

Hospital planning: the risks of basing the future on past data

Sandra G Leggat

Abstract

Planning for capital development of public hospitals in Victoria is guided by a multi-stage process with comprehensive data analysis and thorough approval processes at each of the stages. The long development timeframes and the limitations in the data available to project service utilisation may negatively impact upon the service planning processes, and in some cases newly developed hospitals have not been sufficiently planned to meet community needs. This paper suggests that service utilisation forecasts derived from administrative databases require a more detailed verification process than currently exists. The process requires consideration of the drivers of demand to document the core assumptions about the future drivers, benchmarks with other jurisdictions, epidemiological, comparative and corporate needs assessment to explain the differences in utilisation rates, and sensitivity analysis. Given the cost of hospital construction and the rate of change in the healthcare sector, it is important that future hospital planning processes do not accept current utilisation trends as valid for future planning without this level of verification.

Keywords (MeSH):

Health Care Sector; Health Care Quality, Access, and Evaluation; Planning, Health Facility; Delivery of Health Care; Statistical Data Analysis

Introduction

Like many other jurisdictions, the state of Victoria has established a multi-phased process for capital development of public hospitals. The process requires travelling through a series of planning requirements and corresponding approval steps. The process starts with service analysis, comprising examination of population and policy data and demographic service data that are analysed to complete a service plan (Department of Human Services [DHS] 2007a). The service plan is then used to structure the functional analysis, physical area analysis and finally, cost analysis of the capital development (DHS 2007b). The availability of data to assist in hospital planning processes is limited, tending to be focused on the actual service utilisation for admitted patients collected through the Victorian Admission Episodic Database (VAED). These administrative data are then married with population data to arrive at projections for the future need for health care services.

The consequences of this planning process are that hospital development projects, while based on the best available information, may not fully reflect community needs once the new building is opened. The planning process has many stages and ultimately needs to tie in with the government budget allocation. It may be many years between the data analysis for the service plan and the construction of the hospital. In the intervening years there may be changes in technology, practice and population health status that decrease the relevance of the earlier planning data. It is widely acknowledged that forecasting more than two years into the future is 'notoriously inaccurate' (Hogarth & Makridakis 1981: 122). We have seen a pattern where newly opened hospitals, such as Northern and Sunshine hospitals, have required almost immediate planning to increase their capacity. In a recent example, the Victorian Auditor General commented that the new Royal Women's Hospital

(RWH) in Melbourne had not been planned with sufficient capacity for the future:

In light of the increased maternity demand, which became more obvious during construction, it would have been prudent for DHS (Department of Human Services) and DTF (Department of Treasury and Finance) to conduct a cost/benefit analysis of the option to add extra floors during the construction phase, as part of a possible solution to address the rise in maternity demand and other increasing pressures in the public hospital system. However, we saw no evidence of any consideration by DHS during the construction period to exercise the design option to add extra floors (Victorian Auditor-General 2008: 26)

Most recently, ‘...reports have raised concern that the new \$1 billion Royal Children’s Hospital, which will have an extra 46 beds, will not cope with growing demand for services’ (Medew 2008).

By definition, service planning requires an understanding of the future health service needs of the population. These needs may change over time, as the size and demographics of the population change; however, the processes used for service planning largely assume that future practice can be forecast from past practice. This paper explores the health information data used in the service planning process and makes recommendation on other factors that need to be considered in analysing utilisation data for the purposes of service planning. Both need and demand are discussed, as both are important for capacity planning. While there has been debate about the definition of need, it is generally regarded as the ability to benefit from health care (Stevens & Raftery 1994) or the assessment of the value of the health service in improving an individual’s health status (National Health Strategy 1991). This is distinguished from the economic concept of demand that includes the notion of an

individual’s preference and ‘their willingness to pay’ for services (Eagar, Garrett & Lin 2001:139).

Understanding demand for hospital services

Sources of data

The planning process typically requires secondary analysis of a variety of data to estimate future service needs. For example, census data and population projections are available from the Australian Bureau of Statistics (ABS). Population projections are also completed specifically for the state by the Victorian Department of Sustainability and the Environment. Hospital utilisation data are obtained from the Victorian Admitted Episodes Dataset (VAED), the Victorian Emergency Minimum Dataset (VEMD), the Victorian Ambulatory Classification and Funding System (VACS) and from data collected by individual hospitals and health services that may not be reported centrally. The VAED is a comprehensive dataset and, consistent with national minimum data set requirements, the VAED includes information on age, sex, postcode, ethnicity, occupation, language, reason for admission, diagnoses, procedures and interventions, and discharge status.

The VEMD contains demographic, administrative and clinical data detailing presentations at Victorian public hospitals with 24-hour Emergency Departments. There are 17 VACS funded hospitals in the state and the model, based on 35 weighted medical and surgical clinical specialties and 11 unweighted allied health specialties, has not changed since its implementation in the late 1990s. A recent review of VACS indicated that the VACS ‘classification system needs to capture the full range of services provided through public hospital outpatient services’ (Apex Consulting 2008: 5),

suggesting this database was not complete in the hospitals included or the services recorded. As a result while emergency presentations and inpatient admissions are included in the statewide databases, many primary care, ambulatory, outpatient and community health services are not included in standardised databases. Individual health services collect a wide range of utilisation data, but these have not always been shown to demonstrate the accuracy, reliability and comparability that come with a centralised database.

Additional data on health status can be obtained through the Australian Institute of Health and Welfare (AIHW) and the state government burden of disease studies. However, it is often the case that the sample sizes of these types of national surveys do not provide for sufficient responses at a local level to enable valid local data beyond the aggregated responses for the state.

The forecasting used for projecting future hospital service demand tends to be a rolling forecast that is updated with each additional year of utilisation data. The forecasts are not publicly available, but are provided to health services to assist in 'approved' service planning projects. Future hospital service utilisation tends to be forecast for the state using a linear regression model applied to the VAED separation data over a period of years. While generally accepted as an appropriate forecasting method, the risk of a linear regression is that outlier data points can over-influence the regression results, leading to erroneously high or low (and even negative) utilisation rates (Jones et al. 2008). This suggests a need for close review and adjustment of the final forecasts.

Forecasting models need to be based on retrospective data over a number of years, as planning should not be based solely on current year utilisation (Eagar et al. 2001). The DHS service planning process requires that future service demand is forecast annually over a ten year period. In any one year various health system 'crises', such as internal outbreaks of gastroenteritis that result in nursing ward closures, industrial action among the many occupational groups or external outbreaks of contagious disease can have an impact on the annual utilisation that does not reflect the true

steady state of the hospital system. These forecasting models are usually capable of factoring in future population changes and some expected service practice changes, such as the shift to same-day treatment. As such the forecasting models may provide a reasonable representation of how a changed population (i.e. an older population, a larger population, or a smaller population) would be expected to use existing hospital services. There are however substantial weaknesses in using these forecasts as the foundation for identification of future hospital capacity, which are outlined below.

Factors that impact upon forecasting from current utilisation data

Limitations of the existing datasets

The most commonly used dataset for hospital planning in Victoria is the VAED, which tracks patients admitted into a hospital within the state. There is general acknowledgement that the VAED data are relatively accurate as they form the basis of the hospital casemix funding system. Yet there have been many studies that have found that health care administrative databases, such as the VAED, have limitations that suggest they are not appropriate standing as the sole information source to inform health sector decision making processes (Peabody et al. 2004; Romano et al. 1994; Hannan et al. 1992).

The VAED comprises the hospital care that takes place in beds, and a focus on beds, while convenient and easily understood, fails to take account of the significant pressures on acute hospital providers (Jones et al. 2008). A brief review of hospital statistics reported in the 2006/07 annual reports illustrates that 60% to 80% of Victorian hospital activity tends to be non-admitted services, such as outpatient and emergency attendances. This suggests that while the VAED is a useful database for the bed-based activities of the hospital, it misses much of the essential service utilisation in today's hospitals. While the emergency department attendances are recorded in the VEMD and can be used as a resource for planning, utilisation data are not readily available for planning purposes for other non-admitted services. For example, utilisation

data on primary care, ambulatory and outpatient services that are provided privately or which are funded through the many non-admitted funding streams of the DHS are not collected consistently. This means that it is difficult to obtain reliable planning data for a large portion of the activity of an acute care hospital.

Accounting for unmet needs

Basing the future health system capacity on the utilisation recorded in the VAED, or any other existing patient administrative data set (e.g. Elective Surgery Information System [ESIS] data), assumes that past relationships between variables will be the same in future years. Forecasts that apportion the future activity for each age group according to past referral patterns have the potential to ignore the needs of those unable to access the health care system. That is, the use of past utilisation data to develop future forecasts does not consider unmet needs. If the future planning of the system is based on existing separation patterns it only includes those individuals currently receiving care within the system, and therefore excludes those individuals who may have required hospital care, but for one reason or another did not receive such care. This is particularly important in communities with large immigrant populations, who may not access the health care system in the same ways as Australian citizens (Murray & Skull 2005; Sheikh-Mohammed et al. 2006), and those communities with lower socioeconomic status, as studies have shown a correlation between lower socioeconomic status and under-utilisation of health care services (e.g. Hall et al. 2001; Cass et al. 2001). This lack of attention to unmet needs may result in under-planning of the capacity of the services.

In order to ensure the hospital capacity is sufficiently sized, the admission data need to be adjusted to account for unmet needs. This requires a process where the population-based demand is estimated. Stevens and Raftery (1994) outlined epidemiological, comparative and corporate methods as three approaches to population-based needs assessment. The epidemiological approach has been recommended (Gibbs et al. 2008), where estimates of prevalence and incidence of key conditions are used to analyse whether existing utilisation (and

therefore forecasts of future utilisation) appears sufficient to meet the current and future health care requirements for these conditions. Assuming the data are available for all of the required conditions and with sufficient geographical specificity, this would be an effective method to interrogate the existing utilisation data for unmet needs. Comparison of national, state or other appropriate jurisdictional disease and utilisation rates, that is, the comparative approach, may also highlight areas with unexpectedly low utilisation that suggest a need for further analysis of unmet needs. Eagar et al. (2001) stress the importance of ensuring that differences in the socio-demographic profile of the comparative populations are included in the comparative analysis. Finally, the corporate approach, that considers the demands, wishes and perspectives of the relevant stakeholders through qualitative data gathering, may also be effective at identifying unmet needs.

Accounting for variation in utilisation

Studies have found that hospital utilisation is more closely related to the number of beds and health professionals employed than the characteristics of the population being served (e.g. Wennberg et al. 2007; Fakhoury & Roos 1996; Wennberg 1985). This suggests a need to ensure the utilisation recorded in the VAED and other administrative databases is questioned to reveal over- or under-servicing. While the focus of this paper has been primarily on ensuring sufficient capacity in hospital planning, it is equally inappropriate to build over-sized facilities based on over-servicing that is not best clinical practice. Databases, such as the VAED, record the utilisation within the system, but are not able to impart a value judgement as to whether the utilisation was appropriate.

Small area variation analysis has consistently found wide variations in rates of medical treatment, such as surgeries, that are not related to patient characteristics or preferences (Wennberg 1985). These studies have suggested that admissions vary for a number of reasons. For example, some patients with like conditions may be treated with an admission in some areas, but as an outpatient in other areas; with some conditions there is uncertainty around both the diagnosis and the 'best' treatment that

leads to the variation; and the available access to health system resources, both within the hospital sector and the other sectors, such as primary and residential care may also result in treatment variations. The outcome of this is that projecting future hospital capacity on past utilisation may perpetuate poor clinical practice and inadequate capacity in other essential sectors of the health care system.

We know that in comparison with other industries, the providers of health services have substantially more power to create consumer demand for the services that are provided. The recent media coverage in Victoria of alleged over-servicing and over-billing of external funding agencies is an illustration of this principle (Baker & McKenzie 2008). While public policy and associated regulation and performance management are focused on patrolling the health market to limit self-serving behaviour, it is likely that we will always observe variation in practice; not necessarily as a result of provider-induced demand, but as a result of the different beliefs held by health professionals. It will be important in future hospital planning initiatives to develop the required data that link practice to outcomes to have a much clearer picture of how much variation is appropriate, and therefore how the system should be planned to accommodate this variation.

Changes in government policy

Hospital utilisation rates may change, as government policy changes. The change in birth rates experienced in the RWH redevelopment referred to above is an example of how changes in government policy can have an impact on hospital utilisation. In the interim between the service planning and the construction planning, the national government introduced the Australian Baby Bonus scheme. This change in policy may be one of a number of factors that have had an impact in reversing the declining birth rate. As a result, service planning based on the declining birth rate, reflected in both the birth numbers and the admissions to the hospital, would not have foreseen this change in policy, with such a significant impact on the capacity required by the new hospital. This is an example of how a change in government policy at the national level could

have a significant impact on services provided at another government level.

Although it is not possible in the planning horizon to identify all possible policy changes, clear documentation of the planning assumptions is essential. If it appears that the assumptions are not holding during the planning timeframe, there may be a need to amend the facility plans. Eagar et al. (2001) have suggested that planners need to develop assumptions related to social, economic, political, technological and environmental factors. The development of utilisation scenarios and sensitivity analysis, which consider higher or lower utilisation forecasts and the resulting impact on the hospital, may also assist in ensuring appropriate flexibility in the design and construction processes.

Changes in the services in other hospitals

In the Victorian system individual health service boards and staff develop major strategic priorities that are agreed with the Department of Human Services, but smaller variations in service capacity resulting from lack of staff, renovation of facilities or public health issues are, by definition not planned and often happen with little communication to either the DHS or neighbouring hospitals. This decentralised approach is different from other Australian states and territories, which have a more centralised approach to planning hospitals. Changes in the service capacity in a neighbouring hospital may have significant implications for other hospitals serving the same population. This may result in changes to services within individual hospitals that have not been planned on a regional basis and that may have a significant impact on hospital utilisation. In the case of RWH, during the planning period the Mercy Hospital for Women moved from the site in East Melbourne to a new hospital site in Heidelberg. This change would not have been recorded in the historical VAED utilisation data and the anticipated shift in utilisation would need to be included in the service and facility planning processes and forecasts based on past utilisation adjusted accordingly.

An associated factor is the treatment of private hospital utilisation when planning public hospital capacity. In a review of sub-acute care capacity planning, Gibbs et al. (2008) found that inclusion

or exclusion of private sector demand had material impact on the forecasts, with evidence from the UK that assumptions made during the initial era of the Private Finance Initiative (about reductions in National Health Service [NHS capacity]) were too severe and were in fact overturned by the National Beds Inquiry (Dunnigan & Pollock 2003). Private hospital utilisation is likely to be strongly influenced by government policy and needs to be subject to the same strong requirements for clear documentation of the utilisation assumptions, as well as sensitivity testing within the service planning model. A shift in private hospital use during the planning horizon can have significant implications for the utilisation of neighboring public hospitals.

Discussion

Limitations of the data available for planning

The recognition that planning for hospital services required data that could be analysed to determine the size, location and service mix of a hospital was a big step for Australia in the 1970s. The development of national datasets assisted in moving the planning process from one inextricably linked with politics to a process that attempted open and transparent allocation of resources. Prior to the purposeful development of data that would be useful for planning, hospitals were often established in areas primarily for political gain (Sax 1984). As a result, the construction of hospital facilities has not necessarily matched health care needs, with a history of too many hospital beds in inner city areas and too few beds in the quickly developing suburban areas (Eagar et al. 2001).

Although since the 1970s the national and state governments have aimed to address the serious shortage of data available for the planning and evaluation of hospital services, access to adequate data has remained an issue. In 1980 the Commission of Inquiry into the Efficiency and Administration of Hospitals (Jamison Report) reported that health information systems were inadequate (Commonwealth Department of Health 1980). In 2004 there were similar concerns found through a survey of hospital chief executives in Victoria that essential hospital

and health service outcome indicators were not available (Leggat, Bartram & Stanton 2005).

This suggests a need to identify and implement data collection, linking and analysis that provides a more coherent picture of the operations and outcomes of the health care system. Recent discussion of tying the Australian Health Care Agreements to performance indicators (Duckett & Ward 2008) may ensure the development of a comprehensive set of performance indicators that will in turn enhance the data collected. Health care utilisation data that provide a complete picture of the health care system including primary and community care, rehabilitation, sub-acute and long term and residential care, in addition to the current emphasis on in-hospital care are required. Although large hospital capital construction projects happen infrequently, hospitals still require the same service planning data to regularly monitor their performance in meeting the health care needs of the populations they serve.

In many instances the planning processes focus on the quantitative data that are available, potentially at the expense of a more accurate focus on the actual needs. This is not uncommon; previous study of capital budgeting processes found that the costs and benefits most difficult to quantify were excluded from the planning process (Marsh et al. 1988). In hospital capacity planning the process focuses primarily on the current and forecast separation data. However, the research suggests a need for the 'harder' numerical data to be enhanced with the softer qualitative information that enables testing and confirmation of the quantitative data:

To leave [soft considerations] out of the analysis simply because they are not readily quantifiable or to avoid introducing 'personal judgements,' clearly biases decisions against investments that are likely to have a significant impact on such important considerations of the quality of one's product, delivery speed and reliability, and the rapidity with which new products can be introduced. (Hayes, Wheelwright & Clark 1988: 77)

This suggests that demand planning initiatives should be structured to ensure that the quantitative data projections are married to relevant qualitative data and subject to sensitivity testing. In fact the Department of Human Services

outlines factors other than the existing demand that can influence future service demand:

- the potential for hospitals to collocate and share services
- changes to the catchment boundaries
- the service standards
- anticipated changes in services' practices
- the potential for development of new services
- advancement in clinical and administrative technologies
- attraction of demand currently using other services (e.g. utilisation of community or outreach type services rather than institution-based services)
- availability of complementary services and resources to support identified new needs
- changes in legislation and community expectations
- methods for containing or channeling demand to other services (DHS 2007a).

Little of this information is currently available in the planning datasets and purposeful analysis is required that ensure the forecasts based on the administrative databases are 'adjusted' to take into account these factors. Coupling the VAED and VEMD forecasts with focused epidemiological, comparative and corporate needs assessment is essential to improving the quality of future service planning in Victoria.

Limitations of forecasting

Forecasting the future is most effective when there is little change (Mintzberg 2000). However, in recent years few would describe health care as a stable industry. While the individual drivers of future demand for health care are relatively easy to identify, they are complex and interact in ways that are not easy to predict (Jones et al. 2008). Hospitals are but one part of the health care system and to fully understand the needs the hospital should be designed to respond to it is essential to understand the hospital's place within the broader system. The presence or absence of a coherent primary care sector, the referral patterns among doctors and among hospitals, the availability of transportation and the geography of the area can all influence how a hospital serves its community. This suggests that it is essential to have a strategic plan for the healthcare system of the state in place that enables the service

planning of individual hospitals to contribute to a rationally planned system.

Scenario building has been recommended as a tool to counteract the limitations of forecasting (Porter 1985). However, Mintzberg (2000) has pointed out the problems with scenario planning that make it difficult to implement. These include the substantial resources required to build the scenarios; the uncertainty around how many scenarios are needed; and the strong evidence that suggests that organisations have difficulty responding in a meaningful way to scenarios that outline a future that appears to be different from the current situation. This suggests that comprehensive scenario analysis to refine the forecasts is unlikely to be successful, but using the technique to promote consideration of alternate conceptual interpretations may improve our ability to forecast future demand.

This analysis has shown that there are a range of factors that make anchoring hospital service and capacity planning predominantly on past utilisation data risky. This suggests that a more complex service planning process is required, which takes the current utilisation data through a number of steps that are designed to test the validity and reliability of these data for forecasting future capacity. These steps should include:

1. Within the confines of the health system strategic plan, develop a baseline forecast based on current utilisation, marrying current age sex utilisation rates by major clinical group and/or diagnosis related group (DRG) with the population projections.
2. Identify the current and future drivers of demand for hospital services, considering social, economic, political, environmental and technological factors and complete trend analysis for these factors. Using this information, explore a few relevant scenarios that require thinking about futures that may be quite different from the past and use these to develop core assumptions about the future drivers.
3. Identify relevant utilisation rates from other jurisdictions and use these to benchmark the current and forecast utilisation rates looking for areas where the forecasts seem materially higher or lower.

4. Complete epidemiological, comparative and corporate needs assessment, as appropriate, focusing on those areas where the current and forecast utilisation rates appear to be different from the benchmarks.
5. Adjust baseline forecast to reflect expected changes in demand from both the driver and benchmarking analysis.
6. Test the sensitivity of the adjusted forecast; that is, explore how the forecasts would vary with changes in the major documented assumptions. This step will suggest the areas where greater flexibility needs to be built into the capacity forecasts.

If these steps are included in service planning projects there is greater chance that the capacity decisions at this stage will have included consideration of the range of factors likely to influence future hospital utilisation.

Conclusions

Although health service planning is based on the best information available at the time, there is a need to compare data from a variety of sources to test assumptions. Subjecting projections based primarily on historical utilisation data to benchmarking and sensitivity analysis may assist in ensuring that changes in technology, practice and population health status are considered in planning for future hospital capacity. The suggestion from this paper is that it is essential to ensure that multiple approaches and sources of planning data influence capacity planning decisions.

References

Apex Consulting (2008). *Review of the Victorian Ambulatory Classification & Funding System Enhanced VACS. A reformed funding and classification model*. Melbourne, Apex Consulting.

Baker, R. and McKenzie, N. (2008). Surgeons told of insurer audit. *The Age* 12 June 2008.

Cass, A., Cunningham, J., Wang, Z.Q. and Hoy, W. (2001). Social disadvantage and variation in the incidence of end-stage renal disease in Australian capital cities. *Australian and New Zealand Journal of Public Health* 25(4): 322-326.

Commonwealth Department of Health (1980). *The Commission of Inquiry into the Efficiency and Administration of Hospitals (Jamison Report)*. Canberra, AGPS.

Department of Human Services (DHS) (2007a). *Hospital Capital Planning Module*. Available at: <http://www.capital.dhs.vic.gov.au/capdev/ProjectProposals/Benchmarking/HospitalCapitalModule/> (accessed 4 September 2008).

Department of Human Services (DHS) (2007b). 1. *Developing the Service Plan*. Available at: <http://www.capital.dhs.vic.gov.au/capdev/ProjectProposals/ServicePlanning/DevelopingServicePlan/> (accessed 4 September 2008).

Duckett, S. J. and Ward, M. (2008). Developing 'robust performance benchmarks' for the next Australian Health Care Agreement: the need for a new framework. *Australia and New Zealand Health Policy* 5(1). doi:10.1186/1743-8462-5-1. Available at: <http://www.anzhealthpolicy.com/content/5/1/1> (accessed 4 September 2008).

Dunnigan, M.G. and Pollock, A.M. (2003). Downsizing of acute inpatient beds associated with private finance initiative: Scotland's case study. *British Medical Journal* 326(7395): 905.

Eagar, K., Garrett, P. and Lin, V. (2001). *Health planning: Australian perspectives*. Crows Nest, NSW: Allen & Unwin.

Fakhoury, W.K. and Roos, L. (1996). Access to and use of physician resources by the rural and urban population in Manitoba. *Canadian Journal of Public Health* 87(4): 248-52.

Gibbs, A., Jones, N., Pearse, J., Meleady, K., Sheehan, J. and Javasinha, H. (2008). Estimating and projecting sub-acute care demand: findings from a review of international methods. *Australian Health Review* 32(4) (in press).

Hall, S., Holman, D., Hendrie, D. and Spilsbury, K. (2001). Unequal access to breast-conserving surgery in Western Australia, 1982-2000. *Australian and New Zealand Journal of Surgery* 74: 413-419.

Hayes, R.H., Wheelwright, S.C. and Clark, K.B. (1988). *Dynamic manufacturing*. New York, Free Press.

Hannan, E. L., Kilburn, H. Jr., Lindsey, M. L. and Lewis, R. (1992). Clinical versus administrative data bases for CABG surgery: does it matter? *Medical Care* 30(10): 892-907

Hogarth, R.M. and Makridakis, S. (1981). Forecasting and planning: an evaluation. *Management Science* 27(2): 115-38.

Jones, N., Hards, G., Ryan, S., Sheehan, J., Cox, C., Meleady, K. and Jayasinha, H. (2008). Projected acute inpatient activity in New South Wales – aIM2005. *Australian Health Review* 32(3): 528-536.

Lee, C. and Gramotnev, H. (2006). Motherhood plans among young Australian women: who wants children these days? *Journal of Health Psychology* 11(1): 5-20.

Leggat, S.G., Bartram, T. and Stanton, P. (2005). Performance monitoring in the Victorian health care system: an exploratory study. *Australian Health Review* 29(1): 17-24.

- Marsh, P, Barwise, P, Thomas, K. and Wensley, R. (1988). Managing Strategic Investment Decisions in Large Diversified Companies. Centre for Business Strategy Report Series, London Business School.
- Medew, J. (2008). Hospital 'turned away' children. *The Age* March 7, 2008.
- Mintzberg, H. (2000). The rise and fall of strategic planning. London, Pearson Education.
- Murray, S. B. and Skull, S. A. (2005). Hurdles to health: immigrant and refugee health care in Australia. *Australian Health Review* 29(1): 25-29.
- National Health Strategy (1991). In fair health? Equity and the health system. Background Paper No. 3. Canberra, Commonwealth Department of Health, Housing and Community Services.
- Peabody, J. W., Luck, J., Jain, S., Bertenthal, D. and Glassman, P (2004). Assessing the accuracy of administrative data in health information systems. *Medical Care* 42(11):1066-1072.
- Porter, M. (1985). *Competitive advantage: creating and sustaining superior performance*. New York, Free Press.
- Romano, P.S., Roos, L.L., Luft, H.S., Jollis, J.G. and Doliszny, K. (1994). A comparison of administrative versus clinical data: coronary artery bypass surgery as an example. Ischemic Heart Disease Patient Outcomes Research Team. *Journal of Clinical Epidemiology* 47(3): 249-60.
- Sax, S. (1984). A strife of interests. Sydney, Allen & Unwin.
- Sheikh-Mohammed M., MacIntyre, C. R., Wood, N. J., Leask, J. and Isaacs, David (2006). Barriers to access to health care for newly resettled sub-Saharan refugees in Australia. *Medical Journal of Australia* 185(11/12): 594-597.
- Stevens, A. and Raftery, J. Eds (1994). *Health care needs assessment: the epidemiologically-based needs assessment reviews* Vol.1. Oxford, Radcliff Medical Press.
- Victorian Auditor-General (2008). The New Royal Women's Hospital —a public private Partnership. Melbourne, Victorian Government Printer PP No 114, Session 2006-08.
- Wennberg, J.E. (1985). On patient need, equity, supplier-induced demand, and the need to assess the outcome of common medical practices. *Medical Care* 23(5): 512-520.
- Wennberg, J.E., Fisher, E.S., Skinner, J.S. and Bronner, K.K. (2007). Extending the P4P agenda, Part 2: how Medicare can reduce waste and improve the care of the chronically ill. *Health Affairs* 26(6): 1575-1585.

Sandra G. Leggat BSc(PhysicalTherapy),
 GradCert(HigherEd), MHSc(HealthAdmin), MBA, PhD
 Professor, Health Services Management
 School of Public Health
 La Trobe University
 Bundoora VIC 3086
 AUSTRALIA
 Tel: +61 3 9479 1746
 Email: S.Leggat@latrobe.edu.au

