New Zealand DHB Nurse Roster Systems

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New Zealand DHB Nurse Roster Systems

Introduction
The following project examines nurse roster systems in New Zealand District Health Boards. The emphasis of the project is to provide a brief comparative analysis of roster systems in New Zealand. The research synopsis will provide an overview of the advantages of an e-roster system and a vision for the future of nurse roster solutions in New Zealand District Health Boards. The scientific merits of the vision will be presented, followed by an overview of the foreseen barriers to implementation.

Multi Modal Search Strategy
The primary search strategy involved searching the University of Otago library online databases Medline (Ovid) and PubMed. Tables Figures 1 and 2 are snap shots of the search screen for Medline. The database was searched both with and without application of filters. Restricting the time period to within the last five years excluded a significant amount of results from the search. Due to the limited availability of research on the topic of nurse scheduling and electronic rostering in hospitals, the only limit which was applied to the search was ‘English’ language, as all abstracts, full text and article reviews needed to be included in the search results.

Table Figure 1

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The second search strategy was to perform a general internet search using the 'Google' search engine. The following headings were searched.

- Nurse roster systems
- Nurse scheduling
- Electronic scheduling in New Zealand hospitals
- Electronic roster systems in New Zealand hospitals.

The third phase of the research strategy was to search the individual roster systems themselves. For example 'One Staff'. Information on each of the S-Flex current electronic roster systems was collected, including interface requirements, testimonials, and any evidence of validation through current literature.

**Research Method**

![Research Method Diagram](image)

1. The methodology for researching nurse roster systems in New Zealand DHBs began with a multi modal database search. It became clear that there is a considerable research-application gap. It would seem that many DHBs have purchased systems which do not have research based evidence that validates their chosen roster systems. The exception to this is the Workforce central tool used at .

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2. The second phase of the project was to speak with Health Benefits Limited (HBL). The purpose of speaking with HBL was to gain clarity around the scope of the national nurse roster project. According to HBL there are eight DHBs who are still using some form of paper based system. This varies from the National Health IT Board table which shows DHB current platforms including current roster systems. According to HBL this is because DHBs are still using a combination of paper based and electronic roster systems. In some instances the electronic system has been purchased but the organisation remains on the paper based system.

3. The third phase of research methodology was to gather some end user feedback from a small group of nursing staff who are currently employed by various DHBs around the country. The nurses were asked for feedback on the following 2 questions?
   - Do you access a computer for your current roster system?
   - Do you complete a paper time sheet for payroll purposes?

Discussion

The past decade has witnessed significant changes to nurse roster systems in New Zealand District Health Boards (DHBs). Historically (and still in place in two DHBs) New Zealand has used a paper based roster system for nurse scheduling. In some organisations (such as Tairawhiti), the current system is a combination of paper based, Excel spread sheets and paper time sheets which are then manually entered into an electronic payroll system. While in this day and age a paper based system seems rather antiquated for large organisations such as DHBs, it would seem that New Zealand is not the only country making a slow transition to a fully electronic system. As recently as 2011 Leeds Hospital, a major National Health Service (NHS) hospital in the United Kingdom, changed from a paper based to an e-roster system.

Scheduling has historically been “nursing’s domain” (Gardner, 2003) which may explain the slow progress in the acquisition of electronic based solutions. For nurses, computer literacy has been described as a ‘creeping competency’ and as it stands computer literacy skills are still not addressed in under graduate nursing programmes.

For New Zealand the subject of nurse roster systems has been thrown into the national health sector arena and is the cause of considerable discussion. Health Benefits Limited (HBL) has been tasked to provide a national solution for nurse rostering in New Zealand DHBs. Which system this will be is still up for debate, and it may be that their recommendation will propose a choice of systems, depending on what DHBs already have in place. “In the area of Human Resources/workforce management, HBL will be working with DHBs interested in going to market to agree systems that could be used by the sector across these functions” (Health Benefits Ltd). According to the HBL...
website, HBL has a projected savings for 2016/2016 related to workforce management and Human Resources equal to $35,000,000.

In order to be able to analyse the progress made in relation to nurse rostering it is important to first understand the functionality required of a roster system within the health sector.

According to DHSS Tasmania a roster system must do the following:

- Rosters must comply with the relevant industrial and legislative provisions
- Rosters must provide an efficient and effective utilisation of staff
- Rosters must provide safe staffing levels
- Rosters must provide for a suitable skill mix of staff
- Rosters must support work life balance
- Rosters must cover service delivery requirements
- Rosters should enable employees to be actively involved in the review of equity

(Department of Health and Human Services, 2011).

An e-roster solution for New Zealand DHBs must have the capability to interface with other national solutions, such as payroll.

As it stands there are five electronic roster systems in use in New Zealand DHBs. According to HBL, the complexity of the five systems is not to be under rated, as each system is being used in slightly different ways and in most instances different versions of the software have been installed (personal communication, Richard Franklin, Project Lead for HRM and Roster Systems, May 2013). Added to the challenge is a mixture of in-house excel spread-sheets and paper based roster solutions. Feedback from end users also confirms that roster to payroll solutions are not always in place, with some end users still completing a paper time sheet regardless of the electronic roster system. One example of this is seen in Auckland DHB, who is currently implementing its third electronic nurse roster system. The first system purchased completely lacked the capability of interfacing with the DHBs payroll system.

In the past decade New Zealand’s three largest DHBs have all purchased different roster systems:

| Capital Coast | One Staff |
| ADHB | Workforce Central (five year roll out) |
| Canterbury | Microster |

Although this inconsistency adds to the complexity of the task ahead, standardising the current roster system to a single national solution will be the foundation on which the future vision for rostering can be attained.
Future vision of nurse rostering in New Zealand DHBs: ‘Virtual Staffing’

“Virtual staffing is the optimization of front-to-back hospital processes, integrating traditionally disparate systems to provide prospective and informed decisions about resource planning. In its most sophisticated form, virtual staffing integrates admission/discharge/transfer (ADT), finance, and clinical information systems with the nurse scheduling” (Gardner, 2003).

The current plan by HBL is to provide a single instance, fully integrated roster solution for New Zealand DHBs. The concept of a fully integrated roster system, one that responds to changes in demand/resource and capacity (informed by patient acuity and bed utilisation data) has been mooted by HBL. The idea of a fully integrated roster solution implies that data inputted into ‘other’ existing solutions, such as patient acuity data, demand data, forecasting data, resource and supply data, will inform a recommended roster system, including skill mix required in order to meet the needs of the organisation. According to Gardner (2003) “we need to look at running our hospitals with real-time information using artificial intelligence and optimization tools. By collecting and processing that data in real time, we can automatically modify the schedule to create and distribute the resource needs, both in terms of manpower and in the qualifications and competencies of that manpower.”

Research to date indicates that web based roster solutions will feature prominently in the future. The trend in web based solutions for health systems is growing in popularity. A web based solution would seem to be the simplest way of ensuring a fully integrated solution where patient acuity and service demand will inform the roster requirements. The roster will need to provide visibility of staff resource in the moment and retrospectively while also provide for forecasting based on demand patterns. Future rostering solutions need to be based on a ‘bottom up’ budget, informed by demand indicators such as utilisation and patient acuity as well as resource indicators such as staff and skill mix available.

Further to the vision of a seamless system with full interface functionality there are also many other benefits to acquiring an e-Roster system, for example:

The ability to interface with a Human Resource System (HRM)

In New Zealand, Northland DHB has their patient acuity tool and roster system interfacing with their HRM system. Due to this functionality Northland is a pilot site for New Zealand DHBs to trial an alert system placed on the roster system when an Annual Practicing Certificate (APC) for a nurse being rostered has expired, or is about to expire. This functionality is enabled through having HRM information (which contains all nurses APC numbers) flowing into the HRM function of their current roster system (TrendCare). The DHB is then able to send an export data to the New Zealand Nursing Council (NZNC) via a csv file. The NZNC matches the exported APC numbers against their database which shows registration status. NZNC then sends a return csv which is uploaded into the Northland DHB TrendCare database.

In the remaining 19 DHBs, the process for checking APC status is done manually by both Human Resources and by the Charge Nurse Manager, with the actual certification needing to be sighted and photocopied. The pilot in Northland demonstrates how an e-roster system with interfaces to other...
organisation systems can have multiple benefits in terms of efficiencies and public safety (no nurse can be rostered without a current APC).

**Potential Road Map for a fully integrated roster system**

There is work underway in New Zealand to allow for system to system integration. The following example looks at the CapPlan/Concerto systems and how a patient acuity and roster system may interface to allow for a fully integrated roster system.

Some New Zealand organisations have already purchased CapPlan. CapPlan is described as 'enabling' software. In basic terms it is a version of decision support software (DSS), allowing healthcare organisations to forecast demand and plan accordingly. Concerto is a Clinical Information System; otherwise known as the 'physicians' portal' it allows the user to view electronic patient information such as lab results, clinical notes, documentation, radiology images and observations. Both systems have a clinical work station user interface.

According to the Orion Health website (Concerto is owned by Orion) CapPlan has partnered up with Orion Health. In the same instance one particular roster vendor (TrendCare) has had recent conversations with Orion to discuss the potential to develop a Concerto/TrendCare interface. What this all means is that there is a real opportunity to have roster/acuity, clinical and DSS software all connecting via HL7 messaging. This may be possible through the use of an integration engine, which could provide connectivity from system to system in real time.

Many organisations are showing ‘real time demand’ on TV screens displayed throughout their organisations (tableFigure 3). The demand is based on bed utilisation and patient acuity data. If this real time information was then linked to a roster system then there is the potential to show nurse resource and nurse skill mix required.

![TableFigure 3](image)

This Capacity at a Glance view serves two purposes

1. For staff – to be able to indicate their clinical status in real time
2. For the organisation to be able to see the total picture of demand and capacity

This is a patient management system and TrendCare driven view of all units of the hospital (or the DHB). The CaG view illustrates physical capacity, patients by type and number, and the match between demand and capacity.

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Further to this, future roster systems will have the ability to interface with national regulatory bodies, ensuring the automated update of registration numbers.

**Advantages**

- A move from multiple systems to one system can promote efficiencies (economies of scale, benchmarking)
- Potential to reduce time spent on roster development
- Potentially reduces agency/casual/bank staff costs, as real time resource availability is visible. Staff can be re-deployed across the organisation as opposed to calling in more staff.
- Potential to be flexible enough to adapt to any changes in the demand profile of the organisation.
- Reduces payroll errors. Roster to payroll efficiencies. (Anon., 2013)

**Scientific Merits**

"Nursing salaries make up the largest single element in hospital costs. Scheduling nurses in hospitals is a complex problem due to variability in demand and a variety of conflicting interests and objectives" (Sitompul, 1990).

Research demonstrates that long standing issues between supply and demand (be it bed shortage or nursing resource shortage) have contributed significantly to cancellation in surgical procedures, extended waiting times in emergency departments, and bed blocking. This is particularly true for the winter season, where many DHBs experience staffing shortages, coupled with hospital utilisation reaching or exceeding capacity. According to Gardner (2003) "nursing professionals have been aware of the management challenges associated with hospital scheduling for years. However, today’s changing workforce, advances in technology, increased financial pressures and regulatory oversight have put the scheduling process on healthcare’s strategic agenda."

Capacity planning is the key to effective nurse scheduling. DHBs are employing various tools to enable robust capacity planning. Two such examples include CapPlan, a DSS based solution, or engaging in the Care Capacity Demand Management programme (CCDM), a programme which uses a staffing methodology to predict nursing resource full time equivalent on each and every shift, each day of the week. Some organisations have both CapPlan and CCDM in place.

**Barriers to implementation**

"The challenge of getting the virtual staffing concept on the executive agenda has been somewhat alleviated by the current labour shortage. Costs related to nurse productivity, turnover, insufficient staffing, and lack of an optimized schedule all have the potential to negatively affect a hospital’s operating costs. Forward-thinking health care executives are beginning to realize that placing the optimization of the scheduling process on the strategic agenda can provide competitive advantage” (Gardner, 2003). [The first three sentences of this paragraph are really more about the benefits]
Further to this Gardner (2003) also states that "fully evolved virtual staffing will be a difficult goal to attain until the information fed from patient clinical information systems and patient algorithms can be integrated into the staffing information system."

As with any new system there are potential for barriers related to usability, cost, maintenance and upgradeability. Moving the entire public hospital system onto a single system may also have the following barriers:

- Computer Literacy (particularly amongst Charge Nurse Managers responsible for rostering)
- Consensus agreement on which system to adopt
- Leaving behind already purchased ‘expensive rostering solutions’ in favour of a national shared instance
- Proving efficiency, benefits to organisation and benefits to staff.

Conclusion

The past decade has witnessed significant changes to nurse roster systems in New Zealand DHBs. The transition to electronic rostering for the health sectors largest workforce has not been entirely smooth and there is still a considerable amount of work to be done.

Whilst there is an organisational imperative to ensure that nurse roster systems are planning for and ensuring adequate staffing around demand and capacity, as well as meeting MECA requirements, there is also the challenge of agreeing on a national solution which will integrate with all DHBs current platforms as the New Zealand health sector progresses towards a more consistent national standard for health system IT solutions.

The research for this project has highlighted the research-application gap. "Nursing research should continue to formalize methodology development and develop standardized approaches to the virtual scheduling and staffing process" (Gardner, 2003)
References

Anon., 2013. SMART.. [Online] Available at: http://www.smart-rostering.co.uk/


