

Hospital Outcomes Research: Towards Evidence-Based Local and National Policy for Deepening Nurse Shortages

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Outline

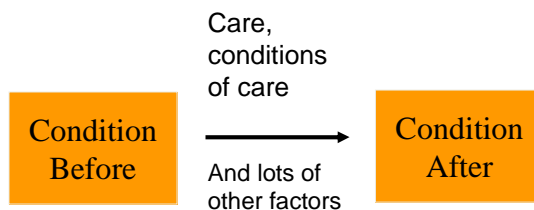
- **Introduction: Hospital outcomes research**
- **Workforce realities facing hospital-based clinicians and managers in the coming decade.**
- **How research can guide management and where cautions should be exercised in its application to practice.**
- **Local and national policy and strategic initiatives for nursing that draw upon nursing outcomes research findings.**
- **Concluding remarks**

Outcomes Research

- The study of context (patient, providers, community, health care system) in relation to the endpoints of clinical care
 - Why do some patients do better than others when to all outside appearances they should fare equally well/poorly?
- Goal is to provide data for improving care quality.
Intended audiences:
 - Clinicians
 - Managers/Administrators/Executives
 - Policymakers
 - Other stakeholders (the public?)

Outcomes as a Function of Inputs (A Probabilistic Model)

Outcomes=f(baseline, patient clinical characteristics, patient demographic/ psychosocial characteristics, treatment, setting)



From Kane (1997)

Nursing Outcomes Research

- Gathering data to address practical choices faced in delivering nursing care to optimize outcomes with whatever ideas and methods have the most to offer (including approaches from sociology, economics, clinical epidemiology)
- Contextually-driven variability in care provided is of great interest—not an annoyance
- Aims: Offering direction for allocating the scarce resource of nursing care wisely and assembling the best evidence possible to guide health policy

Nursing Care

- Challenging clinical populations
- Independent clinical judgment
- Implementation of interdisciplinary care plan
- Complex organizational contexts

- Requires a great deal of individual education, judgment, skill, and expertise accrued over time

Staffing

- The personnel responsible for a volume of patients/patient services
- The qualifications of these personnel
- Special significance:
 - Cost implications
 - Recurring shortages

- Staffing is a necessary but insufficient condition for positive outcomes
- What does this leave? ...

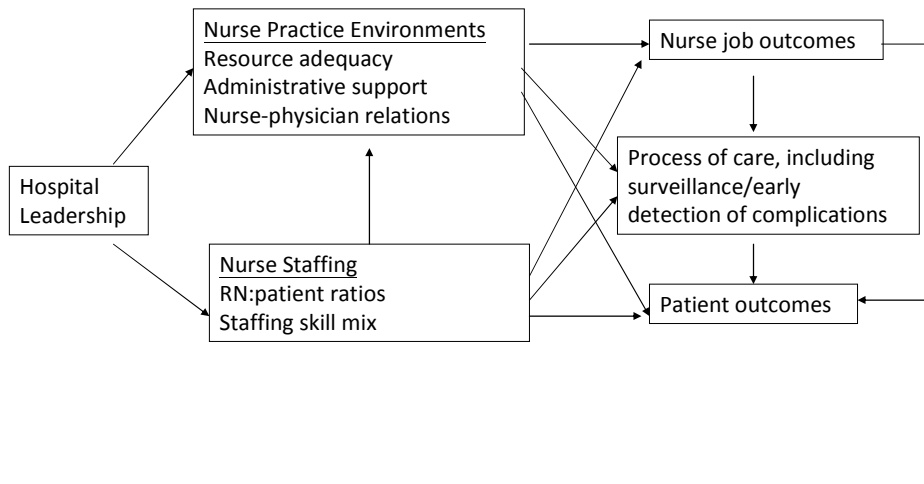
Practice Environments

- All the factors influenced by leaders in an institution that influence nurses' practice beyond staffing parameters:
 - Support for nursing practice
 - Interdisciplinary practice
 - Profile/respect for nursing in the organization

Practice Environments

- Related ideas
 - Organizational climate (broad)
 - Safety climate (narrow)
 - Work environment (for clinicians, practice environment encompasses the elements that permit good patient care)
 - Management practices (leadership in its broadest sense, but also resource allocation)
 - Team functioning (nurse to nurse, nurse to support staff, nurse to other professional staff)

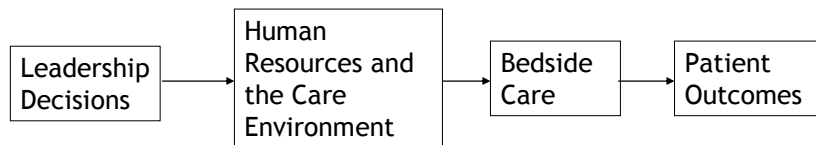
Nurse Practice Environments, Nurse Staffing, and Outcomes



A Summary of the Framework

- Leaders at all levels of the organization make decisions that shape care
- The decisions are of at least two types: human resources and influences on the environment for practice
- It's hard to have excellent care environments with substandard staffing
- Staffing alone doesn't guarantee good care.
- "Real" impacts of staffing and practice environments on care ultimately relate to quality of front-line care.

Framework



Human resources = Staffing levels and qualifications of nurses
Care environment = Support of nurses from managers, availability of resources for care, relationships with physicians, etc.

The Workforce Challenges Ahead

Factors influencing health professional supply

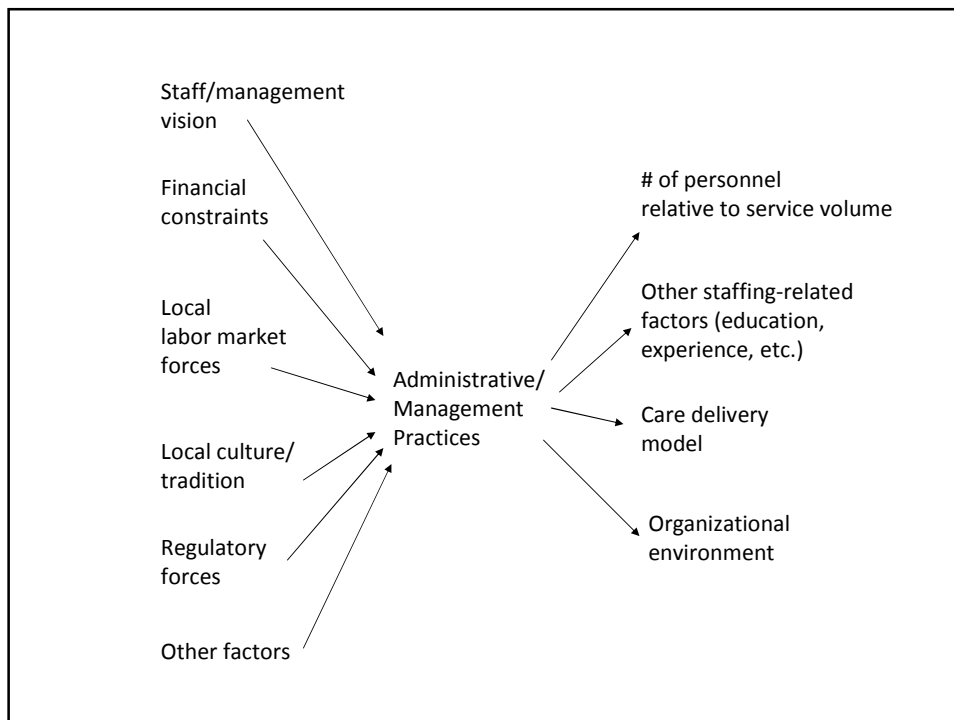
- Educational program outputs
 - Nursing education enrollments and graduations
- Hours worked (part-time vs. full-time)
- Departures from areas of practice where needs are
 - E.g. acute care hospital nursing
- Temporary departures from practice
 - Parental leaves, education leaves
- Permanent departures from the profession
 - Career changes and retirement
- Immigration
 - E.g. internationally-educated nurses
- Reentry following temporary departures
 - E.g. nurses coming back to work taking refresher courses

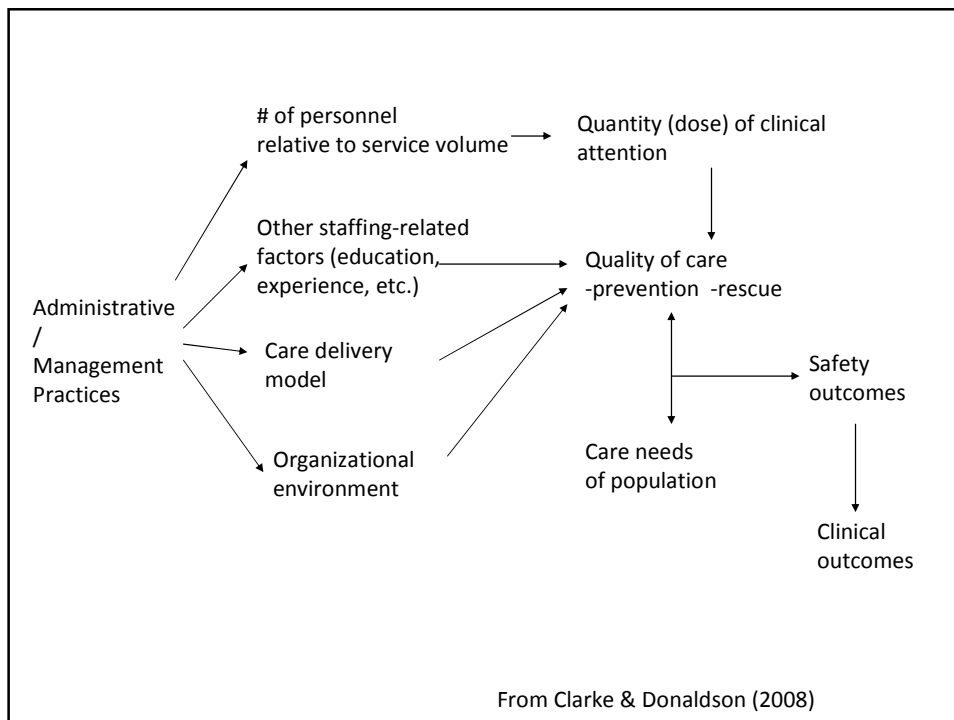
Factors influencing demand for health professionals

- Population needing various services
- Models of care
 - Use of RNs within hospitals or other health care agencies
- Alternative types of health workers providing services (substitution)
 - E.g. practical nurses for RNs, APNs for physicians

Caveats about modeling supply and demand

- Supply is easier to predict than demand
- Demand could be affected by
 - Social change
 - Economic change
 - Technology (could increase or decrease demand)
 - Regulations
 - Changes in scope of practice for nurses and/or those with scopes bordering on nursing
- Like weather forecasting—estimates only as good as the data being used and can always be flawed





Unfilled positions ...

- 3.5% excess demand for registered nurses and nurse supervisors in Canada (Human Resources and Social Development Canada, 2007), 6.9% unfilled positions in 2002 (OECD, 2005)
- American Hospital Association estimates of unfilled RN positions in the U.S.
 - 2001: 126,000
 - 2006: 118,000

Where We Are ...

- Nurse supply and demand trends:
 - Supply
 - Nurses are working more hours, later in life than ever before
 - International migration of nurses
 - Nursing school enrollments have rebounded
 - We have not yet seen mass retirements
 - Demand
 - We have not yet seen the full demographic impact of aging on demand yet ...

Projections/Estimates in the U.S.

- Age and chronic disease burden is increasing
- Optimistic estimates: 300,000 short by 2020
- Pessimistic estimates: 680,000 short by 2015 and 1 million short by 2020
- Will vary from region to region, state to state ... but will touch essentially all states by 2020

- Experts are convinced that Canada and the U.S. will face a national shortage of RNs
 - Perhaps up to 30% of workforce

Realities for Health Care Managers

National and international demographic trends are the major driver of the current shortage—the worst has not struck yet

Supply-demand issues

Does not consider changes in the wind in health care financing

How Can Research Help Us Deal With These Realities?

What is the evidence?

Kane et al. (2007)

Nursing staffing and quality of patient care.
Available at <http://www.ahrq.gov>

- 94 studies examining associations of nurse-to-patient ratios and hours per patient day on patient outcomes in hospital practice from the United States and Canada, 1990-2006
- Formal meta-analysis (calculation of pooled effect sizes across studies and subpopulations) incorporating evaluation of methodological quality

Clarke & Donaldson (2008)

Kane et al. (2007)
Nursing staffing and quality of patient care.
Available at <http://www.ahrq.gov>

- Outcomes associated with RN-to-patient ratios

- Hospital-related mortality
- Failure to rescue+
- Medical complications
- Unplanned extubation*
- Pulmonary failure*+
- Hospital-acquired pneumonia*
- Bloodstream infections+
- Cardiopulmonary resuscitation*+
- Extended length of stay

* Evidence of a stronger effect or more consistent evidence in ICUs

+ Evidence of a stronger effect or more consistent evidence in surgical patients

Clarke & Donaldson (2008)

Kane et al. (2007)
Nursing staffing and quality of patient care.
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Outcomes associated with HPPD (all staff types):

Mortality

Shock

Upper gastrointestinal bleeding

Nosocomial infection

Extended length of stay

Clarke & Donaldson (2008)

Kane et al. (2007)
Nursing staffing and quality of patient care.
Available at <http://www.ahrq.gov>

Where evidence is still limited ...

RN HPPD

- Limited support for impact on outcomes

LPN and Unregulated Health Worker NPR and HPPD

- Trend towards association of worse outcomes with higher use/levels in acute care

Early evidence

- RN education
- Negative effect of overtime

Little evidence

- Policy approaches
- Internationally educated nurses
- Supplemental nursing staff

Clarke & Donaldson (2008)

**Outcomes Linked to 2 Other Factors by
Research at U/Penn's CHOPR and by
Colleagues/Collaborators ...**

- Nurse education
 - Mortality among surgical patients, failure to rescue in surgical patients [death following complications] (Aiken, Clarke et al. 2003) and medical patients (Estabrooks et al. 2005; Tourangeau et al., 2007)
- Practice environments
 - Mortality among medical and surgical patients, failure to rescue in surgical patients (Aiken, Clarke et al., in press, 2008; Tourangeau; Estabrooks)
 - Adverse events in patient care reported by nurses (across a variety of studies)
 - Nurse rated quality of care (Aiken, Clarke, Sloane, 2002 and others ...)
 - Burnout, job dissatisfaction, (Aiken, Clarke, & Sloane, 2002) and needlestick injuries in nurses (Clarke, 2007)

Practice/Care Environment

- Strongest evidence is for factors related to retention of nurses (job satisfaction, burnout, intention to leave)
- *Limited* data demonstrating the link between environments, actual care delivered, and outcomes despite intuitive nature
 - Tourangeau et al. (2007); Aiken et al. (2008); Friese et al. (2008)
 - Limitations of measures and data sources on both independent (environment) and dependent (process, outcomes) sides

A Study With Process of Care Measures Examining Factors Beyond Staffing (MS in Preparation)

- Study funded by RWJF INQRI program
- 552 hospitals total in 3 US states from 2005-2006
- 217,552 patients admitted with primary diagnosis of acute myocardial infarction (AMI)
- Data linkages
 - Large-scale anonymous staff surveys—aggregated to the hospital level
 - Publicly reported HospitalCompare (CMS) process measures
 - State hospital discharge abstract databases (for clinical outcomes)

Nursing Foundations for Quality of Care scale (Sample items)

- An active quality assurance program.
- Active inservice/continuing education programs for nurses.
- A preceptor program for newly hired RNs.

Hospital-Wide Profile of Nursing scale (Sample items)

- Staff nurses are involved in the internal governance of the hospital.
- An administration that listens to and responds to employee concerns.
- A chief nursing officer highly visible and accessible to staff.

In 552 hospitals in California, Pennsylvania, and New Jersey in 2005-2006 ...

- Surveyed levels of “Hospital-Wide Profile” and “Foundations” predict (above and beyond patient and hospital characteristics and staffing):
 - The percentage of patients receiving evidence-based treatment for AMI (this was also negatively associated with levels of practical nursing staff)
 - Risk-adjusted inpatient mortality for patients with AMI
 - Risk-adjusted AMI mortality above and beyond the effect they appear to have on implementation of evidence-based medical treatments
- ... to be continued ...

How Can Research Help Us?

What can we do?

Thinking at Multiple Levels about Nurse Workforce and Nursing Management Issues

- Societal/national/state level
 - Human resource planning
 - Health system funding and alignment of incentives
 - ? Regulation
- Local concerns
 - Investments in local resources
 - Choosing judiciously
 - Defending them
 - Maintaining them

Examples of Potential Investments in Nursing Services at the Local Level

- More staff
- Enriching skill mix
- Revising compensation and benefit packages
- Maintaining/increasing clinical specialist coverage
- Supporting prelicensure programs/students
- Resources to benchmark and improve practice environments
- Selection and development of front-line managers
- Continuing/in-service education
- Investments in analyses of care processes and systems and systems change
- Handling shortfalls of staff—the mix of internal floated nurses versus supplemental agency staff

Examples of Other Specific Investments ...

- Special orientation/nurse residency programs
- Multidisciplinary organization of care
 - ? Rapid response teams

How Can Research Help Us?

What do we need to watch out for?

The Research Question That Has Historically Been Asked

- Are staffing variations correlated with differences in patient outcomes?

The Practical Questions On Everyone's Mind

- What is a safe level of staffing?
- What model of care (constellation of staff by qualification and distribution of responsibilities and tasks) will achieve optimal patient outcomes in a cost-effective manner?

What is Still Needed in Staffing Research

- Can staffing levels in most research studies be *directly* compared to those in the field? No ...
 - Nursing acuity measurement for adjusting staffing to make staffing numbers comparable across institutions is needed.
- Better outcomes:
 - Reliable, valid means of determining to what extent patient nursing care needs have been met
 - Validated outcome measures closer to the point of care with meaningful connections to nursing
- Better databases:
 - Data sources for staffing and outcomes of sufficient size, and of sufficient detail and quality to allow more precise linkages by time and setting of care

Where staffing-outcomes research falls short

- Mechanisms that tie staffing to outcomes
 - Almost all findings are CORRELATIONAL and CROSS-SECTIONAL (same is true for most studies about many other factors)
 - Scientific credibility of the findings
 - Can be used as justification for general approaches/priorities but provides limited guidance for specific managerial and policy decisions
- Limited study of outcomes beyond mortality (and serious methodological concerns about many of the non-mortality outcomes studied)
- Limited/no study of clienteles outside of general types of acute medical-surgical (including ICU) care

Some further unanswered questions

- Models of care involving practical nurses and unlicensed personnel?
- Experience, education and other nurse-specific factors?
- Evaluating approaches to compensate for lower than ideal staffing?
- Direct role of managerial influences and organizational characteristics
 - Interaction of staffing with such factors

Other Innovations in Organization of Human Resources/Services/Care

- Very difficult to evaluate
 - Workable outcomes measures difficult to find
 - Often the evaluation takes place after there has been buy in and the stakes are very high
- Results are often somewhat disappointing
 - Studies are rarely able to identify compelling differences in mortality or turnover costs, for instance, because many factors involved and designs tend to be weak
- Multiple outcomes through the eyes of multiple stakeholders a better way to proceed? ...

So Where Next?

Where We Stand?

- All evidence points to nurse staffing levels/mixes adapted to patient needs as a necessary but not sufficient condition for reducing negative hospital outcomes
- More evidence is accumulating linking factors other than staffing (i.e. conditions of practice, including interdisciplinary relations) to outcomes
- Much more research data than ever before—most has appeared in past decade
- Effective allocation of nursing human resources and wise investments in staff development/quality improvement and practice environments have potentially great consequences for patients and health care organizations
 - Destined to become even more critical in the coming decades

Critical Needs

- Further study and active policy debate about workforce planning
- Thoughtful experimentation with models of care and thorough evaluation of innovations



Benchmarking Background

- Research shows consistent associations between staffing and outcomes
 - Beyond those expected by chance alone
 - Beyond controls for important facility characteristics
 - Beyond controls for important patient characteristics
- Strong suggestions that practice environment factors directly and indirectly influence process of care and outcomes
- Literature and theory suggest a need for leaders to know the positioning of their organizations on staffing and outcomes related to staffing ... and possibly to report these publicly ...

Making the Business Case

- Clarifying what investments should be made
- Benchmarking the country/region/facility on an important structure, process or outcomes parameter
- Understanding stakeholders' perspectives (what's of primary concern to them)
- Defining the benefits from investments (using research or other types of data)
- Framing the data and making the case for stakeholders

Factors to be Considered in Local Business Cases

- Investments
 - Personnel budgets
 - Recruitment
 - Retention
 - Leadership
 - Staff development
- Consequences
 - Turnover and staffing cost overruns
 - Reputation
 - Tangible and intangible markers of care quality
 - Costs of care relative to revenues
 - Reimbursements (especially under P4P)

What Options are Available to Policymakers?

- Carrots (incentives to move in certain directions)
- Sticks (disincentives to move in others)
- Sermons (information to concerned parties to shape behavior)

Political Action

- Analysis of problems
- Outlining and analyzing proposed solutions
 - Costs, effectiveness, durability
- Understanding background, history, previous attempts to solve problem
- Understanding the larger political landscape
- Evaluating stakeholders' positions
- Conducting values assessments
- Ascertain financial and personnel costs
- Analyze power bases available

Influences on Policy Decisions

- Scientific: Searching for truth and building theory, aiming for rigor and objectivity
- Political: Using legal, economic and political arguments consistent with value positions to achieve professional or organizational goals

Policy Approaches

- Carrots (incentives to move in certain directions)
- Sticks (disincentives to move in others)
- Sermons (information to concerned parties to shape behavior)

The Future

In the coming decades ...

- Who will practice nursing? What will professional nursing education look like?
- What will scope of practice be for nurses, other professions and occupations?
- How will institutions and agencies use nurses' services?
- How will nursing services be paid for?
- What societal impacts will nursing services and/or shortages have?
- What societal realities will impact on demand for nursing services?



“Post Apocalyptic Nurse”
RN: The Past, Present and Future of the Nurses' Uniform

University of Pennsylvania, October 3, 2003 - February 14, 2004

“Without good and careful nursing many must suffer greatly, and probably perish, that might have been restored to health and comfort, and become useful to themselves, their families, and the public, for many years after.”

– Benjamin Franklin (1751)

