Emerald Journal of Health Organization and Management

Management practices in Australian healthcare: Can NSW public hospitals do better?

Journal:	*Journal of Health Organization and Management*
Manuscript ID:	JHOM-01-2015-0016.R1
Manuscript Type:	Original Article
Keywords:	Best practice, Hospital management, Management, Operations management, Performance management, Human resources management

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Introduction

Researchers have long acknowledged the role of management practices in driving better performance in hospitals. Adopting good hospital management practices can help improve clinical outcomes such as reducing patient mortality (Patterson et al., 2012; West et al., 2002), as well as enhancing operational outcomes such as service delivery and workforce efficiency (McDermott and Stock, 2007; Anderson et al., 2003). Yet, the variability in the quality of management practices across hospitals raises the question of why some hospitals have better management practices than others.

To assess the factors driving good management practices in hospitals, it is necessary to first define and measure management practices. However, a major impediment towards analyzing management practices within health care systems has been the lack of reliable empirical data on hospital management practices. The few studies that have been published are centered on specific aspects of management, such as operations management (McDermott and Stock, 2007; Vos et al., 2007), performance management (Giuffrida et al., 1999; Hafner et al., 2011), target management (Geelhoed and de Klerk, 2012) and people management (West et al., 2002; Hunter et al., 2000; Michie and West, 2004; Omar et al. 2007) or in specific health care settings such as nursing (Laschinger and Leiter, 2006).

Bloom and colleagues (2009) in conjunction with McKinsey & Co. attended to this research gap by designing a robust, multi-dimensional survey to measure hospital management practices in a holistic manner. Dorgan and colleagues (2010) further deployed this instrument across seven countries - USA, UK, Sweden, France, Germany, Italy and Canada. This interview-based scoring instrument collates 21 hospital management practices into all four areas of management – operations, performance, target, and people management – to construct a holistic Management Practices Score (MPS). The MPS is found to be positively correlated to clinical outcomes (e.g. lower heart attacks and general surgery mortality rates), operational indicators (e.g. patient satisfaction, waiting lists and staff turnover) and financial performance in the US and UK hospitals (Bloom et al., 2009; Dorgan et al, 2010; Bloom, Propper et al., 2010; Bloom, Genakos et al. 2012). While this association is not causa l, it still suggests that the MPS is a useful and valid measure with informational content.

In this paper, we adopt Bloom and colleagues (2009) methodology to assess Management Practices Scores in New South Wales (NSW) public hospitals. We focus on NSW because it is Australia's largest state-run health care system. In addition, the Australian health care system is facing significant challenges to maintain high quality services due to rising health care costs, workforce supply constraints, changes to demography with an ageing population, and an increasing burden of chronic disease (Armstrong et al., 2007; Australian Government, 2007; NSW Health, 2007; Queensland Health, 2007). Therefore, our goal in this paper is to investigate the factors that influence the adoption of good management practices in NSW public hospitals. The insights of this study can form the basis of informed policy and managerial decision making across NSW publics hospitals, as a means of providing high quality, efficient and effective healthcare services.

Literature review and research hypotheses

Hospital management practices

Good management practices have been acknowledged as a way for hospitals to create value and

improve health care outcomes (Bloom et al. 2009). The health care industry can draw upon a vast range of management practices originally developed for the manufacturing and/or service sector to achieve better performance in the changing health care environment (Butler et al., 1996; Trisolini, 2002; Laing and Shiroyama, 1995). However, transferring and adapting best practices to the health care context is challenging as it not only involves understanding the technical components of health care, but also the operational, strategic, and human factors associated with its effective implementation (Berta and Baker, 2004), and the subsequent impact it can have on performance monitoring (Hood & Peters, 2004). Management of good health care delivery is therefore multi-dimensional in nature and incorporates a range of areas, such as operations, performance monitoring, targets and people management.

Operations management

Evaluation of operations management practices in hospitals is often assessed by the average length of stay for patients, effectiveness and efficiency of patient care, and hospital cost performance (McDermott and Stock, 2007; Stock and McDermott, 2011). Lean systems, workforce management, planning and control systems, as well as quality management systems can aid in efficient hospital operations (Kollberg and Dahlgaard, 2007; Kujala et al., 2006; Li et al., 2002; Tucker and Edmondson, 2003; Goldstein and Ward, 2004; Rambani and Okafor, 2008). In addition, an effective layout and design of hospital areas and patient flow (Vos et al, 2007; Proudlove and Boaden, 2005); use of well-documented standardized protocols, clinical pathways and evidence-based clinical practice guidelines (Scott et al., 2008; Rotter et al., 2010); and a committed approach to continuous improvement (Bloom et al., 2009; Dorgan et al., 2010) are regarded as best practices in operations management within hospitals (Vos et al. 2007; Scott et al., 2008; Rotter et al., 2010).

Performance monitoring

Multiple, clearly defined evidence-based performance metrics are central to measuring and reviewing hospital performance (Peterson at al., 2006; Gross et al., 2008; Ferguson and Lim, 2001; Chang et al., 2002; Giuffrida et al., 1999). According to Scott and colleagues (2008), an effective performance monitoring system is based on evidence (guidelines, protocols, pathways, reminders and prompts), incorporates systems for evaluation (audits, feedback, clinical indicators and process measures), and targets formulation and implementation of strategies for quality improvement. Recently, research conducted by Hafner and colleagues (2011), which used interviews with hospital staff to ascertain their perceptions about the impact of publically reporting performance data, found that “public reporting motivates and energies organisations to improve or maintain performance”. Bloom and colleagues (2009) and Dorgan and colleagues (2010) also consider the use of well-defined systems for reviewing performance through Key Performance Indicators (KPIs), and the use of problem-solving techniques and action plans . The role of the clinical community and network-based approaches to quality improvement and performance monitoring has also been highlighted (Aveling et al., 2012; Addicott, 2008).

Target management

Researchers have acknowledged the role of clinical governance and performance management systems, and the importance of moving clinicians into management roles in building accountability in health care organizations (Fitzgerald, 1994; Lega and Vendramini, 2008; Rowe and Calnan, 2006; Roland et al., 2001). Hospitals need to ensure their goals and targets are holistic, realistic, clearly defined, interlinked with the overarching hospital strategy, and consistently communicated across all areas and levels (Bloom et al., 2009; Dorgan et al., 2010; Buetow, 2008; Mannion et al., 2005). Graf and colleagues (1996) further describe an IPA (Importance, Performance, Awareness) mapping framework, which is a strategic planning and decision-making tool that incorporates both external customer orientation and internal efficiency considerations in resource deployment in hospitals. An

example of target management is the Australian Government's 2012 initiative to improve performance in public hospital Emergency Departments (ED) under the National Emergency Access Target (NEAT), which aims for 90% of all patients presenting to ED to be admitted, referred to another hospital for treatment, or discharged within four hours. Initially introduced in Western Australia, the 4-hour rule program has significantly reduced tertiary overcrowding and there is early evidence to support a fall in overall hospital mortality rate associated with improvements in access block and 4-hour performance (Geelhoed and de Klerk, 2012).

People management

Health care organizations that incorporate aspects of high performing work systems (HPWS) have been shown to drive employee commitment and job satisfaction (Young et al., 2001), and thereby deliver better quality of patient care (Leggat et al., 2011; McDermott and Keating, 2011). Studies show an inverse link between human resource management practices, infection rates and patient mortality (West et al, 2002; Omar et al. 2007; Patterson et al, 2012). Sophisticated performance appraisal systems, incentives, and team work are linked with increased job satisfaction (Patterson et al, 2012), employee motivation and retention (Adzei and Atinga, 2012), and better mental health for employees (Borrill et al, 2000). Training and development have also resulted in better retention of specific health care professionals (Hunter and Nicol, 2000, Brooks et al., 2002). Moreover, non-financial incentives and merit-based promotions are considered important aspects of good people management within hospitals (Bloom et al. 2007, 2009; Dorgan et al., 2010).

Factors influencing the adoption of hospital management practices

Understanding the factors that impact the adoption of best management practices is critical to improving outcomes in hospitals. We investigate a range of hospital specific characteristics that may effect the quality of best management practices and articulate hypotheses from them.

Hospital size

Hospital size can influence management practices through resource allocation and the operation of economies of scales, which can ultimately effect patient outcomes. A study by Gaynor and colleagues (2005) showed that the probability of death due to heart surgery is appreciably lower in hospitals that conduct a high volume of heart surgery, and that this volume-outcome effect arises primarily through scale economies. A systematic review of more than 200 studies also concluded a reduction in patient mortality as hospital volumes increased (Sowden et al., 1997). Accordingly, we posit the following hypotheses:

Hypothesis 1: There is a positive association between the management practices score (MPS) and hospital size as measured by the number of beds (Hypothesis 1a), the number of employees (Hypothesis 1b), and the number of doctors (Hypothesis 1c) in NSW public hospitals.

Skills and education

Hospitals are knowledge-based organisations, and the education and skills of its staff members can impact management practices and patient outcomes. Aiken and colleagues (2003) found a statistically significant inverse relationship between the proportion of registered nurses with a baccalaureate degree and the likelihood of patients dying within 30 days of admission, suggesting that the education and skill levels of nurses are related to patient outcomes. In addition, few studies have found that hospitals with a higher percentage of board certified physicians have lower mortality rates (Hartz et al., 1989, Manheim et al., 1992), while others have shown no association with physician expertise (Tourangeau et al., 2002). Bloom and colleagues (2009) further conclude that a higher proportion of clinically skilled and qualified managers are associated with improved

management practices in hospitals. This suggests that by aligning clinical and managerial knowledge, managers and doctors can communicate efficiently with each other. Accordingly, we posit the following hypothesis:

Hypothesis 2: There is a positive association between MPS and the level of clinical education of a manager in NSW public hospitals.

Autonomy

Armstrong and Laschinger (2006) suggest that hospitals that empower the health care team facilitate an open, honest, and responsive culture of patient safety. Accordingly, they advocate that nursing and physician leaders should seek to remove silos, departmental turf issues, and professional territoriality in the health care system to enhance patient safety. Studies also show that efforts of nursing leaders to create autonomous work environments can influence nurses' ability to practice in a professional manner, ensuring excellent patient care quality and positive organisational outcomes (Laschinger and Leiter, 2006). Bloom and colleagues (2009) and Dorgan and colleagues (2010) demonstrate that higher-performing hospitals have managers with higher levels of autonomy. Accordingly, we posit the following hypothesis:

Hypothesis 3: There is a positive association between MPS and the manager autonomy in NSW public hospitals.

Organisational hierarchy

Contingency theory posits that organizational outcomes are determined primarily by the fit between key elements of the organization's structure such as formalization and centralization, and their operating context (Leatt and Schneck, 1982; 1984; Burns, 1995). Therefore, it can be argued that these formal structural elements are important for the smooth functioning of hospital operations. Studies have also shown that structures allowing for more horizontal communication seem to be more effective when the care required is less technical but still complex (Teresi et al., 1993). Many studies suggest that the use of multidisciplinary team models for primary care is associated with better outcomes in hospitals and nursing homes (Stuck et al., 1993; Teresi et al., 1993). It therefore seems reasonable to believe that the presence of a formal organizational structure and a certain level of hierarchy may allow for a structured disposition to management within hospitals. Accordingly, we posit the following hypothesis:

Hypothesis 4: There is a positive association between MPS and the organisational hierarchical structure in NSW public hospitals.

Research Methodology and Sampling Frame

Research participants

We selected 42 acute care NSW public hospital across the eight Area Health Services (AHS)[4]. These hospitals had an emergency department with at least one of the two subspecialties, cardiology and orthopedic surgery, which is consistent with the Bloom and colleague (2009) methodology. In addition, we chose hospitals categorized as Level 4, 5 & 6[3] which described higher complexity of clinical activity in that health care service (NSW Ministry of Health, 2013).

We interviewed up to four managers in each hospital, both clinical and non-clinical, who were responsible for hospital operations and performance. We interviewed a total of 116 managers; the majority was doctors (41.38%), followed by nurses (39.66%) and non-clinical managers (18.97%). We interviewed consultant cardiologists (n=14, 12.07%), orthopaedic surgeons (n=7, 6.03%) and others

(n= 95, 81.90%). The other category included multi-specialty managers, such as Director of Medical Services, Director of Nursing, and Director of Clinical Support Services, as well as single specialty managers from the Emergency Department and Allied Health Services. Site Specific Ethic approvals were obtained for conducting this research study across all health jurisdictions that were part of this research study.

Survey instrument

We used the research methodology adopted by Bloom and colleagues (2009), and later Dorgan and colleagues (2010). This survey instrument is unique in that it uses an interview-based scoring grid to construct a holistic Management Practices Score (MPS) based on 21 hospital management practices across multiple dimensions. An overview of these hospital management practices, and how the best practice (score 5) and worst practice (score 1) is recorded is shown in Table 1. These scores are then combined to arrive at an overall score for each of the four broad areas of management - operations, performance, targets and people management. The MPS is then calculated as the average of the individual management scores across the four dimensions. This aggregation implicitly assumes that the effects of individual management practices are additive, which is consistent with prior studies (e.g. MacDuffie, 1995). For the statistical tests, the 21 management practices were a priori standardised to z-scores with mean zero before additively combining them to form the MPS. The survey also gathered information on hospital characteristics including the number of hospital beds, the number of employees, the number of doctors, the number of managers with clinical training, the degree of autonomy given to managers, and the hospital's ownership structure.

Insert Table 1 Management practice scoring dimensions

The interviews were conducted with hospital managers via telephone during March and April 2010 from a central location in Sydney. Each interview took on average 50 minutes. The interview was conducted in a conversational mode (as opposed to a conventional survey) and comprised of specific yet, open-ended questions in order to evoke a clear and detailed picture of management practices within the hospitals. To reduce bias a "double blind, double scored" methodology was used (Bloom and Van reenen 2007; Bloom et al., 2009; Dorgan et al., 2010; Agarwal et al. 2014a; Agarwal et al. 2014b; Agarwal et al. 2012). The "double blind" nature of the interviews meant that the interviewer was not privy to information on the hospital, and the interviewees were not aware of the scoring grid. Approximately 85% of the interviews were also "double scored", meaning that while the interviews were run and scored by the main interviewer, another team member was also independently scoring them[1]. The scores of the listener were used for calibration purpose only and not for analysis. The interviewers underwent specialized training in this novel interviewing methodology to ensure consistency in standards and comparability with the global health care study[2].

Analysis, results and discussion

In our analysis, we assess the association between hospital characteristics and MPS using ordinary least squares (OLS) regression with robust standard errors, which are clustered by hospital to control for hospitals entering the sample more than once. The model used has the following general formula:

$$\mathbf{MPS}_{it} = \alpha_0 + \alpha_n \mathbf{Hospital\ Characteristics}_{it\ t} + \varepsilon_{it}$$

where:

MPS = Average of 21 Hospital Management Practices Score converted to a z-score
Hospital Characteristics = Proxies for factors expected to explain MPS such as hospital size, education and skills, autonomy and organisational hierarchy.

Table 2 provides a summary of the four variables used to test the hypotheses. Firstly, hospital size was measured by the log value of three indicators: total number of beds, total number of employees and total number of doctors in the hospital (data provided by NSW Health). Level of skills and education was defined as the estimate of the percentage of doctors and nurses in the hospital who had a clinical degree. Autonomy was measured through two indices. Autonomy index 1 was derived by normalising (using Z-score) the average score of hospital manager autonomy in hiring, adding hospital beds, budget-setting and strategic investments, and capital investment decisions. Autonomy index 2 was obtained by normalising (using Z-score) the average score of hospital CEO autonomy in hiring and adding hospital beds. These dimensions of autonomy were assessed using a scale of 1 to 5, with 1 being that the manager/CEO did not have authority and the decisions in these activities were made at a higher level; and 5 being that the manager/CEO had full authority and involvement in the decision-making of these activities. In addition, the estimated amount of maximum capital expenditures (CAPEX) that could be made at the level of the hospital manager being interviewed without signoff from the hospital CEO was also recorded in absolute value. Finally, an overall index of organizational hierarchy was obtained by normalizing (using Z-score) and consolidating three relevant indicators: number of layers between the hospital manager and CEO, number of people directly reporting to the hospital manager, and the number of people directly reporting to the hospital CEO.

Insert Table 2: Factors influencing the adoption of hospital management practices

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Descriptive statistics

Table 3 shows the score for the 21 management practices individually and in aggregate (MPS). The average value for the MPS is 2.56, with the worst and best performing hospitals scoring 1.4 and 3.9, respectively. Overall, NSW hospitals scored best in operations management (average score 2.88), closely followed by performance monitoring (average score 2.86). Targets management and people management were relatively weak areas with an average score of 2.35 and 2.27, respectively.

Insert Table 3: Descriptive Statistics for Management Practice Scores

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Table 4 shows the descriptive statistics for the variables used to test the hypotheses. The average hospital in this study has 332 beds, 1710 employees and 240 doctors. Among the interviewed hospitals, approximately 74% of managers have clinical degrees. The average score for the hospital manager and CEO's involvement in hiring decisions is 2.45 and 3.85 respectively, and the score for adding hospital beds is 1.29 and 2.96, respectively. The average score for the hospital manager's autonomy in budget-setting and strategic investments is 1.51. These dimensions of autonomy were assessed with a score from 1 to 5 with 1 being that the manager/CEO did not have any authority and 5 being that the manager/CEO had full authority. In addition, the average capital expenditure (CAPEX) that could be made at the level of the hospital manager being interviewed without signoff from the hospital CEO is $15,240. Analysis of organisational hierarchy shows the average number of layers between hospital manager and CEO is 4.36, the number of people directly reporting to the hospital manager is 20.28, and the number of people directly reporting to hospital CEO is 10.32. The standard deviations for all variables in Table 4 and 5 demonstrate that there is variation in the data,

allowing for tests of the hypotheses to be made.

Insert Table 4: Descriptive Statistics for Overall Management Practices Score and Variables

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Analysis and results for hospital management practices

Table 5 presents the Pearson's correlation test results for the four management areas and the overall MPS. The model shows a positive and significant ($p<0.05$) correlation between all four management areas. This suggests that hospitals that scored well in one aspect of management practices (e.g. operations management) also scored well in other areas (e.g. performance monitoring, target setting and people management). Furthermore, the overall MPS is also positively correlated with all four management areas, indicating that hospitals with higher overall management scores are likely to score highly across all four management areas.

Insert Table 5: Correlation Matrix for the four areas of management

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The Pearson's correlation test for each of the 21 individual hospital management practices and for the overall MPS shows that there is an association between some, but not all, of the individual management practices (data not published). This suggests that a hospital does not necessarily have to be the 'best' or 'worst' in all of the components of the four management practice, but they can have a combination of 'best' and 'worst' practices.

Analysis and results for hypotheses 1-4

Table 6 shows the results for the hypotheses tested in this study. All models are based on the 116 hospital personnel interviews clustered by hospital. The models are OLS bivariate regressions with robust standard errors. The models have adjusted R-squares ranging from 0.08 to 19 explaining that the models have explanatory power. However, the low R-squares could be attributed to a relatively small sample size (116 interviews clustered into 42 hospitals), which is likely to increase with an increase in sample size. There are 7 Models wherein Models 1-7 test each of the hypotheses individually.

Insert Table 6: Association between hospital-related factors and MPS

Hospital size (Hypotheses 1a, 1b and 1c)

The coefficient on hospital size as measured by the number of beds (hypothesis 1a) is positive and significant ($p=0.037$) in model 1. Therefore, we are unable to reject hypothesis 1a: higher the number of hospital beds, higher the management practices score. This is consistent with the economies of scale theory which supports efforts to consolidate services to form larger facilities.

The coefficient on hospital size as measured by the number of employees (hypothesis 1b) is also positive and significant ($p=0.096$) in model 2. Therefore, we affirm hypothesis 1b: hospitals with more employees tend to be better managed than those that employ lesser people. This finding is in sync with Anderson and colleagues (2003) who concluded that larger size nursing homes support

better management as more number of employees' encouraged increased connections, interactions, and information flow amongst people, which facilitated better management practices and constructive self-organisation.

The coefficient on hospital size as measured by the number of doctors (hypothesis 1c) is not significant (p=0.779) in model 3. Accordingly, we reject hypothesis 1c: the number of doctors does not impact management practices. It is unclear why exactly this is so; however one possible explanation is that management performance is based on structure, processes, and resources rather than a subset of employees. In larger, high-volume hospitals with more hospital beds for example, there would be better access to resources and infrastructure such as integrated data systems, financial support, clinical integration, and information system capability. This in turn would allow for better patient management, adoption of best practices and ensure higher performance than those hospitals with lesser beds, and the number of the doctors may not influence this. Dorgan and colleagues (2010) also show that size matters, with better management practices in larger than smaller hospitals.

Skills and education (Hypothesis 2)

The coefficient on the level of skills and education within hospitals (hypothesis 2) is positive and significant (p=0.06) in model 4. Therefore, we affirm hypothesis 2: hospitals with a higher proportion of clinically qualified and skilled managers perform significantly better in management practices. These findings are consistent with Bloom and colleagues (2009) and Dorgan and colleagues (2010) who conclude that "Clinically trained managers can understand clinical challenges better, communicate with clinical staff in a language they understand, and enjoy credibility that non-clinicians rarely achieve". In similar vein, Ashmos and colleagues (1998) have also empirically shown that the more clinical professionals participate in strategic decision-making, the better the hospital's financial performance. They argue that clinical professionals have the knowledge and skills to interpret management issues in a different way to develop strategic solutions and alternatives that result in lower costs and better performance.

Autonomy (Hypothesis 3)

The coefficient on autonomy index 1 – hospital manager involvement in hiring, adding hospital beds, budget-setting and strategic investments, and capital investment decisions – is highly positive and significant (p=0.000) in model 5. The coefficient on autonomy index 2 – hospital CEO authority in hiring and adding hospital beds – is also positive and significant (p=0.033) in model 6. Based on this, we are testify hypothesis 3: higher degree of autonomy is linked to better management performance suggesting that autonomy is a powerful motivator for hospital managers. Managerial autonomy aids quick and involved decision-making and stimulates the adoption of innovative management practices in hospitals (Alexander et al., 2006). Research further validates that nurses with higher teamwork exhibited higher levels of autonomy and were more involved in decision-making (Rafferty et al., 2001). In addition, Budge and colleagues (2003) conclude that nurses with higher levels of autonomy within their work, are also more likely to experience collaborative relationships with physicians and other departments which in turn is associated with better quality of nursing care and improved patient outcomes. This finding is also in sync with global health care studies that advocate autonomous work environments for hospital managers (Bloom et al., 2009; Dorgan et al., 2010).

Organisational hierarchy (Hypothesis 4)

The coefficient on organizational hierarchy index is positive and significant (p=0.107) in model 7. Based on this result, we are unable to reject hypothesis 4: that there is a positive association between the MPS and the hospital organizational hierarchical structure. This finding goes against the notion of a flat hierarchy in hospitals. From this finding we can interpret that in the context of NSW

hospitals, a certain degree of hierarchy is necessary for the organization and management of operations, or at least that an organizational structure allows for structured disposition within hospitals. This aligns with research supporting the view that more bureaucratic control (e.g. centralization to assure coordination and communication) is associated with better outcomes in hospital settings (Shortell, Becker, and Neuhauser, 1976; Flood and Scott, 1978; Knaus et al. 1986).

Research Contributions

A robust measure of management practices in NSW public hospitals has been obtained which contributes to the evidence-base of management practices and performance of NSW Health hospitals. The results confirm that there are significant variances in the quality of management practices among NSW public hospitals. Studies have attributed the large performance differentials in the healthcare sector to this dispersion in hospital management practices (Skinner and Staiger, 2009; Kessler and McLennan, 2000; Hall et al., 2008). Therefore, by focusing on improving practices in those hospitals that have delivered a poor management score and narrowing the spread of hospital management practices, NSW Health can deliver better healthcare performance outcomes (Bloom et al., 2012).

This research uncovers what factors are associated the adoption of management practices in NSW hospitals. Hospitals with more employees and/or more beds are better managed than those that employ less people and/or those that have less number of beds. Hospitals with a higher proportion of clinically qualified managers display a higher management performance, while those with a lower percentage of clinically skilled manager's score lower in management practices. Having a clinical background increases the manager's ability to understand hospital processes, associated challenges and allows them to communicate with clinical staff with better credibility. Dorgan et al. (2010) further show that clinical training of hospital managers can improve an organisation's management score over time, which suggests much could be gained by encouraging more clinical staff into management.

Our results also show that higher degree of autonomy is associated with better management performance in NSW hospitals. There is a highly significant positive relationship between the management score and the overall hospital manager involvement in hiring, adding beds, budget-setting and strategic investments, and capital investment decisions. The consolidated degree of hospital CEO authority in hiring and adding beds is also linked to better management performance in NSW hospitals. This suggests that autonomy can be a powerful motivator as it induces a greater sense of accountability within the hospitals, thereby leading to enhanced performance and outcomes. Furthermore, organisational hierarchy is positively correlated to the management score, a finding possibly indicating limitations in flatter structures within NSW hospitals. This result viewed in conjunction with the findings on manager autonomy potentially infer that while a structured hierarchy aids in systematic implementation of management practices, at the same time introducing flexibility in the management style and empowering the workforce for decision-making is beneficial in driving performance. Hence, striking an optimal balance between organisational structure and levels of autonomy appears to be the key to effective and efficient management practices.

Managerial Implications and Limitations

Key implications of this research indicate that hospital executives can target these hospital-specific factors to improve the quality of management practices and performance in their hospitals. These factors can also guide targeted healthcare reforms aimed at delivering high-quality healthcare services in NSW Health hospitals. Hence, the insights of this study are likely to be of interest to hospital managers as well as healthcare policy-makers across all Australian states and elsewhere.

This research has some limitations which also present opportunities for future research. First, we use a scoring grid-based survey instrument as the purpose of our study was to quantify the management practices and arrive at a MPS for NSW public hospitals. Although the scoring is done through conversational style interviews (rather than a traditional survey), we still lose out on rich qualitative insights through our approach of measuring management practices. Future research can adopt complementary research methods such as observation of naturalistic data and analysis of qualitative interview data and archived documents to cull out psychological, individual, contextual and situational factors influencing the adoption of management practices. Second, in this study, the MPS incorporates a range of 21 hospital management practices across three broad areas of management. But, it is likely that more management practices exist which have not been included in the study. Future research can look at refining the management practice dimensions to make it more comprehensive. Future work could also consider the effect of interactions between different practices (e.g. Challis, Samson and Lawson, 2005; Flynn and Flynn, 2005; Hsu, Tan, Kannan and Keong Leong, 2009).

Conclusions and Future Research

In summing up, this paper has provided empirical evidence on the association between management practices and a range of hospital characteristics in acute care Australian public hospitals of NSW. Better management scores are positively associated with hospital size (as measured by the number of hospital beds and hospital employees), level of education and skills, autonomy and organisational hierarchy. Against a backdrop of rising patient demand and simultaneous workforce shortages, these insights hold key implications for future policy and managerial decision-making toward lifting the quality of management practices and healthcare performance in NSW Health hospitals, for both clinical doctors and multi-clinical speciality managers.

The results also guide future research avenues. There is scope to extend this study to other state-run healthcare systems to provide more comprehensive insights on Australian healthcare. The outcomes of this paper can also form the foundation for further research in studying the impact of good management practices on hospital performance – in terms of clinical outcomes, like mortality rates, readmission rates, infection rates, as well as operational and financial performance. There is also scope for future research in comparing management practices in the public and private health sector, and studying the causality linkages between management practices and its several determinants.

Footnotes:

1 As per privacy regulation, interviewees were informed of their call being monitored for quality and control purposes.

2 We would like to thank Nick Bloom and his team from the LSE who trained and guided the UTS team throughout the NSW Health management practices project

3 Level 4 – Hospital can handle most emergencies. Purpose designated area. Full-time director. Experienced medical officer(s) and nursing staff. Experienced registered nurses on site 24 hours. Specialists in general surgery, paediatrics, orthopaedics, anaesthetics and medicine on call 24 hours. May send out medical and nursing teams to disaster site. Participation in regional adult retrieval system (country base hospitals) is desirable. May be a Regional Trauma Service.
Level 5 - As per Level 4 plus can manage all emergencies and provide definitive care for most. Access to clinical nurse consultant is desirable. Has undergraduate teaching and undertakes research. Has designated registrar. May be Area/Regional Trauma Service. May have neurosurgery service.
Level 6 - As Level 5 plus has neurosurgery and cardiothoracic services on site. Sub-specialists available on rosters. Has registrar on site 24 hours. May be designated Supra-Area Trauma Service.

4 This study was conducted prior to the formation of the Local Health Networks

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Table 1: Management practice scoring dimensions
Source: adapted from Bloom et al. (2009).

Operations Management
Layout of patient flow:
Best practice: Hospital layout has been optimised for patient flow; workplace organisation is challenged regularly and changed whenever possible*;*
Worst practice: Hospital layout is not conducive to patient flow.
Rationale for introducing standardisation and pathway management:
Best practice: Clinical and financial changes were made to improve overall performance and communicated coherently;
Worst practice: Changes were introduced top down and rationale was not communicated or understood.
Standardisation and protocols:
Best practice: Protocols are known, used and regularly monitored by all clinical staff;
Worst practice: Little standardisation and few protocols exists.
Good use of human resources:
Best practice: Staff recognise effective human resource deployment as a key issue; shifting staff from less busy to busy areas is done routinely and in a coordinated manner;
Worst practice: Staff often end up undertaking tasks for which they are not qualified or over-qualified; staff do not move across units, even when they are underutilised.
Performance Monitoring
Continuous improvement:
Best practice: Exposing and resolving problems is regular and involves all staff groups along the entire patient pathway;
Worst practice: Process improvements are made only when problems occur, or only involve one staff group.
Performance tracking:
Best practice: Performance is continuously tracked with critical measures and through visual management tools;
Worst practice: Measures tracked do not indicate directly if overall objectives are being met; tracking is an ad-hoc process.
Performance review:
Best practice: Continually reviewed, based on the indicators tracked; all aspects are followed up to ensure continuous improvement.
Worst practice: Reviewed infrequently or in an un-meaningful way (e.g. only success or failure is noted).
Performance dialogue:
Best practice: Regular review conversations focus on problem solving and addressing root causes; purpose, agenda and follow-up steps are clear to all;
Worst practice: No constructive feedback; a clear agenda is not known and purpose is not explicit; next steps are not clearly defined.
Consequence management:
Best practice: A failure to achieve agreed targets drives retraining or moving individuals to where their skills are appropriate;
Worst practice: Failure to achieve agreed objectives does not carry consequences.
Targets Management
Targets balance:
Best practice: Goals are a balanced set of targets (including quality, operational efficiency, and financial balance); interplay of all target dimensions is understood by staff;
Worst practice: Goals focussed only on government targets and achieving the budget.
Targets interconnection:
Best practice: Goals increase in specificity as they cascade, ultimately defining individual expectations for all staff groups;
Worst practice: Goals do not cascade down the organisation.
Time horizon of targets:
Best practice: Long term goals are translated into specific short term targets;
Worst practice: The staff's main focus is on achieving short term targets.
Target stretch:
Best practice: Goals are genuinely demanding for all parts of the organisation and developed in consultation with senior

staff;
Worst practice: Goals are too easy or impossible to achieve, in part because they are set with little clinician involvement.
Clearly defined accountability of clinicians:
Best practice: Formal accountability for quality, service and cost dimensions and consequences for good/poor performance;
Worst practice: Formal accountability for clinical performance only.
Clarity and comparability of targets:
Best practice: Performance measures are well-defined and strongly communicated;
Worst practice Performance measures are complex and not clearly understood.

People Management

Rewarding high performers:
Best practice: Financial and non-financial rewards awarded as a consequence of well-defined and monitored individual performance;
Worst practice: Staff members are rewarded in the same way irrespective of their level of performance.
Removing poor performers:
Best practice: Poor performers are moved out of the hospital/ department or to less critical roles as soon as a weakness is identified;
Worst practice: Poor performers are rarely removed from their positions.
Promoting high performers:
Best practice: Top performers are actively identified, developed and promoted;
Worst practice: People are promoted primarily on the basis of tenure.
Managing talent:
Best practice: Senior staff are held accountable for the strength of the talent pool they build;
Worst practice: Attracting, retaining and developing talent is not a top priority.
Retaining talent:
Best practice: All effort is made to retain top talent;
Worst practice: Little is done to try and keep top talent.
Attracting talent:
Best practice: A strong employee value proposition is offered;
Worst practice: Competing hospitals offer stronger employee value propositions.

Table 2: Hospital characteristics expected to explain management practices

Measure	Hypothesis test - sign	Description
Hospital Size	Hypothesis One a,b,c- positive	Log of Total number of Beds, Log of Total number of Employees, Log of Total number of Doctors in the hospital.
Level of skills and education	Hypothesis Two- positive	Estimate of the percentage of doctors and nurses within the hospitals who have a clinical degree.
Autonomy	Hypothesis Three- positive	Autonomy index 1: normalising (using Z-score) the average score of manager involvement in hiring, adding beds, budget-setting and strategic investments, and capital investment decisions. Autonomy index 2: normalising (using Z-score) the average score of hospital CEO authority in hiring and adding beds.
Organisational hierarchy	Hypothesis Four- positive	Overall index of organisational hierarchy by normalising (using Z-score) and consolidating three indicators: number of layers between the hospital manager & CEO, number of people directly reporting to the hospital manager, and number of people directly reporting to the hospital CEO.

Table 3: Descriptive statistics for Management Practices Scores

Management Practices by dimension	Score (out of 5)	Min	Max	Std. Dev
Overall Management Practices Score	***2.56***	***1.4***	***3.9***	***0.40***
Operations Management	***2.88***	***1.75***	***4.25***	***0.47***
Layout of patient flow	2.73	1	5	0.78
Rationale for introducing standardisation and pathway management	3.04	1	5	0.71
Standardisation and protocols	3.03	2	4	0.59
Good use of human resources	2.70	1	4	0.64
Performance Monitoring	***2.86***	***1.8***	***4***	***0.53***
Continuous improvement	3.06	2	4	0.74
Performance tracking	2.90	2	4	0.59
Performance review	2.75	1	4	0.73
Performance dialogue	2.91	1	4	0.72
Consequence management	2.67	1	4	0.78
Targets Management	***2.35***	***1***	***4.6***	***0.56***
Targets balance	2.42	1	5	0.86
Targets interconnection	2.61	1	5	0.72
Time horizon of targets	2.30	1	5	0.87
Target stretch	2.33	1	4	0.67
Clearly defined accountability of clinicians	1.99	1	4	0.72
Clarity and comparability of targets	2.12	1	4	0.61
People Management	***2.27***	***1.17***	***3.67***	***0.45***
Rewarding high performers	2.24	1	4	0.67
Removing poor performers	1.98	1	4	0.80
Promoting high performers	2.28	1	4	0.74
Managing talent	2.45	1	4	0.65
Retaining talent	1.86	1	4	0.65
Attracting talent	2.81	1	5	0.79

Table 4: Descriptive Statistics for Overall Management Practices Score and Variables

Variable	n.	Mean	Std. Dev.	Min	Max
Overall Management Practices Score	116	2.56	0.40	1.4	3.9
Hospital Size (number of beds)	114	332	198.47	70	900
Hospital Size (number of employees)	109	1710	1152.61	380	5000
Hospital Size (number of doctors)	102	240	226.82	30	1000
Level of skills and education	113	74	23.15	5	100
Autonomy: Hospital manager's involvement in hiring decisions	116	2.45	1.09	1	5
Autonomy: Hospital CEO authority in hiring decisions	88	3.85	0.92	1	5
Autonomy: Hospital manager's involvement in decisions to add beds	116	1.29	0.69	1	4
Autonomy: Hospital CEO authority in decisions to add beds	82	2.96	1.14	1	4
Autonomy: Hospital managers involvement in budget-setting and strategic investments	116	1.51	0.68	1	4
Autonomy: Hospital manager's maximum capital expenditure	115	15240	12858	0	500000
Organisational hierarchy: Layers between hospital manager & CEO	115	4.36	1.29	2	9
Organisational hierarchy: number of people directly reporting to hospital manager	115	20.28	24.15	0	220
Organisational hierarchy: number of people directly reporting to hospital CEO	109	10.32	5.84	2	30

Table 5: Correlation Matrix for the four hospital management practices

	MPS	Operations	Performance Monitoring	Targets	People
MPS					
Operations	0.7388*				
management	(0.0000)				
Performance	0.8250*	0.6364*			
monitoring	(0.0000)	(0.0000)			
Targets	0.8201*	0.3960*	0.5442*		
management	(0.0000)	(0.0000)	(0.0000)		
People	0.8072*	0.4629*	0.4671*	0.6079*	
management	(0.0000)	(0.0051)	(0.0000)	(0.0000)	

Table 6: Association between hospital-related factors and Management Practices Score

Column (Model)	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Dependent variable	MPS	MPS	MPS	MPS	MPS	MPS	MPS
Hospital Size (no. of beds)	0.0069 (0.037)						
Hospital Size (no. of employees)		0.0042 (0.096)					
Hospital Size (no. of doctors)			0.0363 (0.779)				
Skills and education				0.0089 (0.06)			
Autonomy (Index 1)					0.7150 (0.000)		
Autonomy (Index 2)						0.2196 (0.033)	
Organisational hierarchy							0.3911 (0.107)
Observations	114	114	100	111	114	91	106
Hospitals (n)	41	41	40	40	41	37	41
Adjusted R-squared	0.92	1.16	0.08	4.20	19	4.69	5.05

Note: All columns estimated by OLS with the p-values in parentheses under coefficient estimates (the p-values are estimated using standard errors that are clustered by hospital). "MPS" is the hospital-level management practices score, standardised to a Z-score.