



*Literature Review:  
Integrated Bed and Patient  
Management*

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Force  
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*Literature Review:*  
***Integrated Bed and Patient Management***

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## ***1. Background***

Like health systems around the world, the Victorian public health system is struggling to meet demand for acute inpatient care, particularly in winter. Waiting lists for elective surgery, long waits for emergency admission and the use of ambulance bypass – three important indicators of problems with access to inpatient care - have all grown in recent years, with a sharp rise in emergency access problems since May 1999.

In response, the Department of Human Services established the Patient Management Project in October 2000 with the goal of developing strategies to alleviate hospital demand pressures in the short and medium term, assisted by an industry-based Patient Management Task Force. The Task Force terms of reference include a requirement to identify essential organisational and patient management practices which would maximise the ability of hospitals to respond to the demand for inpatient care; and to determine key indicators of good practice, appropriate benchmarks and incentives.

This report has been commissioned to assist the Task Force. It aims to inform the Department and the Task Force about integrated bed and patient management based on a thorough and systematic review of national and international literature in the past five years. Further, based on this evidence, it aims to provide high level policy advice to the Department and to the hospital field.

## ***2. The Literature Review***

The report is structured to enable readers to gain a quick overview of the learnings from the literature, as well as to gain a more detailed understanding of the evidence on which its conclusions are based. Section 3 entitled 'Learnings and Policy Advice' presents the overview; the following sections provide a more detailed analysis of the literature and the policy implications. A full reference list and a description of the methodology we employed are included for the interested reader.

As described in detail in the Methodology (p40), we have used both peer reviewed and 'grey' literature – acquired from hospitals, health authorities and via the internet. We have assigned levels of evidence to the literature placing emphasis on external validity (comparability of health systems from which results are reported), with levels from 1 (highest – well-conducted systematic reviews) to 11 (lowest, uncontrolled, non-peer-reviewed reports). Where relevant, the level of evidence is noted in the text following the reference in the format 'L1' denoting Level 1 in the hierarchy of evidence. Fig 1 (p41) shows the hierarchy we employed.

There have been a number of recent major government reviews, and review papers commissioned by them, which address the problem of timely access to acute inpatient care in the UK (National Audit Office, 2000; Department of Health, 2000b; The Scottish Office, 1998), in Canada (Menec et al 1999), in New Zealand (Hider et al, 1998b) and in New South Wales (NSW Health Council, 2000). While much of the material in these reviews constitutes a mixture of 'expert opinion' and research evidence, they are informed by the same literature we have reviewed, and are up-to-

date and often highly relevant to the issues under review in Victoria. We have concentrated on these sources in preference to the more clinical literature because of their explicit policy focus.

There are basically three types of strategies to address the access problem which emerge from these and other published studies:

- ❑ Managing Demand - those strategies which seek to reduce or better manage demand for inpatient care
- ❑ Improving Throughput - strategies designed to increase the efficiency with which inpatient care is provided, with the aim of reducing the average time patients spend in hospital and thus maximising the number of patients treated with a given bed stock
- ❑ Balancing the System - strategies aimed at getting rid of bottlenecks in the system as a whole, so that patients do not occupy acute beds simply because alternative forms or settings for care are not available when they're needed.

There are two additional areas for which literature was reviewed:

- ❑ Consumer Perspectives – the need to ensure that efforts to improve the system meet consumer expectations and protect their rights
- ❑ Key Performance Indicators and Incentives – the question of how to measure performance and how government policy might support good performance.

### ***3. Learnings and Policy Advice***

A number of themes emerge from a reading of the government-commissioned policy reviews. They generally agree that:

- Hospitals function as a ‘last resort’ option in urgent situations, and a significant volume of emergency admits (around 12-15%) would not be necessary if alternatives were available at the right time.
- Variations in ALOS between hospitals for comparable patients (mostly defined by DRGs) indicate that hospital practices are a strong influence on ALOS, and could be improved. More active management of admissions, integrated bed management and better discharge planning are called for.
- The issue of appropriate models of care for frail older patients and others who tend to use a disproportionate volume of ‘inappropriate’ days of stay is particularly important. If this issue were successfully addressed, it could free up a significant number of beds which could then be used to increase elective throughput and reduce both elective and emergency waits for admission.

The level of consensus on these basic themes is striking, and gives some confirmation for current local efforts to improve performance, such as the Effective Discharge Strategy, funding for Care Co-ordinators in Emergency Departments (ED’s) and the ED-based ‘Breakthrough Collaborative’.

The research evidence tends to demonstrate more modest gains than policy-makers generally hope for, but does confirm that many recent reform efforts produce clinical outcomes that are safe and comparable to conventional care; and can be effective and well accepted if appropriately resourced and targeted to the right groups of patients.

There is little evidence of alternatives being cheaper in the real world (although they may be cheaper when considered in isolation), and this is true even when the costs which are transferred out of the human services system and on to families and communities are not included. The point is often made that small improvements in efficiency of throughput are quickly overtaken by increases in demand, and that efforts to reduce demand may give more lasting benefit.

The introduction of new services in the primary sector which are intended to act as substitutes for secondary or tertiary care can be effective in certain circumstances, particularly for those with chronic illnesses, but can also have the impact of widening the net and thereby increasing costs, or offsetting potential savings.

The evidence from the policy and research literature is detailed in Sections 4 – 9. The major findings and conclusions are presented below.

#### ***The Impact of Increasing Emergency Demand***

Emergency admissions have increased in recent years in many countries, and constitute an increasing majority of admissions to public hospitals. The single largest cause is increasing admissions for cardiac and respiratory conditions in the elderly. This situation represents a fundamental shift, is likely to continue, and has many implications for hospital systems of care delivery.

It is high bed occupancy, rather than number of beds per se, which underlies acute access problems, with problems occurring when occupancy is above 85%. There is an exponential increase in the number of times a hospital experiences access block when occupancy goes above 90%. In Canada and the UK there is a high correlation between winter peaks in demand and influenza (and pneumococcal infections) indicating that continuation of the incentives for vaccination of the elderly and vulnerable is warranted.

Clearer definitions of the various categories of emergency and urgent admissions, and better data are required, to support ongoing efforts to manage hospitals in which emergency admissions predominate.

### ***Potential to Reduce Use of Inpatient Care***

In the mid-90's about 15% of admissions and a higher proportion of days of stay were probably inappropriate to the acute setting, although virtually all patients were in need of health care. Changes in clinical practice since the time of the studies (eg day admission for chemotherapy, day of surgery admission for many conditions) would have already reduced these rates. The ready availability of alternative, lower-intensity settings of care could have averted some admissions and reduced inappropriate days of stay. Further reduction would require investment in alternative care settings, which would need to be as readily accessible as hospitals are. Local current validation of these results is required.

### ***Demand Management Strategies***

More appropriate admission decisions may be made if EDs are staffed and supported by experienced medical staff.

Rapid response services provided within the ED, with the ability to organise home-based support services immediately, can assist to avert some admissions particularly of the elderly.

Emergency admissions from nursing homes make a small contribution to demand for acute beds, and there may be some benefit in seeking to improve the ability of these facilities to respond to the onset of acute illness, although there is no evidence that the majority of these admissions are preventable or unwarranted. The availability of day-based settings for the assessment and care of the elderly, as part of a comprehensive home-based service, warrants further consideration.

Further efforts to improve continuity of care in the post-acute phase may be worthwhile.

Short-stay/observation wards may be warranted in busy ED's, and Chest Pain Assessment Units are effective in reducing demand for inpatient stays.

Hospital in the Home has a continuing role, but its impact on demand for acute beds is likely to remain limited. There is insufficient evidence, particularly of cost-

effectiveness for specific conditions/indications, to recommend any large-scale increase in services which deliver acute care at home.

Co-ordinated Care is beneficial for appropriate patients, but is unlikely to have a major impact on acute care utilisation in the short-term.

There is no evidence that most of the care provided to people in their last year of life is inappropriate. However, there are indications that patients may prefer to avoid acute admission at the time of dying.

### ***Strategies to Improve Throughput***

The Australian National Demonstration Hospital Projects 2 (NDHP2) is the most comprehensive and well-documented approach to reform of bed management processes available, and a range of innovations seem to enable hospitals to increase efficiency in the use of inpatient beds. Further dissemination of the more successful innovations should be encouraged. The experience of NDHP2 hospitals tends to show that improvements in performance against access indicators may be swamped by continuing increases in demand.

Care of elderly inpatients in specialised geriatric units reduces length of stay and may have other benefits including less readmission and health outcome improvements.

Universal case management has not been proven to deliver benefits, but may support better use of acute beds for care of the frail elderly. These patients are more likely to experience increased lengths of stay in acute care, notwithstanding the fact that the majority of elderly patients return to their previous living arrangements. Those who require admission to long-term care are most likely to become 'bed blockers'. Comprehensive discharge planning, with the ability to ensure that continuing needs are met, has benefits for the elderly patient at risk of delayed discharge or readmission and increasing dependency. Effective targeting of services is important.

There is no evidence regarding the effectiveness of a central bed bureau.

### ***Balancing the System: Bedblockers***

Bed blocking is most often the result of inability to place frail elderly patients in appropriate sub-acute, post-acute or long-term care, or refer them to effective home support services. If the use of acute beds for non-acute care is to be reduced, the supply of lower-intensity care (including care at home) must be adequate to meet demand in a timely way. Resources to achieve this cannot be reallocated from hospital budgets if hospitals are to retain the capacity to improve access for those with acute care needs both urgent and elective.

### ***Waiting List Management***

Policy on access to acute hospital care must balance the roles of modern hospitals to provide both timely elective surgery and time emergency admission. Strategies to make waiting times more sensitive to clinical need are currently under evaluation in a number of jurisdictions, but with no clear outcomes at present. Maximising elective

surgical admissions in summer months shows some promise to relieve pressures on emergency admissions during winter. We did not find any evidence of waiting list patients 'abusing' the emergency admission system.

### ***Consumer Perspectives***

Consumer acceptance of care innovations is generally high. Broader research is needed to determine consumer priorities and preferences. Consideration of care in the last year of life and care for dying should be approached from a consumer-focused perspective.

### ***Incentives and Standards***

There is a dearth of evidence regarding the effectiveness of policy incentives. Consideration should be given to refining the standards for access performance to take account of the relative burden of emergency multi-day stays on hospital workloads. Consistent application of definitions of what constitutes an 'emergency' admission also requires further policy attention.

Conflict between policy goals and financial incentives is a problem. Care is needed with the process of change and innovation if new initiatives are to be effective.

## **4. Defining the Problem**

Emergency and urgent admissions to public hospitals now constitute the majority of admissions, but there is little consensus over the factors which have driven recent increases, the real volume of increases or the definition of emergency admissions.

### **4.1 Increase in Emergency Demand**

As pressure on public hospitals has increased over recent years, one of the important trends has been an increase in the proportion of emergency or urgent admissions compared to elective admissions, with a general trend to emergency admissions constituting about two-thirds of all admissions in the UK (National Audit Office, 2000, L10, p1) and about 60% of all medical admissions in New Zealand (Hider et al, 1998b, L1, p27).

The predominance of emergency admissions, which also applies in Victorian public hospitals, represents a fundamental change in the balance of workload for most public hospitals with many implications for hospital systems of care delivery. The unplanned nature of emergency admissions, combined with high daily bed occupancy rates, make it more likely that emergency patients will wait for a bed and elective patients will experience cancellations.

Hider et al (1998b, L1, p35) note that the increase is primarily related to cardiac and respiratory conditions in the elderly in New Zealand. Hider et al also note that the increase arises from more people being admitted, rather than increases in the number of people being admitted on multiple occasions (p28). The predominance of emergency admissions is thus likely to continue for the foreseeable future.

*Conclusion: Emergency admissions have increased in recent years in many countries, and constitute an increasing majority of admissions to public hospitals. The single largest cause is increasing admissions for cardiac and respiratory conditions in the elderly. This situation represents a fundamental shift, is likely to continue, and has many implications for hospital systems of care delivery.*

### **4.2 High Bed Occupancy Underlies Emergency Access Block**

Over the last two winters in Melbourne, performance against emergency access standards has deteriorated markedly, even though the increase in emergency presentations and admissions over that time has not been similarly dramatic. The injection of the Winter Emergency Demand Strategy funds last winter had only a modest impact on performance.

The literature on emergency access block is mostly at the level of policy debate and recommendations. However, one important study by Bagust, Place and Posnett (1999, L9), commissioned by the UK National Health Service (NHS) Executive, may at least partly explain the Victorian experience. It models the risk of a hospital having insufficient capacity for patients requiring immediate admission under various realistic parameters of demand, length of stay, seasonal variation etc. The authors conclude that the risk of a hospital experiencing a bed shortage is minimal so long as

the mean bed occupancy remains below about 85%, and that when occupancy is above 90%, 'the system is regularly subject to bed crises' (p156). The model demonstrates that spare capacity is essential if emergency admissions are to be accommodated in a timely manner. It must be noted that the study's definition of bed crisis is at a low threshold – the non-availability of a bed at the time it is required in a single hospital. If allowance for, say, an 8 hour wait for a bed, or for transfers to nearby hospitals, had been modelled, the critical level of occupancy is likely to be somewhat higher.

The authors also conclude that 'where several hospitals are all operating close to maximum capacity, a crisis in one hospital can quickly be transmitted through the whole of the local system – the domino effect' (p 157).

The probability of access block is shown to increase exponentially as occupancy increases above some critical level (eg, 90%). It may be that the Melbourne public hospital system passed a 'breakpoint' in the curve of risk of access block during recent winters, such that a modest increase in demand caused a dramatic increase in performance failure. The implication for Victorian hospitals is that efforts to improve performance on access block will only succeed if they can be successful in bringing the system back to a point of equilibrium, where there is some spare capacity to cope with peak demand.

The Bagust et al analysis is consistent with a recent Canadian study. The Manitoba Centre for Health Policy and Evaluation (MCHPE) was contracted by Manitoba Health to examine the patterns of hospital use in Winnipeg over 11 years to 1998, in response to a period of winter 'crisis' (Menec et al 1999, L10). They found that high pressure periods are predictable, occurring during most winters, due to increased emergency/urgent medical demand in winter. High pressure periods were not the result of downsizing, as they had occurred both before and after large-scale bed closures in Winnipeg. Winnipeg acute hospitals were operating at close to maximum capacity at most times of the year – consistent with the Bagust et al model which identifies occupancy, not bed numbers per se, as creating vulnerability to 'bed crisis'.

They also found a correlation between periods of peak incidence of influenza and high pressure periods in all of the years in which high pressure periods occurred, and recommended flu vaccination for the vulnerable population (those aged over 65 years or otherwise vulnerable). This link between flu and bed crisis is widely accepted in the UK (eg Hanratty 1999) and in Australia, but we were not able to confirm it locally from the literature.

*Conclusion: It is high bed occupancy, rather than number of beds per se, which underlies acute access problems, with problems occurring when occupancy is above 85%. There is an exponential increase in the number of times a hospital experiences access block when occupancy goes above 90%. In Canada and the UK there is a high correlation between winter peaks in demand and influenza (and pneumococcal infections) indicating that continuation of the incentives for vaccination of the elderly and vulnerable is warranted.*

### **4.3 Need for Better Definition and Data**

Hider et al (1998b, L1, p22), and Hobbs in an editorial opinion (1995, L9) highlight the problem of defining and counting emergency admissions. Government reviews (NSW Health Council 2000, L8; The Scottish Office 1998, L10) echo this concern:

*'The range of opinion offered to account for emergency pressures suggests a lack of coherent information regarding all aspects of emergency care. Major uncertainties remain, responses have been uncoordinated, and few of the many initiatives undertaken have been properly evaluated or costed against their objectives'. (Scottish Office, 1998, para 210.)'*

It is increasingly important that the levels and types of emergency admissions are properly defined and monitored, not least to enable evaluation of the impact of any action arising from the work of the Task Force, as well as to enable fair comparisons between hospitals' performance. A better understanding of the route of presentation and admission is also required, particularly in light of a growing perception in Melbourne that Emergency Departments are being used by frustrated referring clinicians and patients as a way to circumvent waits for surgery or diagnostic procedures. Hider et al (1998b) report on a study conducted by the New Zealand Ministry of Health which found that while GPs were the largest source of referral (51%), ED's themselves accounted for 43% (p25). They also report that there is little evidence of large-scale abuse of the emergency admission category in either New Zealand or the UK (p65). They conclude that the rise in acute medical admissions cannot be attributed to longer waiting lists for elective procedures.

*Conclusion: Clearer definitions of the various categories of emergency and urgent admissions, and better data are required, to support ongoing efforts to manage hospitals in which emergency admissions predominate.*

## 5. *Managing Demand*

The first of three fundamental approaches to bed management is managing demand. The proposition underlying this literature is that fewer acute beds would be required if patients requiring less intensive treatment were seen outside the acute hospital setting, or as day cases, and that this treatment would be less costly (or more cost-effective) than conventional inpatient care.

A focus on managing demand, rather than simply improving efficiency and throughput, is supported by the Bagust et al modelling of the impact of changes in various parameters affecting emergency care. They conclude that 'Policies designed to reduce the rate of growth in the demand for emergency admissions and those designed to provide alternatives to admission in the acute sector offer greatest long term benefit' (p 157), whereas improvements in efficiency tend to generate a once-off effect.

We have focussed on the appropriateness of the *setting and mode of care* rather than on the effectiveness of clinical care itself. There is also a substantial literature on variations in practice (particularly elective surgical utilisation rates) which raises questions about the appropriateness of particular treatments currently provided in acute hospitals, but this literature has not been reviewed here. We have also excluded a large literature on the broader question of prevention of illness and the potential to reduce demand on hospital services through population-based health promotion.

There is a need for caution in interpreting the findings of the literature on demand management. A major review commissioned by the UK National Beds Inquiry (Goddard, McDonagh and Smith 1999, L1) notes that there are limits to the extension of study findings about alternative lower-intensity care to the general patient population, because studies which establish the feasibility or cost-effectiveness of substitute forms of care generally use highly selected populations. While findings may be generalisable to like patients in other institutions, they may not provide the basis for wider application to different patient populations, at least not with the same clinical outcomes and/or cost-effectiveness.

Hider et al (1998b, L1) in their review of acute admissions, found that most such studies of alternative settings of care use retrospective casenote examination, a method which is much less reliable than prospectively designed evaluations (p85).

It has long been observed that some emergency admissions, particularly of the elderly, occur because 'hospital beds may provide the only refuge for many people, despite their inappropriateness and expense' (Barlow et al 1996, p24, quoting The Kings Fund). Studies of inappropriate admission are reviewed below. Studies of inappropriate emergency admission in particular have produced widely varying estimates of incidence, depending largely on the instruments and methods of assessing inappropriateness. However, there is some convergence in estimates of a rate of clinically inappropriate emergency admission of older patients of about 20% (Goddard, McDonagh & Smith, 1999, L1; Coast, 1996, L9).

Round (1997, L9) found that 'emergency medical admission rates were consistently higher in the population whose GP had access to community hospital beds.

Multivariate analysis suggests that in addition to supply factors, age, sex, morbidity and socio-economic circumstance influence admission rates’.

Attempts to reduce inappropriate admission of older patients need to focus both on short-term crisis intervention, and on the adequacy of alternative services (see Section 7.1 below for the latter).

### ***5.1 Evidence of potential to reduce the use of inpatient care***

There is a substantial body of literature exploring the question of how necessary inpatient care is to all of those who receive it, and while the findings vary considerably, there are grounds to conclude that inpatient care is used as a substitute for lower-intensity options for a range of patient groups and clinical indications.

The available tools and methods of utilisation review are evaluated by McDonagh, Smith and Goddard (2000, L1). They note that the most widely used of these in published studies is the Appropriateness Evaluation Protocol (AEP) (Gertman & Restuccia, 1981).

While formalised utilisation review is helpful in identifying systematic patterns of poor admission/retention practice in particular institutions or regions, it has a number of limitations. The first is poor generalisability: instruments developed and validated in a particular health care system may reflect clinical practice or alternative forms of care available in that system. Second, such instruments are weak on what might be termed ‘social’ indications for sub-acute admission/delayed discharge (eg, homelessness), although such indications might in themselves suggest the need for alternative forms of care.

Hider et al (1998b, L1) highlight the shortcomings of formalised attempts to identify inappropriate admission, and note the wide range of results – between 1% and 50% of all adult admissions which have been labelled inappropriate (p88).

#### ***The Manitoba Study: High Rates of Inappropriate Admission and Days of Stay***

DeCoster et al (1999 L9) report their utilisation review study using InterQual (a proprietary US instrument) and validated against a second instrument. While the level of evidence is relatively low for this observational (non-experimental) study, it is a well-designed and executed descriptive study in a comparable health system (Manitoba, Canada) and has been subjected to peer review.

Using chart review on a large random sample of 1993/94 inpatient episodes in 26 Manitoba hospitals (urban and rural, large and small), they found that just under half of all patients were assessed as requiring acute care at the time of admission (55.5% in urban hospitals), with a further 25% assessed as requiring observation. In urban hospitals, almost 25% were assessed as requiring less acute care: outpatient care (15.3%), home care, a long-term care institution or other services. In urban hospitals, only 1.6% of patients were assessed as requiring no health care.

When days of care were analysed, only 34% of days were assessed as requiring acute care, with long-term institutional care being the largest alternative category (27%).

These results were discussed with a clinical Working Group, and their suggestions as to the reasons for these results were then further investigated. Using only those patients assessed as acute at the beginning of the stay, they found that by the 8<sup>th</sup> day, only 48% were still acute. It is important to note that the absolute levels of inappropriateness are unlikely to apply to Victorian hospitals today. Much has changed since this 1993/94 sample, and for example in this study, inpatient admission for chemotherapy contributed to rates of inappropriateness.

Patients assessed as requiring observation generally spent three days or less in hospital, which tends to support the validity of this categorisation (ie observation was required 'in case' and these patients left relatively quickly).

The application of an earlier version of InterQual increased the acuteness rating by an average of 17%, but even so, the authors conclude that 16% of admissions and 26% of bed days incurred by medical admissions in urban Manitoba hospitals could be avoided. They conclude that 'patients in hospital are ill, but that many of them may need a different level of health care than that provided by a hospital' (p157).

Patients of low socio-economic status had no differences in the rate of acuteness from those of high status. Native Canadians had higher rates of acuteness (13%). Age was not a factor in acuteness at admission, but the proportion of non-acute days increased steadily with age. The authors note that:

*'Our reliance on hospitals has developed because hospitals are historically the most well funded and politically visible institutions in the health care system. They were the first part of the system to be universally insured and access is based on need without financial barriers; any system of alternatives to acute care must share these characteristics' (p160).*

*'We conclude that alternatives to hospital care must first be established and made known and available before a shift in health care resources can occur' (p151).*

### **Ontario: Similar Findings**

A study conducted in late 1995 (Flintoft et al 1998 L9) applied a later version of InterQual and examined over 13,000 case notes from 105 Ontario hospitals, consisting of a random sample of patients within each of eight common diagnoses or procedures which were seen as variable and for which utilisation could potentially be reduced (cardiac, stroke and respiratory medical diagnoses and elective joint replacement, hysterectomy and TURP). While they found similarly low average levels of acuteness on admission (62%) and days of stay (27.5%), they added a sub-acute category which accounted for 20% of admissions and 40% of days of stay. Sub-acute was defined as 'comprehensive inpatient care rendered immediately after or instead of acute hospitalisation to treat one or more specific, active complex medical conditions. Subacute care is generally more intensive than traditional nursing facility care and less than acute care' (p1290).

They found significant variation between diagnoses, and a declining rate of acuteness with age. Sub-acute care increased with age, and non-acute levels were roughly constant. The authors conclude that earlier studies may have overstated the inefficiency of Canadian hospitals by not considering sub-acute care needs. They also

point out, however, the remaining high level of non-acute admissions and days of stay (18% and 32%), which includes for example, 40% of patients admitted for joint replacement being admitted at least one day before their surgery.

It is important to remember that all of the sub-acute patients were judged to need inpatient care, but not necessarily in acute hospitals. As DeCoster et al (1999) point out, this category of patient cannot be removed from hospitals until alternatives are available on an equivalent basis.

### *New Zealand*

A 1997 study of emergency admissions (the Auckland Healthcare Utilisation Review) reported in Hider et al (1998b) found that between 13% and 29% of adult and paediatric emergency admissions were inappropriate, using both the AEP and an expert panel (p25). Two other studies undertaken in NZ found about 7% of admissions were inappropriate (p90).

In reviewing the available evidence on inappropriate admission, Hider et al note that more recent studies using AEP have found that approximately 12% of admissions in NZ, Italy, the US and Spain are inappropriate.

### *The UK*

Smith, Pryce, Carlisle et al (1997, L9) report on the validation of the AEP in an NHS district general hospital. They report a high level of agreement between the AEP-based assessment and a clinician panel. They found 6% of admissions and 45% of days of stay were inappropriate in a series of adult patients admitted to general medicine during one calendar year (1992).

After reviewing the available literature, the York Review (Goddard, McDonagh & Smith, 1999, L1) concludes that 'to a large degree, delayed discharge or inappropriate admissions appear to be caused by lack of alternative (more appropriate) care options. In most cases, a lower level of care is required' (p157).

### *Implications for Victoria*

Before any conclusions about the Victorian situation can be drawn from this literature, examination of existing local data and the conduct of local studies would be required. The last 5 or 6 years have seen rapid change in clinical and management practice, and conditions may be very different. Neither can conclusions be drawn from these studies about appropriate alternatives. The relative costs and benefits of hospital-based and other options would need to be understood, and it is neither feasible nor desirable to reduce non-acute use of hospitals to zero. For example, it may be that it is better for patients to stay one or two days more in hospital than to transfer to an alternative temporary care setting.

*Conclusion: In the mid-90's about 15% of admissions and a higher proportion of days of stay were probably inappropriate to the acute setting, although virtually all patients were in need of health care. Changes in clinical practice since the time of the studies (eg day admission for chemotherapy, day of surgery admission for many*

conditions) would have already reduced these rates. The ready availability of alternative, lower-intensity settings of care could have averted some admissions and reduced inappropriate days of stay. Further reduction would require investment in alternative care settings, which would need to be as readily accessible as hospitals are. Local current validation of these results is required.

## ***5.2 Diversion from the Emergency Department***

Considerable attention has been directed to the issue of 'inappropriate' presentation to Emergency Departments for outpatient care. A systematic review of the literature on Emergency Department attendance (Hider 1998a, L1) concludes that no valid and reliable method has been developed to identify 'inappropriate' attendances, most work has not assessed the health outcomes of alternatives provided, and 'no conclusive evidence exists' for assertions that such attendances are more expensive to health care funders than the alternatives (p 27).

Essentially the same conclusions were reached by a more recent Australian observational study of Emergency Department presentations (Ieraci et al, 2000, L7). None of these sources suggests that any savings in bed use might be achieved by diverting ambulatory patients from the Emergency Department to alternative forms of acute care.

*Conclusion: While patients with relatively less urgent or serious conditions continue to attend EDs there is no reason to believe that diverting these patients would have any impact on the demand for emergency admission.*

## ***5.3 Emergency Department Staffing***

Hider et al (1998b) in their NZ review of effective strategies for reducing emergency admissions report that the employment of GPs in the ED had been shown to reduce inappropriate admissions and investigations, as compared to the use of junior hospital medical staff. Other interventions identified as promising for the reduction of inappropriate emergency admissions include use of senior staff in the ED. The propensity of junior medical staff to admit more readily than experienced staff was also noted in a UK study cited by Goddard, McDonagh and Smith (1999, p.42, Tsang, et al, 1995).

*Summary: More appropriate admission decisions may be made if EDs are staffed and supported by experienced medical staff.*

## ***5.4 Rapid Response Services***

Services which provide rapid-response home-based alternative care for those at risk of admission have been established and evaluated in several countries, including the UK (Barlow et al, 1996, L9), Canada (Brazil et al, 1998, L9) and Australia (Coopers and Lybrand, 1997, L8).

These services typically accept referrals from Emergency Department staff and community physicians, and aim to respond within hours with a range of home-based

nursing, allied health and home-help services designed to support for a limited time period patients at risk of emergency admission.

The evaluation by Coopers and Lybrand of a South Australian 'Emergency To Homecare Outreach Service' (ETHOS) found that the service was effective, and that about one third of all patients admitted to the service would otherwise have had an inpatient admission. The financial analysis found that the service was cost-effective, but this was based on the assumption that savings from averted days of stay, at average cost, could be reallocated to the service, a highly unlikely outcome. Special funding for the service has continued, and the hospital has extended referral rights to a selected group of local general practitioners with strict criteria designed to ensure that the service is not used as a substitute for community-based care (update supplied by the hospital).

Hider et al (1998b) report that arrangements to make a rapid consultant opinion available to GPs may reduce emergency admissions by perhaps 5%, based primarily on a retrospective UK study (p129).

Reported results indicate that these services can be effective in preventing admissions. However, selection of patients is important, and use of services to delay an 'inevitable' admission is not cost-effective (Coast, 1996, L9).

*Conclusion: Rapid response services provided within the ED, with the ability to organise home-based support services immediately, can assist to avert some admissions particularly of the elderly.*

## **5.5 Admissions from Nursing Homes**

There is a level of interest in Victoria in the question of whether admissions of patients from nursing homes could be prevented through earlier intervention instituted in the nursing home. Finucane et al (2000, L7) conducted a prospective study of 184 consecutive admissions to Flinders Medical Centre following ED attendance of people aged over 65 and living in residential care. Over 60% came from hostels, and 35% from nursing homes. 10% of total admissions were assessed as potentially avoidable if specialised care were provided in the residential setting. 96% of patients survived hospitalisation, and 74% returned to their usual residential setting. At 3 month follow-up 20% of the group had died, and 5% were again in hospital. The authors conclude that 'strategies that prevent health breakdown in the residential care setting need to be developed and trialed' (p138).

Beringer and Flanagan (1999 L9) surveyed use of acute beds by nursing home residents in the Royal Victoria Hospital in Belfast on 2 days in June 1996 and January 1997. A physician assessed that just less than 10% of patients could have had investigations and/or treatment instituted in the nursing home. The proportion of beds occupied by these patients was 6% in 1996 and 10% in 1997.

### ***The Geriatric Day Hospital***

Black (1997, L9) evaluated the use of a geriatric day hospital for emergency assessment of frail older people. While geriatric day hospitals are not used in

Victoria, and day care rehabilitation programs are not in favour, this is an interesting alternative. The author reports on a case series of older people whose GP had requested admission and who were assessed at the day hospital instead of going to the ED. Nearly two thirds of patients (63%) were not admitted, although three months later, the proportion had declined to 45%. The author notes that 'With multiple pathology, often relatively minor problems are too difficult and too time consuming to resolve in primary care, thus leading to breakdown of the formal caring networks and admission to hospital' (p345). He also notes that the day hospital setting allows adequate time for assessment and permits greater confidence in the decision not to admit.

A Cochrane Review of medical day hospital care for the elderly (Forster et al 2000 L1) concluded that such care is more effective than no intervention but may have no clear advantage over other forms of comprehensive medical services for the elderly.

A Saskatchewan, Canada review of home care (Parr et al 1996, L1) found that day hospital cancer treatment (now standard practice in Australia) was cost-effective. They also concluded that day hospital rehabilitation was more costly than either in-patient or mixed in-patient and home care (although they note that the costs of unused capacity may have caused this result) (p28).

*Conclusion: Emergency admissions from nursing homes make a small contribution to demand for acute beds, and there may be some benefit in seeking to improve the ability of these facilities to respond to the onset of acute illness, although there is no evidence that the majority of these admissions are preventable or unwarranted. The availability of day-based settings for the assessment and care of the elderly, as part of a comprehensive home-based service, warrants further consideration.*

## **5.6 Post-Discharge Intervention**

An Australian randomised controlled trial (Stewart et al 1998, L2) found a significant reduction in both total readmissions to hospital and out-of-hospital deaths resulting from a home-based intervention. The intervention was provided post-discharge to patients who were prescribed a medication regimen for a chronic condition and judged at high risk of readmission. The criteria for assessment as high risk of readmission were more than one of: age 60 or over, prescription of two or more medications, unplanned readmission within the previous 6 months, and living alone and/or possessing limited English language.

The intervention consisted of a home visit by a nurse and pharmacist at one week, action to improve compliance with medication if indicated and further assessment to identify early clinical deterioration with referral as appropriate.

Other results include fewer attendances at hospital EDs, and no significant differences in quality of life scores. Although contact with primary care doctors and home-based services was similar for the two groups, the intervention group had 18% fewer days of hospitalisation. The authors note that the predominant benefit of the intervention may accrue to patients at particular risk of multiple readmissions.

*Conclusion: While the extent of unplanned readmissions of the elderly is unknown, this well-designed Australian study indicates that further efforts to improve continuity of care in the post-acute phase are worthwhile.*

## **5.7 Emergency Department Observation/Short Stay Wards**

ED observation or short-stay wards are units run by the ED and admit patients for observation or short-term treatment. They diagnose, observe and treat patients within a defined time limit, prior to discharge

Hider et al (1998b, L1) report that two randomised controlled trials of short-stay wards found no significant difference in relapse rates, and one reported improved quality of life as measured by the SF36 (pp136-7). They found some evidence of increased return to the ED within 72 hours. They drew no firm conclusions regarding effectiveness or cost-effectiveness.

Evaluation of an Observation Ward (LOS 24 hours) in the Emergency Department at Sir Charles Gairdner Hospital in Perth found that total hospital ALOS for the 10 most common DRGs declined by over a third, from 4 to 2.6 days, indicating that observation wards can help to manage bed demand (Williams et al, 2000). The Scottish Office (1998) advocates the establishment of acute admissions/assessment units in each hospital (p3).

The Chest Pain Assessment Unit (CPAU) is a specialised short-stay ward, which may be run as a distinct unit, or as part of a general observation/short-stay ward. The evidence on CPAU is clearer, and the NZ review concludes that the Units are both safe and cost-effective, which confirms Victorian experience.

*Conclusion: Short-stay/observation wards may be warranted in busy ED's, and Chest Pain Assessment Units are effective.*

## **5.8 Hospital in the Home**

Hospital in the Home (HITH) has been the subject of considerable research, and of several recent systematic literature reviews. The consensus is that HITH produces comparable health outcomes and readmission rates, is generally well accepted by patients (with most studies reporting higher quality of life and satisfaction levels), but with some concern by carers for some groups of patients (Goddard, McDonagh and Smith, 1999, L1, p124).

Soderstrom et al (1999, L1) reviewed the available controlled studies on the use of home care, as a substitute for acute care, from a Canadian perspective. They found only four studies which met strict internal validity criteria. They concluded that acute home care produces no notable difference in health outcomes, with mixed effects on health system costs; and that effects on social and health system costs appear to vary with the condition treated.

Parr et al (1996 L1) conducted a review for the Health Services Utilization and Research Commission of Saskatchewan, analysing home care in relation to acute care, institutional care and as a preventive measure. In relation to acute care, they reached

similar conclusions to Soderstrom et al. They found that in-hospital case management showed potential for cost savings, antibiotic IV therapy at home is cost-effective, and pain management and rehydration therapy appear cost-effective.

The evidence on cost effectiveness is unfortunately mixed, and no definite conclusions can be drawn (Goddard, McDonagh and Smith, 1999, L1, p124; Hider et al, 1998b, L1, p117; Parr et al, 1996, L1, p16). However, Stessman et al (1996, L11) found that hospital at home as a substitute for acute care for older patients was cost effective.

Hider et al also note that current policies which emphasise primary and community care in several countries have meant the expansion of hospital in the home is given priority. Caution is urged by several reviewers, given that eligibility criteria of most existing schemes mean that only a small proportion of patients can benefit from HITH, and given that some patients and/or carers do not want HITH and opt for traditional care. The total impact of HITH on demand for acute beds is likely to be fairly modest.

*Conclusion: Hospital in the Home has a continuing role, but its impact on demand for acute beds is likely to remain limited. There is insufficient evidence, particularly of cost-effectiveness for specific conditions/indications, to recommend any large-scale increase at this time in services which deliver acute care at home.*

## **5.9 Co-ordinated Care**

Unpublished data from the NSW Department of Health (L8) suggests that patients with serious chronic conditions have 'as many as 3 or more hospital admissions per year, of which as many as 30% are unplanned, urgent admissions through Emergency Departments' (NSW Health Council, 2000; xvi). Better outpatient management may lead to fewer acute crises requiring admission, and/or better planning of unavoidable admissions for acute care.

Findings from the National Evaluation of the Coordinated Care Trials (Silagy et al 1999, L3) suggest, however, that while the various forms of care management trialled in these pilots had many benefits, they did not uniformly reduce use of inpatient care. Over the two year time scale of the evaluation, this is not surprising, and leaves open the possibility of greater reductions in unplanned acute admissions over a longer time period.

The NSW Health Council has recommended a focus on the care of people with chronic and complex conditions, with a particular focus on cardiovascular and respiratory conditions and cancer (pp 16-19).

*Conclusion: Co-ordinated Care is beneficial for appropriate patients, but is unlikely to have a major impact on acute care utilisation in the short-term.*

## **5.10 Care of the Dying**

There is concern that inappropriate treatment for the dying is increasing health care costs and increasing demands on acute beds. McGrail (1997 L10) reports a Canadian

study of the use of health care services by people in the last 24 months of life in 1988 compared to 1993. It was found that acute inpatient care for this group declined over the 5 years by about 18% (compared to 30% in the total population), while day surgery rates almost doubled. Pharmaceutical expenditure increased by over 60% and use of homehelp by over 40%. The increases in these latter were not entirely substitution, however, as the group which had no hospital use during the last 24 months of life had equally large increases in the use of community-based services. Overall, the author concludes that utilisation by the dying appears to move in the same general directions as the rest of the population, implying that cost control efforts directed at this group are unlikely to produce large cost savings.

However, there are indications of patient preference for dying at home or in alternative settings to hospital. A UK study found that 100% of patients who died at home had expressed a wish to do so, versus only 35% of patients who died in hospital (Karlsen and Addington-Hall, 1998). An Italian study found that those with home care services were four times more likely to die at home (Castantini et al 1993). The York Review (Goddard, McDonagh & Smith, 1999) concludes that hospitalisation of dying patients could be reduced through increasing the alternative services available (p47).

The Program of All-inclusive Care for the Elderly (PACE, see 7.1 below for full description) in several US states places a high priority on discussing preferred approaches to end-of-life care with patients and families. Eng et al (1997) emphasise the importance of holding these discussions well in advance, allowing for 'thoughtful reflections on what constitutes quality in the remaining years of life in frail older people' (p228). Advance directives are documented, and are reviewed annually or when medical conditions change.

See Section 8 below for further comment.

*Conclusion: There is no evidence that most of the care provided to people in their last year or more of life is inappropriate. However, there are indications that patients prefer to avoid acute admission at the time of dying.*

## **6. *Improving Throughput***

There is a body of current literature which addresses the effective management of inpatient beds as a key resource for hospital care, and several themes emerge from both the research evidence and the policy reviews.

We have not addressed the multitude of disease-specific studies, most notably for stroke care, as we understand that these condition-specific issues are addressed by other reviewers.

Variations in length of stay unexplainable by casemix differences indicate varying levels of efficiency. An observational study by Brownell and Roos (1995, L9) compares 8 major acute hospitals in Manitoba on ALOS for 14 specific, high volume DRGs and for all acute admissions. Length of stay (adjusted for key patient characteristics and excluding the most seriously ill and long-stay outliers) is strongly influenced by hospital of admission. Variation in practice (as measured against the hospital with the shortest length of stay) contributes between 10% and 25% of total bed days. The authors also report variation between DRGs, noting that 'most of the efficient hospitals had inefficient discharge practices in some diagnostic areas' (p680).

### **6.1 *Integrated Bed Management***

Integrated Bed Management (IBM) is defined as 'the management of all admissions, stays, transfers, and discharges by a hospital within a framework that integrates and coordinates all processes related to these activities' (Department of Health and Aged Care, 1999a, L8, p1). IBM was the focus of the second round of the National Demonstration Hospitals Program, funded by the Commonwealth in 1997/98.

A series of national demonstration projects experimented with different methods of optimising access for medical and surgical patients to inpatient beds. The result was a series of models, united by a set of principles which focus on the management of beds as a key resource which can determine access to needed care. While recent government-commissioned reviews in the UK, Canada and New Zealand have focused on access to inpatient care, NDHP appears to provide the most systematic and comprehensive approach to improving the efficiency of bed utilisation within hospitals.

The issue is seemingly very simple: if the flow of patients into and out of beds is achieved as efficiently as possible, there will be fewer long waits for emergency admission and fewer cancellations of elective surgery. There are multiple factors working against the achievement of this simple goal, summarised in the final report on NDHP2 (1999a, p2) as:

- ❑ cross-divisional boundaries (ie lack of coordination between units)
- ❑ lack of appropriate information systems
- ❑ outdated policies for the allocation of priority and management of beds.

The report emphasises the importance of integrated accountability, responsibility and information for effective bed management, and outlines an approach to implementation based on 15 principles. The integrated or centralised approach to bed

management represents a significant change in accepted practice for some hospitals. The potential to achieve similar improvements in efficiency through a devolved system of bed management supported by agreed protocols and priorities is yet to be investigated.

NDHP lead and collaborating hospitals implemented a wide range of initiatives, including pre-admission clinics, day of stay admission (DOSA), transit lounges, bed management teams, discharge planning projects, and information systems to improve the effectiveness of their bed management (some of which are addressed separately in this review). The NDHP results support the view that further improvement in throughput is possible, and the recent NSW Health Council Report (2000) advocates system-wide implementation of some of the features of NDHP (p13).

In its report on results of its NDHP2 project, The Alfred Hospital documents a halving in the number of 12-hour waits and of occasions of ambulance bypass, a reduction in cancellations of elective surgery of over 90%, an increase in DOSA from 24% to 70% and an increase in day surgery of 23% over the three years from 95/96 to 97/98 (The Alfred, 1998, Appendix C). We understand that these improvements in performance against access indicators has not been sustained, probably due to further increases in demand.

Stobhill Hospital in Glasgow (2000, L10) has reported on the success of innovation in the way emergency medical admissions are handled. The project shares many characteristics with approaches in Victorian hospitals. They moved from a standard 'taking unit of the day' system to a 26-bed acute medical receiving ward for rapid investigation and assessment. The changes included the appointment of a patient management team to coordinate the administrative aspects and ensure that patients move through the system promptly; improved consulting arrangements from specialty units; and more rapid turnaround of laboratory investigations (made easier by the centralisation of all assessment patients).

Birmingham Heartlands and Solihull Trust have reported on efforts to improve the responsiveness of this teaching hospital, through 'An A-Z of Winter pressures' (1999 L10). Strong emphasis is placed on the need for senior leadership and consultation and communication with staff.

Some further specific measures arising from NDHP or other literature on efficiency are outlined below:

### ***Pre-admission Clinics, Day of Surgery Admission and Day Surgery***

We note that pre-admission clinics, DOSA and day surgery are well established practices which now require implementation rather than evidence. The NSW Health Council has proposed a target for day surgery of 60% and DOSA of 80% (p14), and these levels are consistent with current practice in some NDHP hospitals.

### ***Surgical Summers***

Menec et al (1999 L10) recommend that elective surgery be routinely reduced during winter and concentrated in the summer months.

### ***Management of Surgical Emergencies***

The Scottish Office advocates a model for hospitals who receive surgical emergencies, in consideration of the need for economies of scale to support a high quality, timely emergency surgery service (p4).

### ***The 7 Day Hospital***

Menec et al 1999 (L10) recommend that the capacity to discharge patients on weekends during the winter months should be increased in Winnipeg hospitals.

### ***Transit Lounge***

Transit lounges have been established widely in Australia, the UK and in NZ. While they have not been well-studied, experience at NDHP hospitals indicates their contribution to improving efficiency of throughput (Department of Health and Aged Care, 1999a).

*Conclusion: The Australian National Demonstration Hospital Projects 2 (NDHP2) is the most comprehensive and well-documented approach to reform of bed management processes available, and a range of innovations seem to enable hospitals to increase efficiency in the use of inpatient beds. Further dissemination of the more successful innovations should be encouraged. The experience of NDHP2 hospitals tends to show that improvements in performance against access indicators may be swamped by continuing increases in demand.*

## **6.2 Case Management**

Hickey et al (2000, L6) uses a prospective, controlled study to evaluate the effect of inpatient case management on a general medical service. They conclude that case management has an impact on LOS only for patients at 'high-risk', and has no impact on general LOS, post-discharge use of medical services or patient satisfaction.

The NSW Health Council advocates the use of case managers particularly for patients having complex treatment and those with chronic conditions (p15).

*Conclusion: Case management by itself has not been proven to deliver benefits; see below for further comment on discharge planning.*

## **6.3 Inpatient Care of the Elderly**

Older people are high users of acute care (eg people over 65 years consume 63% of hospital bed days in the UK as reported by the Department of Health, 2000, p38). In a systematic review commissioned by the UK National Beds Inquiry (Lambert and Arblaster 1999, L1 in Department of Health, 2000) found that guidelines, short-stay facilities (for eg asthma and chest pain) and rehabilitation (by specialist units for the elderly) can reduce the length of stay for the elderly with these particular conditions (p106).

Barrick et al (1999, L6) report on a case-control study evaluating the use of specialised geriatric acute units in the US. They found that patients treated at the Unit were less likely to die, had shorter lengths of stay, less rehospitalisation and longer times between hospitalisations than the control groups. A Swedish randomised trial (Asplund et al 1995, L5) found slightly higher rates of discharge to home and shorter lengths of stay among those in the Unit, but no other significant differences between the two groups. Resource consumption was similar.

A Canadian study (Brymer et al 1995, L9) compared use of beds by patients awaiting transfer to alternative care in Toronto hospitals with and without acute geriatric programs and discharge planning services. They found that hospitals with programs had an average 51% reduction between 1985 and 1992 in the percentage of beds occupied by patients awaiting long-term care placement, whereas the 'control' hospitals had experienced a 25% increase.

Hider et al (1998b, L1) conclude that comprehensive geriatric care is supported by the evidence (p161).

*Conclusion: Care of elderly inpatients in specialised geriatric units reduces length of stay and may have other benefits including less readmission and health outcome improvements.*

## **6.4 Discharge and the Older Patient**

We did not review the literature on discharge planning per se, because it is now accepted as standard practice, and the issue is not evidence but application. However, the literature on the impact of innovative approaches to supportive discharge practice for the older patient has current relevance to the Victorian system, as highlighted by the Minister of Health's recent statement that 350 acute beds could be freed up in Victoria if those in need of long-term care could be discharged when ready (quoted by Rollins, 2000).

This section discusses the problem of delayed discharge and strategies that can be employed by hospitals to facilitate timely discharge for the group commonly called the 'frail elderly'. The broader question of ensuring that the right mix of alternative care settings for this group is available is addressed under Section 7.1 below.

### ***Defining the Problem: Length of Stay by older patients***

The *York Report on Acute Hospital Care* (Goddard, McDonagh and Smith, 1999 L1) reviewed published studies of 'inappropriate' use of acute care beds by elderly patients (1988-1998). Their conclusions were that at least 20% of days of stay might be said to be inappropriate; that rates of inappropriate use had fallen over the decade reviewed (attributed to better availability of nursing home care in the UK); and that the 'patient hotel' model would not be of benefit for elderly patients (pp 43-44).

Hayes (1995, L9) reports on evaluation of appropriateness of days of stay of elderly patients in Ireland, and found 29% were inappropriate. Hospital factors contributed to about half, rehabilitation needs to about one quarter and lack of availability of alternative care facilities contributed to 40%.

However, it is important not to adopt unproven or discriminatory stereotypes in considering the use of acute care by older patients. An Australian case series of acute patients aged 90 or over (Harris et al 1997, L7) illustrates this point. All separations of patients aged over 90 in 1995 from a major teaching hospital in Adelaide were retrospectively reviewed, with 317 separations of 214 patients. Over 90% survived hospitalisation, and two thirds returned directly to their previous living circumstances. Mean LOS was 6.9 days, compared to 3.7 for the total inpatient population, with 25% being one day or less. Patients coming from the community were less likely to be emergency admissions (72%) than those who came from hostels (87%) or nursing homes (93%). The LOS of those requiring transfer to a rehabilitation facility or more supportive level of residential care was twice the mean. Acute care was thus appropriate for these patients, and while their average LOS was high, they were not all bed blockers.

### *Effective Discharge Strategies*

Early and supported discharge services for the elderly are assessed as offering good outcomes at less cost than standard care, but the intensity and quality of the support services and adequacy of targeting influences the results (eg UK Department of Health 2000, p98).

Nikolaus et al (1999, L6) report on a randomised trial of comprehensive geriatric evaluation and management followed by home intervention in the care of hospitalised patients in Germany with 12 month followup. Patients were elderly, lived at home before admission, had multiple problems or were at risk of placement in a nursing home. They were randomised to three groups – intervention (assessment plus pre-discharge and home care by interdisciplinary team for an average of 8 days (range 1 – 41 days) with 3-month followup; assessment (assessment and recommendations); and control (standard care).

The intervention group had significantly shorter length of stay (33.5 days compared to over 40 days) and less frequent discharge to a nursing home, but similar functional status at discharge to other patients. At 12 months, there was no difference in mortality, but the intervention group had better functional capacity and higher life satisfaction and perceived health. While there was no difference in rates of admission to nursing homes over the 12 months, intervention patients were admitted later. There was no difference in rates of hospital readmission or number of visits to primary care physicians.

Use of community services was higher in the intervention group, but net savings of US\$4,000 per patient were calculated, based on theoretical savings of hospital and nursing home stay reductions.

This study found no beneficial impact of geriatric assessment alone (that is, with recommendations for continuing care but no mechanism to ensure followup). An interesting effect of changes in the relationships between providers was shown in this study:

*'Better information exchange between hospital and family doctors, as well as quicker, more appropriate discharge planning, resulted in a great reduction in*

*the length of stay when patients were readmitted to our hospital. No effect was seen when patients were admitted to other hospitals' (p546).*

Naylor et al (1999, L6) conducted a well-designed randomised trial of comprehensive discharge planning and home follow-up of hospitalised older patients at risk for hospital readmissions in Philadelphia. Comprehensive discharge planning by Advanced Practice Nurses (APNs) commencing at 48 hours after admission, and home support (both direct care and coordination of needed home services) for 4 weeks post-discharge were provided to the intervention group, with the control group receiving standard care, including home visiting nurse services. At 24 week followup, the intervention group showed reduced readmissions (20% vs 37% readmitted at least once) and experienced shorter hospital stays. Time to first readmission was longer, and total health care costs (as measured through Medicare reimbursements) were halved, at a saving of \$US3000 per patient. There was no impact on functional status, patient satisfaction, depression or use of non-hospital post-discharge services (including visits to Emergency Departments). The authors note that reduced rehospitalisation in the absence of differences in functional status may indicate that the benefit was achieved by enhancing the capacity of patients and carers to cope with their multiple medical problems and disabilities (p620).

*Conclusion: The frail elderly are more likely to experience increased lengths of stay in acute care, notwithstanding the fact that the majority of elderly patients return to their previous living arrangements. Those who require admission to long-term care are most likely to become 'bed blockers'. Comprehensive discharge planning, with the ability to ensure that continuing needs are met, has benefits for the elderly patient at risk of delayed discharge or readmission and increasing dependency. Effective targeting of services is important.*

## **6.5 The Question of Central Co-ordination**

The question of setting up a central bed bureau for Melbourne, or for regions within Melbourne, has been raised. We have not identified any evidence regarding the effectiveness of such a measure.

Hospitals in some areas of the UK have set up 'bed management consortia' which co-ordinate admissions across a group of hospitals using a centralised bed bureau. There is no reliable evidence regarding their effectiveness (Hider et al 1998b, p144).

Menec et al (1999) recommend the establishment of a central co-ordination unit in Winnipeg, but the difference in size of Winnipeg and Melbourne should be borne in mind.

*Conclusion: There is no evidence regarding the effectiveness of a central bed bureau.*

## 7. *Balancing the System*

One strong theme emerging from the commissioned literature reviews and government inquiries is the potential to reduce the use of acute care for non-acute health care needs. The point is made that if such use of the acute system is to be reduced, the alternatives must be accessible in a timely way and funded in a way equivalent to and integrated with the acute system so that hospital admission is not the easier or cheaper way for patients, families, GPs and others to respond to care needs (eg De Coster et al, 1999).

Given the large shifts in life expectancy, disease patterns and care options that have occurred since the basic structure of the health care system was put in place in most developed countries, it is not surprising that current needs, particularly of those with chronic illnesses, require a different balance of options in the system (Impallomeni and Starr 1995).

In recent years, a great deal of effort has gone into finding ways to reduce the required number of hospital beds, and large scale bed closures have occurred in many jurisdictions, achieved largely through reductions in ALOS but assisted by a greater focus on alternative care settings and on care in the community. For the first time in recent years, opinion is emerging that the limits of the return on reducing bed numbers may have been reached. For example, the UK National Beds Inquiry has projected that the UK will require increased beds (1.4%) by 2003/04 (Department of Health 2000a).

The process of rebalancing the system has been underway for some time. We conclude that the next major step forward should be through policies which focus on investment in new services for post-acute and sub-acute care, and the removal of organisational and financial barriers against the smooth transfer of patients between settings. Ensuring that there is an adequate supply of residential care beds for the frail elderly is important, but needs to be matched with an adequate supply of alternatives designed to enable elderly people to remain at home (see 7.1).

Other reviewers, while acknowledging that care in alternative settings may be more appropriate for many reasons, caution against the assumption that the provision of alternative settings will necessarily be cost-effective (eg Goddard, McDonagh and Smith 1999, p158). They note that evidence of cost-effectiveness is patchy at best, and even if alternative services are cost-effective in terms of outcomes, they may not be cost-reducing due to expansion of eligibility and/or coverage.

If the goal is to enable acute hospitals to respond in a timely way to both emergency and elective patients, it is essential that resources freed up by the exit of non-acute patients are redirected to improving the timeliness of elective surgery, and to enabling hospitals to run at appropriate occupancy levels. It would be futile to seek to take the resources for new services from hospital budgets. Hospital funding will need to be maintained and as necessary increased in accordance with the community's needs for acute care and expectations of timely treatment.

## ***7.1 Frail Aged – bed blockers***

The UK National Beds Inquiry consultation document (Department of Health, 2000b) is worth noting in some detail. It draws on the York Review (Goddard, McDonagh and Smith, 1999, L1) and employs sophisticated modelling techniques to project bed requirements under a range of assumptions about emergency admissions.

Three funding/bed supply strategies are canvassed to address the inappropriate emergency admission of older people. The first is maintaining the current balance between hospital and community services; the second is to increase bed availability for emergency admissions, and the third is a ‘care closer to home’ option which preferentially builds the capacity of community-based health and social services to prevent admissions and shorten length of stay.

The modelling of the third scenario (‘care closer to home’) entailed:

*‘...expansion of community health and social care, often in the form of intermediate care (illustrated by district nurse contacts, home help hours and step down and community hospital intermediate care beds) to reduce emergency admissions and to facilitate earlier discharge from acute settings. Intermediate care places rise more than the bed days lost from the acute sector to reflect greater emphasis on promoting independence’ (p 67).*

Modelling of these three scenarios with a range of values for trends in admission rates, sameday surgery and average length of stay yields different estimates of the number of acute beds required over the next 20 years. In seeking response to their consultation document, the Inquiry warned that:

*‘...service reconfigurations based on assumptions about major reductions in bed use are unlikely to be safely attainable unless expanded intermediate and community services are put in place’ (Department of Health, 2000, p 70).*

The studies reviewed in Sections 5.1 and 6.4 identify the frail aged as the largest single group of patients who stay in acute beds beyond the acute period of their illness, and this is consistent with Victorian experience. While efforts to improve discharge practice are still needed, there is a bottleneck caused by inadequate supply of post-acute and long-term care options (including care at home). The recent experience with the opening of additional post-acute/sub-acute beds in Melbourne was that the impact on ability to discharge patients from acute beds to these beds was short-lived. A once-off improvement was not sustained because the new beds became ‘blocked’ fairly quickly due to the continuing shortage of long-term options. This experience underlines the need to achieve the correct balance across the continuum of care options if bottlenecks are to be avoided.

De Coster and Kozyrskyj (2000 L10) reviewed data on all adult medical and surgical long-stay patients (LOS>30 days) in Winnipeg acute hospitals from 91/92 to 97/98. These patients are 5% of admissions, but consume about 40% of hospital bed days. They identified discharge destination as the single strongest influence on LOS for these patients, with average stays of 170 days for those who go to nursing homes or other ‘Personal Care Homes’ (PCH), 82 days for those who died in hospital, 81 days for those who transferred to another hospital and 58 days for those who went home (52% of total long-stay patients).

For those who went to a nursing home, only about 15% of their stay was spent receiving acute care, with 40% spent waiting to be assessed for PCH, and 45% awaiting placement. Length of stay also varied with hospital of admission, but the variation was largest for the PCH group. For patients discharged home, hospital of stay had less impact (variation of 11% for medical and 15% for surgical patients).

Hider et al (1998b) reviewed studies of the determinants of long-stay, and found that the most important predictors were age, living alone and impaired mental state (p65).

It is important to remember that it is not only delayed discharge but also inappropriate admission which could be reduced through better balancing of the care system. For example, the York review (Goddard, McDonagh and Smith, 1999) concluded that 11% of unplanned admissions of elderly patients in the UK could have been averted had there been better access to sub-acute and long term care (p44).

Parr et al (1996 L1), in their review of the literature from a Canadian perspective, found that the use of home care as a substitute for institutional care generally maintained or improved patient outcomes, and can be cost-effective, but targeting of services to patients who are at genuine high risk of institutionalisation is the key to cost-effectiveness. They emphasise the need for 'institutional arrangements which reduce the possibility of add-on services (eg single-entry systems)' (p37).

They also found that preventive post-acute home care for the frail elderly appears to be cost-saving (p56). They emphasise the importance of a continuing care system incorporating case management, integrated management of service delivery and single entry (p57).

Eng et al (1997, L11) report on the Program of All-inclusive Care for the Elderly (PACE) in the USA, which provides (directly or by purchasing services) all health care needs of elderly patients assessed as eligible for nursing home care, with a life-time commitment to patients. Care in day centres, in PACE clinics and in the patients' homes are provided. It has its origins in San Francisco's Chinese community in 1971, and is reported to be operational in 11 cities in 9 states across the US. PACE programs enter into contracts with Medicare (for the elderly) and Medicaid (for the poor), and receive monthly capitation payments for each enrolled client. All health care costs incurred by the patient are covered by PACE, with services co-ordinated by a multi-disciplinary care team, and the reported results include a reduction in the use of nursing homes and other institutional care, and a reduction in the use of acute care and length of stay (p229).

*Conclusion: Bed blocking is most often the result of inability to place frail elderly patients in appropriate sub-acute, post-acute or long-term care, or refer them to effective home support services. If the use of acute beds for non-acute care is to be reduced, the supply of lower-intensity care (including care at home) must be adequate to meet demand in a timely way. Resources to achieve this cannot be reallocated from hospital budgets if hospitals are to retain the capacity to improve access for those with acute care needs both urgent and elective.*

## 7.2 *Waiting List Management*

Modern hospitals have two distinct functions which are in tension to some extent. These are receiving patients in urgent need of hospital care and performing complex surgery with attendant care during recovery. Policy focus swings between these two objectives, as reduced waiting times for elective surgery often lead to capacity crises for acute admissions, and a focus on improving emergency access can lead to bed shortages for elective surgery.

Responding to the growth in demand for hospital care, publicly-funded hospital systems around the world are struggling with the issue of waiting times for elective surgery. In 1997, Health Canada commissioned a comprehensive [L1] review of the international literature on waiting lists/times (Sanmartin, Barer and Sheps, Chapter 5 in McDonald, Shortt, Sanmartin, et al, 1998; L10) as part of a larger report on waiting times for elective surgery in that country. This work emphasises the poor quality of data usually used to test hypotheses about waits for care, and suggests that 'demand side' policies of consistent definition and selection of eligible patients are more effective in the longer term than 'supply side' strategies which attempt to target funding to those on a waiting list.

A subsequent empirical study of waiting times in Manitoba demonstrated that public perceptions of longer waiting times for surgery in that province were belied by falling or stable trends in median waiting time for 10 high-volume procedures (DeCoster, Charriere, Peterson, et al, 1999; L9). The Western Canada Waiting List Project, a collaborative project of four provincial governments, health authorities, health research centres and the Canadian Medical Association, will report in March 2001 on tools for prioritisation of waiting lists for an initial five clinical services (WCWL, 2000; L10).

The New Zealand Ministry of Health has also adopted a 'demand side' approach by introducing standardised criteria for assessment of priority for treatment, along with a booking system guarantee of access to care within a specified time period for patients judged in need of or likely to benefit from a specific treatment (Hefford and Holmes, 1999; L9). Full implementation of the policy only commenced in June, 2000, and it will be some time before evaluation of the policy can be attempted. An interesting report on a similar policy initiative in Sweden (Hanning and Spangberg, 2000; L9) suggests that as resource constraints which make traditional admission policies more difficult are encountered by clinicians, initial support for waiting-list guarantees may turn to clinical resistance, with government in that country formally abandoning the waiting time guarantee policy after only 4 years.

Waiting time information is now published on the net by both the Netherlands (Sheldon, 2000; L10) and NSW ([www.health.nsw.gov.au/waitingtimes/](http://www.health.nsw.gov.au/waitingtimes/)), in the latter case with waiting times specific to individual procedures and clinicians, in the former using only regional data at specialty level. These are designed to provide comparative data for policy, but also to change patients' and referring doctors' willingness to seek care in centres with shorter queues.

The report this year from the NSW Health Council (2000, L8) recommends a series of measures to improve clinical practice with regard to elective surgical admissions.

These include the aim of admitting the majority of elective patients on the day of their surgery, increasing the proportion of day-only surgical admissions, wider use of clinical pathways, and better articulation of care with the non-hospital sector (including improved discharge communication and clinical case management).

*Conclusion: Further development of systems for categorising patient care needs is required. There is no evidence that waiting list patients are 'abusing' the emergency admission system.*

## **8. Consumer Perspectives**

The evidence on consumer preferences and acceptance of current and alternative care options is inconclusive.

The York Report (1999) provides a brief overview of the evidence of the preferences of elderly people for care outside the acute care hospital. Unremarkably, older people prefer to receive care in their own homes. The authors suggest such evidence should be read carefully, however, to take note of differences between short term acute care outside hospital and long term care, with preferences not easily extrapolated from one decision context to the other. They also suggest that the preferences of the well elderly may diverge from their preferences when acutely ill. Finally, they suggest that the views of the main care giver should be considered, in addition to those of the dependent person, in evaluating 'consumer' views about care alternatives, although they also note that the evidence suggests divergence between these two groups only when the quality of the alternative to home care is very good (Goddard, McDonagh and Smith, 1999, p 102)

In general, consumer acceptance of alternative care options is reported to be equivalent to or higher than acceptance among control groups. For example, Bonnema et al (1998) report on a randomised trial to assess the impact of early discharge after surgery for breast cancer (125 women, excluding those with unsatisfactory home environments, pre-operative treatment and high risk of complications). They found that early discharge is safe, and well received by patients. Short stay patients were more likely to discuss their disease with their families.

However, the emphasis in such studies is on ascertaining relative satisfaction with packages of care, and the results may not be able to be generalised. The question of consumer preferences and priorities may become increasingly important, particularly if policies to rebalance the health care system are to be implemented. For example, it seems that any broad changes to our approach to care of the dying would need to be considered primarily from the perspective of the patients and their families, and such consideration would need to be well informed about community views.

*Conclusion: Consumer acceptance of care innovations is generally high. Broader research is needed to determine consumer priorities and preferences. Consideration of care in the last year of life and care for dying should be approached from a consumer-focused perspective.*

## **9. Key Performance Indicators, Benchmarks and Incentives**

Victoria has the most active program of financial incentives for performance in the Australian public hospital system. The Hospital Access Program (HAP) set performance standards for the timeliness of both elective and emergency care, and enjoyed good results for several years, until 1999. It would seem that the strategies employed by hospitals to lift their performance and meet the standards in earlier years ceased to be effective. One possible explanation of this experience has been given in Section 4.2. The question now is whether HAP continues to be useful.

The literature we reviewed was largely unhelpful in relation to this question, and it seems that policy instruments such as performance incentives are rarely if ever evaluated in the literature.

The available evidence and commentary is not encouraging. For example, Hider et al (1998b, L1) concluded that strategies aimed at modifying practitioner behaviour are unlikely to be successful in reducing emergency admission rates, because 'the characteristics of the admitting doctor are a relatively unimportant determinant of acute medical admission rates' (p59).

### ***Better Measurement of Emergency Demand***

As noted above (Section 4.3) reviewers have called for better definition and measurement of emergency workload. One important aspect of this issue in Victoria is measurement of the balance of emergency and elective workload and its impact on performance against access standards.

There is good reason to believe that the relative proportions of emergency and elective adult medical and surgical multi-day admissions are a key determinant of hospitals' ability to deal with access block. While access to paediatric, obstetric and psychiatric inpatient care is important, it is in the adult medical and surgical areas that peaks in demand have their greatest impact. Similarly, while same day admissions are an important method of minimising the demand for inpatient beds, sameday workload (both elective and emergency) should be excluded from the denominator in the measurement of performance against access standards and indicators, as it clouds the issue of access to inpatient beds.

Consideration should be given to refining the standards for access performance to take account of the relative burden of emergency multi-day stays on hospital workloads.

Consistent application of definitions of what constitutes an 'emergency' admission also requires further policy attention.

### ***Problem of Conflict Between Policy Goals and Financial Incentives***

The problem of conflicting policy goals and incentives is perhaps the strongest single theme. For example, Wasem (1997) reports on efforts in Germany to improve access to non-acute beds for patients with long-term needs, and finds that the policy goal is in conflict with the financial incentives set up by the way that responsibility for

paying for acute versus rehabilitation care is divided. He advocates better integration of the funding arrangements, a theme which is relevant to the Australian situation.

Holdsworth (1995) comments on the problem of conflicting incentives in the UK, where he reports hospitals needed to compete for funding for elective throughput, leading to a neglect of emergency care. Wardrope (1997) echoes this concern in his comments on the funding of 'extra' emergency care at marginal rates, while higher-priced elective care is foregone: 'The unacceptable news is that the more efficient a hospital is at handling these crises the greater its budget deficit.' (p 369).

### ***Processes of Change***

Hospital reports of successful innovations (Department of Health and Aged Care 1999b, L8; Williamson, 1999, L8; The Alfred, 1999, L8; Birmingham Heartlands and Solihull, 1999, L10; Stobhill Hospital, 2000, L10) consistently emphasise the importance of careful management of the process of design and implementation of change in the management of beds and patient care. The active involvement of clinicians of all disciplines, and an approach which addresses the problems they face, is consistently emphasised.

The problem of dissemination failure is also noted. For example, the King's Fund comments that 'there is still scope for hospital trusts to learn from existing good practice bearing on the management of their beds' (King's Fund, 2000, p3). Hospitals should be encouraged to work together to share learnings, but the need for each hospital to respond to local conditions in determining which solutions will work in their own organisations must be respected.

While there is a large literature on change management, NDHP has distilled from it a very relevant set of principles for change management suggested by the qualitative evaluation (Department of Health and Aged Care, 1999b, pp37-42).

*Conclusion: There is a dearth of evidence regarding the effectiveness of policy incentives. Consideration should be given to refining the standards for access performance to take account of the relative burden of emergency multi-day stays on hospital workloads. Consistent application of definitions of what constitutes an 'emergency' admission also requires further policy attention. Conflict between policy goals and financial incentives is a problem. Care is needed with the process of change and innovation if new initiatives are to be effective.*

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# ***Methodology***

## ***Assessment of the evidence: internal vs external validity***

Learning from experiments entails evaluating both their internal and external validity. The methods of evidence-based medicine and evaluation of clinical interventions place emphasis on internal validity, essentially evaluating whether an experiment was designed to provide a good test of the intervention. Guides to the evaluation of this literature, such as those published by the National Health and Medical Research Council (NHMRC) (*How to use the evidence: assessment and application of scientific evidence*, Canberra, NHMRC, 2000) emphasise levels of evidence based on study design and study quality to judge internal validity.

Clinicians and other decision-makers are increasingly reluctant to rely on evidence from poorly-designed experiments. Management and policy interventions, however, are much less likely to have been evaluated using randomised or even comparative study designs, and thus a conventional 'levels of evidence' approach will not be very informative, with nearly all studies falling into the lowest level of the evidence hierarchy. In part this reflects the current stage of development of health service management research as well as some inherent differences between the fields of clinical medicine and health care management. However, in part this situation reflects the importance placed on the other aspect of validity: reproducibility or external validity.

Where it may be assumed that biological responses to clinical interventions can be extrapolated from one human population to another, this assumption cannot be made of health care institutions and health care systems. Differences in professional culture, management system design, financial incentives, to name only a few variables, may make extrapolation of the findings from one health system or hospital to another problematic. Thus, external validity of studies assumes at least equal importance in the evaluation of policy and management interventions.

A second problem with placing exclusive attention on internal validity lies in the nature of 'control' of confounding factors in a policy or management 'experiment'. Clinical investigators use randomisation of individuals as the way to ensure that results are not mistakenly attributed to an intervention when they may have arisen from systematic differences in the experimental groups. With management and policy interventions, however, the unit of analysis is much larger (usually at least a clinical unit, if not a hospital or entire hospital system).

Generally, the intervention is an idea (in contrast to a medicine or operation) and isolation of the control site from the flow of ideas is much more difficult, setting aside the difficulties of designing a placebo intervention. The investigators of a reasonably well-controlled experiment on bed management in Canada have commented:

*'The MACRO (Managing Acute Care Resources in Ontario) study demonstrates the difficulty in establishing formal evidence for the evaluation of utilisation management practices. In the current hospital sector environment, any effects of formal, focussed strategies for utilisation*

*management may be lost among the large and rapid ongoing changes within this sector.’ (Basinski et al, 1997).*

In evaluating what can be learned in Victoria from the international literature on bed management, weighting of the various contributors to internal and external validity is difficult: is an uncontrolled Australian intervention study likely to provide better evidence on improving bed management in Victoria than a controlled study from Canada or the UK?

Our approach to evaluating the local and international evidence will be to use two criteria of internal validity and one of external validity to create a hierarchy of evidence as shown in Figure 1.

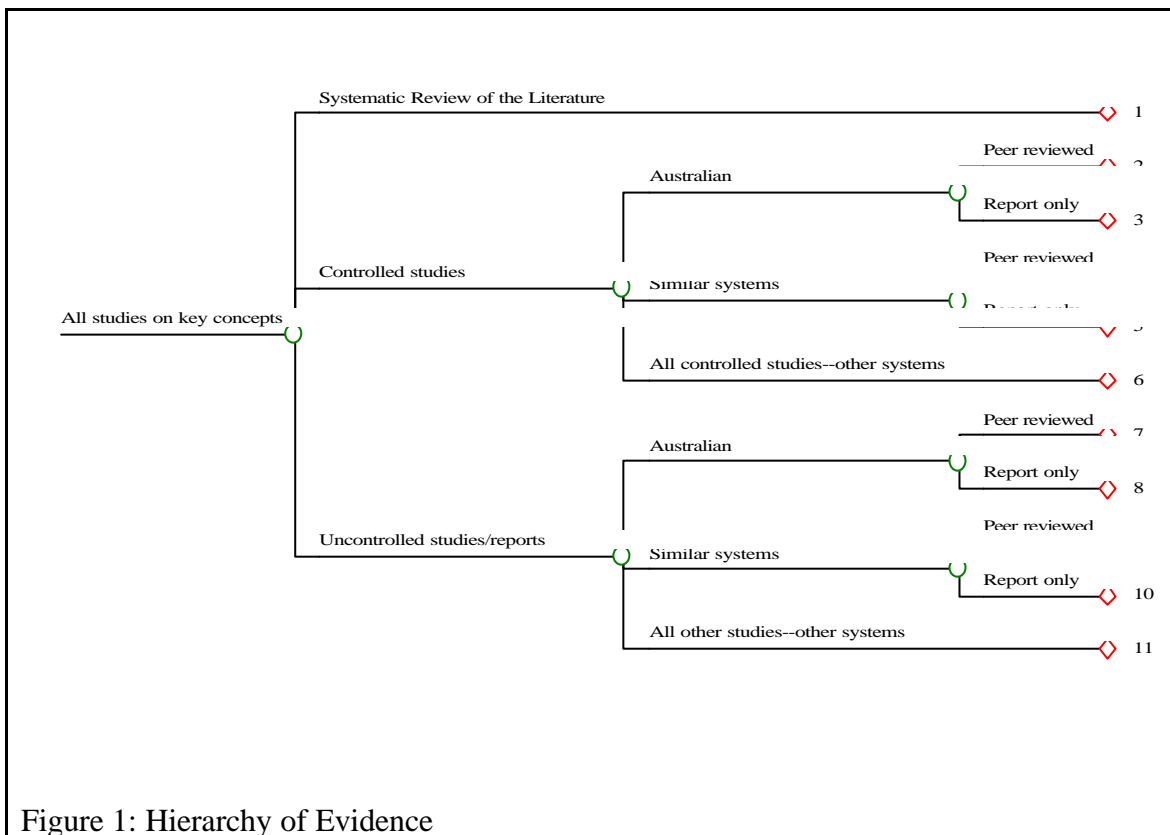


Figure 1: Hierarchy of Evidence

We have placed systematic reviews of relevant bodies of literature as the highest level in this schema because the scope and criteria used for such studies are rigorously applied and well documented. Generalisations from systematic reviews can be easily referenced back to the larger body of evidence used.

With regard to single studies or reports, we consider that the use of a comparative design (with an intervention and a control) provides better evidence of the success of an intervention than uncontrolled or descriptive studies. It should be noted, however, that there are relatively few controlled studies reported, and that evidence from well-designed descriptive studies may be very useful to policy at this stage of the evolution of this field of research.

The second-level criterion relates to the external validity of the evidence. We have assigned three rough levels of external validity: Australian studies, studies from

'similar' health systems, and studies from 'other' health systems. Canada, the United Kingdom and the Scandinavian countries have been identified as 'similar' systems for the purpose of this exercise, as has the Veterans' Administration system of hospitals in the United States. These have been chosen because of their common use of salaried medical specialists in hospitals and the service obligations of hospitals to provide 'universal' coverage of their particular population.

Other European countries and other systems in the U.S. have been placed lowest on the external validity hierarchy because they are more fragmented in terms of both funders and providers, and/or operate with a high proportion of fee-for-service in-hospital medical specialists. Our preliminary review of the literature suggested that little is being published in the U.S., where over the past decade managed care has become the dominant system. It may be that bed management innovations are considered to give managed care firms a commercial advantage which is preserved by not publishing accounts of successful strategies. Reports from non-OECD countries and Japan will not be used because of the very different nature of hospitals and coverage of their health systems.

The final criterion is whether the report has been subjected to peer review. There is ongoing debate about how successful peer-review is in identifying faulty research prior to publication. Notwithstanding this controversy, much of the literature reviewed here has been published only as commissioned research reports, with minimal peer review, and thus our schema gives greater weight to studies which have been published in a peer-reviewed publication.

Criticisms can be made of this schema. System issues will be different in Australian states (such as NSW) and 'similar' countries (UK) where hospital funding is not casemix-adjusted. The Veterans' Administration coverage population is much older than Victoria's. Canada uses fee-for-service payment for in-hospital care, even though its health insurance system was the model for Australia's and Canadian population dispersion, health policy and medical culture are very similar to Australia. Where such issues might mitigate against the credibility of study findings, we will comment on their implications for learning from otherwise useful studies.

## ***Methods and Scope***

Our search strategy combined a structured search of Medline/Healthstar on limited key words, an exhaustive search of health services research, management and health economics websites known to the authors, reports of bed management innovations in Australia (focused on ARCHI, the NDHP2 hospitals and State health websites), and 'snowballing' of references from these sources.

We emphasised web-accessible resources for two reasons. The first was that much of the bed management literature, and certainly the most recent literature, consists of commissioned research and policy documents not referenced in the U.S. National Library of Medicine system, but available from the websites of research and policy institutions. The second was a more pragmatic accommodation to the project's timelines. Given recent policy interest in the issue of bed management in the UK,

Canada and elsewhere, it was our judgement that studies which were not referenced in one of the web-accessible sources were unlikely to yield much additional information.

We also noted the parallel project commissioned by the Victorian Department of Human Services from the Monash University Centre for Clinical Effectiveness to review the clinical literature on the topic, and refocussed our efforts on issues of health planning, management and funding policy.

The scope of our search was thus structured in terms of the following limitations:

- ❑ A focus on adult medical and surgical inpatient care, given that these are the areas that incur the vast majority of access problems, particularly in winter. Studies focused on psychiatric, obstetric and paediatric care are excluded.
- ❑ Publications prior to 1995 are excluded, on the grounds that the relevance of earlier material has been eroded by policy and clinical practice change in the intervening period; and any important innovations have been carried forward.
- ❑ Clinical studies in medical specialties are not reviewed unless they are focused on the relevant questions of substitution, appropriateness of admission or reduction in ALOS.
- ❑ Studies which focus on day surgery as a clinical practice are not included, as this is an established approach.
- ❑ Studies and reports which address home care or care in other settings are included only when they address the issue of substitution for or diversion from acute care.

Time constraints made it impossible to double-read any of the sources. The principal authors each took responsibility for defined sections of the literature, with reassignment of some topics as overlaps became apparent. Full copies of all sources discussed in this report are held by the authors.

A narrative synthesis of these sources is provided, as there are not sufficient studies of any particular type, similar specified outcome variables or system-specific context to support metaanalysis.