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Linking Nursing Outcomes, Workload and Staffing Decisions in the Workplace: The Dashboard Project

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Abstract

Research shows that nurses want to provide more input into assessing patient acuity, changes in patient needs and staffing requirements. The Dashboard Project involved the further development and application of an electronic monitoring tool that offers a single source of nursing, patient and organizational information. It is designed to help inform nurse staffing decisions within a hospital setting. The Dashboard access link was installed in computers in eight nursing units within the Hamilton Health Sciences (HHS) network. The Dashboard indicators are populated from existing information/patient databases within the Decision Support Department at HHS. Committees composed of the unit manager, staff nurses, project coordinator, financial controller and an information controller met regularly to review the Dashboard indicators. Participants discussed the ability of the indicators to reflect their patients' needs and the feasibility of using the indicators to inform their clinical staffing plans.

Project findings suggest that the Dashboard is a work in progress. Many of the indicators that had originally been incorporated were refined and will continue to be revised based on suggestions from project participants and further testing across HHS. Participants suggested the need for additional data, such as the time that nurses are off the unit (for code blue response, patient transfers and accompanying patients for tests); internal transfers/bed moves to accommodate patient-specific issues and particularly to address infection control issues; deaths

and specific unit-centred data in addition to the generic indicators. The collaborative nature of the project enabled staff nurses and management to work together on a matter of high importance to both, providing valuable recommendations for shared nursing and interprofessional planning, further Dashboard development and project management.

Background

Research shows that nurses want to provide more input into assessing patient acuity, changes in patient needs and staffing requirements (Kramer and Schmalenberg 2003, Laschinger et al. 2003). This Hamilton pilot project was developed out of a series of Ontario government studies and earlier pilot projects regarding nurse staffing and workload issues. A 2007 Ontario report, *Measuring Nursing Work in Ontario*, prepared by the Nursing Workload Task Committee, which was established by the Ontario Nursing Secretariat (part of the Ontario Ministry of Health and Long-Term Care [MOHLTC]), found that there is no consensus on how to define or measure the work of nursing. The report also noted that many complex factors must be considered in determining patient requirements.

Further, the report found that maintaining consistency is difficult within the various complex systems and with the frequency of change in processes and technology. The report concluded that what was needed was an approach to staffing plans that can adjust to a changing environment and changing circumstances.

The report suggested that staffing plans should

- be developed at the organization and unit levels in consultation with front-line nurses using a shared governance model;
- provide options for nurses when staffing arrangements are inadequate;
- identify expected nurse–patient ratios, skill requirements, scopes of practice, staffing models and resources required for quality of care;
- recognize the complexity involved with the appropriate matching of nurses' and other care providers' skills, education and experience with patients' needs; and
- be created by individuals trained for and capable of making these complex decisions.

The report noted that there were information gaps in the existing frameworks used to determine staffing levels – gaps such as patient outcome information – and recommended that provincial demonstration projects be supported to address the gaps.

Hamilton Health Sciences (HHS) was one of several Ontario pilot project sites that had been engaged in constructing their individual Dashboards. It had participated in provincial studies and had also undertaken its own initiative to support evidence-based internal resource allocation and to more accurately reflect the true costs of providing care, rather than just average or expected costs per patient. HHS had also initiated the development and implementation of formal clinical staffing plans. The development of dashboards and staffing plans relied on previous work, as well as a wealth of academic research (Donaldson et al. 2005, Doran 2003, Egan 2006, Juntila et al. 2007, Lowe and Baker 1997, Mazzella-Ebstein and Saddul 2004, Park and Huber 2007, Rosow et al. 2003, Saint-Eloi et al. 2005, Urden 1996, Whitman et al. 2001, Fitzpatrick 2002, Mills and Walters 2006, O'Brien-Pallas et al. 2002, Sangster 2007).

Hamilton Health Sciences, the Ontario Nurses' Association (ONA) and the Ontario MOHLTC Nursing Secretariat developed a project to complement the various Ontario studies and initiatives. The project involved the development and application of a tool called the Nursing Dashboard – a single source of nursing, patient and organizational information to facilitate data-driven decisions about the appropriate staffing for nursing care. The tool aimed to use common, agreed-upon indicators that could be applied across different sectors and settings. The construction of this tailor-made software application began in 2008 under a provincial nursing workload demonstration project supported by the Ontario MOHLTC's Nursing Secretariat.

This project, Linking Nursing Outcomes, Workload and Staffing Decisions, responded directly to the recommendation for a pilot demonstration project to determine what indicators were needed and useful to assess the level of staffing on an individual unit required to provide high-quality patient care. This project builds on and enhances initiatives already underway in the province. Importantly, it integrates front-line nurses into these activities.

The project involves staff nurses in collaboration with managers, and finance and information controllers, in the ongoing construction and pilot use of a central repository for information relevant to understanding the nursing workforce, nursing work and nursing/patient/organizational outcomes, and in considering nursing staffing decisions.

Objectives

This project further aimed to support and evaluate a Nursing Dashboard of evidence-based indicators. The goal was to determine the indicators that best

support nurse leaders at the unit, organizational and provincial levels to measure nursing work and make informed decisions regarding nursing staff requirements. Additionally, the project aimed to provide opportunities for nurses to be involved in assessing their workload to gain a better understanding of the multiple factors affecting nursing workload and to create a comprehensive approach to support nursing human resources decisions.

More specific objectives were to assess the validity and feasibility (involvement, burden and receptivity for nurses, managers, controllers and the organization in collecting and using the indicator data) of the Nursing Dashboard and to describe

- the frequency with which data needed to be collected and reviewed to provide useful information;
- the degree of completeness and accuracy of the Dashboard indicator data;
- the usefulness of the Dashboard data in supporting nursing staffing and workload decisions;
- the potential for the Nursing Dashboard to be used in other clinical areas beyond the pilot units; and
- the direct costs associated with recording, abstracting and linking indicator data, reviewing the data and the educational time required to use the data.

Overview: Design and Planning

The building of the central repository, a tailor-made software application called the Dashboard, began in 2008 under a provincial Nursing Workload Demonstration Project. The term “dashboard” is meant to draw a comparison with the dashboard in a vehicle, particularly with the control panel that provides drivers with a snapshot on important variables such as supply of gas, temperature, speed when travelling and so on. In this case, input information includes characteristics of patients, nurses and the system; throughput information consists of nursing care processes and environmental complexity; and outputs are patient, nurse and system outcomes. The concept behind the program is that elements in each section of the model that characterize the patient population, the nursing staff and the system (unit, organization or both), when combined with nursing processes and other complexities in the environment, contribute to important organizational outcomes.

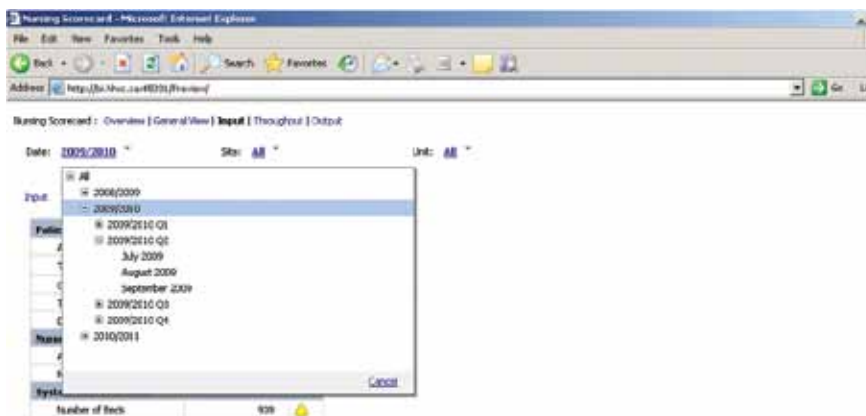
Depending on the service or program, patients are characterized by various indicators, such as age, gender and medical diagnosis, which are important in identifying or summarizing their health status and needs for care. The attributes that characterize nurses include age, experience, education, skills and knowledge.

There should be a match between nurse characteristics and the care needs of the patients. The system for that care would reflect the patient and workload metrics, staff hours and skill mix. The context, processes and complexities of care and the ensuing outcomes for patients, nurses and the system (unit, organization and beyond) are then fed back for explanatory evaluation, education or program and staffing planning.

The Dashboard stores historic data and incorporates a drop-down menu so that users can access specific data for defined periods of time (Figure 1). Additional features on the HHS Dashboard include a monitor unit and system items that permit benchmarking, and a green-yellow-red system of symbols to indicate when key data were at acceptable corporate levels, at a cautionary level or at a level well above or below usual or anticipated targets (Figures 2 and 3).

Figure 1.

Time parameter drop-down menu for Dashboard data



An Ontario project management committee composed of representatives from HHS, the ONA and the Nursing Secretariat of the MOHLTC led this project. A full-time project coordinator (with part-time clerical support) was engaged to work with the committee and was accountable for the day-to-day management of the project and coordination of the work plan activities.

Figure 2. Full Dashboard data set, all sites

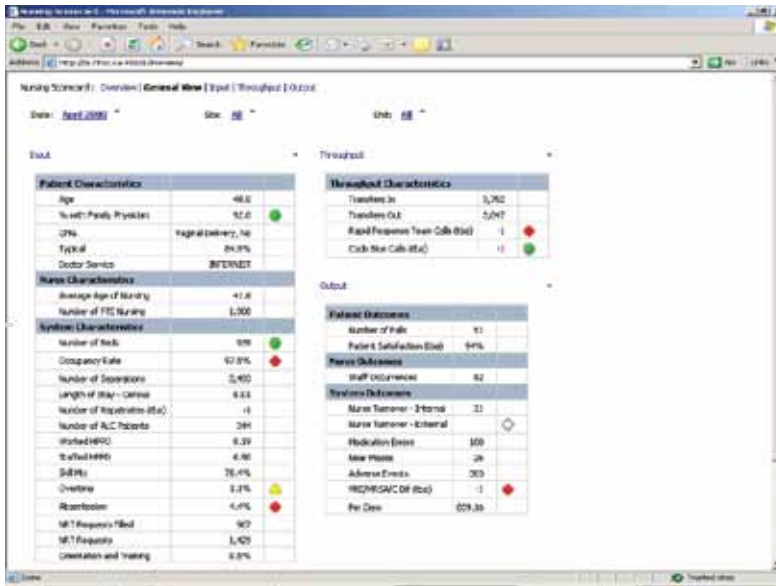
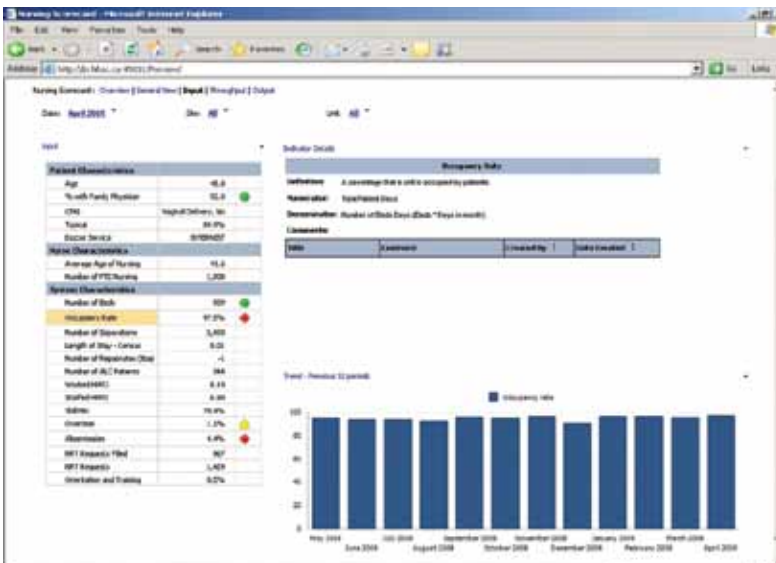


Figure 3. Graphic output of Dashboard data



The work plan for the 18-month project included three broad phases: project planning, implementation and project evaluation. The project began in November 2008 and the Dashboard was finalized in December 2008. Meetings for planning and evaluation began in spring 2009. The project received ethics approval from the HHS Institutional Research Ethics Board on April 21, 2009.

Initially, 10 nursing units were recruited from the clinical areas within the hospital sites to pilot the Dashboard. From the 10 pilot units, eight units from a variety of clinical settings across three HHS sites participated in the project. Nursing units included an emergency department, neonatal intensive care unit, cardiac care unit, cardiology in-patient unit, surgical orthopaedic and oncology units and medical units. Dashboard committees were struck at the eight participating HHS nursing units – five units at the Juravinski Hospital (previously Henderson General Hospital), two at Hamilton General Hospital and one at McMaster University Medical Centre. The committees were composed of the unit manager, staff nurses, a financial controller and an information controller. The two controllers, who also serve other departments and programs, joined the committees as partners to contribute financial and decision support information and assistance. This also gave HHS the opportunity to have key individuals understand and assess the applicability of the Dashboard to other non-pilot units. Nursing staff participation for committee membership was solicited through individual, explanatory letters and the encouragement of the clinical manager and the project coordinator.

The project coordinator convened information sessions for the unit staff nurse representatives and the unit staff at large. Several strategies were used to engage and educate the staff. These included handouts on project information in a question-and-answer format, PowerPoint presentations and one-to-one consultation with the project coordinator.

Staff nurses were provided with additional resources for ready reference, such as a definition list of the indicators that appeared on the Dashboard, where indicators were organized under the input, throughput and output elements of the Patient Care Delivery Model. Once committee members were in place, they were encouraged to discuss the project with peers. However, for the purposes of the project, the direct use or review of the Dashboard itself was limited to those on the unit committees. Hands-on training on the Nursing Dashboard was organized for the clinical managers, staff nurses, financial and information controllers and program directors involved in the project.

Implementation

A total of 21 staff nurses, most of whom had not been involved in the initial construction of the tool and the selection of indicators, participated in the Dashboard Project at the eight HHS pilot units alongside seven unit managers, three financial controllers and three information controllers (the controllers served multiple units).

Dashboard users signed an agreement in which they agreed (among other terms) they would use the information on the Dashboard only “for the purpose of the evaluation of the Nursing Dashboard on my clinical unit.” The Dashboard could be accessed from any computer on the unit, providing managers and nurses with an overall picture of their unit’s situation. Nurses and managers reviewed the Dashboard to ensure that the indicators were representative, to discuss changes occurring within the clinical unit and to determine whether the Dashboard could be made more helpful or accessible. Monthly reviews of the Nursing Dashboard indicators were conducted using a standard data collection tool developed by the Decision Support Department at HHS. Between July 2009 and February 2010, a total of 46 Dashboard review meetings were convened, at which the project units engaged in the monthly reviews of the indicators. Participants discussed the apparent accuracy of the indicators in reflecting their patients’ needs and the feasibility of using these indicators to inform their staffing plans (i.e., they provided input into the utility of the indicators in the Dashboard).

Project participants generally utilized the Dashboard through the regular monthly meetings with the manager and financial/information controllers. These meetings initially served to educate the nurses regarding the indicators being utilized and how these described the activity and patient outcomes within their clinical unit. The nurses contributed to these meetings by “telling and describing the patient stories” that in fact drove the indicator data.

Evaluation

A descriptive, exploratory design was employed to evaluate participant opinions on participant involvement and the attributes of the Dashboard. An opinion questionnaire was developed, and six focus group sessions were held, using an external consultant (facilitation/analysis). A content analysis approach was used to analyze the qualitative data.

Questionnaire data affirmed that the Dashboard was quite easy to use, and that selected indicators would benefit from further development to reflect the actual

volume and intensity of nursing work. Focus group analysis affirmed the quantitative findings and revealed two predominant themes: that the Dashboard is a work in progress and that nurses' voices add value.

Challenges

Nurses were initially skeptical about the purpose of the project, suspecting that the Dashboard might be used to justify nursing staff reductions. For some, it felt like one more project in a climate where things are constantly changing. As well, some nurses were not comfortable or experienced in using the computers, and it took time to become familiar with the terminology and acronyms used in the Dashboard.

Some nurse participants had thought that the Dashboard would be useful to acquire staff for immediate needs. The tool, however, does not provide "real time" data and is not intended to inform day-to-day staffing, but rather to use historical data to provide evidence for projections about future staffing requirements.

Scheduling regular Dashboard review meetings and achieving full engagement of nursing staff were ongoing challenges throughout the course of the project. Nursing shortages, in spite of backfill, and general workload issues were noted as key challenges affecting nurses' ability to leave the unit for Dashboard review meetings. In addition, unanticipated bed closures resulting from budget constraints meant that units had to revise their staffing models, and this had a negative impact on nursing staff morale and engagement in the project.

Other challenges encountered over the course of implementation included leadership changes in one project unit; an outbreak of Norwalk virus on one of the participating units; roll-out of revisions to the existing workload tool at one site (in March 2009), which affected the project units at that site; and the impact of H1N1 on both the organizational and clinical levels for time and resources.

Certain components of the Dashboard were not applicable to the Neonatal Intensive Care Unit where it was piloted, because the Dashboard is based on an adult population and the NICU had its own database. Additionally, its application to the Emergency Department had limitations, as it did not capture some relevant information about, for example, triage.

Outcomes

Participants gained an appreciation for the depth of knowledge needed to determine the appropriate numbers of staff for nursing units.

The Dashboard is a work in progress. Many of the indicators that had originally been established were refined and will be revised based on suggestions from project participants and tested across the HHS. Participants suggested the need for additional data, such the time that nurses are off the unit (for code blue, patient transfers and accompanying patients for tests); internal transfers/bed moves to accommodate patient-specific issues and particularly to address infection control issues; deaths and specific unit-centred data in addition to the generic indicators.

Probably the strongest aspect of the project was its collaborative nature, as staff nurses and management staff worked together on a matter of high importance to both, providing valuable recommendations for shared nursing and inter-professional planning, Dashboard development and project management.

The cost for education on the Dashboard at the unit level was estimated at \$14,760, while training costs for directors, controllers, managers and Office of Professional Medical Conduct representatives was estimated at an additional \$6,310. Owing to the limited project time, it was not possible to develop effective measures to estimate other costs associated with Dashboard use.

Lessons Learned

- The purpose of the Dashboard should be made clear, especially among the front-line staff, to avoid misconceptions. Communication about the project, its value and relevance should be active and ongoing from the outset, especially with regard to its main use for trending, tracking and projections rather than day-to-day staffing.
- The Dashboard is a learning tool for new managers, staff and students. As such, effective strategies for collaborative education are warranted.
- It is important to acknowledge and appreciate that staff nurses may have different levels of interest and computer skills. Similarly, they may not have knowledge of management terms, acronyms or facility with computers. Education takes time and patience.
- The financial and information controllers are important partners in the unit committees.
- Any single change in the Dashboard involves multiple levels of discussion and activity, and these take time.
- Project development should be ongoing in order to sustain impetus and energy, as well as to give staff confidence that their involvement in pilot work has long-term value.
- For certain data sets, such as workload and incidents, the data are only as

accurate as the frequency of rating or recording. Compliance in entering data and in recording/reporting incidents varies, depending on several nurse or unit factors.

- Determining staff complements goes beyond patient volume projections. This project demonstrated the value of collaborative work while building a practical tool for data-based nursing staffing decisions.

Sustainability and Transferability

HHS intends to continue to build, use and sustain the Dashboard in the pilot units and extend this tool to other units. The plan is to use the Dashboard to support quality initiative of Hamilton Health Sciences. It is intended that it will become embedded within HHS Quality Framework.

The Dashboard approach may be useful in other sectors, such as long-term care, public health and community services, and to other professions, departments and professional teams. Forecasting staffing targets, skill mix and the need for nurses (and their interprofessional partners) with other scopes of practice, skills and experience is equally applicable. The need for shared decision-making is no less important in non–acute care settings. However, participants have cautioned that while the Dashboard may be very valuable to smaller organizations, robust IT (information technology) capacity and infrastructure must be in place.

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