Forecasting Future Workforce Demand

A Process Evaluation

Andrea Baumann, RN, PhD

Camille Kolotylo, RN, PhD

Table of Contents

Contributing Authors

St. Michael's Hospital

- Ella Ferris, Chief Nursing Executive and Executive Vice President of Programs
- Sylvia Halliday, Vice President, Human Resources
- Kaiyan Fu, Director, Nursing Innovation and Change Management & Project Lead
- Susan Allen, Project Manager
- Deborah Ambrose, Human Resource Analyst
- Peter Tommasulo, Human Resource Information Specialist

Kingston General Hospital

- Eleanor Rivoire, Senior Vice President, Patient Care Programs & Chief Nursing Executive
- Hazel Gilchrist, Project Lead, Human Resources

West Park Healthcare Centre

- Donna Renzetti, Vice President of Programs
- Barbara Bell, Chief Nurse and Health Professions Officer
- Liliana Catapano, Project Lead, Director of Human Resources
- Nadia Marchese, Human Resources Analyst

Royal Victoria Hospital, Barrie

- Leslie Willekes, Project Lead, Human Resources Consultant
- Kim Townes, Manager, Human Resources

University Health Network

- Che Marville, Project Lead, Senior Human Resources Advisor
- Aimi Ly, Business Analyst, Human Resources

Ontario Hospital Association

- Dana Ross, Human Resources Project Consultant

The Advisory Board Company

- Kate Kline, Practice Manager, HR Investment Center

Executive Summary

Funded by the Nursing Secretariat, Ontario Ministry of Health and Long-Term Care, the Forecasting Workforce Demand Project is a demonstration of health human resources (HHR) planning. This study focuses on the implementation and evaluation of the Forecasting Future Workforce Demand Tool (the Tool) developed by The Advisory Board Company (2007a, b). It was hypothesized that implementation of the Tool would enable hospitals to enter historical workforce data to create one-to five-year forecasts for proactive HHR planning and strategy development.

The participant organizations consisted of five hospitals: three teaching, one community, and one rehabilitation and complex continuing care. The organizations and the Ontario Hospital Association sought to address a gap in the provincial healthcare system and contribute to strategic HHR planning. Initially a one-year project, permission was obtained to use the Tool for a second year. The organizations that participated in year two were the same as in year one.

The sample for the organizations varied to meet the needs of each site. Two teaching hospitals and the rehabilitation hospital chose nursing and allied health disciplines as their forecasting groups, the other two organizations chose only nursing. While focused efforts were made to improve consistency in implementation, consideration was given to the unique setting of each organization in order to generate relevant findings.

This project is the first of its kind in Ontario to use a forecasting tool as a standardized approach to human resource (HR) planning across healthcare organizations. Key findings include the approach to HR planning varied across organizations, it takes time to collect

and enter the data elements, and standardized definitions are critical to accuracy and applicability. Another key finding was that organizations vary in how they store data and how they code employees.

The Tool was a systematic method for data collection. It captured historical data and was useful for pre-planning and identifying trends. However, historical information became less valuable when there were major changes in the organization. The Tool breaks forecasting down into five easy steps and provides user-friendly tools to assist the organization. In addition, client support is offered by The Advisory Board Company.[1]

All participants agreed it was a useful process and that the exercise provided insight both into comparability of data and organizational differences in HR data collection and storage. The company has moved from an Excel-based application to a web-based format that may be more convenient, but all data in this format will be stored in the United States. Organizations would need to explore any implications this might have for privacy and data protection.

---

1 The corporate offices of The Advisory Board Company are in Washington, DC, USA.

Introduction and Background

Healthcare organizations must adopt a proactive approach to recruiting that is grounded in quantitative forecasts of future hiring needs. Rigorous forecasts allow managers and recruiters to source talent and increase hiring capacity (Advisory Board Company [ABC], 2007a). Funded by the Nursing Secretariat of the Ontario Ministry of Health and Long-Term Care (MOHLTC), the Forecasting Workforce Demand Project is a demonstration project in health human resources (HHR) planning. It consists of the implementation and evaluation of the Forecasting Future Workforce Demand Tool (the Tool), which was developed by a healthcare think tank in consultation with hospitals across North America and was beta tested by some of this project's partner organizations (ABC, 2007a). Implementation of the Tool enables hospitals to enter historical workforce data to create one- to five-year forecasts for proactive HHR planning and strategy development. One of the five organizations in the study acted as the lead and worked in partnership with the other four organizations to address the gap in Ontario's healthcare system and make an important contribution to strategic HHR planning.

Significance of the Demonstration Project

Strategic human resource (HR) planning creates a sufficient, healthy, and productive nursing workforce, thus resulting in the delivery of safer patient care (e.g., reduced medication errors and fall prevention) and operational efficiencies (e.g., reduced turnover costs and premium costs associated with absenteeism, overtime, and replacement costs). Healthcare organizations that are adept at recruitment and retention of their professional nursing staff have better evaluations of the quality of nursing care provided. The Joint Commission on Accreditation of Healthcare Organizations re-

ported that hospitals with turnover rates under 12% had low risk-adjusted mortality scores and low severity-adjusted lengths of stay, compared to hospitals with turnover rates that exceeded 22% (Cantrell & Browne, 2006).

Human resource profiling is a challenge in healthcare. The Tool allows managers and organization leaders to comprehend existing supply and demand constraints, as well as recruitment and retention issues experienced at the unit, discipline/department, and organizational level. This project addresses a considerable gap in HHR by testing and evaluating this forecasting instrument. The goal was for the participating hospitals to be able to develop forecasts via the implementation and evaluation of the Tool to predict areas at greatest risk of experiencing shortages. These forecasts could then be used to inform management decisions regarding the deployment of resources, development of HR policies, and the creation of programs to target these areas. Hospitals can further build on areas of strength, implement proactive and strategic recruitment, and monitor progress using quantitative forecasts.

Purpose

The main purpose of this project was to implement the Forecasting Future Workforce Demand Tool (ABC, 2007a) across multiple healthcare settings and to evaluate its accuracy and effectiveness. Secondary purposes include: to evaluate the instrument's ease of implementation and user-friendliness, and to evaluate the generated data for usefulness in assisting management decision making regarding proactive recruitment.

Research Questions

Nine research questions were identified for this project:

1. Does the Tool generate accurate forecasts for future hiring needs?

2. Is the Tool easy to implement and user-friendly (e.g., time, training, financial investment required for implementation)?

3. Does the Tool interface with existing Human Resources Information Systems?

4. Can the Tool be applied provincially to specific care settings and environments?

5. Is the Tool applicable across various healthcare settings?

6. Does the Tool generate useful information to assist management decision making in terms of proactive recruitment?

7. Does the outcome of the Tool lead to effective management decision making?

8. Does the outcome of the Tool lead to improvement of existing recruitment processes (e.g., process, efficiency, and effectiveness)?

9. Did the use of the Tool lead to shared learning and promotion of knowledge transfer among partner organizations?

Overview

The forecasting of HHR has had a checkered history. The Barer-Stoddart report (1991) was the first attempt to estimate the future supply of physicians in Canada. This report was met with varied responses and was often taken out of context. Other forecasting models followed, but general application has been a challenge because healthcare changes rapidly. One of the continual issues is the lack of standardized, accessible data. Although institutions are similarly accountable to the MOHLTC, they vary in size and capacity to collect reliable primary data.

Data collection is complex and although healthcare organizations are replete with information, they often do not have the appropriate resources to collect all the necessary data for planning purposes. Researchers in nursing HR have worked on common definitions of important variables such as vacancy rates, turnover, and employment status (Baumann, Fisher, Blythe, & Oreschina, 2003). Several attempts have been made to develop primary databases to give a more accurate picture of workforce characteristics (Baumann, 2007; Baumann, Keatings, Holmes, Oreschina, & Fortier, 2006). However, variability of definitions exists across many organizations, including those participating in this project. The use of the Tool was an attempt to apply a consistent approach to HHR data collection across organizations and across a selected number of professions.

Approach

Quantitative and qualitative methods were used in both years of the project, The data collection worksheet (tool number 4) and the forecasting accuracy self-test (tool number 11). For additional information on data element definitions, quantitative and qualitative tools, interview guides, and developmental background, please see the *Forecasting Future Workforce Demand Project Report* (Baumann & Kolotylo, 2009).

Forecasting Instrument Psychometrics

The purpose of using the Tool is to simplify workforce forecasting while increasing the utility and accuracy of hiring projections (ABC, 2007a). The Tool is organized into 5 steps and 11 tools with systematic instructions, guidelines, templates, and exercises designed to increase forecasting rigour and hiring capacity. This ensures that the instrument is implemented and interpreted in a uniform way by all respondents (Fink, 1995). Instrument psychometric data (i.e., validity and reliability testing) were not reported by the Tool developers (Fink, 1995). Specific information about how widely the Tool is used and its applicability in hospitals in the United States is not available.

Forecasting Instrument Definitions

Definitions for inputs required to complete the Tool (e.g., beginning headcount and budgeted/required FTEs) are provided in the year one report (Baumann & Kolotylo, 2009). Forecasting groups are defined as job categories, departments, units, or facilities. To improve the accuracy of the forecasts, groups and subgroups should have at least 40 FTEs; groups can be broken down into a maximum of 10 subgroups for greater specificity (ABC, 2007b). In year

two of the project, one organization received permission to use groups and subgroups with 20 FTEs, instead of 40 FTEs or more.

Human resource representatives from the organizations agreed upon some shared industry terminology and metrics for common terms, and a *Glossary of Key Data Elements* was created (see Appendix A). Definitions requiring clarification include:

- Headcount refers to the average employee count and is the "total number of full-time and part-time employees in the forecasting group" (ABC, 2007a, p. 10).
- Average employee headcount is the "average employee-count figure at the start and ending of the reporting period" the organization selected (Baumann & Kolotylo, 2009, p. 54). This figure includes individuals on authorized leaves, full-time and temporary staff, and casual employees.
- Actual FTEs are the "actual number of FTEs as measured at the end of the survey reporting period selected by the organization" (ABC, 2007a, p. 10).
- Budgeted FTEs are the "number of budgeted positions included in the forecasting group in FTE terms" (ABC, 2007a, p. 10) and "the original number of FTEs budgeted at the beginning of the survey reporting period selected by the organization" (Baumann & Kolotylo, 2009, p. 56).
- Calculated FTEs are the "actual number of FTEs employed in the forecasting group; calculated by subtracting the number of vacancies (FTEs) from the number of budgeted FTEs" (Baumann & Kolotylo, 2009, p. 56).
- Separations calculator -is used to determine "turnover projections or to input a predicted turnover rate directly" (ABC, 2007a, p. 13). It permits "users to estimate a turnover rate by assigning [estimating] turnover probabilities to each employee" (ABC, 2007a, p. 16) and is more effective with smaller departments, organizations with unreliable or unavailable turnover data for a forecasting group, and

departments with substantial cooperation from operational leaders.

All participating organizations in this project used headcount data for both years. However, in the second year, one organization populated the Tool with headcount and FTE data and conducted two separate forecasts.

Forecasting Instrument Implementation

The Tool was chosen for implementation and evaluation because of previous beta testing by HR representatives from four of the organizations participating in the project. The representatives assessed the Tool to be user-friendly and able to capture the key data elements required for workforce forecasting. This Microsoft Excel-based tool was designed to assist in the prediction of the number of people institutions needed to hire over the next one to five years (ABC, 2007b). Data manipulation is required to modify the data to the format required for the Tool. The ABC has moved to a web-based application this year.

Quantitative Aspects of the Forecasting Instrument

Implementation of the Tool allowed for two approaches for estimating the number of staff needed to replace staff who have left the organization. Organizations entered historical workforce data, which consisted of a comprehensive list of all the data elements contributing to hiring needs for each of the forecasting groups or subgroups in the creation of one- to five-year forecasts of future hiring needs. A separations calculator allowed management to estimate the probability of staff leaving (i.e., turnover) during the next year. Turnover probabilities were then summed, resulting in a general estimate of the total number of terminations and the replacement need (ABC, 2007b). The historical data approach was used by all

organizations participating in the second year of the project. One organization, in addition, updated data in the separations calculator used in the project's first year .

Historical Data Approach

Mandatory data elements used in the historical data approach include budgeted headcount, actual headcount, vacancies, and turnover rate. Recommended data elements include transfers, status changes, leaves of absence (LOAs), estimated future staffing need/(surplus) due to growth, planned facility expansions/closures, and planned technology acquisitions.

Separations Calculator Approach

For the separations calculator approach, data were generated about each individual employee's probability of turnover. Managers estimated the likelihood that an individual would leave the organization, and assigned each employee a percentage to reflect their probability of separation from the organization.

The results from HR managers' meetings with unit managers, using the separations calculator - interview guides for managers, were entered into the Tool's separations calculator by the HR analyst and used to create a forecast for each employee and each unit. The probabilities were added to generate an estimate of the total number of separations. The separations calculator was updated by one organization in the second year of the project. Completing the entire separations calculator is a lengthy process.

Interview Guides

The interview guides were not used in the second year of this project. For further information, refer to the year one project report and Appendix B.

Qualitative Aspects of the Forecasting Instrument

The qualitative component consisted of collecting data at every meeting and conference call about ongoing issues and perceptions about the data collection process. Each site had the opportunity to compare perspectives and discuss issues more frequently in the second year of the project. This occurred because the site leads requested increased communication in year two, both face-to-face and by other means, such as conference calls. Information was collected via notes and minutes.

Forecasting Instrument Reports

The Tool produces several reports tailored to specific audiences. For the purposes of this project, the drill-down report, group summations reports, and the executive summary were produced.

Project Assumptions, Year Two

The Tool runs calculations from FTE values and the organizations had access to headcount data; therefore, for this project, headcount data were substituted for FTE data and entered into all of the FTE data fields. The assumptions for the second year of the project were:

- using the Tool's historical data approach, workforce need can be forecast for between one and five years
- all organizations use the same data element definitions
- all required data for the Tool are available for every organization
- headcount data, rather than FTEs, are used to populate the Tool and does not affect accuracy

Demonstration Project Participant Organizations

The project participants consisted of five healthcare organizations. The Tool was initially beta tested in Ontario by four of this project's organizations, as well as by many healthcare organizations in the United States. Results of the testing process suggested that the Tool was user-friendly and had the potential to address the gaps created by the lack of quantitative forecasting tools in HHR planning in Ontario. Leveraging the funding opportunity made available through the Nursing Secretariat, the five organizations and the Ontario Hospital Association (OHA) decided it was feasible to work together on this demonstration project to implement and evaluate the Tool. Descriptions of the five organizations are provided below.

Organization One

This specialty rehabilitation, complex continuing care, and long-term care facility is located in a large city in Ontario. There are 287 rehabilitation and complex continuing care beds and 200 long-term care beds on the hospital campus. The long-term care site was not included in this project. The HR department does not currently use a workforce forecasting tool and previously used numerous HR planning documents and tools during the budgeting process.

As recommended by the *Forecasting Future Workforce Demand: User Guide for the Center's Forecasting Tool* (ABC, 2007a), the separations calculator was used to forecast for small groups (i.e., the allied health disciplines) in year one of the project. In year two, the separations calculator data from the year one forecast, including new hires and terminations, were updated and used to forecast hiring needs for 2009-2010 (year two forecast).

Assumptions used in year one remained unchanged for year two of the project.

Forecasting Groups
Six health care disciplines were chosen for forecasting including RNs, RPNs, physiotherapists, respiratory therapists, speech language pathologists, and pharmacists. RN subgroups used for forecasting included those RNs in complex continuing care full-time, complex continuing care part-time, rehabilitation full-time, and rehabilitation part-time. Historical data were used for forecasting these larger groups (i.e., RNs and RPNs).

Forecasting Assumptions
An average of three years of historical data was used to populate the data collection tool and provide forecasts for RN and RPN turnover and staffing needs. A 2007 unit expansion, additional expansion, and the creation of new positions affected several data elements. Transfers into and out of subgroups were included for the RN group only.

Data Collection: Data Elements, Year Two
Data elements were populated in different ways for different forecasting groups. This organization used headcount rather than FTE data. Data elements populated were:

- average headcounts for RNs, RPNs, and allied health disciplines were used;
- beginning headcount was populated with full-time, part-time, and temporary employees, and LOAs; it did not include casual employees or employees on long-term disability (LTD);
- budgeted/required headcount included the beginning headcount data plus vacancies;
- vacancies - April 1, 2009 vacancies are headcount data;

- estimated future separations - turnover rate (percentage) includes the average of three years of historical data for voluntary and involuntary terminations (2006-2007 to 2008-2009), forecast for 2009-2010;
- number of headcount separations include an average of three years of historical data and all permanent full-time and part-time voluntary and involuntary terminations; it does not include temporary positions;
- estimated future transfers into or out of this group from another group was not populated;
- estimated future transfers within this group was populated in 2007-2008 with three out of four new full-time positions filled by transfers; was populated in 2008-2009 with two out of three new full-time positions filled by transfers;
- replacement need from transfers within this group - the project lead assumed that there would be fewer transfers into this group in 2009-2010 because there are fewer new positions than the previous years;
- status change was not populated;
- headcount returning from LOAs - was populated with three years of historical headcount data; including maternity leaves and not including LTDs;
- headcount departing for LOAs - was populated with three years of historical headcount data; a forecast for 2009-2010 was not included;
- estimated total replacement need (headcount) was populated with three years of historical headcount data for 2009-2010 and held constant through 2013-2014;
- estimated future staffing need/(surplus) due to growth, change in headcount due to change in beds was populated with two years of headcount data (2007-2008 and 2008-2009) and forecast for 2009-2010; in 2007-2008 and 2008-2009, expansion and the creation of new positions were reported; and it was assumed that some growth would continue through 2009-2010;

- estimated total new hire need was populated with three years of averaged headcount historical data for 2009-2010 and a lower number was held constant from 2010-2011 to 2013-2014 (rationale was not given for the use of the lower number);
- actual hires during the year - it was assumed the there would be fewer full-time RNs hired because there was less growth in 2009-2010;
- estimated total replacement need was included for 2009-2010 and held constant through 2013-2014; and
- actual hires during the year were included for 2009-2010 and held constant through 2013-2014.

Organization Two

This large tertiary/quaternary care provincially-designated teaching hospital with 507 inpatient beds is located in a large city in Ontario. The organization uses numerous internally produced retrospective tools to get a sense of the workforce's current state and relies on internal and external trends to predict workforce need. The trends in these reports are examined over time and projected forward for the coming year, assuming the reported trends continue. Forecasting is short-term, for a year at most.

This organization used three years of historical data to forecast in the second year of the project. Historical data were entered for nursing and allied health disciplines.

Forecasting Groups
Twenty-four clinical units were chosen for forecasting. Subgroups of RNs by functional unit were identified for historical and FTE data collection. They included cardiology, cardiovascular ICU, cardiovascular surgery, combined care gynaecology, coronary care, emergency, gastrointestinal surgery, general internal medicine, haemodialysis, inpatient mental health, level II nursery, medical surgical ICU, nephrology urology, oncology INF, OR combined,

orthopaedics, post-anaesthesia care, psychiatric emergency service, surgical day care, therapeutic endoscopy, trauma neurology ICU, trauma and neurosurgery unit, heart and vascular unit, and the birthing centre.

Forecasting Assumptions
In year one, both the historical data and separations calculator data were used. In year two, three years of averaged historical data (2006-2007 to 2008-2009) were used to forecast (2009-2010), and this forecast was held constant through 2013-2014. Because it was difficult to determine an exact average after the two-year threshold, two years of forecasting data were considered. Data about casual employees are manually collected and were excluded from any forecasting reports. Data were unavailable for estimated future staffing need/(surplus) due to growth. Data collection was completed with a Human Resource Information System (HRIS) and by garnering information from other departments, such as the finance department.

In year two, after conferring with the ABC consultant, this organization decided to include just the major clinical units with more than or equal to 20 FTEs, rather than the previously recommended 40 FTEs per unit. The site lead determined that using this method would cover approximately 90% of full-time and part-time RNs. Because year one data were organized by health discipline and year two data were organized by functional unit, these data were not comparable. A separate manual spreadsheet was used to track casual employees whose turnover tends to be large.

Data Collection: Data Elements, Year Two
This organization used headcount rather than FTE data. Populated data elements were:

- average headcount data were used to populate the Tool;

- beginning headcount was populated with full-time and part-time employees and did not include casual employees;
- budgeted/required headcount are budgeted versus actual headcount data provided by the finance department;
- vacancies are budgeted versus actual vacancies and include temporary positions;
- estimated future separations, turnover rate (percentage) are the average of three years of historical headcount data, kept constant through 2013-2014;
- number of headcount separations are derived from attrition reports from another department;
- estimated future transfers into or out of this group from another group are headcount, not historical data, because one half-year of actual data were available for use;
- estimated future transfers within this group was not populated because subgroups and transfers between/among them were not being used;
- headcount status change was populated with one half-year of actual data;
- headcount status change was populated with second quarter data, doubled for the 2009-2010 forecast;
- LOAs was populated with one half-year of actual data;
- estimated total replacement need (headcount) are full-time and part-time headcount data;
- estimated future staffing need/(surplus) due to growth were unavailable;
- estimated total new hire need (headcount) included full-time and part-time data; and
- actual hires during the year (headcount) were year-to-date actual hires and included new graduate hires.

Organization Three

This large tertiary/quaternary care provincially-designated teaching hospital is located in a large city in Ontario. It uses various tools to

forecast hiring needs and produces numerous internal reports. It also uses HRIS software for data storage and retrieval. The site used headcount and FTE data and calculated separate forecasts for RNs only.

Forecasting Groups
To populate the Tool, the project lead separately entered headcount and FTE data to create two forecasting reports. To forecast workforce needs using headcount data, the tool was populated with headcount data for the Ontario Nurses' Association (ONA), allied health groups, and MRI technologists. The subgroups used were (1) for ONA, the intensive care unit (ICU), emergency room (ER), operating room (OR), and 'other'; (2) for allied health, physiotherapy and respiratory therapy; and (3) MRI technologists which was not separated into subgroups. To forecast workforce needs using FTEs, the tool was populated with FTE data for ONA RNs only.

Forecasting Assumptions
For the forecast based on headcount data for the ONA nurses in the ICU, OR, and ER, the Tool was unlocked and four years of historical headcount data were averaged, entered into the tool, a forecast was calculated for 2009-2010, and this was kept constant through 2013-2014. The ONA 'other' group, allied health groups, and MRI technologist group forecasts were all based on three years of historical data. The process of using three and four years of historical data was done to determine the number of years of historical data that would produce the most accurate forecast.

For the forecast based on FTEs, the Tool was unlocked and four years of historical FTE data were averaged, entered into the tool, a forecast was calculated for 2009-2010, and this was kept constant through 2013-2014 for the ONA nurses groups. In the FTE forecast data, only data regarding ONA nurses, for ICU, ER, OR, and 'other' were entered into the Tool.

Even though forecasting was calculated for five years, only the first forecast year will be used.

Data Collection: Data Elements, Year Two
The collection and entering of data to populate the Tool with headcount or FTE data was the same:

- headcount data were entered for April 1, 2009;
- an average of four years of historical FTE or headcount data (2005-2006, 2006-2007, 2007-2008, 2008¬-2009) was used to populate the Tool for ONA RNs in the OR, ER, and ICU; three years of historical data (2006-2007, 2007-2008, 2008-2009) were used for the ONA 'other' group, allied health professionals, and MRI technologists;
- vacancies and LOAs were excluded from any of the other data elements;
- beginning headcount was populated with averaged historical headcount data, including permanent full-time and part-time as of April 1, 2009;
- budgeted/required FTEs or budgeted headcount data were forecast for 2009-2010 and held constant through 2013-2014 and included permanent full-time and part-time, casual, and temporary data;
- vacancies was populated as of April 1, 2009 with FTE or headcount data;
- estimated future separations, turnover rate (percentage) was the average of historical FTE or headcount data for 2009-2010 and was kept constant through 2013-2014; includes all permanent staff separations; turnover was calculated using the total turnover divided by the total headcount in the reporting period;
- number of FTE separations or number of headcount separations used the averaging method with historical FTE or headcount data and includes all permanent staff separations and retirements;
- estimated future transfers into or out of this group from another group was populated using averaged FTE or headcount data,

forecast for 2009-2010, and held constant through 2013-2014, including permanent full-time and permanent part-time employees;

- estimated future transfers within this group included transfers into and out of one subgroup to another, using averaged FTE or headcount data, including permanent full-time and permanent part-time employees;
- FTE status change or headcount status change were averaged historical FTE or headcount data for 2009-2010 which was held constant through 2013-2014 and included casual to permanent part-time and permanent part-time to permanent full-time employees;
- FTE or headcount status change, reduction of staff were FTE or headcount data, including staff from full-time or part-time to casual status;
- FTE or headcount status change, addition of staff were FTE or headcount data, including staff from casual to permanent full-time or part-time status;
- returning or departing LOAs was populated with FTE or headcount data, including permanent full-time to permanent part-time, maternity leaves, and LTD;
- estimated total replacement need (FTE or headcount) used the averaging method of historical data for 2009-2010 which were held constant through 2013-2014, without any explanation; estimated future staffing need/(surplus) due to growth data were unavailable;
- estimated total new hire need was populated with FTE or headcount data;
- actual hires during the year was populated with FTE or headcount data;
- estimated cumulative total new hire need were FTE or headcount data; and
- cumulative new hires were permanent full-time and part-time, historical FTEs or headcount data to forecast 2009-2010 and cumulatively added through 2013-2014.

Organization Four

This community hospital with 299 beds is located in a small Ontario city. A computerized HR database was adopted and implemented at this site in 2010. Microsoft Excel-based manual spreadsheets are used to track certain data (e.g., transfers). This site used the averages of three years of historical data in both years of the project. Due to capacity issues, the separations calculator was not used in either year. The organization is transitioning to an HRIS, thus certain data were tracked manually.

Forecasting Groups
The forecasting groups were identified as RN and RN2. The RN group included RNs in ten subgroups: ER, mental health, OR/endoscopy, cancer care inpatient unit, ICU, geriatric/long-term care, obstetric, inpatient surgical unit, oncology outpatient, and adult medicine. The RN2 group included RNs in seven subgroups: the float pool, rehabilitation, post-anaesthesia care unit, dialysis, other-direct care, indirect care, and medicine.

Forecasting Assumptions
In year two, three years of averaged historical headcount data (2006-2007 to 2008-2009) were used to forecast (2009-2010). Forecasts were not included for 2010-2011 to 2013-2014. LOAs were not included in the beginning headcount, nor were temporary or casual employees, or vacancies.

The following data decisions were made:

- only full-time and part-time employees were included in the Forecasting Tool;
- only RN subgroups were included;
- employees working in a casual capacity were not included in any reports;
- all data were calculated by fiscal year;
- forecasted turnover and staffing needs for RNs and RN2s were an average of historical, headcount data for the past three fiscal years; and

- turnover rate, estimated future transfers into or out of groups and within the groups, LOAs, and actual hires during the year were forecast for one year.

Data Collection: Data Elements, Year Two
The data element were populated with head-count data, which includes:

- averaged headcount data were used to populate the Tool
- beginning headcount was populated with three years of averaged historical headcount data, including full-time, part-time, and tem-porary RNs; vacancies, LOAs, temporary, or casual employees were not included;
- budgeted/required headcount was the be-ginning headcount plus vacancies;
- vacancies were headcount data, tracked for each fiscal year (April 1 to March 31) and included temporary positions;
- calculated headcount was populated with budgeted/required headcount data plus vacancies;
- estimated future separations: turnover rate (percentage) included the number (head-count) of terminations divided by total headcount and includes LOAs leaving the organization;
- number of headcount separations included the number of terminations (headcount) in a fiscal year and were forecast for 2009-2010;
- estimated future transfers into or out of this group from another group was populated with headcount data and included RNs coded as SEIU/NON Union who switched to ONA (RN);
- estimated future transfers within this group was populated with headcount data;
- headcount status change data were unavail-able because they were too difficult to col-lect;
- LOAs were headcount data, including em-ployees returning from LOAs in that fiscal year and employees departing for LOAs in the same fiscal year;

- estimated total replacement need (head-count) includes full-time, part-time, and temporary data;
- estimated future staffing need/(surplus) due to growth data were unavailable;
- estimated total new hire need (headcount) includes full-time, part-time, and temporary full-time data; and
- actual hires during the year (headcount) included full-time, part-time, and temporary full-time data.

Organization Five

This 456-bed teaching and community hospital is in south eastern Ontario. The site previously used a spreadsheet and numerous HR plan-ning documents and tools to determine staffing needs. The previous forecasting tool was not regularly maintained. The site used a strategic nursing HR plan, modelled after the Ottawa Hospital Plan and the Nursing Health Human Resource Plan.

Forecasting Groups
Registered nurses were chosen as the fore-casting group because they have the biggest impact on direct patient care and considerable turnover, high vacancy rates, and impending retirements. In addition, there is a substantial depth of HR knowledge regarding nursing data and the majority of the required data are accessible in the HR system. This organization used historical data in both years of the project to forecast workforce needs for RNs in seven clinical specialities: medicine, cardiac, critical care, emergency, SPA, obstetrics and gynaecol-ogy, and oncology, encompassing 24 units or departments. The RN resource pool was also included as a subgroup.

Forecasting Assumptions
In year two of the project, the average of three years of historical headcount data, for 2006-2007 to 2008-2009 fiscal years, were entered into the Tool as of April 1, 2009 and forecast

for 2009-2010. Averaging and rounding up or down to the next nearest whole number was the forecasting technique used for many of the data elements. If the data suggested a downward or upward trend, averaging and rounding down or up to the next nearest whole number (for headcount) was done. Rounding down for turnover percentage sometimes required rounding down a percentage point to reach the next lowest whole number for headcount data. The organization did not use the separations calculator in either year of the project.

Due to the lack of FTE data, three years of averaged headcount data were substituted and used to populate the Tool. The site lead changed all FTE titles to reflect headcount. Forecasting was completed for one year, 2009-2010. An HRIS was used for data collection.

Data Collection: Data Elements, Year Two
Headcount data were entered into the data elements of the Tool, and included:

- beginning headcount was not populated, as per the project lead group decision, because a workaround from the ABC was required if headcount data only were used to populate the Tool;
- budgeted/required headcount was populated with three years of averaged headcount data, rounded up or down to the nearest whole number, based on historical data trends plus vacancies, in order to estimate budgeted headcount;
- vacancies was populated with headcount data and included actual internally and externally posted, unfilled vacancies as of April 1, 2009;
- calculated headcount was three years of averaged historical headcount data, minus vacancies;
- estimated future separations comprise voluntary and involuntary external terminations, rounded down to the nearest whole number for headcount;

- estimated future separations, turnover rate (percentage) was populated with the average of historical headcount turnover data, rounded up or down to the nearest whole number, based on historical data trends to forecast the 2009-2010 turnover rate;
- number of separations was populated with averaged historical headcount data rounded up or down to the nearest whole number based on the historical data trend and forecast for 2009-2010; RN transfers to casual employment are considered a status termination;
- estimated future transfers into or out of this group was populated with averaged historical headcount data, rounded up or down to the nearest whole number, based on the historical data trend and included transfers into a subgroup from another group within the organization and transfers from other job classifications;
- estimated future transfers within this group was populated with averaged headcount data, rounded up or down to the nearest whole number based on the historical data trend and included transfers into a subgroup from another subgroup within the same group; movement was not anticipated in some of the RN subgroups;
- headcount status change are additional headcounts from employees increasing scheduled hours, available for 2008-2009 and held constant for 2009-2010; full-time employees can only increase or decrease their hours through the transfer process; part-time employees have an established minimum commitment and the number of hours worked fluctuates based on scheduling provisions;
- headcount status change was the reduction in headcount from employees decreasing scheduled hours; reduction in hours was not anticipated, therefore 2008-2009 data were held constant for 2009-2010; full-time employees can only decrease their hours through the transfer process;

- replacement need from headcount status change provided for 2008-2009, was held constant for 2009-2010;
- LOAs - due to a deviation from the standard definition, all departing and all returning LOAs were entered into the Tool to determine the LOAs;
- headcount returning from LOAs was averaged historical headcount data, rounded up to the nearest whole number, based on the historical data trend; permanent employees were not hired to replace employees on temporary leave; whether temporary vacancies were filled could not be accessed from the HRIS; included data not previously included about temporary vacancies;
- headcount departing for LOA was averaged historical headcount data, rounded up to the nearest whole number, based on the historical data trend;
- estimated total replacement need (headcount) was populated with full-time and part-time RNs;

- estimated future staffing need/(surplus) due to growth was not tracked in the HRIS system and would require more time and effort than was available to populate; therefore, this data element was determined to be outside the scope of this project;
- estimated total new hire need (headcount) were averaged historical headcount data, rounded up to the nearest whole number, based on the historical data trend:
- actual hires during the year (headcount) were year-to-date actual hires, full-time and part-time employees, averaged and rounded up to the nearest whole number, based on the historical data trend; and
- cumulative new hires were the actual hires during the 2009-2010 fiscal year, held constant through 2013-2014.

Data Collection

To understand present and future HR needs and to evaluate the usability of the Tool for data collection, quantitative and qualitative approaches were used in the both years of the project.

Sample

The sample varied across sites to meet the needs of each organization. Three organizations chose to include forecasting groups of RNs and allied health professions; two chose to focus solely on RNs.

Overall Design

As stated previously, quantitative and qualitative methods were used in year two of the project.

Quantitative Approach

The quantitative phase of the project's second year consisted of the following:

- Parameters that guided and bound forecasting efforts were established. Each organization determined the employee groups and subgroups to include in the study. However, they did not always use the same level for data collection, which made comparison between years one and two difficult.
- Data inputs were collected to create projections for the selected employee groups and subgroups.
- A *Glossary of Key Data Elements* (see Appendix A) was developed to facilitate a common understanding of terms and metrics, although similar definitions could not be used in all cases.

Historical Data Approach
- Historical data were collected for the selected employee group(s).
- Data were collected for fiscal years 2006-2007, 2007-2008, and 2008-2009 from the HRIS in four of the organizations; data were collected manually in the fifth site.
- One organization's project lead collected an a forth year of historical data (2005-2006) for RNs, but not for the allied health disciplines.
- Mandatory and recommended data were collected when possible.

Separations Calculator Approach
This approach was used by two organizations in year one. In year two, one organization added to some of the data but did not use the full separations calculator.

Quantitative data were used to generate forecasts for future hiring needs in year two of the project. Three years of historical headcount data for 2006-2007 to 2008-2009 were collected by the organizations to generate predictions for recruitment needs for the 2009-2010 fiscal year. One site also included 2005-2006 data (i.e., a forth year of historical data) to compare the accuracy of forecasts based on three years versus four years of historical data. Headcount data were used instead of FTE data in four of the sites; one site used both types of data, headcount and FTEs. Even though most sites provided forecast data for more than one year, forecasts for 2009-2010 only were considered.

In the historical data approach, data elements are classified as required (must have) and recommended (nice to have). Required or mandatory HR data elements include actual headcount, budgeted/required headcount, vacancies, and turnover rate. Recommended data elements include transfers, headcount status change, LOAs, planned facility expansions/closures, and planned technology acquisitions.

Qualitative Approach

In the qualitative component, data were collected via notes and minutes during meetings and conference calls. In year two of the project, the five site leads requested more frequent communication. Thus, each site had increased opportunity for discussion about ongoing data collection issues and perceptions.

Protection of Human Subjects

As in year one, each organization submitted an ethics protocol for approval to their hospital ethics boards prior to the continuation of the second year of the project. Participants were informed that their involvement was voluntary and that their consent could be withdrawn at any time. They were also apprised of what was expected of them and the risks and benefits of the study. Confidentiality and anonymity were assured, and the secure storage of data[2] was discussed. Data will be kept for 10 years and then destroyed. Regarding the separations calculator - management interviews, the personal employee data shared between the HR analysts and the managers were kept confidential and discussed by role, not by name, when shared with others in the research team.

Population of the Forecasting Future Workforce Demand Tool

In the second year of the project, all data were entered into the web-based version of the Tool because the ABC no longer supports the Microsoft Excel-based tool. The organizations' project leads or HR analysts populated the Tool.

Assessment of Accuracy of the Forecasts

- This phase of the study was conducted by HR services, the organizations' project leads, or designates.
- All five organizations used the forecasting accuracy self-test (section one - data collection process) and evaluated forecasting efforts by comparing the actual new hires needed and the projected demand for new hires.
- Current vacancies not filled at the end of the study were accessed from HR and added to the actual new hires needed in the forecasting accuracy self-test (section one).

Data Analysis

Forecasting accuracy is determined by comparing the actual hiring needs to forecasted needs for 2009-2010. Data for each organization were collected separately and data analysis was completed centrally.

Quantitative
Forecasting accuracy was evaluated by comparing the actual hiring needs to forecasted needs for the 2009-2010 fiscal year at each organization. This was accomplished using tool number 11 (section one).

Qualitative
Based on review meetings, conference calls, testing, and discussions at each organization, a summary of the Tool's strengths and weaknesses was developed.

---

2 In a password-protected computer and/or a secure file cabinet in the researcher's locked office.

Findings

The second year of the project allowed the team to consolidate their approaches and apply a greater understanding to their use of the Tool. The mandatory data elements were clearly identified and the project leads had increased clarity about the data element definitions and data collection. Some organizations collected more data in year two than in year one. Because the organization leads had a greater understanding of the tool in the second year of the project, they were able to spend more time "figuring out what went wrong and problem solving" (project site leads, personal communication, March 16, 2010). Data manipulation was necessary to transform the collected data into the required format.

General

Mandatory and Recommended Data Elements

The five project organizations were able to access and collect the *mandatory* data elements needed to populate the Tool, which then were used by the Tool to calculate other data elements (see Box 1). The mandatory data elements were populated in all five organizations with headcount data; in addition, one organization also populated the Tool with FTE data and ran two separate forecasts for comparison purposes. The organizations had difficulty accessing and collecting the *recommended* data.

Box 1. Data Elements Calculated by the Tool
Calculated headcount
Number of headcount separations
Replacement need from transfers into or out of this group (headcount)
Replacement need from headcount status change
Replacement need from LOAs
Estimated total replacement need (headcount)
Estimated total growth need/surplus (headcount)
Estimated total new hire need (headcount)
Estimated cumulative total new hire need (headcount)
Cumulative new hires (headcount)

Standard Definitions

The Project Steering Committee formulated a *Glossary of Key Data Elements* (see Appendix A). Most of the definitions are similar to those provided by the Ontario Human Resources Benchmarking Network (Quality Worklife-Quality Healthcare Collaborative, 2009) and are broadly accepted. Definitions indicated that average headcounts would be substituted for all FTE data elements, as recommended by the ABC consultant.

Separations Calculator as a Tool for Managers

One organization updated certain data for the separations calculator, but the remaining organizations did not use this method of data collection in year two.

Forecasting Assumptions

All organizations agreed to forecast for one year, 2009-2010 (fiscal year), and to use averaged headcount data. Project organizational leads were required to create their own fore-

casting assumptions, which were not calculated by the Tool. The most common assumption was that averaging three years of historical data and rounding up or down depending on data trends would accurately forecast future workforce demand. However, in examining the data, these recalculated averages could not often be reproduced.

Data Manipulation Strategies
Each organization utilized different types of personnel, have different HR information systems, and use different ways of warehousing data. Meetings and telephone calls were frequently conducted to clarify the required tasks. Strategies were created to enhance the compatibility of data across organizations. For example, substitution of average headcount data for FTE data elements. Other techniques were also used for data manipulation (see Box 2).

Box 2. Techniques Used by the Organizations to Manipulate the Data
Data for 2009-2010 were an average of three years of historical data and were held constant for 2010-2011 through 2013-2014.
Averaged data were rounded up or down depending on data trends.
One organization averaged four years of historical data for a one-year forecast and two separate forecasts were conducted (one using FTEs and one using headcount data).
One organization used six months of actual data to forecast.
One organization used actual hires to forecast year to date.
One organization used different data collection groups (e.g., data collection at the employee level versus unit level).

Organization Support Structure
The efficiency of data collection and input into the Tool is reliant on the computer and human support structures in the organization. Large organizations typically have electronic HR databases. Small organizations may not have electronic HR systems and may have to manually

track and collect the required data. The quality of data is likewise affected by the number of people available for data collection. Implementation of the Tool requires high levels of commitment from everyone involved, including the Project Steering Committee, project leads, and HR analysts.

Implementation of the Tool provided an opportunity for interdepartmental communication and collaboration. The Tool requires quantitative HR data and the input of operations leaders concerning service changes and HR needs. Thus, it may increase each department's knowledge about necessary data elements for forecasting.

Instrument Implementation
The data collection worksheet (tool number four) was completed, as agreed upon by the organizations. When all the mandatory data are entered for a group or subgroup, the instrument automatically calculates the executive summary, the forecasting group summations, and the drill-down report. Because of issues of data accessibility and availability across organizations, the organizations were unable to calculate a 12-month hiring plan.

Data Quality
On average, most of the data within organizations were accessible and reliable. However, there were differences among organizations in how data were collected and tracked. As noted earlier, the Tool is an FTE-based instrument and manipulation of the organizations' headcount data were necessary. Wherever FTEs were required, average headcount data were substituted decreasing data accuracy. For example, budgeted/required FTEs was populated with average headcount data plus vacancy data for an estimation of this data element. This decision was made by the Project Steering Committee and the ABC consultant.

Data collection was time-consuming for all organizations, and the storage and transmis-

sion of information varied. Ease of data access and availability were affected by the support structure, number of people available to access and collect data, and interdepartmental relationships. In one organization, for example, estimated future staffing need/(surplus) due to growth was difficult to obtain because the participating managers did not have information regarding a planned expansion.

Population of Missing Data in Year Two

As stated previously, FTE data elements were not collected at most of the sites because the HRIS collect and track headcount data only. Finance systems typically track actual and budgeted FTEs. A system is not in place to reconcile the two systems. The following data elements were not populated in the first year of the project but were populated in year two.

**Estimated Future Staffing Need/
(Surplus) Due to Growth**
These data were unavailable because they are not tracked in HRIS or manually. In order to generate consistent estimates across units and programs, considerable time and effort would be required by HR, program managers, and directors. Due to time constraints, collecting these data were determined to be outside the scope of this project. It was suggested that a reconciliation system be implemented or these data be drawn from the finance budget data. In year two, one site collected information for this data element on some of the forecasting groups (i.e., RNs, RPNs, respiratory therapists) through personal communication with managers.

FTE Status Change
These data were not available and were not used in the first year of the project. In year two, four sites populated this data element. The fifth site did not enter these data, indicating that they were too difficult to collect. One site included data for 2008-2009 and forecast

for 2009-2010 using one year of historical data. Another site used three or four years of averaged historical data for all forecasting groups and subgroups to forecast 2009-2010 workforce need, which was held constant through 2013-2014. Status change at this site was populated with headcount data and included employees moving from casual employment to permanent full-time and permanent part-time employment.

In the third site, three years of averaged historical data were used to forecast one year for all nurses. For allied health disciplines, one-half year of actual data were used to forecast the workforce need for 2009-2010. In a fourth site, 2008-2009 data were held constant for 2009-2010 for some of the forecasting groups; data were unavailable for the other groups.

In the fifth site, employment status is predefined in the HRIS based on union collective agreement language (e.g., full-time, part-time, casual, weekend worker). Full-time employees can only increase or decrease hours through the transfer process. Part-time employees have an established minimum commitment and the number of hours worked fluctuates based on scheduling provisions.

Leaves of Absence
LOAs were not populated in year one of the project. All five sites populated this data element in year two, possibly because of more familiarity with the Tool and data requirements. An LOA is defined as a "formal long-term leave of absence . . . [that will be covered] by hiring a permanent employee" (see Appendix A). Deviation from this standard definition was necessary because permanent employees are not hired to replace employees on temporary leave. All returning and departing LOAs were included. This data element is included because it provides an indicator of temporary vacancies, which were not included in the initial vacancy data.

Most of the sites used an average of years of historical data (range from one to four) to forecast this data element, and rounded up or down to the nearest whole number based on the historical data trend. Instead of historical data, one site used six months of actual data to forecast. LOAs were not forecast for all of the groups or subgroups at all of the sites. Some sites forecast for one year (2009-2010), while others held the forecast constant through 2013-2014. Some of the sites used an unreported method for forecasting because the figures could not be reproduced.

Estimated Total New Hire Need
This data element is calculated by the Tool. Most sites used the average of three years of historical data and forecast for one year (2009-2010), rounding up or down to the nearest whole number based on the historical data trend. However, the amount of historical data varied at one site. Consequently, the organization used year to date at the end of the second quarter for some forecasting groups, one year of historical data and a one-year forecast for other groups, and three years of historical data (held constant through 2013-2014) for additional groups. Due to the number of new hires in 2007-2008 and hospital expansion in 2008-2009, another site used half of the average of three years of historical data to forecast for one year for RPNs. The site that ran forecasts with headcount and FTE data did not populate this data element.

**Recommendations for
Tracking Missing Data**
Project leads at the organizations were not able to collect all of the recommended data. When asked how they could begin to track the missing data, the following were suggested:

- To track historical data from the point of initiation (i.e., request for a new employee) rather than retrospectively;
- To initiate real time tracking and recording to save time and increase data accuracy;

- To implement an integrated HR/finance budgeting system to track missing data elements;
- To initiate a process to generate consistent growth estimates;
- To ensure the HRIS is able to provide a current snapshot of vacancies and has the functionality to identify all permanent transfers;
- To expand the capability of the HRIS to capture transfer information (i.e., full-time status transfer to part-time status, units of transfers);
- To implement a position control module, available in the HRIS, to track movement in specific position types (i.e., by unit, by status); and
- To increase understanding of who collects data, where it is stored in an organization, and what decision support structures exist for accessing and comparing data.

Data Access and Availability

Data Access
- The Workforce Demand Forecaster is programmed to run calculations based upon FTE values. For organizations without readily available FTE data, a workaround, provided by the ABC consultant, was required, which entailed the substitution of headcount data for FTE data when populating the Tool. This practice resulted in confusion because the data element titles were in FTE terms and did not reflect the actual data which were headcount data. As well, outcomes based on headcount data would be less accurate than outcomes based on FTE data.
- For budgeted/required headcount, the budget data, measured in FTEs, are typically housed in the finance department's database. Systems are not in place to reconcile finance department data (FTE based) with HRIS data (headcount). Vacancy data were added to the beginning headcount to produce budgeted/required headcount data, which were then substituted for FTE data.

Some sites included data on permanent staff, three sites included data on temporary staff, and one site included data on permanent, casual, and temporary staff. Budgeted/required headcount data were not always available and average headcount plus vacancies were entered as estimates of this data element.

- The number of vacancies may not be an accurate reflection of true need because an information system is not in place that communicates with other information systems that have compatible vacancy data.
- Multiple definitions are used for transfer data. Historical data were gathered from HR information systems that do not distinguish between permanent and temporary transfers. Manual review of transfer data was required for each change in position assignment to determine if it was a transfer. Manual review was also required for all other transfers to determine the unit from which the employee transferred because reports only identify units into which employees transfer.
- Historical LOA data are available for employees going on LOAs or returning from LOAs. Temporary vacancy data are available, but these data are unreliable because of the lack of position control in most of the sites. It was not possible to confirm if the vacancies created by LOAs would be filled or the manner in which they would be filled. Some sites used LOA definitions that deviated from the standard LOA definition agreed upon for this project. LOAs included employees whose absences were filled with temporary employees. LOAs filled with permanent employees would not be included in this data element.
- Estimated future staffing need/(surplus) due to growth data were not available in four of the five sites and this data element was left blank. The project lead who populated this data element reported growth and expansion at the site with the creation of new positions in 2007-2008 and 2008-2009 with

continuing but decreased growth in 2009-2010.
- In the second year of the project, data were more accessible. However, there were issues accessing some of the data, including estimated future staffing need/(surplus) due to growth, FTE data, transfers, LOAs, and actual hires. Appendix C provides a list of data access challenges and contributing factors.

Data Availability
Major assumptions held prior to this study were that data elements necessary to populate and implement the Tool were available, accessible, and compatible with the data elements tracked in the organizations. If not, modifications could be made that would not affect the overall outcome of the Tool (i.e., generating forecasts of future hiring needs). Assumptions underlying data collection and the use of historical data for forecasting were discussed with the ABC consultant and were agreed upon prior to forecasting. In addition, assumptions and techniques used in forecasting were discussed and approved prior to Tool population. For example, averaging and rounding data up or down based on historical data trends, doubling second quarter data, and holding data constant for several years of forecasting.

Lessons Learned

A summary of lessons learned was developed from the review meetings, conference calls, instrument testing, and themes identified in both years of the project. The lessons are organized into five categories: (1) upfront planning, (2) separations calculator as a tool for managers, (3) indicator definitions, (4) general usefulness, and (5) other general comments. All five organizations submitted these data.

Upfront Planning

Upfront planning[3] was described as necessary by all project leads because it contributes to the accuracy and consistency of data collection. When multiple organizations are using an instrument with the intention of cross-comparison, a common approach is crucial. Detailed planning reduces the necessity of re-collecting and re-entering data and decreases confusion about data inclusion and exclusion.

More time for face-to-face communication in the initial planning stages would ensure stakeholders had sufficient opportunity to provide input into the project direction, approach, outcomes, and evaluation. Similar approaches and objectives for the project at each organization would allow for comparability of data and output across organizations. Early clarification about the funding body's expectations regarding evaluation (i.e., the expectations for a demonstration project versus a research

project) and a common, more detailed education about the Tool in a group setting is also recommended.

Importance of Common Definitions

The development of common definitions for the data elements was accomplished (i.e., *Glossary of Key Data Elements*; see Appendix A). However, in both years of the project, the organizations were unable to adhere to the agreed upon definitions. Some organizations collected data and then noted deviations from the definitions. Others did not gather data not in the required format. Missing data was much less a problem in year two of the project. Initial planning, with discussion of various topics, will assist in Tool implementation.

In year one, there was not enough time to fully discuss projection assumptions, the need for common assumptions, and the impact different assumptions could have on the forecast (e.g., averaging versus trend analysis). However, in year two, ongoing discussions among group members proved useful to ensure greater understanding of data element definitions and assumptions.

In a project that includes comparison across organizations, it would be useful to have a data expert who works across all sites from the start of the project to assist implementation and adherence to guidelines and documentation. Leadership from HR is likewise required to oversee the implementation process. A spreadsheet was created and maintained throughout the second year of the project to track deviations and assumptions, which were discussed by the leadership and project group.

---

3 Includes preplanning for discussion and consensus on the approach to data entry, the use of common definitions and metrics, the creation of a list of common assumptions and forecasting methodologies, and the complete description and understanding of the use, strengths, and limitations of the instrument.

Nursing Health Services Research Unit

Project Supports

The project manager was described as key to the success of the project. The method of communication via reminders from the project manager regarding data access and storage was useful. The OHA was important in the development of a joint communication plan. The establishment of easy electronic access to information for all organizations was also beneficial.

Acceptability of Historical Data

This demonstration project has established that HHR workforce planning at the regional or provincial level requires a common core of data elements that are captured, utilized, and reported in a uniform way, which would be facilitated with a common HRIS platform. Historical data are not good predictors for new units, and three years of historical data are an insufficient basis for projection assumptions because of rapidly changing environments. Using an average as a projection assumption is an issue because the range of data over three years has created deviations of as much as 50%, and internal realignment within programs contaminates historical data.

Forecasting Tool Evaluation

Forecasting Tool strengths, limitations, and recommendations Tool and data collection improvement came about through Tool implementation.

Strengths
The strengths of the Forecasting Tool are:

- There is excellent client support from The Advisory Board Company;
- The use of the web-based version of the Workforce Forecaster (tool number 4) includes technical support from the ABC;

- The Workforce Forecaster is straightforward;
- The web-based tool has more functionalities and is more automated compared to the Microsoft Excel-based tool;
- The Tool provides the opportunity to clarify definitions and develop a common data dictionary;
- The Tool captures all of the required data elements needed to develop a workforce forecast;
- The forecasting process is broken down into five readily understood steps;
- The Tool is useful to help managers shift from reactive to proactive HR management;
- The Tool provides a common platform for HR planning and decision making;
- The user-friendly tools are provided to assist the organization at each step of forecasting;
- The Tool is a sophisticated data collection spreadsheet;
- Implementation of the Tool provided an opportunity for interdepartmental communication and collaboration, thus increasing knowledge about necessary data elements for workforce forecasting;
- The Tool is a useful data repository to store all data elements needed for forecasting;
- It was hypothesized that when more data are entered, data accuracy (tool number 11, section 1) would improve; and
- The Tool provides an opportunity to discuss and compare different data analytic methods and definitions.

Limitations
The following limitations of the Tool were identified by the project participants. Suggested Tool modifications are:

- The Tool does not integrate with existing HR systems in the organizations;
- It is not possible to compare data across organizations because of variations in software and data collection methods;
- The Tool does not generate forecasts based on HR assumptions that have been tested empirically (i.e., empirical links between

turnover, transfer, and forecasting have not been tested through research);

- HR metrics vary across different organizations;
- The small organizations without an electronic HRIS have to populate the tool manually;
- The Microsoft Excel-based tool is no longer supported by the ABC (personal communication, March 16, 2010), only the web-based tool is available;
- The Tool is based on FTEs and has not been adapted for headcount data;
- The HRIS software does not include important data elements such as transfer, temporary employees, and casual employees;
- Some of the data elements are not easy to capture, for example, status change (casual hours to full-time hours) and estimated future staffing need/(surplus) due to growth;
- The separations calculator is time-consuming because its population requires discussions with every manager about individual employee situations and the probability rating about employee departures; and
- Historical data collection can be a challenge when organizations are constantly growing and/or changing.

Forecasting Tool Improvement
Recommendations for Tool improvement are:

- The need for established, agreed upon data element definitions and compatible software across organizations, in order to compare data;
- Tool enhancement so that changes made to groups and subgroups data are carried throughout the Tool, at the detail level;
- Tool refinement to enable the use of both headcount data and FTE data to populate the Tool's data elements;
- Tool enhancement to allow for the collection and storage of more than three years of historical data, which may improve the predictability of the workforce need;

- Provisions need to be made to the Tool to separate full-time, part-time, causal, and temporary employee forecasts; and
- Both versions of the Tool (i.e., Microsoft Excel-based and web-based) need to be supported in the future by the ABC.

Improvement of Data Collection
Suggestions for data collection improvement include:

- The integration of all databases used at each site to improve data accuracy;
- Use software, such as an HRIS, to collect and store HR data;
- Use of integrated HR/finance information systems so the Tool could be completed without headcount data manipulation;
- Harmonize electronic HRIS data and manually maintained data tracked with spreadsheets (i.e., integrate manual and electronic systems so data retrieval is easier);
- Track temporary vacancies in a way that is supported by HRIS;
- Expand HRIS capabilities to capture transfer information (i.e., full-time status transfer to part-time status, units of transfers); and
- Implement a position control module in HRIS to track movement in specific position types (i.e., by unit or by status).

General Usefulness: Forecasting Tool
There is project group consensus about the need for a forecasting tool in organizations and possibly province-wide. The Tool has been identified as a way to capture historical data in one place. It is useful for identifying trends and preplanning because it includes all the necessary variables for predicting recruitment need consolidated into one worksheet. The Tool can be used to predict forecast need in a systematic way rather than by, for example, eyeballing or guessing at need based on multiple reports. It is important that the user has a clear understanding of data element definitions and Tool implementation. The Tool is also use-

ful to begin important conversations regarding HR requirements.

One of the benefits of continuing the project for two years was a greater understanding of the instrument's utility in the second year. However, several project leads did not think the Tool provided sufficient value to justify its cost and the cost of membership in the ABC, based on the extensive time required to collect data and implement the Tool, the lack of comparability across sites, and issues of forecasting accuracy.

Analysis of the Tool by the project leads indicated that populating data elements with headcount data substituted for FTE data is not useful. Because the formulas in the Tool are driven by FTE data, the value of the Tool is diminished if FTE data are not available. A large amount of manual work is required for data gathering and input because it is unlikely that an organization would be able to implement an automated interface between the Tool and the HRIS without the expenditure of numerous resources.

The Tool is "not a magic bullet". It is a spreadsheet that requires the population of historical data in a specified format. The user is required to formulate forecasting assumptions based on historical data or organization-specific knowledge regarding future trends. Strong system skills are recommended with a well-developed understanding of the organization in which the Tool will be implemented, its HR processes, and finance and budgeting processes.

Findings By Participant Organization

The Forecasting Future Workforce Demand Tool consists of 11 tools and interview guides. This demonstration project focused on the implementation of the data collection worksheet (tool number four) and utilized the forecasting accuracy self-test to evaluate the output of tool number four. All sites completed the Workforce Forecaster and the forecasting accuracy self-test (section one). The Project Steering Committee, along with the ABC consultant, decided that only headcount data would be entered into the Tool. In addition, the Project Steering Committee decided the forecast would be for one year only. See Appendix D for additional information on estimated new hire need and actual hires for 2009-2010.

Organization One

Data to describe the nursing workforce and demographic properties are available for RNs and RPNs for the 2008-2009 fiscal year.

Demographic Data
In the 2008-2009 fiscal year, the average age of RNs (full-time and part-time, not including casual) was 48 years, with 31% over 55 years of age. The total headcount of full-time RNs was 79 and FTEs were 83.33. The total headcount of part-time RNs was 68 and FTEs were 30.48. The total headcount of full-time RPNs was 46 and FTEs were 44.53. The total headcount of part-time RPNs was 60 and total FTEs were 25.23. The average age of RPNs (full-time and part-time, not including casual) was 44, with 21% over the age of 55. Eight new RN graduates were hired, but none was hired into permanent full-time positions. Six RPN new graduates were hired, but none was hired into full-time positions. The turnover rate for RNs was 9.8% and 5.6% for RPNs. Demographic data for the other forecasting groups were not available.

Forecasting Data
Data for ten forecasting groups and subgroups were entered into the Tool. This organization used average historical data input for all of the forecasting groups, regardless of their size. Forecasting assumptions include the following: forecasted leaves of absence starts and returns, forecasted turnovers, and forecasted transfers in and out of subgroups are averages of the last three fiscal years. Headcount is the "total number of full-time and part-time employees in the forecasting group" (ABC, 2007a, p. 69). Long-term disability was not included in the headcount, but maternity leaves were included. Vacancies, the "number of open FTE positions for which you are actively recruiting" (ABC, 2007a, p. 70) were listed as of April 1 of every year.

Three years of historical headcount data (2006-2007 to 2008-2009 fiscal years), available from the HRIS, were entered into the Tool (number four) and were used to produce workforce predictions for the 2009-2010 fiscal year for nursing and allied health disciplines. An HR analyst, under the direction of the project lead, entered the mandatory and recommended data. The remaining data elements were automatically populated by the Tool based on the data entered about the organization. The project lead focused on collecting mandatory data because some of the recommended data were difficult and/or impossible to extract from the HRIS. For example, only one code is used for all transfers, thus the reasons employees transfer cannot be determined.

The separations calculator was not used in year two of the project, although year one data were updated with new hires and terminations. Growth at this organization in 2007-2008 and 2008-2009 was followed by less growth and fewer new hires in 2009-2010.

Separations include external turnover (voluntary or involuntary terminations) and internal turnover (transfers out of a unit, position, changes in status resulting in an FTE reduction). Casual and agency staff are excluded. Turnover rate is in headcount terms and is the total number of employees who have left the organization divided by the average number of employees over the same period.

Data Issues

All of the mandatory data for the Tool were available, but were captured and tracked in various databases and spreadsheets (e.g., vacancy data, positions filled lists, and ongoing positions filled data), making data retrieval laborious. For example, long-term disability is captured in a spreadsheet, which needs to be updated to ensure historical data are not lost. Vacancy lists, captured and tracked in spreadsheet programs separate from the HRIS, are received from the finance department. Transfer data were not collected due to the additional resources required to collect historical data. FTEs are not available for input at the employee level. For example, part-time unionized personnel are not guaranteed hours and are not captured in FTE data.

This project lead came up with solutions to improve data accessibility and strengthen the HR database:

1. New transfer codes were created to collect more information about transfers, although this still requires collecting transfer information manually on a regular basis (monthly).

2. The positions-filled spreadsheet was expanded to include all of the additional data needed for this project.

3. To ensure all data for this project are available and accessible, the HRIS should be overhauled to capture information currently kept in various spreadsheets.

Because of this project, a system is being designed to expedite the collection of transfer data. Greater familiarity with the Tool's instructions and data element definitions in the second year of the project was advantageous for the project lead, although more guidance and support to facilitate this process was suggested. This site currently does not have a specific workforce forecasting tool to determine labour needs. The HRIS is used to develop statistical information based on headcount data. Budget process tools (i.e., staffing reports) are used to determine FTEs, when required.

The majority of data at this organization are housed in HR, although some data are collected manually. One issue with the HRIS is that it does not save all of the historical information necessary for this project (i.e., transfer data). Because of concerns about the time and resources needed to manually access historical data and concerns about data accuracy, transfer data within groups were entered into the forecasting instrument for RNs and RPNs in year two only. If the Tool were to be adopted for future use, historical data would need to be captured separately and manually on a regular basis (i.e., biweekly or monthly) until needed. The HR analyst has begun to collect the transfer data.

This project lead offered further insight about the project:

> On the surface, the tool seems very straightforward. However, when I entered the raw data and looked at the numbers, I realized many times the numbers did not make any sense. I learned by trial and error and spent a lot of time revising the numbers because information that I collected should not have been counted or vice-versa.

The site lead further explained that "if more guidance could be provided in the instructions for a novice, such as myself, that may have saved me some time and energy" (Site Lead, personal communication, April, 2010).

Organization Two

Data describing the nursing workforce for the 2008-2009 fiscal year are reported here and, where specifically indicated, data describing the nursing workforce for 2006-2007 are included.

Demographic Data

This organization reported a total number of 1,298 full-time and part-time RNs in 2008-2009 and 1,358 in 2009-2010. The FTE for RNs is 1,234. The average age of full-time and part-time RNs (excluding those casually employed) was 42 years in both 2006-2007 and 2008-2009, with 13.88% older than 55 years of age in 2006-2007 and 18% in 2008-2009. The total headcount of full-time RNs increased from 2006-2007 (881) to 2008-2009 (1,029), as did the full-time FTEs (920 to 941.1). The total headcount of part-time RNs decreased from 2006-2007 to 2008-2009 (304 to 269), but the part-time FTEs increased (177 to 255.3).

The percentage of the nursing workforce that were degree-prepared increased from 2006-2007 to 2008-2009 (18% to 44.3%). The number of hours worked by casually employed RNs decreased in 2008-2009 from 236,116 hours to 147,853, and the number of hours worked by RNs employed by agencies decreased from 54,418 to 43,838. RNs worked fewer overtime hours in 2008-2009 due to replacement (i.e., sick/leave) and workload (61,272 to 54,387). The total number of new RN graduates hired into permanent full-time positions increased from 2006-2007 to 2008-2009 (58 to 90).

The RN turnover rate was 5%. Reasons for terminating employment for RNs and RPNs included relocating out of the district, going elsewhere for job advancement, and retirement. Retired RNs and RPNs returned to work in direct care, project work, educational capacities, and as mentors or volunteers. Issues identified in rank order from the most critically important to the least critically important were patient acuity/complexity, aging workforce, retention/turnover, recruitment/replacement, and technology (i.e., complexity).

Forecasting Data

In the past, HR used numerous internally produced retrospective tools to predict workforce needs. The trends in these reports were examined over time and projected forward for the coming year, assuming the reported trends continued. Forecasting is short-term and provides an informal non-systematic prediction of the coming year. A comprehensive systematic forecasting tool to predict future staffing needs for longer-range workforce planning does not exist.

This organization did not use three years of average historical headcount data (2006-2007 to 2008-2009 fiscal years) to forecast workforce needs. Instead, one half-year of actual data were used for forecasting. The data elements for RNs that were not populated were estimated future transfers within groups and estimated future staffing need/(surplus) due to growth. Budgeted/required headcount and vacancies were populated with budgeted versus actual headcounts and vacancies. Historical data were not used for headcount status change and LOAs because one half-year of actual data were available for the forecast.

For health disciplines, the beginning headcount, vacancies, and turnover rate were populated with three years of averaged historical data, forecast for 2009-2010, and kept constant through 2013-2014.

Data Issues

To estimate RN future separations, data from 2006-2007, 2007-2008, and 2008-2009 were averaged, forecast for 2009-2010, and kept constant through 2013-2014. The headcount separations data were populated from attrition reports produced by a department other than HR. Estimated future staffing need/(surplus) due to growth was not populated because these data are unavailable. Actual hires during the year were populated with year-to-date actual full-time and part-time hires, as at the end of the second quarter.

Historical and other data were difficult to obtain because they are accessed by the infor-

mation technology department. The primary data for this site were entered at the unit level in year two, which differs from the data level used in the first year of the project, making comparison between the years impossible. An ease of data extraction, report writing, and ease of using the Tool were identified at this site. The most accessible data were identified as new hires and the least accessible data element was estimated future staffing need/(surplus) due to growth because managers would need to be interviewed to determine potential growth. Having systems capable of communicating with one another would make data retrieval easier. Use of the Tool at this site was not seen as strengthening the HR database.

Organization Three

This organization uses various tools to forecast hiring needs. Data describing the nursing workforce for the 2008-2009 fiscal year are reported.

Demographic Data
There is a total headcount of 2,182 (full-time and part-time) RNs in 2008-2009 and 2,126.5 FTEs. The average age of full-time and part-time RNs was 41 years, with 12.1% of RNs older than 55 years of age. The RN turnover rate was 5.4%.

Forecasting Data
In the first year, three years of average historical data were used to predict hiring needs from 2008-2009 to 2012-2013. In the second year, three years and four years of average historical data were used to populate the Tool for certain forecasting groups. This was done to determine the number of years of historical data that would provide the most accurate forecast.

Because of the HRIS used at this site, all data elements for the Tool were accessible, except for estimated future staffing need/(surplus) due to growth.

For ONA nurses working in the ER, OR, and ICU, four years of averaged historical data from 2005-2006 to 2008-2009 were used to forecast workforce needs for 2009-2010. Data for these nurses were input in both headcount and FTEs. Separate forecasts were calculated. The average of three years of historical data were used for ONA nurses other, physiotherapy, respiratory therapy, and MRI technologists.

The beginning headcount data, as of April 1, 2009, was populated with permanent full-time (PFT) and permanent part-time (PPT) data. All other data elements for RNs were populated with an average of four years of historical headcount data for PFT and PPT nurses. Workforce needs for RNs for 2009-2010 were forecast and held constant through 2013-2014.

Data Issues
Status change was populated with headcount data about nurses changing their status from casual to PFT or PPT and was based on four years of historical headcount data. LOAs included PFT and PPT, maternity leaves, and long-term disability leaves. Estimated future staffing need/(surplus) due to growth was not populated and a notation was made that these included MOHLTC funded projects. FTE data were entered into the Tool for ONA nurses only.

Organization Four

This organization has not previously used a forecasting tool to determine recruitment needs.

Demographic Data
Based on the 2007-2008 fiscal year nursing plan data, the average age of RNs (full-time and part-time, excluding casual) was 42 years, with 10.4% over the age of 55. The mean age of RPNs was similar (43 years) and 10% were older than 55 years. The total headcount for full-time RNs was 363, accounting for 317 FTEs. Part-time RN headcount (n=173) accounts for 97 FTEs. Seventy-three full-time RPNs and 70 part-time RPNs account for a

headcount of 60 and FTEs of 39. Five RPNs and 11 RNs were hired in this fiscal year, but none was hired into full-time positions. This organization reported an RN turnover rate of 12.9% and an RPN turnover rate of 4.1%. Reasons for turnover include relocation out of the district, job advancement elsewhere, and retirement.

Forecasting Data

Registered nurses were selected for forecasting because RN positions are hard to fill. Time constraints limited the amount of data that were available and accessible. In year one, it was thought that the implementation of an electronic HRIS would support more accurate forecasting in the future.

An electronic HRIS was being implemented in year two of the project and because of the concurrent implementation and testing of an electronic HRIS, data were collected for this project using manual spreadsheets. All data entered into the Tool were averaged historical headcount data (2006-2007 to 2008-2009) calculated in fiscal years and substituted for requested FTE data, for RNs in 17 departments or units. Causal employees were not included in these data.

Beginning headcount for this site did not include LOAs, temporary positions, casual employees, or vacancies. Budgeted/required headcount was populated with headcount data and included vacancies. Vacancies were tracked from April 1, 2009 to March 31, 2010.

The most accessible data was turnover; the least accessible was vacancies. As in the first year, vacancies were hard to access in the second year because they were in a manual list that was difficult to interpret and there were missing data. It is thought that data collection will be easier with the new HRIS because the recruitment data will be captured electronically. This forecasting project was not seen as helping to strengthen the HR database.

Data Issues

Some of the data were deemed to be out of scope (i.e., inaccessible or unavailable) for the project and were not collected, thus limiting the instrument's ability to produce certain outputs (i.e., the 12-month hiring plan). Out of scope data included status change, estimated future staffing need/(surplus) due to growth, and actual and cumulative new hires during the year. Transfers and LOA data were collected, but status change data were not, deemed too difficult to collect. The other recommended data elements were populated and forecast for one fiscal year (2009-2010), using the averaging and rounding upward techniques. Also, actual hires during the year (headcount), full-time, part-time, and temporary full-time data, were tracked and entered into the Tool. Data on casually employed RNs were not included in the transfer data; temporary positions (i.e., casual employees working full-time) were included.

Organization Five

Data to describe the nursing workforce at this site are available for the 2008-2009 fiscal year.

Demographic Data

This site reported a total headcount of 728 full-time RNs and 797.2 full-time RN FTEs. The total headcount of part-time RNs and part-time total FTEs were 262 and 196.5, respectively. The average age of full-time and part-time (not including casual) RNs was 40.75, with 9.2% of RNs (full-time and part-time) over 55 years of age. One quarter (25.5%) of the nursing workforce is degree prepared. The number of hours worked by casually employed RNs was 51,294 and the total number of agency hours was 5,089. RNs also worked numerous overtime hours (55,046) due to workload, replacement (i.e., sick/leave), and vacancies. Forty-five new RN graduates were hired, 35 of whom were hired into permanent full-time positions in 2008-2009. The RN turnover rate

was 8.9%. Reasons for terminating employment for RNs included relocation out of the district and retirement. Issues identified in rank order from most critically important to the least critically important were patient acuity/complexity, retention/turnover, recruitment/replacement, aging workforce, and technology (i.e., complexity).

Forecasting Data

This organization used historical data to forecast workforce needs for RNs in seven clinical specialties and 29 units or departments. Historical data are available for RNs on in-patient units for April 1, 2009. This study was conducted using only RNs because they have the biggest impact on direct patient care and provide a large sample size. In addition, RNs are a common discipline across the five organizations. The RN population in this hospital has considerable turnover, impending retirements, and high vacancy rates. Current nursing shortages, internal movement, and new graduate interest in moving directly into specialty units have resulted in critical shortages in all programs. Using nursing agency staff is not an option to relieve emergent staffing pressures. Human resources staff has a depth of knowledge regarding nursing data and the majority of the data are accessible in the HRIS.

In the past, this site used numerous HR planning documents and tools, as well as a spreadsheet for forecasting staffing needs. The previous forecasting instrument was not regularly maintained. All were described as similar, but less sophisticated, than the Tool. This site participated in testing the Tool because it captures all of the key data elements required in what appeared to be a user-friendly manner.

Historical data (2006-2007, 2007-2008, 2008-2009) were collected from HRIS for all the mandatory data and most of the recommended data for the selected employee groups. All data inputs, with the exception of planned facility expansions/closures and planned technology acquisitions, were accessed from the HRIS. The

historical data trend forecasting technique was used, where historical data are averaged and rounded up or down to the next nearest whole number. An assumption/technique exception occurred when 2009-2010 data were held constant for forecasting groups that only had one year of data. The raw historical data were downloaded from the HRIS by HR services staff and did not include any direct employee identifiers.

Data Issues

Many of the required data elements were available for the identified groups, although sifting through numerous reports and cross-referencing was required to ensure the completeness and accuracy of the data. Manual review of large data sets was also required, to ensure necessary data were included.

Headcount data were entered, substituting for FTE data, into all of the FTE data elements. Budgeted headcount data was estimated using averaged headcount data plus vacancies. Estimated future staffing need/(surplus) due to growth data remained unavailable. The projection technique used was to average three years of historical headcount data and round up or down based on the historical data trend to the nearest whole number.

The separations calculator was not used by this site in either year of the project because ethics board approval could not be attained for use of this alternate data collection method. Furthermore, based on discussion with the project leads from the other organizations, "the return on the amount of time required to use the separations calculator was prohibitive."

Vacancy headcount data as of April 1, 2009 were entered. Internally and externally posted unfilled vacancies were included in the vacancy data. In instances where there was only one year of data, the projected data were held constant. The Tool generated the executive summary, the forecasting group summation, and the drill-down report.

Forecasting Accuracy - Section One: Self-Test

All organizations completed the forecasting accuracy self-test, which evaluates forecasting efforts by comparing actual hiring needs to forecasted needs. The ABC recommends that the self-test be completed at the end of the one-year forecasting period. An employee group is selected and data elements from the workforce forecast are compared to assess forecast accuracy.

Most of the forecasting accuracy percentages were not within the acceptable percentages defined by the ABC. When asked, an ABC consultant indicated that accuracy indices may be greater than 100 percent "if the actual new hire need exceeds the need as projected by the Tool. For example, an accuracy index of 115% would indicate that the actual need is 15% higher than the projected need" (J. Knight, the ABC, personal communication, May 18, 2010).

The compared elements are the projected demand for new hires and actual new hires needed (including current vacancies not filled). The actual new hires needed is divided by the projected demand for new hires and multiplied by 100 for a percentage of accuracy of the demand for new hires. An acceptable accuracy lies between 85% and 115%, as identified by the ABC (2007a).

If the result is an unacceptable accuracy index, instrument users are instructed to review the drill-down report, the accuracy of the number of separations, estimated total growth need/(surplus), estimated future transfers into or out of a group and within groups, and to determine if other factors may have affected the accuracy. See Appendix E for additional information on forecasting accuracy.

Organization One

This site submitted accuracy information for nurses and allied health disciplines for the initial forecasted period of April 1, 2009 to March 31, 2010 (i.e., 12 months). Because the combined RN group had a 64% accuracy (i.e., less than 85%), the drill-down report was reviewed. The number of separations and estimated total growth need were considered and inaccuracies about new hire projections, failure of the expected business growth, and inaccuracies regarding the translation to hiring needs were identified as possible incorrect entries.

In other forecasting groups (i.e., RN full-time in complex continuing care), the estimated growth was overstated, which may be because there was no growth or the hiring needs estimation was incorrect. While in other groups (i.e., RN part-time in complex continuing care), the average vacancy rate in 2009-2010 was overstated by three, growth was overstated, and separations were understated. Turnover was lower than expected for full-time RNs in rehabilitation nursing.

For the allied health professions, the Tool inaccurately calculated that the number of separations for pharmacists was 0.6, the separations calculator assumptions were inaccurate, and there was no demand for new hires. The range of accuracy scores was from zero to 120%, with 6 out of 10 accuracy tests falling between the recommended 85% and 115% accuracy.

Organization Two

This site submitted forecasting accuracy data on subgroups of RNs by functional unit, nine months following the forecast for 2009-2010. The accuracy of demand for new hires at this

organization ranged from 25% to 500%, with 10 of 24 accuracy tests falling between the recommended 85% and 115% accuracy. An overall accuracy for all RNs in this organization using actual data was calculated by averaging already averaged data. Based on this flawed calculation, it was hypothesized that the formula used in tool number 11 "seems to properly reflect numbers that are high and does not really produce a good picture of accuracy using smaller numbers."

Organization Three

This site selected ONA nurses and allied health disciplines by group and subgroup for forecasting workforce needs for the period of April 1, 2009 to March 31, 2010. Accuracy reports were submitted in both FTE and headcount for ONA nurses and ranged from zero to 176.4%. None of the accuracy percentages were within the recommended 85% and 115%. Because vacancies were not included with the actual new hires needed, the accuracy of the demand for new hires cannot be reported. The project lead identified that the forecasted data were based on using the averaging method for the last four (ONA) or three (allied health) years of historical data and the existence of a hiring freeze in 2009-2010, which affected the accuracy of the forecast. Comparison of accuracy with varying years of historical headcount data and FTE data was not possible.

Organization Four

This site chose RN, RN2, and all subgroups on which to forecast workforce need from April 1, 2009 to March 31, 2010. An overall forecasting accuracy for all RN groups of 86% is just within the accepted range of 85% to 115%. The accuracy of the demand for new hires for RN and RN2 ranged from zero to -900%, with only two individual departments meeting the accuracy criterion range (i.e., the OR/endoscopy

department and the cardiac care unit). The project lead hypothesized that the low accuracy figures may be due to the use of manual tracking systems at this site and the change in database systems in November 2009 from only manual tracking to an electronic HRIS.

Organization Five

This site selected all RNs by group and subgroups for forecasting workforce needs for the period of April 1, 2009 to March 31, 2010. This site reported an overall forecasting accuracy of 49% for the RN groups. In the 8 groups and 26 subgroups, accuracy ranged from zero to 200%, with only two subgroups meeting the criterion for accuracy, with the demand for new hires falling between 85% and 115%.

Various reasons for inaccurate forecasting were identified: the organization is in the midst of implementing a performance improvement plan, including lay-offs and on-hold vacancies; the expansion and opening of a new unit in 2010 has caused internal movement of staff to the new unit; and staffing mix changes, with the introduction of RPNs. There was an insufficient number of RPNs to develop a separate forecast, and RPN data were not included with RN forecast data. The project lead explained that when organizations are undergoing significant changes, generating forecasts based on historical data are not meaningful. She also indicated that when organizations are changing and historical data are used, estimated future staffing need/(surplus) due to growth, which was not available at this site, is important for forecasting.

Outcomes of Research Questions

Responses to the research questions are dependent on data and organizational variables for the collection of consistent, accurate information with sufficient numbers of people in the organizations who are able to perform these tasks.

1. **Does the Tool generate accurate forecasts for future hiring needs?**
Providing and maintaining the required data greatly improves the accuracy of the Tool for proactive workforce forecasting. However, organizations must have the capacity to collect historical data and understand the determinants that affect future workforce needs (i.e., skill mix changes, expansion) and instrument implementation. Estimated accuracy for new hires by organization, based on the acceptable percentages set forth by the ABC, are as follows:
- organization one - 6 out of 10 forecasts were accurate
- organization two - 10 out of 24 were accurate
- organization three - there were no accurate forecasts
- organization four - 2 out of 17 forecasts were accurate
- organization five - 2 out of 26 subgroups predictions were accurate

If the accuracy is not within acceptable limits, users are instructed to review the Workforce Forecaster data collection worksheet to determine if other factors may have had an effect (e.g., hiring freezes).

Users should also evaluate the accuracy of each of the following data elements:
- Number of FTE separations: Inaccuracies in the data element usually turn up as inaccuracies of new hire estimations; the ABC (2007a) recommends the investigation of historical turnover data for misleading

trends or evaluating the probabilities that were assigned in the separations calculator.
- Estimated total growth need: The ABC (2007a) recommends determining whether the expected growth failed to materialize or the translation to hiring needs was inaccurate.
- Estimated future transfers: It is recommended that an evaluation of whether the increase or decrease in internal staff movement is evidence of a longer-term trend or a one-time event.

2. **Is the Tool easy to implement and user-friendly (e.g., time, training, financial investment required for implementation)?**
It takes some time to collect and clean the necessary data. Electronic human resource tracking systems are helpful in the exercise although even then some data have to be collected manually.

In the second year, all organizations thought that the Tool was straightforward, but the data gathering process was not. The instrument was thought to be a useful spreadsheet in which HR data could be housed together. Although, as one moves forward with using the Tool, historical data older than three years are at risk of being deleted unless these data are manually preserved. Forecasting would result in the earliest of the three-year data being deleted as one forecasts for subsequent years.

3. **Does the Tool interface with existing Human Resource Information Systems?**
In year two, data entry was changed from a Microsoft Excel-based to a web-based format. Since it is designed primarily for use with full time equivalents, this limits its use in organizations that use headcount data. Automatic data upload depends on the organizations' human resources information systems.

4. **Can the Tool be applied provincially to specific care settings and environments?**

A great deal of learning and knowledge transfer occurred between and among the organizations during this project. This initial two-year implementation of the Tool resulted in several positive outcomes, such as a more complete picture of the workforces in the organizations. There are still issues of ease and comparability of data.

5. **Is the Tool applicable across various healthcare settings?**

At the present time, this is not possible due to different systems of collecting and storing human resource data.

6. **Does the Tool generate useful information to assist management decision making in terms of proactive recruitment?**

The data generated were helpful in obtaining a more complete picture of the workforces in the organizations. While most forecasts were not feasible, the increased communication and data discussions helped clarify the HR variables necessary for understanding the workforces in each organization.

Analysis of many group meetings, participation in, and evaluation of several conference calls in both years of the project resulted in close communication among all members involved in the project. The submitted data were reviewed using the framework of the HR Investment Center Member Toolkit (ABC, 2007a). In the second year of the project, every project site lead completed a series of questions about forecasting and HR profiles about the data collection process, data quality, and data access.

The process of discussion and adoption of the definitions used in this project and the search for and collection of available data was labour intensive. The efficiency of the process was reliant on focused attention by consistent members of the research project. Large organizations had much of the data in an electronic format, although certain data elements (e.g., casual employees) were tracked manually.

The following factors differ across the organizations and affect the accessibility and availability of data: electronic versus manual extraction, the type of relationship(s) between or among departments where data are housed and where data are needed, the complexity of the organizations, and how the data are stored and transmitted.

7. **Does the outcome of the Tool lead to effective management decision making?**

The use of the Tool provides a guide to collect information. It could be very helpful if data were collected in a standardized way within and across organizations. Use of the Tool assumes that all organizations have access to sophisticated information systems that are accurate, available, and comparable.

8. **Does the outcome of the Tool lead to improvement of existing recruitment processes (e.g., process, efficiency, and effectiveness)?**

The Tool does identify existing vacancies and facilitates dialogue about future needs. Organizations would need to compare what they presently do to the process that is required to discuss and populate the necessary information.

9. **Did the use of the Tool lead to shared learning and promotion of knowledge transfer among partner organizations?**

All organizations agreed that the exercise increased discussion across the organizations about forecasting issues. It became apparent that organizations approach HR planning differently depending on manual or electronic data collection systems. The organizations varied in size and data collection methodologies. Year two of the study allowed a more efficient uptake of the demands of the project, given that all participating sites remained stable throughout the two-year period of the study. There was one replacement. However, that person was available before the end of year one, which allowed for some orientation to the use of the Tool before implementation in year two.

Conclusions

Funded by the Nursing Secretariat, Ontario Ministry of Health and Long-Term Care, the Forecasting Workforce Demand Project is a demonstration of health human resources (HHR) planning. This study focuses on the implementation and evaluation of the Forecasting Future Workforce Demand Tool developed by The Advisory Board Company (2007a, b). It was hypothesized that implementation of the Tool would enable hospitals to enter historical workforce data to create one- to five-year forecasts for proactive HHR planning and strategy development.

The participant organizations consisted of five hospitals: three teaching, one community, and one rehabilitation and complex continuing care. The organizations and the Ontario Hospital Association sought to address a gap in the provincial healthcare system and contribute to strategic HHR planning. Initially a one-year project, permission was obtained to use the Tool for a second year. The organizations that participated in year two were the same as in year one.

The sample for the organizations varied to meet the needs of each site. Two teaching hospitals and the rehabilitation hospital chose nursing and allied health disciplines as their forecasting groups, the other two organizations chose nursing only. While focused efforts were made to improve consistency in implementation, consideration was given to the unique setting of each organization in order to generate relevant findings.

This project is the first of its kind in Ontario to use a forecasting tool as a standardized approach to human resource planning across healthcare organizations. Key findings include the approach to HR planning varied across organizations, it takes time to collect and enter data into the data elements, and standardized definitions are critical to accuracy and applicability. Another key finding was that organizations vary in how they store data and code employees.

The Tool was a systematic method for data collection. It captured historical data and was useful for preplanning and identifying trends. However, historical information became less valuable when there were major changes in the organization. The Tool breaks forecasting down into five easy steps and provides user-friendly tools to assist the organization. In addition, client support is offered by the Advisory Board Company, whose corporate offices are in Washington, DC, USA.

All participants agreed it was a useful process and that the exercise provided insight, both into comparability of data and organizational differences in HR data collection and storage. The company has moved from an Excel-based application to a web-based format that may be more convenient, but all data in this format will be stored in the USA. Organizations would need to explore any implications this might have for privacy and data protection.

Recommendations

Recommendations from discussions at the organizations and debriefing meetings are organized into data issues, process issues, and instrument issues.

Data Issues

Issues with data generally include the need for more direction and guidance, improved data element definitions, and the inclusion of other data elements. Suggestions include the following:

- more guidance is needed to calculate the future staffing need/(surplus) due to growth data element;
- improved data element definitions are required for LOA; it currently states that employees on long-term LOA will be replaced by hiring a permanent employee, but LOAs are temporary and would not be filled with a permanent employee;
- the rounding issue requires attention; use of headcount data assumes full bodies, so whole numbers are entered, with the exception of turnover because turnover rate was used for projections; the rounding issue will affect the accuracy of the forecast;
- projection rate needs to be adjusted to create a whole number data element for turnover;
- common definitions should be developed for data elements using headcount data so that participants can enter these data, or FTE data, depending on how data are tracked and captured at the organizations;
- all data elements for the instrument should be labelled as "must have," with the exception of the estimated future staffing need/(surplus) due to growth data element; and
- other data elements should be included, for example, temporary transfers, the addition of rows for temporary data elements, transfer into/out of groups, transfers within the group, and status change.

Process Issues

Issues with the process include inconsistency among organizations regarding forecasting assumptions, methodology, objectives, and use of a common knowledge base. Further issues include having sufficient time allocated for discussion, guidance, and direction for the project. Suggestions include the following:

- there should be earlier research consultant support to help with the definition of measurements and outcomes and the writing of the REB application;
- the amount of time needed to attain REB approval should be clarified;
- organizations should use the same approach and the same objectives;
- organizations should use common forecasting assumptions and methodologies, which should be determined prior to the entry of data into the instrument;
- each organization should have a common knowledge base and understanding of the terms used in the Tool;
- there should be more time and face-to-face communication allocated for discussion of the all aspects of the project during the planning stage; and
- there should be additional guidance and direction from the ABC.

Instrument Issues

Issues with the instrument encompass the discussion of the Tool and its subscales prior to agreeing to its implementation, the need for more description and instruction on how the Tool works, what exactly is required of the organization project leads, and changes to be made to the Tool to make it more useful. Suggestions include the following:

Prior to implementation of the Tool
- clarify that the Tool is used to facilitate the forecasting process, it does not generate forecasts based on HR assumptions that have been tested empirically (e.g., turnover and transfer);
- clarify that the user is required to formulate forecasting assumptions based on historical data or organization-specific knowledge regarding future trends;
- specific definitions and very clear instructions are needed regarding the mandatory data elements (which refers only to the technical functioning of the Tool);
- thorough and in-depth discussion of the separations calculator is needed;
- the instrument should be clearly identified as a spreadsheet that requires population of historical data in a specified format; and
- that the crucial issue, that the Tool is programmed to run calculations from data elements in FTE values, not headcounts, be identified very early in the project.

Recommended Changes to the Tool
- that the inflexibility of the Tool with regard to customization of fields and reports be remedied;
- that the comments/rationale column should be larger because it cuts off the comments when viewed or printed;
- that an enhancement of the Tool be made so that changes made to groups and subgroups would carry through at the detail level, which would minimize the data re-entry requirement;
- that the instrument can be changed by adding columns where additional years of historical data can be housed and each new year of forecasting data is automatically saved as historical data the following year; and
- that a column be added to the instrument for internal movement (transfers/status change/LOA) and another column added for growth to allow the full picture of a group or subgroup to be seen.

References

Advisory Board Company. (2007a). *Forecasting future workforce demand: User guide for the center's forecasting tool*. Washington, DC: Author.

Advisory Board Company. (2007b). *HR investment center member tool overview.* HR Investment Center Member Toolkit: Forecasting Future Workforce Demand. Retrieved January 27, 2009, from http://www.advisoryboardcompany.com/content/strat/hr.html

Barer, M. L., & Stoddart, G. L. (1991). Toward integrated medical resource policies for Canada: 1: Background, process, and perceived problems. *Canadian Medical Association Journal,* 146(3), 347-351.

Baumann, A. (2007 December). *Better data, better decisions, strengthening your organization: Nursing workforce planning toolkit.* Hamilton, Ontario: Nursing Health Services Research Unit, McMaster University.

Baumann, A., Fisher, A., Blythe, J., & Oreschina E. (2003). *Vacancy rate: A proxy for staffing shortage?* Hamilton, ON, Canada: Nursing Effectiveness, Utilization and Outcomes Research Unit, McMaster University.

Baumann, A., Keatings, M., Holmes, G., Oreschina, E., & Fortier, V. (2006 October). *Better data, better decisions: A profile of the nursing workforce at Hamilton Health Sciences Corporation 2002-2003.* Health Human Resource Series Number 4. Hamilton, ON, Canada: Nursing Health Services Research Unit, McMaster University.

Baumann, A., & Kolotylo, C. J. (2009). *Forecasting future workforce demand project report.* Hamilton, ON, Canada: Nursing Health Services Research Unit, McMaster University.

Cantrell, M. A., & Browne, A. M. (2006). The impact of a nurse externship program on the transition process from graduate to registered nurse: Part iii. Recruitment and retention effects. *Journal for Nurses in Staff Development,* 22(1), 11-14.

Fink, A. (1995). How to ask survey questions. *The survey kit (TSK 2).* Thousand Oaks, CA: Sage.

Quality Worklife-Quality Healthcare Collaborative. (2009). *A snapshot of worklife measurement in Canadian healthcare organizations: Indicator survey results.* Ottawa, Canada: Accreditation Canada.

Appendix A. Glossary of Key Data Elements

Standard Definitions Document

For purposes of the research project we will agree on some industry standard definitions for common terms and metrics. We also require agreement on how we will define the Workforce Forecaster terms in order to comply with our industry standard metrics.

In the second year of the project, the separations calculator was not used by any of the sites. the project sites reported that the separations calculator was time consuming. In addition, its contribution to forecasting accuracy was unknown.

Shared Industry Terminology and Metrics

Term	Reference	Definition	Discussion
Casual	Nursing Secretariat, 2002	A nursing position, in which the incumbent will work less than full-time hours, but is not committed, and does not commit to a regular schedule.	
Full Time	Nursing Secretariat, 2002	A nursing position, in which the incumbent will be regularly scheduled to work normal full-time hours (as defined by the hospital).	
Job Share	ONA Central Agreement	An arrangement whereby two or more nurses share the hours of work of that would otherwise be one full-time position.	
Part Time	Nursing Secretariat, 2002	A nursing position, in which the incumbent will regularly work less than full-time hours, and who makes a commitment to be available for work on a regular predetermined basis.	
Headcount (Average Employee-Count)	HRBN - CAHO (2008) - ID section	Average of the employee-count figure at the start and ending of the reporting period your organization selected. This figure is an employee-count figure not a full-time equivalent (FTEs) figure. Include all individuals who are considered "employees" of the organization (i.e., who are issued T4s) including any individuals on authorized leaves. "Employees" include temporary as well as full-time staff and casual employees. Students are also included if they receive T4s.	
Turnover Rate	HRBN - CAHO (2008) - Indicator #7	# Separations Divided By # Average Employee-Count (see HRBN Indicator #7 for detailed Turnover definitions)	
Actual FTEs	HRBN - CAHO (2008) - CAHO Indicator #5 and ID section	This is the actual number of FTEs as measured at the end of the survey reporting period selected by the organization (e.g., End of fiscal 2007/08 is March 31, 2008).	This project will use Head-counts
Budget FTEs	HRBN - CAHO (2008) - CAHO Indicator #5 and ID section	This is the original number of FTEs budgeted at the beginning of the survey reporting period selected by the organization (e.g., Start of fiscal 2007/08 is April 1, 2007).	This project will use Head-counts
FTE Vacancy Rate	HRBN - CAHO - CAHO Indicator #5 and ID section (2008)	(Budget FTEs - Actual FTEs) / FTE Budget* 100	

Workforce Forecaster (WF) - Input Definitions

Below please find definitions of the inputs required to complete the Workforce Forecaster.

Note: Within the Forecaster Tool when the cell requests FTE data, there will be an assumption that we will use headcount data.

Term	WF Definition	Requirement	Is This Different Than Above?	Project Definition
Headcount	The total number of full-time and part-time employees in the forecasting group.	Must Have	Yes - above is average employee count and includes casuals Headcount in turnover calc in HRBN includes ALL staff not just FT & PT	> Average headcounts will be used (see HRBN def) > Included are FT and PT statuses for which we actively recruit > Leaves are excluded
Budgeted FTEs (Headcount)	The number of budgeted positions included in the forecasting group in FTE terms; may be omitted if both vacancies (FTEs) and actual FTEs are provided (see below).	Must Have	No, but are we using FTE or headcount Kate's comment – use budget headcounts if FTE not available	> Headcounts will be used instead of FTEs
Vacancies	The number of open FTE positions for which you are actively recruiting	Must Have	No Kate's comment – use headcount vacancies if FTE vacancies are not available	> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Calculated FTEs (Headcount)	The actual number of FTEs employed in the forecasting group; calculated by subtracting the number of vacancies (FTEs) from the number of budgeted FTEs.	Must Have	No Kate's comment – use actual headcount if FTE headcount not available	> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Turnover Rate	Total number of FTEs who left the organization (including resignations, dismissals, retirements, and death) divided by the average number of FTEs employed over the same time period. For example, if you are calculating your organizations turnover rate for 2006, you would use the following formula: Total FTE separations / (Total FTEs on Jan. 1, 2006 - Total FTEs on Dec. 31, 2006)/2).	Must Have	Yes - different This is FTE turnover, HRBN is based on heads	> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"

Term	WF Definition	Requirement	Is This Different Than Above?	Project Definition
Estimated future transfers into or out of this group (FTEs)	These inputs should relate to transfers that involve other groups (external transfers).	Nice to Have		> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Transfers into this subgroup from other group	The number of FTEs hired by the forecasting group who were previously employed elsewhere in the institution.	Nice to Have		> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Transfers out of this subgroup into other group	The number of FTEs separated from the forecasting group who left to work elsewhere in the institution.	Nice to Have		> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Estimated future transfers within this group (FTEs):	These inputs should relate to transfers that occur between subgroups within the group (internal transfers).	Nice to Have		> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Transfers into this subgroup from other subgroups	The number of FTEs hired by the forecasting subgroup who were previously employed elsewhere in the forecasting group.	Nice to Have		> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Transfers out of this subgroup into other subgroups	The number of FTEs separated from the forecasting subgroup who left to work elsewhere in the forecasting group.	Nice to Have		> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
FTE status change	FTE additions and reductions due to changes in employees scheduled hours; for example, an employee who works a full-time schedule of 40 hours per week who changes her schedule to work only 20 hours per week would represent a loss of .5 FTE.	Nice to Have		> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"

Term	WF Definition	Requirement	Is This Different Than Above?	Project Definition
Leave of absence (LOAs)	Those employees on formal long-term leave of absence for whom you will cover by hiring a permanent employee. Count only those departures/returns of LOAs that occur during your defined forecasting time period, not those planned for future periods (those LOAs will be counted in upcoming forecasting periods).			> Headcounts will be used instead of FTEs
FTEs returning from LOAs	During the forecasted period, the number of FTEs returning from a long-term leave of absence; include only those for whom you covered their absence by hiring a permanent employee.			> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
FTEs departing for LOAs	During the forecasted period, the number of FTEs departing for a long-term leave of absence; include only those for whom you covered their absence by hiring a permanent employee.			> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Each of the following inputs should be determined by HR working in collaboration with line managers and directors. Use the information gathered through interviews with service line directors and line managers to estimate the following:				
Change in FTEs due to change in beds	The number of new positions created (or existing positions removed) in FTE terms due to a change in the number of beds in the forecasting group			> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Change in FTEs due to innovation	The number of new positions created (or existing positions removed) in FTE terms due to innovation (e.g., change in staffing mix).			> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Change in FTEs due to patient volume	The number of new positions created (or existing positions removed) in FTE terms due to a change in patient volumes.			> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"

Term	WF Definition	Requirement	Is This Different Than Above?	Project Definition
Change in FTEs due to acuity	The number of new positions created (or existing positions removed) in FTE terms due to a change in patient acuity			> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Actual Hires During Year : Each of the following inputs should be based on historical performance, future forecasts of hiring need, and attainable HR hiring expectations.				
Actual Hires During Year (FTEs)	The number of expected new hires in FTE terms.			> Headcounts will be used instead of FTEs > Same definition replacing "FTEs" with "Headcounts"
Actual Hired During Year (Headcount)	The number of expected new hires in headcount terms. Rather than projecting this number independently, this value can be calculated by multiplying the current headcount to FTE ratio by the Actual Hires During Year (FTEs) input.			WF definition

Separations Calculator

For purposes of defining "separation" for the separations calculator, assessing the risk of separation will consider the following as part of a separation. The separations calculator was not used in the second year of this project.

A "separation" will include

- External Turnover - Voluntary or involuntary separation from the organization
- Internal Turnover - which includes transfers out of unit (subgroup), transfers out of position (subgroup), and changes in status resulting in an FTE reduction (e.g., FT to PT or CA)

Data Inclusions/Exclusions

- Casual staff are excluded
- Agency FTEs are excluded

Appendix B. Interview Guides and Questions

HR Analysts Interview Guide

Answer the following questions to evaluate your data collection efforts - the process from obtaining data from information systems to inputting values into the Workforce Forecaster.

How easy was to collect the data required for the Tool?

1. Extremely Difficult   2. Difficult   3. Neutral   4. Easy   5. Extremely Easy

Based on your ranking between 1-5, please describe further on the ease of use or difficulties you had experienced during the Data Collection process?

_____

Which data points were most difficult to obtain? How can we make the process easier?

_____

How easy was to input the requested data into the Tool?

1. Extremely Difficult   2. Difficult   3. Neutral   4. Easy   5. Extremely Easy

Based on your ranking between 1-5, please describe further on the ease of use or difficulties you had experienced during the Data Entry process?

_____

Were we able to collect and input all of the requested data? If not, how can we begin tracking the missing inputs?

_____

What investments (i.e., financial, personnel, and time) did each organization have to make in order to implement the Tool? What are the other support needed to implement the Tool?

_____

Are there any other recommendations for improving the Tool related to the Data Collection and Entry process?

_____

Version 1, June 13th 2008

Project Steering Committee Interview Guide

Answer the following questions to evaluate your data collection efforts - the process from obtaining data from information systems to inputting values into the Workforce Forecaster.

How easy was to collect the data required for the Tool?

1. Extremely Difficult   2. Difficult   3. Neutral   4. Easy   5. Extremely Easy

Based on your ranking between 1-5, please describe further on the ease of use or difficulties you had experienced during the Data Collection process?

_____

Which data points were most difficult to obtain? How can we make the process easier?

_____

How easy was to input the requested data into the Tool?

1. Extremely Difficult   2. Difficult   3. Neutral   4. Easy   5. Extremely Easy

Based on your ranking between 1-5, please describe further on the ease of use or difficulties you had experienced during the Data Entry process?

_____

Were we able to collect and input all of the requested data? If not, how can we begin tracking the missing inputs?

_____

What investments (i.e., financial, personnel, and time) did each organization have to make in order to implement the Tool? What are the other support needed to implement the Tool?

_____

Are there any other recommendations for improving the Tool related to the Data Collection and Entry process?

_____

Version 1, June 13th 2008

Managers Interview Guide

Answer the following questions to evaluate the efforts to partner with service line leaders - the interview process for obtaining growth projection information as well as meetings to obtain information for the Separations Calculator, if applicable.

How successful were the Project Team at engaging service line/department leaders in the forecasting process?

1. Not Successful   2. Successful   3. Very Successful

What should be done differently?

_____

What parts of the process would you like to be more or less involved with?

_____

What support do you require (e.g., more in-depth training, customized reports, etc.) in order to benefit from the Tool?

_____

How does the Tool or the outputs of the Tool help you as a manager?

_____

How can the forecasting process be improved?

_____

Will your organization use the outputs of the Tool (i.e., forecasted future hiring needs) to inform strategies, policies, and management decision-making, and how? Please explain.

_____

Version 1, June 13th 2008

Interview Guide for Managers - Separations Calculator

Introduction
The separations calculator enables users to estimate a probability of separation during the next year for each individual in a forecasting group or subgroup. Probabilities are then added in order to generate an estimate of the total number of separations. In order to assess the likelihood of an individual employee leaving the organization Managers will be asked the following questions. All names will be blinded and all data will be anonymized for the purposes of the interview process.

Background
1. How long has the employee worked for the hospital?
2. Why did the employee choose to work for our hospital?
3. What does the employee enjoy about his/her job?
4. What are the employee's career goals?

Relationship
1. How is the employee's relationship with his/her manager?
2. How strong are the employee's relationships with his/her coworkers?
3. Does the employee communicate openly with his/her direct supervisor?

Employment Proposition
1. Has the employee expressed frustration with compensation?
2. Has the employee expressed frustration with scheduling?
3. Has the employee expressed frustration with work intensity?
4. Has the employee recently been recognized for his/her contributions?

Version 1, June 13th 2008

Operational Leader Interview Guides

1. Service Line Director

Instructions for HR: Use this interview guide to elicit information from service line directors at your institution about trends and environmental factors likely to influence future staffing needs. The information you uncover during this conservation will help you to generate and refine your workforce projections. If possible, bring to the meeting data on separations, retirements, vacancies, and the use of agency labour in the department. You may also want to bring a list of current employees and their ages.

Instructions for the Service Line Director:
The purpose of workforce planning is "to get the right people, in the right place, at the right time." In order to do so efficiently, the HR department is working to create an estimate of the organization's future staffing needs. Your answers to the following questions will be used, along with historical data on employment trends, to generate estimates of the future staffing needs of your department.

Strategic Plans
In order to create workforce projections, it is necessary to have a sense of what changes the department is likely to undergo in the future and what impact those changes will have on staffing needs.

1. What strategic goals have you set for your department over the next 1-3 years?
2. Do you expect your department to grow, hold steady, or decrease in size during the next 1-3 years?
3. When will these changes occur?
4. If you expect your department to grow or decrease in size this year, please answer the appropriate questions below. If you expect your department to hold steady, please continue on to the questions under Competitor Activity.

**If you expect your department
to grow this year:**
(Growth may include an increase in number
of beds, an increase in revenue, an increase in
patient volume, the addition of a service line,
the purchase of new technology, etc.)

a. How is your department going to grow in
   2007?
b. Will you need to add staff to accommodate
   this growth?
c. How many FTEs will need to be added?
d. What specific skills and/or credentials will
   these new staff members require?

**If you expect your department
to decrease in size this year:**
(Reasons may include a decrease in patient
volume, closing beds, dropping a service line,
or improving efficiencies, e.g., through auto-
mation or Lean principles, to such an extent
that the same work can be performed by fewer
people.)

1. How is your department going to decrease
   in size in 2007?
2. Will you have an excess of staff as a result?
   If so, how many?
3. Do you have plans to redeploy them? What
   new roles could they fill?

Competitor Activity
The actions of our hospital's competitors have
an effect on our ability to retain employees
and attract new applicants. When answering
the following questions, please define competi-
tors as any employers in the region (including
doctor's offices, freestanding clinics, hospitals,
retail pharmacies, etc.) that compete with your
department for employees. Note to HR: The
hospital's CFO, COO, Manger of Compensation
and Benefits, or Department Directors may be
able to provide additional information in this
topic. In some cases, it may be more appropri-
ate to direct these questions to them.

1. To your knowledge, are any competitors
   planning to raise wages in 2007? If so, by
   how much?
2. To your knowledge, are any competitors
   planning to significantly expand or shrink
   their business in 2007?
3. What effect do you think their plans will
   have, if any, on your staff?
4. What effect do you think their plans will
   have, if any, on your ability to recruit new
   hires?
5. Any new competitors planning to enter our
   labour market?
6. What effect do you think their plans will
   have, if any, in your staff?

Other Factors Influencing Staffing
Are there any other factors not covered here
which are likely to influence staffing in your
department? (e.g., changes in skills require-
ments, changes in licensing/certification/edu-
cation requirements, school closures, develop-
ments in technology, etc.) Please explain.

2. Line Manager

Instructions for HR: Use this interview guide
to elicit information from line managers at
your institution about trends and environmen-
tal factors likely to influence future staffing
needs. The information you uncover during
this conservation will help you to generate
and refine your workforce projections. If pos-
sible, bring to the meeting data on separations,
retirements, vacancies, leaves or absence, and
the use of agency labour in the department.
You may also want to bring a list of current
employees and their ages.

Instructions for the Line Manager: The pur-
pose of workforce planning is "to get the right
people, in the right place, at the right time." In
order to do so efficiently, the HR department
is working to create an estimate of the orga-

nization's future staffing needs. Your answers to the following questions will be used, along with historical data on employment trends, to generate estimates of the future staffing needs of your department.

Staffing Challenges

Understanding your department's current staffing situation will help the HR department to better understand it's future outlook.

1. What are the primary challenges you face when hiring, recruiting, and retaining employees in your department?
2. What factors are driving those challenges?
3. What staffing challenges are you expecting to encounter over the next six months? Over the next year?
4. Does your department employ agency labour? If so, would you like to decrease utilization of agency labour?
5. What job categories should be included in our workforce plans?

Strategic Plans

In order to create workforce projections, it is necessary to have a sense of what changes the department is likely to undergo in the future and what impact those changes will have on staffing needs.

1. What strategic goals have you set for your department over the next 1-3 years?
2. Do you expect your department to grow, hold steady, or decrease in size during the next 1-3 years?
3. When will these changes occur?
4. If you expect your department to grow or decrease in size this year, please answer the appropriate questions below. If you expect your department to hold steady, please continue on to the questions under Competitor Activity.

If you expect your department to grow in 2007:
(Growth may include an increase in number of beds, an increase in revenue, an increase in patient volume, the addition of a service line, the purchase of new technology, etc.)

a. How is your department going to grow in 2007?
b. Will you need to add staff to accommodate this growth?
c. How many FTEs will need to be added?
d. What specific skills and/or credentials will these new staff members require?

If you expect your department to decrease in size in 2007:
(Reasons may include a decrease in patient volume, closing beds, dropping a service line, or improving efficiencies, e.g., through automation or Lean principles, to such an extent that the same work can be performed by fewer people.)

a. How is your department going to decrease in size in 2007?
b. Will you have an excess of staff as a result? If so, how many?
c. Do you have plans to redeploy them? What new roles could they fill?

Turnover

Historical turnover data will be used to estimate future in your department. In order to improve the accuracy of these projections, it is helpful to identify those factors which have driven turnover in the past, and how they are likely to change in the future.

1. In 2006, there were _____ [HR to provide number] employee separations from your department. Were there any unusual circumstances contributing to that number (e.g., competitors' activities, changes within the department, etc.)?
2. Note to HR: If you do not have access to data on retirement versus non-retirement

turnover, managers may be able to provide an estimate. Of the separations which occurred in 2006, how many were retirements? If an exact number is unknown, please provide an estimate.
3. Do you expect turnover to remain roughly the same in 2007? Why or why not?
4. Do you know of any employees in your department who plan to leave their jobs in 2007, perhaps due to retirement, family commitments, illness, plans to return to school, LOA, etc.?

Retirement

Many departments in the hospital employ a disproportionate number of employees over 50. Because of this "bubble", we expect to see an increase in the number of employees retiring in the next 5-15 years. Your answers to the following questions will help to generate an estimate of the number of employees who will retire in the near future.

1. There are _____[HR to provide number] employees in your department over the age of 50. Have any of them talked to you about their retirement plans? Note to HR: It may be helpful to bring a list of names to review with the line manager.
2. At what age do employees in your department usually retire? If an exact number is unknown, please provide an estimate.

Leaves of Absence

Although not all staffing needs created by leaves of absence will be filled with a new hire, those that do require replacement should be accounted for in the Workforce Forecaster. Line managers should be prompted with the following questions concerning leaves of absence in general, as well as replacement plans.

1. How many employees, on average, take a leave of absence each year? Note to HR: It may be helpful to bring historical data on LOAs to review with the line manager, if available.

2. What is the average length of employees' LOAs?
3. Do you know of any employees who are planning to take a LOA over the next 12 months?
4. For those employees anticipated to take leave over the next 12 months, how many will need to be replaced with a new hire?
5. Do you know of any employees who are planning to return from leaves of absence across the next 12-months?

Other Factors Influencing Staffing
1. Are there any other factors not covered here which are likely to influence staffing in your department? (e.g., changes in skills requirements, changes in licensing/certification/education requirements, school closures, developments in technology, etc.). Please explain.

Appendix C. Data Access Challenges - Contributing Factors

- There is variability across the organizations regarding data accessibility and ease of data collection.

- The complexity of organizational storage and transmission of information varying from organization to organization compromises the comparability of workforce data.

- Information sources vary across the project sites, for example HR and finance departments.

- Some data need to be accessed by personal communication with managers. Missing data elements sometimes related to the lack of information from managers about present or future expansions and the effect on staffing needs.

- The site leads need further guidance on how to calculate inputs for the Tool.

- Data are stored at a different level than that required by the Tool (e.g., employee level versus unit level).

- Site HR information systems limit the data that can be extracted, for example, part-time employees do not have an associated FTE. Therefore, data regarding status changes as defined by the Tool cannot be extracted.

- Some data are tracked on spreadsheets and these data may be hard to interpret, lost, or missing.

- Obtaining some of the missing data would have required a lengthy manual process.

Appendix D. Estimated New Hire Need and Actual Hires for All Organizations

Table 1. Organization One: Forecasting Groups and Data Elements, Based on Averaged+ Historical Headcount Data, 2009-2010

Forecasting Groups	Calculated Headcounts	Separations	Vacancies	Turnover Rates	Estimated New Hire Need	Actual Hires
RNs	144.0	10.8	12.0	7.0%	21.8	21.0
Complex Continuing Care Full-Time	42.0	2.0	1.0	4.8%	3.0	2.0
Complex Continuing Care Part-Time	34.0	4.8	7.0	14.0%	13.8	10.0
Rehabilitation Full-Time	28.0	0.6	1.0	2.3%	-1.4	1.0
Rehabilitation Part-Time	40.0	3.4	3.0	8.4%	6.4	8.0
RPNs	95.0	3.8	2.0	4.0%	8.8	8.0
Physiotherapists	18.0	1.3	1.0	7.0%	2.3	3.0
Respiratory Therapists	17.0	1.5	0.6	9.0%	5.3	5.0
Speech Language Pathologists	6.0	0.1	0.0	2.0%	0.1	0.0
Pharmacists	6.0	0.6	1.0	9.2%	1.6	1.0

+Based on three years of historical data (2006-2007, 2007-2008, 2008-2009)

Table 2. Organization Two: RN Functional Units and Data Elements,
Based on Averaged+ Historical Headcount Data, 2009-2010

RN Functional Units	Calculated Headcounts	Separations	Vacancies	Turnover Rates	Estimated New Hire Need	Actual Hires
Birthing Centre	38.0	2.2	0.0	5.8%	5.0	4.5
Cardiology	30.5	1.5	-1.0	5.0%	2.9	3.5
Cardiovascular ICU	70.0	3.9	7.0	5.5%	14.6	5.0
Cardiovascular Surgery	41.0	2.5	2.0	6.0%	17.0	8.0
Combined Care Gynaecology	34.5	0.7	1.0	2.0%	3.6	3.5
Coronary Care	39.0	1.2	0.0	3.0%	1.2	1.5
Emergency	63.0	9.5	-1.0	15.0%	13.0	10.5
Gastrointestinal Surgery	40.5	4.5	3.0	11.0%	10.3	5.5
General Internal Medicine	95.0	8.1	-10.0	8.5%	2.3	14.0
Haemodialysis	58.0	0.0	3.0	0.0%	5.3	2.5
Inpatient Mental Health	41.5	3.5	3.0	8.5%	8.7	4.0
Level II Nursery	30.0	3.2	2.0	10.5%	10.6	5.0
Medical Surgical ICU	114.0	6.3	4.0	5.5%	15.6	11.5
Nephrology/ Urology	32.0	2.9	-2.0	9.0%	0.9	3.0
Oncology/INF	25.0	0.0	-1.0	0.0%	0.8	1.0
OR Combined	91.0	1.8	9.0	2.0%	18.2	8.0
Orthopaedics	43.5	4.4	8.0	10.0%	14.9	6.0
Post-Anaesthesia Care Unit	27.5	1.8	-1.0	6.5%	3.1	2.0
Psychiatric Emergency Service	23.5	4.3	0.0	18.5%	3.7	5.5
Surgical Day Care	22.5	0.0	-3.0	0.0%	-3.6	0.0
Therapeutic Endoscopy	15.5	0.0	2.0	0.0%	1.8	0.5
Trauma Neurology ICU	73.0	1.8	18.0	2.5%	25.5	8.5
Trauma & Neurosurgery Unit	82.0	2.9	-4.0	3.5%	1.4	7.5
Heart & Vascular Unit	73.0	0.7	9.0	1.0%	11.6	3.0

+Based on three years of historical data (2006-2007, 2007-2008, 2008-2009)

Table 3. Organization Three: Forecasting Groups' Data Elements,
Based on Averaged Historical Headcount Data, 2009-2010

Forecasting Groups	Calculated Headcounts	Separations	Vacancies	Turnover Rates	Estimated New Hire Need	Actual Hires
ONA RNs†	2184	139.2	0.0	6.0%	197.2	197
ICU†	392	27.4	0.0	7.0%	25.4	25
ER†	99	5.7	0.0	5.8%	11.7	12
OR†	157	12.4	0.0	7.9%	13.4	13
Others*	1536	93.7	0.0	6.1%	146.7	147
Allied Health*	109	5.9	0.0	5.0%	9.9	10
Physiotherapists*	49	4.9	0.0	10.0%	8.9	9.0
Respiratory Therapists*	60	1.0	0.0	1.6%	1.0	1.0
MRI Technologists*	41	3.6	0.0	9.0%	7.6	8

†Based on four years of historical data (2005-2006, 2006-2007, 2007-2008, 2008-2009)
*Based on three years of historical data (2006-2007, 2007-2008, 2008-2009)

Table 4. Organization Three: ONA Registered Nurses' Data Elements,
Based on Averaged Historical FTE Data, 2009-2010

Forecasting Groups	Calculated FTEs	FTE Separations	Vacancies	Turnover Rates	Estimated New Hire Need	Actual Hires
ONA RNs†	1973.6	38.9	0.0	2.0%	57.2	59.3
ICU†	427.4	10.4	0.0	2.4%	-0.9	0.0
ER†	137.6	2.4	0.0	1.8%	-1.1	0.0
OR†	223.2	5.4	0.0	2.4%	3.3	3.3
Others†	1185.4	20.6	0.0	1.7%	56.0	56.0

†Based on four years of historical data (2005-2006, 2006-2007, 2007-2008, 2008-2009)

Table 5. Organization Four: RN and RN2 Forecasting Groups and Data
Elements, Based on Averaged Historical+ Headcount Data, 2009-2010

Forecasting Groups	Calculated Headcounts	Separations	Vacancies	Turnover Rates	Estimated New Hire Need	Actual Hires
RN	391.0	27.0	97	7.0%	137	46
ER	76.0	3.0	26	3.9%	33	10
Mental Health	22.5	2.0	3	8.9%	5	1
OR/Endoscopy	43.5	6.0	6	13.8%	10	1
Cancer Care Inpatient	31.5	7.0	7	22.2%	13	10
ICU	51.0	0.0	10	0.0%	10	4
Geriatric LTC	11.0	0.0	0	0.0%	1	3
Obstetrics	50.0	2.0	14	4.0%	18	4
Inpatient Surgical Unit	35.5	2.0	6	5.6%	13	6
Oncology Outpatient	18.0	1.0	6	5.6%	8	2
Adult Medicine	52.0	4.0	19	7.7%	26	5
RN2	169.5	12.0	15	7.0%	18	16
Float Pool	23.5	3.0	0	12.8%	-3	11
Rehabilitation	20.0	2.0	5	10.0%	3	3
PACU	40.5	2.0	2	4.9%	6	0
Dialysis	20.0	0.0	5	0.0%	4	0
Other-Direct Care	10.0	1.0	1	10.0%	-1	0
Indirect Care	22.0	2.0	1	9.1%	3	0
Medicine	33.5	2.0	1	6.0%	6	2

+Based on three years of historical data (2006-2007, 2007-2008, 2008-2009)

Table 6. Organization Five: RN Forecasting Groups' Data Elements, Based on Averaged+ Historical Headcount Data - Estimated New Hire Need and Actual Hires, 2009-2010

RN Forecasting Groups	Calculated Headcounts	Separations	Vacancies	Turnover Rates	Estimated New Hire Need	Actual Hires
Medicine	158.0	25.0	17.0	16.0%	56.0	36.0
Connell 3	34.0	8.0	1.0	23.6%	15.0	8.0
Kidd 7	32.0	3.0	6.0	9.3%	13.0	6.0
Connell 10	28.0	6.0	3.0	21.4%	11.0	9.0
Kidd 6	32.0	6.0	5.0	18.8%	14.0	12.0
Clinics	32.0	2.0	2.0	6.1%	3.0	1.0
Cardiac	72.0	4.0	1.0	5.0%	10.0	2.0
CV Lab	13.0	--	0.0	0.0%	--	0.0
Cardiac Science	39.0	2.0	1.0	5.0%	6.0	0.0
Davies 3	20.0	2.0	0.0	10.0%	4.0	2.0
Critical Care	170.0	19.0	12.0	11.0%	33.0	13.0
ICU	116.0	16.0	9.0	13.8%	27.0	9.0
D4 ICU	54.0	3.0	3.0	5.6%	6.0	4.0
Emergency	156.0	19.9	10.0	13.0%	38.9	13.0
ER	71.0	9.0	7.0	12.7%	24.0	7.0
Renal	59.0	7.0	3.0	11.8%	10.0	5.0
Satellite Dialysis	26.0	4.0	0.0	15.2%	5.0	1.0
SPA	211.0	23.9	9.0	11.0%	37.9	27.0
OR	49.0	5.0	0.0	10.2%	9.0	3.0
PACU	24.0	1.0	2.0	4.0%	2.0	3.0
OPPU	10.0	--	0.0	0.0%	--	0.0
IVR	9.0	2.0	0.0	11.1%	1.0	0.0
Connell 9	47.0	5.0	4.0	10.6%	9.0	7.0
Kidd Davies 4	40.0	7.0	2.0	17.4%	7.0	7.0
Kidd 3	32.0	5.0	1.0	15.5%	10.0	7.0
Obstetrics & Gynecology	145.0	14.0	10.0	10.0%	30.0	8.0
Connell 5	20.0	1.0	4.0	5.0%	6.0	0.0
Kidd Davies 5	38.0	4.0	2.0	10.5%	8.0	2.0
NICU	57.0	4.0	1.0	7.0%	9.0	5.0
Pediatrics	30.0	5.0	3.0	16.6%	7.0	1.0
Oncology	26.0	3.0	3.0	11.5%	5.0	0.0
Resource pool	64.0	7.0	48.0	11.0%	55.0	7.0

+Based on three years of historical data (2006-2007, 2007-2008, 2008-2009)

Appendix E. Comparison of Actual Hiring Needs to Forecasted Needs for all Organizations

Table 1. Organization One: Forecasting Accuracy (12 Months) from April 1, 2009 to March 31, 2010

Forecasting Groups	Estimated Demand for New Hires‡	Estimated Actual Hires During Year‡	Actual New Hires Needed#	Accuracy of Demand for New Hires△
RNs	22.0	21	14	63.6%
Complex Continuing Care FT	3.0	2	1	33.0%
Complex Continuing Care PT	14.0	10	5	35.7%
Rehabilitation FT	1.0	1	1	**100.0%**
Rehabilitation PT	6.0	8	7	**109.0%**
RPNs	9.0	8	10	**111.0%**
Physiotherapists	9.0	3	2	**100.0%**
Respiratory Therapists	5.0	5	6	120.0%
Speech Language Pathologists	0.1	0	6	0.0%
Pharmacists	2.0	1	0	0.0%

‡ Based on three years of averaged historical data.

Estimate based on real data.

△ Actual New Hires Needed (include current vacancies not filled) ÷ Estimated demand for new hires = Accuracy of Demand for New Hires.

Numbers **bolded** have an accuracy percentage between the recommended 85% to 115%.

Table 2. Organization Two: Forecasting Accuracy (Nine Months)
from April 1, 2009 to December 31, 2009

Forecasting Groups	Estimated Demand for New Hires‡	Estimated Actual Hires During Year‡	Actual New Hires Needed#	Accuracy of Demand for New Hires△
Birthing Centre	7	3.5	7	**100.0%**
Cardiology	1	3.5	1	**100.0%**
Cardiovascular ICU	5	5.0	8	160.0%
Cardiovascular Surgery	22	8.0	13	59.1%
Combined Care Gynaecology	5	3.5	3	60.0%
Coronary Care	1	1.5	1	**100.0%**
Emergency	12	10.5	20	166.0%
Gastrointestinal Surgery	4	5.5	3	75.0%
General Internal Medicine	16	14.0	14	**88.0%**
Haemodialysis	4	2.5	1	25.0%
Inpatient Mental Health	4	4.0	2	50.0%
Level II Nursery	5	5.0	6	**115.0%**
Medical Surgical ICU	9	11.5	6	67.0%
Nephrology/ Urology	2	3.0	2	**100.0%**
Oncology/INF	4	1.0	2	50.0%
OR Combined	6	8.0	5	84.0%
Orthopaedics	12	6.0	13	**108.0%**
Post-Anaesthesia Care Unit	2	2.0	1	50.0%
Psychiatric Emergency Service	4	5.5	2	50.0%
Surgical Day Care	2	0.0	1	50.0%
Therapeutic Endoscopy	3	0.5	1	33.0%
Trauma Neurology ICU	2	8.5	7	350.0%
Trauma & Neurosurgery Unit	7	7.5	7	**100.0%**
Heart & Vascular Unit	1	3.0	5	500.0%
Birthing Centre	7	4.5	7	**100.0%**
All RNs*	140*	–	131*	**93.6%***

‡ Based on three years of averaged historical data.

Estimate based on real data.

△ Actual New Hires Needed (include current vacancies not filled) ÷ Estimated demand for new hires = Accuracy of Demand for New Hires.

* Actual data used, not averaged historical data.

Numbers **bolded** have an accuracy percentage between the recommended 85% to 115%.

Table 3. Organization Three: Forecasting Accuracy (12 Months) from April 1, 2009 to March 31, 2010

Forecasting Groups	Estimated Demand for New Hires‡	Estimated Actual Hires During Year‡	Actual New Hires Needed#	Accuracy of Demand for New Hiresᐃ
ONA-ER†	-1.1	--	1.94	176.36%
ONA-ICU†	-0.9	--	0.00	0.0%
ONA-OR†	3.3	3.2	2.34	71.0%
ONA-other†	56.0	3.2	17.57	31.0%
Physiotherapy*	8.9	9.0	3.00	33.7%
Respiratory Therapists*	1.0	1.0	0.00	0.0%
MRI Technologists*	7.6	8.0	3.00	39.0%
ONA-ER*	11.7	12.0	5.00	43.0%
ONA-ICU*	25.4	25.0	0.00	0.0%
ONA-OR*	13.4	13.0	6.00	44.7%
ONA-other*	146.7	147.0	51.00	35.0%

†FTE data

*Headcount data

‡ Based on three years of averaged historical data.

Estimate based on real data.

ᐃ Actual New Hires Needed (include current vacancies not filled) ÷ Estimated demand for new hires = Accuracy of Demand for New Hires.

Numbers **bolded** have an accuracy percentage between the recommended 85% to 115%.

Table 4. Organization Four: Forecasting Accuracy (12 Months) from April 1, 2009 to March 31, 2010

Forecasting Groups	Estimated Demand for New Hires‡	Estimated Actual Hires During Year‡	Actual New Hires Needed#	Accuracy of Demand for New Hires^Δ
Emergency (ER)	33	10.0	26	79%
Mental Health	5	1.0	0	0%
OR/Endoscopy	10	1.0	11	**110%**
3NB	13	10.0	8	62%
CCU	10	4.0	11	**110%**
Geriatrics	1	3.0	6	600%
BU / OB	18	4.0	0	0%
4SC/Am Care	13	6.0	10	77%
Oncology	8	2.0	6	75%
4SB	26	5.0	3	12%
Float	-3	11.0	23	-767%
3SA Rehab	3	3.0	4	133%
4NC	6	2.0	8	133%
PACU	6	0.0	1	17%
Dialysis	4	0.0	5	125%
Other Direct Care	-1	0.0	9	-900%
Indirect Care	3	0.0	2	67%

‡ Based on three years of averaged historical data.

Estimate based on real data.

Δ Actual New Hires Needed (include current vacancies not filled) ÷ Estimated demand for new hires = Accuracy of Demand for New Hires.

Numbers **bolded** have an accuracy percentage between the recommended 85% to 115%.

Table 5. Organization Five: Forecasting Accuracy (12 Months), April 1, 2009 to March 31, 2010

Forecasting Groups	Estimated Demand for New Hires‡	Estimated Actual Hires During Year‡	Actual New Hires Needed#	Accuracy of Demand for New Hires△
Corporate	266	74	131	49.0%
Medicine	56	18	20	36.0%
Cardiac	10	1	6	60.0%
Critical Care	33	6	20	61.0%
Emergency	39	11	15	38.0%
SPA	38	8	18	47.0%
Obstetrics & Gynecology	30	3	9	30.0%
Oncology	5	2	3	60.0%
Resource Pool	55	25	40	73.0%
Connell 3	15	3	3	20.0%
Kidd 7	13	2	2	15.0%
Connell 10	11	13	14	127.0%
Kidd 6	14	0	0	00.0%
Clinics	3	0	1	33.0%
CV Lab	0	0	0	**100.0%**
CCU	6	0	3	50.0%
Davies 3	4	1	3	75.0%
ICU	27	4	12	44.0%
D4ICU	6	2	8	133.0%
Emergency	24	7	10	42.0%
Renal	10	2	2	20.0%
Satellite	5	2	3	60.0%
OR	9	0	0	00.0%
PACU	2	2	4	200.0%
OPPU	0	0	0	**100.0%**
IVR	1	0	0	00.0%
Connell 9	9	1	4	44.0%
Kidd Davies 4	7	3	4	57.0%
Kidd 3	10	2	6	60.0%
Connell 5	6	1	2	33.0%
Kidd Davies 5	8	1	2	25.0%
NICU	9	0	3	33.0%
Pediatrics	7	1	2	29.0%
Oncology	5	2	3	60.0%
Resource Pool	55	25	40	73.0%

‡ Based on three years of averaged historical data.
# Estimate based on real data.
△ Actual New Hires Needed (include current vacancies not filled) ÷ Estimated demand for new hires = Accuracy of Demand for New Hires.
Numbers **bolded** have an accuracy percentage between the recommended 85% to 115%.

Forecasting Future Workforce Demand
A Process Evaluation

Andrea Baumann, RN, PhD
Camille Kolotylo, RN, PhD