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**Background**

The College of Registered Nurses of Nova Scotia (CRNNS) believes that health policy, at the provincial and national level, is influenced and strengthened by evidence related to outcomes of nursing practice. Thus, one of the key initiatives of CRNNS is to provide stakeholders, including government, registered nurses, nurse practitioners, employers and other health professionals, with access to evidence of the contributions made by registered nurses and nurse practitioners to health outcomes.

This document provides an overview of the state of nursing outcomes research, provides a summary of key research findings about nurse staffing and patient safety, as well as references and annotations of other articles. This document is updated once a year with the latest research to provide CRNNS with an ongoing comprehensive resource of literature related to nursing outcomes for use by stakeholders.

**Introduction**

Registered nurses (RNs) provide care to patients in acute care, long-term care, and community settings. In spite of this reality, much of the work of nursing remains invisible to health care systems (Kimball & O’Neil, 2002; Maas & Delaney, 2004), as well as other health disciplines. Researchers have demonstrated that nursing-sensitive outcomes provides a better understanding of the contributions RNs make to the healthcare system and in turn may assist nurses, employers, and government in the planning of new programs and services. Additionally this information can be used in:

- Developing best practices to be incorporated into patient treatment plans;
- Establishing quality indicators of care provided by nurses;
- Informing staffing decisions;
- Assisting in decisions pertaining to cost, quality and access; and
- Identifying how RNs make a difference to patients and their experiences of illness

(Doran, 2003; Doran, et al. 2004; Kimball & O’Neal; Schreb, 2001).

**Nursing-Sensitive Outcomes**

Nursing outcomes research attempts to identify nursing interventions that contribute to desired outcomes, are cost effective, and make nursing interventions understandable to other professions, administrators and patients (Schreb, 2001). By focusing on outcome indicators we are able to learn how patients and their health conditions are affected by interactions with RNs (Doran, 2003). Interest in nursing-sensitive outcomes has become increasingly important to the health care system (Mitchell, 2001). Although demonstrating nursing-sensitive outcomes can be traced back to the data collection efforts of Florence Nightingale, studies of nursing effectiveness are in their infancy. Most outcomes research has focused on staff and organizational outcomes instead of clinical outcomes for patients. Increasingly there is a need to demonstrate how nurses provide care, the interventions or actions used by nurses to influence patient health outcomes, and the appropriate mix of nursing staff necessary to provide safe competent care (White & Pringle, 2005).

No large databases demonstrating nursing-sensitive data are currently available for outcomes research in Canada. Without this type of cumulative data, demonstrating nursing effectiveness is restricted. Although large databases are in existence in the United States (US), there is a lack of data directly related to nursing interventions. Currently data generated are used for authorization of payment for services; provider specific databases that help document care, assist with quality improvement, clinical research, and administrative reporting; research databases designed to answer specific questions; disease registries of certain diseases; and death registries. Unfortunately, nursing data typically remains invisible within these large national health related databases (Schreb, 2001).

Major efforts to identify nursing-sensitive outcomes that can be captured and housed in cumulative administrative databases have been underway for more than 10 years. The Iowa Outcomes Project and the American Nurses...
Association in the US and, in Canada, the Nursing and Health Outcomes Project sponsored by the Ontario Ministry of Health and Long-Term Care have lead the way in identifying nurse-sensitive outcomes that can be identified, measured, and accumulated in administrative databases. Accumulating measures of nursing-sensitive outcomes in large administrative databases will allow researchers, administrators and policy makers to analyze patient experiences and determine what nursing interventions are associated with better patient outcomes. Nursing will become visible to the health care system (Pringle & White, 2002). The Canadian Health Outcomes for Better Information and Care (C-HOBIC), previously names the Nursing and Health Outcomes Project, has identified patient health outcomes that can be measured and attributed to nursing interventions. These outcomes are 1) functional status, 2) therapeutic self-care (readiness for discharge), 3) symptom management (pain, nausea, fatigue, dyspnea), and 4) safety (falls, pressure ulcers). These outcomes will be explained in more detail later in this paper. Studies investigating nurse staffing and patient safety comprise the majority of studies located for this project. Nurse staffing and patient safety have been attributed to safety/adverse occurrences outcome.

**Cumulative Resources of Registered Nursing-Sensitive Outcomes**

The original intent of this project was to develop an annotated bibliography of nursing-sensitive outcomes. Early in the project it became evident that the majority of studies currently in the literature used very small sample sizes, the findings could not be generalized to larger populations, and there were inconsistencies in the definition of terms and instruments used for measurement. Additionally, there was a lack of research or that built on previous studies. What is included in this document are research articles and other resources that provide evidence related to a) nurse staffing and patient safety, b) clinical outcomes research, and c) studies investigating the effects of nursing education and patient outcomes.

**Search Strategy**

The search strategy used for this project sought to identify quantitative and qualitative published and unpublished studies of nursing-sensitive patient health outcomes in the English language. This report has been updated annually since first written in 2007.

Although randomized controlled trials (RCT) are acknowledged as the ‘gold standard’ for experimental research, nursing interventions are complex and must be captured within the context of nursing practice and patient relationships (Nies et al. 1999; Spilsbury & Meyer, 2001). Findings were not limited to RCTs and include research that uses diverse study designs and methods. Studies meeting the inclusion criteria, regardless of methodological quality, are included in an effort to provide evidence of nursing-sensitive outcomes. Studies that demonstrate patient health outcomes specific to nursing interventions; interventions within the scope of practice of RNs; and results that indicate a positive relationship between a nursing intervention and patient health outcomes are included.

Electronic databases searched were:

- CINHAL
- Medline
- The Cochrane Library
- The Joanne Briggs Institute
- Evidence Based Medicine Reviews
- Digital Dissertations
- EBSCO
- Google Scholar Summons PsychInfo
- Web of Science
Search terms included:
- Nursing outcomes
- Nurse sensitive outcomes
- Evaluation
- Patient outcomes
- Outcome assessment
- Nursing practice
- Process

The Nursing Role Effectiveness Model (NREM) was used as the conceptual framework to guide the inclusion of studies. The NREM is one of the early conceptual models to incorporate the structure-process-outcomes model of quality care (Irvine, Sidani, & McGillis Hall, 1998). The importance of the NREM is its contribution to the identification of nursing-sensitive patient health outcomes. Irvine et al. separates the processes of care into nurses’ independent, dependent and interdependent role functions. Outcomes of patient care are related directly to various nursing role functions. Independent nursing role functions include patient assessment, decision making, interventions, and follow-up care for which nurses are held responsible and accountable (Doran, et al. 2006). The NREM demonstrates how structural variables influence the processes of how nurses provide care and thus the outcomes of care that can be directly related to nursing practice (Sidani & Irvine, 1999).

Main Results
This report has been updated annually beginning in 2008 and new articles, that meet the inclusion criteria, have been added. Articles are excluded if the findings cannot be directly related to RN practice, no difference between comparison groups, or the use of terms made it difficult to associate findings to RN specific practice. Studies identified fall into one of three categories; nurse staffing, clinical aspects of care, and interventions related to education of patients. Each study was reviewed for the use of 1) an outcome concept, such as functional health status, therapeutic self-care, symptom management, adverse occurrences, or patient satisfaction; 2) a definition of the nursing intervention; and 3) a description of the reliability and validity of instruments used for assessment. Studies related to outcomes of CNS practice are also included.

Limitation of Findings
Articles were rejected if the findings failed to produce desired results, there was no difference between control and experimental groups, or results were not demonstrated across time. These findings are similar to those of other researchers who have attempted to document nursing-sensitive outcomes and support the need for large databases of nursing interventions that can be related to patient health outcomes (Doran, 2003; Pringle & White, 2003; Schreb, 2001).
Nurse Staffing and Patient Safety

Synthesis and Key Issues

The research studies included in this document provide evidence that nurse staffing levels affect patient safety. Fewer numbers of RNs on units have been attributed to greater adverse events affecting patients. As hospitals have searched for ways to reduce costs, reducing the number of RNs providing care has been used as a viable strategy. This cost reduction approach has resulted in decreased patient safety and increased adverse events. Adverse events in these articles are defined as pressure ulcers, medication errors, infections (usually urinary tract or wound), falls, and patient satisfaction. Conversely, more recent studies have demonstrated the effect of increased hours of care provided by experienced RNs with a baccalaureate degree improve patient outcomes. Decisions pertaining to appropriate ratios of nurses to patients and skill mix of staff must be made using appropriate decision-making models.

Nurse Staffing and Patient Safety Article 1


The study’s purpose was to compare missed nursing care between high vs. low nurse staffing units.

**Type of Study:** A cross-sectional design comparing missed nursing care in nursing units with high staffing (7 patients/RN) and low staffing (17 patients/RN). In the high-staffing units 115 nurses participated and 117 nurses from the low-staffing unit. The MISSCARE survey was used.

**Findings:** Nursing from the high-staffing units had a significantly lower overall score of missed nursing care than the low-staffing units for seven elements: bathing/skin care, mouth care, setting up meals, turning, assistance with toileting, feeding, and patient assessments per shift. Among the seven elements the greatest difference was with turning, mouth care and bathing/skin care.

The three most missed elements in the high-staffing units were ambulation, bathing/skin care and mouth care. Patient discharge planning and teaching, responding to call lights, assessment in each shift, monitoring intake/output, vital signs and bedside glucose monitoring were the most frequently missed elements on both high- and low-staffing units.

Nurse Staffing and Patient Safety Article 2


The aim of this study was to evaluate the relationship of nurse staffing and work environment with patient survival after an in-hospital cardiac arrest (IHCA).

**Type of Study:** Cross-sectional linking data from the American Heart Association’s Get with the Guidelines In-hospital Cardiac Arrest–resuscitation (GWTG-R) database, the University of Pennsylvania Multi-State Nursing Care and Patient Safety Survey, and the American Hospital Association’s annual survey of hospitals. Hospitals were located in Pennsylvania, New Jersey, California and Florida (n=75). Patient population (n=11,160) was limited to those on inpatient units at the time of the IHCA. Hospitals were limited to those with > 10 cardiac arrests from 2005-2007. Data from the Multistate Nursing Survey was collected in three states from September 2005 and August 2006 and in the fourth state from November 2007 to April 2008, >100,000 nurses responded to the survey. Data from the nursing survey was used to classify hospitals as having poor, mixed or good work environments. Staffing and patient outcomes in ICUs was compared to medical-surgical units.

**Findings:** Better nurse working environments and lower patient to nurse ratios on medical-surgical units were associated with increased survival after IHCA. Likelihood of patient survival was 16% lower in hospitals categorized as having poor nurse working environment and 5% lower for each additional patient/nurse on medical-surgical units.
**Nurse Staffing and Patient Safety Article 3**


The aim of this study was to explore the relationship between exposure to understaffed shifts and nurse-sensitive outcomes.

**Type of Study:** A secondary analysis of existing administrative data of patient and nurse staffing from a large acute care hospital in Australia and included all adult patients admitted between November 8, 2004 and October 30, 2006. Patient data was obtained from the hospital’s Total Open Patient Administration System (TOPAS), and staff hours from the Human Resource Data Warehouse and Rostar rostering system. Nurse-sensitive outcomes include mortality, failure to rescue (FTR), CNS complications, wound infection, pulmonary failure, UTI, pressure ulcer, pneumonia, DVT, UGI bleeding, sepsis, physiological/metabolic derangement, and shock/cardiac arrest.

**Findings:** Total sample size was 36,529 patient admissions, mean length of stay was 5.9 days. A total of 14 wards were included in the study. After controlling for patient factors findings indicated that for every understaffed shift a patient was exposed to there was a 3% increase for physiological/metabolic derangement and 8% increased risk for DVT and any nursing-sensitive outcome in surgical patients.

**Nurse Staffing and Patient Safety Article 4**


The purpose the study was to determine if differences in patient to nurse ratios and nurses’ educational level in nine of the 12 RN4CAST countries were associated with variation in hospital mortality after common surgical procedures.

**Type of Study:** Observation study using discharge data for 422730 patients aged 50 or older who underwent common general, orthopedics or vascular surgery in 300 hospitals in nine European countries (Belgium, England, Rinland, Ireland, the Netherlands, Norway, Spain, Sweden and Switzerland). Survey data of 26516 nurses employed in the hospitals measures nurse education and staffing levels.

**Findings:** An increase in a nurse’s workload by one patient increased by 7% the likelihood of an inpatient dying within 30 days after admission. Every 10% increases in nurses with a bachelor’s degree reduced the likelihood of an inpatient death by 7%.

**Nurse Staffing and Patient Safety Article 5**


The purpose of this study was to determine the association between the use of agency employed supplemental RNs (SRNs) and patient mortality and failure to rescue (FTR).

**Type of Study:** The study linked administrative data, nurse survey data (n=40,356), and patient outcome data (1,295,068 patient discharges) from 665 hospitals in four conveniently selected states to evaluate the association between the use of SRNs and 30-day-in-hospital mortality and FTR. Logistic regression models were used, controlling for patient and hospital characteristics, nurse staffing, the proportion of nurses with bachelor’s degrees, and quality of the hospital work environment.

**Findings:** Higher use of SRNs does not appear to have adverse consequences for patient mortality or FTR. Poorer work environment may be the explanation for poor patient outcomes associated with higher use of SRNs rather than issues with the SRNs. These findings suggest that SRNs employed by agencies are qualified to deliver quality patient care.
Nurse Staffing and Patient Safety Article 6

The aim of this study was to examine the effects of RN education by determining whether nurse-sensitive patient outcomes were better in hospitals with a higher proportion of RNs with baccalaureate degrees.

Type of Study: In this cross-sectional study, data sets from 21 teaching hospitals in the US, with average number of beds per hospital 557, were used. Outcome indicators included mortality from CHF, hospital acquired pressure ulcer, failure to rescue (death in surgical patients from complications), infection due to medical care, post-operative deep vein thrombosis or pulmonary embolism, proportion of patients with length of stay longer than expected for the diagnosis-related group (DRG). The measure of nurse education was the proportion of nurses employed in the hospital with a baccalaureate degree or higher.

Findings: On average 62% of nurses working in the hospitals held a baccalaureate degree or higher. As RN education increased, patient adverse events and LOS decreased. These decreases in adverse outcomes were statistically significant for CHF mortality, hospital acquired pressure ulcer, failure to rescue, deep vein thrombosis/pulmonary embolism, and LOS greater than expected. Hospitals with higher numbers of baccalaureate prepared RNs had lower rates of CHF mortality, hospital acquired pressure ulcer, failure to rescue, deep vein thrombosis/pulmonary embolism, and LOS greater than expected.

Nurse Staffing and Patient Safety Article 7

The objective of this study was to assess the effects of nursing care hours per patient day, nursing skill mix, and nurse turnover on central line-associated bloodstream infection (CLABSI) rates, length of stay (LOS), and mortality in the context of intensive care units (ICUs).

Type of Study: The study used longitudinal data from 45 ICUs in 35 hospitals in two faith-based health systems across 12 states. The 45 ICUs were divided into two groups, 19 months of experience for the first group and a year of experience for the second group was reported in this article.

Findings: Controlling for other influences, higher nursing care hours were associated with fewer CLABSIIs and shorter length of stay. Greater than 20 nursing care hours per patient day was associated with a near 60% reduction in the CLABSI rate compared to ICUs with nursing care hours less than 20. Units with nursing care hours per patient day less than 20 was associated with longer length of stay.

Nurse Staffing and Patient Safety Article 8

The purpose of this study was to examine the impact on patient outcomes of nurse staffing and registered nurse (RN) skill mix in California hospitals to determine if there were differences in patient outcomes sensitive to nursing care.

Type of Study: Economic impact research in which researchers were interested in two questions: 1) what type of nurse staffing and skill mix patterns are used in medical-surgical units in acute care hospitals in California, and 2) what are the differences in patient outcomes potentially sensitive to nursing care based on total direct nursing hours per day and RN skill mix proportions?

Data sources included Hospital Annual Disclosure Report (HADR) and Patient Level Discharge Database (PLDD) from 2006. The HADR provides RN, licensed vocational nurses (LVNs) and nursing assistants (NAs) productive hours. The PLDD provides a record of patient discharges and diagnostic related groups and all procedure codes.
Independent variables were total nursing hours per patient day and RN proportion of skill mix. Dependent variables were urinary tract infection (UTI) and length of stay (LOS). Over 2 million patient discharges across 253 hospitals were analyzed.

**Findings:** As total hours of nursing care per patient day increased, the odds of developing a UTI during the hospitalization decreased 1.013 times. As the proportion of care provided by an RN increased the odds of developing a UTI decreased by 4.25 times. Similarly, as the nursing hours per patient day increased the LOS decreased and the greater the proportion of RN skill mix, the shorter LOS.

**Nurse Staffing and Patient Safety Article 9**


The purpose of this study was to determine the rate of occurrence of nursing sensitive outcomes (NSOs), the relationship of skill mix to the rate and numbers of patients affected per year. Findings from the study were published in two different journals, both citations are listed above.

**Type of Study:** Data was a subset of data from a larger longitudinal study and included patient and nurse staffing data. Patient data were episode of care and ward start and end dates (admission and discharge dates). Nurse staffing data were registered nurse hours as a proportion of total nursing hours and rates of nursing sensitive outcomes. Nursing sensitive outcomes included central nervous system complications, decubitus, failure to rescue, ulcer/gastrointestinal bleeding, pneumonia, sepsis, and urinary tract infection (UTI).

**Findings:** Increased proportion of hours worked by registered nurses resulted in a decrease in 45% fewer central nervous system complications and 11% fewer pneumonias. Increasing the proportion of registered nurses by 10% resulted in a 34% reduction in UTIs.

**Nurse Staffing and Patient Safety Article 10**

The purpose of this study was to investigate the use of temporary nurses and nurse and patient outcomes. Nurse outcomes were defined as the incidence of needle sticks and back injuries. Patient outcomes were falls and medication errors.

**Type of Study:** This study was a secondary analysis of data from a larger study, the Outcomes Research in Nursing Administration Project II, which was a non-experimental, longitudinal causal modeling study using nursing units (n=277) as the units of analysis, from 142 hospitals.

**Findings:** The greater use of temporary nurses was not significantly associated with needle sticks. Nurses working on units with 15% or more total nursing hours provided by external temporary nurses were 1.730 times more likely to have back injuries or a 73% increase in back injuries. Nurses on units with 15% or more nursing hours provided by temporary RNS reported an 18.8% increase in patient falls which was statistically significant. Nurses on units with 5% to 15% external temporary nursing care hours reported fewer medication errors. Overall the study found that high levels of use of temporary nurses (15% or more) were associated with high levels of back injuries and patient falls. Moderate utilization of temporary nurses (5-15%) was related to fewer medication errors.
**Nurse Staffing and Patient Safety Article 11**


The purpose of this study was to estimate the impact of changes in RN staffing on the quality of patient care with direct measurement of nurse staffing levels.

**Type of Study:** Longitudinal regression analysis of adult inpatients (n=11,945,276) in acute care hospitals (n=283) where inpatient staffing is directly measured from 1996-2001. Staffing levels were measured as the number of full-time equivalent RNs per 1000 in-patient days. Patient outcomes were defined as surgical failure-to-rescue (FTR) after a nurse-sensitive complication and in-patient mortality ratio.

**Findings:** Estimates suggest that higher staffing ratios were associated with reductions in mortality and FTR. This study supports the growing body of literature on RN staffing and hospital quality of care. The authors emphasize the need to explicate a theory of how RN work affects quality of care and how organizational structures and processes and patient characteristics affect RN work.

**Nurse Staffing and Patient Safety Article 12**


The purpose of this study was to explore the relationship between nurse’s burnout and their perceptions of patient safety and adverse events or near-miss reporting behaviour.

**Type of Study:** This study used a cross-sectional survey design of nurses in a hospital setting (n=148). The Maslach Burnout Inventory was used to assess burnout. The Agency for Healthcare Research and Quality Patient Safety Culture Survey was used to assess patient safety outcomes.

**Findings:** Nurse burnout was associated with perceptions of a less safe environment and lower reporting of near misses.

**Nurse Staffing and Patient Safety Article 13**


The purpose of this study was to evaluate the influence of nurse staffing and work environment variables on patient outcomes by testing the conceptual model Patient Care Delivery Model (PCDM). The PCDM is based on Open Systems Theory. The PCDM is used to understand the relationships between outcomes and factors known to influence the variability in nursing work; such as, patient and nursing team characteristics, and environmental factors.

**Type of Study:** A prospective, correlational design with cross-sectional and longitudinal components was used to collect data in 6 participating Canadian hospitals. In total 1230 patients and 727 nurses from 24 units completed the data forms.

**Findings:** Patient characteristics influenced nursing care requirements and the extent that positive clinical outcomes were achieved. Patients’ pre-existing physical and mental health and their level of complexity influenced the extent to which medical consequences were experienced and improvement of physical and mental health was achieved at discharge.

Patients cared for on units that were understaffed relative to patients’ need for nursing care were more likely to experience declines in their physical health, their knowledge, status, and behaviors related to their health condition. Higher levels of regulated nursing staff at the unit level were associated with improved physical functioning of patients.
This study contributes to the knowledge that improvements in patient outcomes are influenced by multiple and interrelated staffing and work environment factors. Patient outcomes are a key measurement of the effectiveness of nursing care; however, nurses need supportive working conditions to enable high quality patient care.

**Nurse Staffing and Patient Safety Article 14**

The purpose of this study was to examine the association between nurse-staffing levels in postoperative cardiac surgery nursing units and the in-hospital mortality of these patients.

**Type of Study:** Data from administrative data-bases representing all Belgian cardiac centres (n=28) which included data from 58 ICUs and 75 general nursing units and 9054 patients was analyzed. A multilevel logistic regression model was used that controlled for differences in patient characteristics, nursing care intensity, and cardiac procedure volume.

**Findings:** Increased nurse staffing in postoperative nursing units was significantly associated with decreased mortality. Nurse staffing in ICUs was not significantly associated with in-hospital mortality. These findings build upon previous studies associating nurse staffing influencing patient safety.

**Nurse Staffing and Patient Safety Article 15**

The purpose of this study was to assess longitudinally whether change in RN staffing and skill mix would lead to change in nursing home resident outcomes while controlling for potential endogeneity of staffing.

**Type of Study:** Quarterly Minimum Data Set (MDS) assessment data for nursing homes within 120 days of an annual Online Survey Certification and Reporting (OSCAR) data was used resulting in 399,206 resident-level observations. Outcomes studied were incidence of pressure sores and urinary tract infections. RN staffing was measured as the care hours per resident day and skill mix was measured as RN staffing hours as a proportion of total staffing hours [RN, LPN, and nursing assistant (NA) combined].

**Findings:** Greater RN staffing significantly decreases the likelihood of pressure sores and urinary tract infections while increasing skill mix only reduces the incidence of urinary tract infections.

**Nurse Staffing and Patient Safety Article 16**

**Type of Study:** This study was a secondary analysis of existing datasets from hospitalized surgical oncology patients with cancers of the head and neck, esophagus, colon-rectum, pancreas, lung, ovary, prostate, and endometrium. Three outcomes measures were examined: 30- day mortality, complications, and failure to rescue and compared with three characteristics of hospital nursing: the nurse practice environment, nurse staffing, and the educational preparation of RNs.

**Findings:** Hospitals with poorer nurse staffing and unfavorable nurse practice environments had higher 30-day mortality rates; whereas hospitals whose nurses had higher levels of education had lower mortality rates. Hospitals with better nurse staffing and positive practice environments had lower rates of complication and failure to rescue. Increased nursing education also contributed to lower failure to rescue rates.
Nurse Staffing and Patient Safety Article 17

**Type of Study:** Using data from the National Database of Nursing Quality Indicators (NDNQI), this study examined the relationship between several nursing workforce characteristics and the adverse events of patient falls and hospital acquired pressure ulcers occurring in 1,610 hospital units that included critical care, step down, medical, surgical, combined medical-surgical, and rehabilitation units.

**Findings:** Fall rates were reduced by increasing the total number of nursing hours / patient day by one hour (patient fall rate reduced by 1.9%) and increasing the percent of nursing hours received by RN by 1% (patient fall rate reduced by 0.7%). Fall rates were also reduced by 1% with every one year increase in average RN experience. Similarly, lower rates of hospital- acquired pneumonia were attributed to RNs with 10 or more years of experience in nursing providing more of the patient care.

The study suggests that the NDNQI indicators may be used to demonstrate nursing sensitive outcomes, and that interventions carried out by more experienced and knowledgeable nurses contribute to safe patient outcomes.

Nurse Staffing and Patient Safety Article 18

**Type of Study:** This retrospective study used data from the California Office of Statewide Health Planning and Development, pediatric patient discharges (n=3.65 million) from California general and pediatric hospitals (n=286) disclosure reports from 1996-2001.

**Findings:** Increased RN staffing was associated with statistically significant reduction in postoperative cardiopulmonary complications, pneumonia, and infections in pediatric populations.

Nurse Staffing and Patient Safety Article 19

**Type of Study:** This article documents the findings from 30 English hospital trusts that participated in the International Hospitals Outcomes Study that began in 1999. Data were obtained from three sources; administrative databases provided information on hospital structure (size and teaching status); data from surveys of nurses (n=3984) on patient-to-nurse rations, staffing adequacy, working conditions, and quality of care indicators; and patient outcomes were obtained from nurse surveys and discharge data. Data were merged to examine the influence of staffing and other hospital conditions on nursing and patient outcomes.

**Findings:** English hospitals with higher nurse to patient ratios (fewer patients cared for by a nurse) had lower surgical mortality and failure to rescue rates. These findings contribute to the knowledge of the link between better nurse staffing and better patient outcomes (not clear what you mean here). Hospitals with higher levels of nurse staffing also had lower rates of dissatisfaction among nurses, as well as less nurse burnout.

The findings of this large study is are similar to studies done in the United States and thus demonstrate, from an international perspective, that nurse staffing impacts patient outcomes.
**Nurse Staffing and Patient Safety Article 20**

**Type of Review:** A systematic review providing the results of studies that examined the relationship between RN staffing levels, patient length of stay, and hospital costs. A total 17 articles, published between 1990 and 2006, were included.

**Findings:** Higher levels of RN staffing provided better monitoring and surveillance of patients, and reduced patient length of hospital stay.

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**Nurse Staffing and Patient Safety Article 21**

**Type of Review:** This annotated bibliography represents findings from 19 studies of patient staffing in acute care settings. Some of the studies indicate that adverse events, such as falls, pressure ulcers and infections, decrease as the number of RNs increase in acute care settings.

**Findings:** Findings were mixed. Limitations of findings from all of the studies include inconsistent definition of terms, instrumentation, and data collection strategies. The use of the large national databases of nursing-sensitive outcomes will contribute greatly to consistency within future research strategies.

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**Nurse Staffing and Patient Safety Article 22**

**Type of Review:** Similar to the annotated bibliography of Haberfelde et al. (2005), this review looked at 20 research studies in acute care settings. Articles from 1990 forward were included. The authors found extrapolating data from all of the findings difficult because of inconsistent terminology, instruments, and data collection strategies.

**Findings:** In spite of limitations the authors suggest strong evidence to support the association between greater numbers of RNs on staff and reduced common complications such as falls, pneumonia, medication errors, pressure ulcers, and infections.

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**Nurse Staffing and Patient Safety Article 23**

**Type of Review:** Synthesis of the literature. The literature for this review was obtained from studies conducted in acute care settings, long-term care settings, intensive care units (ICU), community mental health centres, and a dialysis unit.

**Findings:** A significant relationship between nurse staffing and patient safety. Studies provided strong evidence of increased incidence of pressure ulcers, falls, medication errors, infections, and increased length of stay with reduced nurse staffing. The greater the ratio of nurses to patients and the increased number of RNs in the skill mix of staff resulted in reduction of these adverse patient outcomes. Findings also demonstrate a strong relationship between nursing education, experience with patient populations and positive relationships with physicians and better patient outcomes. Recommendations from this research include:
- A minimum of 4:1 ratio of nurse to patients, except in critical care areas with high acuity where the recommended ratio is 2:1.
- Support for baccalaureate education for entry to practice for RNs.
- Staff units with RNs experienced with patient population.
- Link staffing initiatives with management practices that engender quality practice environment for staff.
- Develop standard terminology and definitions for use in outcomes research.

**Nurse Staffing and Patient Safety Article 24**


**Type of Review:** Literature review of nurse staffing. Nurse staffing has an impact on patient outcomes, medical errors, length of stay, nurse turnover, and patient mortality. Studies included in this document indicate that hospitals with magnet designation in the US, and with greater numbers of RN staff, had fewer patient deaths. In nursing homes with greater numbers of RN staff and lower turnover rates of RNs, patients experienced improved functional status, reduced pressure ulcers, fewer urinary tract infections and less use of antibiotics. Achieving best possible outcomes for patients is contingent upon having adequate numbers of knowledgeable nursing care providers.

**Findings:** Determining the appropriate mix of staff is complex. A lack of effective decision-making models for staffing mix contributes to the inability to adequately predict staffing needs in various units. Instead of universal staff mix ratios, this review suggests that decisions pertaining to staffing mix should be unit specific and evaluated by patients outcomes.

Recommendations for appropriate staff mix obtained from this review of the literature suggest that staffing decisions need to be based on evidence to:

- Reduce patient’s length of stay,
- Decrease adverse occurrences (pressure ulcers, infections, falls, etc.),
- Increase patient safety,
- Improve patient outcomes,
- Avoid errors,
- Decrease staff turnover, and
- Capitalize on the staff’s education and experience.

**Nurse Staffing and Patient Safety: Article 25**


Findings from this synthesis include:

- Safe and appropriate nurse staffing is critical to patient health and safety;
- Current nurse staffing methods have become inadequate and may result in compromising patient and nursing outcomes; and
- Nurse staffing is complex and involves matching patient care needs to appropriate human resources. Recommendations from this synthesis are:
  - Implement effective, formal staffing plans;
• Highly educated and experienced regulated nurses should care for patients;
• Workplaces should sustain improved patient, nurse and system outcomes; and
• Create standard nurse staffing definitions.

**Nurse Staffing and Patient Safety: Other Resources**


This text offers details of the work of the Nursing Outcomes Project, currently identified as the Health Outcomes for Better Information and Care, sponsored by the Ontario Ministry of Health and Long-Term Care ([http://www.health.gov.on.ca/english/providers/project/hobic/privacy_information.html](http://www.health.gov.on.ca/english/providers/project/hobic/privacy_information.html))

Contributors include Dorothy Pringle, Souraya Sidani, and Diane Doran. All three authors have published extensively on nursing-sensitive outcomes and nursing effectiveness. The text provides a comprehensive and critical examination of the evidence related to nursing-sensitive outcomes. These outcomes are those that can be related to nursing interventions and for which nursing is accountable and have been identified as 1) clinical, including symptom control and management; 2) functional, including physical, psychosocial, and self-care management; 3) safety, including adverse events or complications, e.g. pressure ulcers, infections; and 4) perceptual, including satisfaction with nursing care. This is an excellent resource for those who are interested in nursing-sensitive outcomes and the current state of the science of outcomes research. Although the text was published in 2003, it remains current for today’s practitioners, researchers, and administrators.

**Nurse Staffing and Patient Safety Internet Resources**

The following is a partial list of Internet sites that contain research pertaining to nursing-sensitive outcomes and nursing practice. This list is current as of October 31, 2008. Many if not most of the sites have numerous references to nursing research that covers a broad range of topics. The exception is CNA’s report on advanced practice nursing. This report is useful for nurses interested in advanced practice nursing. The report describes CNA’s current position and the dialogue that has recently occurred regarding advanced nursing practice.

**Nurse Staffing and Patient Safety Internet Site 1**

Canadian Health Outcomes for Better Information and Care Project: [http://c-hobic.cna-aiic.ca/about/default_e.aspx](http://c-hobic.cna-aiic.ca/about/default_e.aspx)

The goal of the Health Outcomes for Better Information and Care Project is to identify nursing-sensitive outcomes that will be collected and stored in administrative databases. This website contains information of the work that has been completed by Dorothy Pringle, Diane Doran, and other nurse researchers. A portion of the work from this project is included in the text *Nursing-Sensitive Outcomes State of the Science* (2003). Information contained in Phase One include the background work of the project and a link to the 1999 Nursing Task Force Report Good Nursing, Good Health: An Investment for the 21st Century. Phase One’s report also describes the nursing-sensitive outcomes that have been recommended for inclusion in administrative databases. These are outcomes that have demonstrated sensitivity to nursing interventions and valid instruments that exist to measure an outcome. These outcomes are:

• Functional status, including activities of daily living (ADL), and instrumental activities of daily living (IADL),
• Therapeutic self-care indicated by patients’ ability to manage their care and knowledge of their health condition or disease,
• Symptom management related to fatigue, nausea, pain, and dyspnea,
• Adverse occurrences including falls and pressure ulcers. There was inconsistent evidence to support inclusion of medication errors, or nosocomial infections. Information on these issues will not be collected, and
Patient satisfaction with nursing care.

Reports from Phase Two of the project describe efforts undertaken to demonstrate the feasibility of collecting information pertaining to nursing interventions in a standardized way. The report of this phase is entitled Collecting Data on Nursing-Sensitive Outcomes in Different Care Settings: Can it be Done? What are the Benefits. The report concludes that it is possible to collect high quality data on nursing-sensitive outcomes, and once relevant data is collected nurses will incorporate the data into nursing practice to improve patient care. The study also identifies barriers to collecting these data including: a) nurses’ time which is affected by workload, staff shortages, and necessary training of staff; b) severity of illness and language barriers of patients; and c) environmental factors such as unforeseen outbreaks of diseases or computer problems. Recommended solutions to these barriers include:

- Eliminating duplicate nursing assessment tools and incorporating outcomes assessment into other nursing assessment tools, and
- Insuring timing and frequency of data collection is appropriate for the setting.

Extensive information and reports are available at this website, the information provided here is only a brief synopsis of findings. Readers are encouraged to go to the website to obtain in depth information.

Nurse Staffing and Patient Safety Internet Site 2

Canadian Nurses Association
http://www.cna-aiic.ca/en

The CNA website offers various resources related to nurse staffing and patient safety under the “on issues” and “advocacy” tabs found on the homepage.

Nurse Staffing and Patient Safety Internet Site 3

Evaluation Framework to Determine the Impact of Nursing Staff Mix Decisions
https://www.nurseone.ca/en

Representatives from CNA, the Canadian Practical Nurses Association (CPNA), the Canadian Council for Practical Nurse Regulators (CCPNR), and the Registered Psychiatric Nurses of Canada (RPNC) collaboratively developed the evaluation framework found at this site. The intent of the framework is to enable employers to effectively determine whether they are using an appropriate staff mix.

Nurse Staffing and Patient Safety Internet Site 4

Canadian Federation of Nurses Unions
http://www.nursesunions.ca/publications/reports-studies

The Canadian Federation of Nurses Unions’ website offers a variety to reports, position statements, and backgrounders related to nursing, the workplace and patient safety. Two 2012 reports are available on nursing workload and patient care.

Nurse Staffing and Patient Safety Internet Site 5

National Health Services Research Unit
http://www.nhsru.com

This site is under the nursing research chair sponsored jointly by University of Toronto Faculty of Nursing and McMaster University School of Nursing and is funded by the Ontario Ministry of Health and Long-Term Care. The aim of the information found at this site is to inform decision- making related to quality and effectiveness with a focus on nursing in Ontario. There are numerous publications of completed research as well as projects currently in process.
Additional information at the site includes a webinar series that provides an overview of databases available that can be used to inform decisions, fact sheets that give a concise overview of important issues related to the federal and provincial health care system, and reports related to health human resources. This site has valuable health human resource information beneficial to decision-makers.

**Nurse Staffing and Patient Safety Internet Site 6**

**Canadian Foundation for Healthcare Improvement (CFHI)**
http://www.cfhi-fcass.ca/AboutUs.aspx

The CFHI brings researchers and decision-makers together to create and apply knowledge to improve health services for Canadians. CFHI is an independent, not-for-profit corporation, established with endowed funds from the federal government and its agencies, and incorporated under the Canada Corporations Act. Various research reports are located under the drop down tab for publications. Reports found at this site include topics related to teams in primary care, continuity of care, human resource planning and hospital mergers. The site also offers links to other publications such as reports from the Romano Commission.

Reports funded by CFHI include:

**Commitment to care: the benefits of a health work place for nurses, their patients and the system**
http://www.cfhi-fcass.ca/Migrated/PDF/psomcare_e.pdf

Key messages from this report:

- Canada’s nursing shortage is in part due to work environments.
- Job satisfaction of nursing staff impacts patient satisfaction.
- Nurses who are stressed are more prone to injuries, and they have higher absenteeism and disability rates than any other profession.
- Increased workloads increase long-term costs.
- Nurses work best in respectful environments that are supportive of autonomy and ability to practice to full scope.
- Supportive, less stressful, cooperative care delivery teams benefit patient care.

Recommendations are multi-systems:

- Government: support the welfare of nurses, ensure the supply of nurses for the future, and create appropriate funding strategies.
- Professional Associations and Councils: continue to work with employers to develop quality practice environment, and be advocates for nurses.
- Employers: address staffing issues, reward effort, strengthen organizational structures, support nursing leadership and professional development, promote workplace health and safety, ensure the environment is one of learning, and promote recruitment and retentions.
- Educators and researchers: develop databases, workload-measurement and human- resources forecasting tools, evaluate the effectiveness of strategies to improve nursing well-being, and ensure match between curriculum and skills for the workplace.

**A Systematic Approach to Maximizing Nursing Scopes of Practice**

**Organizational Change in Healthcare with Special Reference to Alberta**

**Teamwork in Healthcare: Promoting Effective Teamwork in Healthcare in Canada**
The ICN website contains various publications. Each year a report on various topics is published for International Nurses Day. The report on staffing was published in 2006. Since then reports have been published such as the 2006 report listed below on staffing levels. Other reports include positive practice environments, nurses’ delivery of quality primary health care and chronic care, and care innovations. All reports, policies and research papers may be found at the ICN website by typing in International Nurses Day.

Reforming Primary Health Care: A Nursing Perspective (2012)

In this report the authors describe the benefits of positive work environments for nurses working in primary health care and the core elements of primary health care practice. Appendices include lessons learned about the development of community nursing practice, a nursing model for public health, and key characteristics of positive practice environments for health care professionals.

http://www.truthaboutnursing.org/news/2006/may/12_nurses_day.html

This tool kit is designed for use by professional nursing associations and nurses. It outlines the essential background information to support the argument for appropriate staffing levels. The annexes contain support material that include a nurse staffing assessment tool, a list of activities for nurses to improve safe staffing, a fact sheet, a sample press release, a sample powerpoint presentation and examples of nurse patient ratios.

The Canadian Nurses Foundation is committed to promoting health and patient care across Canada by supporting nursing research and education. Resources available at this site include best practices related to nursing practice.

The AHRQ is the lead federal agency in the US that is charged with improving the quality, safety, efficiency, and effectiveness of health care. The primary goals of the AHRQ are to reduce the risk of harm by promoting delivery of the best possible health care, improve health care outcomes by encouraging the use of evidence, and facilitate wider access to effective health care services and reduce unnecessary costs through the use of evidence.

Resources available at this site include nursing research reports related to patient safety and nurse staffing. The 2004 text Keeping Patients Safe can be downloaded from this site, as well as the 2008 report Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Sections from Handbook include:

- Patient safety and quality
- Patient centred care
- Working conditions and the work environment for nurses
- Critical opportunities for patient safety and quality improvement
- Tools for quality improvement and patient safety

Individuals may also subscribe to nursing research email updates from this site.
World Health Organization, Patient Safety
http://www.who.int/patientsafety/information_centre/reports/en/

The World Health Organization (WHO) provides a variety of resources, research, and reports on patient safety and nurse staffing. This website also provides an international context to issues related to patient safety and staffing.

Summary of Nurse Staffing and Patient Safety

In summary the above resources are intended to provide key stakeholders, including government, registered nurses, nurse practitioners, employers and other health professionals, with evidence of how nursing interventions contribute to patient health outcomes. The evidence and reports pertaining to nurse staffing and patient outcomes supports the need for adequate numbers of educated and experienced nursing staff providing care to patients. Inadequate numbers of registered nursing staff contribute to adverse patient health outcomes, specifically increased complications (falls, pressure ulcers, infections) and increased length of stay. All of these complications contribute to increased costs to the health care system.

Resources in this document have been provided to assist with staff planning, retention and recruitment of nursing staff, outcomes to consider for tracking, and valid instruments that may be used to measure selected outcomes. In all, these resources are a beginning step to ongoing assessment of nurse staffing and patient safety in acute care, long term care, and community settings. It is recognized that there is a need to accumulate nursing data in administrative databases, these resources may be the starting point for nursing in Nova Scotia.

Other Nursing Internet Sites

Internet site 1
Nursing Alliance for Quality Care (NAQC)
http://www.naqc.org/

The NAQC is a partnership among national nursing organizations, consumers, and other key stakeholders whose mission is to advance the highest quality, safety, and value of consumer-centered health care for all individuals, patients, their families, and their communities. Resources available at the site include updates on policy and health care quality, quality measurement work, and nursing leadership. The Alliance is managed by the American Nurses Association. A 2103 White Paper on patient engagement is found at the site.


Internet site 2
Robert Wood Johnson Foundation
http://www.rwjf.org/pr/topic.jsp?topicid=1318

The Robert Wood Johnson Foundation is a private foundation whose aim is to improve health and health care for all Americans. There are many resources for nurses and nursing located under publications and research. Subscribers may sign up to receive e-news alerts which provides monthly alerts on research, conferences, grants and nursing organizations, policy briefs on nurses and nursing and recent journal articles. Other resources include tools to help nurses and nursing organization address issues affecting bedside nursing, these include the Transforming Care at the Bedside toolkit and other tools.
The Transitional Care Model provides comprehensive in-hospital planning and home follow-up for chronically ill high-risk older adults hospitalized for common medical and surgical conditions. The Model was developed at the University of Pennsylvania in 1987 by Mary Naylor, RN, PhD. The Model has been used extensively resulting in reduced preventable hospital readmissions, improved health outcomes and patient satisfaction and reduced total health care costs.

Systematic Review of RN Outcomes Research

Review of the Literature Article 1

The purpose of the systematic review was to assess and summarize evidence of the effect on advanced practice nurses’ (APNs’) interventions when caring for adults 65 and older in acute, out-patient, home and residential care.

**Type of Review:** Systematic review, registered with PROSPERO, that included randomized controlled trials (RCTs), quasi-experimental and observational studies. Patient outcomes included functionality, mortality, quality of life, morbidity, satisfaction, adverse drug events, falls, failure to rescue and cognitive status. APNs included practice nurses, NPs, experienced RNs, and CNSs.

**Findings:** Fifteen RTCs and intervention studies published between 1999-2014 were included in the review. APN role features included professional autonomy, case management, advanced assessment, diagnostic and decision-making skills, consultancy to other team members and program development. Significant results were found in long-term care settings including reduced mortality and admissions, improved self-care, and increased patient and caregiver’s satisfaction. APNs provide continuity of care and are the link between health systems and patients and other external providers. In the majority of studies APNs were members of multidisciplinary teams there the authors were unable to identify specific effect attributed solely to the APN.

Review of the Literature Article 2

The objective of the review was to assess the relationship between the nurse work environment and five nurse-sensitive patient outcomes in hospitals.

**Type of Review:** Systematic of quantitative studies published in English from 2004 to 2012 using the Dutch version of Cochrane’s critical appraisal instrument.

**Findings:** In total 29 studies were included and 20 were from US, 3 Canada, two Australia and New Zealand and one from the UK and one from Belgium. Twelve studies examined pressure ulcers and 11 patient falls, 17 focused on nurse staffing.

The review identified mixed results in association of nurse staffing and the outcome measures of patient falls and pressure ulcers. As well, there were indications that work environment characteristics other than nurse staffing relate to nurse-sensitive outcomes. Higher staffing numbers are associated with fewer patient falls. Similarly, nurse-physician
collaboration and more experienced and higher educated staff were associated with lower rates of pressure ulcers and fewer patient falls.

**Review of the Literature Article 3**

The aim of the review was to evaluate the effects of nurse-led educational interventions on improving patients with cancer pain outcome.

**Type of Review:** Systematic review using standards of Joanna Briggs Institute of RCTs and quasi-experimental studies in English and Chinese published from December 2007 to February 2014.

**Findings:** Six studies were included, five were RCTs and one quasi-experimental study. Nurses conducted all educational interventions and 778 patients participated. Overall nurse-led educational interventions increased oncology patients’ knowledge of and attitude toward analgesics and cancer pain management.

**Review of the Literature Article 4**

The purpose of this review was to assess the clinical effectiveness and costs of nurses working as substitutes for physicians in primary care.

**Type of Review:** Systematic review and meta-analysis of randomized controlled trials from any country in which any type of nurse substituted for physicians in providing autonomous or delegated care was compared to physician care in community or ambulatory care settings and reported patient satisfaction, quality of life (QoL), hospital admissions, mortality and cost of services. Twenty-six RCTs and two economic evaluations studies comprising of 38,974 randomized participants were included. Nurses defined in studies were NPs, RNs and LNs.

**Findings:** Nurse led care resulted in significant increase in patient satisfaction scores, RNs had a stronger effect that NPs on patient satisfaction, significant reduction in all-cause hospital admissions, NPs had a positive effect in reducing hospital admissions, and reduced all-cause mortality.

**Review of the Literature Article 5**

The purpose of this environmental scan was to further define and advance the role of RNs and NPs in chronic disease management.

**Type of Review:** Environment scan of literature reviews, best practice guidelines, key informant interviews, and focused discussions. The intent of the scan was to further advance and define the role of RNs and NPs in self-care management for patients with chronic disease and to look at outcomes at the client, provider, organizational and systems levels.

**Findings:** The scan identified contributions of RNs and NPs in supporting chronic disease self-management and issues that influence their ability to make these contributions at the individual, organizational and systems levels. At the individual level findings from the environmental scan indicated that NP support leads to reduced smoking and alcohol use, shorter hospital length of stay, decreased hospital admissions and appropriate office visits. Patients are
satisfied with care received from RNs and NPs in primary care settings. Gaps in research were identified and policy recommendations at the individual, organizational and system levels were presented.

Review of the Literature Article 6

The aim of this literature review was to explore the relationship between nursing and value and nursing’s contributions to health care by answering four questions. These were: 1) to what extent does the evidence support a nurse-quality effect, 2) to what extent does evidence support associations between nursing and efficiency, 3) is there evidence that demonstrates the efficiency and value of APNs, and 4) is there evidence that links inpatient nursing care processes with high value?

Type of Review: Research synthesis of published literature between 1998 and 2008. Seventy-four articles were included in the review, 45 examined the relationship between nurse staffing and work environment variables and clinical and financial outcomes.

Findings: Overall there are limitations in the data and methodologies used in the studies, and therefore it is difficult to draw meaningful conclusions. The author states that there is insufficient evidence to substantiate nursing’s contribution to high value. However, results demonstrate a nurse staffing-quality effect for failure to rescue, inpatient mortality, and length of stay, especially for surgical inpatients. There have been some associate between nurse staffing and bloodstream infections, ventilator-associated pneumonias, and urinary tract infections. Although few studies have addressed nurse staffing and cost, those that have indicate that better nurse staffing is associated with lower costs.

Little evidence addresses the contribution of APNs in inpatient settings.

Review of the Literature Article 7

The purpose of this review was to examine the research literature on the effects of nurse-led telephone interventions on people with cardiac disease.

Type of review: An integrative review of research articles related to nurse-led telephone interventions of people with cardiac disease after discharge published between 1980 and 2009. Twenty-four studies met the inclusion criteria and were included in the review. Studies included in the review examined risk factors and knowledge, functional status, psychological status, self-management and self-efficacy, complications and hospital consumption, and satisfaction. A variety of tools were used to measure these outcomes.

Findings: Fifteen of the included studies demonstrated at least one positive result associated with nurse-led telephone interventions. Nine did not detect any significant differences in any outcomes measured. Studies demonstrating positive outcomes indicate that nurse-led telephone interventions may help people with cardiac disease to reduce risk factor behaviours, improve their physical functioning, improve psychological status, and reduce hospital consumption and postoperative complications. Studies using educative interventions carried out by expert cardiovascular clinical nurses or advance practice nurses delivering the telephone intervention or provided more than six telephone calls for at least three months of follow-up had more positive outcomes.

Review of the Literature Article 8
The purpose of this review was to assess the impact of interprofessional collaboration (IPC) practice-based interventions on patient satisfaction and/or effectiveness of the care provided, along with the degree of IPC achieved. While this review is not limited to interventions carried out by nurses, the reality is that much of nursing practice is carried out in IPC environments. Consequently, this review provides evidence of the effect of IPC on patient health outcomes.

**Type of Review:** Intervention review of the literature published between 1982 and 2007. Only randomized controlled trials of IPC interventions that reported changes in objectively measured or self-reported patient outcomes and/or health status outcomes, and/or healthcare process outcomes were included in the review. Five studies met the inclusion criteria and were included in the review.

**Findings:** Although limitations of the studies exist, as is true in all research, the findings support IPC. Types of IPC interventions included interprofessional rounds, meetings, and an external audit. Three of the studies found that the IPC intervention resulted in improvements patient care through changes in drug use, length of hospital stay and total hospital charges.

**Review of the Literature Article 9**

The purpose of this review was to focus on the economic value of incremental changes in nurse staffing that result in improved quality of patient care.

**Type of Review:** Data from previous studies was used to quantify the economic value of professional nursing. This was accomplished by developing an economic value of nursing model that combined RN hours per patient day and changes in nursing sensitive patient outcomes. Estimates of incidence and costs of patient outcomes were also analyzed using the Nationwide Inpatient Sample. The findings of the RN hours per patient day were applied to cost data to estimate the economic implications of changes in RN staffing.

**Findings:** Increasing RN staffing levels can lead to increased costs to hospitals. However, using this model the authors estimate that adding 133,000 FTE RNs to the acute care hospital workforce in the United States would save 5900 lives per year. The productivity value of total deaths averted is equivalent to more than $1.3 billion per year, or about $9900 per additional RN.

Adding 133,000 RNs nationally would decrease hospital days by 3.6 million, and save about $1700 or $231 million as patients recover more quickly. The benefits of increased RN staffing for patient care will generate over $60,000 annually in reduced medical costs and improved national productivity. The economic value of adding more RN staffing averages $57,700 for each of the additional 133,000 RNs. These findings add to other studies and support the economic case for hospital investment in nursing.

**Review of the Literature Article 10**

This article is a review of the literature from 1999 to March 2004 to evaluate the impact of nursing interventions in the management of congestive health failure. Findings indicate that post- hospitalization nursing interventions have a positive impact on patient health outcomes such as functional status, quality of life and self-care.

Four models of nursing interventions were identified:

- **Home-based nursing interventions:** Results of this intervention is unclear based on the findings of the studies reviewed. Differences among studies make it difficult to determine outcomes.
• **Nurses have pivotal roles in multidisciplinary interventions:** Studies suggest that this model may provide benefits to clinical outcomes. Decreased length of stay, admission and readmission rates; decreased costs; decreased mortality/longer event-free survival and improved quality of life are identified as benefits. Conclusions from these studies suggest that: a) nurses need to be experienced in cardiovascular nursing and have access to a cardiologist, b) interventions need to be intensive and implemented over time, c) comprehensive patient and family education is imperative, d) multidisciplinary team members must be involved, and e) there must be adequate support for all team members.

• **Heart failure clinics with nursing as a significant component of care:** Studies offer convincing evidence that heart failure clinics that incorporate nurses are effective in reducing hospitalization and emergency department visits, decreasing mortality, improving self-care and quality of life, and reducing costs.

• **Telephone or technology-based interventions:** Study findings indicate decreased emergency department visits and increased patient satisfaction.

**Review of the Literature Article 11**


The purpose of this review was to provide the best available evidence related to nurse-led cardiac clinics.

**Type of study:** Systematic review of evidence of nursing interventions with patient diagnosed with coronary heart disease.

**Findings:** This review indicates that nursing interventions with patients diagnosed with coronary heart disease reduce: 1) depression, 2) the number of angina attacks, 3) the degree of physical disability, 4) risk factors prior to cardiac surgery by increasing smoking cessation, body mass index (BMI), blood pressure and cholesterol levels, and 5) increased level of patient satisfaction. Recommendations from findings include the use of nurse-led clinics: 1) for patients with coronary heart disease, 2) to increase clinic attendance and follow-up rates, and 3) for patients who require lifestyle changes.

**Clinical Aspects of Care**

**Synthesis and Key Issues**

Fifteen articles and one website were located that looked at clinical interventions by nurses and the resultant patient health outcomes. Although the studies discuss limitations of findings associated with the inability to generalize across studies, we list these studies to demonstrate how collectively the findings can be attributed to nursing interventions. These findings also build on the evidence found in nurse staffing and patient safety. Patients benefited from care provided by nurses experienced in cardiovascular health, stroke care, and Parkinson’s disease. Nurses were able to reduce complications of re-hospitalization, visits to emergency departments, and reduce mortality while improving patient self-care and satisfaction. All of these interventions contribute to reduction in health care cost and improved patient health outcomes.

**Clinical Aspects of Care Article 1**


The purpose of this study was to examine the association between home health length of stay (LOS) and the number of skilled nursing visits (SNVs) on hospitalization rates within 90 days of discharge from home health among Medicare beneficiaries. The authors did define SNV, it is most likely visits completed by either an RN or LPN.
Type of Study: A retrospective, observations study of five CMS-owned administrative and claims databases for 2009. Five data sets were obtained through the Research Data Assistance Center: Outcome Assessment Information Set (OASIS), Home Health Standard Analytic File (HHSAF), Medicare Provider and Analysis Review (MedPAR), Denominator/Eligibility File and the Provider of Services file (POS). Two independent, random samples were obtained (each with n=31,485).

Findings: LOS were weighted into three groups: low=0-21 days, medium=22-41 days, and high=>42 days. In the SNVs groups the number of visits were weighted as low=0-2, medium=4-6 and high=>7 visits. Most hospitalizations occurred in low LOS group (17.1%) compared to the medium group (15.5%) and high (15.2%). When compared to a home health LOS of 21 days or less, a LOS of 42 days or more decreased the odds of hospitalization by 13% with minimal difference between the medium and high LOS groups. Similarly, most hospitalizations occurred in the low SNV group (24.7%) compared to medium (11.4%) and high (11.2%) number of SNV groups. Four to six SNV (medium) when compared to three SNV or less (low) decreased the odds of hospitalizations by 61% and seven SNV or more (high) when compared to low SNVs decreased the odds of hospitalization by 62%. There was minimal difference between the medium and high SNV groups.

Clinical Aspects of Care Article 2

One objective of this study was to evaluate the patient experience of a nurse-led urodynamics clinic in comparison to consultant-led urodynamics clinic in New Zealand. A second objective was to analyze the impact of the clinic on wait times, cost reduction, freeing up consultants time to see more complex patients.

Type of Study: A cross-sectional mixed method postal survey mailed to 97 patients who attended the clinics in the past year, n=47 sent to patients of the nurse-led clinic and n=48 to the consultant-led clinic.

Findings: Of the 97 surveys mailed, 56 were returned, n=27 from the nurse clinic and n=25 from the consultant clinic. More respondents from the nurse clinic reported no delays in being seen (33%) and 24% less reported having to wait for more than 10 minutes. There was no difference in patients’ experience between the consultant and nurse clinics. As well, there was no significant differences in patient safety between the two clinics. 76% of respondents rated overall consultant care and treatment as excellent and 56% of respondents rated over care in the nurses’ clinic as excellent and no significant difference in overall satisfaction between the two clinics.

The creation of the nurse-led urodynamics clinic has resulted in increased capacity and increased appointments with consultants generating potential revenue of NAS$36732.36 per year.

Clinical Aspects of Care Article 3

The purpose of this study was to evaluate the introduction of nurse-led early triage (NET) in a coronary care unit (CCU) could improve the time to assessment and management of patients with non-ST-elevated acute coronary syndrome (NSTEMI-ACS). The study compared two time periods, the first was at the time the service was first introduces and five years later to determine if changes were sustained in the longer term. Chest pain triage included obtaining a patient history, ECG interpretation, differential diagnosis and risk stratification.

Type of Study: The study had two parts, an initial audit pre-NET and during the first six months of NET compared patients who received usual care. The second data collection point was after the NET service had been existence for five years. Baseline, pre-NET included 79 patients, 103 patients included for NET at six months and at five years n=92
patients. Primary end point measured was time to ECG, other measures were evidence-based drug therapy prescribed on admission for suspected high-risk NSTE-ACS patients, and high risk patients managed in CCU.

Findings: Six months after implementing NET there was significant improvement in number of patients having their ECG recorded and interpreted within 10 minutes, median time was four minutes from admission to ECG, significant increased prescribing of clopidogrel prescribing and significant increased number of patients managed in CCU. The changes identified at six months were sustained at five years.

Clinical Aspects of Care Article 4


The purpose of this study was to identify the impact of using specialist nurses to provide in-reach services for older people presenting to the emergency department from residential care. In-reach refers to services provided by acute care staff in residential care facilities. Specialist nurses were not defined by the authors. Specialist nurses, supported by a geriatrician, provided timely and skilled assessments and diagnostic support to residents of long-term care facilities when a resident became ill or fell through telephone triage and clinical advice. Specialist nurses were available to attend to the resident in the facility instead of transferring to ED. Education and training was offered to staff of the facilities to improve their geriatric assessments and management skills.

Type of Study: Retrospective multisite cohort study of all emergency presentations to three ED in Australia. A total of 4329 people 65 and older residing in residential care who presented to the ED were included. Group 1 consisted of patients who presented to the ED prior to implementing in-research services from July to December 2009, n=2278. Group 2, n=2051, consisted of patients presenting to the ED from July to December 2011 after the introduction of the in-research service. Data were summarized using descriptive statistics, between group comparisons using SPSS-21.

Findings: After implementing in-research services the number of presentations to ED decreased by 11%, the number of multiple ED visits decreased 12%. As well, the proportion of people discharged back to their residential care facility increased 23.2% and 20.9% of patients receiving palliative care that were admitted to hospital were discharged with end of life care plans. The number of people remaining in the ED longer than eight hours decreased from 38% in 2009 to 31% in 2011.

Clinical Aspects of Care Article 5


The aim of this prospective audit was to explore the usefulness of nurse-led telephone intervention for supporting cancer patients when compared to a home-based intervention over standard care.

Type of Study: A longitudinal prospective evaluation of toxicity that was part of an ongoing clinical audit of new telephone follow-up service as part of a quality improvement project in the UK. Participants were patients undergoing adjuvant or palliative treatment for colorectal cancer who received either standard care consisting of routine information from the cancer centre (n=81), home care nursing program which included home visit for symptom management and patient education and/or treatment (n=83) or nurse-led telephone follow-up consisting of standard care and two phone calls during cycle 1 and one phone call during cycle 2, call duration 5-10 minutes or 10-15 minutes for new patients (total of three phone calls) (n=298). Toxicity was assessed during each phone call.

Findings: No significant difference between home care and telephone follow-up for oral mucositis, hand/foot syndrome, constipation or vomiting suggesting the interventions had equal effect for these symptoms. There was no significant difference between telephone follow-up and standard care for hand/foot syndrome, diarrhea, constipation
or fatigue suggesting either intervention had equal effect for these symptoms. Patient satisfaction indicated that the nurse identified problems and answered their questions and issues were dealt with satisfactorily and patients were satisfied with the telephone follow-up service.

**Clinical Aspects of Care Article 6**


The purpose of this literature review was to review the literature in the past five years regarding nurse-led follow-up cancer care, with particular attention to patients with head and neck cancer. Nurse-led care includes helping patients to manage complications and symptoms and coordinating care.

**Type of Study:** Literature review of the past five years (February 2007-September 2012).

**Findings:** There is evidence to suggest that nurse-led services are high-quality, safe and efficient. Although the authors found limited research of nurse-led clinics for patients with head and neck cancer, they were able to infer that nurse-led services are applicable to nearly all cancer populations. They recommended additional research in nurse-led care to determine its clinical impact and effectiveness.

**Clinical Aspects of Care Article 7**


The purpose of study was to examine the role of labor and delivery nurses’ perceived ability to influence physician decisions about mode of delivery and outcomes.

**Type of Study:** Cross-sectional descriptive qualitative study with experienced nurses employed in a nurse-managed labor unit (n=13) in a community based hospital. Educational level of nurses: 23% associate degree, 41% diploma, 32% BSN and 5% master’s degree, all were experienced intrapartum nurses (range 10-40 years of experience). During semi-structured interviews RNs describe their ability to affect delivery mode decision making emphasizing nurse-physician communication during the intrapartum period.

**Findings:** Nurses exerted their influence by negotiating for more time to implement practices that promote vaginal delivery. There was no attempt to differentiate the educational level of the nurses and how they negotiated for more time.

**Clinical Aspects of Care Article 8**


The purpose of this study was to explore the impact on patient health and service outcomes after the introduction of the nurse consultant (NC) role in Hong Kong public hospitals. Nurse consultants are experienced RNs with at least a Master’s degree who has completed nursing specialty training. According the authors’ description of the NC role, it is similar to the NP or CNS roles in other countries. It is found in acute care settings and seems to be developed at the organizational level. NCs are expected to improve patient outcomes and service delivery by working with RNs and physicians. The role provides career advancement opportunities for RNs.

**Type of Study:** Historically matched controlled pilot study to evaluate the impact of NCs on patient outcomes. Data was obtained from the records of patients cared for by NCs (intervention, n=140) and matched with patients not receiving NC care (control, n=140) on seven hospital units.
Patient health and service outcome measures included 1) accident and emergency visits in the first six months after discharge from admission in which patient received NC care, 2) hospital admissions and length of stay after discharge, 3) number of acute complications during hospitalization, 4) number of times of treatment or medication regimen altered by nurses because of changes to the patient’s condition, 5) Glycated hemoglobin A1c (HbA1c) values during the admission and six months later, 6) Urea level and urea-to-creatinine ration during admission, 7) number of dressings during hospitalization and 8) patient satisfaction.

Findings: Patients cared for by NCs had significantly fewer accident and emergency visits or hospitalizations in the first six months after discharge. Of those in the NC cohort who were readmitted within the first six months after discharge their length of stay was significantly shorter. Patients cared for by NCs had better specific health outcome measures for diabetes, renal and surgery specialties. Patient satisfaction with care from NCs was at a good level (106.3/125 total score), satisfaction was not compared between the two groups.

Clinical Aspects of Care Article 9

The purpose of this study was to compare the effectiveness of nurse delivery primary care to usual care physician delivered to patients requesting same day appointments in a primary care clinic in Spain.

Type of Study: Randomized controlled unblinded trial involving 38 primary care practices. Patients in the intervention group (n=753) were seen by nurses [not nurse practitioners] (n=155) with additional training (there is no description of the type and amount of additional education and training the nurses received in the article) to respond to low complexity acute pathologies by using an electronic application with guidelines and decision support tools developed specifically for this study. Nurses could prescribe drugs included in the decision support tools and there was no mention of their ability to order diagnostic tests. Acute problems included were: burns, injuries, acute diarrhea, non-specific low back pain, acute mild upper respiratory symptoms (including odynophagia) and urinary discomfort. Patients in the control group (n=708) were seen by physicians (142) who did not use a decision support tool and provided usual care.

Data were collected through telephone interviews with patient participants 15 days after their visit. Primary outcomes were resolution of symptoms and patient satisfaction two weeks after the intervention. Secondary outcomes measure were resolution of the patient’s complaint and the degree, if any, of involvement of a physician in the visit.

Findings: Nurses successfully resolved 86.3% of the cases they saw. The most common complaints were burns, injuries and acute diarrhea. They referred 17.5% of patients with low back pain, 16.09% with acute mild upper respiratory symptoms, and 15.56% of visits with urinary discomfort to a physician. The duration of the nurse visit was six minutes and physician visit three minutes. Nurses prescribed drugs to 65.1% of the cases vs. 84.8% physician prescribing.

Patients attended by the nurse was more satisfied with care, however the difference between the two groups was not statistically significant, the nurse group was 8.5 points and the physician group was 8.3 points.

Clinical Aspects of Care Article 10

The objective of this study was to evaluate the effect of a nurse directed, coordinated, culturally sensitive school-based, family centred lifestyle program on activity behaviors and body mass index.

Type of Study: Randomized controlled trial using a community-academic partnered participatory research approach. Participants were children ages 8-12 from elementary schools in urban, low-income neighborhoods, (intervention
Children in the intervention group received a program called Kids N Fitness which had two parts; a family centred educational lifestyle program, physical activity and nutrition education and school level environmental activities as the school site. In the control group children received general education and participated in standard physical activity program in the school and did not receive physical or nutrition education. The program lasted four months, data were collected at the end of the intervention and 12 months later.

**Findings:** Nurses have a role in preventing childhood obesity and have the knowledge and expertise to provide health promotion education and address the needs of overweight and obese minority children in schools. In the intervention group boys decreased TV viewing and girls’ increased daily physical activity, attended physical education classes, and had decreased body mass index z-scores from baseline to 12 month follow-up.

**Clinical Aspects of Care Article 11**


The purpose of the study was to evaluate the effects of nurse navigators for patients with cancer on health outcomes; quality of life, satisfaction with care, and length of stay.

**Type of Study:** The study was a non-equivalent control group, pretest-posttest design of 12-week nurse navigator program for patients with newly diagnosed cancer. The study took place in two hospitals in Korea. Total participants n=78, experimental group n=53 and control group n=25. Nurse navigators were nurses with a baccalaureate degree or higher who were currently working in cancer care. Each navigator received a three week training program based on a cancer care protocol, which was developed for a review of the literature, focus groups, and a field survey. The nurse navigator role had six major roles; professional, nursing practice, consultation, coordination and collaboration, education, and research and quality improvement.

The intervention provided by the nurse navigator included; 1) providing a continuum of care from initial assessment and admission to follow-up care, 2) explanation of treatment plans to patients and families, 3) education of patients and families to provide brief counselling and caregiver support and appropriate referral when needed, 4) coordination of multidisciplinary services, 5) assist with service needs, and 6) monitor patient progress and care. Three tools were used to measure effects of the program; 1) index of quality of life (European Organization for Research and Treatment of Cancer Quality of Life Questionnaire C30 [version 2.0]), 2) index of satisfaction with care (researcher developed 8 item questionnaire), and 3) length of hospital stay.

**Findings:** Quality of Life: participants in the experimental group had higher physical and social functioning and lower financial burden and less constipation. Satisfaction with care: participants in the experimental groups were more satisfied with care; however, there was no difference between the groups in satisfaction with care and quality of life. Length of Stay: patients in the control group stayed 9.11 days longer than participants in the experimental group.

**Clinical Aspects of Care Article 12**


The purpose of this study was to assess for a correlation between caring as perceived by patients and their satisfaction with nursing care, to assess for differences across the six countries, and determine if nurses caring behaviours affect patient satisfaction.

**Type of Study:** This was a multicentre correlational design involving six countries (Cyprus, Czech Republic, Greece, Finland, Hungary and Italy). Thirty-four general hospitals and 88 wards representing all countries participated in the study. Data was collected using the Caring Behaviours Inventory 24-item version (CBI-24) and Patient Satisfaction Scale (PSS). Nurse caring was defined an interactive and intersubjective process that occurs between the patient and the nurse. The CBI-24 is based on Watson’s Transpersonal Caring Theory. The PSS examines patient satisfaction
with nursing care. Questionnaires were distributed at the time patients were hospitalized, n=1565 questionnaires, representing all countries, were returned and included in data analysis.

**Findings:** Patients perceived that nurses carried out caring behaviours related to knowledge and skills most often. This included knowing how to give injections and manage equipment. In all countries, nurse caring behaviour was associated with patient satisfaction. Findings indicate that patient satisfaction was affected by their relationship and connectedness to nurses, but they found this missing from their contact with their nurses. Patients perceived that their nurses had the necessary knowledge and skills to provide care, but knowledge and skill was not as important in their overall satisfaction with care.

**Clinical Aspects of Care Article 13**

The purpose of this study was to investigate the relationship between registered nurse (RN) and physical therapist (PT) staffing levels on patient outcomes in Medicare nursing home stays.

**Type of Study:** Data on Medicare discharges (n=4086) from the 1997 and 1999 National Nursing Home Survey were used to evaluate the association of RN and PT staffing levels to patient outcomes and length of stay in the nursing homes.

**Findings:** A higher level of RN staffing was related to fewer hospitalizations. The higher level of PTs was associated with decreases in discharges due to death and increases in recovered/stabilized discharges. Higher levels of nursing and PT staff were associated with shortened length of stay among recovered/stabilized patients.

**Clinical Aspects of Care Article 14**

The aim of this study was to test the hypothesis that the stroke nurse could provide continuity of care to clients post-hospitalization that would improve recovery from stroke through education and support.

**Type of study:** Randomized control trial plus a qualitative component focusing on patients and caregivers perceptions of the intervention using the stroke nurse. N=87 in experimental group N=89 in control group.

**Findings:** No significant difference between groups in physical dependence, depression or performance of physical activity. The control group patients had a higher level of physical deterioration at 3 and 12 months. Care givers in the experimental group perceived lower levels of stress. However this difference did not extend to 12 months. Utilization of a specialist nurse whose focus of intervention is on the psychosocial aspects of care can be effective in improving stroke survivors’ perceptions of their health.

**Clinical Aspects of Care Article 15**

The aim of this study was to determine the effects of a specialist nurse in Parkinson’s disease (PDNS) on patients’ health outcomes and healthcare costs.

**Type of Study:** This was a randomized control trial that ran over 2 years. N=1859 (experimental group N=1028, control group N=808).
Findings: No difference was found between the two groups except that patients followed by the PDNS indicated they benefited in subjective well-being.

Clinical Aspects of Care Internet Site 1
Oncology Nursing Society
https://www.ons.org

The Oncology Nursing Society has developed a web-based resource to assist oncology nurses incorporate evidence into their practice and improve nurse-sensitive outcomes including patients’ symptom experiences, functional status, safety, psychological distress, and health care costs. The site includes a variety of resource cards to support nursing interventions in the management of fatigue, nausea/vomiting, sleep disturbances, prevention of infections by putting evidence into practice.

Located at the site is a position statement entitled: The Impact of the National Nursing Shortage on Quality Cancer Care.

Nursing Education of Patients

Synthesis and Key Issues

Five studies are included that look at educational interventions and patient outcomes. Educational interventions are typically directed toward improving patients’ abilities to understand a health state and increase their capacity for self-care, which is a fundamental principle of nursing (Sidani, 2003). The educational interventions from these studies resulted in increased smoking cessation, improved parenting skills, improved prenatal and postpartum outcomes for young women, increase in patients’ confidence in managing their illness and in performing self-care, and reduced feelings of stigma and greater physical function of women with human immunodeficiency virus (HIV). Although each study if considered in isolation is small, considering educational interventions collectively provides support for nursing interventions aimed at improving patients’ capacity for self-care, which ultimately impacts the overall health system (Sidani).

Nursing Education of Patients Article 1


The purpose of this study was to investigate an education discharge plan that included information about postnatal depression (PPD) to reduce the severity of depression after childbirth.

Type of Study: Randomized controlled evaluation study. Women who had an uncomplicated delivery, married, between the ages of 20 and 35 were recruited to participate. Participants were randomized into the intervention group (n= 92) or the control group (n=83). The intervention group received discharge education about postnatal depression provided by a postpartum ward nurse during hospitalization and after their delivery. The Edinburgh Postnatal Depression Scale was mailed to participants six weeks postpartum.

Findings: Women who received discharge education related to PPD experienced fewer depressive symptoms at three months postpartum and scored lower on the Edinburgh Postnatal Depression Scale.
**Nursing Education of Patients Article 2**

This review was undertaken to determine the effect of smoking cessation educational nursing interventions on smoking behaviours of adults.

**Findings:** Support a positive effect on changing smoking behaviour when nurses used smoking cessation educational intervention with hospitalized patients who had a perceived threat of the need for cardiac bypass surgery.

**Nursing Education of Patients Article 3**

The purpose of study was to evaluate an early intervention program (EIP) of home visitation made by public health nurses to adolescent mothers and their babies. Participants were adolescents between the age of 14-19 years of age, 26 weeks or less gestation, first pregnancy, and intent to keep the baby.

**Type of Study:** A randomized controlled trial N=56 in EIP group and control group N=45. The EIP was designed to improve maternal health behaviours during and after pregnancy, improve birth outcomes, build care taking skills, prevent repeat pregnancy, increase educational achievement and build social competence for the mother. Mean age of participants in the study was 16.7 years, predominantly poor, unmarried, and from an ethnic group of color.

**Findings:** Infants in the EIP group had fewer non-birth related hospitalizations and visits to the emergency room.

**Nursing Education of Patients Article 4**

The purpose of this study was to evaluate patients’ perceptions of the implementation of a nursing intervention in the form of a 24-hour telephone service that provided patient education and triage of patient care needs. The goal of the telephone service was to improve health promotion and disease prevention, and disease management.

**Type of study:** Telephone survey, mailed surveys were used for data collection. Total returned surveys were 337.

**Findings:** Improved performance of self-care, and increased appropriate use of health care services, and patient satisfaction with service.

**Nursing Education of Patients Article 5**

The purpose this study was to determine the efficacy of an HIV self-care symptom management intervention.

**Type of Study:** An experimental design. Mothers were randomly assigned to experimental group N=59 and control group N=50. Experimental group received 6 home visits from a registered nurse (RN).

**Findings:** Mothers in the experimental group had lower perception of stigma and higher physical function.
Research Related to CNS Practice

Article 1

In this paper the authors summarize the findings specific to CNS effectiveness in providing transitional care in a systematic review. This paper is derived from the finding of the review discussed below (Kilpatrick, et. al, 2014).

Type of Review: Systematic review of RCTs retrieved from 1980-July 2012 in which master’s prepared CNS-led transitional care was compared to usual care. Use of health system resources (e.g. length of stay) and costs incurred by patients, providers or organizations were the outcomes of interest.

Findings: A total of 13 studies were included 12 conducted in the US, and one in the UK, and included 2463 participants. The Quality Cost Model of APN Transitional Care was the conceptual basis for most interventions and included patients with post cancer surgery, heart failure, the elderly, high-risk pregnant women, and low birthweight infants. Interventions included discharge planning, care coordination and patient education.

None of the 13 studies assessed costs and outcome jointly. For a variety of reasons there was low-quality evidence that CNS-led transitional care improved patient health outcomes, rehospitalization or length of stay. While CNS-led transitional care has the potential to reduce acute care costs and utilization further research is necessary to identify the types and intensity of pre- and post-discharge planning interventions.

Article 2

The aim of this review was to summarize the results of randomized controlled trails (RCTs) in which the evaluation of the cost-effectiveness of CNSs providing outpatient care in alternative or complementary roles and use the evidence to make recommendations. Alternative roles were those in which CNSs substituted for another provider, usually physicians. Complementary roles enhanced existing services.

Type of Review: Systematic review of RCTs comparing CNS outpatient care to usual care. Utilization of health resources including health resources emergency department visits and hospitalization and costs of health care; patient outcomes, e.g. health status; and provider measures, e.g. quality of care. Eleven RCTs of CNSs in an outpatient role were included, four RCTs evaluated the CNS in an alternative role and seven evaluated the complementary provider role.

Findings: CNSs in an alternative provider role caring for patients with asthma, diabetes, cancer and rheumatoid arthritis had mostly similar patient outcomes similar to usual care with some evidence of reduced use of health resources and costs. CNSs interventions included patient and family needs assessments, education of health condition, self-care management, symptom management and referral to other providers.

CNSs in complementary roles cared for patients with psychiatric symptoms, depression, heart failure, breast cancer, rheumatoid arthritis, high-risk pregnancy, and residents in nursing homes. The care was similar to usual care with none of the care worse than usual care. Care included regular contact with the CNS, needs-based education, design and implementing treatment plans, monitoring patient progress, connecting patients/families to other services, counselling, and medication review and education.

Evidence supports the use of CNSs in alternative and complementary outpatient roles to care for patients with some chronic conditions, although the quality of evidence was low-to-moderate and additional research is warranted.
Article 3


The purpose of this systematic review was to answer three research questions: 1) do advanced practice nurses (APNs) improve the quality of care, quality of life, functional and health status, health services use and satisfaction of older adults living in long-term care (LTC), 2) do APNs improve quality of life and satisfaction of family members of older adults in LTC, and 3) do APNs improve the skills, quality of care and job satisfaction of healthcare staff in LTC?

Type of Review: Quantitative systematic review using Cochrane Collaboration systematic review methods to specify inclusion and exclusion criteria, search and retrieve studies, appraise study quality, and synthesize findings. Randomized controlled trials and non-randomized quantitative studies with a comparison group were included. Four studies were included in the review, CNS=2, NP/MD=2. Each study tested different outcome measures.

Findings: CNS: 1. Minnesota Study: CNS intervention goals were to reduce urinary incontinence, pressure ulcers, depression, and aggressive behavior by facilitating the application of evidence-based protocols, provide staff education, consultation, and direct care to residents post admission. As a result of CNSs working with certified nursing assistants (CNAs) urinary incontinence, pressure ulcers, aggressive behaviors, and loss of affect in cognitively impaired residents improved or the rate of decline was reduced.

2. Restraint Study: CNS education intervention aimed to increase staff’s awareness of restraint hazards and how to manage residents’ behavior in one home and education plus 12 hours/week of CNS consultation with the staff for 6 months in a second home, third LTC home had usual care. In the LTC home where CNS provided education and consultation residents were 25-40% less likely to be restrained with no increase in staffing, psychoactive drug use or falls.

NP/MD: 1. Goal-attainment Study: NP/MD team (intervention group) providing care to residents in LTC was compared to MD only care (control group). Adaptation-related goals (a personal goal of improved ambulation) differed significantly for residents receiving care from NP/MD team. Cost-per-patient associated with primary care encounters, non-hospital, hospital and nursing home care was approximately the same for intervention and control group.

2. EverCare Study: Compared care provided by NP/MD team to usual care. Family members were more satisfied with care from the NP/MD team.

Overall the findings from the included studies indicate that APNs make an important contribution to the care of residents in LTC residential settings.

Article 4


The purpose of this systematic review was to answer the question: compared to other providers (physicians or teams without advanced practice registered nurses (APRNs) are APRN patient outcomes of care similar? APRNs included NPs, CNSs, certified nurse midwives (CNWs), and certified nurse anesthetists (CRNAs).

Type of Review: Systematic review following processes for Evidence Based Practice Centres.

Findings: Sixty-nine studies were included in the review, NP=37, CNS=11, CNM=21, CRNA-0, 20 randomized controlled trials (RCTs) and 49 observational studies.

NP: The review included 37 studies related to NPs (14 RCTs and 23 observational studies) that identified 11 patient outcomes. These were patient satisfaction with provider/care, patient self-assessment of perceived health status,
functional status, blood glucose, serum lipids, blood pressure, emergency department visits, hospitalization, duration of ventilation, length of stay and mortality rates.

When comparing NP to MD care, there was a high level of evidence to support equivalent levels of patient satisfaction, self-reported perception of health, functional status, control of blood glucose and blood pressure, emergency department visits, hospitalizations and mortality rates. There was high level of evidence that NPs managed serum lipids levels better. When comparing NPs to MDs, there was a low level of evidence to support equivalent duration of mechanical ventilation and moderate level of evidence to support equivalent length of stay.

CMW: The review included 21 studies related to CNMs (2 RCTs and 19 observational studies) 13 outcomes of care were identified. When comparing CNMs to MDs there was a high level of evidence to support CMWs had: lower rates of caesarean sections; lower rates episiotomies and third and fourth degree lacerations; and reduced use of labour analgesia and vaginal operative delivery (use of forceps, vacuum or both); and equivalent infants birth weights. When comparing CNMs to MDs there was a moderate level of evidence to support CMWs had: lower rates of epidurals and labour augmentation; equivalent or lower rates of induction; comparable or lower rates of infants admitted to NICUs; higher rates of breast feeding; comparable or higher rates of vaginal birth after caesarean section. When comparing CNMs to MDs infants had similar APGAR scores.

CNS: There were 11 studies related to CNSs (4 RCTs and 7 observational studies) four outcomes were identified, satisfaction, hospital length of stay, hospital costs and complications. Findings indicate that when comparing CNS and non-CNS groups; there is a high level of evidence to support equivalent group satisfaction scores indicating that CNSs do not have a direct effect on patient satisfaction; equivalent or lower patient length of stay; CNS group has lower costs of care; and moderate level of evidence to support that CNSs decrease complication rates.

CRNA: No studies were identified related to CRNA.

In summary, this systematic review indicates that patient outcomes of care provided by NPs and CNM in collaboration with physicians is similar to or better than care provided by physicians alone. The use of CNSs in acute care can reduce patient’s length of stay and cost of care for hospitalized patients.

**Article 5**

This is a publication of 58 abstracts accepted for podium presentations at the National Association of CNS’s annual national conference in 2010. The purpose of the publication was to make available new knowledge generated by CNSs to those unable to attend the conference. The abstracts emphasize patient safety and quality of care outcomes, leadership, evidence-based practice, and new ways to shape CNS practice.

**Article 6**

The aim of this study was to evaluate the outcome of CNS partnership-based nursing practice for people with chronic obstructive pulmonary disease (COPD).

**Type of Study:** A pro- and retrospective study design that assessed number and length of hospitalizations, the difference in health related quality of life (HRQL) using the St. George’s Respiratory Questionnaire (SGRQ), difference in anxiety and depression as measured by the Hospital Anxiety and Depression Scale (HADS), difference in BMI, smoking rates and capacity to use medications for patients (n= 50) cared for by a CNS using a participatory partnership with dialogue approach.
Findings: Hospitalizations and length of stay, because of COPD, were significantly reduced. Health related quality of life measured by the SGRQ improved significantly and clinical anxiety and depression decreased. Patients who were previously underweight, BMI improved and ability to use inhaled medications improved.

Article 7

The purpose of this study was to describe the role of the CNS in helping hospitals to achieve and maintain Magnet designation.

Type of Study: A descriptive cross-sectional research design. A researcher developed 18-item survey was mailed to hospitals that had achieved Magnet status, n=152 surveys were returned, 91 were completed by the hospital CNO.

Findings: Eighty-eight percent (88%) of participants indicated that CNS's in their hospitals were important or very important for achieving Magnet status and 92% indicated the CNSs were important or very important for maintaining Magnet status. The CNS was an educational resource for nursing staff and served as a role model for nursing staff.

They also helped nurses to incorporate evidence based practice and research, assisted in the establishment of standards of care, quality improvement and provided leadership.

Article 8

This annotated bibliography offers research articles related to clinical and educational programs provided by CNSs to patients, families, and staff; and anecdotal reports about CNS practice. The bibliography lists the title of the publication, method used if research, and results of findings. The purpose of the bibliography is to identify CNS designed nursing practice interventions and associated outcomes.

Reports of Nurse Staffing and Patient Outcomes

Report 1

This report was developed by the National Expert Commission and recommends cost-effective, wellness-based model of care that emphasizes primary care, health promotion, and management of chronic diseases and the role of nurses, RNs and NPs, within the model. Examples of how nurses, RNs and NPs, are leading the way in developing new programs and redesigning processes to deliver care across a continuum and enhance the health-care experience of Canadians and reduce costs are provided.

Key messages from the report:

- Nursing interventions make it possible to design a cost-effective health system.
- Nurse-led models of care are optimizing health and saving the health system millions of dollars.
- Nurse-led programs enable patients with complex chronic conditions to be cared for in the community.
- Diabetes, hypertension, obesity, COPD and other chronic diseases can be effectively managed through specialty care and nurse-led primary health-care services.
- Primary care nursing services enable patients to understand how to reduce the risks of acquiring a chronic
• Nurses are successfully helping clients achieve their health goals by implementing evidence-based practice guidelines and techniques.
• Focusing nursing resources on prevention and extending their reach to populations at greatest risk for poor health may reap the greatest gains in population health.

Recommendations for going forward:
1. Maximize the RN role in primary care,
2. Increase the use of nurse navigators to coordinate care
3. Extend prescribing authority to RNs.

Report 2

The Healthy Work Environments Best Practice Guideline Project was driven by two assumptions. First that nurses are essential for achieving and sustaining affordable access to high-quality, timely health care for Canadians. Second, work environments that maximize health and well-being are essential for good nursing and best patient/clients and organizational outcomes. This evidence-based guideline was developed as a result of the Project to identify attributes of interprofessional health care to optimize quality outcomes for patients, providers, teams, organizations and the healthcare system. Best practices to enable, enhance and sustain teamwork and interprofessional collaboration are identified in the report. Target audiences are nurses and other healthcare professionals in all roles and practice settings, administrators, educators, researchers, policy makers, and professional organizations who want to achieve healthy work environments for nurses and bring about transformation change that focus on underlying workplace and organizational factors.

Nine healthy work environment best practice guidelines, an organizing framework and a conceptual model for developing and sustaining interprofessional health care are included in the report. Recommendations and supporting evidence for physical/structural, cognitive, psychological, social, cultural, professional and occupational components of developing and sustaining interprofessional health care in the workplace that must be addressed at the external/systems level to ensure best practice are also included.

Report 3

This report documents the results of a systematic review of literature and studies of how models of nursing care are able to effect chronic disease management, home and community care, primary care and mental health care. Objectives of the report were to:
• Analyze recent evidence of the impact of nursing care across a range of outcomes variables: mortality and morbidity, systems impacts, and patient impacts
• A list of nurse-led or nurse-involved innovations
• Highlight innovations at provincial and national levels
• Recommendation key clinical programs for achieving better care for Canadians
• Comment on strategic investments
**Type of Study:** Systematic review of the literature of the effects of models nursing interventions. Included in the review were 27 high-quality systematic reviews, 29 high-quality studies and nine Ontario economic evaluation studies of comparative nursing models for people with chronic conditions.

**Findings:** Based on the analysis of the literature compared with current usual care, it is effective and efficient to use specialty-trained nurses to lead teams of professionals, including those with physicians, to care for chronically ill patients. This model of care would be more effective and less or no more costly, or at least equally effective but less costly, than the current on demand physician-led model. Physicians could continue to be involved along with replacement nurse practitioners to manage acute and episodic care.

**Report 4**

The purpose of this synthesis report was to review published and grey literature for the contributions of nurse-led and interprofessional teams in chronic disease, health promotion, prevention, improved health outcomes and access to care. Specifically, the contributions of registered nurses, advanced practice nurses, and nurse practitioners in the management of complex chronic diseases in primary care.

**Conclusions from review of literature of nursing effectiveness:**
- In some cases, nurses were shown to provide equivalent care to physicians within their legislated scope of practice.
- Nurse-led initiatives were shown to improve outcomes, access and continuity of care, however cost savings may not be realized if more resources are used.
- Needs, demographics, payment modality, and structure of healthcare systems will influence the ability to compare studies and reviews to each other and to the Canadian context.
- Study length may affect the results obtained because some gains may appear later.

**Conclusions from grey literature of effectiveness:**
- Nurses can be effective in the management of chronic diseases if able to use their full scope of practice and skill sets.
- Target additional resources to populations with the most health deficits.
- Existing financing and healthcare structures create challenges to greater utilization of nurses.

**Generalizations related to primary care financing:**
- The fee-for-service payment system maximizes patient contact and minimum time per patient. This payment system rewards volume and not intensity of service.
- Incentives to use non-physician providers are limited unless directives and compensation are explicitly incorporated into the payment system.
- Intensive patient contacts are associated with more effective chronic disease management and are more likely obtained in comprehensive capitation or blended compensation systems.

**Conclusions of report:** Enhanced use of nursing resources can improve patient contact, education and disease management. The use of interprofessional teams offers the potential for cost-effective improvements to healthcare assess and to health outcomes if they are appropriately valued in cost-effectiveness analysis.
Report 5


This report is the result of an ad hoc committee commissioned by the Robert Wood Johnson Foundation and the Institute of Medicine to examine the nursing workforce capacity to meet health care demands and develop approaches to solve the nursing shortage in the United States. The committee addressed the following issues, with the goal of identifying vital roles for nurses in designing and implementing a more effective and efficient health care system:

- Reconceptualizing the role of nurses;
- Expanding nursing faculty and redesigning nursing education;
- Examining innovative solutions to care delivery by focusing on nursing and the delivery of nursing services; and
- Attracting and retaining well prepared nurses in multiple care settings.

Recommendations:

- Nurses should practice to the full extent of their education and training.
- Nurses should achieve higher levels of education and training through an improved education system that promotes seamless academic progression.
- Nurses should be full partners, with physicians and other health professionals, in redesigning health care in the United States.
- Effective workforce planning and policy making require better data collection and an improved information infrastructure.

Although the report reflects the American health care system, nursing leaders, policy makers, and faculty may identify similar issues facing nursing in Canada.

Conclusion

While this report of nursing sensitive outcomes is not inclusive of all literature available related to registered nurse-sensitive outcomes, it is a beginning on which we will be able to build over time. The evidence provided supports the need for ongoing identification and documentation of nursing interventions that positively affect patient health outcomes. Reduction of nurse staffing as cost saving strategies has led to negative patient outcomes in the form of increased complications and decreased patient safety. The increasing body of evidence strongly supports the need to match nurse staffing to patient needs and to use valid frameworks to justify staffing ratios. CRNNS looks forward to ongoing dialogue among all stakeholders and providers as we continue to work toward making nursing interventions more visible within the health care system of Nova Scotia.
References


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