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Development and validation of health service management competencies

Health service
management
competencies

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Abstract

Purpose – The importance of managerial competencies in monitoring and improving the performance of organisational leaders and managers is well accepted. Different processes have been used to identify and develop competency frameworks or models for healthcare managers around the world to meet different contextual needs. The purpose of the paper is to introduce a validated process in management competency identification and development applied in Australia – a process leading to a management competency framework with associated behavioural items that can be used to measure core management competencies of health service managers.

Design/methodology/approach – The management competency framework development study incorporated both qualitative and quantitative methods, implemented in four stages, including job description analysis, focus group discussions and online surveys.

Findings – The study confirmed that the four-stage process could identify management competencies and the framework developed is considered reliable and valid for developing a management competency assessment tool that can measure management competence amongst managers in health organisations. In addition, supervisors of health service managers could use the framework to distinguish perceived superior and average performers among managers in health organisations.

Practical implications – Developing the core competencies of health service managers is important for management performance improvement and talent management. The six core management competencies identified can be used to guide the design professional development activities for health service managers.

Originality/value – The validated management competency identification and development process can be applied in other countries and different industrial contexts to identify core management competency requirements.

Keywords Competencies, Management, Competency models, Health managers, Competency frameworks

Paper type Research paper

Introduction

There is agreement among practitioners and academics that managerial competencies are useful for monitoring and improving the performance of organisational leaders and managers (Levenson *et al.*, 2006), with useful application in healthcare (Stefl, 2008). While a wide variety of competency frameworks or models have been developed for healthcare managers around the world (Calhoun *et al.*, 2008; Garman and Scribner, 2011; Stefl, 2008), there is strong evidence suggesting that management competencies are influenced by the industry context (Robotham and Jubb, 1996; Brownell, 2008). This limits the usefulness of competency scales developed for other industries or in other countries. In Australia, the needs of health service organisations have outpaced the science, with organisations adopting competency frameworks for which there is limited evidence and no validated and reliable measurement tools. Previous studies have suggested both a lack of leadership and management abilities in healthcare (Leggat *et al.*, 2011; Leggat and Dwyer, 2005; Bartram *et al.*, 2012), suggesting a

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need for an evidence-based competency system in Australia to inform measurement of management competence and to drive training and education requirements. This paper describes the development, testing and validation of a management competency framework relevant to the role requirements for health services managers working in Australia.

Theory

Since the concept developed by David McClelland (1973), the use of competencies to identify high-performing employees has gradually become widespread in human resource management (HRM) in both the health and non-health sectors (Rodríguez *et al.*, 2002; Young and Dulewicz, 2008). Lucia and Lesinger (1999) defined a management competency as, “a descriptive tool that identifies the skills, knowledge, personal characteristics and behaviours needed to effectively perform a role in the organisation and help the business meet its strategic objectives” (Lucia and Lesinger, 1999, p. 5). Similarly, Hellriegel *et al.* (2008) viewed competence as the “sets of knowledge, skills, behaviours, and attitudes that a person needs to be effective in a wide range of positions and various types of organisation” (p. 2).

A competency should predict performance on the job, be measured against well-accepted standards (Lucia and Lesinger, 1999). Competency of the management team can be achieved through recruitment and retention of competent managers, or through internal and external development activities (Cappelli, 2008). Therefore, the knowledge and utilisation of required management competencies is a critical strategic resource of an organisation (Castanias and Helfat, 2001) with evidence of a strong positive link between management competency identification and individual management performance, and a weaker relationship with unit-level performance (Levenson *et al.*, 2006).

The use of core competencies to improve management practice in healthcare has received substantial support (Calhoun *et al.*, 2002). Despite the strong evidence for management competencies, a review of the literature suggested that organisations were not successful in managing their employee talent (Ariss *et al.*, 2014). The increasing complexity in healthcare management suggests that the necessary competencies change over time (Liang and Howard, 2010), and that talent management strategies underpinned by formalised and integrated strategic HRM are important, given the pace of change and instability within the industry (Cappelli, 2008). This is a challenge to public healthcare, as this sector lags behind private sector healthcare and other industries in the practice of effective talent management (Castro *et al.*, 2008) and strategic HRM (Bartram *et al.*, 2007). Again, effective talent management practice in public sector healthcare needs strategies that address both the demand and supply of highly competent managers.

Identified competencies are typically organised into competency frameworks and operationalised in an organisation through behaviourally based competency systems (Calhoun *et al.*, 2004). The management literature suggests two different approaches to competencies in the workplace, with differentiating competencies that distinguish excellent performance (Boyatzis, 2008) and threshold competencies that are the minimum required to perform a job (Spencer and Spencer, 1993). In previous studies, online survey (Bondoc and Herz, 2008; Sutto *et al.*, 2008; Mohd-Shamsudin and Chuttipattana, 2012), focus group discussions (Clark and Armit, 2010), interviews (Calhoun *et al.*, 2004; Kirk, 2009; Jefferies *et al.*, 2016) and role and scenario analysis (McCarthy and Fitzpatrick, 2009) were used to identify management competency requirements.

Australia has one of the best healthcare systems amongst OECD countries (Schneider *et al.*, 2017). However, the three-tiered government and policy arrangements to provide largely private primary care services, a mixture of publicly and privately funded hospitals covered by both universal health insurance (Medicare) and private insurance is challenging to manage. Australian healthcare management positions are unregulated with no specific registration

requirements or credentials for being a manager. Competencies requirements for health managers are often unclear, providing limited guidance to developing formal and informal training and development programmes (Liang *et al.*, 2014). The review of the Master programmes in health service management/health administration confirms the lack of application of such framework in guiding the design of these programmes (Liang *et al.*, 2014). Recent evidence indicates a huge diversity amongst the Australian formal educational programmes in health service management and a lack of agreement on the approach taken to management development (Ritchie and Yen, 2013). In fact, a significant number of healthcare managers do not hold formal management qualifications but have risen up the ranks in accordance with their excellent clinical practice. Moreover, in many healthcare-related degrees, there is little or no management or HRM training integrated into the curriculum. This may be extremely problematic, given that clinical and managerial competencies are vastly different.

The purpose of this paper is to describe the development and validation of a management competency framework relevant to the requirements of health services managers working in Australia. The framework is also intended as a guide for the development of a management competency assessment tool that can measure managerial competency of health service managers. A second paper will address the testing and validation of the assessment tool.

Research questions

The following research questions were developed based on an extensive literature review and used to structure the competency development and validation process:

- RQ1.* Can a set of core management competencies for Australian health managers be identified and confirmed by a literature review, focus group discussions, an expert working group and an online survey of managers?
- RQ2.* Can measureable behaviours be identified that correspond with these management competencies?
- RQ3.* Is the competency framework considered reliable and valid for developing a management competency assessment tool that can measure management competence amongst managers in health service organisations?
- RQ4.* Can the supervisors of health service managers use the framework to distinguish perceived superior and average performance in management roles in health service organisations?

The development process is described in the Methods section (responding to the first two research questions). The findings from the supervisor survey are presented in the Results section.

Methods

Identification of management competencies and their behavioural items

The management competencies were identified through a four-stage mixed methods approach, building on previous research (Cheng *et al.*, 2005; Liang and Howard, 2010).

Stage 1: identification of management tasks and competencies by position description (PD) analysis and a literature review. The first stage was a PD content analysis to identify the tasks common to the management levels in Australian hospitals and community health services (CHS). Whilst it was appreciated that some job descriptions would be out of date, the analysis would provide baseline data on which to base further investigation. In total, 175 PDs for senior- and middle-level management positions, comprising 96 from 2 hospitals, 27 from members of the health service management professional college and 52 from CHS were collected and analysed. This resulted in the identification of nine to ten key tasks for

each of the four management levels based on the requirement for job-focussed analysis (Liang *et al.*, 2012). The tasks identified by the PD analysis by management level and sector are provided below. Also, management levels are defined in Table I.

PD analyses – managerial tasks by sector and management level – are as follows:

- (1) Hospital & CHS level 1: chief executive officers:
 - provide Board with comprehensive information and support in developing strategic plan;
 - promote and develop the organisation;
 - create a supportive and learning culture;
 - assets, human and financial management;
 - increase revenue generation including core funding from a wide range of sources;
 - improve health status of community and provide competitive clinical services and level of care of high quality;
 - risk and occupational health and safety management;
 - develop organisation policy and plan (strategic and operational); and
 - retain and attract a multi-skilled and highly motivated workforce by promoting and facilitating high-quality education, training and research.
- (2) Hospital level 2: heads of division:
 - staff management and development;
 - performance and financial management;
 - revenue generation and resource allocation;
 - provision of leadership to staff and key stakeholders;
 - maintenance and improvement of quality and safety of service provision;
 - development of organisational vision, strategic direction and policies;
 - promotion and development of organisational image and public relations;
 - effective information management to inform learning and development for staff and practice/service delivery; and
 - oversee occupational health and safety and risk management in accordance with legal requirements.
- (3) Hospital level 3: senior management level:
 - provision of leadership to staff;
 - budget and financial management;

Table I.
Definition of health services management levels in Victoria, Australia

Level	Responsibility	Setting	Specification
Senior management	Responsible for policy and strategic direction of the organisation	Hospitals CHS	LII – report directly to the CEO LIII – report to level II LII – report directly to CEO
Middle management	Day to day operations	Hospitals CHS	LIV – report to level III LIII – report to level II

- staff management and development;
 - development of effective communication practice;
 - networking and liaison with key stakeholders (internal and external);
 - effective development and implementation of OHS and risk management;
 - ensure continuous improvement of service provision in a safe environment;
 - oversee and manage the implementation of organisational policies and strategic plans; and
 - undertake divisional planning and service performance review including organisation.
- (4) Hospital level 4: middle-level managers:
- contribute to a safe work environment;
 - budget development and management;
 - incident reporting, monitoring and review;
 - responsible for information management;
 - contribute to effective communication practice;
 - assist with divisional planning and development;
 - develop, implement and monitor specific OH&S and risk management programme;
 - contribute to staff development including identification of training, mentoring and supervising;
 - establish quality systems and processes that evaluate and improve patient/client care and facilitate and develop initiatives that ensure the delivery of optimum patient outcomes; and
 - fulfil administrative duties including medico-legal reporting, maintenance and monitoring of personnel/rosters, and secretarial responsibilities.
- (5) CHS level 2: heads of division:
- staff management and development;
 - performance and financial management;
 - provision of leadership to staff and key stakeholders;
 - maintenance and improvement of quality and safety of service provision;
 - develop and oversee implementation of organisational strategic service; and
 - effective development and implementation of OH&S and risk management.
- (6) CHS level 3: middle-level managers:
- provision of leadership to staff;
 - contribute to a safe work environment;
 - budget development and management;
 - responsible for information management;
 - contribute to effective communication practice;
 - undertake divisional planning and service performance review;

- networking and liaison with key stakeholders (internal and external);
- contribute to staff development including identification of training, mentoring and supervising;
- fulfil administrative duties including medico-legal reporting, maintenance and monitoring of personnel/rosters, and secretarial duties;
- establish quality systems and processes that evaluate and improve patient/client care and facilitate and develop initiatives that ensure the delivery of optimum patient outcome; and
- oversee and manage the implementation of organisational policies and strategic plans.

Following the task identification, the research team reviewed the literature to create a comprehensive list of all potential management competencies, outlining the person-centred macro-competencies. This list comprised ten generic management competencies (Liang *et al.*, 2013) that would be relevant to managers working in Australian hospitals and CHS.

Stage 2: confirmation of the core tasks and their competencies through focus group discussions and an online survey. In stage 2, the task list and identified competencies were explored by discussions with focus groups of middle- and senior-level public hospital and CHS managers to confirm the key tasks for each level and the essential competencies required to perform them effectively. In total, 16 public hospital managers, 12 CHS managers from the Melbourne metropolitan area and 9 regional CHS managers were invited and participated (Liang *et al.*, 2012a, b). The participants confirmed that some of the current job descriptions did not represent the tasks and roles that were required in their positions. At the conclusion of the focus groups, each management level agreed on three to five essential tasks that they had to perform, and the three most essential competencies needed to perform each of the selected tasks. Several competencies were viewed as important for more than one task at different levels. The tasks and competency lists endorsed by the focus groups were sent to all participants for verification and comment. Eight responses supporting the findings were received, with no requests for further change.

Following the focus group discussions, an anonymous online survey to enable a larger sample of managers to contribute to the competency framework was conducted. An invitation to participate in the online survey was sent to managers in four metropolitan and two regional hospitals and six metropolitan and three regional CHS one month after the focus group. This was followed by an e-mail reminder and a hard copy attachment of the survey two weeks later. In total, 74 hospital managers (61 metropolitan and 13 regional) and 15 CHS managers completed the survey online within the deadline (actual response rate was unknown as it was forward to managers via different management networks). This stage resulted in the identification of six management competencies appropriate to levels I-III managers in CHS (Liang *et al.*, 2012), and levels II-IV in hospitals (Liang *et al.*, 2013):

- C1: evidence-informed decision-making (evidence);
- C2: operations, administration and resource management (operations);
- C3: knowledge of healthcare environment and the organisation (knowledge);
- C4: inter-personal, communication qualities and relationship management (communications);
- C5: leading people and organisation (leadership); and
- C6: enabling and managing change (change).

Stage 3: identification of the behavioural items underlying the management competencies. Given that competencies are associated with behaviours (Woodruff, 1996), there was a need to identify the required behaviours for each of the competencies. These underlying

behavioural items were developed through a three-step process. The first step was to review the literature to compile a list of behavioural items for demonstrating each of the competencies identified above.

In the second step, a working group was established to review and revise the behavioural items for each of the competencies. The group included three representatives from hospital HRM, one senior and one middle manager from hospitals, one senior CHS manager and three academics. Members of the expert working group were recommended by the project advisory committee and by nomination of the Victorian Health Services that provided sponsorship to the project. The expert working group met six times during a four-month period and communicated via correspondence. The group identified 79 behavioural items, using the approach outlined by Moore *et al.* (2002), to measure the six competencies, aligned with the competencies; C1 (evidence): 12 items, C2 (operations): 17 items; C3 (knowledge): 11 items; C4 (communications): 17 items; C5 (leadership): 13 items; and C6 (change): 9 items.

Lastly, once the behavioural items had been developed by the expert working group, the development of a behavioural assessment scale was informed by those that had been used by various management competency models and projects: Healthcare Leadership Alliance's competency model by Garman *et al.* (2004), and Emotional Competence Inventory by the Hay Group (2005). A behaviourally anchored seven-point Likert rating scale was applied to each of the behavioural items are explained in Table II (Spangenberg *et al.*, 1989).

Stage 4: confirmation of behavioural items by survey of supervisors and distinguishing the competency levels for superior and average performing managers. The next step involved an online survey of hospital and CHS senior-level managers and board chairs from 21 health regions to confirm the behavioural items important to the managers under their direct supervision. This approach was based on the perspective that competencies distinguish superior performers from average performers (Boyatzis, 2008). In addition, they were asked to rate a manager they perceived as an average performer and one they perceived as a superior performer on each of the 79 behavioural items for the six competencies. The participants were asked if behavioural items and competencies were appropriate, to identify which items were considered critical to the roles of the managers they supervised and if they perceived the need to add additional behavioural items or competencies.

Testing the validity and reliability of the competency framework

Data from the paper-based responses from the supervisor survey were double entered into Excel files and merged with those from the online responses. All data were cleaned by checking for inconsistent or out of range responses against the originals.

Total and mean scores of the six behavioural competencies and a combined competencies score were calculated in MS Excel®. The cleaned files were converted to SPSS using IBM® SPSS Statistics® version 22.0. Univariate analyses were performed on all

1 Not competent	Do not understand the requirement and not capable of applying it to my role
2 Basic or novice	May be capable of demonstrating minor aspects in my role
3 Advanced beginner	May be capable of demonstrating in my role, but not in all required aspects
4 Competent but needs guidance occasionally	Can generally demonstrate in my role, but guidance is needed occasionally
5 Competent, no guidance is required	Can generally demonstrate in my role independently, but have not had extensive experience
6 Proficient	Always apply appropriately in my role, have had extensive experience
7 Superior expertise/skill coach for others	Always apply appropriately in my role, have had extensive experience and can teach this competency to others

Table II.
Behavioural
assessment scale

competencies, their behavioural items (79) and the combined competencies, separately for average and top performers.

Univariate analyses of variance were performed with management level as the independent variable for hospitals and CHS separately for both average and top performers.

In order to assess the reliability and validity of the assessment tool competencies and behavioural items, a series of appropriate analyses were performed. Cronbach's α s, for internal consistency, were calculated for each competency by performance level. The inter-item correlations were calculated for the all of the behavioural items within each of the six competencies.

Inter-rater reliability was assessed by r_{wg} scores as recommended by James *et al.* (1984, 1993) were calculated for each competency cluster by sector (James *et al.*, 1984, 1993).

Content validity was assessed by content validity ratios (CVRs) and was assessed for each behavioural item using methods described by Lawshe (1975) by sector and management level. CVRs range from -1 to $+1$. Any item, which is perceived to be "critical" by more than half of the respondents has some degree of content validity (CVR > 0.0). The more respondents (beyond 50 per cent) perceive the item as "critical", the greater is the extent or degree of its content validity. Content validity indices (CVIs), also described by Lawshe (1975), were calculated for each competency from the item CVRs. Adjusted CVIs (CVI_{adj}) were also calculated by excluding items from the cluster which had very low (< 0.1), zero or negative CVRs. The results of the CVI and CVI_{adj} are reported for each competency.

Before performing principal components analysis (PCA), the suitability of the data were assessed. Inspection of the correlation matrices showed many coefficients above 0.3. The Kaiser-Meyer-Olkin values for the subjective competencies and their items ranged from 0.856 to 0.886, above the acceptable reference point of 0.5 (Kaiser, 1970, 1974) for PCA to proceed. Bartlett's tests of sphericity (Bartlett, 1954) were all highly statistically significant (< 0.0005). Exploratory analyses using PCA and Oblimin rotation were performed on all the competency groups separately for average and top performers. In addition, confirmatory factor analyses were performed using all 79 behavioural items. Components were extracted when eigenvalues were greater than 1 and extracted by limiting the number of components to two or three. For each competency, components with eigenvalues greater than 1 and their behavioural items with high correlation coefficients (> 0.5) were entered into a spreadsheet to assist in elucidation. The interpretation of results were guided by comparing the actual eigenvalues from PCA with the criterion values from parallel analysis (Horn, 1965), using a program written by Watkins (2000). Only components with eigenvalues from the PCA equal to or greater than those from the parallel analyses were included in the interpretation.

Other aspects of validity and reliability will be considered in the discussion.

Ethical approval from La Trobe University Ethics Committee was granted prior to the commencement of the study.

Results

As outlined above, board chairs and senior managers who supervised other managers from 21 health regions participated in an online survey to validate the chosen competencies and behavioural items. The rating exercise was completed by 64 managers from 9 public hospitals and 10 CHS (Table II). This comprised acceptable response rates of 43 per cent from the hospitals and 93 per cent from the CHS (Table III).

Top vs average performers

The reported means for average and top performers for the six management competencies for the three management levels from CHS and hospitals, respectively, are detailed in Table IV.

The CHS participants rated levels I-III (CEO to middle management) and the hospital participants rated levels II-IV (senior to middle management).

The supervisors of the level I CHS managers reported that the top performing level I managers were proficient (see Table II for definition) in all six competencies (see Table IV). Among the CHS level II managers the top performers were characterised as competent in all of the competencies, with proficiency in communications and leadership. The top level III CHS performers were perceived as competent but requiring occasional advice in operations and knowledge, but competent with no assistance required in all of the other competencies. Top performing hospital managers at all levels were reported to have greater competence among all of the competencies than their average performing colleagues (see Table IV). Level II managers in both CHS and hospital sectors scored the lowest for evidence and change.

Table V outlines the reported differences in competency means between the average and top performers for the six management competencies for each of the three management levels by sector. For the three CHS management levels, the difference between the mean competency levels of average and top performers ranged from 0.36 to 1.72 points on the scale. The difference in means between the average and top performers tended to be greater for level II and level III managers. The *t*-tests showed that all but one result (level I CHS CEO, competency 5, leadership) were statistically significantly different with $p < 0.05$.

Health service management competencies

Sector	Management level of participants	No. of questionnaires			Completed for management level
		Online	Paper-based	Total	
Hospital ($n = 9$)	CEO	1	8	9	Level II
	Level II	1	8	9	Level III
	Level III	0	11	11	Level IV
Community health ($n = 10$)	Board member	1	10	11	CEO
	CEO	1	9	10	Level II
	Level II	2	12	14	Level III
Total		6	58	64	

Table III.
Survey respondents by sector, management level and management level supervised

Competencies	Level I manager		Level II manager		Level III manager	
	Average	Top	Average	Top	Average	Top
<i>Community health services</i>						
1 Evidence	5.93	6.37	4.14	5.59	3.33	5.05
2 Operations	5.87	6.30	4.73	5.87	3.49	4.85
3 Knowledge	5.90	6.39	4.78	5.79	3.49	4.86
4 Communications	5.80	6.45	4.62	6.24	3.86	5.46
5 Leadership	5.95	6.31	4.91	6.12	3.58	5.19
6 Change	5.79	6.41	4.39	5.85	3.44	5.06
Overall average	5.87	6.37	4.60	5.91	3.53	5.08
<i>Hospitals</i>						
1 Evidence	3.67	5.67	4.20	5.63	3.83	5.45
2 Operations	4.43	5.88	4.54	5.64	4.48	5.71
3 Knowledge	4.48	5.56	4.44	5.73	4.16	5.18
4 Communications	4.59	5.74	4.29	5.74	4.12	5.80
5 Leadership	4.52	5.68	4.21	5.62	4.00	5.39
6 Change	4.09	5.51	3.95	5.58	3.64	5.23
Overall average	4.33	5.70	4.31	5.66	4.07	5.50

Table IV.
Mean competency levels of average and top performers by management level and sector

Competencies	Difference in level I means (average and top performer) (95% CI) (<i>p</i> -value)	Difference in level II means (average and top performer) (95% CI) (<i>p</i> -value)	Difference in level III means (average and top performer) (95% CI) (<i>p</i> -value)
<i>Community health services</i>			
1 Evidence	0.44 (0.06-0.81) [<i>0.023</i>]	1.45 (0.86-2.05) [<i>0.0005</i>]	1.72 (0.96-2.48) [<i>0.0005</i>]
2 Operations	0.43 (0.04-0.82) [<i>0.032</i>]	1.14 (0.51-1.76) [<i>0.001</i>]	1.36 (0.49-2.22) [<i>0.003</i>]
3 Knowledge	0.49 (0.03-0.96) [<i>0.038</i>]	1.01 (0.48-1.54) [<i>0.001</i>]	1.37 (0.61-2.13) [<i>0.001</i>]
4 Communications	0.65 (0.19-1.12) [<i>0.008</i>]	1.62 (1.18-2.07) [<i>0.0005</i>]	1.60 (0.87-2.35) [<i>0.0005</i>]
5 Leadership	0.36 (-0.02-0.75) [<i>0.060</i>]*	1.21 (0.63-1.79) [<i>0.0005</i>]	1.61 (0.91-2.31) [<i>0.0005</i>]
6 Change	0.62 (0.18-1.06) [<i>0.007</i>]	1.46 (0.75-2.18) [<i>0.0005</i>]	1.62 (0.78-2.44) [<i>0.0005</i>]
Overall average	0.40 (0.02-0.78) [<i>0.041</i>]	1.31 (0.85-1.77) [<i>0.0005</i>]	1.53 (0.86-2.19) [<i>0.0005</i>]
<i>Hospitals</i>			
1 Evidence	2.00 (1.24-2.76) [<i>0.0005</i>]	1.43 (0.50-2.26) [<i>0.005</i>]	1.62 (0.71-2.53) [<i>0.001</i>]
2 Operations	1.45 (0.49-2.40) [<i>0.005</i>]	1.11 (0.29-1.94) [<i>0.012</i>]	1.23 (0.30-2.15) [<i>0.012</i>]
3 Knowledge	1.08 (0.25-1.92) [<i>0.014</i>]	1.28 (0.59-1.97) [<i>0.001</i>]	1.03 (-0.10-2.16) [<i>0.073</i>]*
4 Communications	1.15 (0.17-2.12) [<i>0.023</i>]	1.45 (0.65-2.25) [<i>0.001</i>]	1.68 (0.85-2.51) [<i>0.001</i>]
5 Leadership	1.10 (0.30-1.91) [<i>0.010</i>]	1.41 (0.60-2.22) [<i>0.002</i>]	1.39 (0.49-2.30) [<i>0.005</i>]
6 Change	1.42 (0.59-2.25) [<i>0.002</i>]	1.63 (0.75-2.50) [<i>0.001</i>]	1.60 (0.55-2.64) [<i>0.005</i>]
All competencies	1.36 (0.58-2.15) [<i>0.002</i>]	1.35 (0.60-2.10) [<i>0.001</i>]	1.42 (0.55-2.30) [<i>0.003</i>]

Notes: Italic indicates *p* value. *Not significantly different

Table V.

Differences in mean competency levels between average and top performing managers (community health services and hospitals)

Among hospital managers, the differences between the average and top performing means ranged from 1.03 to 2.0, with all but one (level IV, competency 3 knowledge) statistically significantly different at $p < 0.05$.

Univariate analyses

Across all competencies, there were consistent results of the univariate analyses. These applied to both average and top performers. There were no significant differences between sectors after adjustment for the management level. For hospital managers, there were no significant differences between management levels. However, there were highly statistically significant differences between management levels for CHS managers ($p < 0.005$). The data are summarised in Figures 1 and 2.

Validation of the management competencies

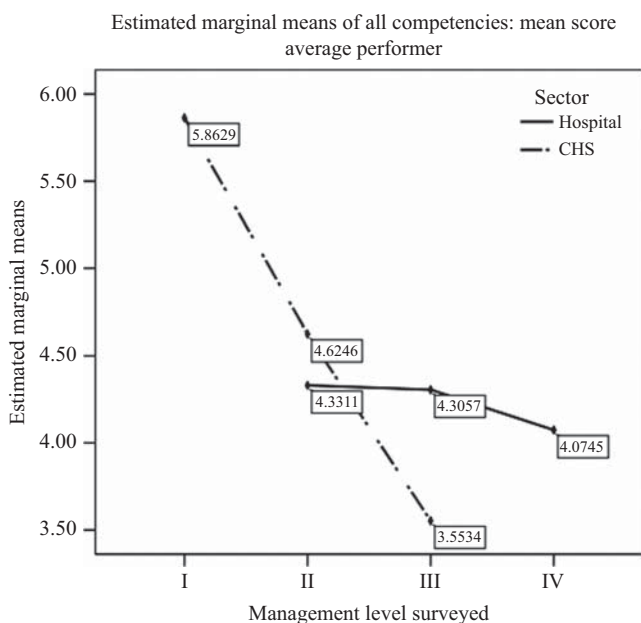
Reliability

Cronbach's α s for the six competencies were high, ranging from 0.962 to 0.975 for average performers and 0.937 to 0.955 for the top performers. All of the behavioural items were included in the analysis. Inter-item correlations values were high across the competencies and ranged from 0.690 to 0.779 for average performers and 0.503 to 0.675 for the top performers.

Inter-rater reliabilities, as measured by $R_{WG(J)}$, were uniformly high. They ranged from 0.924 to 0.975 for average performers and from 0.976 to 0.992 for top performers.

CVR and CVI results

For hospital managers, the CVIs ranged from 0.51 to 0.93 with the greatest variation between level II managers (see Table VI). The most noticeable difference between management levels was observed for competency 2 (operations); the CVI for level IV managers was 0.83 (92 per cent of managers considered these items critical) compared to 0.51 (76 per cent) and 0.56 (78 per cent) for level II and level III managers, respectively.



Health service management competencies

Figure 1. Estimated marginal means of combined competencies mean scores by sector and management level for average performers

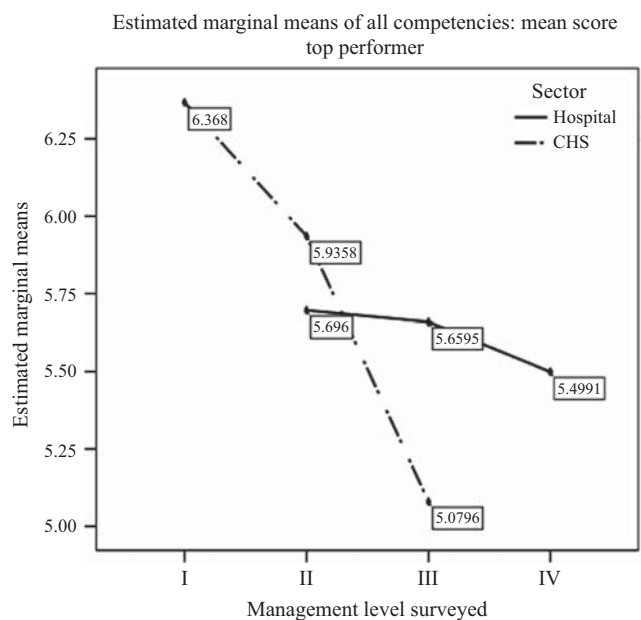


Figure 2. Estimated marginal means of combined competencies mean scores by sector and management level for top performers

There were no significant differences between CVIs and CVI_{adj} ($-x$) values except among level II managers where 9 per cent of items were removed for the CVI_{adj} ($-x$) calculation.

For CHS managers, the CVIs ranged from 0.52 to 0.89 with the least variation among level III managers (see Table VII). Similar to the hospital data, the most noticeable difference

Competency		Level II	Level III	Level IV
C1 "Evidence"	CVI	0.54	0.78	0.83
	CVI _{adj} (-x) ^a	0.62	0.84	0.83
C2 "Operations"	CVI	0.51	0.56	0.83
	CVI _{adj} (-x)	0.63	0.64	0.83
C3 "Knowledge"	CVI	0.60	0.86	0.58
	CVI _{adj} (-x)	0.70	0.86	0.58
C4 "Communications"	CVI	0.90	0.82	0.76
	CVI _{adj} (-x)	0.90	0.82	0.76
C5 "Leadership"	CVI	0.88	0.88	0.78
	CVI _{adj} (-x)	0.88	0.88	0.78
C6 "Change"	CVI	0.93	0.78	0.86
	CVI _{adj} (-x)	0.93	0.78	0.86
# (%) items removed		7 (8.9)	3 (3.8)	0 (0.0)

Note: ^aCVI_{adj} (-x) is the content validity index after adjustment by removing items with very low (≤ 0.1), zero or negative CVR scores) "x" is the number of items removed

Table VI.

Content validity indices (unadjusted and adjusted) by competency and management level for hospitals

Competency		Level I	Level II	Level III
C1 "Evidence"	CVI	0.81	0.65	0.78
	CVI _{adj} (-x) ^a	0.81	0.65	0.78
C2 "Operations"	CVI	0.52	0.54	0.78
	CVI _{adj} (-x)	0.52	0.59	0.77
C3 "Knowledge"	CVI	0.74	0.64	0.66
	CVI _{adj} (-x)	0.74	0.64	0.74
C4 "Communications"	CVI	0.86	0.87	0.91
	CVI _{adj} (-x)	0.86	0.87	0.91
C5 "Leadership"	CVI	0.88	0.89	0.85
	CVI _{adj} (-x)	0.88	0.89	0.85
C6 "Change"	CVI	0.67	0.87	0.85
	CVI _{adj} (-x)	0.67	0.87	0.85
# (%) items removed		0 (0.0)	1 (1.3)	2 (2.5)

Note: ^aCVI_{adj} (-x) is the content validity index after adjustment by removing items with very low (≤ 0.1), zero or negative CVR scores) "x" is the number of items removed

Table VII.

Content validity indices (unadjusted and adjusted) by competency and management level for community health services

between management levels was observed for competency 2 (operations); the CVI for level III managers was 0.78 (89 per cent of managers considered these items critical) compared to 0.52 (76 per cent) and 0.59 (79 per cent) for level II and level III managers, respectively. There were no significant differences between CVIs and CVI_{adj} (-x) values.

PCAs

PCA explained the presence of one or two components with eigenvalues exceeding 1, explaining varying degrees of variance from 70.1 to 80.0 per cent for the competencies of the average performer assessments and from 65.4 to 76.4 per cent for the competencies of the top performer assessments (see Table VIII). However, following comparisons of these values against those from the parallel analyses, only one component was retained for all six competencies for both average and top performer assessments. The PCA of the 79 behavioural item confirmatory analysis of average performers identified 10 components with eigenvalues greater than 1. However, only two components were retained with eigenvalues greater than those obtained from parallel analysis.

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Competency	Component	Total	Initial eigenvalues		Rotation sums of squared loadings
			% of variance	Cumulative %	
<i>Average performers</i>					
C1 (Evidence)	1	9.397	78.306	78.31	8.968
C2 (Operations)	1	11.91	70.070	70.07	11.086
	2	<i>1.593</i>	<i>9.372</i>	<i>79.44</i>	<i>8.890</i>
C3 (Knowledge)	1	7.978	72.528	72.528	7.690
C4 (Communications)	1	12.27	72.203	72.203	12.027
C5 (Leadership)	1	9.92	76.306	76.306	9.407
C6 (Change)	1	7.203	80.037	80.037	7.045
All 79 behavioural items	1	45.94	58.157	58.157	41.553
	2	4.06	5.134	63.290	36.547
<i>Top performers</i>					
C1 (Evidence)	1	7.086	59.052	59.052	6.649
	2	<i>1.141</i>	<i>9.511</i>	<i>68.56</i>	<i>4.553</i>
C2 (Operations)	1	9.468	55.694	55.69	8.403
	2	<i>1.713</i>	<i>10.076</i>	<i>65.77</i>	<i>7.182</i>
C3 (Knowledge)	3	<i>1.274</i>	<i>7.494</i>	<i>73.26</i>	
	1	7.288	66.256	66.256	7.147
C4 (Communications)	2	<i>1.117</i>	<i>10.156</i>	<i>76.41</i>	<i>3.341</i>
	1	9.925	58.385	58.39	9.121
C5 (Leadership)	2	<i>1.196</i>	<i>7.035</i>	<i>65.42</i>	<i>7.740</i>
	1	8.532	65.633	65.63	8.144
C6 (Change)	1	6.409	71.216	71.216	5.922

Table VIII.
Total variances explained by principle component analysis with Oblimin rotation (eigenvalues limited to greater than 1) for both average and top performer assessments

Note: The data in an italicised smaller font represent extracted components with Eigenvalues greater than 1, but rejected because the values were less than those produced from parallel analysis

From the 79 behavioural item confirmatory analysis, two components were retained. The first component included 69 of the 79 items, including 100 per cent of the items from competencies 1 (evidence), 4 (communications), 5 (leadership) and 6 (change). In addition, 64 per cent of the items of competency 3 (knowledge) and 65 per cent of competency 2 (operations) were identified. The latter included 89 per cent of items related to staff management. Component 2 identified 100 per cent of behavioural items from competency 2 (operations) including financial and staff management. These results are not included but are available on request.

Discussion

Data generated via various steps of the study positively answered the research questions outlined earlier which include management competency framework development (*RQ1* and *RQ2*), the measures of reliability and validity (*RQ3*), and the ability of the framework to allow supervisors to distinguish between high-performing and average-performing managers who they supervise (*RQ4*). Guided by past experience, the study established and confirmed a valid process (see Figure 3) that can be adopted to identify and develop a management competency framework that not only demonstrates the core competency requirements of healthcare managers, but also sets the direction for training and development necessary for the effective skill formation of individual managers and management team.

The development of the competency framework and their associated behavioural items via a rigorous, multistage process was described in the first part of the methods section. Both qualitative and quantitative methods were employed, the latter used to confirm the former.

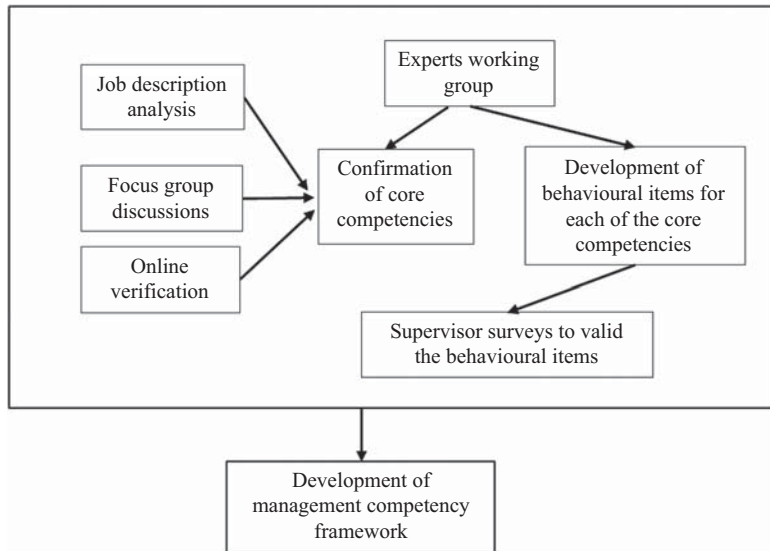


Figure 3. Diagram of the competency identification and management competency framework development process

The development was also informed by published research from the USA (Garman and Scribner, 2011). We suggest that by using this process, the framework and associated behaviours have high levels of face validity.

The final step of the process – the supervisors’ survey – provided statistical evidence of the framework’s reliability and validity, which addresses question 3.

Reliability

The tests of internal consistency (Cronbach’s α and inter-item correlations) were uniformly high, as were the results from the inter-rater reliability tests suggesting that these two aspects of the competencies of the framework and their behavioural items demonstrated high reliability. Test-retest reliability could not be tested at this stage.

Validity

The CVIs based on the analyses of the critical items analyses varied by the management level as might be expected. For example, a higher proportion of supervisors considered the behaviours related to competency 2 (operations) were critical for middle-level managers. However, all scores were above 0.5, which is interpreted as more than 75 per cent of supervisors considered the behavioural items critical.

The results from the PCA showed that the behavioural items of the selected components for all six competencies accounted for more than 55 per cent of the total variance with many over 70 per cent. The selected components for all six competencies included all the behavioural items for the respected competency. The confirmatory analysis of all the 79 behavioural items identified one component, which included 87 per cent of the behavioural items and a second component identifying all the items of competency 2 (operations). These results suggest a high level of construct validity. At this stage of the research, it was not possible to assess other aspects of validity, namely, those of convergence, discrimination and criterion.

The last research question focussed on the ability of the framework to distinguish perceived superior and average performance in management roles in health service

organisations. The supervisors' survey identified statistically significant differences between the competency levels of managers perceived to be high performers compared to the managers perceived to be average performers. This was consistent when analysed by the sector and management levels separately. However, univariate analysis showed a different pattern within sectors. There were highly significant differences by the management level among CHS managers but no significant differences between management levels among hospital managers. There may be a number of reasons for this difference seen between sectors. First, the hospitals tended to be large, tertiary referral centres, whereas the CHS were much smaller organisations. Middle managers in large hospitals tend to have more experience, have higher rates of postgraduate education and memberships of professional organisations compared to their community health counterparts.

Limitations

Although there is evidence linking management competency and individual performance, competency may be context-sensitive. Thus, the application of management competency may be influenced by various factors especially those internal to an organisation and to specific management roles. The extent that managers are able to demonstrate a competency in their management role may ultimately affect their actual performance. Therefore, measurement of competency and performance should take place simultaneously. This study only identifies the competency levels of managers with superior or average performance from their supervisors' subjective judgement, the supervisor's perception rather than actual self-assessment or assessment based on actual application of competencies in their roles, i.e. performance.

The participants were volunteers from organisations who agreed to participate and, therefore, not randomly selected. Whilst this may not affect the internal validity of the study, it raises the question of the generalisability of the results to other populations of healthcare managers, particularly in other Australian States, in the private healthcare sector and in other countries.

Strengths

The authors suggest that the multistage process undertaken to develop and test the framework is rigorous and, to the authors' knowledge, only the second report of such a process, the other being by Garman and Scribner (2011). The results and their subsequent discussion presented in this paper are part of an ongoing process of assessing the reliability and validity of the framework. The results of a second study to be submitted contemporaneously with this paper will report on the use of the competency assessment tool developed from the framework assessing managers' competence using a 360° methodology.

Practice implications

This study raises a number of implications for HRM and management practitioners in health services. First, it is clear that the six competencies are useful indicators to predict managerial performance across different hierarchical levels within hospitals. Coupled with the 79 behavioural items, the competency framework captured the competencies of health services managers in a number of the different health services management samples. The empirical process validated a parsimonious competency framework. Although many existing competency lists tend to have larger numbers of competencies identified than our findings, often these lists do not isolate competencies and include attitudes and behaviours as part of the competency lists. Other studies that have used a validation process have

developed competency frameworks, with a smaller number of competencies (see e.g. Liu *et al.*, 2007).

Health service managers need to be trained and developed through both in-house and on-the-job training and through formal external management courses. HR departments have an important role in ensuring that managers within hospitals possess and can display the six identified managerial competencies. Second, it is also critical that HR managers also provide the HR architecture to support the development of these six competencies, such as congruent performance management and reward management, coaching and mentoring, and career management (Bartram *et al.*, 2012). Third, the findings demonstrate the importance of all levels of management within the hospitals possessing and displaying the six management competencies, as a large body of HRM research has identified the importance of congruence of the interpretation and understanding of HRM across different managerial layers (Bowen and Ostroff, 2004; Stanton *et al.*, 2010). HR practitioners need to ensure that different levels of managers across the organisation possess the six competencies to ensure consistency of HRM message and an overall “strong” HRM system (Bowen and Ostroff, 2004).

Future directions

Further research is being planned, and in some cases undertaken, to extend the generalisability of the competency framework more widely in Australia and New Zealand.

Another potential area for development is the use of competency-based education (CBE) for health service managers. A study of the 13 Masters programmes of Health Administration or health service management available in Australia suggested that less than a third use a competency-based curriculum. However, none of the universities integrated the competencies in assessing the outcome of students (Zhanming Liang, personal communication). The Society for Health Administration Programs in Education may be a channel for further developing this theme. It is also important to measure the extent to which CBE improves not only individual management competency and management outcomes, but also organisational effectiveness.

In addition, a network has been developed in Asia, focussing on Thailand and China to adapt and validate the framework in these health systems. Further international collaboration with researchers in Europe and the USA is underway.

The authors would welcome further validation by other researchers in different settings using the MCAP online tools by contacting the corresponding author.

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