



## Benchmarking management practices in Australian public healthcare

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## 1. Introduction

High quality management practices in hospitals are believed to have a positive impact on patient mortality (West et al., 2002), employee well-being (Michie and West, 2004), workforce efficiency (Anderson et al., 2003), and performance and productivity of the wider healthcare systems that they belong to (Foster et al, 2008; Trisolini, 2002). In this context, it becomes increasingly important to evaluate and benchmark the quality of hospital management practices as the key step towards identifying areas of strength and potential areas of improvement in healthcare management. In order to assess the quality of hospital management practices, it is necessary to have a robust measure of hospital management practices. However, far less research has been devoted to empirically measuring management in a health care context at a national level. This paper addresses this aim in the context of state-managed public hospitals of Australia's Queensland and NSW healthcare systems and investigates the quality of management practices of public hospitals in the Australian healthcare system. Additionally, we globally benchmark the management practices of these public healthcare systems against the health systems of seven countries, namely USA, UK, Sweden, France, Germany, Italy and Canada.

In Australia, public hospitals are nationally funded, managed and administered through state-run healthcare systems. Hence, we assess the management practices adopted by two of the country's largest healthcare systems in Queensland and NSW to gain insights into the quality of management in Australian public healthcare. In achieving its mission of creating dependable public health care and better health for all Queenslanders, Queensland Health embraces a commitment to developing leadership and management that rises to the challenges of the dynamic workplace (Queensland Health, 2011). By the same token, NSW Health also aims to create and sustain a health system that provides high quality, efficient and effective healthcare services to fulfil its mission of nurturing 'Healthy people - Now and in the future' (NSW Health, 2007; 2009). Both Queensland and NSW Health face key challenges in providing consistent and sustainable health care services. These include: the growth in population especially the ageing population; changes in the nature of illness with a rise in health risk factors such as obesity causing an increase in chronic diseases like diabetes; health inequalities amongst groups such as the indigenous and culturally diverse population, people in socio-economically disadvantaged and remotely located areas; coupled with health workforce shortages and rising costs of healthcare (Australian Government, 2007; NSW Health, 2007, Queensland Health, 2007).

The Queensland and NSW healthcare systems face immense pressure to improve their health services amidst these increasing challenges and have undergone major change and transformation. Given the positive role of management practices in healthcare performance, focussing on the management practices within Queensland and NSW Health may be a suitable means of achieving this. Therefore, Queensland and NSW Health provides a valuable setting for understanding how management practices can be leveraged to increase effectiveness and efficiency of healthcare delivery at a national level. In this context, the

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3 questions of how best to measure and analyse the quality of management practices of these  
4 Australian healthcare systems, and how they compare to those in public health systems  
5 across the world are pertinent. This study quantifies and benchmarks management practices  
6 in 67 of the most active acute care public hospitals run and managed by Queensland Health  
7 and NSW Health departments.  
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10 As mentioned earlier, the lack of consistent management data that has been validated in a  
11 cross-national context poses a major impediment in evaluating management practices  
12 across healthcare systems. The focus of most healthcare research has been on specific  
13 management practices such as human resource management (Michie and West, 2004;  
14 Omar et al. 2007) and/or specific healthcare areas such as nursing (Laschinger and Leiter,  
15 2006) as opposed to a holistic view of management. Moreover, studies that conduct a cross-  
16 country comparison of public health care management practices are also very limited (Bureau  
17 and Fenton, 2009; van Essen, 2009).  
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20 Bloom et al. (2009) along with McKinsey & Co. address this shortcoming by developing a  
21 robust survey instrument for the purpose of measuring hospital management practices in a  
22 comprehensive manner, and understanding the correlation between management capability  
23 and hospital success. Dorgan et al. (2010) further extend this instrument and deploy it  
24 across healthcare systems in multiple countries. The Bloom et al. (2009) and Dorgan et al.  
25 (2010) survey instrument uses an interview-based scoring grid following a scale of one  
26 (worst practice) to five (best practice) to construct a holistic management practices score  
27 (MPS) based on 21 individual hospital management practices across four broad areas of  
28 hospital management – operations, performance, targets and people management. In this  
29 paper, we apply this methodology to the Australian context to measure and benchmark the  
30 quality of management practices in the public hospitals of Queensland and NSW states.  
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34 The paper is structured as follows. Section 2 contains the literature review and theory  
35 development. Section 3 contains the research methodology and sampling frame. Section 4  
36 presents the results and findings, and Section 5 provides the conclusion and managerial and  
37 policy implications.  
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## 40 41 42 **2. Literature review and theory development**

### 43 44 **2.1 Best hospital management practices**

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46 Management practices have long been recognised as a driver of organizational performance  
47 and productivity. In more recent times, researchers have advocated the adoption of a  
48 universalist perspective on management practices through the 'best practice' movement  
49 (see, for example, Voss, 1995) arguing that some management practices are 'universally'  
50 better than others, and that the adoption of 'best practices' is associated with increased  
51 productivity and performance (e.g., Flynn, Schroeder and Sakakibara, 1995; Fullerton,  
52 McWatters and Fawson, 2003; Bloom et al., 2012b). This study is couched in this 'best  
53 practice' perspective.  
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57 Best management practices are seen as a means by which value can be created in  
58 healthcare. Health care institutions can draw upon a variety of management practices  
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originally developed for manufacturing or service businesses to improve the quality of healthcare management (Laing and Shiroyama, 1995; Butler et al., 1996; Trisolini, 2002; Kujala et al. 2006). However, transferring and retaining best management practices for improved hospital outcomes such as increased patient safety and reduced errors is significantly complex and requires a multi-dimensional approach (Bloom et al., 2012a). This is because, besides the technological components of healthcare improvement, hospital managers also need to understand the operational, human, institutional, and structural factors associated with effective transfer and management of healthcare management practices (Berta and Baker, 2004). It is hence important to account for this multi-dimensional nature of hospital management and identify a set of best management practices across a variety of areas critical to good healthcare delivery such as operations, performance monitoring, targets and people management.

### **Operations Management**

McDermott and Stock (2007) posit that being service operations, hospitals present a significant opportunity to apply the tools, techniques and practices from the field of operations to the healthcare industry. Their study validates positive association between operational best practices in hospitals and hospital performance in terms of average length of stay, and quality and effectiveness of patient care. Stock and McDermott (2011) further confirm that operational excellence can make a significant difference to the efficiency of patient care and hospital cost performance. The typical best practice categories found in the operations literature include lean systems, workforce management, planning and control systems, and quality management systems (Kollberg and Dahlgaard, 2007; Kujala et al., 2006; Li et al., 2002; Tucker and Edmondson, 2003; Goldstein and Ward, 2004; Rambani and Okafor, 2008). According to Vos et al. (2007), assessing the flexibility and fit of the hospital layout and design can support efficient healthcare operations. The effective use of evidence-based clinical practice guidelines, standardised protocols and clinical pathways (Scott et al., 2008), improved patient flow (Proudlove and Boaden, 2005), as well as improved documentation (Rotter et al., 2010) are also critical to reduce in-hospital complications and maintain effective operations. Bloom et al. (2009) and Dorgan et al. (2010) regard as best practice the implementation of operational systems and processes that not only increase efficiency and reduce costs, but also add value to the overarching hospital goals. An efficient layout of patient flow, focus on continuous improvement and optimal utilisation of resources are believed to aid better operations in hospitals.

### **Performance Monitoring**

Well-defined performance measures and objectives play a key role in the quality of health care (Gross et al., 2008; Ferguson and Lim, 2001). As healthcare has moved towards greater transparency and accountability, public reporting of hospital performance data and evidence-based practice appears to motivate organizations to maintain high levels of performance (Hafner et al, 2011; Farmer and Chesson, 2001). Researchers have argued the need for multiple performance metrics to measure and manage hospital performance fully, as no single indicator can adequately represent all performance dimensions in healthcare (Peterson et al., 2006; Chang et al., 2002; Giuffrida et al., 1999). According to Scott et al (2008), an effective performance monitoring system is based on evidence-based clinical decision support (guidelines, protocols and pathways), incorporates systems for practice evaluation (audits, feedback, clinical indicators and process measures), and supports

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3 formulation and implementation of strategies and guideline-based performance metrics for  
4 quality improvement. The use of well-defined systems and processes for tracking and  
5 reviewing performance through key performance indicators (KPIs), and the use of problem-  
6 solving techniques and action plans to implement process improvements is considered the  
7 key to performance monitoring by Bloom et al (2009) and Dorgan et al. (2010). The role of  
8 clinical community and network-based approaches to quality improvement and performance  
9 monitoring has also been highlighted (Aveling et al., 2012; Addicott, 2008).

### 12 **Targets Management**

13 Researchers have highlighted the role of clinical governance, budgeting and performance  
14 management systems in building trust and accountability in healthcare organizations (Lega  
15 and Vendramini, 2008; Rowe and Calnan, 2006; Roland et al., 2001). Graf et al. (1996)  
16 present the IPA (Importance, Performance, Awareness) mapping framework - a strategic  
17 planning and decision-making tool that incorporates both external customer orientation and  
18 internal efficiency considerations in resource deployment in hospitals. It is also important that  
19 that clinicians are moved into management roles for integrated accountability (Fitzgerald,  
20 1994) and performance incentives are aligned with the goals of the health care organization  
21 (Buetow, 2008; Mannion et al., 2008). Best practice in targets management, according to  
22 Bloom et al (2009) and Dorgan et al. (2010), requires hospital goals and targets to  
23 holistically include both operational and financial perspectives, and balance long- and short-  
24 term performance. Effective targets management is also about setting realistic and well-  
25 defined goals and targets that are seamlessly aligned across all areas, and consistently  
26 communicated throughout the hospital. Clarity in leadership roles and accountability for  
27 delivery of hospital targets is also crucial. An example of target management is the  
28 Australian Government's 2012 initiative to improve performance in public hospital  
29 Emergency Departments (ED) under the National Emergency Access Target (NEAT), which  
30 aims for 90% of all patients presenting to ED to be admitted, referred to another hospital for  
31 treatment, or discharged within four hours. This 4-hour rule program has significantly  
32 reduced tertiary overcrowding and aided a fall in overall hospital mortality rate (Geelhoed  
33 and de Klerk, 2012).

### 39 **People Management**

40 Literature on human resource management (HRM) suggests that key HRM practices  
41 including recruitment, training, appraisals and reward systems are associated with higher  
42 levels of healthcare performance (Harris et al., 2007; Michie and West, 2004; Brooks et al,  
43 2002; Hunter and Nicol, 2000). Specifically, studies show an inverse link between HRM  
44 practices, and infection rates and patient mortality (West et al, 2002; Omar et al. 2007;  
45 Patterson et al, 2012). Sophisticated performance appraisal systems, incentives and working  
46 in teams are linked with increased job satisfaction (Patterson et al, 2012), employee  
47 motivation and retention (Adzei and Atinga, 2012), and better mental health for employees  
48 (Borrill et al, 2000). Systems of training and development have also resulted in better  
49 retention of specific healthcare professionals (Hunter and Nicol, 2002, Brooks et al., 2002).  
50 McDermott and Keating (2011) argue for the centrality of the human resource function in  
51 healthcare organizations as they are highly service-oriented and knowledge-intensive, and  
52 Khatri (2006) goes on to develop a five-dimensional conception of HR capability for health  
53 care organizations. All in all, healthcare organizations that incorporate aspects of high  
54 performing work systems (HPWS) have been shown to drive employee commitment and job  
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3 satisfaction (Young et al., 2010), and thereby deliver better quality of patient care (Leggat et  
4 al., 2011). According to Bloom et al. (2009) and Dorgan et al. (2010), effective people  
5 management is achieved when hospitals follow a structured approach to attraction, retention  
6 and development of talent, including handling poor performers. Designing reward systems  
7 that are well-linked with the performance appraisal system and balance financial and non-  
8 financial rewards, and basing promotions on merit rather than tenure or seniority within the  
9 hospital is considered best practice.

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12 We now describe how these hospital management practices across the areas of operations,  
13 performance monitoring, targets and people management come together to form the survey  
14 instrument for this study.  
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### 16 17 18 **3. Research methodology**

#### 19 20 21 **3.1 Survey instrument**

22 The research methodology adopted by Bloom et al. (2009) and Dorgan et al. (2010)  
23 accounts for the multi-dimensional nature of hospital management and is hence best suited  
24 for this study to measure the management practices of Queensland and NSW Health  
25 hospitals across diverse areas. The survey instrument is unique in that it uses an interview-  
26 based scoring grid to construct a holistic Management Practices Score (MPS) based on  
27 individual hospital management practices across multiple dimensions. This scoring grid was  
28 originally designed and deployed by London School of Economics (LSE), Stanford and  
29 McKinsey & Co. to assess management practices in the manufacturing sector worldwide,  
30 (Bloom and Van Reenen, 2007; Bloom et al., 2012 a,b) and has now been customised for  
31 use in the global health care sector for measuring hospital management practices. This  
32 survey instrument has been deployed in hospitals across seven countries - USA, UK,  
33 Sweden, France, Germany, Italy and Canada.  
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37 Bloom et al. (2009) identify 18 hospital management practice dimensions. Dorgan et al.  
38 (2010) add two more to make 20 hospital management practice dimensions. In our study, we  
39 add one additional dimension under targets management (labelled as 'Clearly defined  
40 accountability of clinicians') to make 21 management practices in all. These healthcare-  
41 specific management dimensions can be 'universally' applied across hospitals, as against  
42 being context dependent, and can be defined as 'best practice' or 'worst practice'. Bloom et  
43 al. (2009) and Dorgan et al. (2010) aggregate these individual hospital management  
44 practices into a MPS for each hospital, which in turn is combined to arrive at an overall MPS  
45 for the healthcare system. In doing so, they implicitly assume that the effects of individual  
46 management practices are additive, which is consistent with prior studies (e.g., MacDuffie,  
47 1995).  
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51 Studies have also tested the validity of the MPS. For example, in the pilot study in the UK  
52 health sector, Bloom et al (2009) demonstrate that the MPS is associated with better  
53 performance in hospitals, both in clinical outcomes as well as general operational and  
54 financial outcomes. The subsequent global health sector research that surveyed around  
55 4000 general acute care hospitals in seven countries also concludes that MPS positively  
56 correlates with clinical outcomes (eg. lower AMI and general surgery mortality rates),  
57 operational indicators (eg. patient satisfaction, waiting lists and staff turnover) and financial  
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3 performance (eg. EBITDA per bed) in the US and UK hospitals (Bloom et al., 2009; Dorgan  
4 et al, 2010; Bloom et al., 2010; 2012b). While this association is not causal, it still suggests  
5 that the MPS is a useful and valid measure with informational content. These studies have  
6 also identified factors that determine the MPS; then hospital size, the extent of competition  
7 with nearby hospitals, the number of hospital managers with clinical training, the degree of  
8 autonomy given to hospital managers, and the hospital's ownership structure (Bloom et al.,  
9 2009; Dorgan et al, 2010; Bloom et al., 2010; 2012b).

11 The 21 hospital management practices used in this study collate into four broad areas of  
12 management – operations management (four practices), performance monitoring (five  
13 practices), targets management (six practices), and people management (six practices). The  
14 scoring grid defines and describes the criteria for scoring these 21 management practices on  
15 a scale of one to five, with five being the best practice and one being the worst practice  
16 (Table 1).  
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23 **Insert Table 1: Hospital management practice scoring grid dimensions**  
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### 30 **3.2 Survey methodology**

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32 The interviews were conducted telephonically from a central location in Sydney with hospital  
33 managers responsible for operations and performance within hospitals. Each interview on  
34 average took 57 minutes. The interviews were conducted in a conversational mode (as  
35 opposed to a conventional survey) and comprised of specific yet open-ended questions to  
36 evoke a clear and detailed picture of hospital management practices. The interviewers used  
37 the scoring grid to score each of the 21 management practices. Consistent with Bloom et al.  
38 (2009) and Dorgan et al. (2010), the overall MPS was calculated as the average of the  
39 individual management practice scores.  
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42 In order to minimise respondent and interviewer scoring bias a 'double blind, double scored'  
43 methodology was used. The 'double blind' nature of the interviews meant that the interviewer  
44 was not privy to background information on the hospital, and the interviewees were not  
45 aware of the scoring grid. Approximately 85% of the interviews were also 'double scored',  
46 meaning that while the interviews were run and scored by the main interviewer, another  
47 team member also independently scored them. This double-scoring technique aided in  
48 aligning the scoring consistency between interviewers. The scores of the listener were used  
49 for calibration and not for analysis purpose. The interviewers underwent specialised training  
50 in this interviewing methodology to ensure consistency and comparability with the global  
51 hospital management practices study.  
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### 55 **3.3 Sampling frame**

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3 Consistent with Bloom et al (2009) and Dorgan et al. (2010) methodology, our sampling  
4 frame comprised of the most active public acute care hospitals in Queensland and NSW with  
5 an emergency department and at least one of the two specialties – cardiology and  
6 orthopaedics. A total of 25 and 42 most active acute care public hospitals fit these criteria  
7 from Queensland and NSW Health respectively. The interviewers randomly contacted  
8 hospitals within this sampling frame. Personnel belonging to medical, nursing and allied  
9 health departments were interviewed, ensuring that both clinicians and managers were  
10 spoken to in each area. Among the medical personnel, while our focus was mainly on  
11 cardiology and orthopaedics to remain consistent with the global healthcare study, we also  
12 interviewed some personnel belonging to other clinical areas such as Emergency Medicine.  
13 Positions of interviewed staff range from director of medical services, director of  
14 cardiology/orthopaedics, director of nursing and nurse unit manager, and director of support  
15 services to other positions such as Resident Medical Officers, Junior Medical Officers,  
16 Consultants and Specialists. Thus, we covered a diverse range of hospital personnel.  
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21 In accordance with Bloom et al. (2009) and Dorgan et al. (2010), the scores emanating from  
22 interviews of personnel belonging to the same hospital are clustered to arrive at a MPS for  
23 that hospital. The overall MPS for the healthcare system is an aggregation of the MPS  
24 across all hospitals. Bloom et al. (2007) classify management practices as ‘better’ or ‘worse’  
25 on average, and even though some of the practices in reality in the aggregate may not be  
26 ‘best practice’ for a specific organization, the effects of individual management practices are  
27 still added in coming up with the MPS score. This approach adopted by Bloom is consistent  
28 with the approach of an earlier study by MacDuffie (1995).  
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31 All hospitals included in the sampling frame were contacted. A total of 135 and 116 hospital  
32 personnel were interviewed within Queensland Health and NSW Health respectively, making  
33 the total sample size of 251 interviews across 67 public hospitals in all.

34 Table 2 Panel A shows the demographic distribution of the interviews on the basis of the  
35 specialties of the interviewed managers. Cardiology and Orthopaedic managers represented  
36 17.93% and 11.16% of the sample respectively, and the rest was made up of the ‘Other’  
37 category (that included multi-specialty managers such as Director of Medical Services and  
38 Director of Nursing, as well as single specialty managers other than Cardiology and  
39 Orthopaedics such as Emergency and Allied Health Services). This categorization of  
40 specialties is consistent with the Bloom et al. (2009) and Dorgan et al. (2010) study. The  
41 distribution of the sample by the profile of the interviewed hospital managers is provided in  
42 Table 2 Panel B. Of the total hospital personnel interviewed, 43.82% were nurses, 39.44%  
43 were doctors and the remaining 16.73% were non-clinical managers.  
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49 **Insert Table 2 Panel A: Distribution of interviewed hospitals by specialty**  
50 **Panel B: Distribution of interviewed hospitals by manager profile**  
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### 53 **3.4 Global benchmarking data**

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55 Data for management practices in public hospitals of seven countries - USA, UK, Sweden,  
56 France, Germany, Canada and Italy - have been collected through the global health sector  
57 research that rigorously adopted the well-tested methodology to measure management  
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practices (Bloom et al. 2009; Dorgan et al., 2010; Bloom and Van Reenen, 2007; Bloom et al., 2012 a, b) available via the World Management System website (See <http://worldmanagementsurvey.org>). Data collected by deploying the same methodology through interviews with the 251 Queensland and NSW public hospital personnel across 67 public hospitals was analysed to benchmark their management practices against those in hospitals of these seven countries. Whilst the global health sector research includes both public and private hospitals, data from only public hospitals have been used for this international benchmarking analysis to ensure comparability with Queensland and NSW Health public hospitals.

## 4. Analysis, Results and discussion

### 4.1 *Quality of management in Queensland and NSW Health hospitals*

Table 3 Panel A summarises the spread of scores in overall management as well as the four areas of management – operations, performance monitoring, targets and people management – in Queensland and NSW public hospitals. For the statistical tests, the scores of the 21 management practice dimensions across the four management areas are standardised to z-scores with mean zero before additively combining them to form the MPS. Table 3 Panel B provides the percentile distribution of management scores. It is evident from this that hospitals have implemented management practices not considered best practice, and this allowed us to identify hospitals with better versus worse management practices.

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#### **Table 3 Panel A: Scores in Overall Management and the four Management Areas**

#### **Panel B: Percentile Distribution of Management Scores**

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The average overall MPS for Queensland and NSW hospitals is 2.51. Table 3 Panel B shows that 10 per cent of the interviewed hospitals scored less than 2 in overall MPS. No hospital scored an overall MPS greater than 4. Only 1 per cent of interviewed hospitals scored above 3.6. The large differences in performance outcomes in the healthcare sector have been linked to the wide spread in the quality of management practices among hospitals (Skinner and Staiger, 2009; Kessler and McLennan, 2000; Hall et al., 2008). Further, it is the ‘tail’ of poor performers (i.e. hospitals delivering disproportionately poor management scores), and not as much the outstanding performers, that are believed to largely determine overall management performance (Bloom et al., 2009, 2012b; Dorgan et al., 2010). Focussing on the critical mass of low scoring hospitals can hence be an effective way of enhancing the quality of management and in turn, healthcare performance.

Operations management is the area where Queensland and NSW Health hospitals performed the best, with an average score of 2.79. Among all hospital managers

interviewed, 10 per cent scored above 3.5, and 1 per cent scored above 4. Only 5 per cent had a score less than 2, confirming that a large portion of hospitals have implemented robust operational systems and processes. Queensland and NSW hospitals have an average score of 2.76 in performance monitoring. 10 per cent of interviewed hospitals scored above 3.4. 10 per cent of them fared poorly, scoring below 2, revealing there is scope to improve in performance monitoring. The average score of Queensland and NSW Health hospitals in targets management is 2.36. 1 per cent of hospitals scored above 3.6; however about 25 per cent of hospitals scored below 2, ascertaining that this is a relatively weak area for these hospitals. Queensland and NSW Health hospitals score 2.26 in people management. While 1 per cent of the hospitals score higher than 3.6 in this area, 25 per cent of them perform poorly scoring less than 2, indicating there is scope for improvement in this domain. People management is the weakest area for Queensland and NSW hospitals (Table 3 Panel A & B). Once again, the pattern of wide dispersion in management practices is evident across all areas, calling for Queensland and NSW Health to focus on transforming management practices in poor-performing hospitals within each management area (Bloom et al. 2012b)

#### **4.2 Quality of the 21 management practices in Queensland and NSW Health hospitals**

Table 5 summarises the performance of Queensland and NSW Health across the 21 management practices. Among the four dimensions within operations management, NSW hospitals are best at basing the standardised operational practices on a sound rationale, and systematically adopting protocols. In performance monitoring, it is in deploying continuous improvement measures that Queensland and NSW Health hospital managers deliver their best. They also perform fairly well in systematically tracking performance and having structured performance review meetings for problem-solving. Among the targets management dimensions, Queensland and NSW Health hospitals perform relatively better in setting well-balanced and inter-connected goals and targets which cascade down the hospital organisation. Among the six dimensions in people management, it is in attracting talent that Queensland and NSW Health hospitals perform relatively better (Table 4).

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**Table 4: Scores in the 21 Management Practices**

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#### **4.3 Global benchmarking of Queensland and NSW Health hospital management**

Exhibit 1 graphically represents the management scores and ranking of Queensland and NSW Health, and how they compare with the scores of public hospitals of the seven other countries (USA, UK, Sweden, France, Germany, Canada and Italy). 'Two sample t-tests with equal variances' have been used to compare the management scores across the benchmarked health systems, and the results are presented in Table 5. With a score of 2.51, public hospitals in Queensland and NSW Health rank sixth in its overall MPS. Queensland and NSW Health MPS share statistical parity with one other country – Canada. The US

public hospitals rank first, with public hospitals in UK, Germany and Sweden also performing statistically better than Queensland and NSW Health hospitals. This indicates the scope for improvement in the management practices of Queensland and NSW Health hospitals to match the world's best health care systems. Best practices deployed across the different management areas by the globally high-performing public health care systems are highlighted in the next section.

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### **Exhibit 1: Overall Management Scores in Public Hospitals – A Global Comparison**

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**Table 5: T-tests Summary – Overall Management Scores across benchmarked countries**

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#### **4.4 Global benchmarking of Queensland and NSW Health hospitals in the four management areas**

We now delve into the four broad areas of management – operations, performance monitoring, target and people. Exhibit 2 graphically represents the scores for operations management across the benchmarked health systems, and Table 6 summarizes the results of 'two sample t-tests with equal variances'. Queensland and NSW Health is ranked sixth in operations management, and scores 2.79 in this category. US public hospitals are in the lead, followed by UK public hospitals. Queensland and NSW Health scores statistically lower than the best performers – US and UK – in operations management practices, but is at statistical parity with public hospitals in France, Germany, Italy and Canada. Studies have shown that operational best practices such as patient flow processes, demand and capacity management systems deployed by hospitals in the US and UK have translated into improved performance outcomes such as reduced costs, increased efficiency and better quality of patient care (Stock and McDermott, 2011; Bowers and Mould, 2002; Laing and Shiroshima, 1995) which Queensland and NSW health hospitals can benefit from.

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### **Exhibit 2: Operations Management Scores in Public Hospitals – Global Benchmarking**

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In performance monitoring, Exhibit 3 graphically represents the scores and Table 6 presents the results of the 'two sample t-tests with equal variances'. Queensland and NSW Health ranks sixth in this area, with a score of 2.76. Queensland and NSW Health is statistically on par with public hospitals in Sweden, Germany and Canada; but trails behind the top tier nations – US and UK. Hospitals in the US and UK have been known to successfully adopt performance management practices from the manufacturing sector to improve efficiency and

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3 effectiveness of healthcare delivery. Bloom et al. (2012a) illustrate the case of a Seattle  
4 healthcare provider that deployed performance monitoring practices inspired by the Toyota  
5 Production System resulting in improved patient care, employee morale and financial  
6 outcomes. The National Health Services (NHS) in the UK has also deployed performance  
7 monitoring systems with sophisticated information databases and formal reporting leading to  
8 evidence-based health care and improved quality of care (Ferguson and Lim, 2001; Mannion  
9 et al, 2005, 2008). This multi-dimensional performance assessment framework is also used  
10 by the UK government as a strategic management tool to link national strategies with local  
11 hospital operations (Chang et al., 2002).  
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### 14 15 16 **Exhibit 3: Performance Monitoring Scores in Public Hospitals – Global Benchmarking** 17 18

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20 Exhibit 4 graphically represents the scores in targets management. Queensland and NSW  
21 Health ranks sixth, and scores 2.36 in this area. US and Sweden deliver exceptional  
22 performance in targets management, and public hospitals in the UK and Germany also score  
23 statistically higher than Queensland and NSW Health. Queensland and NSW Health is in  
24 statistical parity with Canada, Italy and France in this sphere. Table 6 summarizes the  
25 results of the ‘two sample t-tests with equal variances’ for targets management. Research  
26 has shown that public hospitals have had to deal with a large number of targets, often  
27 arbitrary and inconsistent, handed down by the government, making targets management a  
28 challenge (Smith, 2002; Jacobs et al. 2006; Addicott, 2008). High performing health care  
29 systems have taken concerted policy initiatives to overcome this challenge; for example, the  
30 UK NHS introduced organization-wide systems for improved clinical governance  
31 mechanisms resulting in aligned goals and targets and evidence-based decision-making  
32 (Rowe and Calnan, 2006; Mannion et al., 2005; Roland et al., 2001), and also made a  
33 conscious effort to move clinicians into management roles for integrated accountability  
34 (Fitzgerald, 1994). Given that Queensland and NSW public hospitals are managed by state-  
35 run institutions, it is critical to work towards consistency and alignment of goals and targets.  
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### 40 41 42 **Exhibit 4: Targets Management Scores in Public Hospitals – Global Benchmarking** 43 44

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46 Exhibit 5 graphically represents the scores in people management. Queensland and NSW  
47 Health scores 2.26 and ranks fifth. US performs statistically better than all the other nations  
48 in this area. In addition to USA, Queensland and NSW Health also statistically trails behind  
49 Germany, Sweden and UK in this sphere. It is evident that people management is a weak  
50 area for Queensland and NSW Health. This is consistent with Leggat et al.’s (2011) findings  
51 that Australian public health care organizations lack the human resource management  
52 systems and practices that support HPWS. Table 6 presents the results of the ‘two sample t-  
53 tests with equal variances’ for people management. Research on the UK NHS hospitals has  
54 highlighted the link between a variety of HRM best practices and health care outcomes such  
55 as patient mortality (Purcell et al, 2003; Guest and Conway, 2004; West et al., 2002, 2006).  
56 It has also been identified that high-performing hospitals within the UK NHS placed strong  
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3 emphasis on recruiting and retaining clinicians who are committed to corporate rather than a  
4 purely professional agenda, and further training them in broader management skills  
5 (Mannion et al., 2005). There is scope for Queensland and NSW Health hospitals to  
6 incorporate such best practices aligned towards HPWS.  
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10 **Exhibit 5: People Management Scores in Public Hospitals – Global Benchmarking**  
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18 **Table 6: T-tests Summary – Management Scores across benchmarked countries**  
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24 **4.5 Global benchmarking of Queensland and NSW Health hospitals**  
25 **across the 21 management practices**  
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27 Table 7 shows how Queensland and NSW Health's score compares with the respective  
28 global best performer across the 21 management practices. Among the four management  
29 practices within operations management, Queensland and NSW Health tops the dimension -  
30 'Rationale for introducing standardization and pathway management'. It is at statistical parity  
31 with the best performing nation in one other dimension – 'Layout of Patient Flow' – but is  
32 statistically lower than the top nation in 'Standardisation and Protocols' and 'Good use of  
33 human resources'. Queensland and NSW Health scores statistically lower than the best  
34 performing nation in all the management practices encompassing performance monitoring,  
35 targets management, and people management.  
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40 **Table 7: T-tests Summary – Management Practices Scores of QLD-NSW Health and**  
41 **global best performer**  
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46 **4.6 Comparison of Queensland and NSW Health hospitals with US**  
47 **and UK public hospitals**  
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49 We now compare the management practices of Queensland and NSW Health with the public  
50 hospitals belonging to the two top performing health care systems belonging to the US and  
51 UK. In the context of US, public hospitals are hospitals owned by state bodies such as UCSF  
52 (The San Francisco hospitals owned by the University of California). In the UK, public  
53 hospitals refer to hospitals owned and run by the National Health Services (NHS). This  
54 analysis is based on a total of 163 public hospitals and 120 public hospitals in the US and  
55 UK respectively that participated in the global health sector research (Dorgan et al., 2010).  
56 The median management score for the sample of Queensland and NSW Health hospitals is  
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3 2.5. 206 out of the total 283 US and UK public hospitals score higher than 2.5 in their  
4 management practices. This implies that the top 73 per cent of US and UK public hospitals  
5 have better management scores than half of the Queensland and NSW Health hospitals.  
6 This reveals the scope for improving Queensland and NSW Health hospital management  
7 practices in relation to the top performers.  
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## 10 11 12 **5. Key Contributions** 13

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15 This paper has provided empirical evidences on the quality of management practices of  
16 hospitals in the Australian public healthcare systems of Queensland and NSW across the  
17 four broad areas of hospital management – operations, performance, targets and people  
18 management. This study assesses and globally benchmarks the management practices of  
19 Queensland and NSW Health with those of seven countries.  
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22 Overall, this study makes multiple contributions. Firstly, this study provides an internationally  
23 comparable robust measure of management quality in the Australian public healthcare,  
24 specifically in Queensland and NSW hospitals. In particular, this paper unearths insights on  
25 how management practices in Queensland and NSW public hospitals compare with those in  
26 public hospitals across seven countries. Queensland and NSW Health management  
27 practices rate modestly when globally benchmarked and show potential to improve so as to  
28 bridge the gap with the global best-performing health systems. Bloom et al. (2012a) found  
29 that, across the globe, best-practice healthcare institutions were primarily motivated to  
30 evaluate and transform their management practices in response to external challenges. The  
31 rising patient demand and simultaneous workforce shortage and resource constraints facing  
32 Queensland and NSW Health hospitals present just that kind of challenge to spur a  
33 transformation in their management practices.  
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36 Secondly, this study contributes to the quantifiable evidence-base of management practices  
37 in Australian public hospitals. The empirical results demonstrate that not only are there  
38 significant differences in the quality of management practices among hospitals in different  
39 countries; there is also a wide spread between hospital management practices within  
40 Queensland and NSW Health. Studies have attributed the large performance differentials in  
41 the healthcare sector to this dispersion in hospital management practices (Skinner and  
42 Staiger, 2009; Kessler and McLennan, 2000; Hall et al., 2008). By improving practices in  
43 those hospitals that have delivered a poor management score, Queensland and NSW Health  
44 can narrow the spread to translate into better healthcare performance outcomes (Bloom et  
45 al., 2012b).  
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49 Thirdly, this study sheds light on the strength and weaknesses of management practices in  
50 Queensland and NSW Health hospitals. Queensland and NSW hospitals combined perform  
51 best in operations management, and in particular in the practices around defining rationale  
52 for standardisation and pathway management, and designing the layout of patient flow. This  
53 shows that Queensland and NSW hospitals deploy relatively structured systems and  
54 standardised processes for management of their operations. Performance monitoring is also  
55 where Queensland and NSW Health hospitals perform reasonably well, although there is  
56 room for improvement in this area to match the global best practices. Target management  
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3 emerges as an opportunistic area for Queensland and NSW Health hospitals with scope to  
4 improve the process of setting and managing goals and targets effectively and efficiently.  
5 This research identifies people management as the weakest area for Queensland and NSW  
6 Health, with potential to improve practices of attracting, developing and retaining talent. In  
7 doing so, it is critical that Queensland and NSW Health hospitals deploy consistent and  
8 concerted initiatives. Bloom et al. (2012a) highlight that good management practices usually  
9 take time to get institutionalised in healthcare services, yet when they are, they have  
10 transformational effects on the quality and delivery of patient care. Therefore, remaining  
11 focussed and persistent on the path of improving hospital management practices is the key.  
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## 14 15 16 **6. Implications, Conclusion and Future Research** 17

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20 Key implications include promoting a better healthcare system by better leveraging  
21 management practices to cope with the challenge of delivering effective and efficient patient  
22 care while constrained by resource shortages. The findings of this paper can help achieve  
23 this through targeted health reforms that support the adoption and diffusion of improved  
24 management practices, particularly in the area of people management and target  
25 management, at the hospital level as well as at the institutional level. The paper is thus likely  
26 to be of interest to both hospital administrators and healthcare policymakers aiming to lift  
27 hospital management practices as a vehicle to consistently deliver sustainable high-quality  
28 health services. The results and outcomes of this paper also form the foundation for further  
29 research. This study has focused on Queensland and NSW Health, two of the largest state-run  
30 healthcare systems in Australia, to provide insights into the national Australian public healthcare  
31 management practices. There is scope for future research to extending this study to the other state  
32 healthcare systems (eg., Victoria, South Australia, Western Australia) to enable richer and more  
33 holistic insights into the quality of management in Australian healthcare. Studying the impact of  
34 good management practices on hospital performance in terms of clinical outcomes, like  
35 mortality rates, readmission rates, infection rates, as well as operational and financial  
36 performance is also a fertile research avenue. Studying the factors that drive hospital  
37 management practices, causality linkages between management practices and its several  
38 determinants is a potential topic for future investigation Comparing management practices in  
39 the public and private health sector is also a topical area for research.  
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**Table 1: Hospital management practice scoring grid dimensions**

Source: adapted from Bloom et al. (2009)

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

*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 Panel A: Distribution of interviewed hospitals by specialty**

Hospital specialty	No. of interviews	Percentage of interviews
'Other'	178	70.92%
Cardiology	45	17.93%
Orthopaedics	28	11.16%

**Table 2 Panel B: Distribution of interviewed hospitals by manager profile**

Hospital manager profile	No. of interviews	Percentage of interviews
Nurse	110	43.82%
Doctor	99	39.44%
Non-clinical managers	42	16.73%

**Table 3 Panel A: Scores in Overall Management and the four Management Areas**

Variable	n.	Mean	Std. Dev.	Min	Max
Overall Management Practices	251	2.51	0.44	1.15	3.9

Operations Management	251	2.79	0.50	1	4.25
Performance Monitoring	251	2.76	0.57	1	4.2
Targets Management	251	2.36	0.57	1	4.6
People Management	251	2.26	0.49	1.17	4

**Table 3 Panel B: Percentile Distribution of Management Scores**

Percentile	Overall Management	Operations Management	Performance Monitoring	Targets Management	People Management
1%	1.25	1.25	1.2	1	1.17
5%	1.8	2	1.8	1.4	1.5
10%	2.05	2.25	2	1.6	1.67
25%	2.25	2.5	2.4	2	2
50%	2.5	2.75	2.8	2.4	2.17
75%	2.8	3	3.2	2.8	2.5
90%	3.05	3.5	3.4	3.2	2.83
95%	3.25	3.5	3.6	3.2	3
99%	3.6	4	4	3.6	3.67

**Table 4: Scores in the 21 Management Practices**

Variable	n.	Mean	Std. Dev.	Min	Max
<b>Operations Management</b>	<b>251</b>	<b>2.79</b>	<b>0.50</b>	<b>1</b>	<b>4.25</b>
Layout of patient flow	251	2.69	0.70	1	5
Rationale for introducing standardisation and pathway management	251	2.92	0.71	1	5
Standardisation and protocols	251	2.90	0.65	1	4
Good use of human resources	251	2.66	0.72	1	4
<b>Performance Monitoring</b>	<b>251</b>	<b>2.76</b>	<b>0.57</b>	<b>1</b>	<b>4.2</b>
Continuous improvement	251	2.94	0.73	1	4
Performance tracking	251	2.79	0.67	1	4
Performance review	251	2.68	0.74	1	4
Performance dialogue	251	2.78	0.73	1	5
Consequence management	251	2.61	0.76	1	4
<b>Targets management</b>	<b>251</b>	<b>2.36</b>	<b>0.57</b>	<b>1</b>	<b>4.6</b>
Targets balance	251	2.47	0.83	1	5
Targets interconnection	251	2.55	0.74	1	5
Time horizon of targets	251	2.35	0.81	1	5
Target stretch	251	2.33	0.69	1	4
Clearly defined accountability of clinicians	251	1.67	0.71	1	4
Clarity and comparability of targets	251	2.10	0.69	1	4
<b>People Management</b>	<b>251</b>	<b>2.26</b>	<b>0.49</b>	<b>1.17</b>	<b>4</b>
Rewarding high performers	251	2.12	0.71	1	4
Removing poor performers	251	2.02	0.81	1	4
Promoting high performers	251	2.37	0.77	1	4
Managing talent	251	2.43	0.69	1	5
Retaining talent	251	1.91	0.72	1	4

Attracting talent	251	2.70	0.80	1	5
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**Table 5: T-tests Summary – Overall Management Scores across benchmarked countries**

Two sample t-tests with equal variances across benchmarked countries	Pr( T > t )	t statistic	Degrees of freedom
US and UK	0.0174	-2.3918	281
UK and Germany	0.4137	-0.8193	180
Germany and Sweden	0.8400	-0.2023	114
Sweden and Canada	0.0412	-2.0537	223
Canada and NSW-QLD Health	0.9090	0.1143	420
NSW-QLD Health and Italy	0.0696	-1.8197	382
Italy and France	0.3347	-0.9663	269
NSW-QLD Health and France	0.0016	-3.1842	387
NSW-QLD Health and Sweden	0.0260	2.2377	303

**Table 6: T-tests Summary – Management Scores across benchmarked countries**

Two sample t-tests with equal variances between benchmarked countries	Pr( T > t )	t statistic	Degrees of freedom
<b>Operations Management</b>			
US and UK	0.6522	-0.4511	281
UK and France	0.1637	-1.3969	256
US and France	0.0577	-1.9053	299
France and Germany	0.7922	0.2574	198
Germany and Italy	0.9127	0.1098	193
Italy and NSW-QLD Health	0.8077	-0.2435	380
NSW-QLD Health and Canada	0.7614	0.3038	418
Canada and Sweden	0.0035	2.9535	223
<b>Performance Monitoring</b>			
US and UK	0.4872	-0.6958	281
UK and Sweden	0.7152	-0.3655	172
UK and Canada	0.0084	-2.6523	289
Sweden and Germany	0.3536	-0.9314	114
Germany and Canada	0.6071	-0.5149	231
Canada and NSW-QLD Health	0.2569	1.1353	420
NSW-QLD Health and Italy	0.0309	-2.1669	382
Italy and France	0.4763	-0.7133	269
<b>Targets Management</b>			
US and Sweden	0.9214	-0.0988	215
Sweden and UK	0.4240	0.8013	172
Sweden and Germany	0.0774	1.7820	114
UK and Germany	0.1769	-1.3556	180
Germany and Canada	0.1609	1.4067	231
Germany and NSW-QLD Health	0.0162	-2.4165	311
Canada and NSW-QLD Health	0.2175	-1.2371	420



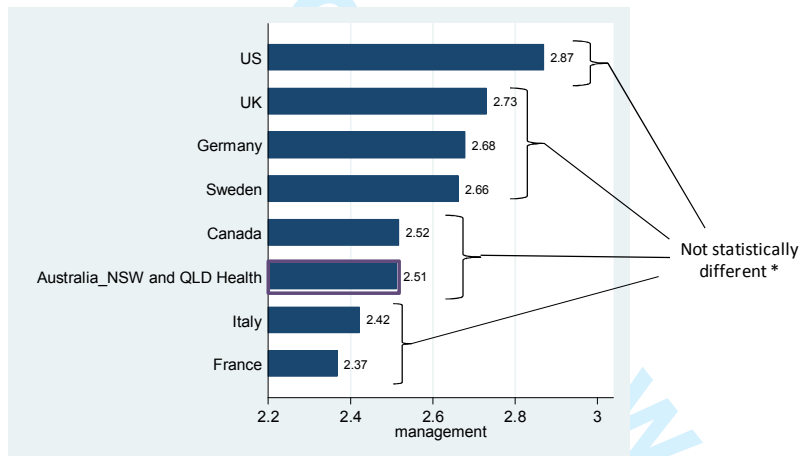
NSW-QLD Health and Italy	0.5280	0.6316	382
Italy and France	0.4117	-0.8221	269
<b>People Management</b>			
US and Germany	0.0046	2.8635	223
Germany and Sweden	0.2551	-1.1438	114
Sweden and UK	0.9029	0.1221	172
UK and NSW-QLD Health	0.0008	-3.3895	369
NSW-QLD Health and Canada	0.0512	1.9550	420
Canada and Italy	0.1950	-1.2989	302
Italy and France	0.0896	1.7037	269

**Table 7: T-tests summary – Management Practices Scores of QLD-NSW Health and global best performer**

Variable	Best Performer	Best Performer Score	QH-NSW Health Rank	Two sample t-tests with equal variances between QH-NSW Health and the Best Performer		
				Pr( T > t )	t statistic	Degrees of freedom
<b>Operations Management</b>						
Layout of patient flow	US	2.77	4	0.2646	-1.1172	412
Rationale for introducing standardisation and pathway management	QH-NSW Health	2.92	1	Not applicable		
Standardisation and protocols	US	3.12	7	0.0019	-3.1305	412
Good use of human resources	US	3.01	7	0.0000	-4.6670	412
<b>Performance Monitoring</b>						
Continuous improvement	Sweden	3.14	7	0.0613	-1.8786	303
Performance tracking	UK	3.21	6	0.0000	-5.6331	369
Performance review	UK	3.14	6	0.0000	-5.6350	369
Performance dialogue	US	3.02	5	0.0008	-3.3890	412
Consequence management	US	2.89	5	0.0006	-3.4722	412
<b>Targets Management</b>						
Targets balance	Sweden	3.03	7	0.0000	-4.4828	303
Targets inter-connection	Sweden	3.12	7	0.0000	-5.0351	303
Time horizon of targets	US	2.73	6	0.0000	-4.3736	412
Target stretch	US	2.69	6	0.0000	-4.8065	412

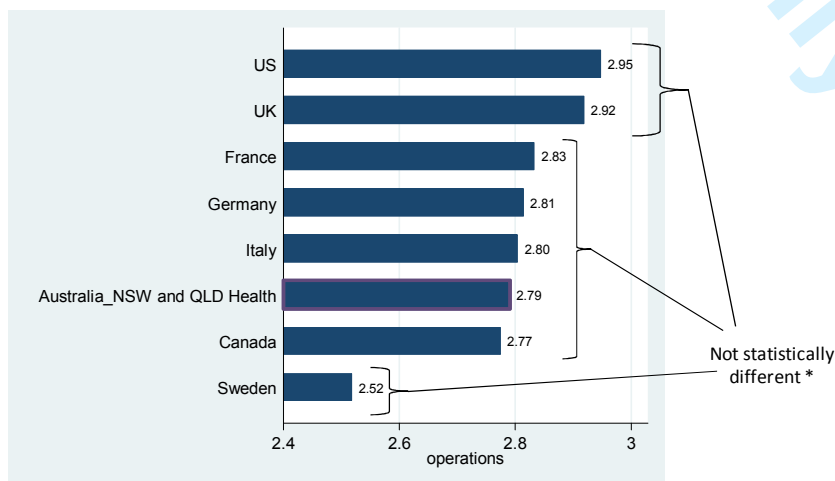
Clarity and comparability of targets	US	2.46	6	0.0000	-4.7117	411
<b>People Management</b>						
Rewarding high performers	Sweden	2.74	3	0.0000	-5.9369	303
Removing poor performers	US	3.17	6	0.0000	-13.6734	412
Promoting high performers	US	2.82	4	0.0000	-5.4197	412
Managing talent	Germany	2.74	3	0.0014	-3.2139	311
Retaining talent	US	2.36	5	0.0000	-5.7354	412
Attracting talent	Germany	3.14	8	0.0001	-3.9405	311

**Exhibit 1: Overall Management Scores in Public Hospitals – A Global Comparison**



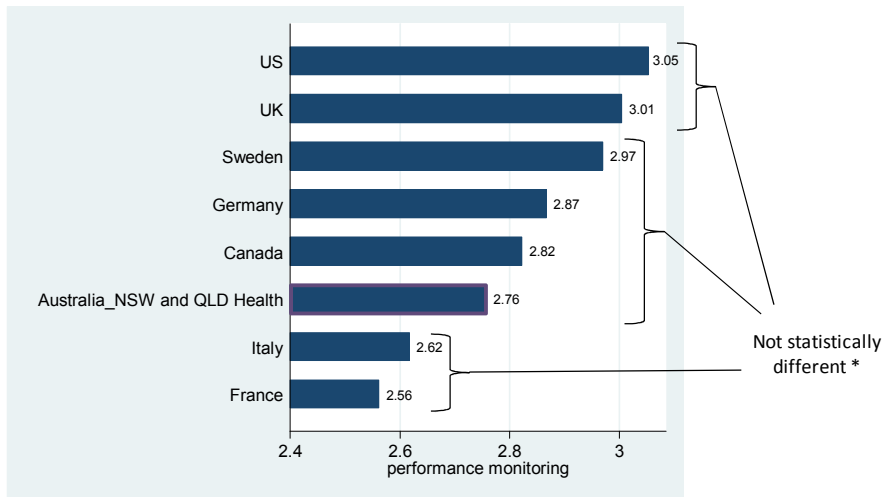
• At the 10 per cent significance level.  
 Source: Queensland and NSW management practices research dataset; Bloom et al. (2009); Dorgan et al. (2010)

**Exhibit 2: Operations Management Scores in Public Hospitals – Global Benchmarking**



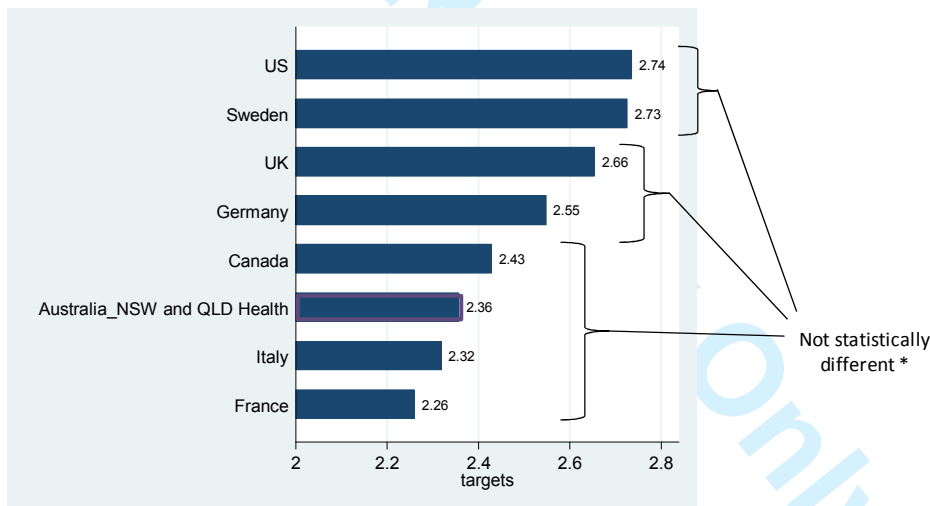
• At the 10 per cent significance level.  
 Source: Queensland and NSW management practices research dataset; Bloom et al. (2009); Dorgan et al. (2010)

**Exhibit 3: Performance Monitoring Scores in Public Hospitals – Global Benchmarking**



- At the 10 per cent significance level.
- Source: Queensland and NSW management practices research dataset; Bloom et al. (2009); Dorgan et al. (2010)

**Exhibit 4: Targets Management Scores in Public Hospitals – Global Benchmarking**

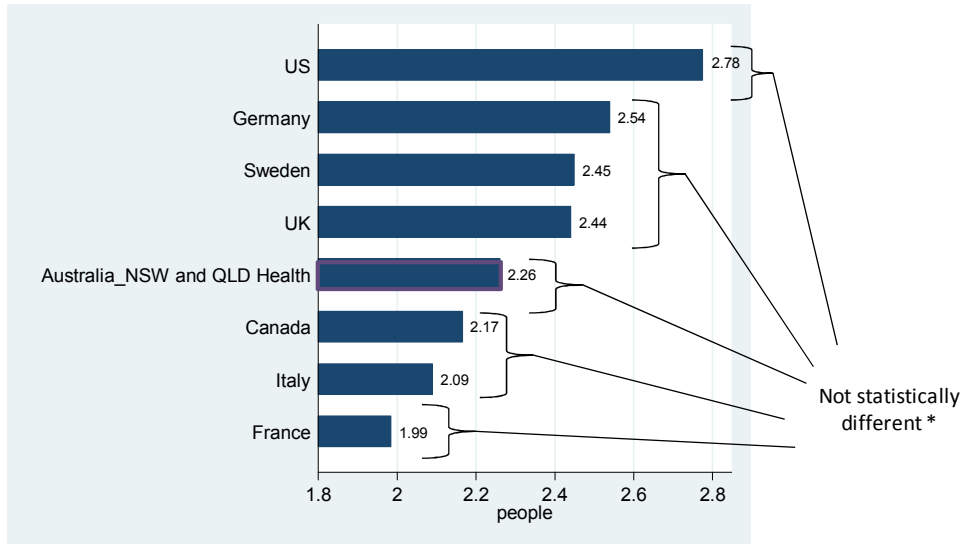


- At the 10 per cent significance level.
- Source: Queensland and NSW management practices research dataset; Bloom et al. (2009); Dorgan et al. (2010)

**Exhibit 5: People Management Scores in Public Hospitals – Global Benchmarking**

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- At the 10 per cent significance level.  
Source: Queensland and NSW management practices research dataset; Bloom et al. (2009); Dorgan et al. (2010)

For Review Only