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The Journal of the Australasian College of Health Service Management

ACHSM

Features:

Health reform
Health workforce reform
Maternal mortality Papua New Guinea
Mobile technologies, theatre utilisation
Doing more with less
Role transitions
Crisis management
. . . and more

CONTENTS

Cover picture: Janus, copyright Wikipedia. In Roman mythology Janus is the God of doors, beginnings and endings. Janus is depicted with two heads facing in opposite directions, able to see into the future as well as the past. Both the Editorial and Special Feature in this issue have references to Janus.

ASIA PACIFIC JOURNAL OF HEALTH MANAGEMENT

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EDITORIAL

Janus-like Policymakers and Health Managers Urgently Required

The inspiration for this editorial comes from the contribution by Gorman. [1] His article suggests that the senior governors of the health system need to be Janus-like in facing government requirements for limiting health demand and reducing costs in the face of desired autonomy and individualism of health providers in delivering patient care.

Janus, from Roman mythology, 'is the god of gates, doors, doorways, beginnings and endings', [2] and is depicted as having two faces, looking in opposite directions, looking into the future and the past. This description of Janus includes being patron of 'concrete and abstract beginnings of the world, the human life, new historical ages and economical enterprises'. [2] Importantly, to the theme of this editorial, Janus was frequently utilised 'to symbolise change and transitions such as the progression of past to future, of one condition to the other, of one vision to the future'. . . and was 'representative of the middle ground'. [2]

In light of the current Australian political context, Janus brings all the qualities required of those charged with developing health policy and of health managers required to implement that policy and to manage the new structures of health service delivery. For those readers not intimate with the current Australian political context, we have seen the recent return at the national level of a re-elected first-term government, which after a period of a few weeks of uncertainty, was able to form a minority government with the support of independents and minor parties. It was this re-elected government that, in its first term, initiated the National Health Reforms and went to the election promising to implement a strategy of health reform.

The final report of the 2009 National Health and Hospitals Reform Commission, 'A Healthier Future for All Australians', [3] described a fragmented health system under growing pressure and suggested the need for action to address 'major access and equity issues, redesigning the health system to meet emerging challenges and creating an agile, responsive and self-improving health system for future generations'. [3, p.3] The government, in its first term and prior to the election, responded with a proposal [4] for far reaching structural reform that would place the Commonwealth (national) government as the majority funder of hospitals, changing the way hospitals are run by taking control from central bureaucracies and establishing local hospital networks throughout Australia. This reform was characterised as 'small groups of hospitals with a geographical or functional connection, large enough to operate efficiently and provide a reasonable range of hospital services'. [4, p.18] Part of the impetus for this reform was the recognition that 'many clinicians and citizens are not adequately involved in decisions about the delivery of health services in their local community'. [4, p.5] That Report also intends that the current system of fragmented and uncoordinated general practice and primary care be reformed into more aggregated delivery and subsequently the establishment of Primary Health Care Organisations[1] was also proposed, with some alignment and functional cooperation with the local hospital networks.

During this period of electioneering and then uncertainty until the government was formed, the States and Territories, which deliver and fund much of the hospitals and health services, have been diligent in responding to the challenges they face in adopting, or perhaps adapting the original reform proposals, within the National Health and Hospitals Network Agreement of the Council of Australian Governments (COAG). [5] While there will be differences between States and Territories about how they implement the national reforms and local networks because of geographical and community differences and interests, the Local Government and Shires Association of NSW has already expressed public disappointment about proposals in that State, in particular, networks they view as being too big to 'effectively manage local concerns'. [6] A reading of the NSW Health proposal for local health networks [7] clearly sees 'community' in the document described as a single entity, not communities or even communities of interest. The contrast in the number of local hospital networks between some jurisdictions is to say at the least, stark.

[1] Also referred to as Medicare Locals

At the same time, those interested in politics and public policy have been active. The relevance of broadband and information technology to access healthcare became prominent in the election and post election government formation. [6,7] There was also a growing pre-election view that a close election result would minimise the chance of effective reform. [8] Others stressed the need for a greater emphasis on the fundamental determinants of individual and Australia's wellbeing through inter-sectoral responses and issues of addressing inequalities of access, particularly for the Indigenous population, the burden of chronic disease, preventative strategies and the transition between hospital and community care. [9] Overall, there was a view that greater vision was required for successful health reform.

So, in Janus-like terms, the announcements of health reform represent a beginning perhaps of abstract ideas for a health system set in concrete central structures. Despite the significance of these reforms there is some concern that the positives may be lost without some resort to the Janus descriptor 'of one vision to the future.' [2] Given the debate of the many structural interests proposing differing priorities of how the system might be better transformed and the complexity of Commonwealth and State relations, perhaps the best we might expect from our use of Janus is a transition rather than transformation.

Post election commentators have welcomed the return of the Minister responsible for the implementation of the reform proposals pre-election, but have called for recalibration of priorities and a greater emphasis on the future vision for the system. [12] Penington [13] in his opinion piece goes much more to the detail of the reasons for the reform, reminding us of the former Prime Minister's recognition that the devolved management of hospitals away from central bureaucracies was vital, as are the alignment with primary care and the interface with local communities. He reminds us all of the respective Inquiries in some jurisdictions and of the need for leadership and engagement by medical staff in teaching and research as being central to the need for reform and for improving quality and safety of care. He returns to a theme central to that of most commentators by emphasising that priority needs to be given to primary healthcare with priorities for interfaces with mental health, aged care and the management of chronic illness through GP networks. He particularly calls for 'the care of older people in their own homes, with effective nurse practitioners liaising with GPs' [13, p.11] and also suggests a review of proposed hospital management arrangements.

The emphasis on primary healthcare is well justified on a number of counts. Firstly, the evidence that Australian utilisation of hospitals is higher than the OECD average and that avoidable admissions, if other community services are in place, run at more than 9% of all admissions, are potent pointers to a greater emphasis on primary healthcare. The fact that Primary Health Care Organisations are yet to be established and are more likely to evolve from community-level engagement of Divisions of General Practice, non-government and private community care providers, provides a wealth of opportunity which could be utilised by government to build on that profile and further reform the level and type of services in the acute sector, rather than the other way around.

While the focus remains on hospital acute care, the importance of the primary healthcare sector is diminished and we need to return to a vision that is focussed on what is required to deliver effective patient journeys, the promotion of self-managed care, equitable access to services for all and, improved population health for communities. In the clamour for resources to improve clinical governance and leadership in the acute sector, more significant challenges in the primary health care sector also need attention. The first challenge is obvious - how to lead and manage changes to a disparate set of largely uncoordinated services into more effective, integrative and cooperative arrangements. The second challenge may well be the need to significantly increase the health literacy skills of probably a significant proportion of the Australian population. They will need this increased health literacy to navigate the health system, no matter how successful we might be in making that 'simpler' and to take greater responsibility for the self-management of their health. The third challenge may well be greater education of health professionals in the practice of self-management, patient education and in managing delivery of care in different ways. [14]

Forging 'one vision for all' to be Janus-like will be a challenge for us all. Health managers in particular will need to understand the vision and have the skills needed to gain a shared vision with staff, other agencies and communities. They will need to have different skills to work effectively in networks as opposed to centralised bureaucracies and they will have to be adept at working at the boundaries of organisations and to engage at the service delivery level with health professionals, organisations across sectors and with communities. Recognition of the central role of well skilled health managers in the reform process should underpin effective reform. [15]

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IN THIS ISSUE

This is an historic occasion for the Journal as the College has decided to move to a fully electronic online version. The appearance and format at this stage remain largely unchanged, except we are starting to include photos of authors. Further changes may occur gradually. Feedback from readers about this change, and ideas and suggestions for improvement are welcome.

The second claim to some historical achievement is that we are beginning to add the Journal to established data bases so that our content is more readily accessible to a broader readership and to those wanting to cite and publish from the wider health sector. This will also be a progressive move with listing on Informit and EBSCO currently underway and others to follow. This signals a maturity in the growth of the Journal based on increasing willingness to publish and contribute.

The photograph on the cover of this issue is of Janus. From Roman mythology, he is first mentioned in our feature article by Gorman and provided the inspiration for the editorial in this issue. The descriptors of this god appear very relevant to current debate in Australia around health reform. The article on health workforce by Gorman gives insights into current initiatives in New Zealand of equal interest to most health systems facing change and workforce reform. The article includes a challenge to provide feedback on proposals from the author and we have responded strongly to this challenge in the accompanying commentary. We are happy to publish further feedback from readers.

Included in this issue is an article from another close-by health system in Papua New Guinea, on the important challenges to that health system in addressing maternal and infant mortality. The authors, Niyi Awofeso and Anu Rammohan, emphasise the importance of good management, governance and public policy in addressing this important issue.

With the continued call to improve effectiveness and efficiency within health systems, we bring you a number of articles that demonstrate that complex systems are not necessarily amenable to easy or simplistic solutions, providing us with 'wicked problems' to grapple with. The article by Monagle, Shearer and Loughnan traverses some of these difficulties in examining the complicating factors in operating theatre utilisation. Fitzgerald, Dadich and Sloan take us on a similar journey in addressing ways to improve patient flows in a sonography department of a public hospital.

Returning to the impact of change on the health workforce, Cowan examines the experiences of allied health clinicians in meeting the challenges of role transition within health systems. Mancktelow takes us through the processes and policies associated with equipping health professionals with the right technologies to enable improved management of information at the point of community care. Canyon and colleagues take us to an increasingly important area of concern in health systems, in describing the management of crises.

Our In Profile this month recognises a more recent member of the College, who finds that membership valuable while predominantly working in the health sector in the Asia Pacific, including Malaysia and Thailand. Readers will find the contribution by Weigl interesting, as it highlights some emerging trends in the ASEAN countries in which he works.

We also welcome the contribution of Avery in providing a review of the latest edition of a well known and respected text by Palmer and Short, *Health Care and Public Policy – An Australian Analysis*. The valuable library contribution by Brockway continues to be appreciated by our readers.

We welcome feedback and contributions. We also welcome assistance in suggesting College members who we might profile, feedback on published articles and new contributions.

SPECIAL FEATURE

The Utility of Idealised Patient Journeys as a Centre-Piece of Health Workforce Planning

D Gorman

Abstract

New Zealand and the other member nations of the OECD have and will experience an increasing mismatch of health service demand, supply and affordability. In addition to organisational changes, there is a need to reform health service configurations and related models of care. If these reforms are to result in a sustainable and fit for purpose health service, they will have to be intelligently informed, innovative and disruptive, and clinically led. Health Workforce New Zealand is developing this intelligence through a variety of measures that include career planning for all those in receipt of public training funds and service reviews. The review teams are essentially made up of clinicians, are determinedly inter-professional, and are supported administratively and analytically. The reviews, which include mental health, aged care, primary care, maternity services, rehabilitation services, eye health, and musculoskeletal health, have to establish a 2020 vision for the respective services within the following design parameters: a series of scenarios that address the potential and various 2020 circumstances; scenarios that can meet a doubling of demand over the 2010-2020 decade (based on current growth and ageing demographics for New Zealand); and, scenarios that can be delivered for 140% or less of the 2010 funding base (based on an annual increase in real GDP of three percent and on holding health spend at about ten percent of GDP). This is demanding. The approach being taken is generally that of an aggregate of clinical vignettes that account for the majority of the service need and then the description of what are current and idealised patient journeys. The approach is described as is the current level of satisfaction with the technique.

Abbreviations: **IT – Information Technology; HWNZ – Health Workforce New Zealand; NHS – National Health Service; NZIER – New Zealand Institute of Economic Research.**

Key words: **health workforce; reform; planning; innovation; patient journeys; clinical leadership.**

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The global health challenge; *a boat we share*

The OECD countries are confronted by a mismatch of health service demand, supply, and affordability. [1-3] Nobel Laureate Robert Fogel's prediction that the cost of healthcare for member nations would reach 20% of GDP by 2020 now appears conservative. [2]

New Zealanders believe that accessible and excellent healthcare is a national birthright. [4] This is central to their citizenship, is basically not negotiable and is the starting point for any conversation.

The New Zealand health system; *keeping the waka afloat*

Nevertheless, New Zealand has ethnic, socio-economic and geographically-based inequities in access to healthcare and in wellness and longevity. [1,5,6] It follows that any ambition to maintain the current level of health services is, at best, modest.

These relative failures are variously attributable to the following characteristics of the New Zealand health system. [1,3,4,7-14]

1. The structure of the health service is complicated. There are three organisational tiers; sequentially, a Health Ministry and some other central Crown entities, 20 autonomous district health boards that engage in variable degrees of regional cooperation and rationalisation, and more than 80 primary health organisations that exist despite what is an explicit

population and community health mandate for the district boards.

2. The New Zealand and Australian health systems are closely related and this serves Australia well in respect to the recruitment of New Zealand health workers. In turn, and in part, this contributes to what is a necessary, but unsustainable, reliance in New Zealand on immigrant health workers.
3. There is a general disregard for health managers and management among the clinician ranks and disruptive schisms exist between the various clinician groups, the governors of the health system and the consumers. Perhaps consequently, clinicians often exhibit guild-like and mercenary behaviours.
4. The primary healthcare funding model does not promote practice-diversity, and has reduced productivity in that sector after it was introduced in 2001. Other aspects of health worker remuneration and regulation also perversely affect hospital productivity and practice utility.
5. The planning and funding of under- and post-graduate health worker education is undertaken by different ministries and is not coordinated.
6. New Zealand has an increasingly industrialised, feminised and part-time health workforce.

Predictions of health service demand; *is your guess as good as mine?*

Our informed guess is that local demand for health services will double over the next decade. [2-4,14] In the absence of reform, about 20% of the total workforce will need to be employed as health workers, in addition to the considerable cost of gearing current configurations to meet such demand-growth. From 1950 to the present, the cost of healthcare in New Zealand has increased more than three times faster than our wealth as measured by GDP. Much of this divergence has been over the last decade – worryingly, a period in which there was a concurrent loss of both hospital and general practice productivity. [4,13] The extent to which the health system is currently affordable is best illustrated by what was the allocation of about half of all the new money in the last two Budgets to Vote Health. The other 30-odd Ministries and Departments, and Services, have had to make do with the other half.

The problem is not secret and the New Zealand Government has established tactical units in the Ministry of Health to develop and maintain a national health plan that is responsive to health need, to configure services and agree models of care that enable this plan, and then, and only then, to formulate an interactive and consequential Information Technology (IT), capital and workforce solution (see Figure One). In the author's opinion, these tactical units will contribute significantly to the development of a sustainable and fit-for-purpose health service. A number of positive outcomes are already evident and these include an increased elective surgery throughput. However, true sustainability and fitness will probably require a complete revision of the way in which the public and private health system is funded and workers are remunerated. [9]

In this milieu, how can we formulate an appropriate vision of the future health service? Without such a vision, planning is fraught.

Tomorrow's health services; *back to the future?*

Thinking back 20 years to 1990, how many would have accurately predicted today's health-related circumstances? Given that the answer is probably none of us, why would our foresight be any more accurate now? A sound assumption then might be that the only truism about health planning is that we will inevitably get it wrong. This is not a call to abandon ship. Instead it leads to the adoption of some planning disciplines, which I will list.

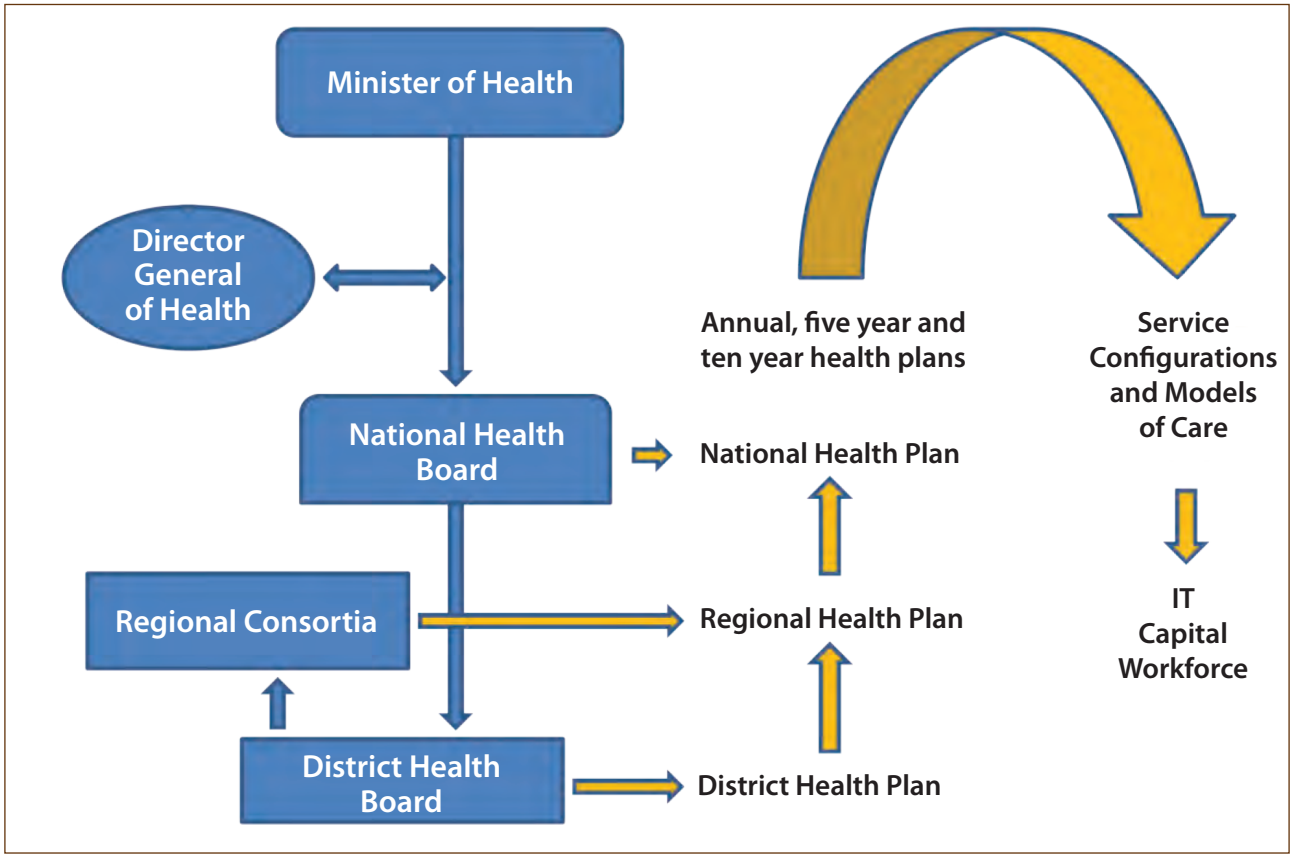
1. Planning needs to be informed by reliable intelligence. We confuse data collection with such intelligence and are drowning in the former and sadly are essentially free of the latter. [4,8] This intelligence will require considerable clinician involvement.
2. The second discipline then is that planning will need to be clinically led. [4]

What does this term, clinician leadership, mean? Conversely, is there a role for the clinically-naïve health manager?

Clinician leadership is a tautology as leadership is an integral and obligate domain of professionalism. [4,15,16] I cannot imagine a meaningful reform of a model of care or a reconfiguring of a health service being successful if the clinicians involved are not supportive; avoiding respective failure requires clinician engagement early in any planning process. The current dislocation of health service governance and the medical profession, [10,15] is such that a plethora of good ideas are either not implemented or are introduced covertly.

What then of the non-health professional manager in health? We can agree a role for administrators and logistics managers that do not require substantive health service insight. I can also think of many outstanding health service

Figure 1: A schematic of the role of the National Health Board in health planning in New Zealand.



governors that came to health from other industries and professions; however, every one of them was a better leader when they became substantially health system literate and especially if they developed strategic and constructive relationships with clinicians. The problem for more senior governors, clinician or not, is how to be Janus-like[1] in facing-up to the Government requirement for policies that limit the demand for health services and/or reduce the cost of meeting that demand, and simultaneously to health providers and their desire for both autonomy and unrestricted individual patient-care. Health Workforce New Zealand (HWNZ) recently hosted a forum on health system leadership and two findings are highlighted. First, there is both a shortage of suitable leaders in and available to the health services and a default to serendipity in the evolution of the next generation of leaders. Second, there is a need for an institutional base to address this shortage; reassuringly, HWNZ has responsive work in hand.

3. The extent of the mismatch of health service demand, supply and affordability is such that we are effectively liberated from the status quo such that consequent planning needs to be innovative. [17] This will be disruptive. Non-disruptive innovation is actually a misnomer for business as usual. True innovation can also only occur if clinicians are strongly involved, and are as aligned as much as is possible, and if the potentially-disrupted cohorts support the process. Success is also contingent on: planning being deliberately whole-of-service and not disciplinary; and, perhaps most importantly, if employers and/or funders agree to any new class of worker or scope of practice from the outset of an innovative development. There also needs to be a willingness to identify and deal with any elephants in the room. These barriers to reform will often be status-based and remunerative, and sometimes legislative and regulatory. [9]
4. Planning needs to address current need as well as the intermediate and long term. We call this keeping the waka (war canoe) afloat.
5. Planning needs to establish and maintain a momentum for and of reform. [4] Along with keeping the waka afloat, we are referring to this as the essential need to get some runs on the board. The background here is that the problem we confront needs urgent address. Second, the

1. In Roman mythology the God of beginnings and endings depicted as having two faces or heads, facing in opposite directions, able to look into the future and the past.

workforce is ready for and expectant of change. There is a misconception that the health workforce is exhausted by change. In contrast to the organisational churn of the last 20 years, actual models of care remain largely unchanged from the nineteenth century. A failure to deliver meaningful reform will quickly lead to cynicism, and a reversion to even more guild-like and mercenary behaviours. Third, our Government has a confidence that clinicians can lead necessary reform. Again, a failure to deliver will quickly result in this confidence being replaced by a pejorative view of the health workforce that is commonplace among politicians that have been in office for some time.

6. Planning that involves health workers will need to focus on the key elements of career progression, training and status; the importance to those workers of how they are perceived by their colleagues and society, their sense of being valued, and so on, should not be depreciated in response to facsimile conversations about pay, car parks and lockers.
7. Planning needs to be scenario-based and involve enough scenarios to address the foreseeable circumstances. For example, if gene array technology is mature by 2020 and intermediate stage bowel cancers can be typed such that their behaviour can be predicted, then the need to train histopathologists will be reduced. Scenarios need to be established then on the basis that this technology will and alternatively won't be effective. Immediate planning needs to accommodate both ends of this spectrum and would require that pathologists in training are not allowed to sub-specialise too early.
8. Planning consequently needs to be iterative and where earlier-adopted scenarios are rejected, modified and or replaced.
9. Finally, and again consequently, health workers should be trained to be adaptable, and in a way that facilitates any necessary re-training and re-deployment. The scope of practice of slow and expensive to train health workers in particular, such as doctors and nurses, will need to be kept as general as possible and for as long as is possible in their training continuum. [16] Purpose-trained practice assistants will have to become part of this workforce. [1]

A 2020-vision

As a generalisation, health planning in New Zealand has been front-to-back. The starting point for planning most commonly has been an aggregate of the existing workforce and the way in which it is organised, extant IT and other technologies, and the facilities that are in place as described in Figure One. Consideration is then given to what service configurations and models of care such aggregates can support; this cascades into a plan that hopefully and in some way addresses the health needs of the community. Not only is this the wrong way around, starting with the solution to a problem means that you inevitably end up with what and where you started. This is counter-innovative and the reason why someone stepping out of the Edinburgh Infirmary of 1860 would recognise many of our hospitals' current models of care.

We also have difficulty interpreting the predictions of health worker need. The New Zealand Institute of Economic Research (NZIER) predicted that given the ageing of our community, somewhere between 40 and 70% more health workers would be needed between 2005 and 2021 to maintain then current service levels. [14] This is a conservative estimate as NZIER assumed stable productivity and a significant compression of morbidity in the latter years of life. Again, as a series of generalisations: the professional colleges tend to over-state need as the number of fellows and trainees determines influence and income; the associations often under-state the need in the interests of maintaining a private practice market; and, the health boards confuse service and training needs and consequently frequently cite alarming trainee projections. Public databases are notoriously unreliable in that more than half the New Zealand health workforce is privately employed. Too often in response, the former ministry agency that funded the training of health workers responded to this chaos by promising high and then delivering low, and using any under-spend to address instantaneous political, media and professional demand. This is pragmatic but is hardly what is needed.

HWNZ is planning in a more robust manner, and in keeping with the principles cited above. The first step has been to make the funding of trainees accountable and to this end we will insist on a career plan for everyone in receipt of HWNZ funding. This will enable a collation of trainee numbers and anticipated employment, and will probably result in regional if not national training loci.

Second, a series of service reviews are underway to produce a 2020-vision of how healthcare could be delivered to best meet need (see Figure Two). The ambition of the balance of this essay is to describe the process we are using and to solicit your feedback.

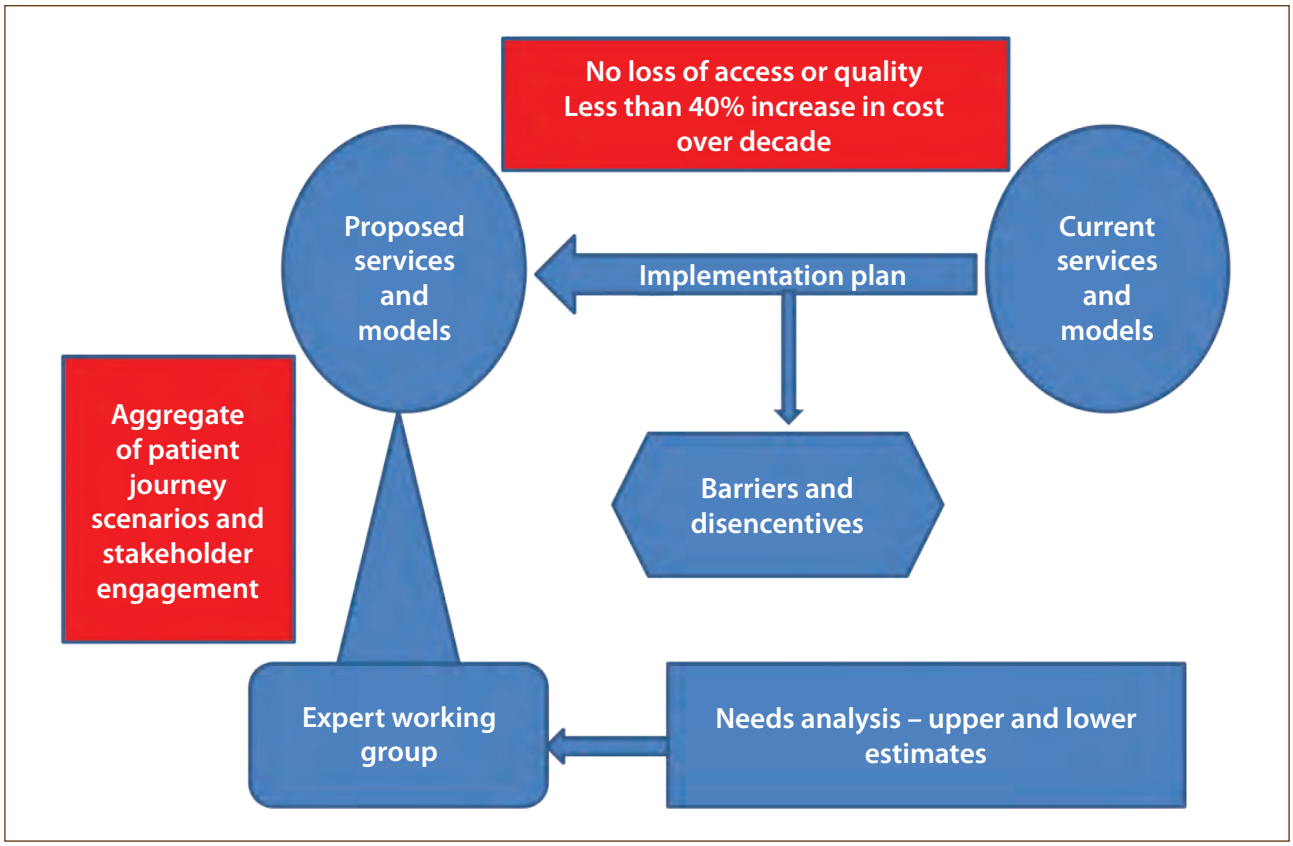
Service review teams are in place and/or are being generated. Interestingly, as a marker of a much-to-be-desired cultural shift, most are arising spontaneously in the health sector and are demonstrably inter-professional and inclusive at the outset! We have no real interest in the role of the doctor in 2020, [16] or for that matter the role of the nurse or midwife. Such chauvinism is anachronistic if healthcare is to be either patient-centred or based on health teams that are contextually led. [1,4,15,16] Instead, we are interested in a 2020-vision of eye health, and of mental health services, maternity services, gastroenterology, diabetes and aged care; along with a whole of system assessment of primary care and of acute and elective care in hospitals. These reviews are mutually informing and interactive. Some, such as aged care, need a strong consumer representation as well as the various clinical champions. The teams are being kept small, which is a challenge, but is actually a point of the exercise, and are supported clerically and analytically by HWNZ.

Some caveats are established up-front. First, the review has to be complete within a few months, although annual reviews are needed and consistent with the principle of iteration and scenario revision. Second, the status quo is only acceptable if there is no superior alternative and hardly likely to be credible given the third requirement for the 2020-vision to meet a doubling of health-service demand, but to be limited to funding at 140% of today's base. This latter figure is based on health costs remaining at current levels (9.2% of GDP and 20% of Government spend) and in turn by an optimistic estimate of 3% annual growth of real GDP. [4] Fourth, there can be no sacrifice of access or quality and existing inequities must be successfully addressed. [5,6]

Two methods are being used to generate possible service configurations. The first is traditional and is the identification of evidence-based best practice; a somewhat empty cupboard for many services. The other related concern is the dissimilarity of the largely publically funded but extensively privately delivered New Zealand Health System from that of our nearest neighbour, let alone the United Kingdom's National Health Service (NHS). We have a legacy of failed attempts to shoe-horn our local scene into many and various NHS configurations.

The second is a patient-journey based process described in Figure Two. The end result is predictably patient-centred and is generically well understood. The steps are as follows. First, the service review team agrees a cache of clinical vignettes that can account for the bulk of the relevant patient-load.

Figure 2: A schematic of the role of idealised patient journeys in health planning in New Zealand.



It is surprising how few are usually needed. The team then agrees both what would be a typical patient-journey today and what would be ideal for each vignette. The question then for the service review team is what is needed by way of service configurations and models of care, and in turn what workers, IT and facilities, to enable these idealised stories. What arises is a series of scenarios of configurations, such as hub and spoke organisations, and of models, with a variety of practitioners and scopes of practice. Capacity is then assessed and each scenario is also costed to limit the portfolio to those that can meet a doubling of demand for relevant health services at a cost of 140% or less of today's funding base. There is no exclusion of preventive health measures here, but, caution is needed in any further discount of clinical service need. Indeed, we have based our doubling of demand guess on considerable public health successes in compressions of morbidity and in preventing avoidable morbidity. We also assume that models of care will be chosen that slow or halt disease progression. An example is diabetes, where the onset of complications, such as renal failure, is accompanied by a significant increase in both morbidity and cost. [18]

The patient-journey vignettes can also be used to test the utility of the 2020-vision produced by those teams using an evidence-best-practice approach. That is, any viable solution should be able to accommodate the idealised stories.

The final step is to design an implementation plan that allows for immediate health needs to be met, and that addresses all surviving scenarios. The plans should identify the relevant barriers, which require attention; it is important that the thinking of the review team is not fettered by these barriers.

In search of your feedback; *Rome was apparently not built in a day*

We seek your constructive feedback and have a web-site that you can use www.healthworkforce.govt.nz; alternatively you could write to the Editor of the Journal. Our planning process will need to be refined. Our principles need to be tested and the way in which we are generating scenario's reviewed. This is where your feedback is both welcome and necessary.

The challenge is great and any response will need to be both inclusive and holistic if that birthright of universal access to excellent healthcare is to be available to our grand-children.

Competing interests

The author declares that he has no competing interests.

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COMMENTARY

Challenging Workforce Planning Approaches

The special feature article in this issue of the *Asia Pacific Journal of Health Management* proposes an approach to health workforce planning based on developing and understanding a required range of patient journey scenarios, obtaining and using reliable intelligence, ensuring clinician involvement and leadership, and adopting a whole of service rather than a discipline-based approach.

What feedback would you provide to inform and develop the principles and processes in this approach to enable adoption as an ongoing national or system-wide approach to workforce planning? What alternatives might you suggest? How might key stakeholder interests be more effectively shaped?

1 Effective management required

Workforce planning is an issue that has been vexing the New Zealand health system for many years. The fact that our models of care and the consequent patient journeys have barely changed over the years, despite much rhetoric, is testament to this. Professor Gorman's analysis is sage, and his paper highlights several systemic characteristics that have inhibited model of care transformation that are worth exploring.

1. Confusion as to who, exactly, is a health manager? I would argue that this is any worker within the health system who makes decisions about the consumption of resources. Thus, there are far more clinically schooled staff who are health managers than those who are not. That we assume because an individual is an excellent clinician they have the requisite skills to be a team leader with minimal or poor quality training, is problematic.
2. A misguided belief that 'managers' are undesirable and that somehow ten billion dollars can be spent effectively without them. Some doctors would have you believe they merely need access to funding for services to their own patients; however, this silo mentality ignores issues of relativity and how necessary underlying infrastructure and systems are developed. Neither the healthy scepticism that capability development of health management is a worthwhile investment, nor the inevitable election time popularist behaviour by politicians helps.
3. Realisation that if we truly wish to transform the delivery of community and hospital care, we have to invest in the change management skills required to change the patient journey, professional roles, funding mechanisms, people and organisational culture. As Professor Gorman highlights, New Zealand does not have a great track record of career development of talent of any sort within the health sector, least of all nurturing health managers irrespective of their 'school' – nursing, medicine, allied health, management studies (the management of people) or management science (the management of complex systems). My personal health-focused post-graduate studies in operations management included things like line balancing, facility layout, production and network optimisation, scheduling techniques, statistical process control, quality improvement tools, facilitation techniques, change management, team and leadership development, strategic planning, business cases, business planning and information systems strategy and implementation. Such studies do not regularly feature in clinical training programs.
4. Fascination with structure and organisational form with insufficient thought given to strategy, function and innovative organisational design. Organisational charts are good at telling you which people are in leadership positions, levels and reporting relationships. They do not explain what is more important to making a difference: expectations, accountability, whether decision-making is autonomous or shared, interdependencies, inter-connectivity and management practices.
5. Persistent belief in local reinvention: *(our hospital faces different issues than any other)* or importation: *(overseas wisdom is more valuable than that of our staff)*. As I presented recently to a District Health Board's (DHB) 'Management Grand Round', it is actually about basic management skills for everyone: process management (how we deliver care), change management (how we change people) and quality management (how we change both people and process). Hospitals I know in Australia, New Zealand, England and Hong Kong all stress similar issues at the coalface: greater numeracy in health service

management (evidence-based approaches using data effectively), multi-disciplinary teams managing collaboratively, skill development (facilitating, meeting behaviours, chairing, leadership, presenting, communicating), and shared knowledge (statistical process control, process mapping, intervention logic, cause and effect, benefit realisation, quality tools).

Recent ACHSM and RACMA conferences [1] have illustrated remarkably similar reform agendas to New Zealand across a range of jurisdictions including Australia, Ireland, Canada, Italy and the United Kingdom: cost control/reduction, quality-led transformation, improving stakeholder engagement, reducing the mana (perceived power and influence) of hospitals while consolidating them for greater efficiencies, and meaningfully reconfiguring primary and community care (horizontally and vertically) to be more responsive to patient and community needs. Struggling with a disjointed primary care sector, the Hong Kong Hospital Authority continues to expand its role in primary care in an attempt to better address community needs. Italy, England and Australia are implementing reconfigured primary care networks. I am currently working with only the second DHB in New Zealand to begin to integrate general practice and primary health organisations with the DHB's directly delivered community services and all other community services they fund.

If we desire transformational change in models of care and the patient journey, there needs to be generational investment in the skills and capabilities of all health workers and not, as some might contend, continued sect-like fads, [2] the most recent of which entails elitist coloured belts and treating the care of a patient like the production of an automobile.

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2 Scenario planning though the lens of patients, managers, clinicians and politicians

Firstly, Health Workforce New Zealand (HWNZ) should be applauded for engaging in a model of workforce planning that is not based on the more traditional labour economics view of supply and demand curves to predict need. Such an approach assumes that the basic service model goes unchanged – hence a reason why models of care have remained unchanged for the last 150 plus years.

A scenario-based approach to planning, complemented with robust dynamic modelling methods is a significant step in the right direction. Like any approach to planning, the devil is in the detail. I'd like to raise four points for HWNZ to consider.

The first point is that the world of health is a complex adaptive system. This means that HWNZ should not spend significant resources making detailed plans. Rather, it should have an overall direction in mind, and then give the resources and responsibilities to those who have the legitimate authority and accountability to action them. These people need to be chosen carefully, as there are no doubt a number of people in positions of authority for which the status quo suits them well. Identifying the 'rallying' points of leadership in the system will be a key aspect of successful planning and implementation.

This leads me to my second point – leadership. As the article makes clear, there needs to be a significant clinical buy-in and leadership within the planning and delivery cycle. This is absolutely the case, but I'd also suggest that the value of management should not be underrated. It is this group that have the expertise in issues of change management, workforce development and behavioural change. While the article highlights that managers have a role, I get a sense that this is somewhat downplayed – perhaps this is reflective of the current political view. Nevertheless, effective and sustainable change in models of care will require a solid relationship approach between managers and clinicians; a relationship where there is joint stewardship of the change. This will no doubt be aided in the New Zealand context where many managers have a clinical background.

My third point is that the scenario model presented is based on disruptive innovations. The argument is made that such approaches are warranted when the challenges faced are such than an incremental improvement will not deliver the desired result. The reality of course may be that that while planners and policy makers at the national level can see the scale of the challenge, those at the grass roots may not.

This lack of a wider perspective has always been a tension in trying to bed in nationally developed strategies. This means that HWNZ will need to give attention to getting the message to those at grass roots about the need to change, using 'attractors' that front line health professionals can rally around.

My final point relates to the principle of patient-centeredness. While it is vital in a planning process, it does not appear (from the article at least) that the voice of the patient is represented in the planning model – other than from the perspective of the range of clinicians involved in the scenario planning. This is something that will need to be addressed. Further, it is becoming clear from a range of literature that what is vital in successful models of care is the relationship between the patient and members of the healthcare team. This would suggest that any scenario needs to understand how the relationship will develop and be maintained. This is not an insignificant task. Most patient journey work struggles to understand how more integration can occur within and between health services. While this may support relationship development between geographically distributed health professionals, what are the implications for relationship development between the patient and the health team?

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3 Learning from experience-the need to engage key stakeholders

In the space of two short decades New Zealand has moved from medical (and nursing) manpower [sic] planning (the 1980s) to leaving the workforce to the market to decide (the 1990s), before returning to deliberative attempts to influence workforce development. The present decade has seen the rise and fall of a series of policies and recommendations to address growing concerns about the health workforce. In addition to those focusing on a particular profession (eg, medicine and nursing), strategies have generally favoured viewing the health workforce in an integrated way rather than being stratified along professional and occupational lines, [1,2] most recently through the establishment in 2009 of Health Workforce New Zealand. [3] Like health system reforms and services restructuring generally, health workforce policy initiatives of recent years have not been sustained. To achieve the shift from profession and discipline-based workforce development requires fundamental structural and cultural change. Discourse promoting an integrated approach to health workforce development and workforce planning around patient journey scenarios will, on its own, likely share the fate of previous initiatives unless key stakeholders are engaged in the process and become part of the change process. Two of these stakeholders are health professions and consumers.

Health is the second largest area of public spending in New Zealand, and although reasonably efficient, increasing funding demands from the sector coupled with a weakening economic position have led to an unsustainable fiscal position, with predictions that financial demand will outstrip growth in available funding over the next decade. [4] Responding to perceptions of crisis, and given the relatively low GDP and aspirations of its small, dispersed population for world-class healthcare, [5] New Zealand has the most restructured healthcare system in the world [6] with changes having occurred more rapidly than in any other developed country. [7] Improved sector productivity is a present focus and includes both labour and non-labour approaches. [5] Approaches to improving workforce productivity (beyond containing wage inflation and increasing output per labour unit) include moving from specialist to generalist and patient-centric models of care, greater flexibility in work practices and improved job satisfaction, while non-workforce strategies include reducing patient waiting and streamlining the patient journey. [5]

Bringing these approaches together and designing health workforce development around patient journeys is seen as a fresh way of solving the challenge of moving a health system and its workforce, which evolved in response to 19th century conditions, to be fit for purpose in the 21st century. 'Better, sooner and more convenient' health services entail a whole of system approach to redesigning the health workforce, and central to the current crop of endeavours to do more with less, and achieve better outcomes for patients. [8]

I have serious reservations about the sustainability of present endeavours to shift the focus of workforce planning from discipline-based, to service-based around patient journeys, if the process of planning does not robustly engage key stakeholders. Previous health system changes of the past 20 years have largely failed to do so. These changes included both radical reforms (health system reengineering, organisational restructuring and down-sizing) [6,7] and rational redesign (investment in primary healthcare including health promotion, prevention and early intervention). [9,10] If there is one message to be taken from the experiences of the past two decades, that largely failed to refocus the health system to better meet the increased demand associated with ageing populations with a growing burden of long-term conditions, it is that stakeholder involvement is essential for change to be sustained.

New Zealand has a sorry history of health sector change not achieving the intended outcome and being resisted, for example: politically imposed change (such as quasi-privatisation) resisted by those working in the health sector and the population alike; generic health service management to improve efficiency and driven by 'managerialism' resisted by clinicians; and role expansion by some health professions resisted by those whose traditional territory is encroached upon. Partly for these reasons, many elements of heath system reengineering introduced from 1991 were by the end of the decade largely abandoned, and strategies to shift the focus of the health system from hospital to primary care, with patients being managed in community settings by inter-professional teams, were less effective than intended because fundamental relationships between professions did not change. In my view, at the heart of these disappointing experiences (at least to their architects) is that insufficient attention has been paid to the weight of history and tradition of the health professions and health services that shaped developments of the past one to two centuries. Regarding present endeavours to redesign health workforce planning around patient journeys, among the many stakeholders there are two that are critical to success.

The first is the complex conglomerate that is the health workforce, collectively referred as 'clinicians'. While the term 'clinician' may serve as shorthand for the multiple health professions and disciplines represented, there are risks that a default position in planning processes will privilege those holding traditional power. Power is institutionalised: a profession that developed historically to serve and protect the public also has interests in protecting its professional position and social status, and in this may be supported by the educational institutes, regulatory bodies, professional colleges and by society at large. One of the greatest challenges to workforce planning processes based on patient journeys is how to effectively engage the range of 'clinicians' so that the respective contributions of the professions are understood and valued, while at the same time subordinating pro-fessional self-interest (in a negative sense) to the interests of patients, society and the health system. Recent history is littered with examples of resistance to inter-professional team development, role expansion and professional boundary crossing, necessary elements of workforce development around patient journeys, seen for example in the resistance of the medical profession to the opening up of limited prescribing rights to other professions, such as pharmacy and nursing, to address access problems.

The second group of stakeholders is the consumer, both actual service users (the patients and their families), and society at large who, in terms of power are subordinate even to the least powerful of health workers. A consumer voice in policy and governance is not uncommon, but often it is a lone voice trying to represent a diverse consumer population, and criticised as tokenism. Consumer involvement is advocated for developing services for persons with long-term conditions, [11] but even when a consumer representative is used it can be a blunt instrument for ensuring that services delivery responds to consumers' interests. There are positive experiences in New Zealand, eg, in maternity services where consumer pressure led to the restoration of midwifery as an autonomous profession in 1989, and in mental health where a 'consumer focus' is promoted. [12] In the United Kingdom specific recommendations have been made for involving users, defined as 'enabling people who use, or may use services to voice their experiences and influence broader care'. [13] For labour-intensive industries such as health, consumer involvement into decisions and models of service delivery will inevitably involve decisions about the workforce. The challenge for health workforce planning based on the patient journey, is how to ensure that

the 'journey' represents that of the patient and not the perspective on the patient journey of the expert, the 'clinician' and, moreover, engages consumers in leading change.

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4 Challenges lie in implementation

Maintaining a stable and adequate workforce is a key challenge confronting many developed world health systems today. We feel this acutely in New Zealand, heavily reliant on foreign-born and trained doctors and nurses to sustain the workforce and one of the highest exporters of these professionals among OECD countries. [1] Most countries with workforce issues have initiated various stopgap measures. Long-term strategies are also required. This feature article offers a solid starting point from which policies can be derived.

As with any policy, the challenges for the way forward are in implementation. Experience and research suggest that the greatest of plans are often dashed through implementation processes. [2] Policy makers, therefore, need to be sure that achieving half their goals will have been a sufficient payoff.

Considerable effort will be required to further develop each of the components in the feature article framework to ensure implementation can be reasonably successful. First, understanding of patient journey scenarios is in its infancy. Resources are required to bring together the various professionals and services that might feed into scenario development. Agreement is needed over who within a healthcare system should be responsible for what in the journey of a patient for a specific condition, when certain procedures and services should be provided and, ideally, how a patient should flow through the system. Importantly, patients need to be involved in such work. Most health systems and services lack this patient perspective. The payoffs can be good, but the investment not to be underestimated. [3]

Second, we need to know a lot more – in terms of 'reliable intelligence' – about the motivations of healthcare workers and which policy levers induce stability. Is it raw pay rates? Or are professionals attracted by progressive healthcare organisations focused on and practising quality [4] improvement, where staff support and satisfaction rates are high, and professionals feel they are valued and joining a team?

Third, clinical governance and leadership are crucial for moving beyond the managerialist era in health services, but also for improving clinical quality. Again, significant challenges must be surmounted including providing sufficient time for clinicians to dedicate to leadership activities. A survey of New Zealand public hospital specialists we have just undertaken, shows around three-quarters of respondents felt such time was simply not available. Many

also felt that hospital management was failing to provide adequate support or opportunities for clinicians to become involved in leadership. Of course, changes to the training of health professionals are also required to nurture the skills of future leaders and teach professionals how to work in teams, which is pivotal to developing a 'whole of service approach'.

Fourth, adopting a whole of service approach is possibly one of the greatest barriers to traverse. Research shows training in teamwork and exposure to other disciplines can help. [5] But professional colleges also demand scrutiny to ensure that their admission and training activities are in the best public interest: that they are focused on adequate supply of specialists and working collaboratively with other specialties and not simply on patch protection. The public in countries like New Zealand, where specialists have joint public-private practice, need reassurance that this arrangement does not undermine system-wide approaches to improvement.

There are various theories about policy implementation. Moving the feature article framework forward may well require a solid 'bottom up' approach. [6] This will entail paying close attention to the views of health professionals as the agenda is further developed and involving them as key stakeholders and even owners of this process.

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5 Challenging workforce planning approaches

Health workforce planning is not something that Australia or many other nations have excelled at. Who made those decisions to reduce medical school intakes in the 1990s and where were those committees overseeing workforce planning over the last two decades when it was patently obvious to those who had looked at the data that our predictions were very wrong? Who allowed the specialist Colleges to maintain a 'cap' on the number of training positions and why is there still a disjoint between the education sector, which trains and the health system, which employs all the health professionals except in Medicine? Did no one realise we were all getting older, that chronic disease was rife and that the health workforce was getting even more feminised and really did not want to work the long hours (for good reason) that previous generations did?

Workforce planning should be about deciding what services one should be providing, who should be providing those services and where they should be provided – and in this day and age – how they are funded. This allows a genuine debate about new models of care – role delineation and possible expansion – and how we might train or retrain others to carry out these new roles. Appropriately trained persons can deliver high quality healthcare with good patient acceptance: it does not always have to be a doctor. Healthcare practitioners now more than ever before, work in teams, so that the skills of team communication that must be taught through interprofessional learning are very important in this context.

We must also remember that some horizon scanning has to be engaged in. We are training professionals now for practice in 10 to 20 years time, when it is unlikely we will be doing things as we do now. The technology available will have changed dramatically. How will we be able to communicate with professionals and patients across this vast land? We have the technology available now although we still don't have the connectivity (broadband) and currently very limited funding to allow these consultations to be appropriately recompensed. Yet the savings in patient and professional travelling time would be significant – not to mention the effect on our carbon 'footprint'.

The critical issue is to place the patient at the centre of the health system and place our services and workforce around that person. This workforce is likely to be 'distributed' with not all members of the team being in close proximity. Patients need to understand the responsibilities they need to take to ensure that they can play a role in maintaining

their own health. To be able to make these informed choices, patients and the community need to have a better and more realistic understanding of what is possible and what is affordable. They need to understand what the community can afford to pay and politicians must try to make evidence-based decisions on funding and not be swayed by lobby groups – accepting that a dollar spent here is a dollar not available there and that there is a limit on the budget. Patient and community engagement is paramount to the success of this system. It is after all 'OUR' health system – we fund it through taxes and other tithes – and we should 'own' it.

These discussions need to be undertaken at a number of levels, much like the 'Oregan' experiences over a decade ago, where the community was asked to prioritise healthcare funding. Although it was hard to translate this into firm policy, the exercise did at least start an important community debate on this very important topic: that is, what sort of health system do we want and how are we going to fund it?

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6 Lessons from remote and rural Australia: a systemic approach

Context is important. Geography, demography, culture and economic development are all critical considerations in the development of appropriate and accessible health services. Whilst New Zealand and Australia have differences in this regard – such as size and population dispersion – they share many similar issues. The structure of the New Zealand health system may be complicated, but it seems to exhibit a hierarchical logic that contrasts with the historical illogic of Australia's health system. Reliance on immigrant health workers, disregard for the importance of health service managers, poor co-ordination between workforce planners and education policy, escalating healthcare costs and the nature of the changing workforce are all similar issues with which Australia is trying to come to grips. Each country has a newly established national health workforce agency as a major strategy in this regard. Heath Workforce Australia is trying to find its feet in a difficult and complex political environment involving two levels of government and a period of health system reform.

There is a variety of health workforce planning approaches based on needs, demands or models of care. The idealised patient journey seems to be another, innovative approach. I agree with the author that rigorous health services evaluation that provides good evidence about effectiveness is all too scarce. At the same time, it's important not to throw the baby out with the bathwater.

In Australia, health workforce and health systems problems are exaggerated and evident in remote and rural areas. These areas have the highest health needs, the least healthcare resources, exhibit poorer socio-economic characteristics, and health workforce demonstrably diminishes the further one travels away from major metropolitan centres. [1] At the same time, these services are also typified by a high level of innovation, such as the iconic Royal Flying Doctor Service; and there are many effective Primary Healthcare (PHC) services. [2] We need to learn from these innovations and build on them. We can derive principles from successful, sustainable health services and adapt these to different contexts.

In Australia, staff recruitment and turnover are major problems for many small rural and remote PHC services. But not for all. Some remote and rural PHC services have taken a systemic and systematic approach to their development that includes workforce, but doesn't stop there. [3] At the macro-scale, it is vital that the policy environment is conducive, that Commonwealth–State issues don't get in the way and that

there is a mechanism for local community involvement with the planning, development and evaluation of the service.

At the micro-scale, several specific service requirements must also be fulfilled. These requirements relate to workforce; funding; governance, management and leadership; service linkages; and infrastructure. These factors are inter-related and inter-dependent. For example, recruitment and retention of health workforce is de-emphasised when adequate infrastructure, good management, allowance for professional development, clear role delineation and a supportive critical mass of practitioners is developed. This conceptual framework has proven useful in the planning of health services in a remote region of northern Australia and in the evaluation of a small rural PHC service. [4]

So, whatever planning approach is adopted, it's important to learn from past experience where 'reliable intelligence' is available, generalise examples of what we know works and establish systems of monitoring and evaluation that allow for sensible future development.

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REVIEW ARTICLE

Maternal Mortality Reduction in Papua New Guinea: millennium development goal worth achieving, but what will it take?

N Awofeso and A Rammohan

Abstract

The United Nations' 2000 Millennium Development Goal (MDG) Five focuses on improving maternal health through reducing maternal mortality ratio by 75% between 1990 and 2015, and achieving universal access to reproductive health by 2015. The two key indicators for monitoring progress towards the first target are maternal mortality ratio and the proportion of births attended by skilled health personnel. National maternal health trends constitute one of the best indicators of the quality of health systems management – poorly managed health systems consistently have worsening maternal health profiles. Papua New Guinea (PNG) has so far not made any real progress in achieving the maternal mortality-related target of MDG, with PNG's maternal mortality ratio almost doubling from 370 per 100,000 live births in 1996 to 733 per 100,000 live births in 2006. The adverse impacts of preventable maternal mortality on children's wellbeing, family cohesion and economic development of PNG underscore a need for effective public health management actions to reverse the trend. The authors provide a review of major causes of maternal mortality in PNG, and propose inter-sectoral interventions involving all stakeholders, with emphasis on population health surveillance; health governance; abortion law reform; improvement in management of maternal health services; and improved aid effectiveness in order to facilitate sustainable improvements in the maternal mortality profile in PNG.

Abbreviations: **Australian Agency for International Development – AusAID; HDI – Human Development Index; MDG – Millennium Development Goal; PNG – Papua New Guinea; WHO – World Health Organization.**

Key words: **Papua New Guinea; maternal mortality; Australian aid; public health management.**

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Introduction

Papua New Guinea (PNG) is one of the most geographically, culturally and socio-economically diverse countries in the world. It comprises the eastern part of the island of New Guinea and about 600 islands. A mandated territory of Australia until 1975, PNG has a population of 6.4 million people, 86% of whom live in rural areas. With a 2009 Human Development Index (HDI) ranking of 148 out of 191 nations (value: 0.541, down from HDI rank of 136 in 2007) 36% of the population living below the income poverty line of $1.25 per day, PNG faces formidable challenges to improve human development in general, and maternal health in particular (Table 1). [1]

PNG has a particularly poor record in maternal mortality outcomes, a key indicator of progress towards the Millennium Development Goal Five (MDG). In sharp contrast to global expectations to reduce maternal mortality by three-quarters by 2015 relative to 1990 estimates, PNG's maternal mortality ratio almost doubled between 1996 to 2005, from 370 per 100,000 live births to 733 per 100,000 live births, based on figures obtained from the 2006 PNG Demographic and Health Survey. [3] The International Classification of Diseases defines maternal mortality as:

Table 1: Papua New Guinea: selected indicators of maternal health [2]

Maternal mortality ratio	733/100,000 (2006)
Population average growth rate	2.0%/year (2008)
Total fertility rate	4.4 births/woman (2006)
Proportion of births in rural areas	86% (2009)
Population with good sanitation facilities	45% (2008)
Life expectancy at birth	Males 60; Females 64 (2006)
Per capita expenditure on health	$US41 (2005)
Literacy rate 15-24 year-olds, women	46% (2000)
Estimated HIV prevalence	2.6% (2006)
Use of modern contraceptives	24% (2006)
Teenage pregnancy percentage	13% (2006)
Utilisation of skilled birth attendants	41% (2006)
Proportion of home births	46% (2006)
Proportion of complicated births	43% (2006)
Women in government	0.9% of Parliamentary seats (2009)

The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

As recently as April 2010, the Partnership for Maternal, Newborn and Child Health, a global alliance hosted by the World Health Organization (WHO), had estimated that maternal deaths worldwide could still be as high as 500,000. However, in September 2010, the WHO revised the global estimates to 358,000 in 2008. The revised estimate constitutes a reduction of about one third compared with 546,000 deaths in 1990. Women in developing countries are 36 times more likely to die from a pregnancy-related cause during their lifetime than their counterparts in developed countries. [4]

The proportion of deaths of females in the age group of 15-49 which fall within the definition of maternal mortality in sub-Saharan Africa is estimated at 90%, and 85% in other regions. [5] The major direct causes of maternal morbidity and mortality include haemorrhage, infection, high blood pressure, unsafe abortion and obstructed labour. Women in PNG have a 1:20 lifetime chance of dying during pregnancy and delivery, compared with 1:50 in other developing countries. The lifetime chance of dying during pregnancy and delivery is a low 1:11,896 in Australia, which has a maternal mortality ratio of 8.4:100,000. [6] Of all human development indicators, the greatest discrepancy between developing and developed countries is in relation to maternal mortality. [7]

The impact of a maternal death on families and communities is devastating – but is especially so for surviving children. Maternal mortality contributes substantially to subsequent malnutrition, infection risk and mortality of orphaned children. [8] The health of women is critical to a country's social, economic and political development. The survival of women during pregnancy and in childbirth reflects the overall development of a country and whether or not the health services and systems are functioning. [9]

This article examines reasons for the worsening maternal mortality trends in PNG. The authors review the policy, management, cultural and health system contributors to the worsening of PNG's maternal mortality profile. The management of Australian aid programs in improving maternal mortality in PNG is discussed as part of a range of health governance reforms to improve the current unsatisfactory situation.

Factors contributing to PNG's worsening maternal mortality profile

Low female literacy

Better female education is associated with a greater likelihood of adopting family planning, lower levels of teenage pregnancies, a greater utilisation of quality prenatal care services and the use of skilled health professionals during childbirth. These factors have been shown to reduce maternal mortality. [10,11] The PNG's 2000 national survey estimated total male literacy rate at 54.9%, while the total female literacy rate was estimated at only 45.8%. Without focused interventions, this current unsatisfactory female literacy rate is likely to worsen given that in PNG's rural regions during 2007, 60% of school-age children were not enrolled. [12]

Violence and ethnic conflict

Most conflicts in PNG take place at the local level. Perhaps because such locally contained violence poses little threat to the national government, its adverse consequences on women's wellbeing (eg, sexual assault, injuries and malnutrition) tend to remain hidden and neglected. Apart from direct consequences of mortality, women suffer substantial socio-economic and emotional losses if their partners are killed or maimed. It is estimated that around 20% of PNG's population is affected by ostensibly 'tribal' violence, with a marked concentration in highland regions. [13] Interpersonal violence against women is also an important issue. A recent survey of 415 women who accessed antenatal and HIV voluntary testing services across four provinces revealed that 58% of the respondents had recently suffered physical and emotional abuse, while 44% had been sexually assaulted. Financial dependence on husbands or partners and cultural norms such as bride-price payments and polygamy acted as important constraints on women's ability to deal with such violence. [14] In several highland Papuan societies, incest restrictions dictate that wives must be taken from other clans. However, sometimes due to the hostile relationships between different clans often verging on warfare, men who abduct women from hostile clans trigger armed retaliation and counter-abductions, resulting in an endless cycle of conflict. Marriage in these societies, and the sexual relationships within marriage, are usually fraught with fear, hostility, violence and anger. Women are the major victims of such violence. [15]

Geography, demography and rural infrastructure

PNG is in an active seismic zone and landslides are regular occurrences. Similarly, tropical cyclones and flooding are frequent, contributing to problems in relation to transport, healthcare delivery and access. Dense forests and near-vertical mountains have so far prevented roads being built from the capital to most of the other major cities. Very few women can afford an air ticket to Port Moresby for treatment in the tertiary teaching hospital. Electric power and sewerage struggle to reach even large towns, and lack of infrastructure dictates that 85% of the population still eke out a living for themselves as subsistence gardeners. The recent outbreak of cholera in the northern provinces of Madang, Morobe and East Sepik, and in coastal areas of Port Moresby in August 2009 - the first cholera outbreak in 50 years - attest to the deteriorating state of social infrastructure in PNG. [16]

Furthermore, hostilities between ethnic groups encumber attempts to deliver effective interregional health services. PNG's 860 linguistic groups are administered within 18 provinces, an autonomous region and a national capital district. The ethnic fragmentation of PNG society exacerbates the problem of sub-optimal health services by creating a situation of many small clans operating effectively as interest groups, attempting to exploit any available public good for their membership. Under such circumstances, it is difficult to develop interregional health services which can effectively and promptly respond to problems experienced by women in several contiguous ethnic groups, particularly during pregnancy and delivery. [17]

General and maternal health care provision

PNG has 240 Village Aid Posts as well as 500 district hospitals and health centres, 18 provincial hospitals and one national teaching hospital. Church-based health service providers cover up to 50% of the total health services in rural areas. The quality of obstetric health services is improving but still unsatisfactory. For example, in 2006 only 41% of births took place under skilled supervision, an improved trend compared with the 1990 23% baseline. However, this improving trend is inferior to that of neighbouring Indonesia, which recorded a figure of 73% of births delivered by a health professional in 2007, almost tripling its 1990 25% baseline. [18,19] PNG's health service provision is fragmented, and in urgent need of reform. The health system is compromised by inadequate government heath funding, limited community involvement in primary healthcare provision and inadequate utilisation of performance indicators. A recent review of PNG's health system [20] highlighted major shortcomings in health policy implementation, including inadequate health management expertise, nepotism, haphazard health financing arrangements and sub-optimal skills of health practitioners particularly at the primary healthcare level. A 2005 - 2008 review of the medical records of 21 women who died from pregnancy-related causes at PNG's Goroka General Hospital

revealed that puerperal sepsis and sepsis complicating unsafe abortion were the most common causes of maternal death accounting for 48% of deaths. Contributing factors for these maternal deaths included residence in a rural area, geographical and transport difficulties accessing care, non-use of family planning services, non-booking for antenatal care and late presentation in pregnancy or labour, and under-resourcing of public health services. The socioeconomic status of most of the women was low, and where educational attainments were recorded these were also low. [21]

Teenage pregnancy

According to 2006 data from the WHO Western Pacific region, teenage pregnancies as a proportion of total pregnancies in PNG was 13%, compared with 4% in Australia. WHO estimates that, in developing countries, maternal and neonatal mortality in girls under 18 is two to five times higher than in women aged between 18 and 25 years. The increased mortality among teenage women is mainly attributable to anaemia, pregnancy-induced hypertension, low birth weight, prematurity and intra-uterine growth retardation. These adverse perinatal outcomes are independent of established confounders such as low socioeconomic status, inadequate prenatal care and inadequate weight gain during pregnancy. [22,23]

Unsafe abortion

Unsafe abortions kill 70,000 women annually, accounting for about 13% of all maternal mortality globally. [24] Sections 228, 229 and 285 of the *PNG Criminal Code Act (1974)* were reproduced from the *Queensland Criminal Code Act (1899)*. Under this Code, the performance of abortions is generally illegal, except to save a pregnant woman's life or preserve her physical and mental health. A person who unlawfully administers any means to a woman with intent to procure her miscarriage is subject to up to 14 years imprisonment. [25] About 50% of PNG's health services are provided by Christian faith-based organisations, and these organisations are generally reluctant to undertake pregnancy termination. Given a low contraceptive use prevalence of 24% and a high prevalence of teenage pregnancies it is likely that unsafe abortions constitute a major contributor to PNG's worsening maternal mortality profile.

Governance

The fragmentation of PNG's national leadership along ethnic lines continues to create serious problems of ongoing inter-ethnic competition and conflict that have undermined prospects for development. Between 2000 and 2008, according to the World Bank's Governance Index, PNG was ranked in the bottom 25% of all nations in terms of control of corruption, rule of law and government effectiveness. [26] Even with a resources-driven economic growth rate of 6% in 2008, approximately 40% of the urban population of PNG was unemployed, implying a failure to transform economic gains into human development. Corruption, defined as the use of public office for private gain, is a major governance issue in PNG. Widespread corruption at major levels of civil society has weakened the rule of law and heightened criminal activity. [27] PNG's fragile political situation has direct consequences for maternal health services as it adversely affects the training, recruitment and retention of health workers who provide maternal health service. PNG currently has 0.13 physicians, 1.50 nurses and 0.10 midwives per 1000 population. The PNG health worker density ratio of 1.52 per 1000 population is much lower than the Western Pacific region's average ratio of 5.8 health workers per 1000 population, or the WHO's 2.28 per 1000 yardstick for defining countries as experiencing acute shortage of health workers. [28]

Australia's assistance to improve PNG's maternal mortality profile

Australia is PNG's largest foreign aid donor. In 2007-2008, Australia's total development assistance was $356 million, which constituted about 70% of all aid flows to PNG and 12% of total government resources in PNG. Between 1998-2008, the Australian Agency for International Development (AusAID) provided $412million in Overseas Development Assistance to the PNG health sector. [29]

In relation to maternal health issues, AusAID assistance has largely been indirect, focused primarily on funding improvements to organisational structures and health planning in the PNG health system. Nevertheless, the outcomes of AusAID for PNG have been consistently less satisfactory compared to other Pacific nations such as Vanuatu and Solomon islands. For example, AuSAID, in its 2009 *Aid Effectiveness Report*, [29] documented that the percentage of births with skilled birth attendance was 85% and 79% in Solomon Islands and Vanuatu, respectively, compared with 41% in PNG. Also, the report documented maternal mortality ratios of 118 per 100,000 live births and 68 per 100,000 live births for Solomon islands and Vanuatu, respectively, compared with 733 per 100,000 live births for PNG. Solomon Islands spent $US52 per capita on health in 2005, compared with PNG's $41 in 2005. The modest difference in health expenditure is an insufficient explanation for the big gaps in maternal health performance between both nations. More than any other factor, PNG's

fragmented health management system and the low priority accorded maternal and child health programs by the PNG government constitute the major reasons for the relatively inferior outcomes of PNG's maternal mortality profile.

A more direct approach to maternal health improvement by AusAID was the 1998-2004 AusAID-funded Women and Children's Health Project which utilised $32.4million of AusAID funds to train front-line health aid workers in maternal and child health issues and to improve utilisation of maternal health services. Evaluation revealed mixed results. Although the project interventions improved the interaction between the community and health system, and improved the use of maternal and child health services, there were inadequate staff, drugs and basic obstetric equipment, leading to unsustainable service delivery progress at the end of the project. [30]

On 15 March 2010, Australia's Federal Parliamentarian for Fremantle, Ms Parke, moved a motion in which she stated that a woman in PNG is 242 times more likely to die from pregnancy or childbirth related complications than an Australian woman, and that the challenges of reducing maternal and child mortality in PNG are many, including difficult terrain and weather conditions, fragile health systems, limited human resources, weak financial governance and management, and poor service delivery in many rural areas. While acknowledging AusAID's efforts in addressing maternal health issues, Ms. Parke proposed:

> Urgent and sustained efforts to address the well-defined system's problems in the health sector in PNG; implementation of universal free primary education as a successful intervention to address maternal mortality in PNG; access for every woman in PNG to supervised delivery by a trained healthcare provider by 2030, and; access for all women in PNG to comprehensive obstetric care and quality emergency obstetric care if required. [31]

Proposals for improving PNG's maternal mortality profile

Improve data accuracy on maternal health

The lack of availability of accurate data is a key constraint for assessing progress and identifying shortcomings in PNG's maternal mortality trends. The 2005 WHO-sponsored estimate of maternal mortality for PNG has a variance ranging from 130 per 100,000 to 1300 per 100,000. [32] The drastic downward revision of the global maternal mortality statistics in 2010 [5] reflects the paucity of accurate data on maternal mortality in most developing nations. The current PNG National Health Plan has revised its maternal mortality target to 247 or less per 100,000 live births by 2015. Reducing maternal mortality is but one variable in the maternal health equation. Collecting adequate data on other aspects of maternal health, such as addressing iron, zinc and other micronutrient deficiencies among PNG's women also deserves urgent attention. [33] This would imply funding the employment of a qualified public health surveillance officer in each province, as well as a national coordinator, in addition to procurement of essential health information systems. [34]

Revise laws that encourage unsafe abortions

PNG's abortion laws are among the most repressive in the world. Given the direct relationship between unsafe abortion and maternal mortality, revising PNG's current anti-abortion law, which has been in operation in various legal guises starting from Ordinance Seven of 1902, is imperative. For example, public awareness of Nepal's high rates of maternal mortality, as well as the fact that women were being imprisoned for having illegal abortions, created pressure on the Parliament to liberalise the law in 2002. Under the amended legal code, abortion is now permitted at a woman's request during the first 12 weeks of pregnancy, and thereafter in cases of rape or incest or foetal impairment, or if there is a threat to the woman's life or physical or mental health. Recent regional WHO data indicate that maternal mortality in Nepal has declined from 475 per 100,000 live births in 1997 to 281 per 100,000 live births in 2006. [35]

Improve aid effectiveness

Real per capita spending on health services in PNG declined between 1998 and 2006 due to slow economic growth and declining foreign aid. Australia's health sector aid may be made more effective in PNG by devoting enhanced attention to improving PNG's health system in terms of optimal coordination of human and material resources. Also it should be mutually rewarding for AusAID to work in partnership with the PNG National Department of Health's Ministerial Taskforce on Maternal Health in fully implementing the five principles of aid effectiveness endorsed through the 2005 Paris Declaration on Aid Effectiveness and the 2008 Accra Agenda for Action: Ownership, Alignment, Harmonisation, Management for Results, and Mutual Accountability. [36]

Adopt a human rights approach towards maternal health improvement

The sustained democratic tradition of PNG, at least at the national level, makes it feasible to utilise human rights approaches as one of the advocacy tools for reducing maternal mortality to stimulate political will. In June 2009, The United Nations Human Rights Council, at its

eleventh regular session, adopted a landmark resolution on 'Preventable maternal mortality and morbidity and human rights' in which governments expressed grave concern for the unacceptably high rates of maternal mortality and morbidity, acknowledged that this is a human rights issue and committed to enhance their efforts at the national and international level to protect the lives of women and girls worldwide. Over 70 United Nations member states co-sponsored this resolution, led by Colombia and New Zealand. Such resolutions may be used by civil society groups to pressure the government to act on aspects such as liberalisation of abortion laws, recruitment of qualified maternal health staff, and improvement in family planning services.

Sri Lanka reduced its maternal mortality ratio from 340 per 100,000 live births in 1960 to 44 per 100,000 live births in 2005 despite comparable economic status as PNG. The human rights approaches that facilitated such remarkable progress in maternal health profiles include free universal education, high female literacy, increased age of marriage for girls, accessible and acceptable family planning programs, well integrated and free family services accessible through community-controlled, government funded health services and maintaining a 95% rate of deliveries assisted by skilled health personnel. [37]

Revamp intra-partum care

Most maternal deaths occur during labour, delivery, or within the first few days following childbirth. Most complications cannot be predicted or prevented. The location of women when they deliver, who is attending them, and how quickly they can be transported to referral-level care are thus crucial factors in determining interventions that are needed and feasible. The best intra-partum care strategy is likely to be one in which women routinely choose to deliver in a health centre, with midwives as the main providers, but with other attendants working with them in a team. [38] As illustrated by the causes of death at PNG's Goroka General Hospital, [21] intra-partum care is sub-optimal in PNG, leading to a high prevalence of infection-related deaths. Developing an effective national integrated intra-partum care strategy, complemented by adequate antenatal and postnatal care, is a prerequisite for improving maternal health in PNG. Training and recruitment of qualified midwives and obstetricians need to be undertaken concurrently with equipping PNG's provincial hospitals and primary care centres to adequately address maternal care during the intra-partum period.

Improve health governance

PNG's political system is unique in the sense that declines in health outcomes and socio-economic standards of the populace co-exist with competitive democracy. The weak political governance in PNG is a product of complex historical factors, not likely to be amenable to short-term interventions. Nevertheless, health governance can produce significant improvements despite weak political governance. Health governance may be defined as the sustainable delivery by the local political leadership of quality health services to the community, especially to those who have little or no resources to pay for these services themselves. It is characterised by the principles of stewardship, service and synergy. [39] External funding support, adequate monitoring of the health management reforms, and public/private partnerships for maternal healthcare management may facilitate the incorporation and effective utilisation of these health governance principles into PNG's health sector, and optimise outcomes from Australia's generous investments in PNG's health sector. [40]

Improve prevalence of contraceptive use

Although government estimates indicate that contraceptive use prevalence increased in PNG from 2.7% in 1990 to 24% in 2006, unmet family planning needs appear higher than the current contraception prevalence rate given the increasing prevalence of teenage pregnancy and premarital sexual relations involving young women. Teenage pregnancy is both a proxy for unmet need for contraception as well as a risk factor for maternal mortality. PNG's adolescent fertility rate is 70 per 1000 births among women aged 14-19, compared with a global average of 48 per 100. The population growth rate in PNG is, at 2.0% per annum, one of the highest in the Pacific region, reflecting a total fertility rate of 4.4 births per woman. [41] Coupled with the fact that females constitute the bulk of PNG citizens living in poverty, high parity increases the risk of maternal mortality. A major obstacle with regards to improving accessibility to contraceptive use in PNG is the Christian Church, which provides at least 50% of all rural health services in PNG. The policy of Christian health provider organisations in PNG is against contraceptive use. [42] Nevertheless, improved use of social marketing techniques and community arts, particularly among young people, have been shown to be effective in improving HIV awareness among teenagers in PNG [43] and contraceptive use among poor women in Indonesia. [44] Such approaches may be usefully adapted to promote appropriate use of contraceptives among teenagers.

Trial well-funded maternity waiting rooms in all provinces

Geographical and transport encumbrances limit access of pregnant women to skilled health workers and adequate delivery facilities, and because most maternal mortality occurs during the intra-partum period, [37] it is worth

piloting a well-funded program for establishing functional maternity waiting rooms within easy reach of regional and district hospitals in PNG. Maternity waiting rooms are designed to provide better access to emergency hospital care for women about to give birth. They are essentially homes away from home. As such, they need to be equipped with facilities to provide comfort to pregnant women in the last few weeks of pregnancy. Successful implementation of this initiative will require strong whole-of-government support, adequate publicity and improvements in all core aspects of the maternity referral system, especially intra-partum care. [45] Pregnant women living in remote or rural areas would be provided with incentives and funding dedicated to the proposed program to relocate to maternity waiting rooms within two weeks of their expected dates of delivery. A meta-analysis reported insufficient data on the impact of maternity waiting facilities in reducing maternal deaths, but effectiveness of maternity waiting homes in decreasing maternal deaths and stillbirths has been affirmed in six retrospective population cohort studies. [46]

Conclusion

The lifetime risk of dying from pregnancy-related causes in PNG is 1:55. [47] PNG's high maternal mortality rate is a sensitive indicator of the sub-optimal quality and functionality of its healthcare system. In 2009, the United Nations defined preventable maternal mortality as a human rights issue. In line with trends from sub-Saharan Africa, [48] it is estimated that up to 75% of maternal deaths in PNG are preventable. Unlike the significant progress in Indonesia and Vanuatu in relation to reductions in maternal mortality over the past decade, [29] PNG's maternal mortality ratio appears to have doubled since 1995. Concerted efforts involving all stakeholders, with an emphasis on improved population health surveillance, upscaling female education, health governance strengthening, reform of abortion laws, revitalisation of general maternal health services, well-resourced intra-partum services, pilot studies of maternity waiting rooms and improved aid effectiveness are important policy initiatives that can reverse PNG's deteriorating maternal mortality profile.

Competing Interests

The authors declare that they have no competing interests.

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REVIEW ARTICLE

Operating Room Efficiency: a discussion of issues and strategies for improvement

J Monagle, B Shearer and T Loughnan

Abstract

The Operating Room (OR) is a major activity centre in all hospitals. There are constant efforts to improve efficiency of the OR in the majority of hospitals.

In this article we provide a discussion of the literature addressing the concept of OR utilisation. Most of the determinants of optimising OR efficiency are in the realm of the surgical team and include the variation in individual surgeon arrival time, attitude and surgical time, as well as time taken for surgical teaching efforts. Most efforts that result in only marginal improvements in utilisation will not translate into additional cases being performed. The effects of modern contemporary surgical techniques that are generally more equipment intensive have an impact on utilisation. The cost of any proposed changes need to be weighed against gains in utilisation and whether improved utilisation results in an improvement in productivity.

Abbreviations: **OT – Operating Theatre; TOT – Turnover Time.**

Key words: **operating theatre utilisation; efficiency; productivity.**

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Introduction

The high activity and costs associated with Operating Rooms (OR) mean significant efforts are frequently expended to improve OR efficiency - but the outcomes of such endeavours are less clear. This article provides a discussion of concepts and approaches to this complex area, guided by a collective 40 years of theatre operational management on behalf of the authors. It is not an in-depth systematic review of all possible approaches but attempts to increase understanding of the issues involved that require consideration by health managers, planners and policy makers when examining theatre utilisation.

We undertook a literature search of the terms operating rooms and efficiency, efficiency (organisational) in Medline. This resulted in a return of a little over 500 articles. Articles were grouped according to themes and representative articles included to highlight the relevant area, the potential for gains by the chosen strategies, and the staffing impact.

Definitions

OR utilisation is the time it takes to perform each surgical procedure (including preparation of the patient in the OR, anaesthesia induction and emergence) plus the total turnover time, divided by the time available. [1] That is the ratio of the total OR time used to the total OR time allocated or budgeted. [1,2] OR usage is simply the sum of time used. [2] While improvements on this definition are suggested, [3] they still focus on time used as the primary measure of efficiency. Further measures of theatre efficiency need to be developed to guide decision-making and planning. [4]

Utilisation

Underutilisation is defined as time during scheduled hours of operation that is not utilised, ie budgeted time not used. [1,2]

Overutilisation is defined as the time used by scheduled cases past the end of scheduled time. [1] Time spent on surgical cases that begin or end outside of budgeted hours should be defined as overutilisation. Cases over-lapping budgeted hours should be apportioned appropriately. [2]

Underutilisation and overutilisation are important measures because they may be used to evaluate the quality of the OR schedules and the efficiency of the OR utilisation. [2] The cost of overutilised OR time includes both the direct costs of overtime, which may have further implications of employee dissatisfaction, resignation and recruitment. [5]

There are obligate sources of unused operative time, including Turnover Time (TOT) and surgical emergencies, which cannot be totally eliminated and will help determine the appropriate target for 'ideal' utilisation. 'Ideal' utilisation will vary with factors such as type and duration of surgery and the nature of the healthcare facility. Quantifying such factors to consider in managerial decisions re theatre management is important. [2]

Factors affecting utilisation

Factors affecting utilisation can either be 'fixed', ie not amenable to managerial intervention, or 'variable', ie amenable to managerial intervention. Fixed factors are case duration (which is surgeon, procedure and organisation dependent) and physical environment (that can rarely be altered in the short-term). TOT, teaching and OR processes have both fixed and variable components. Scheduling is a variable factor related to utilisation. The following is a discussion of the commonly addressed variable factors.

Case duration and scheduling

Shorter cases have a more predictable time course and less case time variability. [1] The lower variability of short cases offers greater predictability in compiling an OR schedule. [6] Decreasing case time variation allows increased utilisation with minimal overruns.

The greater uncertainty of longer case duration makes it more difficult to schedule times accurately and more difficult to achieve maximum utilisation without making patients wait or having the schedule extend past the end of the day. [1] Being able to predict the duration of OR procedures is essential for OR scheduling for maximal throughput with minimal surgeon/patient waiting time and staff member overtime. OR managers often lack this historical information about procedure duration in specific surgeon/procedure combinations in their facility. [6] However times estimates by surgeons, nurses and anaesthetists tend to be consistent and reflect actual times. [7]

Performing shorter cases first results in more predictable planning for the rest of the day and less patient delays. [1,6] Operating rooms that start with short procedures experience a higher probability that subsequent procedures will start on time or with less waiting than ORs that start with long procedures. [6] This does not necessarily sit well with theatre staff, who prefer to manage the long cases first. This is due to the ability to plan longer anaesthetic time or nursing scrub team set up time into an early start to the day (minimising unplanned overruns at the end of the day), as well as leaving the short cases to the end of the list for ease of rescheduling to another time should overruns occur.

Case duration can be affected by the size of the operative team. Where parts of the operation can occur concurrently, surgical time can be reduced. [8] Where nursing teams change during the operation, case times are prolonged. [9]

Block versus case scheduling

Where applicable, dedicating OR time to specific surgical units, instead of a range of units (eg in our setting 'emergency theatres') will result in higher OR efficiency. [5] Scheduling a single surgeon in the one room all day will significantly decrease lost time. [10]

The ability to maximise the scheduled bookings is also dependent on the personality of the staff involved. Staff prepared to take more 'risks' with scheduling improve utilisation compared to theatre co-ordinators who are risk averse. [11]

Turnover time (TOT)

TOT is defined as time from prior patient out of room to succeeding patient in room time for sequentially scheduled cases. [12,13] There is no universal benchmark for TOT – there is too much variability between types of procedures. The fixed component of TOT generally consists of activities such as anaesthetic area clean up and machine cleans, removal of surgical equipment, cleaning and resetting of operating room tables and other fixed equipment. The minimum time to complete these tasks appears to be at least six to ten minutes. More complex surgery means extra time as a result of additional equipment that must be removed, cleaned or replaced. [12]

Set up time varies with staff experience, the department's practice for when the patient is brought into the OR, the team process, completeness of preference cards and supplies and equipment required. [14] The set up of endoscopic equipment appears to have a fixed time component, and endoscopic procedures of any nature appear to have similar TOTs. [14]

The efficiency of the case commencement process will be limited to some extent by OR design. In a single room environment, the room must be set up, followed by the sterile set up, followed by patient movement into the room and subsequently anaesthesia induction prior to any aspect of the surgery commencing. These serial processes incur non-operative time and hence decrease the utilisation of OR space and resources. [15]

Most of those who do better on TOT use parallel processing – ie running steps of the surgical process concurrently (which requires additional space and additional resources). Mostly this has focused on an extra room for placement of local anaesthesia or induction of general anaesthesia while the previous patient is still in the OR in the closing stages of their procedure. The serial to parallel conversion of work processes needs to be supported by restructured perioperative care team including additional personnel – including both increase in nursing staff and anaesthesia staff. [15] Overlapping induction and emergence from anaesthesia involved a significant increase in personnel with a small reduction in TOT. [16] Overlapping induction has the potential to decrease TOTs, however will require increased personnel – and the cost benefit needs to be assessed. [17]

In an experimental setting parallel processing allowed two extra cases per day (but the potential extra patients were admitted to hospital and waiting on the understanding they may or may not get their surgery that day). [18] Overlapping induction in Finland with nursing staff managing maintenance of anaesthesia allowed one extra case at the cost of 1.5 extra nursing staff, [19] and in Switzerland the cost benefit was positive due to the extra gynaecological cases performed. [20] Overlapping initiation of regional anaesthesia with surgery has decreased TOT, but variably allowed for extra cases [21] or not. [22]

Despite the focus on TOT, there is little evidence to support the premise that alterations to this can result in a major, universal impact. Case duration affects utility of reductions in TOT. Changing anaesthesia-controlled time alone cannot impact where case duration averages more than 45 mins. [23] In most settings, decreasing TOT will not allow another case to be performed, [1] especially where average case duration is long. [15] In scheduling lists of short cases, improved TOT may allow additional cases to be considered. [1]

First case late starts

Starting the first case of the day late is similar to long TOT [24] – it is time lost to active surgery. Delays in the first case start are associated with further delays during the day. [25] In one observation 74% of all delay codes were under the heading 'awaiting surgeon arrival' and 83% of delay minutes were under the same heading. [13] In another study the most common delay were surgeon and anaesthetist unavailability, followed by the patient not being ready. [26] Where delays are not due to personnel, equipment failure is a common cause of delay. [25]

Physical environment and processes

As surgical requirements have become more dependent on complicated technology and equipment, set up times have increased. Minimally invasive surgery is increasingly prevalent, with longer set up times required to support minimally invasive procedures in multipurpose ORs. [15] The integrated OR system is specifically designed to minimise the number of devices that need to be individually connected and powered up at the start of each case and also allows the circulating nurse to control equipment and lighting without leaving the nursing station. [15] However although efficiency gains in tasks required have been demonstrated in dedicated minimally invasive ORs, reductions in TOTs have been more difficult to achieve. [27] Theatre redesigned to accommodate disposables storage in the OR, storage of equipment like microscopes in the OR, and distributing extra power, gas and computer links around the room to facilitate work flow would predictably improve efficiency. [12]

Good logistics management provides adequate overall staffing numbers; an appropriate assortment of skills to accommodate the array of scheduled surgical procedures; all required equipment and supplies readied in usable condition by the time each procedure has been scheduled; and procedures scheduled at times that required equipment is available and not being used by another surgeon. [6]

If surgeons who perform the same procedure standardise their instrument sets and room set ups, TOT is quicker because staff have fewer variations to manage. [14] Procedure-specific packs with minimal sets and add ons stored close to theatres minimise set up time and wait time during the procedure. [12] Accurate up-to-date preference cards aid efficient case set up, [16] and having these computer-based allows for regular updates. [12] A 'turnover hamper' helps

reduce TOTs – the hamper has all the items required for clean up and set up (nonsurgical) and is wheeled into the theatre between cases, limiting time taken to hunt for individual items as required. [15]

However there is an obligate minimal time for all the activities that are required to be completed between cases, while ensuring these activities are completed to an appropriate standard. The minimal time will vary between institutions, OR case mix and with different personnel, but there is by necessity a lower limit.

How much can addressing the environment and processing gain? Using six sigma methodology Adams [28] reported TOT savings of about seven minutes (22.8±16.3 minutes to 15.6±13.9 minutes) for a major undertaking of changing all of the following processes – room clean up; room dismantling and subsequent set up; staff rostering; development of case carts; communication processes and increases assistance for anaesthesia personnel - and reported extra case potential. Whether the seven minutes per case across the allocated work per session in a single OR is insufficient to allow additional cases to be completed is one of the important factors for managers to consider before embarking on such undertakings.

Teaching

Academic surgical times are generally 130-150% higher than those in private practice, and not simply because of case complexity. The academic surgical culture allows for long periods of unsupervised resident activity during positioning, preparing, opening and closing of surgical site. [29]

The question is what senior staff do during opening and closing and how they guide house staff through the procedure. The inevitable prolongation of technical procedures in a teaching facility is a little discussed factor in determining the true cost of medical education. Beattie concluded that the sustained success of efficiency-improving endeavours requires ongoing surgical commitment and leadership. A few minutes per day can be hammered out of nursing and anaesthesia procedures, but premature departure of the senior surgeon adding 20-30 minutes to a closure will quickly drain the energy from a complex collaborative effort. [29]

The presence of surgical trainees prolongs all phases of the cases by a significant amount of time [31] and reliably increases operating time across a range of operations. The increase in time is higher the greater the complexity of the surgery. [32] This increased case duration needs to be considered and managed as part of utilisation monitoring.

There is no literature about the teaching of nursing staff, support staff and other groups such as medical students. These must all increase either turn over time or case duration (or both), and must be considered by theatre managers.

What is the target?

Optimal utilisation is between 85-90% depending largely on variability of case duration. [1] For complex ORs with cases of longer duration the utilisation target will be less to prevent a significant amount of costly overutilisation (although paradoxically, a single case per list will appear to offer ideal utilisation). Any change such as cases of different duration, changes in variability of case duration, emergencies, cancellations and so on will decrease utilisation. [1] The impact of these factors is further compounded by a low level of knowledge regarding OR efficiency amongst OR staff. [33]

The classic definition of utilisation considers the time past the end of the day as the same as the time during scheduled hours. This is undesirable because there is a cost to going past the end of the day. Overtime costs may be incurred, and repeatedly running late can be negative on staff morale, and may impact on recruitment and retention and sick leave. Although it is possible, staff may be resistant to improving utilisation if overutilisation results in increased overtime payments! Underutilised time is less expensive than time that is overutilised. Once the roster is set, the additional cost of underutilised time is zero. Maximising the efficiency of use of OR time is synonymous with minimising over utilised OR time. [5]

When OR staff work harder to improve TOT or on time starts, often their reward is to have another case added to the schedule. [13] It is important that staff are recognised for their efforts, and don't see any extra work as punishment!

Efficiency of the OR is achieved by increasing patient waiting time. The most efficient OR is one in which patients are waiting when the OR is available. While this is good for the OR, other players in the patient journey are aiming to minimise patient waiting times, which may be at the expense of OR efficiency.

Summary

Definition and Target: Utilisation is the ratio of the total OR time used to the total OR time allocated or budgeted, and should be monitored for both under and over utilisation. For most mixed elective settings a target of 85-90% appears appropriate.

Case Duration and Scheduling: Case duration (and the inherent case variability associated with this) is the primary determinant of scheduling to targeted utilisation parameters. Short cases are more predictable and allow for better utilisation. In a mixed list short cases should be scheduled first to allow for more on time planning of admission and start times for later cases, which may improve efficiency of waiting time and processes outside of theatre, but will not necessarily improve utilisation.

Scheduling one surgeon for the duration of the workday is more efficient than time lost due to waiting for changing surgeons.

Turnover time and Start time: TOT is case, organisation and staff dependent. In most settings any improvements made will not permit an extra case, although will possibly limit overtime. Parallel processing allows for the greatest improvements, but at significant cost, which may not realise an economic benefit. Having the surgeon available on time and focusing on on-time starts is probably the most cost effective measure to improve utilisation.

Physical Environment and Processes: ORs dedicated to like work, with relevant equipment and disposables stored in theatre provide the most efficient physical space with little staff time devoted to continuous change.

Teaching: Teaching will almost always slow down the process – however the involvement of the senior staff can minimise the impact. We recognise the need to teach and its absolute role in sustainability, and these factors must be considered by OR managers in assessing efficiency.

Conclusion

It has been easiest to demonstrate positive effect among select patient populations with participation restricted to small, highly committed groups. [34] There is no clear benchmark for utilisation or its various components. [35] All of the factors that determine utilisation depend on the case mix, the organisation and the staff mix, which vary both within and between institutions. The main determinants of utilisation (the surgeon and patient) are not amenable to change, and hence all attempts to address utilisation will be marginal. When an organisation decides to focus on an aspect of utilisation the organisation needs to monitor the time, outcome and cost benefit of the effort to increase utilisation. Even within an institution, similar efforts may see different returns amongst different surgical or operating room teams.

Although utilisation is a simple calculation that gives some measure to the extent to which an OR is used, it does not give an adequate measure of how efficiently resources, especially staff time, are used. Future assessment and work in this are needed to address overall productivity, not just time used.

Competing Interests

The authors declare that they have no competing interests.

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RESEARCH ARTICLE

Doing More with Less: ways to improve patient flow in hospital settings

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Abstract

Background: Recent reports suggest that public hospitals are unable to respond to changing population needs. It is critical that innovative approaches be developed to assess and improve the management of hospital resources and improve patient flow. This article presents findings from a study that applies process management principles – typically used in the manufacturing industry – to healthcare services.

Method: An interactive visual software program, Tecnomatix Plant Simulation®, was used to map processes within sonography in the imaging department of a public hospital, within New South Wales, Australia. The map was informed by data, which included the department layout; number of diagnostic rooms available; available equipment; staff rosters; procedure times; scheduling processes; and patient-wait periods. Using the software, data were integrated to provide a visual animation, superimposed on the lay-out of the department.

Results: To assess opportunities for improvement, parameters influencing patient flow were manipulated using the software program. These included variables that influence room use, including staffing, room availability and scheduling procedures. Simulating improvement strategies within a virtual environment had several benefits – strategies were tested instantaneously; they could be viewed as a visual animation; there was no disruption to existing hospital processes; and there was no risk of resistance to change among clinicians.

Conclusion: This article demonstrates the potential value of process management tools in improving patient flow in hospital settings. It indicates that, using interactive animation, innovative ways to manage and deploy hospital resources can be tested virtually, devoid of the many challenges typically associated with trialling changes in the physical setting. This finding has important implications for hospital managers charged with the responsibility of doing more with less.

Abbreviations: BPM – Business Process Modelling; ED – Emergency Department; GP – General Practitioner; NSW – New South Wales; RSI – Repetitive Strain Injury; SPT – Shortest Processing Time.

Key words: patient flow; process management; emergency department; lean thinking.

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Introduction

The Australian public hospital system is facing a myriad of challenges that collectively hinder its effectiveness and its efficiency. [1,2,3,4] This is perhaps most apparent in the Emergency Department. (ED). [5] According to the recent Garling report:

> Most problems or stresses…observed in the NSW [New South Wales] public hospital system find expression, in one form or another, in Emergency Departments, be it a lack of senior doctors, ineffective bed management practices, widespread use of locums or poor communication with patients or their families. [6, p. 716]

Among the reasons for this is an increased demand for emergency services which, according to Garling, is 'in excess of what you would expect by reason of population growth alone'. [6, p. 716] For instance, while the New South Wales (NSW) population grew by only 3.8% from 2001 to 2006, [7,8] the number of people presenting to NSW EDs increased by over 80% over a similar timeframe [2002-03 to 2007-08]. [6] However, public hospitals have a limited capacity to meet this demand. [5]

Limited hospital capacity is evidenced by ED access block. [9,10] Access block occurs when a patient remains in an ED for over eight hours, consequent to the limited availability of an inpatient bed. [2] Although Australian statistics are limited, a recent survey of Australian EDs indicated that more than 40% of patients receiving care in EDs were waiting for ward beds, and 77% of those had been in the department for over eight hours. [11] Given that bed occupancy rates in most Australian hospitals exceed the accepted maximum for efficient care and surge capacity, [3] this statistic constitutes a serious concern.

The consequences of access block are costly. In addition to increasing risk to patient health, [12,13,14] it affects the allocation of limited public resources and the management of healthcare services. More specifically, it is associated with decreased efficiency in the ED [15 -18] and increased inpatient stays. [19] Given the interconnected nature of hospital departments, access block is likely to hinder patient flow throughout a hospital. [20] It can thus reduce the efficiency of the surgical, intensive care, pharmaceutical, and diagnostic imaging departments, among others.

The causes of access block are multifaceted. In addition to an insufficient number of inpatient beds, [9] access block is attributed to:

- Limited workforce capacity;
- The health needs of an ageing population;
- The increasing number of young patients (under 25 years) who access EDs as a substitute for primary care; [5, 21]
- The increasing number of patients requiring intense and/or continued hospital treatment, [22] thus overcrowding hospital departments; [23]
- A decline in community services including nursing homes [9] and mental health services, [22] which in turn adds further strain on the hospital system – for instance, the average length of hospitalisation among patients with mental health issues is approximately 14 days longer than those requiring acute care; [24]
- Changing patient expectations – improved access to health information has enabled patients to access healthcare services earlier, and to intentionally access hospitals that provide an array of different services; [5]
- Changing referral patterns – according to a recent Australian report:

  > There is a strong trend towards patients bypassing their GP [General Practitioner] in the decision to attend an ED, with up to 86% of patients self-referring to the ED and relying on their family and friends for advice. A significant proportion of all patients cited GP accessibility as the reason for attending an ED and only 34% thought they really needed hospital or emergency treatment. [5, p. 5]

- Increased use of ambulance services, which has risen by 10% annually in the last two years; [5]
- The limited access of day clinics and private practitioners; [25]
- The decline in bulk billing among General Practitioners (GPs), [26 - 29] particularly in rural areas, [30,31,32] which in turn may encourage access to bulk billed hospital services;
- Funding arrangements that focus on elective surgery and outpatient care, [9] limiting resources available to EDs; and
- The over-bureaucratisation of the public health system, [33] leading to the use of staff time for administrative actions rather than clinical care.

Although there have been some attempts to improve access to hospital services, these may have exacerbated access block. For instance, efforts to improve the skill level of ED staff and allow access to specialists within the same ED visit may have promoted the use of EDs. [5]

Given the associated costs of access block and the associated impact on service quality, it is necessary to identify ways to improve patient flow in the ED, and thus, the interconnected departments. One approach that holds promise for healthcare services is lean thinking. [34] Typically applied to private industries – notably, manufacturing [35-38] – lean thinking aims to provide products or services 'in the most efficient manner by improving flow and eliminating waste from processes'. [39, p.S39] This is achieved by under-standing current processes, identifying areas for improvement, and implementing necessary change. The application of lean thinking to private industry has helped to improve productivity, reduce waste and lower costs; [40] and it is these strengths that hold promise for healthcare services.

The potential value of lean thinking for the healthcare sector is recognised by Australian government departments. Government policies, for instance, allude to the role of process management principles – normally applied to the manufacturing industry – to the management of healthcare services. [41] This potentially includes the identification of value-adding processes as well as wastage.

Lean thinking can be applied using visual analytics. Visual analytics represents a marriage between computation, visual representation, and interactive thinking. [42] According to Thomas and Cook:

> visual analytics…[is] the science of analytical reasoning facilitated by interactive visual interfaces. People use visual analytics tools and techniques to synthesize information and derive insight from massive, dynamic, ambiguous, and often conflicting data; detect the expected and discover the unexpected; provide timely, defensible, and understandable assessments. [43, p.10]

Techniques that are simultaneously visual and interactive can be helpful for four key reasons [44] namely:

1. They can help users to understand complex data and situations where models alone are inadequate;
2. They readily detect 'trends and anomalies, evaluate hypotheses, and uncover unexpected connections'; [44, p.15]
3. Through the use of contextual cues, they help the user to interpret the information he/she is presented; and
4. They encourage users to engage with and explore large datasets that might otherwise be daunting. [45]

In order to demonstrate the way visual analytics can aid the management of healthcare services, this article reveals the application of visual analytics to a hospital department. It outlines an approach to understanding current sonography processes with an imaging department, identifies areas for improvement, and pilots improved management strategies within a virtual environment. Sonography uses ultrasound-based equipment to produce real-time diagnostic images of soft tissues, including foetal images. The imaging department was selected because, akin to other hospital departments, it is closely associated with the ED and has a bearing on patient flow, and as such, access block.

Methods

The department to which visual analytics was applied is situated in a NSW public hospital that serves a highly populated and ethnically diverse community. [46] The sonography department is situated within the Imaging Department, on the same level and approximately 50 metres from the ED. It contains three fully equipped, dedicated sonography rooms and presently handles around 4,000 patients per year. There were three full time sonographers in the department when the study commenced. Along with ED patients, the sonography department services the other departments in the hospital (see Table 1 for relative usage) as well as a small number of outpatients primarily to enable necessary sonographer training to occur.

Following ethics approval by the relevant academic institution and the Area Health Service, Business Process Modelling (BPM) and visual analytics were used to map the processes of sonography and the layout of the department, identify improvement areas, and simulate innovative strategies to improve patient flow. BPM is a management activity that helps to improve efficiency by allowing the user to observe current processes visually and identify the factors that both help and hinder. [47,48] To effectively manage the wealth of data required for the study, visual analytics software (the interactive visual software program Tecnomatix Plant Simulation®) a software program, was used to integrate information about departmental functions, resources, events, relationships between components, communication links, and information flow. The software program is a tool that facilitates discrete event simulation and the creation of digital models of logistic systems. [49] This allows users to investigate system characteristics, test modifications without disrupting the system, and identify ways to optimise system performance. Following the simulation of the department's current operations, this software enabled the rapid simulation of solutions suggested by the imaging personnel.

Data collection to enable the simulation involved the following stages:

1. Workflow practices – that is, the sequence of connected steps, were observed in person by members of the research team over different hospital shifts on both weekdays and weekends; mapped using operations flowcharts; and then verified by staff from the medical imaging department.
2. Sonography patient case-mix and activity data were collected over three months to measure frequencies and gauge work movements. This information included patient-logs, staff rosters, and machine-use times.
3. Official hospital records – in the form of the bookings record and schedules – were collected over three months. This information included patient demographics, wait-times, procedure durations, test-specifics and procedure delays. The observations of both the researchers and the hospital staff indicated that inpatients who had arrived in the department prior to their scheduled time entered the sonography room on the scheduled time. For this reason, wait-time was calculated from scheduled time until the patient was collected by a sonographer.
4. To gauge the use of the sonography rooms and ensure the accuracy of hospital records, time measuring points were collected over three months: these included patient arrival time to the waiting room; scheduled appointment time; patient arrival after the test; and patient departure time from the department.
5. Staff rosters were collected and constraints were determined: these included skill requirements for positions as well as particular diagnostic procedures; training time; teaching time; and award conditions.
6. The quantitative data collected were cleaned to ensure completeness and accuracy.
7. To refine and validate interpretations of the data collected, ten semi-structured interviews were conducted with staff members who were familiar with sonography, its processes and its relationship with other hospital departments. Themes explored during the interviews included work processes as well as the factors that helped and hindered patient flow.
8. Collected data were regularly cross-checked with the manager of the imaging department and the senior sonographer for verification.
9. Further verification was received from sonography staff members who perused and provided feedback on the collected data and the models developed of current departmental processes.

To avoid the inconsistencies typically evident during December and January, [50] data were collected between March and April, 2008; it was therefore reasonable to extrapolate the data to full-year results. Furthermore, extrapolated totals were consistent with full-year treatment statistics.

Results

Once cleaned, the dataset contained 314 patient records. Relative to the mean, the standard deviation of the sonography procedure times was high. To reduce the standard deviation, the diagnostic procedures were categorised. All procedures that appeared over 15 times were evaluated as a single procedure with their own procedure times. This resulted in seven categories, including abdominal, carotid doppler, lower leg, obstetrics (between 18 and 22 weeks of pregnancy), pelvic, renal, and other. The frequency and distribution of each category were then determined. Curve matching was used to obtain the best fit function to model these distributions, and the gamma distribution [51,52] was found to be the most appropriate statistical function.

Table 1 describes sonography activity. Collectively, the data helped to understand current practices and processes within sonography. For instance, sonography patients came from three sources – 43% were referred from the ED; 36%

Table 1: Selected data describing sonography department (March-April 2008)

OUTCOME MEASURE	CURRENT SITUATION
Average patient waiting time	4:39 min
Patients	
Inpatients	1,784
Outpatients	994
Emergency patients	1,149
Total patients	3,927
Average staff overtime	8:43 min
Room use (09.00-17.00)	54 %
Room use (incl weekends)	13 %
Use of sonography staff[1]	85 %
Timeslot duration scheduled	60:00 min
Average procedure time	48:34 min

[1] Refers to staff capacity

were inpatients; and 21% were outpatients. Collectively, these patients waited an average of over four minutes, yet room utilisation was over 50% during conventional business hours: that is, patients and attending sonographers were only present in the room for just over half of the available time.

Having understood the operation of the sonography department, three parameters were identified for potential manipulation – the procedure frequency; procedure sequence; and timeslot duration. Procedure frequency refers to the amount of times certain procedures were undertaken during the data collection period. Procedure sequence refers to the succession in which the procedures are booked and scheduled, and timeslot duration refers to the time set aside in the booking schedule for the booking of a single procedure.

Given the unpredictable demand for services, particularly from the ED, it is difficult to control procedure frequency. Hence, this parameter was deemed not suitable for manipulation, because it would have been possible to manipulate the sequence of procedures. According to scheduling and sequencing theory, the total wait-time of many tasks or procedures is minimised when these are sequenced using Shortest Processing Time (SPT) rule. [53] As such, procedures are best scheduled from shortest to longest duration. However, sonography staff were of the opinion that differences in procedure times were too unpredictable, and that short or long procedure times depend mainly on individual patient characteristics. For this reason, procedure sequencing was largely deemed to be inappropriate to improve processes, as individual case characteristics can not be determined before the procedures commence. Manipulating the timeslot duration was deemed appropriate. This was because, although timeslots of 60 minutes were allocated for each procedure, on average, only 48.34 minutes was required (SD = 17.34 mins). Hence, it was possible to reduce timeslot duration.

In addition to timeslot manipulation, sonography staff proposed additional strategies to improve patient flow. These included dedicating one sonography room to emergency patients; increasing staff capacity; and terminating all services provided to outpatients.

Simulations

In each of the following strategies the following assumptions were made in the simulations:

1) That the current case-mix of patients from ED, inpatients or outpatients would not change;
2) That all available sonography slots would be filled; and
3) Additional sonographers could be found to staff any additional capacity generated in the situation simulated.

These assumptions appear reasonable as the case-mix has been stable over the data collection period; during this time all available sonography slots were generally utilised; and excess demand has been reported. The staffing was perhaps the most uncertain assumption, but subsequently this has been achieved.

Strategy 1: Dedicated sonography room for emergency patients

The first simulation model assumes that regardless of the number of rooms available, one room will always be assigned to emergency patients.

At the time of fieldwork, three sonography rooms were not always in use. This was largely due to staff shortages, but also arose through equipment maintenance, staff training and other irregular interruptions. All predictable blockages to room use or staff availability identified (eg, routine maintenance, scheduled staff leave or training, historic patterns of equipment breakdown or staff illness) have been included in the simulation. Consequently, dedicating a room to emergency patients may prevent inpatients and outpatients from accessing sonography services. Nevertheless, compared with current practices, this improvement strategy can assist approximately an increased number of patients. As indicated in Table 2, this strategy enables 173 additional patients to be provided with sonography services and it also reduced wait-time by over two minutes. This is largely because the dedicated emergency room is not scheduled, resulting in higher use. The strategy would also increase the number of emergency patients treated by over 800 annually; this is because, under current scheduling practices, the same number of emergency patients is treated regardless of the number of rooms available, resulting in fewer inpatients and outpatients being treated. The reduced number of inpatient appointments may pose little concern because inpatients admitted from the ED may have received their tests in the ED; however, the potential for inpatient bottleneck would require monitoring. Other benefits associated with this strategy included reductions in staff overtime.

Table 2: Dedicated sonography room for emergency patients

OUTCOME MEASURE	ONE ROOM FOR EMERGENCY PATIENTS EACH DAY	CURRENT SITUATION (6 EMERGENCY TIMESLOTS IF 3 ROOMS AVAILABLE)
Waiting time	2:16 min	4:39 min
Total patients	4,100	3,927
Inpatients	1,361	1,784
Outpatients	753	994
Emergency patients	1,986	1,149
Staff overtime	6:22 min	8:43 min
Room use (09.00-17.00)	56 %	54 %
Room use (incl weekends)	13 %	13 %
Use of sonography staff	85 %	85 %

Strategy 2: Fifty minute timeslots

At time of fieldwork, seven timeslots were available each day per room when bookings were made at 60 minute intervals. This is increased to eight when these timeslots are reduced to 50 minutes. Consequently, the number of patients treated increases to 4,488 (see Table 3). Although patient wait-time and staff overtime also increase, so too does the utilisation of staff, largely because of the tighter schedule.

Strategy 3: Increased staff capacity

The use of relevant sonography staff members can be increased by:

1. Including the hours that staff members currently work in other departments, like the x-ray department, in the model; or
2. Increasing staffing by, for example, recruiting one fulltime equivalent sonographer.

At time of fieldwork, two of the three sonographers sometimes worked in x-ray rooms of the imaging department. The continued presence of both workers in sonography would increase the number of available procedure days by 78.

Under the staff roster system that was used at the time of fieldwork, the three sonography rooms were fully staffed only 84 (of 260) days (excluding weekends), over a 12-month period. On the remaining 176 days, there were occasions when no sonographers were scheduled because two staff members were not always available. The employment of 3.6 fulltime equivalent staff members would enable all three sonography rooms to operate simultaneously all year.

Table 3: Changing timeslots

OUTCOME MEASURE	50-MINUTE TIMESLOT	CURRENT SITUATION
Waiting time	11:23 min	4:39 min
Total patients	4,488	3,927
Inpatients	2,042	1,784
Outpatients	1,137	994
Emergency patients	1,309	1,149
Staff overtime	12:38 min	8:43 min
Room use (09.00-17.00)	61 %	54 %
Room use (incl weekends)	14 %	13 %
Use of sonography staff	96 %	85 %

Increasing staff capacity increased room use (see Table 4) because it allowed all three sonography rooms to be operational more often. With increased room use, patient flow also increased. However, the utilisation of staff remained unchanged.

Strategy 4: Not scheduling patients who do not require preparation

Over one-quarter of all patients (25.4%) do not require preparation prior to ultrasound, like the need to fast or the need to have a full bladder. This equates to approximately five of the 21 appointments per day (23.81%). Using this information, a model was devised whereby patients not needing preparation would not be scheduled, and this strategy simulated. As such, two appointments, of a possible seven (25% per room), would be scheduled in each room in the morning and the remaining time would remain unscheduled. The scheduled appointments consisted of a ratio of inpatients (without preparation) to outpatients of 48.36 (48 = 64% x 0.75). The simulation also involved dedicating one of the three sonography rooms to emergency patients. However, when fewer than three rooms are available, a room will not be assigned to inpatients; this is because of insufficient appointment time for inpatients and outpatients that require preparation.

Simulation of this strategy showed increased room use and the average patient wait-time decreased (see Table 5). This was largely because the model assumes that non-scheduled patients do not need to wait for their procedure. Although this might not always be the case, efficient coordination of the department could minimise wait-time among non-

Table 4: Increased staff capacity

OUTCOME MEASURE	SONOGRAPHY STAFF REMAIN IN SONOGRAPHY	EXTRA SONOGRAPHER	CURRENT SITUATION
Waiting time	4:25 min	4:23 min	4:39 min
Total patients	4,459	5,166	3,927
Inpatients	2,026	2,351	1,784
Outpatients	1,133	1,308	994
Emergency patients	1,300	1,507	1,149
Staff overtime	8:43 min	8:45 min	8:43 min
Room use (09.00-17.00)	61 %	72 %	54 %
Room use (incl weekends)	14 %	17 %	13 %
Use of sonography staff	85 %	87 %	85 %

Table 5: First-come-first serve for patients not requiring preparation

OUTCOME MEASURE	NO SCHEDULE FOR PATIENTS NOT REQUIRING PREPARATION	CURRENT SITUATION
Waiting time	1:40 min	4:39 min
Total patients	4,127	3,927
Inpatients	1,500	1,784
Outpatients	649	994
Emergency patients	1,979	1,149
Staff overtime	6:20 min	8:43 min
Room use (09.00-17.00)	58 %	54 %
Room use (incl weekends)	13 %	13 %
Use of sonography staff	91 %	85 %

scheduled patients. Yet, in this scenario, one room was dedicated to emergency patients and the schedule of patients (without preparation) reduced inpatient and outpatient procedures at the cost of increased emergency services.

Strategy 5: Terminating outpatient services

The fifth strategy involved removing all outpatient treatments from the department and treating inpatients and emergency patients using 60 minute timeslots in sonography rooms that were not dedicated to emergency patients: as such, outpatient services were terminated within this model. Average patient wait-time and staff overtime both increased as described in Table 6. This was because inpatients and emergency patients are typically treated for slightly longer periods. Although the number of treated patients remained unchanged, the number of treated inpatients and emergency patients increased. The utilisation rates remained unchanged.

Discussion

Due to the disparity between supply and demand, the healthcare system in many Western nations is far from ideal [2,5,54] and access block is symptomatic of this. [9,10] Although access block might be addressed by attending to a number of systemic issues, [21-32, 55] there is an immediate need to improve patient flow within the hospital system. Failure to address this problem risks the health of healthcare services and patients. [12-19]

In this article, one approach is demonstrated to inform strategic decision-making, and as such, improve patient flow and alleviate access block. By using visual analytics within sonography, this study reveals one way that complex processes within a hospital department can be understood; improvement can be identified; and viable options to improve these areas can be simulated. Given the interconnected nature of hospital departments, [20] improved efficiencies in one department are likely to have beneficial effects on surrounding departments.

The results of this study indicate that, within the research site, patient flow might be improved by:

- Reducing procedure timeslots from 60 to 50 minutes;
- Increasing staff capacity; and
- Separating outpatient services from the imaging department.

Given that these strategies have the potential to improve patient flow, they are also likely to increase demand on patient transport and administrative services. This is because increased patient access to healthcare services is likely to require auxiliary hospital services, including (but not limited to) transport within the hospital and administrative support.

The results also indicate that patient flow might be hindered by:

- Dedicating one sonography room to emergency patients – although this was associated with greater throughput for emergency patients, it also decreased staff ability to perform tests on inpatients. Hence, while the bottleneck might be alleviated in the ED, it might also obstruct patient flow in the wards. This can affect the availability of beds for emergency patients, thus creating a new bottleneck. Furthermore, the ED would have to ensure the dedicated sonography room is used at a constant pace – that is, the room cannot be idle. This may prove difficult due to the unpredictable nature of demand; and

Table 6: Sonography provides inpatient services only

OUTCOME MEASURE	NO OUTPATIENTS	CURRENT SITUATION
Waiting time	5:05 min	4:39 min
Total patients	3,927	3,927
Inpatients	2,394	1,784
Outpatients	0	994
Emergency patients	1,533	1,149
Staff overtime	9:58 min	8:43 min
Room use (09.00-17.00)	54 %	54 %
Room use (incl weekends)	13 %	13 %
Use of sonography staff	85 %	85 %

- Not scheduling patients who do not require preparation – this had a negative result for both inpatients and outpatients.

The ability of this study to map departmental processes and identify feasible improvement strategies was largely contingent on bona fide collaboration with hospital staff. This helped the researchers to understand a complex system and identify options that were appropriate, feasible, and met the priorities of both the hospital and its staff. Visual analytics is largely dependent on context. Without the engagement of, and validation from individuals who might benefit from it, the application of simulated models is likely to be limited.

In addition to the potential for greater efficiencies, visual analytics offers the hospital setting three further benefits; namely:

1. Change can be piloted without the need for environmental (including policy) change;
2. Visual analytics allows hospital staff to observe the potential benefits associated with an altered process, which in turn, can increase confidence; and
3. Visual analytics provides a platform for discussion and a better understanding of the inter-connectivity of processes across different departments.

Although this study helped to test solutions without changing the hospital setting, it is limited by providing a theoretical solution only. A theoretical solution cannot accommodate daily variations that affect patient flow, like telephone calls, limited hospital infrastructure, the limited availability of patient information, as well as occupational health and safety issues, like Repetitive Strain Injury (RSI).

Conclusion

Implications for practice

Within two weeks of simulating the seven strategies presented in this article, staff from the imaging department reported their recommendations to the General Manager. These included:

- Reducing procedure timeslots from 60 to 50 minutes;
- Increasing staff capacity to ensure all three sonography rooms are operational simultaneously; and
- Dedicating one sonography room to emergency patients.

According to the simulated models, these strategies are likely to effect several changes, which collectively have the potential to improve patient flow as described in Table 7.

The interest among hospital staff in some of the simulated improvement strategies suggests that visual analytics holds promise for improving patient flow in hospital settings. Despite the complexity of healthcare services, visual analytics can accentuate opportunities for improvement. It can manipulate critical parameters; test a range of options through animated simulation; and present results visually to ease interpretation. Considering the prime role of EDs, it is essential to develop and provide the means that optimise their processes – visual analytics represents one way to achieve this.

Competing Interests

The authors declare that they have no competing interests.

Table 7: Solutions recommended by hospital staff

OUTCOME MEASURE	50-MINUTE TIMESLOTS 3 SONOGRAPHY ROOMS 1 EMERGENCY ROOM STAFF INCREASE 1.0 FTE	CURRENT SITUATION (6 EMERGENCY TIMESLOTS IF 3 ROOMS AVAILABLE)
Waiting time	8:10 min	4:39 min
Total patients	5,554	3,927
Inpatients	2,276	1,784
Outpatients	1,284	994
Emergency patients	1,994	1,149
Staff overtime	9:20 min	8:43 min
Room use (09.00-17.00)	75 %	54 %
Room use (incl weekends)	13 %	13 %
Use of sonography staff	85 %	85 %

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RESEARCH ARTICLE

Experiences of Allied Health Senior Clinicians on the Challenges of their Transition from a Grade Two Role

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Abstract

Team leadership roles can be challenging and often require specialised skills. This paper presents a qualitative study investigating the experiences of allied health clinicians who have made the transition from a grade two clinician to a team leader or senior clinician. In-depth interviews with eight senior clinicians, who work in an acute or sub-acute campus with a large Victorian public hospital, were undertaken. This study was carried out as part of the coursework component of a Doctorate in Public Health at Latrobe University, Australia. The clinicians were employed in the disciplines of Dietetics; Occupational Therapy; Physiotherapy; and Social Work. Overall, six themes emerged through the conceptual analysis of the data. Results indicate that the role transition to a senior clinician can be challenging and highlighted: 1) the importance of comprehensive orientation and induction programs; 2) the importance of training to facilitate preparation for the role; and 3) the essential role of mentors.

Abbreviations: **IPA – Interpretative Phenomenological Analysis; KPI – Key Performance Indicator.**

Key words: **role transition; clinical leadership; clinical managers; management competencies; mentors.**

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Introduction

Within the hospital system, allied health is structured in a hierarchical model with clinicians employed at various grade levels. Allied health clinical grades range from one to four; one being the most junior to four being a clinical expert. Within this model, a grade three (senior clinician or team leader) is a position that has both a clinical load and team leadership components. Healthcare management has changed over time with increased decision-making being delegated to clinical managers and team leaders with little training, within a climate of decreased resources and a changing employment environment. [1]

Anecdotal evidence suggests that senior clinicians are not well prepared for their team leadership role, and that the transition to a senior clinician can be difficult. There has been limited research investigating the role transition from an allied health clinician to a team leader, with the literature predominantly focusing on senior management role transitions. [2-7]

This study investigated the experiences of allied health clinicians who have made the transition from a grade two clinician to a senior clinician and explored areas such as: personal experiences of the role transition; core competencies required for the role; education and training required for the transition; and the role of mentors in this process.

Role transitions

The work roles and responsibilities between grade two clinicians and senior clinicians can be quite different, with the latter performing additional team leadership and management tasks. Additional responsibilities in the study hospital's allied health position descriptions highlight additional responsibilities for a senior clinician position.

These include: advanced clinical skills; team leadership and monitoring of team activities; supervision of staff; development of research activities; staff development and training; management of a portfolio; assist in the development and monitoring of discipline's Key Performance Indicators (KPIs).

A study examining competencies required for a career move from a speech pathology clinician into management, reported that respondents felt they possessed the following attributes: effective written and verbal communication skills; being team focused; excellent problem solving abilities; and effective negotiation. Despite the above attributes, respondents indicated that they did not feel equipped in areas such as human resource management, administration, leadership, finances and strategy. The findings support the pursuit of post-graduate education and also highlighted the importance of a strong mentor in the career transition process. [3]

In a study evaluating a clinical leadership development program for hybrid clinician managers in a cancer therapy unit, results indicated that there were tensions between achieving clinical and management objectives. The managers also reported issues such as a lack of formal management training; dealing with tension in managing resource issues; requiring increased skills in the performance management of staff; and difficulties with managing the dual role of clinician and manager. [6] Despite a desire to spend more time in their clinical role, the managers acknowledged a need for training in management skills in order to undertake their role effectively.

In another study, which compared the transition from direct healthcare roles to those with considerable management responsibilities, it was found that the health professional's experience of the transition from a clinical to a management role was quite a difficult process, with participants reporting that they were often not well prepared for the transition. They also experienced: a lack of role clarity or ambiguity of the tasks required to do the job; issues with decision-making processes; lack of senior management support; and required the attainment of new skills such as negotiating and managing people. [7]

Methods

In this study, semi-structured in-depth interviews were used in order to obtain detailed information of clinician perspectives of their work roles. The interview guide consisted of a broad range of open-ended questions central to the study aims and was used to ensure consistency in the topic areas that were to be addressed. [9-11]

Participants were recruited from an acute or sub-acute setting of a large public hospital (Melbourne Health) in Victoria, Australia using a non-probability sampling technique, and were specifically selected in order to provide information relevant to the aims of the study. Selection criteria included allied health clinicians who had made the transition from a grade two to a senior clinician within a two year period. Eight participants met the selection criteria. The project did not aim to be generalised. Instead, its aim was to describe the processes involved in the phenomenon, rather than its distribution. A sample will aim, for example, to identify the cases that will provide full and sophisticated understanding of all aspects of the phenomenon. [9] A specific type of non-probability sampling is that of criterion sampling which is a technique that aims to select cases that meet the selection criteria [12] and that it 'will provide detailed rich data'. [11, p. 10]

The clinicians were employed in the disciplines of Dietetics; Occupational Therapy; Physiotherapy and Social Work and their years of experience ranged from five to 22 years. Consent were obtained from all the participants and the data were de-identified. The study was reviewed by Melbourne Health's Human Research Ethics Committee.

Various methods were used to ensure the research was valid and reliable. [11-15] The semi-structured interview schedule was initially pilot tested with senior clinician one, then subsequently adopted for the study. Field notes were maintained throughout the research process to record observations, identify themes and highlight experiences. Qualitative interviews were recorded and transcribed verbatim. The data were manually coded and this allowed the researcher to narrowly define the content of large pieces of data and to define the information contained within them. [13]

A method of qualitative investigation utilised predominantly in the field of psychology is that of Interpretative Phenomenological Analysis (IPA). The purpose of this methodology is to obtain detailed information in relation to the phenomena being investigated from the point of view of the participants, and includes their personal perceptions or account of the area of investigation. [16] Findings and results are presented according to conceptual themes, using responses obtained from participants to illustrate their role transition experiences.

Results

Six themes emerged through the conceptual analysis of the data. These themes are: role transition; role clarity; core competencies; training and education; decision-making; and mentorship, which are discussed below.

Role transition

All of the clinicians reflected on the role transition and in most cases, it was a difficult one. There were significant role differences and additional responsibilities as a senior clinician, and these tasks included: recruitment of new staff; managing staff performance issues; supervising a large number of staff; leading a team; leading a portfolio group or projects; and managing staff shortages. The clinicians also reported that there was a lack of a comprehensive orientation program and time to learn the new role, which would have aided in the transition. The majority of the clinicians had minimal knowledge of expectations to undertake the role, and were required to pick up a clinical case load immediately. Some clinicians reported that the time with the manager was limited also making the transition difficult:

> *I think as you get higher, the expectations of each person and the amount to do is a lot more . . . going to the three felt like I was a bit more on my own and I was certainly having to manage areas where I hadn't personally worked.* **(SC5)**

> *. . . I felt was a big jump . . . you suddenly have to make these decisions, but before you go from having not a lot of responsibility to sometimes being the buck stops with you almost . . . I didn't realise the impact or how much your clinical stuff just has to take a back burner at times . . . it feels like the non-clinical stuff just is more encompassing cause it's harder and more challenging and you feel like you don't know what you're doing sometimes and it's time consuming . . . the clinical stuff comes so easily.* **(SC 8)**

Two senior clinicians felt that they had some form of preparation for the role transition due to the support of their clinical supervisor who also encouraged them to undertake additional leadership roles or tasks whilst working as a grade two clinician:

> *I think that if people are expressing that they want to be a grade three, that the preparation starts well before they actually get the position and I've been lucky enough that I had that but if I didn't have that, stepping into a grade three without already have been running a portfolio or helping (manager) with a lot of those sort of things, I would have been absolutely out of my depth . . . the past two years has [sic] been part of my performance appraisal to bridge the gap between a grade two and a grade three . . .* **(SC2)**

Role clarity

The lack of role clarity was highlighted as another challenging experience, with five of the clinicians reporting a lack of clarity in relation to the non-clinical component of their work. There appeared to be a blur between what was considered the line manager's role and the senior clinician's role. Examples included management of industrial processes, recruitment, and dealing with senior executives:

> *I know that there's job descriptions for the roles, but also as with anything I think different senior clinicians do things differently and probably have different ideas about what they think their role is? I don't know how well that's necessarily defined across the board. It's not always clear as to what is expected of you . . .* **(SC5)**

Core competencies

All clinicians reported that their role was wide and varied and encompassed competencies such as: clinical expertise; possession of advanced communication and leadership skills; supervision of staff and students; managing a team; being a team motivator; maintaining and developing strategic goals; and working in multidisciplinary teams. All of the participants reported that they had the clinical expertise to undertake a senior clinician role:

> *Leadership I think is one of the major competencies; being able to manage the performance of staff so that they can realise their full potential; being able to communicate really effectively with staff so that you can find out what their training needs are and where they're at and what their strengths are and also to relay to them what the organisational requirements are . . . I think also being able to communicate and work well with senior management, to be able to plan and set objectives; to be able to supervise staff and to be able to manage conflict . . .* **(SC6)**

Training and education

This was an area that received considerable focus. All of the participants felt well prepared for the role in terms of their clinical expertise, however, less prepared in the non-clinical areas such as staff recruitment, managing and leading a large team, and dealing with difficult team members. Most of the training was 'on the job' with the development of leadership skills over time. The hospital provided limited training to facilitate the role transition and the development of leadership skills:

> *I think probably the biggest challenge I've found is staff management and just when perhaps staff are not performing . . . management of staff and challenging behaviours is an area that I really feel that I am lacking and need to get better equipped to do . . . sometimes there isn't the support I would*

like to see in terms of recognising that you need to have specialised leadership skills and that there should be some more training in that area . . . **(SC 4)**

Only two participants undertook formal external leadership training, which they reported was most beneficial for the transition to a team leader role and also in other tasks such as interviewing and recruitment:

I did a certificate 4 in front line management which was actually really useful in terms of thinking about teams and how team dynamics work and leadership . . . these skills aren't taught from a clinical perspective and really quite important if you want to have a really functioning team. **(SC 5)**

Decision-making

Half of the participants highlighted the fact that a senior clinician role entails making difficult decisions which at times needed to be done without consultation or without management support. The examples of difficult decisions included: staffing and covering service gaps; approval of leave; industrial issues; and staff performance issues:

. . . making those bigger decisions . . . and just having to do that on the run and not always having somebody to check in with . . . but certainly early on there were lots of times when I felt really unsure about the decision I should be making and whether I should be making that decision as opposed to somebody else . . . before you go from not having a lot of responsibility to sometimes being the buck stops with you almost. **(SC 8)**

Mentorship

Participants talked about the significant role that a mentor had in facilitating their role transition. Allied health managers take on the role of mentor within the supervision structure of senior clinicians and given that the managers were not directly involved in the study, it is difficult to ascertain if any of the managers had formal mentoring training. The seniors reported that mentoring aided with team management; facilitating decision-making; reflecting on clinical practice; discussion of organisational requirements and an avenue to de-brief in relation to difficult encounters or situations:

Sometimes it's just being able to talk to somebody about frustrations...to be a sounding board and maybe help come up with some solutions and options . . . I really respected the fact that she was very aware of my strengths and weaknesses and was able to challenge me to grow in different areas and take on different challenges . . . **(SC 4)**

I think our manager was fabulous and she was certainly my mentor . . . initially I really just needed that reassurance that what I was doing was kind of OK and I guess in a mentor, just being really supportive and giving feedback that's constructive but honest as well... challenging but it didn't feel like challenging it felt like it was just like developing. . . **(SC8)**

Discussion

From a clinical expertise perspective, the senior clinicians felt that they were well prepared for their role transition with providing clinical expertise to their junior team members. They reported being less prepared from a non-clinical perspective, especially in areas such as recruitment of new staff, team leadership and dealing with difficult staff or staff performance issues. The senior clinicians reflected an element of surprise that their prior clinical experience had not prepared them for the non-clinical component of their work, and this theme received considerable focus. The clinicians found that the role transition was difficult in the early stages of their new role especially with their increased team leadership responsibilities; lack of role clarity; the need to make difficult decisions; and perceived knowledge gaps in dealing with difficult team members. These findings are consistent with other studies that had found that participants did not feel adequately prepared in areas such as human resource management; leadership; role clarity or ambiguity; and issues with decision-making processes. [3,7] The senior clinicians reflected that a more comprehensive orientation program and additional 'one-on-one' time with the line manager would have been beneficial in the transition process. Only two of the senior clinicians reported being prepared for their role as they had previously been involved in taking on leadership responsibilities with the support of their clinical supervisor.

The majority of the clinicians had limited training in the areas of recruitment, leadership and management of teams. In most cases, undergraduate training was helpful with clinical supervision of junior staff but not in the overall leadership aspect of the role. Leadership was cited as a core competency by all of the clinicians; however, only two of the clinicians had undertaken formal leadership training and reported that they were prepared for their role. Consistent with the findings of other studies, formal leadership training is beneficial which includes involvement in formal management courses and post-graduate studies. [6,7]

Furthermore, the clinicians reported that the organisation did not provide any training in leadership, recruitment, performance appraisals or performance management. In the area of management training, it was reported that education resources in the public health sector are limited unlike the experience of managers in non-health private industries, who tend to have organisational funding for training. [18]

Healthcare professionals are expected to self fund their own continuing education, within their own time. [19]

The lack of role clarity was a concern for the clinicians especially in decision-making processes. Some clinicians indicated that they were required to make important decisions in isolation stating that 'the buck stops' with them. The participants felt that despite having the support of their managers, there was the sense that they were required to make difficult decisions with limited consultation. This is consistent with the literature reporting devolution of management and decision making to clinical managers and team leaders in the healthcare sector, with these leaders having limited training and support. [1]

The role of a mentor was viewed as essential in the role transition process. All of the clinicians indicated that their discipline manager was their mentor with some also citing peers as an additional source of support. The mentor was an invaluable source of support early on in the transition, and also in the provision of ongoing support in areas such as leadership and ongoing decision-making processes. Yukl reported that there is a growing interest in formal mentoring programs to facilitate management development. Mentors can facilitate adjustment, learning, and stress reduction during difficult job transitions. [8] Despite having the support of a good mentor, the transition to a senior clinician role was viewed as a difficult one. Unlike the experiences of managers in a previous study, [7] the majority of the senior clinicians in this study reported feeling supported by their manager or mentor when making the senior role transition.

Conclusion

This study offers valuable insights into the experiences of senior clinicians who have made the transition from a grade two clinician. The key findings from the study indicate that progressing to a senior clinician role is a difficult step despite having clinical expertise in a particular allied health discipline. The importance of a comprehensive orientation or induction program was highlighted as being essential to prepare for the requirements of the new role. The clinicians highlighted the need for training in areas such as team leadership and management of teams. Skills were gained during their employment in the senior clinician role with most of their learning through 'on the job' training. The mentor was viewed as essential in the role transition process.

Further research could investigate the experiences of allied health clinicians that have made the transition from grade one to grade two, with a comparison with the senior clinician experience. Allied health managers could also be interviewed to obtain an insight into their perceptions of the various allied health role transitions. Further study could also investigate and facilitate the development of a training needs analysis of allied health clinicians and aid in the development of an appropriate training program.

Competing interests

The author declares that she has no competing interests.

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Community Health Clinicians Prepare for an E-Health Future

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Abstract

With an increasing focus on e-Health, mobile technologies play a significant role in enabling information management at the point of care, which was integral to a new health precinct and associated models of care. This health precinct was being built in a northern suburb of Brisbane in Queensland, Australia.

In 2006, an Information Management Project was established under the governance of a formal project management methodology. The objective of the Information Management Project was to identify and deliver innovative and sustainable Information Communication Technologies (ICT) solutions, such as introducing mobile technologies, and to pave the way to an e-Health future for community health clinicians.

Stakeholder consultation was an integral part of the project involving clinicians, administrative, technical, and management staff. During the planning phase of the project this consultation was essential to embed an implementation approach that was owned by the business.

A range of service delivery processes were identified for evaluation. Lean thinking tools were used to compare the end-to-end path for these processes using the traditional models and the mobile technology model. Early results have seen a saving in clinical and administrative time in being able to respond immediately to the clients needs at the time of service.

This project focused on a business integrated approach as technology alone would not deliver a sustainable solution. There are still a number of challenges to be addressed before broader implementation, particularly the need to review policies to achieve a more equitable alignment between strategic and operational requirements.

Abbreviations: **ICT – Information Communication Technologies; OH&S – Occupational Health and Safety; PMBOK – Project Management Body of Knowledge.**

Key words: **change management; e-health; communication technology; lean thinking; mobile technologies; project management.**

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1. Introduction

This paper reports on the implementation process of mobile Information and Communication Technologies (ICT) to support an e-Health future for community health clinicians. A project was undertaken for a new health precinct delivering primary and community health services to a population from the northern suburbs of Brisbane, Queensland, Australia.

Enabling information management at the point of care is supported in the *Individual Electronic Health Record Consultation Report* by the National E-Health Transition Authority. [1] An Information Management Project was established in 2006 to identify and deliver innovative and sustainable ICT solutions for a new health precinct. This project was also seen as an avenue to prepare a culture to embrace an e-Health environment.

Both the Project Sponsor and Project Manager recognised that this would be a complex project requiring the use of formalised project management methodology. The Project Manager was completing qualifications and met the requirements set by the Australian Institute of Project Management as a Master Project Director. [2] Processes and tools used to plan, organise, monitor, and control all areas

of the project were based on the nine knowledge areas of Project Management Body of Knowledge (PMBOK). [3]

These nine knowledge areas are:

1. Integration Management
2. Scope Management
3. Time Management
4. Cost Management
5. Quality Management
6. Human Resource Management
7. Communications Management
8. Risk Management
9. Procurement Management.

An overarching project steering committee was established early in the project chaired by the Project Sponsor who was the Executive Director of the business area. Representatives from management, clinical, and technical support staff made up the full membership of this committee.

The Project needed to identify innovative ICT solutions to support the delivery of multidisciplinary focused models of care which included other community health services, general practitioners and acute services.

Intense key stakeholder consultation was undertaken in the form of discipline specific and multidisciplinary workshops where potential issues with using mobile technologies were discussed. The key issues that needed to be addressed included:

- Replacing the current client information management system used by the community health service. The current system was incapable of meeting new business processes, unable to meet mandatory reporting requirements, and not accessible across a wide area network or via remote access.
- Redesigning paper based clinical forms to electronic formats.
- Facilitating printing of key documents at the point of care. For example, forms that needed to be signed by the client in order to process.
- Managing organisational change from a traditional service delivery culture to a electronic technology-based service delivery.
- Ensuring technology met occupational health and safety regulations. For example, the issue of plugging a piece of technology into an untested socket.
- Maximising client engagement by using the technology 'with' the client and not creating a barrier.

2. Addressing the issues

Given the limited mobile technology solutions available within the community health environment of Queensland and the time constraints to delivery solutions, the Project Manager attended the 2006 Health Informatics Conference in Sydney, Australia, to fast track an informal market scan and research. There was also a large range of presentations, networking opportunities and leading ICT vendor demonstrations from Australia and overseas. One presentation in particular on 'Mobile Information Access and Diffusion in an Ambulatory Care Service Setting' outlined how a project that was technically straightforward, required significant organisational realignment in order to maximise success. [4]

The Project Manager also conducted an informal review of mobile tablets implemented as a trial with an ambulatory care service at a local hospital. This team had been trialing two different types of tablets using the existing local wireless network within the hospital. Ad hoc meetings were held with users to gather feedback and identify lessons learnt. Feedback from technical staff and clinicians were not favourable and highlighted key areas for change. These were:

- The ratio of tablets needed to align with the service delivery model so that all clinicians had access to the right device at the right time.
- To access the required information on-line means that wireless wide area network access is a must.
- To provide printed information for clients at the time of service delivery requires the inclusion of portable printing in the solution.
- Technology support is only part of what is needed for this type of solution to be sustainable and for the benefits to be realised. It was evident that the business needs to invest in a business-focused system manager position to provide the end user training and continual business process redesign.

Positive feedback from clinicians included:

- The 15 inch screen size was an enabler for on-line information to be easily viewed by clients and was seen as a strategy to engage the client in the process to self management.
- The convertible laptop style tablet which provided the flexibility to switch between touch screen and keyboard typing was preferred by clinicians.

3. Defining the Mobile Technologies Project

After the review and research, a business case was prepared and presented to the Project Steering Committee recommending mobile technologies as one solution to enable information management at the point of care.

The Project Manager stressed that this project would need to focus on organisational change as much as the technology component. Clinical and administrative stakeholder consultation was undertaken to identify current business processes and the changes needed as a result of introducing mobile technologies.

4. Organisational change management

The Mobile Technologies Project created an opportunity for significant changes in the way clinical services would be delivered in community settings. The Project Manager drew on strategies from a two-day workshop attended in 2006 on 'Learning to Lead Change'. [5] As a change leader, the Project Manager recognised the importance of engaging stakeholders earlier and put effort into understanding the change implications for various points of view. Senge's five disciplines theory of Systems Thinking; Personal Mastery; Mental Models; Building shared Vision; and Team Learning supported this strategy. [6]

During the time of the Mobile Technologies Project there were multiple organisation changes occurring concurrently. This meant that the communication plan for the Mobile Technologies Project needed to consider all of the changes and how they would impact and be impacted by the Mobile Technologies Project. The major changes included an organisational restructure, replacement of the core client information system, and the introduction of new models of care. The Project Sponsor was across all of these major changes and provided the leadership, communication, and management skills needed to balance competing priorities within a strategic alignment.

Communication was a high priority for the Project Manager and was a key to the success of the entire project. Diane Altwies supports change success being more likely when project managers focus on communication. [7 p. 2]

Understanding the perceptions and expectations of users prior to full implementation of the Mobile Technologies Project was gained by the use of a structured form-based survey. Survey results could inform areas for improvement in a proactive approach. The survey incorporated sub scales as a measure of user acceptance based on the Groupware Adoption Scale: a measure of employee acceptance [8] including ease of use, training, technical support, consultation, work needs met, and system capabilities. Users rated according to a five point level for associated questions with one being disagree completely through to five being agree completely. A total of 23 surveys were sent out with 91% returned. The lowest scoring question was in the area of system capabilities, promoting further investigation with the users to better understand the issues and put actions into place to address those issues that needed addressing prior to full implementation.

4.1 Mobile technologies

Mobile technologies was only one piece of the ICT requirements for the new health precinct. Identifying a balanced approach to provide the right technology at the point of care, wherever that may be, for example clinics within the Health Precinct facility, General Practices, client homes, schools, and shopping centres. A balanced and transparent approach in the allocation of ICT resources would maximise the right access to information at the point of care. The process for this allocation was developed and an Information Management Service Profile documented outline the type of services being provided and the type of ICT technologies required.

There were 20 mobile technology 'kits' introduced to support service delivery away from the health precinct. The kits included a tablet that converts to a laptop style device for standard keyboard typing, an additional battery to enable a full day of battery operated power, a battery operated portable printer, a remote wireless wide area network device, and a portable yet robust bag on wheels to store the technical components and accessories. The accessories included laminated step-by-step instructional sheets and a hard plastic folder with paper for printing.

4.2 Occupational Health and Safety Requirements

Occupational Health and Safety (OH&S) was addressed as part of the Mobile Technologies Project. With clinicians and administrative support staff being involved in the project from the outset, they were able to be proactive in the operational decision-making. The mobile kits would be pooled and booked through the administrative staff. The initial implementation would support over 30 clinicians with an expected growth in kits and clinicians as services expanded.

Clinicians raised two key OH&S issues for consideration. The first requirement was transporting options for the mobile technologies between the health precinct, car, off-site location and back again. The clinicians pointed out that the transporting of the mobile technologies would need to

consider hazardous manual tasks as outlined in the National Standard for Manual Tasks. [9 p. 5] Key clinicians investigated and recommended the purchase of a lightweight, robust storage bag with wheels, and an additional service-specific bag to enable the total weight of the mobile technologies and accessories to be lifted in separately.

The second consideration was to eliminate the need for power cords to operate the tablet and printer when providing services away for the Health Precinct facility, particularly in client homes. The use of battery powered tablets and printers were purchased as the solution. These two OH&S considerations may seem simplistic however were very important in increasing the level of acceptance by the clinicians.

4.3 Core information systems

Having the core information system to needed to support the clinician at the point of care will play a significant role in the overall usability of the mobile technologies.

The main client information management system in use by primary and community health services did not operate over the wireless wide area network. A project was in progress to replace this system to meet the needs of the new health precinct. The replacement system would provide the electronic scheduling and activity data collection the clinicians needed to support their service delivery while with the client.

The remaining core systems that could be accessed over the wireless wide area network included pathology, medication information, decision support systems, and electronic processing of internal referrals. Internet access was also important particularly for opportunistic health information provision and accessing vendor sites to confirm clinical equipment.

4.4 End user testing

End user testing of the new mobile technologies was tedious however this process bedded down the technology before implementation. Clinicians were actively involved in the technology configuration and end user testing, again adding credibility to the implementation process. During this process the Project Manager acted as the conduit between the clinicians and the technology officers. This meant that many of the barriers were overcome by relaying messages to each group in a language that they were familiar with.

4.5 Business process redesign

To maximise the successful implementation of this mobile technologies project, it needed to focus on business redesign and not technology alone. Stakeholder workshops were held to identify current business processes to deliver services to clients away from the health precinct facility. The principles and tools used to review these business processes were from a lean thinking approach which aims to disentangle the various forms of waste and tackle their root causes. [10 p 10] This process focused on improving the end-to-end process through the introduction of mobile technologies. The key areas identified for redesign were:

- Converting manual assessment forms and care plans to electronic templates for typing with the client.
- Changing from manual tentative appointment scheduling, to on-line immediately confirmed appointment scheduling with the client at the point of care.
- Accessing all necessary plan and opportunistic health information at the time of the appointment.
- Printing all key information for the client at the point of care.

Clinicians led the way in converting many of the manual forms to electronic formats further supporting credibility and clinician acceptance of the project.

4.6 Training

The Project Support Officer developed a training program offering a variety of options. Combinations of these options were used to maximise sustainable learning. Clinicians also had input into the development of the training tools. The training program included:

- Step by step 'How To' sheets which were laminated and stored in the mobile technology kit for easy access at the time of use.
- A detailed User Manual used at the time of hands-on group training sessions.
- Follow-up training sessions were available for individuals at the workplace to target specific areas of need as required.

4.7 Sustainability

It was identified that more than technical support would be required for this mobile technology solution. To be operationally sustainable and the benefits realised, approval was given for the recruitment of a permanent business focused Information Systems Support Officer position. This position was appointed prior to the completion of the project so that a transfer of knowledge could be progressively provided by the Project Support Officer. A System Management Plan was developed as part of the handover so that documented processes were in place to maximise sustainability after project completion.

Results

Lean thinking tools were used to compare end-to-end processes in the traditional model of service delivery to the mobile technologies model. Early results of this evaluation have been documented in (Table 1) showing benefits to clinicians, other health care providers, administrative staff, management and clients.

6. Limitations

To implement this type of solution throughout a large community health organisation a number of key limitations need to be considered.

The wireless broadband network and access devices do not provide full connectivity in some areas, however, there is national priority to expand and continually improve this service.

Internal issues focus more on information technology and security policies, and the review of these are needed to ensure they reflect the new operational requirements as recurrent costs and management processes for the business can be significant and unworkable if a black and white approach is taken to meet security requirements.

7. Conclusions

To achieve a business integrated technology solution it was important to manage it as a change project with a major technology component focusing on organisational change management.

Evaluation of this project as a more formal research project would be valuable to inform community health services when preparing for an e-Health future.

Competing interests

The author declares that she has no competing interests.

Table 1: Results of evaluation

Business Process	Without Mobile Technologies	With Mobile Technologies
Completing assessment forms and care plans	Clinicians or administrative staff print manual forms prior to leaving the office. Clinicians manually complete these with the client and then take back to the office. Clinicians or administrative staff photocopy and send to the client for their records.	Core assessment forms and care plans are now being electronically completed by the clinician in real time with the client and many fields can be auto completed. A copy is printed for the client at the point of care.
Making follow up appointment with a client while home visiting	Clinicians use either a manual diary or in some cases an electronic diary that is printed before leaving for home visits. These diaries are usually individual specific and not accessible by other key staff. When the clinician returns to the office appointments are cross referenced with appointments made while away from the office. In many cases appointments are not made and phone messages are left by the administrative staff for the clinician to schedule these appointments when back at the office.	Clinicians confirm real time appointments with the client and have the ability to cross reference with other clinician diaries where multidisciplinary services are being provided.
Recording activity data	Clinician records activity in a manual diary and upon returning to the office the data are entered by the clinician or administrative staff.	Real time recording of activity data by the clinician once only thereby increasing accuracy and timeliness.
Promoting opportunistic health information with the client	Anticipated health information is printed by the clinician or administrative staff prior to a home visits. Additional information identified during the home visit is printed and sent to the client after the home visit.	On-line access to key health information is available to the clinicians at the point of care and printing capabilities at the point of care provide immediate information for the clients.

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RESEARCH ARTICLE

Types of Crises Experienced by Health Organisations

D V Canyon, A Adhikari, T Cordery, P Giguere-Simmonds, J Huang, H Nguyen, M Watson and D Yang

Abstract

Introduction: Changes in modern society have resulted in an increasing need for organisations to protect themselves, their employees and their interests from diverse risks and threats that include terrorism, litigation and threats to personal safety and reputation. This study aimed to investigate the occurrence of such crises to inform organisational planning and preparedness and to update managers on the types of crises likely to confront them.

Method: This study collected data from Chief Executive Officers or other key decision-makers from 2007 to 2008, on several categories of crisis types as experienced by five chiropractic practices, eight physiotherapy practices, five podiatry practices, five aged care facilities, six dental practices, 19 hospitals, 11 medical centres and 18 pharmacies.

Results: Hospitals experienced significantly more crises than other organisations apart from chiropractic practices and pharmacies. Dental clinics were disproportionately crisis prone in some areas and podiatry was the least crisis prone. Overall, product recalls occurred three to ten times more than most other types.

Conclusion: A large amount of variance in the number and type of crises experienced between different organisations was observed although specific types of crises were increasingly associated with diminished organisational size.

Abbreviations: CEO – Chief Executive Officer; IPI – Incidents Per Institution; SARS – Severe Acute Respiratory Syndrome.

Key words: crisis types; hospital crises; allied health crises.

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Introduction

Increasing complexity in our environment is expected to produce more frequent and cumulative crises in organisations. [1] Indeed, trends in human-caused crises have increased exponentially over the course of the 20th century resulting in hospitals and other health organisations being challenged more frequently. [2] A crisis is defined here as 'any event or condition that threatens the survival of the organisation'. [3] Health organisations quickly learn to deal with such events efficiently and humanely, [4] however, preparation typically focuses on events that have been experienced rather than on a sensible range of possibilities that may include the unexpected. [5] As a result, health organisations may implement a suboptimal allocation of resources, leading to loss of life and a lack of public confidence in the wider healthcare system.

While hospitals and other health centres are perhaps geared more highly for managing crises, aspects of major hospitals in Australia and their surrounding regions such as their strong culture, geographical isolation, large catchment areas and the homogeneity of surrounding communities, may render them susceptible to future crises that could severely test and demoralise the system. The extent to which our health organisations experience a broader set of social

crises is unknown. Smaller health entities, such as medical clinics, pharmacies and other allied health organisations constitute an important part of the holistic approach to crisis management, and encounter their own specific set of challenges and threats to function. Since local health providers are among the first agencies to respond to any wider public emergency, it is imperative that they are able to maintain core functions and to lead, as well as support, major health sectors when responding to widespread crises. [6]

The level of crisis preparedness within and between organisations varies from inadequate and reactive to better-than-compliant and proactive. Some organisations possess little or no crisis preparedness where there are no emergency contingencies to deal with crises. Others exhibit basic preparation for natural disasters, fires, bomb threats, epidemics, blackouts and the like. Others still are more thoroughly prepared with infrastructure in place to face a wide variety of threats to core business and technologies. Few organisations are prepared to deal, both systematically and systemically, with a wide range of potential crises. [5] This variation in preparedness is undesirable and stems from the fact that organisations typically employ an ad-hoc, reactive approach to crisis management rather than enabling it by making it integral and systemic. This is important because crises are largely due to systemic deficiencies and rarely have a single cause. [7] In addition, the consequences of many natural disasters are exacerbated by human activity or poor preparation. [8] A lack of adequate crisis preparedness may lead to infrastructure collapse, diminished function, impaired outcomes for patients and lack of safety for staff and patients.

Changes within the structure of Australian society have resulted in an increasing need for companies to protect themselves, their employees and their interests from perceived threats. These threats are diverse, and include terrorism, litigation and threats to personal safety and reputation. This emphasises the need for developing and implementing systemic strategies for crisis management and control, but little insight has been obtained into the types of crises that are commonly experienced in health and allied health organisations. This study investigated the types of crises experienced by hospitals, medical clinics, pharmacies, physiotherapy practices, chiropractic practices, podiatry practices, dental practices and nursing homes with the aims of i) investigating the occurrence of such crises to inform organisational planning and preparedness; ii) updating managers on the types of crises likely to confront them; and iii) creating baseline data upon which further crisis management studies may rely.

Materials and method

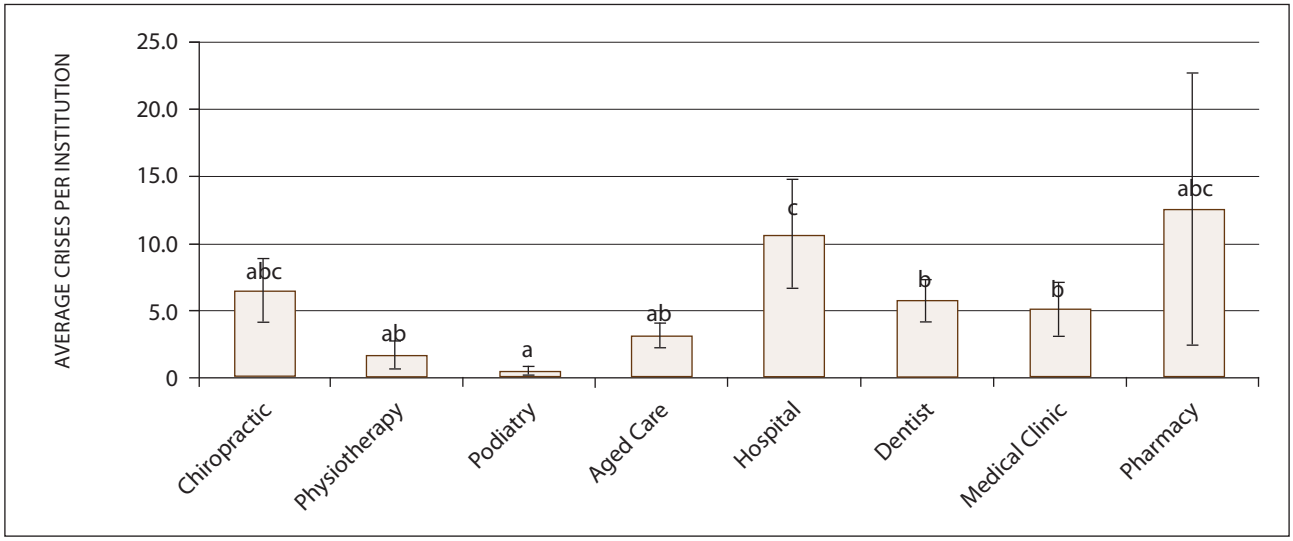
A sample of potential organisations was randomly selected from public directories of health services in Australia with final participants including five chiropractic practices, eight physiotherapy practices, five podiatry practices, five aged care facilities, six dental practices, 19 hospitals, 11 medical centres and 18 pharmacies. The survey was conducted from mid-2007 until mid-2008 by telephone and face-to-face interviews. An acceptable participation rate of 40% was achieved and this limit was due to an inability to contact prospective participants, time constraints, organisational confidentiality requirements regarding ongoing crises and legal proceedings, and personal perceptions of the contact. Interviewees were preferentially the Chief Executive Officer (CEO) or members of the organisation's crisis management team, if it existed. When they were unavailable, practice managers or other decision-making executives were interviewed. In the interests of standardisation, interviewers followed strict protocol during the interview and interviewees were assured anonymity. Ethics approval H2522 was obtained from the Ethics Committee at James Cook University.

A questionnaire based on elements in a Crisis Management Audit developed by Professor Ian Mitroff [5] was used to collect data on the occurrence of various types of crises that have been experienced in the last three years. This tool was selected because it has been successfully used to audit many of the Fortune 500 companies in the United States. Crisis types included: product recalls, product/service tampering, employee sabotage, fires, explosions, chemical spills, environmental disasters, significant drop in revenues, natural disasters, loss of confidential/sensitive information, major lawsuits, terrorist attacks, and damage to corporate reputation. The data were analysed with SPSS for Windows version 18 using One-way ANOVA variance and Duncan post-hoc tests.

Results

In this study, 77 health organisations reported experiencing a total of 588 crises over a three-year period (Fig. 1). A Oneway ANOVA showed a statistically significant difference in the mean values between health organisations ($F=2.126$, $p<0.05$). The data were broken down into a sum per institution per crisis type (Fig. 2). A Oneway ANOVA showed a statistically significant difference in the mean values between crisis types ($F=3.050$, $p<0.01$).

Figure 1: Average total number of crises experienced over a three-year period by each institution within the different health organisations. Columns with the same alphanumeric are not significantly different.



Product recall incidents were the most common type of crisis with 61% of all organisations experiencing them during a three-year period. A Oneway ANOVA revealed a statistically significant difference in the mean values for incidents of this type across all health organisations ($F=12.098$, $p<0.001$) (Table 1). Over 50% of chiropractic practices, hospitals and clinics and all pharmacies organisations experienced product recall.

Product tampering incidents were recorded for 23.4% of all health organisations, but were fairly rare in most. However, 40% of chiropractic and 61% of pharmacy organisations noted this crisis type. A Oneway ANOVA revealed a statistically significant difference in the mean values for incidents of this type across all health organisations ($F=2.249$, $p<0.05$), however the Duncan's post-hoc test revealed no significant differences between organisations.

Employee sabotage incidents were recorded for 19.5% of all health organisations. While fairly rare in most organisations, 31.6% of hospitals experienced this crisis type. A Oneway ANOVA revealed no statistically significant difference in the mean values for incidents of this type across all health organisations ($p>0.05$).

Incidents involving fires, explosions and chemical spills were recorded for 20.8% of all health organisations and were more of a concern for hospitals and dental clinics, which experienced more of this crisis type. A Oneway ANOVA revealed a statistically significant difference in the

Figure 2: Average number of crises in different crisis areas as experienced over a three-year period by each institution.

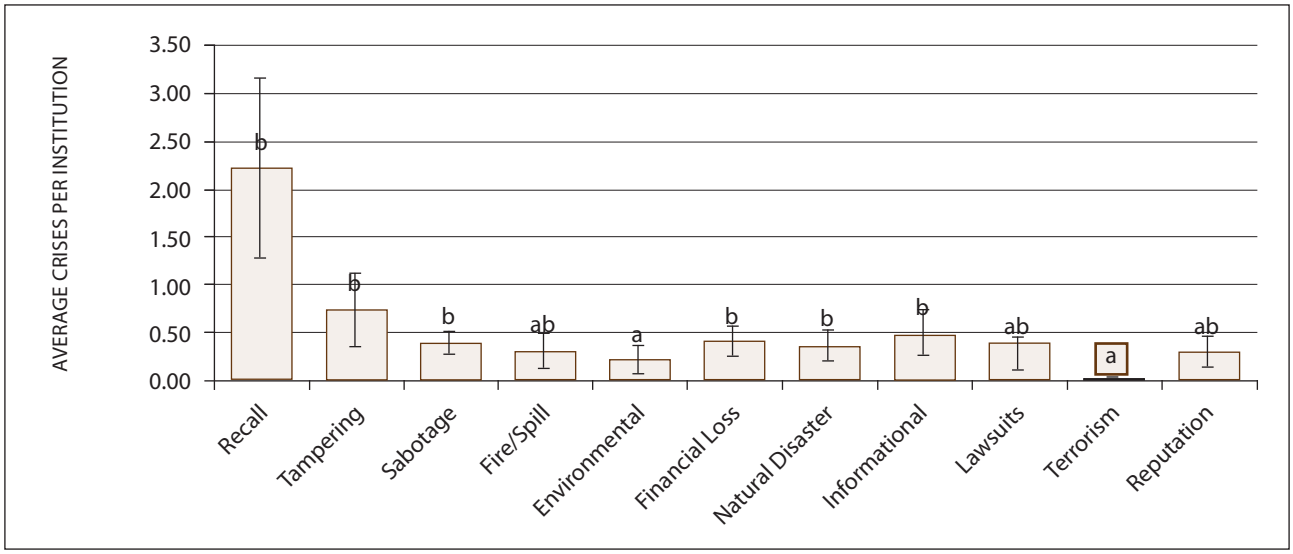


Table 1: Mean numbers of crisis incidents experienced by health organisations during a three-year period, and percentages of organisations experiencing these types of crises.

Health Organisation	Health and allied health organisations that have experienced the following crisis types															
	Product recall		Product tampering		Employee sabotage		Chemical spill or incendiary		Significant revenue drop		Natural disasters		Loss of sensitive information		Damage to reputation	
	Mean±SE	%	Mean±SE	%	Mean±SE	%	Mean±SE	%	Mean±SE	%	Mean±SE	%	Mean±SE	%	Mean±SE	%
Chiropractic	2.80±1.59[ab]	60.0	2.40±1.94	40.0	0.20±0.20	20.0	0.00±0.00	0.0	0.20±0.20	20.0	0.00±0.00	0.0	0.00±0.00	0.0	1.00±1.00	20.0
Physiotherapy	0.13±0.13[a]	12.5	0.00±0.00	0.0	0.00±0.00	0.0	0.13±0.13	12.5	1.25±0.45	62.5	0.00±0.00	0.0	0.13±0.13	12.5	0.13±0.13	12.5
Podiatry	0.40±0.40[ab]	20.0	0.00±0.00	0.0	0.20±0.20	20.0	0.00±0.00	0.0	0.00±0.00	0.0	0.00±0.00	0.0	0.00±0.00	0.0	0.00±0.00	0.0
Aged Care	0.60±0.60[ab]	20.0	0.00±0.00	0.0	0.60±0.60	20.0	0.20±0.20	20.0	0.80±0.49	40.0	1.00±1.00	20.0	0.00±0.00	0.0	0.00±0.00	0.0
Hospital	3.58±0.87[b]	63.2	0.79±0.54	15.8	0.95±0.55	31.6	1.58±0.58	47.4	0.68±0.41	15.8	0.21±0.16	10.5	0.58±0.40	10.5	1.05±0.41	42.1
Dental Clinic	0.67±0.42[ab]	33.3	0.17±0.17	16.7	0.83±0.83	16.7	0.33±0.21	33.3	0.17±0.17	16.7	0.00±0.00	0.0	2.00±1.63	33.3	0.17±0.17	16.5
Medical Centre	1.64±0.39[ab]	81.8	0.90±0.09	9.1	0.18±0.12	18.2	0.09±0.09	9.1	0.00±0.00	0.00	0.91±0.50	36.4	1.00±0.91	18.2	0.00±0.00	0.0
Pharmacy	8.00±0.75[c]	100.0	2.50±0.77	61.1	0.22±0.13	16.7	0.17±0.12	11.1	0.28±0.16	16.7	0.83±0.57	22.2	0.28±0.14	22.2	0.11±0.08	11.1
Total	**3.30±0.44**	**61.0**	**0.96±0.28**	**23.4**	**0.44±0.16**	**19.5**	**0.49±0.16**	**20.8**	**0.44±0.13**	**19.5**	**0.44±0.17**	**14.3**	**0.52±0.21**	**14.3**	**0.38±0.13**	**16.9**

* Means for each health organisation were significantly different if they contained different subscripted letters as determined by Duncan's post-hoc test with alpha = 0.05.

mean values for incidents of this type across all health organisations ($F=4.134$, $p<0.05$), but Duncan's post-hoc test showed no significant differences between organisations.

Incidents involving environmental disasters were recorded for 11.7% of all health organisations. Of note, 5.6% of pharmacies (mean 0.11 [-0.12 - 0.35] ± 0.111 SE), 21.2% of hospitals (0.53 [-0.16 - 1.21] ± 0.328 SE) and 36.4% of medical clinics (1.18 [-0.81 - 3.17] ± 0.893 SE) experienced this crisis type. A Oneway ANOVA revealed no statistically significant difference in the mean values for incidents of this type across all health organisations ($p>0.05$).

Incidents involving significant revenue drops were recorded for 19.5% of all health organisations. Of note, 62.5% of physiotherapy and 40% of aged care institutions reported crises in this area. A Oneway ANOVA revealed no statistically significant difference in the mean values for incidents of this type across all health organisations ($p>0.05$).

Incidents of natural disasters were recorded for 14.3% of all health organisations and were relatively rare in all organisations except aged care and medical clinics. A Oneway ANOVA revealed no statistically significant difference in the mean values for incidents of this type across all health organisations ($p>0.05$).

Incidents involving the loss of confidential or sensitive information were recorded for 14.3% of all health organisations and were relatively rare in all organisations except medical clinics. A Oneway ANOVA revealed no statistically significant difference in the mean values for incidents of this type across all health organisations ($p>0.05$).

Incidents involving major lawsuits were recorded for 15.6% of all health organisations. This type of crisis was experienced by one medical clinic (mean 0.09 [-0.11 -0.29] ± 0.091 SE) and two pharmacies (mean 0.11 [-0.05 - 0.27] ± 0.076 SE), but was noted by 31.2% of hospitals (mean 0.74 [0.02 - 1.45] ± 0.341 SE) and 50% of dental clinics (mean 1.33 [-0.73 - 3.40] ± 0.803 SE). A Oneway ANOVA revealed no statistically significant difference in the mean values for incidents of this type across all health organisations, however a trend was indicated ($p=0.054$).

Only one incident involving a terrorist attack was recorded for a dental clinic. A Oneway ANOVA revealed no statistically significant difference in the mean values for incidents of this type across all health organisations, however a trend was indicated ($p=0.098$).

Incidents involving damage to institutional reputation were recorded for 16.9% of all health organisations and were rare in all organisations except hospitals. A Oneway ANOVA revealed no statistically significant difference in the mean values for incidents of this type across all health organisations, however a trend was indicated (p=0.080).

In summary, the number of actual crises experienced by health organisations was fairly low, but for each crisis type, certain organisations were clearly exposed to a higher level of risk.

Discussion

When looking at the average total number of crises experienced by each institution within the different health organisations (Figure 1), it is apparent that there is a large amount of variance in the number and type of crises experienced between different organisations. Although all organisations may experience crises of various types, the organisational nature of the health system mandates that different health organisations are likely to experience different types of crises and different consequences. Pharmacies were significantly more prone to crises than all other organisations apart from chiropractic practices and hospitals, while podiatry was the least crisis prone. When the average number of different types of crises per institution were analysed (Figure 2), the model was significant but there were few significant differences between types. Product recalls were a standout feature occurring three to ten times more often than most other types. More useful information arose when different health organisations were matched with the crisis types.

Product recalls are a common feature in the press since this crisis type may directly cause injury, illness or death. Organisations that do not have the administrative capacity to implement a recall may become insolvent overnight; even a limited recall may destroy or severely disrupt a small pharmacy or clinic's operations as a commercial entity. Pharmacies were significantly more likely to experience a product recall than other organisations with eight Incidents Per Institution (IPI) over a three-year period. Product recalls were also pronounced in chiropractic (2.8 IPI), hospital (3.58 IPI) and medical clinic (1.54 IPI) organisations (Table 1). Indeed, the product-provision aspect of many health services renders them vulnerable to this crisis type. Pharmacies are more likely to have normal operations disproportionately affected by major drug recalls from shelves or from the public. [9]

Similarly, pharmacies (2.5 IPI) and chiropractic practices (2.4 IPI) were more likely to experience product, equipment, or service tampering than other health organisations. There are many concerns about pharmaceutical security including supply chains, counterfeiting and terrorism [10,11] that are supported by these findings. Some medical staff have even been convicted of product tampering for the purpose of obtaining narcotics. [12] Each tampering incident, whether true or hoax, receives widespread publicity, resulting in 'dozens of new crimes, much consumer anxiety and challenges to companies struggling to sort the many false alarms from true risks to the public'. [13] Limiting product recalls due to suspect tampering, along with avoiding media publicity, can assist in minimising these secondary crises.

The incidence of major crises involving employee sabotage was fairly rare in all organisations, however hospitals and dental clinics experienced around one incident every three years. Security professionals believe detected incidents are merely the 'tip of the iceberg' and that organisations must take a humane approach to staff relations to limit this crisis type. [14] Less obvious sabotage commonly assumes many forms ranging from misuse of time, space, resources and information. [15]

Hospitals were more likely to experience fire, explosion or chemical spill incidents than other organisations (1.58 IPI), however, a third of dental practices also experienced this crisis type. This is likely to be a result of the size and level of infrastructure in hospital sites. [16] Smaller health organisations do not generally deal with radioactive substances, generator fuel and incinerators on a daily basis and so are less exposed to potentially hazardous incendiary and chemical spill incidents.

Incidents due to environmental disasters were very low for all organisations except medical clinics (1.18 IPI). In Australia, general practice includes over 33,700 practitioners and is the essence of the primary healthcare system. On a local level, medical clinics are confronted with the initial stirrings of most crises before hospitals become involved. During the outbreak of Severe Acute Respiratory Syndrome (SARS) in the period November 2002 – July 2003, 7.4% of general practices in Hong Kong and 37.5% of those in Canada ceased to operate. This caused a bottleneck in healthcare demand resulting in a series of secondary crises including struggles with added staffing, resources, transport and social discontent. [17]

The data show that physiotherapy practices (1.25 IPI) are the only organisation to experience a considerable number of financial crises. This is inconsistent with the finding that the public health system in Australia exists in a perpetual state of financial crisis, requiring continual support to maintain

standards of care. [18] Organisations providing specific and limited health services in particular, may be unable to survive major tests of their infrastructure, financial health and logistical capabilities that a precipitous drop in revenue would produce. This study terminated before the 2008-2009 global financial crisis and so the effects of this economic downturn were not part of the data set.

Natural disasters were rare for most organisations except aged care (1.00 IPI) and medical clinics (0.91 IPI). Aged care facilities were not left untouched by the severe Mackay storms of 2008 and the Victorian bushfires of 2009 since a number of facilities were evacuated. The federal government now requires aged care homes applying for funding to take natural disaster planning into consideration to ensure the protection of facilities and assets. [19]

Loss of confidential information was relatively unimportant for most organisations but was relevant for dental (2.00 IPI) and medical (1.00 IPI) clinics. As legal liability insurance does not cover this crisis type, it can be difficult for small to medium organisations to recover from the effects. In a Queensland Government report, vulnerabilities relating to internet security were, 'public embarrassment, loss of public confidence, damage to reputation, loss of sensitive information, financial loss or litigation'. [20]

While litigation against medical practitioners appears common, surveyed organisations reported that major lawsuits were non-existent to rare except in dental clinics (1.33 IPI). When one considers that dental clinics are usually small compared to hospital surgical rooms, it may be assumed that every incident of dental litigation is potentially a major lawsuit that has the capacity to affect the viability of the organisation. This makes a definitive comparison between organisations difficult.

Only one terrorist incident was recorded and that was also in a dental clinic. While the difference between being terrorised by a client and a terrorist act were not clear in the questionnaire, the view was taken that current levels of understanding establish a clear difference between an isolated threat and an organised campaign. A three-year time period of data collection may not have been long enough for this type of infrequent crisis since hospitals are supposedly at 'considerable risk for terrorism because of their mission/purpose...' [21]

Incidents involving damage to organisational reputation were rare for all organisations except hospitals (1.05 IPI) and chiropractic practices (1.00 IPI). Since hospitals have bed shortages, this risk does not primarily refer to patient preference. The recent push to introduce hospital report cards will introduce accountability-based funding that, in combination with patient preference, constitutes a significant looming crisis for unprepared hospitals.

When these crisis incidence results are compared with the capability of these institutions to address these types of crises, [22] there are several areas of disconnect (Table 2).

Table 2: Average organisation scores for capabilities that are specific to particular crisis types, where the percentages indicate the number of organisations that experience the crisis and the cells are shaded to indicate a lack of capability, some capability, and good capability.

	Organisation Type							
Crisis Type	**Chiropractic**	**Physiotherapy**	**Podiatry**	**Aged Care**	**Hospital**	**Dentistry**	**Medical**	**Pharmacy**
Product recall	60%	13%	20%	20%	60%	33%	89%	100%
Product tampering	40%	–	–	–	16%	17%	9%	61%
Employee sabotage	20%	–	20%	20%	32%	17%	18%	17%
Chem/fire hazards	–	13%	–	20%	47%	33%	9%	11%
Environmental disaster	–	–	–	–	21%	–	36%	–
Drop in revenue	20%	63%	–	40%	16%	17%	–	17%
Natural disaster	–	–	–	20%	11%	–	36%	22%
Loss of IP/Info	–	13%	–	–	11%	33%	18%	22%
Major lawsuits	–	–	–	–	31%	50%	–	–
Terror attacks	–	–	–	–	–	17%	–	–
Reputational damage	20%	13%	–	–	42%	17%	–	11%

'–' indicates less than 10% of organisations experienced this type of crisis

The results from this study are presented as percentages of organisations that experienced a crisis type within a three-year period while the capabilities of organisations in terms of planning are portrayed by shading in each cell of the table. Notably, allied health organisations show little capabilities for the crises they already experience. However, while there is a degree of congruity in health organisations, several mismatches are clear. For instance, 32% of hospitals experience employee sabotage, but they have little capacity to address this. Likewise, 42% of hospitals experience reputational crises and 89% of medical clinics experience product recall crises but they each only have some capacity in this area.

Conclusion

In conclusion, the types of crises experienced by health organisations and their incidence are widely varied. In Figure 1, pharmacies appeared the most crisis prone by sheer volume, however, most of their crises related to product recalls and tampering. By contrast, a greater percentage of hospitals experienced more variety in crises. Several alarming results emerged and they were: i) allied health organisations are ill-prepared for crises they normally experience; ii) dental clinics experience a disproportionate number of crises instances for their size; and iii) there is a considerable disconnect between what organisations experience and what they plan for.

Competing Interests

The authors declare that they have no competing interests.

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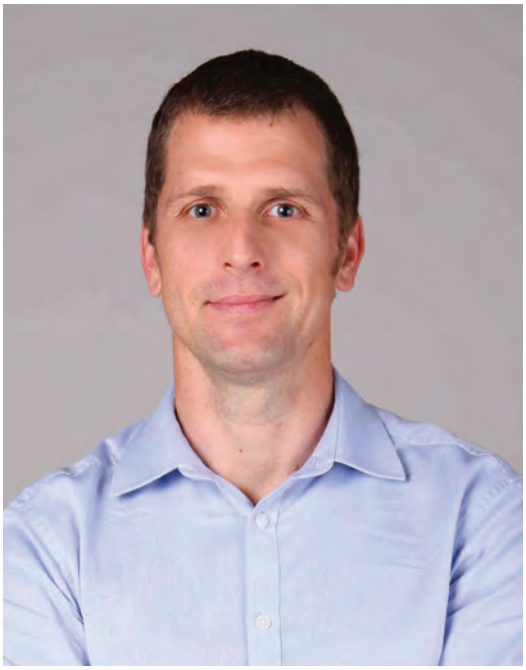
Christoph Weigl

In this issue of the Asia Pacific Journal of Health Management, we bring you an interview with Christoph Weigl, Managing Director of VAMED Healthcare Services Thailand Co Ltd in Bangkok, Thailand since early 2010 and a member of ACHSM since 2007.

Christoph is a late entrant into healthcare. After completing his Masters in International Business from the University of Innsbruck, Austria and University of Stirling, United Kingdom, he began his career as a commercial project manager in power generation and distribution in Vienna, Austria in 1997. Moving up the ladder, Christoph deepened his management experience and in 2005, after his company was taken over by Siemens Austria, became Head of Division, Large Control Systems and Turn Key Systems for Austria and 25 East and South East European countries.

It was only in 2006 that Christoph ventured into healthcare and became the Managing Director of VAMED's service business including hospital, healthcare facility and IT management as well as consulting services for Malaysia and neighboring countries.

After successfully developing the first projects in Thailand from his Malaysian base, Christoph relocated to Bangkok and is now responsible for growing the company as well as overseeing its operations for the markets of Thailand and adjoining countries.



Christoph Weigl

How and why did you come into the healthcare system?

Back in 2005, I was at a crossroads in my professional career. Having steadily moved up the career ladder, I was satisfied with how things were going and felt that I could either remain content to continue with what what I had been doing for the past ten years or I could look for a change.

Change it was, in one of those memorable moments in life I will never forget.

I was on a three-week holiday with my family in Malawi and we had just arrived back in the capital Lilongwe. As we had not had access to internet for just over two weeks, I seized the opportunity to check my mail and came across an email inquiring if I was interested in being posted to Malaysia to work for a healthcare management and consulting company.

Thinking things over and realising it was a challenge that would take my life in a new direction, I decided to give it a go. I am still only at the beginning, but know my decision to go into healthcare was the right one.

What is the most rewarding and enjoyable aspect of your position?

I enjoy every aspect of my position, but would like to mention just three. First, many of the people I meet and work with are true professionals, passionate about what they do and constantly on a quest to improve the healthcare settings and systems they support. Nurses are my true heroes and form the backbone of any healthcare system.

I find it very rewarding to float new ideas or develop projects together with this dedicated group of people.

Second, coming from a different industry and meeting people with very different mind and skill sets, allows me to learn something new every day.

Third, I have been able to live my dream to work and live abroad with every day a new opportunity to explore.

What are the challenges of the different healthcare systems in which you have worked?

I have travelled the region extensively, but just by taking a quick look at the basic health indicators of countries as geographically close as Singapore, Malaysia, Thailand, Vietnam, Laos, Cambodia and Myanmar, reveals that the stage of development they are in and hence quality of healthcare systems varies enormously across the region. I will expand a little on the similarities and differences between Malaysia and Thailand, the healthcare systems I know best.

Next to the undisputed leader Singapore, Malaysia and Thailand have the most advanced healthcare systems in the region with approximately 98% of their citizens under universal healthcare coverage. I see this as a great achievement, which clearly re-enforces their ambition of becoming developed nations with the next ten years.

Both countries have been successful in improving quality, affordability and equity in people's access to care and have seen a continuous convergence to international benchmarks and indicators such as life expectancy, infant and maternal mortality rates etc. The establishment of national accreditation bodies, the Malaysian Society for Quality in Health and the Institute of Hospital Quality Improvement and Accreditation, have contributed to this elevation in quality of care.

However, both countries and Thailand in particular, still face a problem of maldistribution of healthcare providers and health personnel among rural and urban areas.

This is particularly evident when you visit Bangkok and Kuala Lumpur. With the highest concentration of public and private hospitals, they also boast world-class facilities such as Bumrungrad Hospital, Bangkok Hospital and Prince Court Medical Centre. These facilities have not only set new standards in healthcare by introducing international accreditation (mostly by Joint Commissioning International), but are also key promoters for their countries in medical tourism. Thailand is really one of the pioneers in this field as they embarked on a national strategy to become a medical hub of Asia as early as 2004. It has been a success story ever since. Malaysia followed much later and only in 2009 the Ministry of Health introduced Malaysia Healthcare, an initiative to position Malaysia as a preferred destination for world-class healthcare services. The initiative has delivered its first positive results.

The situation in remote areas, such as the Northeastern region of Thailand or East Malaysia in Borneo is quite different and manifests in a struggle for basic provision of medical services. To tackle the maldistribution,Thailand has provided financial incentives to healthcare workers as well as developed policies such as decentralising authority and establishing provincial committees to cater for community needs.

Interestingly and despite shortage of personnel, Thailand relies entirely on Thai healthcare professionals and access by foreign doctors and nurses is heavily restricted. In contrast, Malaysia has opened its labour market a long time ago and the system could not do without Philippine and Indian nurses as well as foreign doctors. With the ongoing liberalisation of medical services within ASEAN, the composition of healthcare staff may change significantly.

What is the one thing you would like to see changed?

I would like to lower resistance to change and increase cooperation across disciplines and professions. Healthcare systems worldwide come under so much financial strain and face such huge challenges that we can only meet if everyone is ready to embrace change and work towards core objectives, while putting away personal interests.

Who or what has been the biggest influence on your career?

My first boss played a significant role in shaping and developing my management skills and leadership style based on core values that include trust, integrity, professionalism, determination and humility.

However, at the same time, I believe the most important influence in your career is yourself. I have always had a three to five year career plan in place and know what I have to achieve within each time span. I have come to know that planning increases the likelihood of success and greatly reduces the risk of failure. However, I must admit that meeting the right people at the right time for the right reason is not something that can be included in any plan.

Where do you see health management and health systems in the areas where you work heading?

The liberalisation of medical and health services within ASEAN, which should be completed by 2015, will profoundly change national health management systems in the region. It's going to be an exciting process and I foresee stronger cross-border investments in hospitals and healthcare facilities as well as free movement of patients and healthcare professionals across countries. It is my experience that people in the region are reasonably mobile and ready to work overseas for more lucrative salaries or travel for cost-effective treatment

Mutual recognition agreements for medical and dental practitioners and nurses are already in place, but currently recognition can still be denied by national regulatory bodies based on an all-purpose escape clause. That's going to be a lengthy process but I am positive that it will be sorted out finally.

The regional integration of healthcare systems due to the liberalisation of medical and health services, as well as the emergence of international accreditation systems and standards will bring about a harmonisation of standards and an elevation of quality of care, for those countries currently lagging behind.

What attracted you to join and participate in the College?

There were two main factors. As part of my assignment in Malaysia, I met and got to know a number of Australian healthcare leaders, some of whom were part of our hospital management team in Kuala Lumpur. I was impressed with their people-centred management style and leadership, which is in marked contrast to a more technocratic management philosophy in Europe.

Secondly, Australian healthcare companies and higher learning institutions are increasingly venturing into South East Asia and at the same time South East Asian countries see Australian education and healthcare systems as laudable benchmarks. All of this led me to conclude that the College would be an excellent learning and networking forum. And, I was right.

What word of advice would you give emerging health leaders?

I would advise them that in order to master the overwhelming challenges we all face in healthcare around the world, such as population ageing, strained budgets, cost explosions, staff shortages etc, any successful healthcare leader needs to be truly open, constantly ready for change, determined and extremely patient. There are no quick wins and easy fixes in healthcare.

BOOK REVIEW

Health Care and Public Policy: an Australian analysis

Reviewed by M Avery

Bibliographic details:

Palmer G and Short S.
Health Care and Public Policy: an Australian analysis
4th edition. South Yarra: Palgrave Macmillan; 2010.
ISBN: 978 1 4202 5614 7 (paperback) 410 pages.

This latest edition both updates the text and brings a strong discussion of health system developments in Australia and reforms across the last ten years. A major theme on the role of the Federal Government in health policy development nationally and regionally relates to Palmer and Short's review and assessment of the reports and recommendations of the National Health and Hospitals Reform Commission delivered in 2009. Detail and thought has gone into the complex issues of the health reform agenda to date and the presentation of directions for policy formulation and implementation. The fourth edition includes new material on health financing, workforce, technology and health needs of disadvantaged groups in our community. The book includes a detailed updating and presentation of health data.

Across 11 chapters, the book provides information on the health services and system; articulates the need for health policy analysis at decision-making, process and structural levels; and sets out a direction for reform in health policy, service delivery and financing. The book is well set out and edited with each chapter providing definitions, explanations, content, summaries and evaluations, suggested further readings and discussion questions.

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Key chapter themes include:

- Australian healthcare system;
- Public policy analysis and healthcare;
- Perspectives on health policy;
- Health insurance and the financing of health services;
- Organising healthcare services;
- Health workforce;
- Medical services and technological change;
- Public health;
- Health services for disadvantaged groups; and
- Reforming health policy-making, delivery and financing.

The book is a rich source of references to key reports and policies and includes an extensive bibliography of health-related published materials, details of web sites and an abbreviations list.

The authors have strong experience and understanding of health services public policy and commentary on the development and change of the system from both a national and international perspective. Professor Palmer is Emeritus Professor of Health Services Management at the University of New South Wales and Chair of the Advisory Board for Health Service Management at the University of Technology, Sydney. He has a distinguished career in learning and research in healthcare, with particular research achievements in policy analysis, funding, insurance and costing systems as well as patient classification systems. Professor Short has extensive experience in sociological aspects of healthcare, public policy and patient experience in healthcare systems. She is Associate Dean of Postgraduate Education in the Health Services Faculty at Sydney University and has held previous appointments at the University of Queensland and Griffith University. The book provides contemporary and solid information and overview of the Australian healthcare system and the spectrum of delivery and financing arrangements. A deeper review and treatment of the current and future state of

a mixed economy that involves government and non-government providers in hospital, community and social services would be valuable. There is a balance of material, insight and agenda-making for the majority of health delivery – this includes services across the health landscape and not just the acute care or hospital sector – hospitals, community health, aged care, disability and related services. A great strength of the book is the information, analysis and direction setting around the need for improvement in health policy-making. The commentary and astute observations on the inter-related development of policy, systems and services make for a valuable read and reference book. The style and approach that combine research, discussion and mapping of development direction are easy to follow and build the argument for improvement in health policy-making and its outcomes. A valuable part of this approach is the inclusion of 'Policy Analysis' sections to most chapters in the book. These are useful review pieces aimed at evaluation and setting the agenda in relation to specific service and system policy areas. Inclusion of such analysis in the area of policy management for health services for disadvantaged groups would have been valuable. The authors continue an argument from the earlier edition for stronger health policy development. They expand that in this book with direction on development approach and identification of some key future issues (quality of life in an ageing population, technology, workforce, costs and cost drivers) requiring treatment through comprehensive coverage and multidisciplinary frameworks.

The fourth edition is aimed at informing students, clinicians, managers and policymakers and the book will be valuable and useful to those learning about and contributing to Australian healthcare growth and development. With the federal elections over and central government returning to key issues of policy formation, resourcing and delivery, Palmer and Shorts' fourth edition is a timely and useful contribution to current and future thinking.

LIBRARY BULLETIN

This Library Bulletin is part of a service offered by the Health Management and Planning Library of ACHSM. The Library provides information on topics such as health services management, organisational change, corporate culture, human resources and leadership. The Bulletin highlights some of the most up to date articles, books, features and literature on health management from both Australia and internationally. Copies of these articles are available at a small charge. The first article costs $11.00 then $5.50 for each additional article. All prices are inclusive of GST.

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Agency for Healthcare Research and Quality, May 2010
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Robertson, Ann and others
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Shukla, CS
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- Accreditation
- Australian Health System
- Emergency Care
- Health Planning
- Models of Care
- Moving Hospitals
- Operating Theatres
- Organisational Change
- Performance Management x 2
- Public Private Partnerships
- Quality
- Safety
- Ward Design

Please contact the Library on library@achsm.org.au if you would like a copy of a Reading List.

Manuscript Preparation and Submission

General Requirements

Language and format

Manuscripts must be typed in English, on one side of the paper, in Arial 11 font, double spaced, with reasonably wide margins using Microsoft Word.

All pages should be numbered consecutively at the centre bottom of the page starting with the Title Page, followed by the Abstract, Abbreviations and Key Words Page, the body of the text, and the References Page(s).

Title page and word count

The title page should contain:

1. **Title**. This should be short (maximum of 15 words) but informative and include information that will facilitate electronic retrieval of the article.
2. **Word count**. A word count of both the abstract and the body of the manuscript should be provided. The latter should include the text only (ie, exclude title page, abstract, tables, figures and illustrations, and references). For information about word limits see *Types of Manuscript: some general guidelines* below.

Information about authorship should not appear on the title page. It should appear in the covering letter.

Abstract, key words and abbreviations page

1. **Abstract** – this may vary in length and format (ie structured or unstructured) according to the type of manuscript being submitted. For example, for a research or review article a structured abstract of not more than 300 words is requested, while for a management analysis a shorter (200 word) abstract is requested. (For further details, see below - Types of Manuscript – some general guidelines.)
2. **Key words** – three to seven key words should be provided that capture the main topics of the article.
3. **Abbreviations** – these should be kept to a minimum and any essential abbreviations should be defined (eg PHO – Primary Health Organisation).

Main manuscript

The structure of the body of the manuscript will vary according to the type of manuscript (eg a research article or note would typically be expected to contain Introduction, Methods, Results and Discussion – IMRAD, while a commentary on current management practice may use a less structured approach). In all instances consideration should be given to assisting the reader to quickly grasp the flow and content of the article.

For further details about the expected structure of the body of the manuscript, see below - Types of Manuscript – some general guidelines.

Major and secondary headings

Major and secondary headings should be left justified in lower case and in bold.

Figures, tables and illustrations

Figures, tables and illustrations should be:

- of high quality;
- meet the 'stand-alone' test;
- inserted in the preferred location;
- numbered consecutively; and
- appropriately titled.

Copyright

For any figures, tables, illustrations that are subject to copyright, a letter of permission from the copyright holder for use of the image needs to be supplied by the author when submitting the manuscript.

Ethical approval

All submitted articles reporting studies involving human/or animal subjects should indicate in the text whether the procedures covered were in accordance with National Health and Medical Research Council ethical standards or other appropriate institutional or national ethics committee. Where approval has been obtained from a relevant research ethics committee, the name of the ethics committee must be stated in the Methods section. Participant anonymity must be preserved and any identifying information should not be published. If, for example, an author wishes to publish a photograph, a signed statement from the participant(s) giving his/her/their approval for publication should be provided.

References

References should be typed on a separate page and be accurate and complete.

The Vancouver style of referencing is the style recommended for publication in the APJHM. References should be numbered within the text sequentially using Arabic numbers in square brackets. [1] These numbers should appear after the punctuation and correspond with the number given to a respective reference in your list of references at the end of your article.

Journal titles should be abbreviated according to the abbreviations used by PubMed. These can be found at: http://www.ncbi.nih.gov/entrez/query.fcgi. Once you have accessed this site, click on 'Journals database' and then enter the full journal title to view its abbreviation (eg the abbreviation for the 'Australian Health Review' is 'Aust Health Rev'). Examples of how to list your references are provided below:

Books and Monographs

1. Australia Institute of Health and Welfare (AIHW). Australia's health 2004. Canberra: AIHW; 2004.
2. New B, Le Grand J. Rationing in the NHS. London: King's Fund; 1996.

Chapters published in books

3. Mickan SM, Boyce RA. Organisational change and adaptation in health care. In: Harris MG and Associates. Managing health services: concepts and practice. Sydney: Elsevier; 2006.

Journal articles

4. North N. Reforming New Zealand's health care system. Intl J Public Admin. 1999; 22:525-558.
5. Turrell G, Mathers C. Socioeconomic inequalities in all-cause and specific-cause mortality in Australia: 1985-1987 and 1995-1997. Int J Epidemiol. 2001;30(2):231-239.

References from the World Wide Web

6. Perneger TV, Hudelson PM. Writing a research article: advice to beginners. Int Journal for Quality in Health Care. 2004;191-192. Available: <http://intqhc.oxfordjournals.org/cgi/content/full/16/3/191>(Accessed 1/03/06)

Further information about the Vancouver referencing style can be found at http://www.bma.org.uk/ap.nsf/content/LIBReferenceStyles#Vancouver

Types of Manuscript - some general guidelines

1. Analysis of management practice (eg, case study)

Content

Management practice papers are practitioner oriented with a view to reporting lessons from current management practice.

Abstract

Structured appropriately and include aim, approach, context, main findings, conclusions.
Word count: 200 words.

Main text

Structured appropriately. A suitable structure would include:

- Introduction (statement of problem/issue);
- Approach to analysing problem/issue;
- Management interventions/approaches to address problem/issue;
- Discussion of outcomes including implications for management practice and strengths and weaknesses of the findings; and
- Conclusions.

Word count: general guide - 2,000 words.

References: maximum 25.

2. Research article (empirical and/or theoretical)

Content

An article reporting original quantitative or qualitative research relevant to the advancement of the management of health and aged care services organisations.

Abstract

Structured (Objective, Design, Setting, Main Outcome Measures, Results, Conclusions).

Word count: maximum of 300 words.

Main text

Structured (Introduction, Methods, Results, Discussion and Conclusions).

The discussion section should address the issues listed below:

- Statement of principal findings;
- Strengths and weaknesses of the study in relation to other studies, discussing particularly any differences in findings;
- Meaning of the study (eg implications for health and aged care services managers or policy makers); and
- Unanswered questions and future research.
  Two experienced reviewers of research papers (viz, Doherty and Smith 1999) proposed the above structure for the discussion section of research articles. [2]

Word count: general guide 3,000 words.

References: maximum of 30.

NB: Authors of research articles submitted to the APJHM are advised to consult 'Writing a research article: advice to beginners' by Perneger and Hudelson (2004) and available at: <http://intqhc.oxfordjournals.org/cgi/content/full/16/3/191> This article contains two very useful tables: 1) 'Typical structure of a research paper' and 2) 'Common mistakes seen in manuscripts submitted to this journal'. [3]

3. Research note

Content

Shorter than a research article, a research note may report the outcomes of a pilot study or the first stages of a large complex study or address a theoretical or methodological issue etc. In all instances it is expected to make a substantive contribution to health management knowledge.

Abstract

Structured (Objective, Design, Setting, Main Outcome Measures, Results, Conclusions).

Word count: maximum 200 words.

Main text

Structured (Introduction, Methods, Findings, Discussion and Conclusions).

Word count: general guide 2,000 words.

As with a longer research article the discussion section should address:

- A brief statement of principal findings;
- Strengths and weaknesses of the study in relation to other studies, discussing particularly any differences in findings;
- Meaning of the study (eg implications for health and aged care services managers or policy makers); and
- Unanswered questions and future research.

References: maximum of 25.

NB: Authors of research notes submitted to the APJHM are advised to consult 'Writing a research article: advice to beginners' by Perneger and Hudelson (2004) and available at: <http://intqhc.oxfordjournals.org/cgi/content/full/16/3/191> This article contains two very useful tables: 1) 'Typical structure of a research paper' and 2) 'Common mistakes seen in manuscripts submitted to this journal'. [3]

4. Review article (eg policy review, trends, meta-analysis of management research)

Content

A careful analysis of a management or policy issue of current interest to managers of health and aged care service organisations.

Abstract

Structured appropriately.

Word count: maximum of 300 words.

Main text

Structured appropriately and include information about data sources, inclusion criteria, and data synthesis.

Word count: general guide 3,000 words.

References: maximum of 50

5. Viewpoints, interviews, commentaries

Content

A practitioner oriented viewpoint/commentary about a topical and/or controversial health management issue with a view to encouraging discussion and debate among readers.

Abstract

Structured appropriately.

Word count: maximum of 200 words.

Main text

Structured appropriately.

Word count: general guide 2,000 words.

References: maximum of 20.

6. Book review

Book reviews are organised by the Book Review editors. Please send books for review to: Book Review Editors, APJHM, ACHSM, PO Box 341, NORTH RYDE, NSW 1670. Australia.

Covering Letter and Declarations

The following documents should be submitted separately from your main manuscript:

Covering letter

All submitted manuscripts should have a covering letter with the following information:

- Author/s information, Name(s), Title(s), full contact details and institutional affiliation(s) of each author;
- Reasons for choosing to publish your manuscript in the APJHM;
- Confirmation that the content of the manuscript is original. That is, it has not been published elsewhere or submitted concurrently to another/other journal(s).

Declarations

1. Authorship responsibility statement

Authors are asked to sign an 'Authorship responsibility statement'. This document will be forwarded to the corresponding author by ACHSM on acceptance of the manuscript for publication in the APJHM. This document should be completed and signed by all listed authors and then faxed to: The Editor, APJHM, ACHSM (02 9878 2272).

Criteria for authorship include substantial participation in the conception, design and execution of the work, the contribution of methodological expertise and the analysis and interpretation of the data. All listed authors should approve the final version of the paper, including the order in which multiple authors' names will appear. [4]

2. Acknowledgements

Acknowledgements should be brief (ie not more than 70 words) and include funding sources and individuals who have made a valuable contribution to the project but who do not meet the criteria for authorship as outlined above. The principal author is responsible for obtaining permission to acknowledge individuals.

Acknowledgement should be made if an article has been posted on a Website (eg, author's Website) prior to submission to the Asia Pacific Journal of Health Management.

3. Conflicts of interest

Contributing authors to the APJHM (of all types of manuscripts) are responsible for disclosing any financial or personal relationships that might have biased their work. The corresponding author of an accepted manuscript is requested to sign a 'Conflict of interest disclosure statement'. This document will be forwarded to the corresponding author by ACHSM on acceptance of the manuscript for publication in the APJHM. This document should be completed and signed and then faxed to: The Editor, APJHM, ACHSM (02 9878 2272).

The International Committee of Medical Journal Editors (2006) maintains that the credibility of a journal and its peer review process may be seriously damaged unless 'conflict of interest' is managed well during writing, peer review and editorial decision making. This committee also states:

'A conflict of interest exists when an author (or author's institution), reviewer, or editor has a financial or personal relationships that inappropriately influence (bias) his or her actions (such relationships are also known as dual commitments, competing interests, or competing loyalties). ... The potential for conflict of interest can exist whether or not an individual believes that the relationship affects his or scientific judgment.

Financial relationships (such as employment, consultancies, stock ownership, honoraria, paid expenses and testimony) are the most easily identifiable conflicts of interest and those most likely to undermine the credibility of the journal, authors, and science itself...' [4]

Criteria for Acceptance of Manuscript

The APJHM invites the submission of research and conceptual manuscripts that are consistent with the mission of the APJHM and that facilitate communication and discussion of topical issues among practicing managers, academics and policy makers.

Of particular interest are research and review papers that are rigorous in design, and provide new data to contribute to the health manager's understanding of an issue or management problem. Practice papers that aim to enhance the conceptual and/or coalface skills of managers will also be preferred.

Only original contributions are accepted (ie the manuscript has not been simultaneously submitted or accepted for publication by another peer reviewed journal – including an E-journal).

Decisions on publishing or otherwise rest with the Editor following the APJHM peer review process. The Editor is supported by an Editorial Advisory Board and an Editorial Committee.

Peer Review Process

All submitted research articles and notes, review articles, viewpoints and analysis of management practice articles go through the standard APJHM peer review process.

The process involves:

1. Manuscript received and read by Editor APJHM;
2. Editor with the assistance of the Editorial Committee assigns at least two reviewers. All submitted articles are blind reviewed (ie the review process is independent). Reviewers are requested by the Editor to provide quick, specific and constructive feedback that identifies strengths and weaknesses of the article;
3. Upon receipt of reports from the reviewers, the Editor provides feedback to the author(s) indicating the reviewers' recommendations as to whether it should be published in the Journal and any suggested changes to improve its quality.

For further information about the peer review process see Guidelines for Reviewers available from the ACHSM website at www.achse.org.au.

Submission Process

All contributions should include a covering letter (see above for details) addressed to the Editor APJHM and be submitted either:

(Preferred approach)

1) Email soft copy (Microsoft word compatible) to journal@achse.org.au

   Or

2) in hard copy with an electronic version (Microsoft Word compatible) enclosed and addressed to: The Editor, ACHSM APJHM, PO Box 341, North Ryde NSW 1670;

All submitted manuscripts are acknowledged by email.

NB

All contributors are requested to comply with the above guidelines. Manuscripts that do not meet the APJHM guidelines for manuscript preparation (eg word limit, structure of abstract and main body of the article) and require extensive editorial work will be returned for modification.

References

1. Hayles, J. Citing references: medicine and dentistry, 2003;3-4. Available: <http://www.library.qmul.ac.uk/leaflets/june/citmed.doc> (Accessed 28/02/06)
2. Doherty M, Smith R. The case for structuring the discussion of scientific papers. BMJ. 1999;318:1224-1225.
3. Perneger TV, Hudelson PM. Writing a research article: advice to beginners. Int Journal for Quality in Health Care. 2004;191-192. Available: <http://intqhc.oxfordjournals.org/cgi/content/full/16/3/191> (Accessed 1/03/06)
4. International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. ICMJE. 2006. Available: <http://www.icmje.org/> (Accessed 28/02/06).

Other references consulted in preparing these Guidelines

Evans MG. Information for contributors. Acad Manage J. Available: <http://aom.pace.edu/amjnew/contributor_information.html> (Accessed 28/02/06)

Health Administration Press. Journal of Health care Management submission guidelines. Available: <http://www.ache.org/pubs/submisjo.cfm> (Accessed 28/02/06)

International Journal for Quality in Health Care. Instructions to authors, 2005. Available: <http://www.oxfordjournals.org/intqhc/for_authors/general.html> (Accessed 28/02/06)

The Medical Journal of Australia. Advice to authors submitting manuscripts. Available: <http://www.mja.com.au/public/information.instruc.html> (Accessed 28/02/06)

Further information about the Asia Pacific Journal of Health Management can be accessed at: www.achse.org.au.

Progress waits for no one, don't let a GOOD idea pass you by.

"Can't you see that I'm too busy to look at your GOOD idea!"

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About the Australasian College of Health Service Management

ACHSM (formerly Australian College of Health Service Executives) was established in 1945 to represent the interests of health service managers and to develop their expertise and professionalism. Today, the college is the leadership and learning network for health professionals in management across the full range of health and aged care service delivery systems in Australia and New Zealand and the Asia Pacific with some 3,000 members from both public and private sector organisations and non-government and not-for-profit organisations.

ACHSM aims to develop and foster excellence in health service management through the promotion of networking, the publication of research, and through its educational and ongoing professional development activities, including accreditation of tertiary programs in health service management, mentoring and learning sets.

ACHSM has Branches in all Australian States and Territories, New Zealand and Hong Kong. Memoranda of Understanding link ACHSM with other health management bodies in the Asia Pacific. As an international organisation, ACHSM is able to draw upon the experiences of researchers and managers in Australia, New Zealand, Hong Kong and other countries within the region to give readers valuable insights into management issues and approaches in a range of cultures and jurisdictions.

ACHSM

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