ORIGINAL ARTICLE

Use of emergency observation and assessment wards: a systematic literature review

M W Cooke, J Higgins, P Kidd

Emerg Med J 2003;**20**:138–142

See end of article for authors' affiliations

Correspondence to: Dr M Cooke, Emergency Medicine Research Group, Centre for Primary Health Care Studies, University of Warwick, Coventry CV4 7AL, UK; m.w.cooke@Warwick.ac.uk

Accepted for publication 21 January 2002

Introduction: 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. They should permit concentration of emergency activity and resources in one area, and so improve efficiency and minimise disruption to other hospital services. These types of ward go under a variety of names, including observation, assessment, and admission wards. This review aims to evaluate the current literature and discuss assessment/admission ward functionality in terms of organisation, admission criteria, special patient care, and cost effectiveness.

Methods: Search of the literature using the Medline and BIDS databases, combined with searches of web based resources. Critical assessment of the literature and the data therein is presented.

Results: The advantages and disadvantages of the use of assessment/admission wards were assessed from the current literature. 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. A number of studies summarise their organisational structure and have shown that strong management, staffing, organisation, size, and location are important factors for efficient running. There is wide variation in the recommended size of these wards. Observation wards may produce cost savings largely relating to the length of stay in such a unit.

Conclusion: All types of assessment/admission wards seem to have advantages over traditional admission to a general hospital ward. A successful ward needs proactive management and organisation, senior staff involvement, and access to diagnostics and is dependent on a clear set of policies in terms of admission and care. Many diagnostic groups benefit from this type of unit, excluding those who will inevitably need longer admission. Vigorous financial studies have yet to be undertaken in the UK. Definitions of observation, assessment, and admission ward are suggested.

Emergency observation wards, admission wards, and assessment wards as terms have been used variably in the literature, and the functioning of these wards is diverse. They perform two main functions; firstly, they can work as observation centres for short-term admissions and secondly, they can form active filters where investigation, including near patient testing and imaging, and urgent treatment,[1] are undertaken. Most assessment/admission wards have a 24–48 hour stay rule.[2] Recent UK government funding has encouraged the running of assessment/admission wards for the management of emergency admissions.[3 4] The NHS Plan launched in July 2000, specifically recommends that assessment and admission wards be established.[5]

The types of patient accepted into assessment/admission wards can be classified into high risk discharges, such as chest and abdominal pain[6]; those requiring short-term treatment[1 7 8]; patients with limited medical needs[6] and clinical conditions needing only short-term observation.[6 9] Changes in medical management have increased the potential use of such wards, for example, in the treatment of deep vein thrombosis where rapid investigation and home treatment is now accepted practice rather than hospital admission. Patients who are not usually admitted to assessment/admission wards include those with unstable vital signs, or patients needing specialist or intensive care.[10]

In the NHS, the history of assessment/admission wards goes back over 40 years. The need for observation beds was first recognised in 1960 by the Nuffield review of casualty services[11]; it was then reiterated by the Platt report[12] and the Lewin Report.[13] In 1968, a 22 bedded accident and emergency (A&E) ward was described,[14] which had an average occupancy of 16 patients, accepting mainly surgical and orthopaedic cases. In 1989, the British Association of Accident and Emergency Medicine (BAEM) recommended every A&E department should have one short stay bed for every 5000 attendances.[15]

Hitherto, the evidence base in favour of assessment/admission wards has not been subject to rigorous review. In an analysis of assessment/admission ward efficacy, the advantages and disadvantages of such a ward have to be considered. This can be done in terms of patient benefit (for example, appropriateness of admission, length of stay, and bed availability); staff benefit (release of pressure and stress on staff); and cost effectiveness. We have systematically reviewed the literature regarding the main functions of an assessment/admission ward and discuss the implications for emergency medicine.

METHODS

A computerised search of the literature was undertaken using Medline and BIDS. Articles were searched for the text words "observation", "assessment", or "short stay" combined with "ward" or "unit" and "emerg$" ($ being a wild card). The medical sub heading (MESH) "observation" was also searched. The related topics facility on PubMed was also used.

Internet searches were carried out using the same text words with a medical filter (www.medisearch.co.uk). The Department of Health and National Institute of Health databases were also searched.

Review of article titles and abstracts identified were undertaken, and all potentially relevant articles were reviewed for inclusion. The bibliography of each relevant article was searched for related citations and these were also reviewed.

Because of the paucity of articles in the field, all those with original data were critically appraised for inclusion in this review. The methods used conform to those described for qualitative systematic reviews.[16]

RESULTS

The current problems associated with medical admissions have been recognised to be communication, appropriateness of referral, finding beds, waiting by patients, and organisation of care.[17] It is recognised that 70% of medical admissions can be admitted through an admissions ward (6% go directly to a critical care ward and the remainder are elective or admissions from clinic).[18] About one third can be discharged within 24 hours.[18] This is not in itself an indication of inappropriate admission [10 19–21] as the patient's condition may have required short-term care or observation to minimise the risk of complications or greater morbidity and to rule out certain serious conditions. However, it has been suggested that 9.5% of short-term admissions could be prevented, most by a senior specialist opinion in the A&E department.[22] Another study showed that increased imaging would prevent 16% of admissions to a medical unit.[10] Over half the emergency admissions will come via 999 ambulance.[18] To allocate those arriving by 999 ambulance to the A&E and those referred by the general practitioner to an assessment ward is therefore illogical and results in duplication of services. Most delays in discharge are attributable to organisational problems.[21] Although these wards may reduce admissions, one study suggested that they may increase the inappropriate care of those discharged home.[23]

Little work has been undertaken on the role of the medical admissions unit. As there is variability in the nomenclature and roles of admission wards, assessment units, etc, it is difficult to combine results to produce findings that are generalisable. One study evaluated a package of changes including the formation of a medical admissions ward and a consultant dedicated to the unit each week. It concluded that medical patients were no longer on other wards, more patients saw a specialist physician earlier, medical staff had less concerns of "losing" patients on outlying wards, and patient and staff satisfaction rose significantly.[24]

The functioning of assessment/admission wards has been described by various authors.[7 25–27] Goodacre[27] recently described the role of short stay observation units in UK A&E departments. Some 59% of A&E departments had a short stay ward. By comparison, a review of Australian emergency departments found that 50% had an observation ward and the number of beds present was 1:5254 emergency department (ED) attendances. The operational characteristics of Australian units were similarly variable to those in the UK and America, but most were under the control of emergency physicians and had a time limitation on stay in the ward. Some concerns were expressed that the presence of an observation ward may decrease decision making in the ED.[28]

Brillman[6] reviewed 10 descriptive studies and concluded that 2%–6% of patients seen in the ED may be suitable for observation unit care. She discovered a wide range in the number of beds, from 10%–40% of bed capacity of the parent emergency department. An earlier American study showed that 27% of EDs had observation wards and that most of these were located within the department. A further 16% were developing such units. Users perceived them to be safe and cost effective.[2] Therefore, observation units seem to be an increasingly important part of hospital care because they can act as an alternative to admission or discharge and for financial reasons, more patients are being managed on an outpatient basis.

One of the key findings from the literature was that patient satisfaction increased with the presence of an observation ward.[29–31] In a prospective, randomised, controlled trial with a sample of 163 patients presenting to the ED with acute asthma exacerbation, Rydman *et al*[29] assigned patients to an asthma observation unit based in the ED, or to customary inpatient care. On four summary ratings of patient satisfaction, the observation unit patients scored higher with fewer total problems and fewer problems regarding care received, communication, emotional support, physical comfort, and special needs, than did the inpatient group. Patients cared for in an observation unit also had fewer investigations and spent time in a more comfortable environment before admission.[32] As an extension of ED evaluation, an observation unit has also been shown to reduce the workload in the ED, thus giving staff better flexibility and improving the flow of patients.[6] Patients may also benefit from the increased time available for monitoring their clinical condition after ED treatment, and as a direct result of this, referral to a specialist team (for example, cardiology) can be made earlier.[24]

The pressure on hospital staff can be reduced by the provision of observation services because more time can be spent making important decisions regarding diagnosis.[6 26] As a consequence of this, senior doctors can prevent inappropriate admissions.[36–38] Hadden *et al*[36] also found that observation in a general ward seems to increase the length of stay in hospital when compared with observation unit stay. Patients also had to wait longer in a ward before being seen by a senior doctor. One of the key causes of delayed discharge is the wait for the results of important investigations.[37] It is necessary therefore that 24 hour access to diagnostic facilities is available in these wards.[6 38] Again, time may be saved if the rapid turnaround of results is focused in one area, permitting earlier discharge. Moreover, the unit may act as a hospital safety net for patient evaluation, again reducing pressure and stress on ED staff.[39]

Although there seem to be many advantages associated with the provision of assessment/admission wards, poor management and inadequate operational policies can have severe effects on the running of the ward and can cause additional problems in other hospital departments.[40] Certainly patient admission and discharge decisions can be complicated by poorly defined procedures. Rainer *et al*[41] commented that patients remaining in the ward in excess of 72 hours can cause a significant increase in workload and hence patients need to be transferred out within 24 hours of arrival.[32] For this reason, some A&E specialists have been averse to accepting responsibility for an observation ward, claiming that a unit may become a "dumping area" for patients who ought to have been either admitted or discharged.[6 41] It is also important that definitions are adhered to regarding admission criteria—that is, whether a patient is admitted under A&E or another specialist group.[41] The potential for increased stress levels among staff and on resources is also clear. The possible drain in staff from the ED needs to be countered by increased staff levels over other wards and the variation in admission numbers each day means that bed occupancy has to be low to ensure adequate capacity for busy days.[32] Another problem with short stay wards is that they could potentially become centres of social care above that of medical care. In areas where assault and alcohol related violence are prevalent, a short stay centre for dealing with patients may be of benefit, yet this should not be at the expense of adequate community arrangements.[41]

A number of studies have evaluated the use of observation wards for specific patient groups. Each study found specialist observation units to be advantageous in terms of cutting costs, preventing unnecessary hospital admissions, and reducing overall treatment times. Nevertheless, a recent study by Goodacre, who reviewed the literature regarding chest pain observation units in the UK, suggested that there was insufficient evidence as to whether an observation unit will improve results if clinical practice is already good.[27] Furthermore, the same study questions the financial benefits of an observation ward, although cost savings do seem to be made in the United States healthcare system. Table 1 shows a summary of the conclusions drawn from specialist patient group studies.

One of the key criteria for assessing the efficacy of observation wards is the reduction in hospital admissions. To date, there have been a number of trials to determine whether such reductions actually occur. One randomised trial, which used a small patient sample size of 222, assessed the treatment of asthma patients and compared hospital inpatient care with an

Table 1 A summary of the benefits of an assessment/admission ward with respect to certain groups of patients

First author (year)	Patient group	Summary of benefits gained from presence of an assessment/admission ward
Khan, SA (1997)[58]	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.
Beattie, TF (1993)[44]	Children	Children get comfortable beds more quickly. Improved awareness of simple pathology.
Biddulph, J (1984)[59]		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)[60]	Self Harm	Most patients discharged next day without need for further follow up. Potential cost savings made.
Jones, A (1995)[39]	Head injuries	Observation ward offers safe and monitored area for recovery. Few patients require admission to other wards.
Brown, SR (1994)[61]		Number of inappropriate discharges decreased.
Gouin, S (1997)[22]	Asthma	An observation unit lowered the hospitalisation rate for children with asthma, yet there was an increased rate of repeat visits to the ED.
Willert, C (1997)[62]		Holding room therapy for childhood status asthmaticus is beneficial both medically and cost wise.
Hutchins, CJ (1978)[63]	Gynaecology patients	Of 408 patients admitted to one gynaecological 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)[64]	Chest pain	Short stay units prevent unnecessary long stays in hospital, and are safe and cost effective.
Goodacre, SW (2000)[27]		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)[65]	Abdominal conditions and trauma	Abdominal trauma and negative diagnostic peritoneal lavage can be safely managed in an observation unit.
Conrad, L (1985)[66]		Patients with initial negative test results can be evaluated in observation units.
Israel, RS (1991)[67]		72% of patients treated for pyelonephritis were successfully managed on an observation ward and were discharged early.

ED observation unit.[42] However, no difference was found in admission rates between the two groups. A before and after study investigating the introduction of a paediatric observation ward noted a reduction in admissions of 31% and the frequency of under 24 hour admissions decreased from 17% to 10%.[23] Brillman[43] described the effect of the opening of an observation ward for adults and children. They found no change in admission rate, but a greater number of patients were sent from the ED to the observation ward and there was a decrease in direct discharge from the ED.

A number of authors have compared the cost of observation ward treatment and inpatient care. From these studies, it has been widely reported that observation units produce savings although, as these analyses are not cost effectiveness studies, they must be interpreted with caution. Table 2 summarises a number of cost studies that have been performed with different patient types.

No clear studies have been performed that compare the different organisational structures running an observation unit but it seems that strong management is essential, especially to ensure that transfers to other wards are not delayed.[44] One study has shown that the time from arrival to the decision to admit was 47 minutes quicker (158 compared with 205 minutes) when the patient was seen by an emergency medicine consultant compared with a general physician.[45] In another study, at least 91% of observation wards had ward rounds by senior staff, with over half undertaking at least one ward round per day.[27] Certainly delegation of tasks and a predetermined line of command will also facilitate decision making processes and assist in the smooth operating of the unit. Staff should be specifically allocated to assessment/admission wards and it is essential that experienced nurses are present to perform traditional doctors' roles.[6 46]

The number of beds required in a paediatric observation unit was assessed by Beattie and Moir.[51] They concluded that one observation unit bed for every 5000 paediatric attendances was appropriate. However, in comparison, an American study suggested that about 75 per 5000 visits are suitable for

Table 2 Cost effectiveness studies of assessment/admission wards in A&E medicine

First author (year)	Country	Patient group studied	Main conclusions
De Leon, 1989[68]	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[69]	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[43]	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[65]	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[64]	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.

Key points

- Use of admission/assessment wards is safe, reduces total length of stay for some diagnostic groups, improves patient satisfaction, reduces A&E department workload, and can mean that patients are seen earlier by senior doctor with early decision making. It also provides a safety net function against inappropriate discharge.
- However, it may be used for social care and other care inadequately provided elsewhere in the hospital rather than true solutions being found. It can cause a drain of staff from A&E.
- Performance is dependent on good management and availability of diagnostic services.
- Cost effectiveness has not been proved.

observation unit care.[48] Some other American studies have proposed that there is a much lower need for paediatric observation units.[49 50] This variation is probably related to variation in practice and definition of observation units. The random daily variation in demand would mean that a single bed would be inadequate 25% of the time and empty 37% of the time. In terms of observation unit location no clear directives exist, though it has been suggested that a position within, or in very close proximity to the A&E ward is very important.[6 51]

CONCLUSIONS

In the UK there has been a proliferation of observation and assesment wards in the past few years. The main driving force has been the avoidance of long waits in A&E. This review looks at whether there is an evidence base for establishing such units. There is no evidence regarding whether the initial assessment is best undertaken in A&E or an assessment ward, local factors will probably determine the best configuration but as functions are similar it is unlikely that geographical location is significant but that the intervention offered is more important. These units also serve as areas where observation can be undertaken. They may result in benefit because the person is admitted to an area where the usual practice is to observe and then discharge and hence they are not mixed with cases where a longer stay is usual. This may therefore maintain a culture of rapid discharge for this group of patients. This, combined with rapid access to senior staff and diagnostics, is probably the key to "observation medicine". Clearly there are a number of advantages over admission to a general ward, yet certain criteria need to be met if the ward is to be of benefit to patients, staff and the hospital as a whole. Assessment/admission wards comprise a wide variety of organisational and functional units. This makes comparison of research literature difficult. Similarly the articles rarely state whether observation beds were additional to or in place of existing inpatient complement. To aid future research and quality assessment, it will be necessary to define the terms observation ward, assessment ward and admission ward. We propose the following definitions:

Assessment unit/ward

An area where emergency patients are assessed and initial management undertaken by inpatient hospital teams. The patient is only in this area while early assessment is made, for example, up to 12 hours and is then moved to another ward.

Observation ward

An area where patients can be observed or have early investigation/ management within the A&E department. Patients are admitted to this area with an expectation of discharge within 24 hours.

Admission ward

A ward to which people are admitted after clinical assessment for their continuing management.

They all have a commonality in only accepting emergency cases. The use of a "patient plan" delineating the reasons for observation, line of treatment, and an end point for patient disposition is imperative. Therefore, the patient's care in the unit should have a focused goal depending on the conditions presented. For example, some patients may require evaluation of specific complaints, while some may need short-term treatment for an emergency condition and so particular problems can be investigated during an observation period.[6] If a physician cannot reasonably set a goal of care for the patient that can be achieved in the agreed time frame, then the patient should not receive an observation unit bed place.

A maximum time limit of 24 hours should also be adhered to as this is important in terms of care costs and to reduce the presence of inappropriate patients who ought to have been discharged or admitted to hospital.[41] In accordance with this, it is important that the severity of the patient's illness is limited and balanced by the intensity of services available.[7]

The assessment/admission ward should be in a well defined area. Ideally this is within the emergency department or directly adjacent to it. An American study has noted that 93% of these wards were located within the department,[2] though an analysis of this sort has not been performed in the UK. Colocation is logical as they share many requirements, for example, proximity to diagnostic facilities, and transfer between the units will commonly occur.

Some wards are managed by the A&E department and others by inpatient specialist teams. If an assessment/admission ward is to be successful, the managerial structure is of primary importance and a designated clinical lead should be appointed.[38] They all seem to have advantages over traditional admission to a general ward. These advantages are, however, dependent on the over-arching structures. Access to regular senior consultations, good diagnostic facilities, and access to external agencies for discharge planning seem to be vital components of a successful assessment/admission ward. They are probably cost effective, although no robust cost effectiveness studies have been undertaken in the UK. The other keys to their success are firstly the clear definition of admission and care criteria, and secondly the ability to maintain the flow of patients through the ward.

Admission and assessment wards have many advantages providing they are correctly managed with appropriate staffing and facilities.

The ideal assessment ward

The evidence suggests that the ideal ward should be time limited (24 hours) and be staffed by senior personnel. Numbers of staff required has not been studied in the literature. There is some evidence that turnaround time is quicker when they are managed by emergency medicine specialists. These units must have access to imaging and laboratory facilities (the evidence is not conclusive on exactly which tests). Strong mangement and policing of operational policies is vital. In particular, procedures for transfer out after 24 hours must be adhered to. Those who will evidently need longer term admission should not use these wards but go directly to a main hospital ward. The required size cannot be predicted from the literature. Other characteristics were not adequately studied to draw conclusions.

Diagnostic groups shown to benefit from a short stay ward include asthmatic patients, diagnostic chest pain, high risk but non-evident trauma, pyelonephritis, deliberate self harm cases, head injuries; they have also been shown to be of use for the elderly population and for children.

Contributors

MWC and JH devised the search strategies and undertook the literature searches. MWC undertook the paper selection and appraised the papers. PK obtained all the papers, and collated the appraisals. PK and JH wrote the first draft of the paper and all authors were involved in writing the completed paper. MWC is guarantor of the paper.

Authors' affiliations
M W Cooke, J Higgins, P Kidd, Emergency Medicine Research Group, Centre for Primary Health Care Studies, University of Warwick, Coventry, UK

Funding: Department of Health A&E Modernisation programme.

Conflicts of interest: MWC was a member of the A&E Modernisation programme.

REFERENCES

1 **Pancheon D**, Nicholson D, Hadridge P. *Emergency care handbook*. London: NHS, 1995.
2 **Yealy DM**, De Hart DA, Ellis G, *et al*. A survey of observation units in the United States. *Am J Emerg Med* 1989;**7**:576–80.
3 **Millenium Executive Team**. *Report on winter 1999/2000*. London: NHS Executive, 2000.
4 **Anonymous**. *A&E modernisation programme: interim report to ministers*. London: Dept of Health, 1999.
5 **Anonymous**. *NHS Plan. A plan for investment. A plan for reform*. London: HMSO, 2000.
6 **Brillman J**, Mathers-Dunbar L, Graff L, *et al*. Management of observation units. *Ann Emerg Med* 1995;**25**:823–30.
7 **Royal College of Physicians of Edinburgh**. Acute medical admissions and the future of general medicine—a review of professional practices in Scotland with recommendations for debate and action. Edinburgh: RCPE, 1998.
8 **Yeung KC**, Wong TW, Chan R, *et al*. Evaluation of the value of an observation ward in an emergency department. *European Journal of Emergency Medicine* 1999;**6**:49–53.
9 **MacLaren RE**, Ghoorahoo HI, Kirby NG. Use of an accident and emergency department observation ward in the management of head injury *Br J Surg* 1993;**80**:215–17.
10 **Burgess CD**. Are short-stay admissions to an acute general medical unit appropriate? Wellington Hospital experience. *N Z Med J* 1998;**111**:314–15.
11 **Nuffield Provincial Hospital Trust**. Casualty services and their setting: a study in medical care. Oxford: Oxford University Press, 1960.
12 **Central Health Services Council**. Standing medical advisory committee. *Accident and emergency services: report of the sub-committee*. London: HMSO, 1962.
13 *Lewin report*. London: HMSO, 1900.
14 **McCarrick H**. Emergency ward. *Nursing Times* 1968;**64**:*555–7*.
15 **British Association of Accident and Emergency Medicine**. *Recommendations for accident and emergency wards*. London: BAEM, 1989.
16 **Cook DJ**, Mulrow CD , Haynes R.B. Systematic reviews: synthesis of best evidence for clinical decisions. *Ann Intern Med* 1997;**126**:376–80.
17 **Houghton A**, Hopkins A. Acute medical admissions: results of a national audit. *J R Coll Physicians Lond* 1996;**30**:551–9.
18 **Hampton JR**, Gray A. The future of general medicine: lessons from an admissions ward. *J R Coll Physicians Lond* 1998;**32**:39–43.
19 **Victor CR**, Khakoo AA. Is hospital the right place? A survey of inappropriate admissions to an inner London NHS trust. *J Public Health Med* 1994;**16**:290.
20 **GIFA**. Trends of the characteristics and appropriateness of admissions to acute geriatric and medical wards n Italy from 1988 through 1993. *Eur J Epidemiol* 1996;**12**:571.
21 **Smith HE**, Pryce A, Carlisle L, *et al*. Appropriateness of acute medical admissions and length of stay. *J R Coll Physicians Lond* 1997;**31**:527–32.
22 **Denman-Johnson M**, Bingham P, George S. A confidential enquiry into emergency hospital admissions on the Isle of Wight, UK. *J Epidemiol Community Health* 1997;**51**:386–90.
23 **Gouin S**, Macarthur C, Parkin PC, *et al*. Effect of a pediatric observation unit on the rate of hospitalization for asthma. *Ann Emerg Med* 1997;**29**:218–22.
24 **Hanlon P**, Beck S, Robertson G, *et al*. Coping with the inexorable rise in medical admissions: evaluating a radical reorganisation of acute medical care in a Scottish District general Hospital. *Health Bull (Edinb)* 1997;**55**:176–84.
25 **Dallos V**, Mouzas GL. An evaluation of the functions of the short-stay observation ward in the accident and emergency department. *BMJ Clin Res Ed* 1981;**282**:37–40.
26 **Maimaris C**, Kirby N. The impact of the observation ward on acute admissions at Guy's Hospital. *Health Trends* 1991;**23**:33–5.
27 **Goodacre SW**. Role of the short stay observation ward in accident and emergency departments in the United Kingdom. *J Accid Emerg Med* 1998;**15**:26–30.
28 **Jelinek GA**, Galvin GM. Observation wards in Australian hospitals. *Med J Aust* 1989;**151**:80–3.
29 **Yealy DM**, De Hart DA, Ellis G, *et al*. A survey of observation units in the United States. *Am J Emerg Med* 1989;**7**:576–80.
30 **Rydman RJ**, Roberts RR, Albrecht GL, *et al*. Patient satisfaction with an emergency department asthma observation unit. *Acad Emerg Med* 1999;**6**:178–83.
31 **Aggarwal P**, Wali JP, Ranganathan S, *et al*. Utility of an observation unit in the emergency department of a tertiary care hospital in India. *Eur J Emerg Med* 1995;**2**:1–5.
32 **McErlain-Burns T**. Admitting a need for change. *Health Service Journal* 1997;**107**:33.
33 **Audit Commission**. *By accident or design*. London: HMSO, 1995.
34 **Bolsin M**. Development of a major trauma resuscitation chart. *Accident and Emergency Nursing* 1997;**5**:2–7.
35 **Cooke MW**, Kelly C, Khattab A, *et al*. Accident and emergency 24 hour senior cover—a necessity or a luxury? *J Accid Emerg Med* 1998;**15**:181–4.
36 **Wanklyn P**, Hosker H, Pearson S, *et al*. Slowing the rate of acute medical admissions. *J R Coll Physicians Lond* 1997;**31**:173–6.
37 **Hadden DS**, Dearden CH, Rocke LG. Short stay observation patients: general wards are inappropriate. *J Accid Emerg Med* 1996;**13**:163–5.
38 **American College of Emergency Physicians**. Emergency department observation units. *Ann Emerg Med* 1995;**25**:863–4.
39 **Currie IC**, Earnshaw JJ, Heather BP. Cutting the cost of emergency surgical admissions. *Ann R Coll Surg Engl* 1996;**78**:180–3.
40 **Jones A**, O'Driscoll K, Luke LC. Head injuries and the observation ward. [Letter]. *J Accid Emerg Med* 1995;**12**:160–1.
41 **Zun L**. Observation units: boom or bust for emergency medicine *J Emerg Med* 1990;**8**:485–90.
42 **Rainer TH**, Swann IJ, Crawford R. Critical analysis of an accident and emergency ward. *J Accid Emerg Med* 1996;**13**:325–9.
43 **McDermott M**, Murphy D, Zalenski RJ, *et al*. A comparison between emergency diagnostic and treatment unit and inpatient care in the management of acute asthma. *Arch Intern Med* 1997;**157**:2055–62.
44 **Brillman JC**. Observation unit impact on ED admission for asthma. 1994;**12**:11–14.
45 **Bazarian JJ**, Schneider SM, Newman VJ, *et al*. Do admitted patients held in the emergency department impact the throughput of treat-and-release patients? *Acad Emerg Med* 1996;**3**:1113–18.
46 **Anonymous**. *Confronting the challenge*. London: Council of International Hospitals, 2000.
47 **Quick G**. Time analysis of consult service emergency department admission process compared with emergency medicine service admission process. *J Emerg Med* 1999;**17**:815–22.
48 **Beattie TF**, Moir PA. Paediatric accident and emergency short-stay ward: a 1-year audit. *Arch Emerg Med* 1993;**10**:181–6.
49 **Bond GR**, Wiegand CB. Estimated use of a pediatric emergency department observation unit. *Ann Emerg Med* 1997;**29**:739–42.
50 **Numa A**, Oberklaid F. Can short hospital admissions be avoided? A review of admissions of less than 24 hours duration in a paediatric teaching hospital. *Med J Aust* 1991;**155**:395–8.
51 **Soulen JL**, Duggan AK, DeAngelis CD. Identification of potentially avoidable pediatric hospital use: admitting physician judgement as a complement to utilisation review. *Paediatrics* 1994;**94**:421–4.
52 **Maag R**, Krivenko C, Graff L, *et al*. Improving chest pain evaluation within a multihospital network by use of emergency department observation units. *Jt Comm J Qual Improv* 1997;**23**:312–20.
53 **Bozien WF**. The observation holding area: a prospective study. *Journal of the American College of Emergency Physicians* 1979;**8**:508–12.
54 **Ellerstein NS**, Sullivan TD. Observation unit in children's hospital: adjunct to delivery and teaching of ambulatory paediatric care. *NY State J Med* 1981;**282**:37–40.
55 **Landers GA**, Waececkerle JF, McNabney WK. Observation ward utilisation. *Journal of the American College of Emergency Physicians* 1975;**4**:123–25.
56 **Morgan WJ**. Functions of an observation ward in the accident and emergency department. *BMJ* 1981;**282**:398.
57 **Neville L**, Rowand RS. Short stay unit solves emergency overcrowding. *Dimens Health Serv* 1983;**60**:26–7.
58 **Tabenhaus LJ**, Robilotti GD. The holding area: new arm of ED. *Journal of the American College of Emergency Physicians* 1972;**1**:15–19.
59 **Khan SA**, Millington H, Miskelly FG. Benefits of an accident and emergency short stay ward in the staged hospital care of elderly patients. *J Accident Emerg Med* 1997;**14**:151–2.
60 **Biddulph J**. A paediatric observation ward. *Papua and New Guinea Medical Journal* 1984; **27**:163–65.
61 **Ryan J**, Clemmett S , Perez-Avila C. Managing patients with deliberate self harm admitted to an accident and emergency observation ward *J Accid Emerg Med* 1996;**13**:31–3.
62 **Brown SR**, Raine C, Robertson CE, *et al*. Management of minor head injuries in the accident and emergency department: the effect of an observation ward *J Accid Emerg Med* 1994;**11**:144–8.
63 **Willert C**, Davis AT, Herman JJ, *et al*. Short-term holding room treatment of asthmatic children. *J Pediatr* 1985;**106**:707–11.
64 **Hutchins CJ**. The functioning of a short-stay emergency gynaecological unit. *N Z Med J* 1978;**87**:311–13.
65 **Gaspoz JM**, Lee TH, Weinstein MC, *et al*. Cost-effectiveness of a new short-stay unit to "rule out" acute myocardial infarction in low risk patients. *J Am Coll Cardiol* 1994;**24**:1249–59.
66 **Henneman PL**, Marx JA, Cantrill SC, *et al*. The use of an emergency department observation unit in the management of abdominal trauma. *Ann Emerg Med* 1989;**18**:647–50.
67 **Conrad L**, Markovchick V, Mitchiner J, *et al*. The role of an emergency department observation unit in the management of trauma patients. *J Emerg Med* 1985;**2**:325–33.
68 **Israel RS**, Lowenstein SR, Marx JA, *et al*. Management of acute pyelonephritis in an emergency department observation unit. *Ann Emerg Med* 1991;**20**:253–7.
69 **DeLeon AC**, Farmer CA, King G. Chest pain evaluation unit: a cost effective approach for ruling out myocardial infarction. *South Med J* 1989;**82**:1083–9.
70 **Zwicke DL**, Donohue JF, Wagner EH. Use of the emergency department observation unit in the treatment of acute asthma. *Ann Emerg Med* 1982;**11**:77–83.