices

Table I: Primary care interventions; Access to Primary Health Care

Author/Setting	Intervention/focus	Study design	Effects measured	Results
Bonham and Barber, Kentucky, USA	Managed care scheme for Medicaid patients	Before and after	Accident and Emergency department attendance rates; treatment patterns	Attendance rate was lower by 40%: 14% less patients saw the doctor and 26% less underwent medical tests
Hilditch, Torornto Canada	Primary health care centres with facilities for urgencies	Before and after	Accident and Emergency department attendance rates	Attendance rate lower by 36%
Hocheiser, New York state, USA	Primary health care centre for children enrolled in Medicaid	Before and after with control group	Paediatric accident and emergency department visitors	A decrease of 38% in study group and 20% in control group
Hurley et al., USA	Managed care type schemes for Medicaid patients in four different areas of the US. The schemes varied in operation	Before and after with control group	Accident and Emergency department attendance rates; utilization patterns of emergency department attenders	Effect ranged from a reduction of 28% to 44% in the study area. A reduction of 13% to an increase of 10% in the control group. No significant effect on utilization patterns of emergency department attenders
Moore, Boston, USA	Primary care health centre	Before and after with control group	Accident and Emergency department attendance rates	No significant change in study area; weak evidence of a general increasing trend in A&E attendance elsewhere
Paneth et al. New York, USA	Primary care program for children	Randomised controlled study (high refusal rate: 45%)	Accident and Emergency attendance rates	Significant difference in the number of emergency visits per patient made during working hours: 0.53 in intervention group, 2.18 in control group. Number of frequent attenders also significantly reduced
Porter, Souther Israel	Comprehensive paediatric primary care service	Controlled study	Paediatric accident and emergency attendance and admission rates	Attendance rate: a reduction of 50%; admission rate was unchanged
Sjonell, Stockholm, Sweden	Reorganization of health centre to provide wide range of primary care	Before and after with control group	Accident and Emergency department visits; ambulance home visits; primary care utilization	A&E visits reduced by 40%; ambulance home visits reduced by 24%; primary care visits increased by 13%. In the control district primary care visits increased by 19%
Ullman, New York, USA	Primary care health centre adjacent to hospital	Before and after	Accident and Emergency department visits for selected specialities	Non accident related paediatric visits to A&E reduced by 27%. No significant change in medical attendances or in accident related visits

Table II: Integrating primary and secondary care in the A&E department: General practitioners employed in hospital A&E departments

Author/Setting	Intervention/focus	Study design	Effects measured	Results	
Dale et al. London, UK	King's College Hospital, inner-city teaching hospital	Quasi-randomized controlled study	Management of patients with primary care type conditions	GPs vs SHOs. Reduction in any investigation, x-rays, prescriptions and hospital referrals by 58%, 64%, 22% and 58% resp. An increase in community referral by 21%	GPs vs Registrars Reduction in any investigation, x-rays, prescriptions and hospital referrals by 44%, 58%, 35% and 52% resp. An increase in community referral by 16%
Murphy et al., Dublin, Ireland	St James' Hospital inner-city teaching hospital	Randomized controlled study	Management of patients with semi-urgent or non-urgent conditions	GPs vs hospital staff (semi-urgent patients). Reduction in any investigation, x-rays and any referrals by 20%, 20% and 41% resp. An increase in any prescription by 41%	GPs vs hospital staff (non-urgent patients). Reduction in any investigation, x-rays, and any referral by 25%, 24% and 64% resp. An increase in any prescription by 52%
Ward et al., London, UK	St. Mary's hospital, inner city teaching hospital	Controlled study	Management of patients with primary care type conditions	GPs vs hospital staff (semi-urgent patients). Reduction in any investigation, x-rays and any referrals by 20%, 20% and 41% resp.	

Table III: Emergency care interventions

Author/Setting	Intervention/focus	Study design	Effects measured	Results
Telephone triage				
Shah et al., Toronto, Canada	Telephone triage and advice for patients ringing Hospital for Sick Children	Before and after	Paediatric hospital A&E attendances and admissions	Attendances reduced by 6% and admissions reduced by 9%
'Inappropriate' accident and emergency attenders directed to primary care providers				
Chan et al., Los Angeles, USA	Following treatment appointment provided	Before and after with control	Hospital A&E attendances	Rate of emergency department attendance: NS. Rate of outpatient clinic attendance: NS. Rate of primary care attendance increased by 361%
Derlet et al., Sacramento USA	Before treatment	Before and after	Health care utilization patterns of patients directed away from hospital	Approximate reduction in A&E attendance by 9.7%
Gadomski et al., Maryland, USA	Before treatment provided	Before and after with control	Hospital A&E department attendance; admissions and outpatient visits	Initial reduction in non-emergency attendance by 25%. Follow up rates of attendance (children denied access to A&E vs matched sample of children attending primary care). A&E attendances, hospuital outpatient visits and hospital admissions increased by 85%, 655 and 300%

Hansagi et al., Stockholm, Sweden	Before treatment provided	Before and after with control	Hospital A&E department attendance; primary care visits	A&E attendance rate decreased by 6% while primary care attendance rate; in the control group A&E attendance, and primary care attendance rate increased by 111% and 18% resp.
Kelly, California, USA	Before treatment provided	Before and after	A&E attendance and case-mix; Primary care visits	A&E attendances decreased by 27% while those classed as non-emergency decreased by 68%. Primary care visits increased by 117%
Rivara, et al., Memphis, USA	Before treatment provided	Before and after	Primary care visits	A&E attendances decreased by 37%
Skinner et al., Houston, USA	Before treatment provided	Before and after	Hospital A&E department attendances; outpatient and primary care visits	A&E attendance and outpatient clinic attendance rates decreased by 67% and 365 resp. Primary care attendance rate increased by 54%
Straus et al., Baltimore, USA	Following treatment	Before and after	Hospital A&E attendances	Non-significant
User charges for accident and emergency care				
Murphy et al., Dublin, Ireland	Since 1994, around 2/3 of Irish population has a financial incentive to visit a GP before attending A&E	Before and after	Hospital A&E attendances	Small decrease in the proportion of patients affected by the incentive scheme attending the A&E department (1%). Small (3%) increase in the proportion of these patients referred by their GP
O'Grady et al., USA	Various insurance schemes with a range of user charges for A&E care	Randomised controlled trial	Hospital A&E attendances and admissions	User charges generally resulted in a significant decrease in attendances ranging from 20 to 35%. Admissions were significantly reduced by 33%. Only one scheme requiring patients to contribute 50% of the cost of care had no significant impact on attendances
Selby et al., California USA	Fixed rate user charge for accident and emergency care	Before and after with control	Hospital A&E deprtment and outpatient attendances and emergency department case-mix	A&E attendance decreased by 15%; change in urgent outpatient clinic attendance was non significant. Pediatric and adult outpatient attendance decreased by 5.2% and 4.6% resp., A&E attendances classified as often not an emergency decreased by 29%
Steinmetz and Hoey, Quebec, Canada	Impact of Medicare scheme enabling eligible patient to receive ED treatment free at the point of delivery	Time series analysis	Hospital A&E department and outpatient attendances	Prior to introduction of Medicare, ED attendances increased at an average rate of 7% pa. After the introduction of Medicare ED attendances increased by 14% pa on average.

Table IV: Emergency observation and assessment wards

Khan, SA (1997)	Elderly	Short stay ward can reduce some patients stay in hospital and reduce demand for in-patient places. Increased level of care for elderly patients
Beatie, TF (1993) Biddulph, J (1984)	Children	Children get comfortable beds more quickly. Improved awareness of simple pathology. Most children admitted to an observation unit were sent home without requiring hospital treatment. Observation easier and more efficient than if admitted fully to hospital
Ryan, J (1996)	Self harm	Most patients discharged next day without need for

		further follow up. Potential cost savings made.
Jones, A (1995) Brown, SR (1994)	Head Injuries	Observation ward offers safe and monitored area for recovery. Few patients require admission to other wards. Number of inappropriate discharges decreased
Gouin, S (1997) Wilbert, C (1997)	Asthma	An observation unit lowered the hospitalization rate for children with asthma, yet there was an increased rate of repeat visits to the ED. Holding room therapy for childhood status asthmaticus is beneficial both medically and cost wise.
Hutchins, CJ (1978)	Gynecology patients	Of 408 patients admitted to one gynecological unit, 56% were in hospital for less than 6 hours and a further quarter did not require hospital admission. Full staffing of a unit could release a number of beds for other selected work.
Gaspoz, JM (1994) Goodacre, SW (2000)	Chest pain	Short stay units prevent unnecessary long stays in hospital, and are safe and cost effective. There is insufficient evidence to say that an observation unit will improve outcomes if clinical practice is good. Not proven to be financially beneficial in the UK yet.
Henneman, PL (1989) Conrad, L (1995) Israel, RS (1991)	Abdominal conditions and trauma	Abdominal trauma and negative diagnostic peritoneal lavage can be safely managed in an observation unit. Patients with initial negative test results can be evaluated in observation units. 72% of patients treated for pyelonephritis were successfully managed on an observation ward and were discharged early

Table V: Cost effectiveness studies of assessment/admission wards in A&E medicine

First author (year)	Country	Patient group studied	Main conclusions
De Leon, 1989	US	Chest pain	Use of the chest pain evaluation unit resulted in an 80% reduction in cost of ruling out acute myocardial infarction for patients not admitted to a coronary care unit.
Zwicke, 1982	US	Asthma	Use of an ED observation unit is less expensive than admission with the mean observation unit stay being 34% of the cost incurred for a hospital admission.
Brillman, 1994	US		The use of an observation unit in the ED does not produce cost savings. Patients that would have been discharged home from the ED were sent to the unit therefore not reducing overall costs.
Henneman, 1989	US	Abdominal trauma	Evaluation of the use of 12 hrs monitoring in an ED observation unit in the management of 230 patients. Selected patients can be managed cost effectively with a potential saving of more than $51000.

Gaspoz, 1994	US	Myocardial infarction	Examined the cost benefits of a new short stay unit for low risk patients who may be admitted to a hospital to rule out myocardial infarction. Concluded that a coronary observation unit may be a cost effective alternative to current triage strategies for patients with a low risk of acute myocardial infarction admitted from the emergency department.

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Conflicts of interest
None known.

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