



# **An emergency department tackles bed management and home-based care**

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## **Abstract**

*Ipswich Hospital Emergency Department played a vital role in the Post Acute Treatment in the Home Program (PATH) of West Moreton District Health Service. PATH used two strategies to reduce the district reliance on acute hospital beds: a short-stay unit for rapid assessment, treatment and early discharge of patients with simple conditions; and a hospital-in-the-home program utilising community health services to treat acute conditions.*

*The program enhanced existing services to create a new treatment stream for acute patients and to promote a cultural shift from fragmented care to district responsibility for total episode of patient care.*

## **Introduction**

Expenditure on acute hospital beds in Australia consumes 41% of the national health budget (Grant & Lapsley 1993). Technological advances, increasing consumer demands, curbs on spending, and demands for efficiency by health

‘corporate rationalisers’ (Palmer & Short 1995) have led to pressures to reduce reliance on acute hospital beds.

Over the past 10 years average lengths of stay across a wide range of diagnostic groups has fallen. This has been especially the case in surgical services where pre-admission clinics, day-of-surgery admissions, increasing use of laparoscopic surgery, and the use of community services for post-operative care have reduced the need for acute surgical beds. Over recent years State, Territory and Commonwealth governments have provided incentives to clear backlogs in surgical waiting lists (Elective Surgery Project, Queensland Health 1996). Hospitals such as Ipswich Hospital have instigated bed management systems to ensure maximum surgical throughput to attract additional funds, whilst providing beds for non-elective acute patients.

Acute admissions are more difficult to control because of random and seasonal variations in admission rates. Even across any one week there are varying pressures on beds because of staff shortages on inpatient wards on and around weekends (Fulde 1998). Community health services are difficult to access on weekends, limiting the ability to discharge patients on Fridays and weekends.

A retrospective chart audit of patients admitted under the care of the Division of Internal Medicine at the Ipswich Hospital over a three-month period from April to June 1996 showed that 17.9% of medical patients had only one problem and an average length of stay of less than 48 hours. The most common diagnoses in these inpatients were overdoses, exacerbations of asthma, and chest pain. Ipswich Hospital targeted these short-stay patients for improvements in patient care and bed management through the following two strategies.

1. The upgrading of the short-stay unit attached to the emergency department. This could provide a rapid turnaround facility for acute medical patients to be assessed, initially treated, and then referred to community nursing and medical services as necessary.
2. The care of patients with acute medical conditions in the community through a hospital-in-the-home program.

The proposal, named the Post Acute Treatment in the Home Program (PATH), was submitted to the Elective Surgery Project of Queensland Health as a model for transitional care: treating patients in the community and freeing acute hospital beds for elective surgery. It received funding of \$234 000 for 12 months from February 1997 to February 1998. In its first year of operation, PATH funded the 24-hour operation of the emergency department short-stay unit and a hospital-in-the-home service.

West Moreton District Health Service provides health care services to Ipswich City on the western urban fringe of Brisbane, and to rural communities up to one hour's drive from the urban area. There are hospitals and community health care services in Ipswich and in the towns of Esk, Laidley and Boonah.

This article examines the pivotal role of the emergency department in the development, implementation and running of PATH. The program has required strategic input from a diversity of health care professionals and its success to date has depended on the cooperative, learning environment fostered by management in the District Health Service. Transitional care programs in Australia are still in their trial stages, and the lessons learned by the West Moreton program are of relevance to similar programs across the national health sector.

## **The proposal in the context of current health care trends**

PATH based its proposal on three separate research areas: the use of the accident and emergency department observation ward, the use of this ward to establish a chest pain clinic, and advances in hospital-in-the-home programs.

### **The emergency department observation ward**

Emergency departments across the United States, the United Kingdom and Australia have established observation wards or short-stay units for several reasons (Brown et al 1994; Hadden, Dearden & Rocke 1996; Ryan, Clemett & Perez-Avila 1996; Goodacre 1998; Khan, Millington & Miskelly 1997; Montalto 1998).

1. The inability of assessments with short time frames and time pressures to rule out significant illness in a proportion of patients presenting acutely to emergency departments.
2. To reduce inappropriate discharges from emergency departments.
3. To provide an environment for concentrated investigation of patients before discharge.
4. The treatment of simple, well-defined illnesses over short time frames.
5. Cost-effectiveness over usual ward admission because:
  - (a) patients are reviewed more quickly by senior medical staff
  - (b) patients have a shorter stay in hospital
  - (c) fewer investigations are performed
6. The initiation of treatment to be continued at home.

Ipswich Hospital identified several conditions suitable for admission to the short-stay unit. These conditions are shown in Table 1.

**Table 1: Eligible diseases for admission to the short-stay unit**

Atypical chest pain	Paroxysmal benign cardiac arrhythmia
Deep venous thrombosis	Diabetes for stabilisation
Urinary tract infection	Transient ischaemic attacks
First seizure	Mild asthma/COPD/bronchitis
Mild community-acquired pneumonia	Minor overdose
Infectious gastroenteritis	Cellulitis
Mild congestive cardiac failure	Headache, migraine

Review of the available literature, however, reveals that many patients identified above would not have routinely required admission and that many, once admitted overnight, would not require treatment in the home. Studies report that short-stay admission may be appropriate for patients with self-harm, including overdose (Ryan, Clemett & Perez-Avila 1996), in the care of the elderly (Khan, Millington & Miskelly 1997), minor trauma (Brown et al. 1994) and chest pain (Gibler 1997; Joseph 199; Mikhail et al. 1997; Rydman et al. 1997). The evidence that asthma short-stay admission reduces eventual hospital admission is doubtful (Goodacre 1998).

Grayson (1998) notes a bracket creep of patients into hospital-in-the-home programs because of financial incentives. Patients with mild congestive cardiac failure, paroxysmal benign cardiac arrhythmias and headache can be managed as outpatients, but may be included as short-stay unit admissions because they attract additional funding to the District Health Service.

The Ipswich Hospital emergency department has 36 000 attendances annually and has access to six beds in its short-stay unit. This is consistent with the British Association of Accident and Emergency Medicine recommendation of 1 observation ward bed for every 5000 attendances (Goodacre 1998). The short-stay unit has taken precautions against possible assertions that patients may be receiving inferior non-specialist care by requiring frequent reviews by medical staff from the emergency department, and by strictly limiting length of stay to 23 hours. This limitation dictates prompt decisions to admit to inpatient wards under specialist care or to discharge.

## **Chest pain clinics**

The premise behind the establishment of chest clinics is that the early diagnosis and referral of patients with ischaemic chest pain improves prognosis (Edmonds & Kelly 1997). Up to 30% of patients with acute myocardial infarction presenting to emergency departments have a normal ECG (Selker et al. 1997) and around 2–5% of patients with acute myocardial infarcts are discharged from emergency departments (Gibler 1997). Chest pain comprises up to 5–8% of emergency department presentations. Of these, 10–15% will be diagnosed as acute myocardial infarction, 10–15% will be tagged as unstable angina, and 20–30% will have other assignable causes, leaving 40–60% of chest pains unexplained (Joseph 1997). Patients with ischaemic heart disease with no myocardial infarct have a similar prognosis over the next 6–24 months to those with myocardial infarction (Mikhail et al. 1997).

Patients with non-ST change infarction have a good prognosis, whether admitted to routine medical wards or a coronary care unit (Edmonds & Kelly 1997). Patients admitted to the short-stay unit have acute myocardial infarction excluded by ECG and cardiac enzymes (CK and troponin) over a 12-hour stay. They are then referred for cardiac stress testing and medical review as outpatients.

## **Hospital-in-the-home programs**

Hospital-in-the-home programs have been extensively trialled in the United States and the United Kingdom, especially in the care of patients with relatively stable conditions such as osteomyelitis, septic arthritis and endocarditis which require long-term intravenous antibiotic therapy (Grayson, Silvers & Turnbridge 1995; Kayley et al. 1996; Williams 1996). There are also well-established protocols for treating deep venous thrombosis in the home with low molecular weight heparins (Ting et al. 1998; Van den Belt 1998).

PATH endeavoured to extend this service into short-term antibiotic therapy for community-acquired pneumonia, cellulitis and pyelonephritis. Research into this type of service is less extensive, though several hospitals in Australia have successfully trialled such services (KPMG 1996; Montalto & Dunt 1997; Foster & McMurray 1998; Montalto 1998). Other conditions suitable for hospital-in-the-home programs include cancer chemotherapy, total parenteral nutrition, and post-operative supportive treatment (Grayson 1998).

There are three models for the provision of home intravenous antibiotic therapy.

1. Hospitals providing services to outpatients.
2. Private physicians administering services from their offices.
3. Employing a home-based service which in the United States has been by private infusion companies (Williams 1996).

The key elements of successful programs are listed in Table 2 (Williams 1996; Montalto 1998).

**Table 2: Key elements of a successful home intravenous antibiotic service**

<b>Service features</b>	<b>Patient features</b>
Knowledgeable primary care physicians	Clearly defined illness
Infectious diseases physician with interest	Completed all surgical and diagnostic procedures
Pharmacist familiar with drugs	Prepared to be willing member of team.
IV Nursing team	Alert orientated, responsible or responsible carer
Willing, compliant patient	Secure venous access
Good communication	Safe illness
24 hour service	Stable safe home with fridge and phone
Treatment record	No known drug or substance abuse
Clearly defined treatment plans	
Patient education	
Quality control	

As with the use of observation wards, there is a tendency to shift patients to hospital-in-the-home programs rather than discharge them on oral antibiotics because of cost incentives (Kayley 1996). The Victorian evaluation (KPMG 1996) of hospital-in-the-home services warns of substitute services being provided at greater cost. It cites the provision of one-day-only chemotherapy in clients' homes as a more expensive substitute for one-day treatment in a hospital outpatient unit.

The purported benefits of hospital-in-the-home programs include the ability of patients to remain with friends and families in familiar environments, the ability to continue work or schooling, lower infection risk of venous access sites and fewer cannula side-effects (Williams 1996). The disadvantages include disruption to family life, non-compliance, misuse of drugs or cannulas, interruptions to intravenous therapy, increased out-of-pocket expenses for patients and carers (for example, for dressings and aids), the problems with claiming medical insurance, and the need for a small proportion to be re-hospitalised. Intravenous access sites may become infected and there may be drug reactions such as rashes or diarrhoea or bleeding in patients receiving anti-coagulant therapy. However, these are likely to be of similar or lower frequency than in equivalent patients treated in hospital (Kayley et al. 1996).

Patient-specific costs are difficult to generate from the accounting systems in most public hospitals, but hospital-in-the-home programs are unlikely to be cheaper than inpatient care because of transport and consumables costs, many investigations are common to both pathways, and drugs used are often more expensive (Grayson, Silvers & Turnbridge 1995; Nathwane & Davey 1996; Grayson 1998). As hospital stays become shorter, the costs of hospital-in-the-home must be compared to the last few days of hospital care (Iliffe 1997). It is likely, however, that the use of hospital-in-the-home services will lead to savings in the capital costs of building and maintaining larger hospitals (Komesaroff 1997).

In the Australian health care environment, with overlap of function and poorly defined responsibilities for health care between Commonwealth, State and local governments, programs must recognise the conflicts of cost-shifting between levels of government. State-funded hospitals save money by discharging patients earlier to the community but add costs to the Commonwealth-funded Medicare system in increased general practitioner and pharmaceutical costs.

Funding for projects aimed at treating patients at home are often delegated to hospitals rather than to community health services. They fail to correct the wide disparity between funding of acute health services in hospitals and community health services.

Services provided by hospital-in-the-home programs should be subject to the same quality controls as other hospital services. Accurate records of patient enrolment and selection, treatment complications and medication errors, customer satisfaction, cure rates, unplanned hospital visits or re-admission, and unscheduled telephone access of the service are some indicators which could be used (Frankston Hospital in the Home and Australian Council on Healthcare Standards 1997; Williams et al. 1997). Drugs and infusion equipment must meet safety and hygiene standards (Rich 1994; Williams et al. 1997).

## **Ethics**

Projects that satisfy quests for economic efficiency and effectiveness of treatment fail to comply with community and professional values. Until recently, professional values, especially of the medical profession, dominated health care decisions. The future certainly should facilitate a role for the consumer (Duckett 1997). With the current emphasis on total episodes of care which cross the boundaries between hospital and community care, hospitals can no longer make decisions based only on the casemix rewards of shorter average length of stay but must consider the unmeasured community costs of these shifts.

West Moreton District covers several rural communities and PATH had to address concerns over access and availability of the program to all areas. Existing community services in these rural communities were recruited to provide services.

The PATH program was reviewed and approved by the West Moreton District Health Services Ethics Committee. They recognised the patient's right to refuse hospital-in-the-home treatment and all enrolled patients formally consented to participate.

## **Legalities**

Subsequent to the implementation of hospital-in-the-home programs in Queensland hospitals, Queensland Health has sought advice from Crown Law, Department of Justice, regarding liability for hospital-in-the-home patients. Advice received suggests that participating hospitals would have the same liability for patients treated at home. They would be liable for injuries which were foreseeable and which arose from the decision to treat patients in their own homes or as a result of other treatment. There would be no additional risk arising from travel to and from the hospital as long as the patient was judged capable of doing so. Children at home alone or in the care of another child were considered unsuitable for hospital-in-the-home programs.

Of particular concern for PATH was the ability for patients to access the service by phone or ambulance. The population is of a lower socio-economic status and many patients had no STD access, had bars on outgoing calls, and did not subscribe to ambulance services.

## **Implementation**

A Steering Committee was formed consisting of senior medical and nursing staff from the Ipswich Hospital, representatives from government and non-government community health services, and the hospital's community liaison nurse.

The short-stay unit and PATH became operational in February 1997, without a medical director. In the absence of a suitably qualified replacement, the responsibility for medical input fell initially to the Deputy Director of Medical Services, and then increasingly upon the Director of Emergency.

The decision to enrol patients rested initially with the medical registrar on duty in the emergency department. However, staff shortages meant that these registrars were rarely available to perform assessment. The obvious alternative was the emergency department senior medical officers whose extensive medical



experience and availability over most shifts made them reliable assessors of patients' medical and social conditions. However, considerable resistance had to be countered from professional staff who feared loss of control, expressed safety concerns, and experienced increased workloads (Fulop, Hood & Parsons 1997); and from the community, who expected hospital care for acute conditions.

Paediatric admissions were excluded very early in the process because of difficulties in supervision, in the provision of a safe environment and appropriately trained nurses, and in nursing children in the same room as injured and ill adults.

There were difficulties in the first year of operation in ensuring the appropriateness of short-stay unit admissions. The unit risked becoming a 'dumping ground' for patients with uncertain diagnoses; conditions that ward registrars did not wish to admit such as back pains, overdoses, or social problems; or patients requiring cardiac monitoring more safely managed in a coronary care unit with appropriately trained nursing staff. A clear set of criteria for admission were developed and responsibility for admission to the unit was devolved to senior medical officers only.

A problem arose in convincing nursing management of the unit's valid role in the management of PATH and emergency department patients because of staffing shortages. On nights when the hospital experienced staffing difficulties, the short-stay unit was the first ward to be closed, or was staffed with enrolled nurses who lacked the level of training to nurse complex, acute patients unsupervised. This created conflict in the establishment of protocols. On some nights, emergency department staff were responsible for managing patients requiring short-stay admission and when the unit was closed it became the ward registrars' responsibility.

Liaison with other health professionals in physiotherapy, social work, medical imaging, pathology and integrated mental health prompted timely assessment of patients within the unit's tight time frame. Close working relationships were established with other areas of the hospital and with community health.

The main problem in establishing protocols for managing chest pain in the short-stay unit was cardiac monitoring. In spite of pressure by medical officers in the emergency department, a decision was made by the Clinical Nurse Consultant and Director of Emergency to prohibit the admission of patients requiring cardiac monitoring. Although many monitors have alarms for arrhythmias, it was felt that the short-stay unit, with only one nurse providing care for up to six patients, did not provide a safe environment for patients whose condition was unstable enough to require cardiac monitoring. This decision also avoided conflict over role delineation with the hospital's coronary care unit.

In an attempt to raise the community profile of the program, the Steering Committee liaised with the local *Queensland Times* newspaper to print the story and photograph of a local personality who had been successfully treated for an acute condition at home.

In Queensland, community health service nurses provided a coordination, health promotion and educational role rather than a hands-on nursing service. Furthermore, industrial awards prevented the district's community health nursing service from providing an effective service because of constraints on the provision of after-hours and weekend services. An Interim Agreement was negotiated with the Queensland Nurses' Union to allow nurses to work from 9.00 am until 5.00 pm on weekends. Outside these hours, the service depended on private contractors.

It was recognised early in the program that there were problems with representations of patients and in the provision of follow-up care. At least on one occasion, conflict arose between the treatment prescribed by a local medical officer and the treating hospital registrar. To avoid possible conflict and the need to up-skill general practitioners in the use of home intravenous antibiotics, the decision was made to review all PATH patients in the hospital. Patients were asked to return to the short-stay unit when a senior medical officer was conducting routine ward rounds. This was considered the best location as there were no appropriate outpatient clinics and patients avoided excessive waiting times in the emergency department.

Clinical pathways were developed for the treatment of deep venous thrombosis and common infectious diseases such as cellulitis, pyelonephritis and pneumonia. These pathways ensure consistency and quality of care.

In February 1997 the Ipswich Hospital proposed PATH as part of its submission to the National Demonstration Hospitals Program. As a result, Ipswich Hospital became a Collaborating Hospital with Frankston Hospital as lead. Visits were arranged between the two facilities and Frankston Hospital provided a review of PATH. The review indicated that the inclusion criteria were too wide, there was room for expansion of the program so that it could enrol patients from the main inpatient wards, detailed costing of the program was of little value until the program was operating at its full potential, and there was a lack of medical leadership and responsibility for patients treated under the scheme.

In response, the Director of Emergency took an active role in the development of the program, the hospital recruited an infectious diseases physician keen to provide advice to the service, and patients have been referred to the service from the medical wards of the hospital.

## Results

### Short-stay unit

In the 14 months of full operation from February 1997 until May 1998, the short-stay unit has been used by 4600 patients, an average of 9 patients per day. The utilisation of the unit has increased as its role has become clearer. In the first year of operation, the average daily number of patients was 5. Over the last five months to the end of May 1998, the daily average has been 11 patients. Table 3 lists the top 20 diagnosis related groups (DRGs) on discharge.

**Table 3: The top 20 DRGs on discharge from the short-stay unit, February 1997 to May 1998**

DRG	Description	Number	ALOS	State ALOS
885	Injuries<65	387	1.01	1.00
473	Fractures, sprains, strains and dislocations of forearm, hand, foot Age <75 w/o cc	267	1.00	1.00
889	Poisoning/Toxic effects of drugs Age <60 w/o cc	218	1.00	1.00
349	Oesophagitis, gastroenteritis and misc digestive diseases Age 10–74 w/o cc	195	1.00	1.40
476	Fractures, sprains, strains and dislocations of upper arm, lower leg Age<65 w/o cc	158	1.02	1.00
347	Abdominal pain or mesenteric adenitis w/o cc	107	1.00	1.30
261	Chest Pain	103	1.00	1.50
579	Urinary Stones w/o ESW lithotripsy	74	1.00	1.50
052	Minor Head Injury	58	1.00	1.00
048	Headache	55	1.00	1.00
494	Trauma to Skin, Subcutaneous Tissue & Breast Age<70	55	1.00	1.00
348	Oesophagitis, gastroent and misc dig dis Age>74	53	2.90	1.00
047	Seizure Age<65 w/o cc	49	1.00	1.30
379	Disorders of the Biliary Tract w/o cc	49	1.00	1.90
126	Dental and oral diseases except extractions & restorations	48	1.02	1.00
455	Medical back problems Age<70 w/o cc	48	1.00	2.40
086	Other disorders of Eye w/o cc	45	1.00	1.40
134	Otitis media and upper resp infection Age>9 w/o cc	38	1.00	1.50
686	Other Antenatal admission with moderate or no complicating diagnosis	38	1.00	1.00
260	Syncope and collapse w/o cc	37	1.00	1.40

Over the five months to May 1998, there were 1706 admissions to the short-stay unit. Only 0.5% required transfer to inpatient wards. The rate of re-admission to the hospital within 28 days has been 5.4%, which is close to the overall performance for the hospital. Savings shown against State average lengths of stay probably represent a lower acuity in these conditions rather than absolute savings.

Of the 103 patients admitted for observation after chest pain, nine (8.7%) required admission to the inpatient wards.

### **Hospital-in-the-home**

In the first 12 months of operation, the PATH program treated 142 patients, 127 of whom received services from a private contractor. The most common diagnoses treated were, in order: deep venous thrombosis, pneumonia, cellulitis and pyelonephritis/urinary tract infection. Other conditions treated included asthma, congestive cardiac failure and diabetes.

Savings in average lengths of stay were calculated by comparing the average length of stay for patients treated on the PATH program with State averages for the same conditions for inpatients. Savings were demonstrated for uncomplicated venous thrombosis (a reduction from 5.2 to 4.7 days) and uncomplicated respiratory infections (down from 5.2 to 3.4 days). Extrapolating this to the full year's operation, there were 356 theoretical occupied bed-days saved. The program was more successful in the winter months of 1997, with pressures on acute beds from seasonal variations associated with a concomitant decrease in the hospital's available bed numbers because of ward closures.

Most of the costs (68%) were incurred in nursing, including those employed in the short-stay unit to increase its operating hours and one full-time project nurse.

Re-admission rate for the program was 11.8%, which compares to a rate of 5% for the Ipswich Hospital and the Australian Council on Healthcare Standards threshold of 3%. Client satisfaction surveys conducted on PATH patients and inpatients with similar clinical conditions showed concordance, with a score of 25 out of a maximum 28 points for both groups.

No useful costing model could be formulated which measured individual total patient costs including assessment, treatment, drugs and equipment, pathology and medical imaging.

The main successes of the program were deemed to be a change in the professional acceptance of a hospital-in-the-home service, the meeting of community demands for such a service, a focus on integrated care facilitated through acute hospital and community health services, and the forging of links

with private providers of community health care. There was a cultural shift at district level from the funding of transitional care as hospital outreach services to the funding of integrated care across hospital and community health services.

## **The future of transitional care**

Funding under the Elective Surgery Project terminated in February 1998. A decision was made by the district to amalgamate the hospital-in-the-home services of PATH with the previously Medicare-funded Post Acute Program. The Post Acute Program had been operational since 1993, targeting savings in acute hospital bed utilisation through the care of post-operative patients by community health services. Medicare funding ceased in June 1998. The decision to amalgamate the programs recognised their shared goals and similar resource requirements.

The combined program became known as the Transitional Care Program. It received bridging funds of \$66 000 to continue operation of hospital-in-the-home components over the period February–June 1998 and budgeted \$150 000 for a combined Transitional Care Program in the 1998–99 financial year.

There is a trend towards seamless care across hospital and community settings and this will result in further pressures on health services to process acute patients to community care. The most likely processing area will be the emergency department. The short-stay unit provides for a longer period of observation, a more thorough patient assessment by medical staff, and a well-staffed area for the treatment of minor conditions requiring short hospital stays. The short-stay unit attracted separate funding from the district in recognition of its increasing importance in patient assessment and transitional care.

Long-term intravenous antibiotic therapy is to be purchased from January 1999 by the Alternative Site Infusion Service of the Princess Alexandra Hospital in Brisbane. This service will provide an infectious diseases clinic at the Ipswich Hospital and serve patients with more complex problems.

The future of home-based care programs will depend on their ability to monitor quality and justify expenditure in terms of outcome. The credentialling of services is now on the agenda of Queensland Health to ensure that hospital-in-the-home and post-acute surgical services meet minimum standards and that adequate resources are allocated to home-based care. PATH has assured a platform for West Moreton District Health Service in influencing State health policy. The district is represented on the State Credentialling Committee.

## Conclusion

The West Moreton District Health Service Transitional Care Program, through its evolution from the PATH program, has provided a valuable learning experience and placed the district in an enviable position to continue in its pursuit for seamless care across health service environments. It has provided an alternative to specialist inpatient care and illustrates the need to explore acute medical bed management as well as surgical throughput. Its main strength has been its enhancement of existing services in the district, rather than the establishment of an entirely new service.

Emergency departments, as gatekeepers to acute hospital services, can play a strategic role in implementing bed management strategies and home-based care. The West Moreton District Health Service Transitional Care Program has focused responsibility for coordination of home-based care on the emergency department. Other health services may wish to use this model in developing their own programs to reduce acute hospital bed utilisation.

## References

- Brown SR, Rain C, Robertson CE & Swann IJ 1994, 'Management of minor head injuries in the accident and emergency department: The effect of an observation ward', *Journal of Accident and Emergency Medicine*, vol 11, pp 144–8.
- Duckett SJ 1997, 'Internal and external challenges for hospitals in the future', *Medical Journal of Australia*, vol 166, pp 20–21.
- Edmonds E & Kelly A 1997, 'Managing potentially ischaemic chest pain and coronary care beds effectively', *Australian Health Review*, vol 20, pp 40–48.
- Foster L & McMurray A 1998, 'Community parenteral therapy project: A pilot study', *Australian Health Review*, vol 21, pp 98–115.
- Frankston Hospital in the Home and Australian Council on Healthcare Standards Care Evaluation Program 1997, *Draft Clinical Indicators for Hospital in the Home*.
- Fulde G 1998, 'We hate Mondays! Tuesdays are not usually that crash hot for emergency physicians either...!', *Emergency Medicine*, vol 10, pp 101–02.
- Fulop N, Hood S & Parsons S 1997, 'Does the NHS want hospital-at-home?' *Journal of the Royal Society of Medicine*, vol 90, pp 212–15.

- Gibler WB 1997, 'Chest pain units: Do they make sense now?' *American Journal of Emergency Medicine*, vol 28, pp 168–71.
- Goodacre SW 1998, 'Role of short stay observation ward in the accident and emergency department in the United Kingdom', *Journal of Accident and Emergency Medicine*, vol 15, pp 26–30.
- Grant C & Lapsley HM 1993, *The Australian Health Care System 1992*, University of New South Wales, Sydney.
- Grayson ML 1998, 'Hospital-in-the-home care: Is it worth the hassle?' *Medical Journal of Australia*, vol 168, p 262.
- Grayson ML, Silvers J & Turnbridge J 1995, 'Home intravenous antibiotic therapy: A safe and effective alternative to inpatient care?' *Medical Journal of Australia*, vol 162, pp 249–53.
- Hadden DSM, Dearden CH & Rocke LG 1996, 'Short stay observation patients: General wards are inappropriate', *Journal of Accident and Emergency Medicine*, vol 13, pp 163–5.
- Iliffe S 1997, 'Hospital in the home: Buyer beware', *Journal of the Royal Society of Medicine*, vol 90, pp 181–2.
- Joseph AJ 1997, 'Chest pain centres', *Clinical Laboratory Medicine*, vol 17, pp 685–99.
- Kayley J et al. 1996, 'Antimicrobial practice. Safe intravenous antibiotic therapy at home: Experience of a UK based programme', *Journal of Antimicrobial Chemotherapy*, vol 37, pp 1023–9.
- Khan SA, Millington H & Miskelly FG 1997, 'Benefits of an accident and emergency short stay ward in the staged hospital care of elderly patients', *Journal of Accident and Emergency Medicine*, vol 14, pp 151–2.
- Komesaroff PA 1997, 'Is the hospital obsolete?' *Medical Journal of Australia*, vol 166, pp 17–19.
- KPMG 1996, *Hospital in the Home Evaluation, Part 1: Summary Report. Prepared for Department of Human Services, Victoria*, December, KPMG, Melbourne.
- Mikhail MG et al. 1997, 'Cost effectiveness of mandatory stress testing in chest pain centre patients', *American Journal of Emergency Medicine*, vol 29, pp 88–98.

Montalto M 1998, 'How safe is hospital in the home care?' *Medical Journal of Australia*, vol 168, pp 277–80.

Montalto M & Dunt D 1997, 'Home and hospital intravenous therapy for two acute infections: An early study', *Australian and New Zealand Journal of Medicine*, vol 27, pp 19–23.

Nathwani D & Davey B 1996, 'Intravenous antimicrobial therapy in the community: Underused, inadequately resourced, or irrelevant to healthcare in Britain?' *British Medical Journal*, vol 313, pp 1541–3.

Palmer GR & Short SD 1995, *Health Care and the Public Purse*, 2nd edn, Macmillan Education Australia, Melbourne, pp 42–5.

Queensland Health 1996, *Surgery on Time: A Plan for Enhancing Surgery Services in Queensland Public Hospitals*, Elective Surgery Project.

Rich D 1994, 'Physicians, pharmacists and home infusion antibiotic therapy', *American Journal of Medicine*, vol 97, no 2A, pp 3–8.

Ryan J, Clemett S & Perez-Avila C 1996, 'Managing patients with deliberate self-harm admitted to an accident and emergency observation ward', *Journal of Accident Emergency Medicine*, vol 13, pp 31–3.

Rydman RJ et al. 1997, 'Patient satisfaction with an emergency department chest pain observation unit', *American Journal of Emergency Medicine*, vol 29, pp 109–15.

Selker et al. 1997, 'Nonstandard ECG leads and body surface mapping', *Annals of Emergency Medicine*, vol 29, pp 88–9.

Ting SBN et al. 1998, 'Deltaparin for DVT: A hospital in the home program', *Medical Journal of Australia*, vol 168, pp 272–5.

Van den Belt AGM 1998, 'Replacing inpatient care by outpatient care in the treatment of deep venous thrombosis: An economic evaluation', *Thrombosis and Haemostasis*, vol 79, no 2, pp 259–63.

Williams DN 1996, 'Home intravenous anti-infective therapy (HIVAT). Do the benefits outweigh the risks?' *Drug Safety*, vol 14, pp 1–7.

Williams DN et al. 1997, 'Practice guidelines for community-based parenteral anti-infective therapy', *Clinical Infectious Diseases*, vol 25, pp 787–801.