The provision and utilisation of casemix and demographic data by nursing managers in seven hospitals

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Abstract

The role of the nursing manager has evolved from clinician and bed manager to one with greater accountability for evidence based practice, benchmarking and more recently, budget liability. Casemix data are widely believed to be a means of providing essential information for effective decision making and financial management but have not been widely utilised by nursing managers (Diers & Bozzo, 1999).

This paper will report the results of a survey of nursing managers in seven hospitals within a metropolitan area health service. The hospitals include tertiary referral hospitals, specialist public hospitals and an affiliated public hospital for aged care and rehabilitation services. The survey sought to establish what casemix and related data were provided to nurse managers, who provided these data and how supplied data were utilised by the nurse managers.

Results demonstrated that the majority of nursing managers surveyed received minimal (if any) casemix and/or demographic data on a routine basis. Some were provided with data in response to specific requests. The information that was provided varied both within and across hospitals while no consistent methods of data distribution were available. Few nursing managers believed that the information provided aided their decision-making processes partly due to the minimalist nature of provided data while some nursing managers demonstrated a lack of understanding of the potential benefit of casemix data as a resource to support management decision making.

Background to survey

Following informal discussions with nurse managers on casemix and diagnosis related groups at one Sydney tertiary referral hospital it became apparent that casemix data were not uniformly provided to nurse managers across the organisation. A survey, in the form of a short questionnaire was distributed in May 2001 to forty-three nurse managers (senior nurse managers and nursing unit managers) to determine what casemix and related data were being provided on a regular basis. Seven more South East Health (SEH) hospitals granted permission to distribute the survey although one public hospital later withdrew consent stating that managers at that hospital did not currently receive "any regular, extensive casemix information". Fifty-six additional surveys were distributed to nurse managers (senior nurse managers and/or nursing unit managers) working within SEH hospitals in February/March 2002 ranging from affiliated hospitals, specialist hospitals and large tertiary referral hospitals.

Literature Review

Casemix is a scientific method of producing health care information that builds upon classifications of patient care episodes to manage health care (Eagar and Hindle 1994). Casemix data can provide information on a wide range of topics ranging including patient episodes to health care funding to workforce planning (Eagar and Hindle 1994).

Organisations (followed by health) have moved from a predominantly "manufacturing" basis to one based on the application of information and knowledge (Sorrells-Jones and Weaver 1999a; Imhoff, Webb and Goldschmidt 2001) to promote efficient business and best practice principles. Nurses have been described as knowledge workers as they apply knowledge to

practice (Sorrells-Jones and Weaver 1999a) both in the clinical and managerial fields. The nurse manager's role has expanded from that of clinical coordinator to one responsible for a diverse range of business practices including service planning within budget allocations. To effect efficient service delivery the nurse manager must apply knowledge management principles or analyse information and apply the specialist knowledge gained to increase productivity, generate new concepts and advance service provision (Sorrells-Jones and Weaver 1999a; Weaver and Sorrells-Jones 1999).

Information systems assist with the organisation of data (Sorrells-Jones and Weaver 1999b) for knowledge management of which casemix is a vital component. Health care however has lagged behind other industries for investing in information systems for knowledge management (Bowles 1997; Lange 1997; Austin, Hornberger and Shmerling 2000; Imhoff, Webb and Goldschmidt 2001; Zazzara 2001; Cohen 2002) resulting in many administrative systems being unable to cater for informational needs (Kohli, Tan, Piontek et al. 1999). Further to this, many information systems do not significantly influence health care (Lange 1997; Norris and Brittain 2000), offer few benefits to nurses (Bowles 1997; Hughes 1999) and have resulted in health professionals being sceptical of new information systems (Diers and Pelletier 2001a).

As the focus of knowledge management has shifted from centralised knowledge to being more distributive (Imhoff, Webb and Goldschmidt 2001), it is essential that "first tier managers" receive data for decision-making (Imhoff, Webb and Goldschmidt 2001). Casemix is widely recognised as being a tool to aid efficiency (Degeling, Black, Palmer and Walters 1996; Bridges, Mazevska and Haas 2001) resulting in the proliferation of the collection and collation of casemix data in Australia (Diers and Pelletier 2001a). Despite this, casemix information use by operational nurse managers has not paralleled this growth (Diers and Pelletier 2001b). Barriers include tight data access control (Hays, Norris, Martin and Androwich 1994; Weaver and Sorrells-Jones 1999), poor dissemination of information to nurses (Diers, Weaver, Bozzo et al. 1998) and need for detailed data (Diers and Pelletier 2001b). However, the capacity of operational managers to look at and interpret casemix data within the Australian nursing arena is slowly emerging (Diers and Pelletier, 2001b).

Dowling (1995) argues that casemix data and reports must be of good quality and fully integrated for managers to realise the benefits. Integration of costing information with clinical outcomes and patient satisfaction results is crucial for health management decision-making (Kohli, Tan, Piontek et al. 1999) and is essential if nursing managers are to embrace knowledge development (Nagle and Ryan 1996). However, Austin, Hornberger and Shmerling (2000) found in an audit of ten US health-care organisations that integration of information systems was restricted.

Globally, it has been identified that clinicians frequently do not recognise health care as a business (Cohen 2002) while in one United Kingdom health trust (nursing) ward managers do not have a comprehensive appreciation of business management (Hughes 1999). Hughes further claims that their information needs are predominantly related to budget or workforce issues defined by finance and human resource departments. Nurses constitute the largest group of health care professionals (Hays, Norris, Martin and Androwich 1994; Lange 1997) so their use of health information can have an enormous impact on health care management (Lange 1997). Regrettably though, as many health professionals are unaware of what data are available they are unable to perceive any use from it (Diers and Pelletier 2001b).

Unfortunately, casemix knowledge amongst some health professionals has been found to be lacking (Degeling, Black, Palmer and Walter 1996; Bridges, Mazevska and Haas 2001). Nurse managers demonstrated a greater knowledge of casemix compared to nurse clinicians but a lower level compared to other health managers (Degeling, Black, Palmer and Walter, 1996). It is surprising little evidence exists of nurses utilising casemix data (Diers and Bozzo 1999) as many nurse managers now possess tertiary management qualifications (Duffield, Moran, Beutel et. al. 2001; Duffield and Franks 2002) and casemix knowledge is associated with educational background (Degeling, Black, Palmer and Walter, 1996; Bridges, Mazevska and Haas, 2001). Contrarily, Staggers, Gassert and Curran (2001) assert that health

informatics and data management has not been widely incorporated into the (American) nursing university curricula at undergraduate and higher degree level.

Aim of the survey

The casemix and related data survey aimed to determine the number of nurse managers who received casemix and demographic data, what casemix and demographic data were received on a regular basis by managers, the source(s) of casemix data provision, how nurse managers used the data provided, and the format of provided data.

Method

Surveys were distributed to a total of ninety-nine nurse managers within seven SEH hospitals. The initial hospital survey was distributed in May 2001 followed by distribution to the additional six SEH hospitals in February/March 2002. Due to the various categories and size of the seven hospitals the number of surveys distributed (per hospital) ranged from 5 to 43 (mean 14). Site representatives circulated the surveys to nurse managers within their organisation and acted as a point of collection for completed surveys. One hospital requested that nurse managers' return completed surveys direct to the researcher. Survey design did not vary between hospitals excluding departmental nomenclature, such as "department of clinical information" or "medical records department" depending upon the individual organisation. Two weeks were allowed for responses, with electronic mail reminders following that period. Agreement was given not to publicly identify individual hospitals; the letters A-G represent the hospitals surveyed. Microsoft Access and Microsoft Excel were utilised for data analysis.

Survey Results

Sixty-three surveys were returned completed giving an overall response rate of 63.6%. Individual hospital response rates varied from 53.5% to 100% (mean 73.3%).

Data Received

In response to an initial question asking nurse managers if they received casemix and related data, 41.3% (n=26) answered in the affirmative, the majority (49.2%, n=31) had never received any casemix or related data while 9.5% (n=6) were unsure or did not respond to the question.

Few nurse managers received casemix data on a regular basis although some managers cited receiving data on an ad hoc basis in response to specific requests or collected data themselves for specific purposes. Results differed slightly when managers were asked the frequency that they received data with a slight decline in those who stated that they had never received data (41.3%, n=26). Correspondingly the number of managers who were unsure or did not respond increased. With the exception of one hospital (hospital G), where data were provided to 80% (n=4) of the nurse managers on a bi-annual basis the frequency of data distribution varied widely within and between hospitals. Data were most frequently provided on a monthly basis to 19% (n=12) of nurse managers followed by bi-annually to 12.7% (n=8) while 6.3% (n=4) of managers received data either annually or on a quarterly basis. (Refer to table 1).

Table 1: Frequency of data distribution to nurse managers within seven hospitals

Frequency of data provision categorised by hospital	A	B	C	D	E	F	G	Total	% of respondents n=63
Never	3	7	0	0	14	1	1	**26**	**41.3**
Monthly	1	1	4	2	4	0	0	**12**	**19.0**

Bi-annually	1	0	1	1	1	0	4	**8**	**12.7**
Annually	1	0	0	2	1	0	0	**4**	**6.3**
Quarterly	0	1	1	0	1	1	0	**4**	**6.3**
On request	0	0	0	0	0	1	0	**1**	**1.6**
Unsure/nil response	0	1	1	2	2	2	0	**8**	**12.7**
Total	**6**	**10**	**7**	**7**	**23**	**5**	**5**		

Casemix data received

Much of the data routinely provided was elementary in nature. Data most frequently provided (34.9% n=22) were unit average length of stay (ALOS) while 23.8% (n=15) of managers received a breakdown of patients by diagnosis related group(s) (DRG), 17.5% (n=11) ALOS by DRG and 12.7% (n=8) received their units "top 10" DRG's. Performance related data on outliers, worst performing DRGs, service costs per DRG and comparisons to State benchmarks were provided to few managers. Examples of data provided under the "other" category were variance report by LOS (hospital F), unit inpatient activity as well as reports related to staffing vacancy rates.

Within some hospitals there was variability of data provided, potentially indicating a lack of uniformity with information sharing and distribution. Although the range of data provided were not extensive, hospitals C and G were most likely to provide (routinely) a wider range of casemix related information while managers in hospitals A and E tended to receive DRG data in response to specific requests (refer to table 2).

Table 2: Casemix data types routinely provided to nurse managers within seven hospitals

Casemix data provided categorised by hospital	A	B	C	D	*E*	*F*	G	*Total*	% of respondents n=63
Unit ALOS	1	2	4	0	10	3	2	**22**	**34.9**
Breakdown by DRG	1	2	3	2	2	1	4	**15**	**23.8**
ALOS by DRG	1	3	3	0	1	1	2	**11**	**17.5**
Unit's "Top 10" DRGs	0	1	3	1	1	0	2	**8**	**12.7**
Other	1	0	0	2	0	3	1	**7**	**11.1**
Patient profile by DRG	0	0	2	1	1	0	2	**6**	**9.5**
Percentage of unit outliers	0	0	1	1	1	0	1	**4**	**6.3**
Unit performance compared to State benchmarks	0	2	1	0	0	0	1	**4**	**6.3**
Worst performing DRGs	0	0	0	0	1	0	1	**2**	**3.2**
Cost of service by DRG	0	1	1	0	0	0	0	**2**	**3.2**
Profile of outliers	0	0	0	1	0	0	0	**1**	**1.6**
ALOS by outliers	0	0	0	0	0	0	1	**1**	**1.6**
Total number of casemix data types selected*	**4**	**11**	**18**	**8**	**17**	**8**	**17**		
Total survey respondents by hospital	**6**	**10**	**7**	**7**	**23**	**5**	**5**		

*Managers were asked to select from casemix data types listed above, the examples applicable to their situation.

Many managers expressed a desire for more information with 23.8% (n=15) stating that they would like to receive all of the above listed data and a further 17.4% (n=11) specified data on DRGs and/or unit performance. Additional requests included patient demographics, admission and readmission rates and more timely reports. Four respondents demonstrated a lack of understanding of casemix and DRGs, two of whom requested further education.

Demographic Data

Following the trend of casemix data provision, few managers received detailed demographic data on their patient populations. Seventeen percent (n=11) of nurse managers received data relating to patient age and gender while less than 10% received data on ethnicity, language spoken at home or area of residence. Examples of "other" data include nursing home transfers while seven respondents mentioned that they either had to collect the information themselves or demographic data was provided in response to specific requests only. Two respondents from hospital E mentioned that demographic data were formerly supplied but that they had not received any for the past year (refer to table 3).
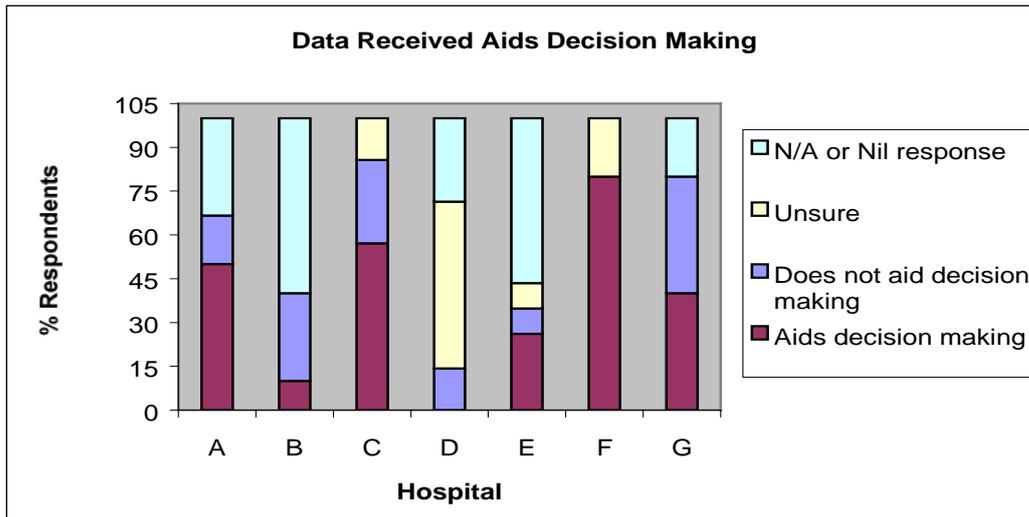
Table 3: Demographic data types routinely provided to nurse managers within seven hospitals

Demographic data types provided categorised by hospital	A	B	C	D	E	F	G	Total	% of respondents n=63
Nil demographic data received	3	7	1	4	16	1	3	35	55.6
Age	0	1	5	3	0	2	0	11	17.5
Gender	0	1	5	3	0	2	0	11	17.5
Other	1	3	0	0	3	1	2	10	15.9
Unsure/nil response	2	0	0	0	4	2	0	8	12.7
Language spoken at home	0	1	2	2	1	0	0	6	9.5
Area of residence	0	1	3	2	0	0	0	6	9.5
Ethnicity	0	1	1	2	0	0	0	4	6.3
Total number of demographic data types selected*	**6**	**15**	**17**	**16**	**24**	**8**	**5**		
Total survey respondents by hospital	**6**	**10**	**7**	**7**	**23**	**5**	**5**		

* Managers were asked to select from the demographic data types listed above, the examples applicable to their situation.

Only 31.7% (n=20) of nurse managers who received data considered it to be of use for managerial decision making, equally 30.2% (n=19) were either unsure or considered the data to be of little use. Several respondents did comment however, that the information would be of value to them if they received it. Analysis by hospital demonstrated that 80% (n=4) of nurse managers working within hospital F believed the data to be useful for decision making compared to 57.1% in hospital C (n=4) and 50% (n=3) of hospital A managers. Hospitals where few (if any) nursing managers believed data aided decision-making (hospitals B, D and E) demonstrated a greater proportion of managers who were either unsure or did not respond (refer to figure 1).

Figure 1: Percent of nurse managers who believed that data aided their decision-making

Data Received Aids Decision Making

Legend:
- N/A or Nil response
- Unsure
- Does not aid decision making
- Aids decision making

Y-axis: % Respondents (0, 15, 30, 45, 60, 75, 90, 105)
X-axis: Hospital (A, B, C, D, E, F, G)

Source of Data Provision

Casemix data were sourced from several hospital departments and databases, with nurse managers frequently obtaining data from more than one source. Most commonly data were provided by the casemix unit (25.4% n=16) or the hospital/divisional executive (19% n=12). Sixteen percent (n=10) of respondents nominated other sources of data provision, of which five were unit based clinical databases while some managers sought data from individuals e.g. Quality Improvement Coordinator (n=2).

Table 3: Source of data provision to nurse managers within seven hospitals

| Source of data provision categorised by hospital	A	B	C	D	E	F	G	Total	% of respondents n=63
N/A or nil response	3	4	1	1	11	2	1	**23**	**36.5**
Casemix unit	2	0	4	5	1	3	1	**16**	**25.4**
Hospital/divisional executive	0	1	2	0	8	0	1	**12**	**19.0**
Other	1	2	1	0	3	2	1	**10**	**15.9**
Dept. of clinical information	1	2	2	1	1	1	1	**9**	**14.3**
Dept. of finance	1	3	0	0	1	0	0	**5**	**7.9**
Total number of sources selected*	**8**	**12**	**10**	**7**	**25**	**8**	**5**		

* Managers were able to select more than one data source.

Provision of Data

Data were considered by 49.2% (n=31) of nurse managers to be provided in a format that was easy to understand. While only 11.1% (n=7) of managers had difficulty with comprehending data, a further 27% (n=17) stated that they were unsure how to interpret the results.

The most common format for data provision across the seven hospitals was table or graph (26% n=20) followed by printed lists (22.1% n=17) and electronic spreadsheet or database (15.6 n=12). "Other" formats (5.2% n=4) ranged from formal report to verbal information sharing (refer to figure 2).

Figure 2: Format of provided data by percent, to nurse managers within seven hospitals
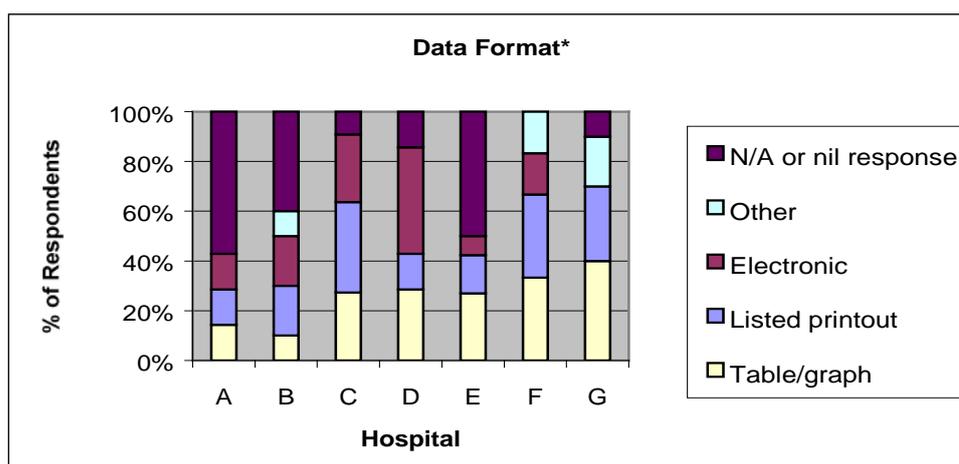
*Managers were able to select more than one data format.
C*omputer and data analysis skills*

Many (36.5% n=23) nurse managers stated that they analysed data received although methods varied substantially from manual analysis (25% n=17) through to "eyeball" (n=1) and "compare to previous reports" (n=1). Electronic data analysis was rarely utilised with only seven respondents (10.3%) using spreadsheets and two (2.9%) utilising Access databases. These results are comparable with the nurse managers' personal assessment of data analysis skills as 33.3% (n=21) rated their skills as average while a further nineteen (30.2%) stated their analysis skills to be poor or very poor. Just 15.9% of managers rated their skills as good (n=8) or very good (n=2).

Nurse managers' knowledge of casemix and DRGs

Unfortunately, many nurse managers did not demonstrate a comprehensive knowledge of the casemix system and DRGs in particular. Some respondents openly acknowledged this while others selected "unsure" or made statements indicating a lack of awareness of casemix and DRGs. The nurse managers were keen however, to improve their knowledge of casemix and data analysis with the majority demonstrating an interest in attending workshops (refer to table 4).

Table 4: Education sessions that nurse managers stated would be of benefit to them

Education sessions of interest to nurse managers categorised by hospital	A	B	C	D	E	F	G	Total	% of respondents n=63
Casemix as a management tool	5	10	6	6	15	3	3	**48**	**76.2**
Data analysis utilising Access database	6	9	5	6	13	3	4	**46**	**73.0**
Data analysis utilising Excel spreadsheet	6	9	5	6	12	2	3	**43**	**68.3**
Principles of casemix & DRGs	4	9	5	4	13	2	3	**40**	**63.5**
N/A or nil response	0	0	1	1	6	1	1	**10**	**15.9**
Other	0	0	0	0	2	0	0	**2**	**3.2**

Total number of sessions selected*	21	37	22	23	61	11	14

* Managers were able to select more than one educational session.

Discussion

Provision of casemix and demographic data to nurse managers working within the seven SEH hospitals surveyed is not regular or extensive. Although the sample size is limited, within two of the hospitals nurse managers seemed to have access to a wider variety of data compared to the others, potentially indicating a greater emphasis by hospital executive(s) on information sharing and empowerment of nursing managers. Indeed, Lange (1997, p1) states that "nurse administrators must appreciate the potential for information technology to contribute to strategic as well as operational goals". Sadly, respondents in one hospital mentioned that data have been previously distributed to them but that this practice had not continued. The implication here is that either regular data distribution (and hence knowledge management) was not perceived as a priority or data recipients did not overtly demonstrate that receiving this information was imperative for health planning and decision making.

Audits of health-care organisations demonstrate that information system planning, although aligned with business and strategic goals, was not always implemented, affecting system integration (Austin, Hornberger and Shmerling 2000). The results have demonstrated poor co-ordination of data provision within hospitals possibly due to non-integration of information systems. Nurse managers receive data on a sporadic basis or as a result of specific requests on their part. Data are sourced from a variety of departments, databases and individuals indicating resourcefulness on the part of the nurse managers to obtain information relevant for their needs but does not imply comprehensive, organisational, strategic planning related to casemix information. This survey focussed on formal methods of data distribution, however it is interesting to note that a small number of respondents reported gleaning data by informal means. Informal methods of information sharing (telephone conversations, meetings with finance personnel etc.) are common practice and assist managers with determining their informational requirements (Hughes 1999).

Many managers did not perceive that provided data aided their decision making, possibly reflecting individuals' lack of comprehension of casemix as a management tool or because data were not provided in a meaningful manner. It is suspected that as ALOS was the most frequent data provided with few managers receiving detailed data on performance by DRG the latter scenario is most likely the case.

Demographic information was again only provided to a small number of managers. This information is routinely collected by hospitals and should be widely distributed. Provision of demographic data on a regular basis would enable nurse managers to examine trends in patient populations and assist with planning and operationalising health services e.g. services for the elderly, interpreter needs and budget predictions.

Possibly reflecting the preferred method of manual data analysis, many of the nurse managers rated their computer skills as 'average' or 'poor'. Although nurse attitude and satisfaction towards computer systems influences their motivation to use them (Marasovic, Kenney, Elliot et al. 1997; Bowles 1997) computer skills (like casemix knowledge) have been associated with educational attainment (Bowles 1997). In addition, Norris and Brittain (2000) argue that health organisations have not invested in education and training pertaining to information systems. Zazzara (2001) and Cohen (2002) contend that as health professionals are predominantly clinicians, computers and informatics are an enigma to them. However, if health management is to move to a more strategic, efficient environment, nurse managers must develop their computer skills and knowledge of health information systems to be able to utilise data in a resourceful manner.

Enthusiasm for additional data to be provided was high indicating a need and interest by nurse managers in the area of clinical data interpretation. The nurse managers were equally

enthusiastic in attending workshops on casemix principles and data analysis. These findings indicate that nurse managers are keen to embrace the application of data analysis and apply the information to their practice. Despite the rise in nurse managers processing tertiary management qualifications (Duffield, Moran, Beutel et al. 2001; Duffield and Franks 2002), at this stage they are generally not familiar with the use of casemix and data management as a business tool.

Conclusion

Nurse managers within the seven organisations surveyed did not routinely receive much casemix and related clinical data. Data provided varied substantially, both between and within hospitals from a multitude of sources demonstrating that provision of data to nurse managers was not centrally coordinated. Reflecting previous studies, knowledge of casemix and clinical data as a managerial tool was not high amongst the nurse managers surveyed. Few nurse managers believed the information provided aided their decision making although those managers working in hospitals that provided a wider variety of data were more likely to use the information.

In line with strategic business planning regular, distribution of casemix and demographic data to nurse managers in a co-ordinated effective manner is recommended. Meanwhile, nurse managers must expand their casemix knowledge and computer skills in order to optimise efficient health service provision within the current fiscal environment.

Acknowledgments

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