Growing evidence suggests that nurse staffing affects the quality of care in hospitals. Little is known however about whether the educational composition of registered nurses (RNs) in hospitals is related to patient outcomes. This study found that the proportion of hospital RNs holding a bachelor’s degree or higher varied across facilities from 0% to 77%. Findings from this study are the first empirical evidence that identify patients cared for by RNs with bachelor’s degrees or higher experienced a significant 5% decrease in both the likelihood of patients dying within 30 days of admission and the odds of failure to rescue. Failure to rescue refers to a failure to prevent a clinically important deterioration resulting from a complication of an underlying illness such as cardiac arrest, respiratory failure, pneumonia, infection, hemorrhage, deep vein thrombosis and upper gastrointestinal bleeding. In conclusion, it is stated that if the workloads were lighter and the workforce composition consisted of higher percentages of bachelor prepared registered nurses or higher, that both the mortality and failure-to-rescue rates would be decidedly lower.

The objective of this study was to determine the association between the patient-to-nurse ratio and patient mortality, and failure to rescue (deaths following complications) among surgical patients, and factors related to nurse retention. Registered nurse staffing ratios were found to be an important factor in explaining variation in hospital mortality. RNs are educated to detect early signs and symptoms of patient deterioration and to act promptly to intervene to prevent irreversible harm and death. Therefore, they are often described as an around-the-clock surveillance system. The effectiveness of this RN surveillance is directly influenced by the number of RNs available to assess patients on an ongoing basis. Therefore it was not surprising to the authors that nurse staffing ratios were found to be important in explaining variation in hospital mortality. They suggest that nurse staffing legislation represents a credible approach to reducing mortality and increasing nurse retention in hospital practice. These findings have important implications for 2 pressing issues: patient safety and addressing the hospital nurse shortage.

This report provides a brief review and analysis of the research, including several government commissioned studies, that focuses on nurse staffing and improved patient safety, better health outcomes, and improved quality of care. The main focus is on the insignificant amount of action taken to ensure safe nurse staffing and thus quality healthcare for Canadians. This policy paper is intended to advise policy makers, decision makers, elected officials and health care executives on the current state of evidence with respect to safe staffing and improved patient outcomes. The hope of the author is that the information inspires a commitment on the part of decision makers to indeed do better.


An improved understanding of the economic value of RN services is needed to help inform staffing decisions and policies. The aim of this study was to quantify the economic value of professional nursing. From an economic perspective, healthcare facilities and other employers of RNs want to achieve a staffing level and mix such that the marginal value of employing one additional RN will equal or exceed the marginal cost. Findings confirm that as RN staffing levels increase, patient risk for hospital acquired complications and length of stay decrease resulting in medical cost savings, improved productivity and lives saved.


Changes in models of service delivery together with economic and service pressures have changed the direction and focus of nurses’ work. However, some of these reforms have had undesirable consequences for nurses’ work in hospitals and the use of their time and skill. This article identifies that patient acuity and complexity have significantly increased which requires RNs with the skill and time to use complex intellectual processes such as critical thinking, problem solving, clinical decision making and creative thinking; core competencies necessary for providing patient safety in today’s environment. However, changes to healthcare have resulted in RNs spending less time at the bedside, spending more time in non-nursing work, and the substitution of RNs with less qualified and less skilled staff, all of which is having a negative impact on patient outcomes and cost effectiveness. In summary, several factors have changed the work of RNs, all of which have the potential to decrease time spent in direct contact with and providing care for patients. Strategies to overcome these consequences are provided.


An examination of the impact on patient outcomes of nurse staffing and registered nurse (RN) skill mix on medical surgical units was conducted. The researchers focused on determining the differences in patient outcomes for conditions that are considered sensitive to nursing care – specifically urinary tract infections (UTI) and length of stay (LOS). The findings show a strong association between the proportion of RN care
provided and a lower LOS and lower odds of patients developing UTI. These findings are significant in addressing rising health care costs due to preventable adverse events.

Holcombe Pappas, S. (2008). The cost of nurse-sensitive adverse events. The aim of this study was to describe to nursing leaders ways to determine the cost of adverse events and effective levels of nurse staffing to efficiently provide quality patient care. Cost management can only occur in a balanced approach when the effect of cost reductions on associated quality outcomes is understood and monitored. Because nursing costs are significant, nurse staffing is subsequently targeted as a potential source of cost savings when hospitals are faced with economic pressures. It is well proven, that the appropriate quality and quantity of nurse staffing are essential to achieving high-quality patient outcomes. When the quantity of nurse staffing is reduced to decrease costs at the department level without reducing the overall cost of patient care, no meaningful change has occurred, and quality of patient care may erode as a result. Nursing practice is an intervention that is instrumental in achieving operating efficiency and success of the healthcare organization. Therefore, it is vital that facilities have a thorough understanding of the occurrence and cost of adverse events and the RN staffing needed to eliminate all avoidable adverse events. Nurse sensitive clinical outcomes studied include medication errors, patient falls, urinary tract infection, pneumonia, and pressure ulcers. The study found that the cost of increasing RN staffing was $659 per case; however, one adverse event increased the cost per surgical case by $903. This increased to $1,029 for an adverse event per medical case. Additional costs related to adverse events include: UTI $1,005, pressure ulcer $2,384 and pneumonia $1,631. Adequate quantities of RNs who provide continuous surveillance to hospital patients prevent complications through intervention and rescue. The evidence from this study provides economic justification for the quantity of nurse staffing, and shifts the view of nursing from an operational necessity to a key strategic element essential to hospital clinical and financial success.

Horn, S.D. (2008). The business case for nursing in long-term care. This study looks specifically at RN staffing impact on patient care outcomes in the long-term care setting. Findings identify that more direct RN care time per resident per day was strongly associated with better outcomes and lower cost to society. Increasing the direct RN staffing to 30 – 40 min. per resident per day resulted in a societal cost savings of more than $319,000. While costs to the nursing home for increasing RN staff were estimated to increase by $199,000 this still resulted in a cost saving of $120,000 with the added benefit of improved patient outcomes.

Horn, S.D., Buerhaus, P., Bergstrom, N. & Smouth, R. J. (2005). RN staffing time and outcomes of long-stay nursing home residents This article studied the impact of RN staffing on client outcomes in long term care facilities (LTCF). The results show that more RN direct care time per resident per day was associated with fewer pressure ulcers, hospitalizations and urinary tract infections. These conditions cause considerable discomfort and health risks to the client, as well as
add a significant burden of cost to the health care system to treat. Other positive impacts associated with more RN care include residents experiencing less weight loss, catheterization, and deterioration in the ability to perform activities of daily living. More care provided by certified nursing assistants and licensed practical nurses was found not to improve patient outcomes. These findings are significant in improving RN staffing in LTCF to decrease avoidable adverse outcomes and suffering and impact the cost of health care services.


The purpose of this study was to examine the association between RN staffing and patient outcomes in acute care hospitals. These included nurse-sensitive factors such as hospital acquired pneumonia, urinary tract infection, respiratory failure, blood stream infection, cardiac arrest, etc. Study findings identify increased RN staffing as being associated with lower hospital related mortality (death) in ICU, surgical, and medical patients. Furthermore, an increase of 1 RN per patient day was associated with a decrease in hospital acquired pneumonia, unplanned extubation, respiratory failure, and cardiac arrest. Length of stay was decreased by 24% in ICUs and 31% in surgical patients. In conclusion the findings support past research that identifies a reduction in hospital mortality as being 9 – 16% lower for each additional RN FTE per patient day and that higher RN staffing levels produce stronger effects on nurse sensitive outcomes. In conclusion, the available evidence indicates that there is a statistically and clinically significant association between RN staffing and hospital related mortality, failure to rescue, and other patient outcomes. These findings are significant in associating positive patient outcomes with RN staffing, thus decreasing health care costs and patient adverse events.


This research quantifies the cost of increasing nurse staffing, reducing adverse outcomes and avoiding hospital days, and in-hospital deaths. Findings show that increasing the proportion of RN hours of care in the skill mix is associated with a net reduction in costs. The findings also identify that by increasing nursing hours without a change in the RN skill mix resulted in a net hospital cost increase of approximately 1.5%. The costliness of adverse events is clear. A single incident of hospital-acquired urinary tract infection (UTI) can create a revenue risk of $846 U.S. and $1,046 U.S. in total cost risk. However, by increasing the proportion of RNs, the odds of acquiring a UTI decreased by 4.25 times. Similarly the revenue gains from lowering length of stay (LOS) can be significant. A reduction in LOS by just 0.5 days is the equivalent of adding 25 beds to a typical 300 bed hospital. Considering the emerging emphasis to hold hospital leadership accountable for outcomes in their organizations it is imperative that they understand the drivers of specific outcomes and the impact of RN care on reducing and preventing these occurrences. The article concludes by identifying the lack of exposure hospital executives have to staffing outcomes research, as well as the lack of recognition
of the role of RNs in ensuring patient quality, as problematic and an issue that needs to be addressed in order to assist their organization to make the best decisions for the patients they serve.


Research involving patient admissions and nursing shifts was conducted to examine the association between mortality (death) and patient exposure to shifts during which staffing by RNs was below the staffing target. Additionally, examination of the association between mortality and high patient turnover owing to admissions, transfers, and discharges was also performed. This is of significant importance as previous studies identify that when nursing workload is high RN surveillance of patients is impaired, thus increasing the risk of adverse events. Findings from this study show staffing of RNs below target levels was associated with increased patient death. As well, patients on units experiencing high-turnover (admissions, transfers and discharges) were shown to have a significant association with an increased risk of death. The study findings reinforce the need for hospitals to consistently match nurse staffing with patients’ needs throughout each patient’s stay. Additionally, the use of systems and tools that improve the ability to match nurse professionals with patient needs is essential to ensuring safe client care.


This study examined the relation between the amount of care provided by nurses in hospitals and resulting patient outcomes. Findings indicate that a higher proportion of hours of nursing care provided by RNs and a great number of hours of care by RNs per day are associated with better care for hospitalized patients. This included shorter length of stay, lower rates of urinary tract infection, upper gastrointestinal bleeding, pneumonia, shock/cardiac arrest and failure to rescue. Measures of staffing by aides and licensed practical nurses had either no significant association with lower rates of the adverse outcomes studied or significant associations with higher rates of the adverse outcomes. Thus, whereas there was evidence that greater numbers of RN hours were associated with positive patient outcomes on the factors studied, there was no evidence of an association between lower rates of the outcomes studied and a greater number of licensed-practical-nurse hours or aide-hours per day.


Failure to rescue refers to the inability to save a patient’s life after the development of complications. The focus of this literature review centers on the skills needed to appropriately intervene before the onset of life-threatening health problems require complex assessment, highly intensive therapies, targeted interventions, critical evaluation, and immediate adjustment dependent on patient response. It is important
to note that failure to rescue does not necessarily imply wrong doing. Rather, the reference is to not recognizing deterioration in patient status and taking steps designed to reverse these changes. Findings from this study clearly identify that higher numbers of RN staffing were associated with hospitals that had a low risk of failure to rescue. Additionally, the importance of RN staffing when evaluating hospital quality and patient outcomes is identified.


Estimating the requirements for health human resources must explicitly consider population health needs, levels of service delivery and health human resource (HHR) productivity while changing supply to meet requirements involves consideration of a broad range of comprehensive intervention. This article demonstrates the application of a needs-based framework for HHR planning to illustrate the potential effects of policies on the short of RNs in Canada. Findings suggest that the shortage of RNs in Canada can be resolved in the short to medium term through modest improvements in RN retention, activity and productivity.


This study examines structures and processes of hospital care influencing 30-day mortality for acute medical patients. An assumption of this research is that each hospital has a unique mix of structures and processes that affect patient mortality; an important subset of these hospital characteristics being nursing care delivery structures and processes. Therefore some hospitals are better than others at preventing unnecessary patient death through its structures and processes of nursing care that contribute to a hospital’s overall success in detecting and treating serious patient complications and potentially death, if not appropriately managed. The presence and actions of professional nurses at the bedside with their critical thinking and judgment skills, facilitates early detection and prompt intervention for serious patient complications. Findings from this study contribute to the mounting evidence that structures and processes of hospital nursing care have an impact on patient mortality and survival. For hospitals to minimize unnecessary patient death for their patient population they should maximize the proportion of RNs in providing direct care, even if this results in lowering total numbers of nursing personnel across all categories. Furthermore, due to the impact that higher proportions of baccalaureate-prepared nursing staff had on lowering hospital mortality rates, the study recommends that hospitals aggressively seek to hire and retain baccalaureate-prepared nurses as hospitalized patients require the scope and depth of knowledge, skill and judgment attained through baccalaureate education to provide safe quality care to complex acute medical patients.

Understanding the determinants of patient mortality (death) can lead to the development of strategies that reduce mortality and prevent unnecessary death. This paper is a synthesis of published research that explores the determinants of mortality of patients who have experienced acute care hospitalization. Findings support several factors impacting patient mortality including: nurse-physician relationships, nurse staffing characteristics, physician characteristics, professional practice environment, nurse experience, RN educational preparation, and clinical nursing support. Recommendations are made to maximize the proportion of RN and baccalaureate prepared RNs in hospital nursing staff, develop and implement initiatives designed to strengthen collaborative relationships among nurses and physicians, maximize the proportion and establish and sustain clinical nursing support systems to enhance the delivery of patient care. These recommendations are made to prevent unnecessary patient death and reduce mortality rates.

References


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