



Moving Beyond Ratios

It is imperative that nurses react to the issue of ratio-based staffing. Intuitively, we understand the right model incorporates the complexities of staff allocation, financial resources, and patient outcomes. As ratios migrate from California to the national health care stage, it is nurses who must keep the conversation focused on patients, not laws.

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Framing the Debate

This issue of ENK establishes a forum for nurses and health care leaders to present and debate the efficacy of mandated ratio-based staffing. Are ratios a knee-jerk solution driven by alarming reports of the recent past? Or are they the awkward but necessary first steps toward safer working environments and better outcomes? ▶ [Read More](#)

Moving Beyond Ratios

Guest editors Karole Mourek and Ken Colbert present a series of essays that both defines the issue of ratio-based staffing and sets a course for how nurses can respond to the issue with relevant evidence that incorporates the real-world complexities of patient needs.

[Staffing Ratios and Patient Outcomes: Linkage, Legislation, and Logic](#)

> by Karole Schafer Mourek and Kenneth W. Colbert

[Comparing Staffing to Outcomes: A Conceptual Framework](#)

> by Karole Schafer Mourek and Kenneth W. Colbert

[Comparing Staffing to Outcomes: Model Applications](#)

> by Kenneth W. Colbert and Karole Schafer Mourek

Living with Ratios

California is conducting a live field test on ratio-based staffing for the rest of the world to observe. While anecdotes and initial data are beginning to emerge, two ENK contributors add their voices to our real-time understanding of what nurses and patients are observing here.

[A Bedside View](#)

> by Ruth Plumb

[Costs & Consequences](#)

> by Roberta Mori

Expanding the Context

Perspectives on ratio-based staffing vary depending on point of view. The CNO sees it differently than the unions, and all could benefit from understanding the performance improvement methodologies that must be brought to bear as part of any fair-minded analysis.

[An Executive Viewpoint](#)

> by Richard Hader and Tara Dugan Claudio

[A Performance Improvement Perspective](#)

> by Kelly L. Podgorny

[The Case for Ratios](#)

> by Greg Perry

FROM THE EDITOR



This was our goal: Create a forum where nurses could encounter nursing's best ideas, tested by the challenge of real world nursing. You're looking at the result. Every month, a new issue of ENK will be shaped by a guest editor whose work deserves a larger audience. These are nurses working in settings where nursing knowledge is directly applied — where research and reality are engaged in a lively debate.

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An Entirely New Form of Excellence: Shaped by Your Peers. Shaped by You.

ENK will have a sharp clinical focus in December with guest editors Lisa Pilla, RN, MSN, CNOR, and Marianne Fredrick, RN, BSN, CPAN.

The Centers for Medicare and Medicaid Services (CMS) and the Centers for Disease Control (CDC) are mandating performance improvement in infection prevention, specifically surgical infection prevention (SIP).

In the next issue of ENK, read about how a community hospital in New Jersey developed new evidence-based strategies for SIP, and then implemented them through a nurse-led, multidisciplinary approach that improved the care of surgical patients as it empowered nurses to put evidence into practice.

This Month & Next in ENK

Our third issue of ENK establishes a forum for nurses and health care leaders to present and debate the efficacy of ratio-based staffing. Are ratios a knee-jerk solution driven by alarming reports of the recent past? Or are they the awkward but necessary first steps toward safer working environments and better outcomes? There are no answers yet, but nurses are ideally located to direct the conversation. The ENK guest editors this month are doing that, and more.

Karole Mourek, RN, PhD, and Ken Colbert, MS, have developed a conceptual framework that nurses can use to move beyond ratios, and they've put a pilot project in motion that incorporates the true complexity of staffing and patient care. Mourek and Colbert have also gathered perspectives from the bedside to the CNO's office. They've assembled a strong and important edition of ENK. We are honored to present their work. Please join them and their contributors in helping nurses and all health care professionals stay focused on what matters most: better and safer care.

If you're reading this, you're an ENK subscriber. Congratulations! You've joined with many others who have recognized the value of ENK. We believe our model that presents ideas and evidence from nurses in service roles is worth paying for. We're going to prove it to you, month after month, and we ask you to help us by spreading the word about ENK. And, as always, please write me with your thoughts, suggestions, or gripes. ENK is a continual work in progress, and readers like you are part of it all.

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Karole Mourek & Ken Colbert

Staffing Ratios and Patient Outcomes: Linkage, Legislation, and Logic

It is imperative that nurses react to the issue of ratio-based staffing. Intuitively, we understand the right model incorporates the complexities of staff allocation, financial resources, and patient outcomes. As ratios migrate from California to the national health care stage, it is nurses who must keep the conversation focused on patients, not laws.

The question of how to staff in a clinically safe and fiscally responsible fashion is currently a topic of discussion both within and outside the health care arena. At the heart of this discussion is the increasing acuity and complexity of patient needs, an on-going nurse shortage, and severe financial constraints. While most acute care facilities have increased care hours per patient day to address rising patient acuity, the additional care hours have come largely from unlicensed staff.

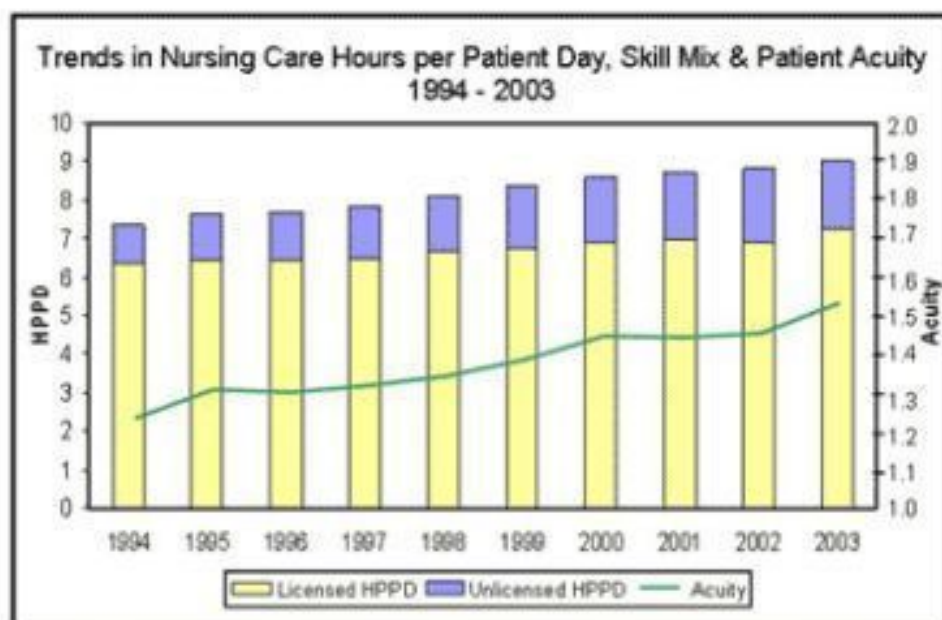


Figure 1: As the acuity of inpatient populations has risen, acute care facilities have responded by increasing the care hours delivered per patient day (HPPD). However, the rise in HPPD has been supported primarily by an increased use of unlicensed healthcare workers, leading to additional responsibilities for RNs at the bedside. This ten year data base was compiled from an annual sampling of over 75 North American hospitals'

patient acuity and staffing information. Acuity was determined by employment of a shared, standardized patient classification methodology. Staffing information was also collected and collated using established definitions of caregiver, skill mix and hours worked. Source: QuadraMed Corporation Inpatient National Benchmarking Database: 1994-2003.

Basically, most health care facilities have altered their delivery model by adding more unlicensed health care workers in order to address issues of rising patient acuity, nurse shortages, and fiscal constraints. How have these changes affected patient outcomes? What is a safe nurse to patient ratio? To answer these questions let's look at published research.

Published Research on Link Between Staffing and Patient Outcomes

The links between staffing resource allocation and patient outcomes have been the topic of many published nursing studies. Most of the larger published studies operationally define staffing in terms of a staff to patient ratio. The patient outcomes are usually defined in negative terms such as failure to do something (or failure to document that it was done) or negative patient outcomes associated with the nursing domain of practice. A compilation and analysis of this literature appears in a recent article in the *Journal of Nursing Administration* (JONA). This article by Lang et al. (2004) contains a comprehensive systematic review of all published studies over the past 20 plus years that researched the relationships between nurse staffing and the patient, nurse employee, and hospital outcomes. It concludes, in part, that the profession's body of literature has little to offer on the whole topic of what constitutes safe minimum nurse to patient ratios. The authors go on to say that a minimum nurse to patient ratio alone is probably not adequate to ensure the quality of care but that a more refined measurement of individual patient care needs is required coupled with consideration of more detailed staffing dimensions.

The American Organization of Nurse Executives (AONE) 2003 Policy Statement (2003) noted that staffing is a complex decision based upon a complex set of variables. Although staffing variables such as percent registered nurse, organizational environment, and patient to staff ratio have all been demonstrated to influence patient outcomes, the policy statement concludes AONE has not been able to demonstrate clear connections and guidance regarding the upper and lower ranges of a staffing model that would provide the intended patient outcomes while also considering staff concerns and appropriate, cost-effective allocation of staffing resources.

Legislated Staffing Standards

Legislators have now entered the staffing standard dialogue. At both the national and state levels, legislators have begun to investigate and establish mandated staffing ratios. The first to have enacted such legislation is California. In September, 2003, California state legislators enacted a law (AB 394) mandating minimum nurse to patient ratios for the acute care setting. Specific minimum ratios were set for 22 different clinical areas, and these ratios must be met "at all times" around the clock rather than on an averaged shift basis.

In the U.S. House of Representatives, there is a bill under review (H.R. 4316) titled: Nurse Staffing Standards for Patient Safety and Quality Care Act of 2004. The primary purpose of this bill is to establish minimum nurse staffing requirements. The bill details steps expected to be completed in the development and re-evaluation of a staffing plan. The bill also provides protections for any nurse who refuses an assignment on the occasion that a hospital violates this act's mandated staffing ratios.

In Section 2906, Definitions of the House of Representatives Bill 4316, it is of interest to note how legislators define who is a nurse and what constitutes an acuity system. In this bill, a nurse is defined as a direct care registered nurse *or* direct care licensed practical nurse as licensed by at least one state, and who provides bedside care for one or more patients (Sec. 2906 H.R. 4316).

Acuity system, which is to be used in the development and evaluation of a staffing plan, is defined as “an established measurement tool that predicts nurse care requirements for individual patients based on severity of patient illness, need for specialized equipment and technology, intensity of nursing interventions required, and the complexity of clinical nursing judgment needed to design, implement, and evaluate the patient's nursing care plan; details the amount of nursing care needed, both in number of nurses and in skill mix of nursing personnel required, on a daily basis, for each patient in a nursing department or unit; takes into consideration the patient care services provided not only by registered nurses but also by direct care licensed practical nurses and other health care personnel; and, is stated in terms that can be readily used and understood by nurses.” (H. R. 4316, Section 2906, Definitions)

H.R. 4316 goes on to specify minimum direct care registered nurse to patient ratios. The bill even goes further and lists additional factors to be considered and documented in a staffing plan such as acuity level of patients as determined by an acuity system, specialized experience required of direct care registered nurses on a particular unit, level of technology available that affects the delivery of direct patient care, staffing levels and services provided by other non-RN health care personnel in meeting direct patient care needs, and physical layout of the hospital.

The bill does make a provision for adjustment in reimbursement for additional costs incurred in providing services to Medicare beneficiaries that are attributable to compliance with requirements imposed under sections of this bill.

On the Senate side, a bill (S 991) titled Registered Nurse Safe Staffing Act of 2003 provides for some of the same mandated staffing ratios as the House of Representatives bill. At the same time, Senate Bill 373 focuses on limitations for hospitals on mandatory overtime for nurses.

The language in legislative bills reviewed demonstrates a fairly sophisticated grasp of structural issues associated with constructing a staffing plan. However, it is unclear on what basis those drafting this legislation determined what the absolute minimum staffing ratios should be in order to assure patient safety and quality of patient care in a variety of diverse clinical settings.

Establishing a Shared Logic for Staffing Patterns

Given the increased interest and activity outside of the profession toward a categorically defined ratio-based staffing methodology, it is imperative that nurses react. Nurses must direct their research efforts and pool their shared expertise and professional experiences for the purpose of developing a staffing model that accounts for all the complexities involved in the relationships between staffing allocation practices and positive patient outcomes. The goal of this issue of ENK is to initiate such a forum for practitioners. Although authors in this issue are coming at this topic from differing perspectives, they are collectively trying to share

information and experiences on working with staffing ratios while trying to achieve positive patient outcomes.

The first two articles are written by the guest editors. Using existing research as a starting point, Karole Mourek and Kenneth Colbert focused on patient need to build a new conceptual model that looked beyond staffing ratios when comparing staffing allocation to select nurse-sensitive patient outcomes. The new model not only looked at actual staffing resource allocation but also the variance between established staffing standards and the actual staffing allocations. The model also considered the impact of variance on select nurse-sensitive patient outcomes at multiple levels of the organization. The conceptual article is followed up with an article demonstrating the model's application where a small pilot study was undertaken to apply the model concepts. The cross-sectional study involved six institutions, two thirds of which carry the American Nurses Credentialing Center (AACN) designation of Magnet Hospital.

The next two authors for this issue were selected because they are currently living through the first year of mandated staffing ratios in the state of California. The first article, authored by Ruth Plumb, examines this movement from the bedside nurses' viewpoint at two acute care facilities. There at "ground zero," Ms. Plum interviews 31 bedside nurses on their experiences and concerns. The next article, written by Roberta Mori, looks at her California hospital system's experiences with planning for and managing the costs and changes associated with implementing mandated staffing ratios. This article speaks to the fiscal impact mandated staffing ratios have had on a hospital's budget. Ms. Mori's article also identifies several interesting and unanticipated consequences of this legislative policy.

Patient Safety and quality of care, which of course are two of the primary stated reasons for much of the legislation involvement, is the focus of Kelly Podgorny's article. Ms. Podgorny makes the point that unlike some other service industries with mandated staffing ratios, like the airline industry, professional nursing care differs due to the individual patient's need for assessment, care, and interventions in an ever-changing practice setting. In her article she outlines, from the performance improvement perspective, an approach to study the collective effects of mandated staffing ratios on patient safety and quality of care with a plan to systematically evaluate the effectiveness of nursing ratios in improving patient safety and assuring positive patient outcomes.

Finally, Richard Hader and Tara Claudio together offer the executive nurse's perspective on mandated staffing ratios. These authors state, "Clinical expertise, education, shared governance, and evidence-based practice should dominate the patient care delivery system provided by nurses, not staffing ratios based upon arbitrary, regulatory requirements."

Our Position on Staffing Ratios

We believe that it is in the best interest of patients and their families and caregivers to make staffing decisions based upon patient needs. Accurate and timely assessment of patient needs enables caregivers to make appropriate decisions about resource allocation to best ensure quality care. While there is obviously a link between nurse staffing and patient outcomes, the research to-date has failed to identify optimum staffing levels or even minimum thresholds to assure patient safety and quality care. As the nursing shortage continues, specification and enforcement of evidence-based minimum staffing ratios may one day provide protection for patients and caregivers. Certainly mandating ratios derived at by

negotiation that become de facto staffing levels does not improve health care from the patient's or provider's perspective.

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Karole Mourek & Ken Colbert

Comparing Staffing to Outcomes: A Conceptual Framework

There is a substantial and growing body of literature that compares staffing resource allocation to patient outcomes. Yet, a significant portion of the research quantifies staffing allocation in relation to patient numbers instead of patient needs. In this article, which uses the existing research as a starting point, the authors present a new conceptual model that moves beyond staffing ratios.

To develop a model comparing staffing resources to patient outcomes based upon patient need, one must first define *patient need*. Most researchers acknowledge that a simple patient census figure is not sufficient despite the tendency in large database analyses to use a “patient head count” as the operational definition of patient need. One recent study does emphasize that staffing ratios should be linked to or set by patient characteristics (Sasichay-Akkadechanunt, Scalzi, and Jawad, 2003). A useful framework must include an objective measure of individual patient need for nursing care in addition to patient census measure.

The term *staffing resources* must also be operationally defined. With respect to the published literature, allocated staffing resources are examined in several different ways. Some of the most respected studies compare nurse staffing allocation to patient population in terms of a patient to staff ratio (Aiken, Clarke, Sloane, Sochalski, and Siber, 2002) (Needleman, Buerhaus, Mattke, Steward, and Zelevinsky, 2002). Staff resource is commonly determined by the number of total nursing personnel (not just those at the bedside) hours in comparison to a patient census figure. Skill mix is another frequently analyzed staffing resource allocation descriptor. Percent RN staffing is considered by many experts in the field as the strongest predictor of patient outcomes (Moore, Lynn, McMillen, and Evans, 1999).

In constructing a useful analytical framework for comparing staffing resources to patient outcome measures, it is useful to know how many actual hours of bedside nursing care were provided for a patient as well as the actual skill mix. It is also imperative to analyze the variance between how much and what kind of caregiver nursing resources were allocated versus how much and what kind of caregiver nursing resources were required to meet patients' needs. A framework focused on caregiver staffing levels that can analyze the impact of staffing variance, staffing skill mix, and staffing in relation to patient needs may provide the best opportunity to explain variance in patient outcomes.

Patient outcomes must also be operationally defined. In the research, there are several clinical outcomes that are frequently and consistently linked to nurse resource allocation. The majority of patient outcomes studied frequently are adverse events. It is not reasonable to assume that all types of patient outcomes are affected equally by staffing attributes. Boyle (2004) used the term “nurse-sensitive adverse events” to distinguish those adverse patient outcomes that included interventions or acts of prevention which exist within the domain of professional nursing practice (Boyle, 2004). Focusing on the variance in nurse-sensitive patient outcomes should provide the best framework to determine effects of staffing resource allocation.

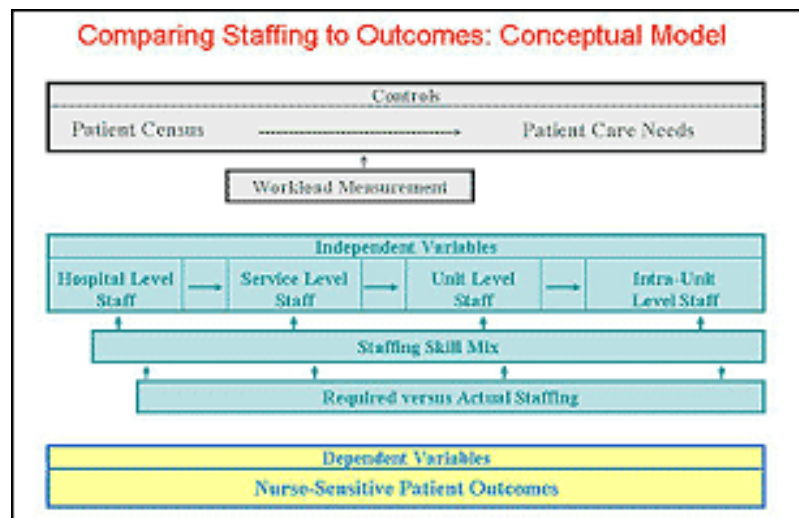
The comparison of staffing resources to patient outcomes can be undertaken at many levels of analysis. Studies undertaken purely at the hospital level risk masking differences that are visible only at some other organizational level. Intra-hospital variance exists between staffing levels, staff characteristics, and delivery environment, making more detailed analysis desirable. Large studies at the hospital level may also misrepresent relationships between staffing allocation and patient outcomes as hospitals with vastly different resource availability are compared.

Several recent studies explored individual patient, unit-level characteristics in relationship to patient outcomes (Boyle, 2004); however, these relationships have been studied primarily at the hospital or global level (Kovner and Gergen, 1998). In order to better understand the relationships between staffing and patient outcomes, it is important to be able to complete multiple levels of organizational analysis with one common data set. Analysis must include a “drill down” approach from aggregate hospital-level data, to service levels, to individual patient care units, to intra-unit (day-to-day) data thus allowing a better understanding of the complexities and variances within and among organizational levels.

Using the literature as a starting point, the researchers developed a conceptual model for a comprehensive comparison of staffing resource allocation to patient outcomes. Although the key elements of the model were discussed individually, it is useful to summarize the design decisions. They include:

1. The concept of *patient* must be measured not only in terms of a census figure, but also by using an objective methodology that takes into consideration the individual patient's needs for nursing care;
2. The concept of *staffing* must include several measurements:
 - a. Total nursing staff hours devoted to patient care
 - b. Skill mix
 - c. Required nursing staff care hours and skill mix based on a measurement of individual patient care needs
 - d. Actual nursing staff care hours and skill mix based on a measurement of individual patient care needs
 - e. Variance between required care hours and actual care hours provided
3. The concept of *patient outcome* as nurse-sensitive adverse events; and
4. Comprehensive levels of analysis including the hospital level, service level, unit level, and intra-unit level (day-to-day detail).

The conceptual model is diagrammed below.



Using the language of experimental design, the conceptual model diagram indicates:

The *control variables* are patient measures. From the most general to most specific these include: patient census and individual patient care needs based upon patient workload assessment.

The *independent variables* are staffing allocation measures. From most general to most specific these include: hospital level staffing, service level staffing, unit level staffing, and intra-unit (daily) level staffing. At each level, staffing skill mix and required versus actual staffing levels are evaluated.

The *dependent variables* are nurse-sensitive patient outcome measures. Some of the proposed outcomes for study included:

- *Psychiatric Leaving Against Medical Advice* — AMA discharge of acute care psychiatrically hospitalized patient; premature release of acutely ill psychiatric patient (premise: patients admitted only if danger to self or others so premature discharge can have fatal result). Intervention shared domain of professional nursing.
- *Hospital Acquired Decubitus Ulcer* — inadequate nutrition, incontinence, shearing action, immobility, lack of positioning. Prevention is domain of professional nursing (Boyle, 2004).
- *Hospital Acquired Pneumonia* — results from immobility, inadequate ventilation of lobes of lungs, inadequate pulmonary toileting techniques. Prevention in domain of professional nursing practice (Boyle, 2004).
- *Hospital Acquired Urinary Tract Infection* — associated with indwelling urinary catheters; infection results from catheter use, lack of sterile technique during placement, delay in securing physician order to remove catheter quickly. Prevention in domain of professional nursing (Boyle, 2004).

The conceptual model was developed with three specific application goals:

1. To add to the body of research that explores the relationship between staffing allocation and patient outcomes by comparing both nurse-to-patient workload ratios *and* nurse-to-patient ratios to occurrences of several commonly identified nurse-sensitive

- adverse events;
2. To compare refined staffing measures to occurrences of specific nurse-sensitive adverse events using staffing measures such as workload-adjusted required staffing, workload-adjusted actual staffing, and workload-adjusted staffing variance; and
 3. To analyze occurrences of nurse-sensitive adverse events in relation to the staffing variables at increasingly detailed levels including: hospital level, service level, unit level, and intra-unit level (day-to-day detail).

A pilot study presenting application of the conceptual model is also presented in this issue under the title "[Comparing Staffing to Outcomes: Moving Beyond Ratios-Model Applications.](#)"

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Karole Mourek & Ken Colbert

Comparing Staffing to Outcomes: Model Applications

The literature is rich with studies that compare staffing resource allocation to patient outcomes. The focus is almost exclusively on broad staffing measures and patient outcomes at an overall hospital level. Due to data availability, most researchers have not been able to examine the relationships between staffing and patient outcomes at a service, department, or day-to-day level of detail. Moreover, most of the researchers behind the published studies did not employ a methodology to control for patient workload differences or consider the effects of variances between required and actual staffing on patient outcomes. In this article, you will read about a pilot study now under way designed to bring these questions down to the unit level, where patient needs can be directly observed.

In an attempt to add to the body of staffing-to-outcomes research and to test the previously developed conceptual model, a pilot study was designed and undertaken in 2004. The pilot study examined a small group of geographically proximate hospitals where detailed patient workload, staffing, and patient outcome data were available.

The study measured patient variables both by numbers of patients and by an acuity-defined patient workload. Staffing was refined by examining staffing levels not just at overall hospital levels, but also by looking at service, unit, and intra-unit (day-to-day) staffing levels. Further staffing measure refinement was employed by looking at the required staffing to patient workload levels, actual staffing to patient workload levels, and the variance between the required and actual levels. Staffing skill mix was also measured and analyzed.

Integral to the study design was the incorporation of patient workload measurement as an additional control variable. To measure patient workload and provide consistent measurement across the data sample, a standardized patient classification instrument was employed. The instrument utilized was a patient-needs-based factor system that is currently used in more than 100 North American hospitals. The selected patient classification instrument was integrated with a workload-based staffing allocation component that enabled the study to track required staffing to workload, actual staffing to workload and the staffing to workload variance.

To select hospitals for the study, sites were needed that were proximate in location; that had publicly available, patient-specific outcome data; and that all utilized the common and comparable workload measurement

system. Six hospitals were chosen for analysis. The six hospitals were all from the same state within 35 miles of one another. The hospitals ranged from 150 to 448 operating beds. Half of the hospitals belonged to multi-hospital groups, and half were teaching institutions. Of the teaching institutions, two had university affiliations.

Half the hospitals were AACN Magnet-designated hospitals. As Magnet hospitals, these organizations are recognized for their excellent quality of patient care, a work environment that strongly supports nursing practice, and the ability to attract and retain nurses (American Nurses Association, 1997). A recent study indicates that Magnet hospitals have specific organizational characteristics that support professional nursing practice and in turn promote better patient outcomes (Aiken, Havens, and Sloane, 2000). This designation was important because it speaks to the organizational environment of the hospitals under study.

The patient outcomes examined in the study were adverse events generally considered to be nurse-sensitive (Boyle, 2004). The patient outcomes included rates of hospital-acquired decubitus ulcers, psychiatric patients that left against medical advice, hospital-acquired pneumonia, and hospital-acquired urinary tract infection. The patient outcomes were measured using ICD-9 diagnosis and procedure coding. Complete definitions and calculations of the studied outcome measures can be found in the appendix at the end of this article.

The study examined several staffing variables that were adjusted by the numbers of patients, patient workload, staffing skill mix, and the variance between required and actual staffing. For all of the staffing variables, only direct caregivers and hours devoted to direct care were included. The staffing variables that were examined included:

- Patient to staff ratio
- Patient to RN ratio
- Required staff hours to patient workload
- Required RN hours to patient workload
- Actual staff hours to patient workload
- Actual RN hours to patient workload
- Staffing Variance - Required vs. actual staff hours to patient workload
- Staffing Variance - Required vs. actual RN hours to patient workload

Matching data from a patient-needs-driven workload measurement and staffing allocation system to ICD-9 coding provided a powerful database for examining relationships between staffing and outcomes. Each patient's daily location, workload, and staffing were available to compare to specific patient outcomes. The assessment of patient workload also enabled measurement of required and actual staffing by caregiver skill mix on a daily basis. The staffing measures could then be aggregated to a unit, service, or hospital level.

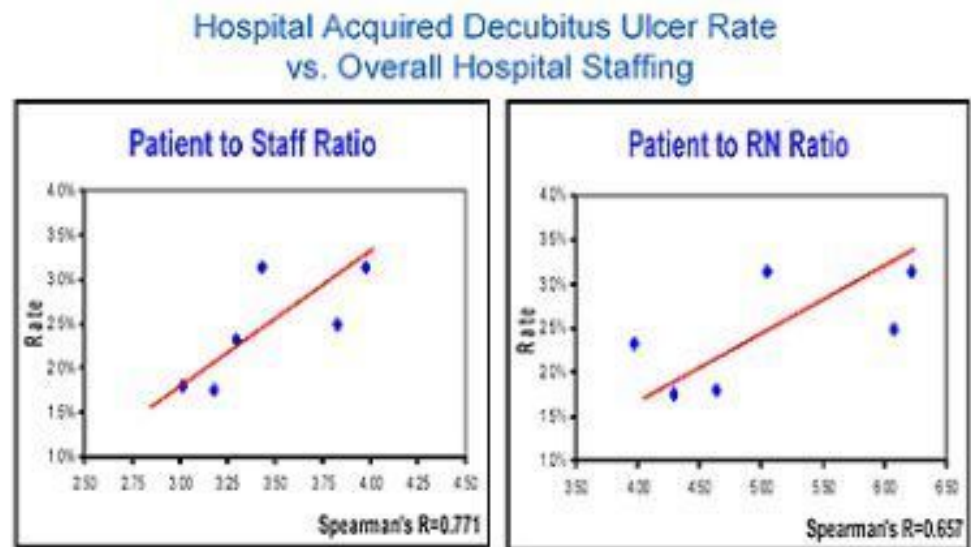
Comprehensive staffing, patient workload, and patient outcome data were analyzed for the six hospitals for a three-month period within the 2002 calendar year. Comparisons of staffing to patient outcomes were examined at several levels. To compare with previous studies, relationships at the hospital level were examined. To account for intra-hospital variances of staffing and patient outcomes, relationships at the service and unit level were examined. Finally, to account for day-to-day fluctuations in staffing and rates of patient outcomes, relationships were studied at the intra-unit

level. Appropriate parametric and non-parametric statistics were employed to quantify the staffing to patient outcomes relationships.

Results & Discussion

To compare with previous staffing to outcomes studies, the occurrence rate of each studied patient outcome was compared to the staffing variables at the overall hospital level. Given the similarity and small number of the studied hospitals, numerous significant relationships were not expected to be found. With the sample size of six hospitals, non-parametric tests of association were utilized to quantify relationships between the staffing variables on the outcome rates. Of the four patient outcome variables tested, only mildly significant relationships were quantified between the hospital-acquired decubitus ulcer rate and staffing variables (see figure 1). Both patient to staff ratio and patient to RN ratio were positively associated with the hospital-acquired decubitus ulcer rate ($p=0.07$ & $p=0.15$, respectively) meaning that a higher incidence of hospital-acquired decubitus ulcer was related to higher patient to staff and patient to RN ratios. This finding agreed with previous findings from a 1997 ANA report, but the finding has not been documented consistently by other researchers (American Nurses Association, 1997) (Lang, Hodge, Olson, Romano, and Kravitz, 2004).

Figure 1



Since one of the goals of the study was to move beyond using overall hospital data, the relationships between patient outcomes and staffing were further examined at the service and unit levels. Correlating patient outcomes with staffing allocations at the service and unit levels presented difficulties since the majority of patients transferred over several units or services during their length of stay. It was also difficult to quantify staffing over a single service, for example, segregating surgical staffing on a medical/surgical unit. Generally, one clearly defined service area is mental health. Care for mental health patients is generally provided by separate staff on mental health specialty units.

To examine staffing versus patient outcomes at the service level, the study looked at the outcome rate of mental health patients who left against

system. Six hospitals were chosen for analysis. The six hospitals were all from the same state within 35 miles of one another. The hospitals ranged from 150 to 448 operating beds. Half of the hospitals belonged to multi-hospital groups, and half were teaching institutions. Of the teaching institutions, two had university affiliations.

Half the hospitals were AACN Magnet-designated hospitals. As Magnet hospitals, these organizations are recognized for their excellent quality of patient care, a work environment that strongly supports nursing practice, and the ability to attract and retain nurses (American Nurses Association, 1997). A recent study indicates that Magnet hospitals have specific organizational characteristics that support professional nursing practice and in turn promote better patient outcomes (Aiken, Havens, and Sloane, 2000). This designation was important because it speaks to the organizational environment of the hospitals under study.

The patient outcomes examined in the study were adverse events generally considered to be nurse-sensitive (Boyle, 2004). The patient outcomes included rates of hospital-acquired decubitus ulcers, psychiatric patients that left against medical advice, hospital-acquired pneumonia, and hospital-acquired urinary tract infection. The patient outcomes were measured using ICD-9 diagnosis and procedure coding. Complete definitions and calculations of the studied outcome measures can be found in the appendix at the end of this article.

The study examined several staffing variables that were adjusted by the numbers of patients, patient workload, staffing skill mix, and the variance between required and actual staffing. For all of the staffing variables, only direct caregivers and hours devoted to direct care were included. The staffing variables that were examined included:

- Patient to staff ratio
- Patient to RN ratio
- Required staff hours to patient workload
- Required RN hours to patient workload
- Actual staff hours to patient workload
- Actual RN hours to patient workload
- Staffing Variance - Required vs. actual staff hours to patient workload
- Staffing Variance - Required vs. actual RN hours to patient workload

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Comprehensive staffing, patient workload, and patient outcome data were analyzed for the six hospitals for a three-month period within the 2002 calendar year. Comparisons of staffing to patient outcomes were examined at several levels. To compare with previous studies, relationships at the hospital level were examined. To account for intra-hospital variances of staffing and patient outcomes, relationships at the service and unit level were examined. Finally, to account for day-to-day fluctuations in staffing and rates of patient outcomes, relationships were studied at the intra-unit

Figure 3

Hospital Acquired Pneumonia Rate Comparison by Major Diagnostic Category

	MDC 5 Circulatory System		MDC 6 Digestive System		MDC 8 Musculoskeletal System	
	Rate (%)	Rank	Rate (%)	Rank	Rate (%)	Rank
Hosp A	0.00	1	0.78	1	1.60	5
Hosp B	0.21	4	0.79	2	0.50	1
Hosp C	0.19	3	1.99	4	1.60	5
Hosp D	0.43	5	3.98	6	1.25	4
Hosp E	2.20	6	0.87	3	1.20	3
Hosp F	0.00	1	2.42	5	0.74	2

To correlate patient outcomes with staffing at the unit level, it was desirable to find patients who spent their entire length of stay on the same unit so any adverse outcomes could be correctly related to staffing on that unit. Examining patients within MDC 8 (Musculoskeletal Systems) provided an opportunity to study patient outcomes versus staffing at the unit level since a significant number of these patients spent their entire length of stay on orthopedic units. Within the three months' data sample among the six study hospitals, four hospitals had a large (>100) number of MDC 8 patients who spent their entire length of stay on a single unit to allow analysis of staffing versus patient outcomes at the unit level.

Comparing patient outcome rates versus staffing levels at the unit level for the four orthopedic units did not provide any clear relationships. Given that there were only four units and the staffing levels were similar on each unit, statistically significant relationships were not observed. While insufficient data were available to adequately compare staffing to patient outcomes at the unit level, each unit had three months of data to enable valid comparisons of staffing to patient outcomes at the daily level.

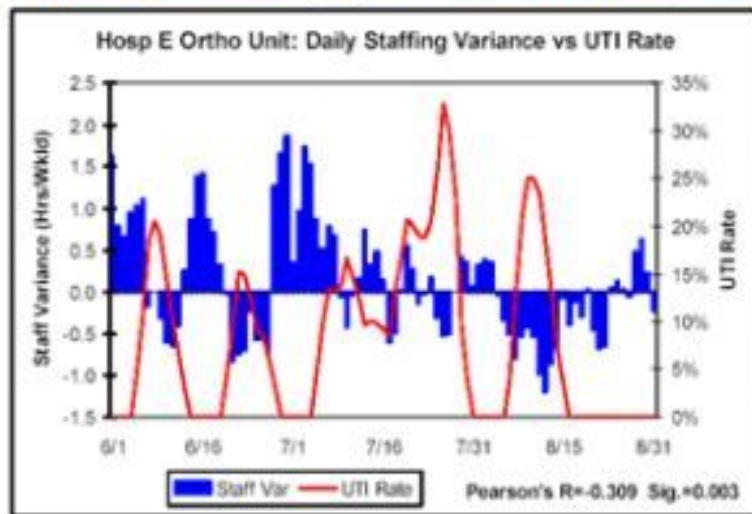
Since the incidence of hospital-acquired urinary tract infection (UTI) was the most prevalent of the studied outcomes observed on the orthopedic units, the daily rate of UTI was compared to daily staffing for each of the four orthopedic units. To analyze the incidence of UTI compared to staffing, daily UTI rates were computed for each of the orthopedic units. Again, in looking at UTI incidence, only patients who spent their entire length of stay on the unit were considered in the numerator or denominator when computing the UTI rates. Patients who developed UTI at any time during their length of stay were indicated as having a UTI occurrence on each day of their length of stay.

Daily rates of UTI were compared to the staffing variable for each day on each unit. On two of the four units, significant relationships were observed. Specifically on both units, strong negative correlations were observed between the daily UTI rate and the variance between actual staffing hours to workload and required staffing hours to workload (see figure 4). Lesser

strength negative correlations were observed between the UTI rate and the variance between actual and required RN staffing hours to workload. Lesser strength positive correlations were also observed between patient to staff ratio and patient to RN ratio. Interpretation of the correlations meant that overall and RN staffing below the required levels per workload was related to higher incidence of UTI — and that more patients per staff and per RN related to higher incidence of UTI.

Figure 4

**Surgical Patient Hospital Acquired Urinary Tract Infection
Major Diagnostic Category 8 – Musculoskeletal Systems**



Further analysis on one orthopedic unit was undertaken comparing the ratio of actual staffing to required staffing per workload. Analysis revealed that the unit was 1.9 times as likely to have an incidence of UTI when the actual staffing hours to workload were less than 90% of the required staffing hours to workload (95% confidence interval: 0.96 – 3.88).

Conclusions

Although consistent relationships between staffing levels and patient outcomes were not documented, several intriguing findings were observed. In many cases, the sample size limitations of the pilot study may have inhibited potential findings. Some previously documented relationships between patient to staff ratios and patient outcomes were duplicated at the hospital level. Intra-hospital variances of patient outcomes were also documented suggesting a need for outcomes analysis at service or unit levels.

At the more detailed level, some relationships between staffing and patient outcomes were documented at the intra-unit level when day-to-day staffing and patient outcome data were compared. The variance between required staffing hours to workload and actual staffing hours to workload proved to be a potential predictor of patient outcomes. Additionally, employing staffing hours to workload versus patient to staff ratios seemed promising in accounting for more variance in patient outcomes.

The design of a larger, similar staffing to patient outcomes study using 2004 data is currently being considered. The larger study may be able to

document relationships between staffing and patient outcomes more conclusively. In the mean time, the pilot study has indicated the importance of looking beyond hospital level data and examining outcomes at more detailed levels. The pilot study has further shown the importance of looking beyond measuring numbers of patients to measuring patient needs and the importance of staffing to meet those needs.

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APPENDIX: Patient Outcome Measures

Hospital-Acquired Decubitus Ulcer Rate

Denominator:

- All med/surg discharges with LOS 5 days or greater
- Exclude MDC 9 (skin disorders), MDC 14 (Ob patients)
- Exclude patients with diagnosis of hemiplegia, paraplegia, quadriplegia
- Exclude patients admitted from a long-term care facility

Numerator:

- Above with any secondary diagnosis of code 707.0 (decubitus ulcer)

Psychiatric Left Against Medical Advice Rate

Denominator:

- All discharges with MDC 19 & 20 (mental diseases and disorders)

Numerator:

- Above with discharge status of left against medical advice

Hospital-Acquired Pneumonia Rate

Denominator:

- All medical/surgical discharges with LOS 2 days or greater

Numerator:

- Above with any secondary diagnosis of code 997.3 (respiratory complications)

Hospital-Acquired Urinary Tract Infection

Denominator:

- All medical/surgical discharges with LOS 2 days or greater

Numerator:

- Above with any secondary diagnosis of code 599.0 (urinary tract infection)

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A Bedside View

Thought to be a welcome change, many nurses in California are finding the mandatory staffing ratios difficult to work within. Unexpectedly, it is changes in the method of care delivery, perceptions of care quality, and staff morale that may pose greater challenges in the work environment than finding enough competent nurses to satisfy the mandated ratios. There is a new disharmony in the work environment. Read about ratios from the perspective of bedside nurses and their supervisors.

This story begins with California Assembly Bill 394 (AB394). Introduced by the California Nurses Association (CNA) in 1999 and signed by Governor Gray Davis, the safe nurse to patient ratio bill became law on January 1, 2004. The California Department of Health and Human Services was tasked with determining specific nurse to patient ratios and the enforcement of those ratios. Through politicking, it appears the representatives of the bedside nurses were able to influence ratios and guidelines more stringent than anything proposed by the hospital administrators who were represented by the California Healthcare Association. The stringency of AB394 has led to many changes in patient care delivery in California.

In order to better understand the effects of AB394 on nursing leadership and bedside nurses, a series of interviews was conducted in June of 2004. In all, four interviews were completed with nurse leaders and 31 interviews were conducted with staff nurses.

During interviews with nurse managers and service line directors, it became clear that their first concern with the legislation was not regarding potential and actual effects on patient care and care delivery, but on finances. Nurse leaders discussed the ongoing financial drain and the need to find other resources/staff from which cuts could be made in order to afford more bedside nurses. Some necessary staff cuts, such as the loss of one or more unlicensed assistive/supportive personnel (ULP), were considered a minor alteration in unit routine by nursing leadership. With respect to patient care delivery, nursing leadership collectively believed that little has or will change due to legislated ratios. Nursing management felt most changes implemented or planned due to AB394 were considered positive for staff nurses due to the mandated increase in their numbers at the bedside.

In addition to the nursing leadership interviews, 31 RNs working in acute and telemetry units were interviewed. The interviewed staff nurses came from patient care units within full service hospitals that are part of a multi-facility organization in southern California. These hospitals maintain an

average daily inpatient census of 250-300. Twenty of the nurses interviewed worked day shift, the other 11 worked nights. The interviewed nurses had varying years of RN experience. All of the nurses interviewed worked on the same patient care unit at least six months prior to and six months after the implementation of ratios. Of note, on the days when the interviews were conducted, an average of one quarter of nursing staff working on the units had been there less than one year; they were traveler or registry nurses.

The major themes articulated by the bedside nurses interviewed included: a concern for the decreased number of support staff working, the lack of consistency in care delivery models used, and a frustration in the requirement of meeting staffing ratios at all times.

Maintaining ratios at all times prompted a rework of coverage for the RN's break, lunch, and other off-unit activities. The practice of nurses reporting off to one other RN had changed to reporting off to several RNs to insure proper ratio-driven patient reassignment. Some units designated an additional resource nurse to cover all breaks. In all units, fairly strict schedules have been implemented to accommodate the required ratios at all times. Nurses take breaks when assigned rather than when desired, or when most appropriate for their patients. This rigid approach was regrettable to those interviewed. The camaraderie of staff members sharing their experiences and lives together over meals and breaks was also lost.

In addition to coverage issues, care delivery has taken on a new structure in most nursing units. In preparation for the financial drain of recruiting, orienting, and maintaining the salary of more RNs, ULPs were being reduced. Now, ULPs are not replaced when these positions open up, and some have even been assisted in finding alternate positions within the organizations. Nurses accustomed to delegating basic care needs of patients to ULP now have to rethink and reorganize their work. Most nurses working day shift are rethinking primary care. The RN is managing routine care needs in addition to coordinating and managing the patient's hospitalization. This has required a rethinking and alternate planning of personal organization and patient care coordination. While mandated ratios have generally indicated a primary nursing approach, based on unit census, ULP can be flexed enabling team nursing; thus creating a daily rethinking and planning of the RN's approach to patient care.

Michelle Federe Riingen is an RN with 17 years' experience and is a nursing faculty member at Point Loma Nazarene University in San Diego. She continues to practice on a medical/surgical unit in southern California. She notes, "We implemented differentiated practice, making clear the task-driven role of the nursing assistant. Now there is anxiety on the unit. We've been told that when one of the nursing assistants leave, they won't be replaced."

The loss of some ULPs, which some nurse leaders describe as a "minor change," had created noticeable tension and unrest among the bedside staff. The negative impact of reduced ULPs was expressed more by day-shift nurses. They see a direct correlation between the removal of ULP on days and the increase of RNs on nights and are verbal about their discontent. The reduction of support staff on days, undertaken in order to financially accommodate mandated ratios on nights, has created a source for animosity between the day and night shifts.

In order to understand the effects of ratios, bedside RNs were asked

specific questions, to be ranked on a three-point scale (better, worse, same). The questions were:

Since implementation of the ratios:

1. Has the quality of the care you personally deliver changed?
2. Has the quality of care the patient receives changed?
3. Has your job satisfaction changed?

Half of the day nurses interviewed expressed a belief that the quality of care that they personally provided was worse since implementation of mandated nurse to patient ratios. More than half also believed the patient was receiving worse care.

Night nurses had the near opposite perception. Seventy-three percent of the night nurses believed the patients were receiving the same or better quality care. Night-shift staff members were also more likely to have improved feelings of job satisfaction. In comparison, the majority of day-shift staff stated they had maintained their current level of job satisfaction.

Bedside RN Perceptions of Change
Post AB394 Implementation

Perceptions of Change	Responses		
	Better	Worse	Same
Personal Care Delivery	4	11	16
Patient Receipt of Quality Care	8	13	10
Job Satisfaction	4	7	20

Bedside RN Perceptions of Change in Care Delivered and Job Satisfaction

Post AB394 Implementation

By Years Nursing Experience

Years Nursing Experience	Sample	Better	Worse	Same
1-2 Years	6	44%	28%	28%
3-10 Years	10	7%	43%	50%
11-20 Years	6	6%	39%	56%
>20 Years	9	19%	22%	59%
Overall	31	17%	33%	50%

When evaluating the nurses' responses based on years in nursing, regardless of shift worked, the data demonstrate an interesting response pattern. RNs with one to two years' experience perceived the greatest

improvements in quality of care and job satisfaction due to mandated ratios. Those perceiving the greatest decline in quality and job satisfaction were nurses with three to ten years' experience (generation X nurses). This is not entirely surprising as generation X nurses are generally dissatisfied after two to three years in any one particular role since they are eager to move on to the next challenge and the next opportunity for growth.

Mrs. Riingen, who has worked in a clinical nurse specialist role, brings another perspective. She identifies nurses with less than two years' experience nurses as being in the honeymoon phase. "They're still excited about nursing." She goes on to explain that the young nurse hasn't fully developed delegation skills. Ratios make their work easier. The nurses moving into three to ten years are well educated as to the changes in health care. "Patients are getting sicker. The nurses are tired; it's hard work. Nurses are not caring for themselves and become dissatisfied."

Of the bedside nurses surveyed, the charge nurses were the most dissatisfied as they felt pressure for assuring safe patient care and maintaining financial accountability. Charge nurses must now also consider both the mandated ratios and patient acuity while supporting the flow of patients into and out of the unit. In some instances, charge nurses felt that patient safety should override mandated ratios such as when considering patient admission to the unit versus having the patient wait in the lobby or the overcrowded ED. However, the charge nurses found staff generally inflexible with regards to exceeding ratios even for short periods of time. Open beds no longer mean open to admissions, which is unfavorable to admitting physicians, OR recovery rooms, emergency departments, and facilities trying to transfer patients. The pressure on charge nurses continues to rise.

Nurse satisfaction with mandated staffing ratios varies, especially by work shift and years of experience. The effects of mandated nurse to patient ratios are significant, and they can alter the methods of care delivery; the flow of patients through the hospital; and relationships within the unit, facility, and community. Mandated ratios are not the panacea nurses were led to believe they would be. Many professionals at the bedside are disappointed in systems they had come to trust: the CNA, their union, and their supervisors.

Mandated ratios may be viewed as the full swing of the pendulum that will soon return to center with reasonable and acceptable models for patient care. Flexibility has been a quality innate to nursing. Practicing in the first state to legislate ratios, California nurses have lost many degrees of flexibility. Other states should think twice before sacrificing that flexibility.

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Costs & Consequences

Although Sutter Health began planning to implement the mandated California nurse to patient ratios in advance of the mandate, the enactment of the law precipitated costs and consequences far beyond expectations. Initial cost projections have been exceeded, while the consequences to care delivery are still unmeasured. Read about how nurses in one system, Sutter Health, are navigating the new territory of ratios.

California Assembly Bill 394 (AB394) mandates that hospitals staff all inpatient units with specified minimum nurse to patient ratios. For example, medical and surgical units are required to have one registered nurse for every six patients, and telemetry units are required to have one registered nurse for every five patients. The law also stipulates that hospitals must meet ratio requirements "at all times," which means that hospitals must comply with the ratios throughout all work shifts and that an additional nurse must be available to cover for any nurse breaks, meals, or other off-unit activities.

Sutter Health affiliates serve more than 20 counties in Northern California, covering from the Oregon border to the San Joaquin Valley and from the Pacific Coast to the Sierra foothills. Sutter Health supports 26 acute care facilities and numerous clinics and outpatient services. Sutter Health is one of the nation's leading not-for-profit health care organizations.

Staffing 26 hospitals with sufficient nurses to meet the mandated staffing ratios and the "at all times" provision was anticipated to cost the organization approximately 22 million dollars. This cost only addressed filling needed positions and did not address position upgrades or modifications to staffing rotations. Meeting the "at all time" provision resulted in additional costs for support staff, resource nurses, and/or charge nurses to provide the necessary break, meal period, and off-unit coverage needed to maintain the required ratio staffing. Additionally, the legislative requirement for patient classification and staffing did not go away; hospitals must staff on top of the ratios based on patient acuity needs. This presented an extra layer of challenges and uncertainties as administrators struggled to satisfy both legislated mandates.

Several facilities have been impacted financial since the enactment of the ratios in January 2004. At Sutter Auburn Faith Hospital, a rural facility in Northern California, the facility added \$1.2 million to their operating budget for 2004 to meet the mandated staffing ratios. "The facility has encountered a fluctuating census over the past few years and this, in addition to the staffing ratios has had a significant impact on our financial operations," states Linda Cook, chief nurse executive. The facility has had

to implement an 8% reduction in the workforce in all departments to meet budget targets for 2004. Sutter Delta's chief nurse executive, Susan Bumatay, stated in an article titled State of Concern, in *Alliance*, published in June 2004, "Sutter Delta posted openings of 21 additional nursing positions to meet the 'at all times' provision at a cost of more than \$2 million. We'll have to continually use travelers until we can recruit," she says, but the price has been staggering. By late April, she had already exceeded her staffing budgets for numerous areas.

In addition to the financial burden of increasing and reorganizing nursing staff, AB394 has also caused both foreseen and unforeseen consequences to patient care delivery. Specifically, meeting AB394 has influenced changes in patient placement practices, patient care delivery models, and nurse work and coverage patterns.

Patient placement under AB394 has required additional scrutiny. As emergency departments back up, there is a push to admit patients; at times there is a struggle to match the patient care needs with the appropriate nursing unit. For example, a patient may be placed according to staffing concerns where placement would not mandate the need for an additional nurse. A patient may be transferred multiple times as caregivers strive to meet the patient's optimal care needs, as well as the facility productivity targets.

Implementation of AB394 has also influenced patient care delivery as RNs become the predominant caregivers, causing a shift from a team nursing approach to a primary care module. As primary care nursing is re-implemented, concerns over RN utilization are raised. Is RN time spent bathing and walking patients truly an efficient use when focus on assessment, medication management, and treatments might be more optimal for patient care coordination? Monitoring nurses for work-related injuries due to a change in the patient care model is also a concern that should be evaluated as the impact of ratio staffing is gauged.

Nurse coverage under AB394 has also required increased focus on nursing time on the units. Nurses must now adhere to strict break schedules to ensure "at all times" ratios are maintained versus past practice of relying on nurses' judgments to determine optimal break times. Labor laws require meal periods be taken within specified time frames, increasing the challenge of providing coverage for lunches and breaks with a relief nurse.

Increased utilization of charge nurses and other coverage nurses often means these nurses are utilized to perform patient procedures when not assigned to cover staff for breaks and lunches. This can cause an interruption in care continuity as care is shifted to utilize available staff on the nursing unit. The increased coverage responsibilities for the charge nurse and/or resource nurse have required a new role definition and job duties for these staff members.

The California Healthcare Association (CHA) has been surveying nurse executives since January to determine what effects the ratios have had on California Hospitals. As of July 2004, the Nurse Staffing Ratio Survey reports:

- Longer emergency department wait times, as compared to one year ago, were reported by 33% of the respondents.
- (For the week of July 15, 2004,) 86% of respondents reported they were unable to meet the ratios in every unit for every shift.

- Of the respondents reporting that they were unable to transfer patients, 34% reported the reason was the inability of the receiving hospital to meet the ratios.

Barbara Nelson, chief nurse executive, Sutter Roseville Medical Center, states, "We struggle to comply with these regulations on a continual basis 'at all times,' on all units. In addition there are simply not enough nurses in the world to meet the current demand, yet alone the ratios. When RN supply is limited and ratios mandated, choices will have to be made about open beds and access."

Some of the goals of AB394 were to improve patient safety, patient satisfaction, and quality outcomes. Conclusive effects on patient safety are not yet available. While Sutter Health continues to monitor patient satisfaction, there is no definitive data on the effects of AB394 at this time to indicate that it is a patient satisfier. Regarding patient outcomes, the California Nurses Outcome Coalition, the largest nationwide prospective nursing database, indicates, "they have not seen significant data at this point to indicate that the staffing ratio changes are improving patient outcomes," *Alliance*, July 2004).

While the effects of AB394 on patient satisfaction and clinical outcomes are uncertain, the need for more nurses is real and growing. The critical nursing shortage further impacts staffing ratios. In the Sacramento area, Sutter began looking at the nursing shortage in 2002 and determined that the area's colleges graduated only 238 nurses annually while 1,000 openings existed. Data gathered indicated that the Sacramento County area would need 4,070 registered nurses by 2006 based on growth and attrition. This equates to 581 new openings per year. Sutter Health put together a joint venture with Los Rios Community College and provided \$13.6 million to be utilized toward education, classrooms, and tuition. Sutter also agreed to provide clinical instructors and clinical site access for this competitive-based accredited program. By 2005, all nursing programs in the Sacramento County area combined anticipate graduating 1112 new registered nurses. This represents an increase of 238% over a three-year period.

While Sutter has been successful in increasing the future supply of new nurses, it is not known if AB394 will enable hospitals to retain more nurses. VHA's Vice President and Chief Nursing Officer Lilee Gelinias, RN, says, "Although staffing numbers have improved at most California hospitals, what's going to tell the story is the turnover." She adds, "Are nurses staying at hospitals or are they still seeing them as a bad place to work and leaving? It's not the staffing number that's the true bellwether; it's the turnover rate." *Alliance*, July 2004.

Data gathering and assessment on AB394 continue. It is essential that we monitor patient care outcomes, length of stay, patient and nurse satisfaction, and retention as we continue to care for patients with a critically limited workforce.

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An Executive Viewpoint

“Clinical expertise, education, shared governance, and evidence-based practice should dominate the patient care delivery system provided by nurses — not staffing ratios based upon arbitrary, regulatory requirements.” So states Richard Hader and Tara Claudio in this essay, which defines how New Jersey's Meridian Health, a three-hospital, award winning Magnet system, has chosen to meet patient needs by staffing according to aggregate, objective, and reliable data submitted by nurses who are providing patient care.

When based upon a professional nurse's assessment, an evidence-based acuity system can provide the nurse with information that can result in the appropriate allocation of human resources to effectively meet the needs of the patient. The delivery of nursing care is complex as it requires both professional interventions and ancillary services to effectively deliver patient-centered care. The patient needs are the driver that determines skill mix, hours of care per patient day (HPPD), and ultimately the translation of that data to a budget that is based upon valid information.

Staffing nursing units based upon ratios assumes that all patients require the same amount of nursing care regardless of their acuity. Individual patient needs are dismissed by the implementation of a staffing model based upon a “cookie-cutter” approach to professional nursing care and practice. Staff nurses have historically argued the uniqueness of each individual patient. The patient's need for education, behavioral and spiritual support, as well as technologic interventions must all be measured to ensure that the quality of the interventions result in improved clinical effectiveness. An effectively managed acuity system that is implemented through the use of a consistent methodology will more closely align with the nurse's assessment of the needs of his or her patients, validating the need for staff.

Staff nurses and nurse leaders must be held accountable for the distribution of a finite pool of human resources. Staff nurses govern the amount of staff required on the unit based upon their professional assessment of the needs of the patient. Allowing the nurse to autonomously measure the needs of the patient provides a workforce that is more engaged in the business of managing the unit and provides an environment that is based upon a professional model of nursing care and practice. It is the nurse leader's role to ensure that the data provided by the registered nurse is accurate by implementing regular reliability studies to assure the integrity of the system. Wasting professional talent based upon subjective regulations, disregarding the needs of the patient, and barring nurses from appropriately assessing their patient needs will further disenfranchise nurses in an already turbulent work environment.



Tara Dugan Claudio

To be effective, an acuity system must be valid and reliable. The system must be properly implemented, continually maintained, and periodically evaluated. An acuity system must accommodate minimum staffing to provide basic patient safety at times of low workload or census. An acuity system must also be flexible enough to be effective throughout the health care continuum and allow for unpredicted changes in volume or census.

Economic pressures require that professional nurses measurably define those areas that require the delivery of expert care. An acuity system allows the budgetary process to be free from subjectivity, providing true "apple-to-apple" comparisons between units. Using a tool that is both reliable and valid is required armor in making difficult budgetary decisions.

Staffing ratios are not the cure to improving the workplace of the nurse. Distributing resources based upon need, evidence, and objectivity will improve the workplace and ultimately the care delivered to the patient.

About the Authors

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A Performance Improvement Perspective

Will Ratios Work? Or Won't They?

Only through disciplined investigation from a performance improvement perspective will nurses and other stakeholders know the answers to these questions. In this article, read about how a noted quality management expert sees the question of effectiveness and what she believes ratios must prove in the essential areas of safety and outcomes.

Introduction

Nurse staffing patterns have been a central focus in health care for the past 20 years, and they continue to receive considerable professional and public attention since mandated nurse staffing ratios went into effect in the state of California. Current nursing and health care research indicates that there is no evidence to support mandated nursing ratios.

However, a report recently published by the Institute of Medicine (IOM; 2003) discusses the utilization of regulated personnel ratios by other service industries, including child day care, education, fire services, and the airline industry. It can be argued that nursing care differs from these service industries in that direct assessment, care, and interventions are provided by nurses to an ever-changing population of varying acuity within the multifaceted hospital setting.

Consequently, nursing ratios are an inappropriate intervention for the complexity found in the nursing and the health care environments. However, dismissing nursing ratios without further study is equally inappropriate particularly as they are in effect in California and are under consideration by other states and the United States federal government. From a performance improvement perspective, nursing ratios should be rigorously studied and evaluated for their effectiveness. Specifically, nursing ratios must demonstrate effectiveness to significantly improve two fundamental aspects of modern health care: patient safety and patient outcomes.

Patient Safety

Since the 1999 publication of the Institute of Medicine's report *To Err is Human: Building a Safer Health System*, there has been continued emphasis on improving patient safety in the health care environment.

This emphasis demonstrates that safety is considered to be an essential component of quality care by key stakeholders. In 2001, the Agency for Healthcare Research and Quality (AHRQ) reported that 50 million dollars in funding would be made available to reduce medical errors and improve patient safety. The Centers for Medicare and Medicaid (CMS) issued a new rule in 2003 requiring hospitals to implement quality improvement

programs designed to reduce medical errors and identify patient safety issues.

Additionally, the Joint Commission on Accreditation of Health Care Organizations (JCAHO) is addressing patient safety through its 2004-2005 National Patient Safety Goals and through a significant number of the accreditation standards. Other key organizations actively pursuing patient safety include the National Quality Forum (NQF) and The Leapfrog Group.

Clearly patient safety is a national agenda. Interestingly, many of the safety initiatives and research stemming from these organizations involve, either directly or indirectly, the impact of nursing care on patient safety. In fact, the IOM 2004 report, *Keeping Patients Safe: Transforming the Work Environment of Nurses* states: "The evidence cited ... makes it clear that ... nurses are the largest contingent of health care workers and perform critical patient safety functions while operating at the 'sharp end' of health care."

Nursing care and patient safety are inexorably linked, and a safe patient environment necessitates a sufficient number of registered nurses to care for patient needs. Mandated nursing ratios have yet to demonstrate that they have impacted and improved patient safety. Evidence for their efficacy would be demonstrated in two domains:

1. A reduction in safety-related incidents and outcomes that have previously been associated with nurse staffing levels including medication errors, pressure ulcers, nosocomial infections, sentinel events, and/or near misses.
2. The effective implementation of nursing-related national patient safety goals (NPSG) and the National Quality Forum (NQF) endorsed safety practices, including but not limited to*:
 - Use at least two patient identifiers (neither to be the patient's room number) whenever administering medications or blood products. (NPSG)
 - Accurately and completely reconcile medications upon admission and transfer within and outside of the organization. (NPSG)
 - Specify an explicit protocol to be used to ensure an adequate level of nursing based on the institution's usual patient mix and the experience and training of its nursing staff. (NQF)
 - Evaluate each patient upon admission, and regularly thereafter, for the risk of developing pressure ulcers. (NQF)

*These bullets do not represent the complete content of the national patient safety goals or the NQF endorsed safety practices. Please see www.jcaho.org and www.qualityforum.org for the full versions.

To effectively implement nursing-related national patient safety goals and NQF endorsed safety practices, a sufficient number of registered nurses will be necessary to assess and evaluate patient status, provide process-focused nursing activities, and provide nursing interventions based on patient needs.

Patient Outcomes

Along with patient safety, the effect of mandated staffing ratios on patient outcomes must also be examined. Several definitions of patient outcomes

are available in the health care literature. However, the following definition will be used for the purpose of this discussion:

(An) outcome is usually defined in terms of the achievement of or failure to achieve desired goals. Relative to these goals, from a defined starting point, outcomes can be either positive or negative, ranging from complete health to death (or worse) (Wilkin, Hallam, and Doggett; 1992).

Traditionally outcomes have been described in terms of mortality, physiological measures, infection rates and patient satisfaction. Research focusing on nursing-sensitive patient outcomes has not been conducted historically. Hall et al. (2003) reported that research on nursing-sensitive patient outcomes began after the publication of the 1996 IOM report that focused on nurse staffing in hospitals and nursing homes.

These researchers report clinical outcomes that have been linked to nursing care in the literature including: functional status, pain control, self-care, and symptom distress (McGillis Hall, L., Doran, D., Pink, G.; 2003). However, the impact of nursing care on patient outcomes is contradictory (Lang, Hodge, Olson, Romano, Kravitz; 2004). Yet, in May 2004 the AHQR published a press release reporting that recent research identified:

Hospitals with lower nurse staffing levels, nurses who spend less time with patients, or fewer registered nurses compared with licensed practical nurses or nurses' aides tend to have higher rates of poor patient outcomes including pneumonia, shock, cardiac arrest, and urinary tract infections (AHQR; 2004).

This research takes into account a more recent outcome designated as "failure to rescue."

Despite the contradictions in the literature, it is apparent that certain patient outcomes are affected by nursing care and that a sufficient number of nurses are necessary to avoid negative outcomes. Needleman et al. (2002) reported that although greater numbers of registered nurses were associated with lower rates of adverse outcomes, this association was not found with licensed practical nurses or nursing aides. It appears that the skills and expertise provided by registered nurses may be associated with better patient outcomes. However, none of the recent studies provide specific direction for the amount of registered nurses necessary to prevent negative patient outcomes or assure positive outcomes.

Thus, there is no current evidence to support minimum nurse patient ratios in relation to patient outcomes (Lang, et al.; 2004). Conversely, none of the studies linking nursing care and patient outcomes specifically focused on evaluating nurse-patient ratios. To understand the impact of mandated nursing ratios on outcomes, two domains should be the focus of study:

1. A reduction of negative outcomes associated with nurse staffing including failure to rescue, urinary tract infections, pneumonia, and pressure ulcers.
2. A statistically significant improvement in positive patient outcomes including pain management, symptom distress, functional status, self-care, and patient satisfaction.

Overall research is lacking on the planned effect of nursing care on patients and needs serious attention by the nursing research community (McGillis Hall et al.; 2003) (Lang et al.; 2004). The NQF has recently published the National Voluntary Consensus Standards for Nursing-Sensitive Care: An Initial Performance Measure Set. According to the NQF's Web site, this report presents 15 measures to promote public accountability and quality improvement (NQF; 2004). The 15 nurse-sensitive performance measures include:

Patient-centered outcome measures

1. Death among surgical inpatients with treatable serious complications (failure to rescue)
2. Pressure ulcer prevalence
3. Falls prevalence**
4. Falls with injury
5. Restraint prevalence (vest and limb only)
6. Urinary catheter-associated urinary tract infection for intensive care unit (ICU) patients**
7. Central line catheter-associated blood stream infection rate for ICU and high-risk nursery (HRN) patient**
8. Ventilator-associated pneumonia for ICU and HRN patients**

Nursing centered intervention measures

9. Smoking cessation counseling for acute myocardial infarction**
10. Smoking cessation counseling for heart failure**
11. Smoking cessation counseling for pneumonia**

System centered measures

12. Skill mix (registered nurse [RN], licensed vocational/practical nurse [LVN/LPN], unlicensed assistive personnel [UAP], and contract)
13. Nursing care hours per patient day (RN, LPN, and UAP)
14. Practice Environment Scale—Nursing Work Index (composite and five subscales)
15. Voluntary turnover

See the [full report](#) for specifications, risk adjustment (if applicable), additional background, and reference material.

** Also an NQF-endorsed voluntary consensus standard for hospital care. For more information see: <http://www.qualityforum.org/txNCFINALpublic.pdf>.

Evidence for specific nurse ratios is lacking. Specifically there is no evidence to support that mandated nurse ratios improve or impact patient safety or patient outcomes. Nursing researchers should make these mandated nurse ratios a priority for future study and investigation. Solid empirical evidence is needed to justify the utilization of nurse ratios. Using the current, available evidence as rationale is not sufficient.

The Role of Performance Improvement

The literature cited in this article is based on research. However, a performance improvement framework may provide a beneficial

perspective to the nurse ratio controversy. According to established performance improvement practices, when a problem is identified, corrective actions are to be established and implemented to improve and resolve the problem.

Through continuous evaluation and application of statistical process control methods, the action is evaluated for effectiveness. Nurse mandated ratios were implemented as a corrective action to improve the care and safety provided to patients in the acute care setting. As a corrective action, ratios must be evaluated for their effectiveness. Performance improvement methodology can provide a solid avenue for studying the effectiveness of nurse ratios in a “real-time” environment and provide reliable information while research results are pending.

Recent work by Sullivan, et al. (2004) combines performance improvement methodologies with research techniques to evaluate staffing effectiveness and provides a framework that can be used by others. In their “staffing-effectiveness methodology,” these researchers utilize statistical process control charts (SPCC), an essential practice in performance improvement, Z-score transformation, and spider diagrams. This approach provides a mechanism to evaluate the impact of staffing on various patient safety issues and patient outcomes as well as comparing data that is tracked differently. The authors state, “Spider diagram plotting of converted Z-score data permits interrelational analysis of data previously considered non-comparative.” (Sullivan, et al.; 2004).

This method, which is reported at the unit level, can be adopted by organizations implementing mandated ratios to evaluate their impact. Finally, staffing and nursing ratios should be integrated into organizations' ongoing performance improvement and safety initiatives. Addressing the impact of nurse ratios at the aggregate, organizational level is not sufficient. Unit-level analysis is essential as nursing units vary in patient acuity, nurse competency, and other elements that affect safety and outcomes. Organization/unit-level report cards and benchmarking are additional performance improvement practices that can be utilized to continuously evaluate the effectiveness of nurse ratios.

Conclusion

Mandated nursing ratios are not derived from evidence-based management practices in health care, despite their use in other service industries. Ratios address a symptom within today's health care environment but do not focus on the root causes that jeopardize patient safety and patient outcomes. Effective staffing practice requires addressing multiple issues including:

- Acuity and patient-specific needs
- The competency and experience of the registered nurses
- The effects of nursing ratios on the hospital's operating budget
- The work environment
- Nursing satisfaction
- The nursing shortage

A discussion of these issues is beyond the scope of this article.

A comprehensive evaluation of nurse ratios, including the aforementioned issues, must be provided to policy makers and stakeholders to determine their effectiveness. If nursing ratios do indeed improve patient safety and outcomes, it is imperative that we understand why. It is equally

imperative that we can demonstrate why nursing ratios do not work. Patient safety and patient outcomes are key domains that will provide a solid foundation for this evaluation.

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The Case for Ratios

Any approach to frame the dialogue on ratio-based staffing must also include an understanding of what the proponents are saying, and doing. In this overview, read about the origins, the legal tests, and the movement of ratios onto the national stage.

California Beginnings

The passage of [California 's Assembly Bill 394](#) was a major victory for one of the bill's most persuasive champions, the California Nurses Association (CNA), <http://www.calnurse.org/cna/ratios62803/> a union representing 56,000 California nurses. For more than a decade, the organization worked to bring nurse/patient ratio legislation onto the governor's desk and led an educational campaign aimed at both California nurses and health care consumers.

Since the law's passage and movement into law in January of 2004, the CNA has worked to pass another bill, AB 253 that mandates effective implementation with meaningful penalties for unsafe staffing.

The organization even maintains a "Ratios Hotline" that logs calls from nurses with questions about the law and even reports violations.

The CNA links staffing ratios to patient safety citing a host of reports from the Institute of Medicine (IOM), Joint Commission on Accreditation of Healthcare Organizations (JCAHO), The New England Journal of Medicine, and the Journal of the American Medical Association (JAMA). Part of the CNA argument for mandated ratios includes a prediction that by improving working conditions for nurses, ratios will serve as a counterbalance to the nursing shortage.

According to the CNA, ratios also deliver cost savings in reduced spending on temporary RNs and overtime costs, lower RN turnover, and shorter length of patient stays.

Clearing the First Legal Hurdle

A challenge from the California Healthcare Association, a hospital industry trade group, was dismissed without merit in May of 2004 by a Sacramento Superior Court. The lawsuit sought to reinterpret the "at all times" clause to exclude periods when nurses were on break or otherwise away from their stations.

The court upheld the law as it stands in a ruling that states, "Staff ratios would be meaningless if not applied to break periods." The decision was

applauded by the CNA and other proponents of the ratio requirements, who had argued that doing away with the "at all times" provision would essentially gut the law.

An appeal is under consideration, according to the California Healthcare Association

On a National Scale

The American Federation of Labor-Congress of Industrial Organizations (AFL-CIO) is aligned with Representative Jan Schakowsky (D-IL) who is sponsoring federal legislation that sets mandatory nurse-to-patient staffing.

The Nurse Staffing for Patient Safety and Quality Care Act of 2004 establishes minimum staffing levels for different hospital units. Once these minimum levels are met, hospitals will be required to develop staffing plans, in consultation with staff, to meet patient needs in the hospital.

Among the bill's provisions is one that provides nurses with the right to refuse to accept assignments that would violate staffing requirements or for which they are not prepared, and prohibits retaliation by hospitals for such refusals or for reporting violations of staffing requirements.

The bill has been referred to the House Subcommittee on Health for further debate.

A New Survey to Support Ratios

In partnership with the AFL-CIO, the National Consumers League (NCL) released a poll that investigated the relationship between nurse staffing and patient safety.

The survey found nearly half or 45 percent of those who have had direct hospital experience in the past two years believe that their safety or that of a family member was compromised by inadequate nurse staffing levels. More than one-third report not receiving important elements of care in a timely fashion, and more than three-quarters support legislative action to improve nurse-to-patient staffing standards.

The survey data is contained in the NCL report, *Consumer Perspectives: The Effect of Current Nurse Staffing Levels on Patient Care*. Click [here](#) to download the report.

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Conference Report

Fifteen hundred nurses and nurse leaders gathered in Chicago in early October for Lippincott Williams & Wilkins' Nursing Management Congress 2004. It was a record turnout of attendees and a rich experience for all. In the next two issues of ENK, we'll present highlights from selected session presentations.

Teamwork Toolkit

Sharon Cox, RN, MSN, CNA

Good teamwork is a complex dynamic with emotional competency as the driving skill in creating effective and self-sustaining teams. Emotional competency, according to Cox is made up of self-awareness, mood management, initiative, empathy, and people skills.

Building good teams can be seen as a pyramid constructed by trust at the base, then moving upward through conflict, commitment, accountability, and results.

The aspects of trust include setting clear expectations and consistent follow through; consistency and dependability; inclusion; visible efforts to drive fear out of the workplace; and, of course, honesty.

Conflict is a natural part of healthy teams, says Cox. Conflict extracts and exploits the best ideas of team members; it solves real problems quickly; it makes critical topics visible for discussion; and, at the very least, conflict makes for lively and interesting meetings. Leaders need the skills to help teams manage conflict in healthy, productive ways ... ways that lead to team members "talking out their issues, not acting them out."

Commitment is about clarity in direction and priorities. The entire team needs to be aligned around common objectives, and the feedback loops are rapid, with immediate assessments of what worked and what didn't. Visual—not verbal—tracking of goals and progress is essential to maintaining commitment in a team, says Cox. Accountability is a powerful force in teams. It ensures that poor performers feel pressure to improve; it identifies potential problems before they can cause significant delays or damage; it creates respect among team members; and it sidesteps the bureaucracy of performance management and corrective action.

Results are what good teams focus on, but not to the exclusion of all else. When in balance, a results-oriented team says "we" more than "I," and it has a continual momentum that moves from good to great.

Finally, about results, Cox says, "Health care consumers are in a report

card mentality. Why aren't we?"

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Retention ... Resilience ... Relationships
Debra Townsend, RN, CEO/President
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Debra Townsend presented a lively and engaging session that urged nurses to make "retention, resilience, and relationships" the mantra of every organization.

Townsend holds that health care and nursing "took our eyes off of retention decades ago, and we're paying the price now." She adds, "Our stars are falling, our leaders are exhausted, and the new kids on the block are being eaten alive."

Unless we change our course, what brought us success in the past will bring us failure in the future.

The new course? According to Townsend it's "Leading with Soul." It's about giving nurses a "choice and a voice" as a antidote to the commitment crisis she observes in many care settings. As hospitals retreat from the promises of security and higher pay as a way to create loyalty, a new generation of nurses has entered the field looking for more from work. How do you ignite performance at all levels, without creating burnout?

One solution, according to Townsend, is understanding the "circles of success." In the first circle is knowing what you and your organization do well and what you don't; the second circle is understanding what drives your economics; the third is knowing where your passion lies, and continually moving toward it.

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Worldviews on Evidence-Based Nursing

***Worldviews* editors select 10 abstracts you should read from the evidence-based pre-conference that was held in Dublin in July.**

In the fourth quarter issue of *Worldviews on Evidence-Based Nursing*, due out in December, we will present a picture of the evidence-based pre-conference "Evidence-Based Nursing: Strategies for Improving Practice" held in Dublin in July 2004.

More than 60 abstracts were selected for oral presentation, and more than 50 for poster presentation. *Worldviews* is committed to disseminating useful information for the achievement of evidence-based practice internationally and to providing a forum for the exchange of ideas supporting the fostering of potential collaborations.

With this in mind, the editorial team has selected some abstracts for publication in this issue. The abstracts published are those that were assigned the highest scores in the submission process for conference presentations and represent the top ten submitted.

As readers will see, these abstracts reflect a wide range and scope of practice, including, for example, implementing clinical guidelines, care of brain-injured patients, and the management of indwelling catheters. Hopefully the publishing of these abstracts will facilitate the harvesting of knowledge for improving patient care throughout the international community.