Perspectives in Ambulatory Care

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Access to Quality Health Care: Links Between Evidence, Nursing Language, and Informatics

Executive Summary

▶ Despite evidence on nursing's contribution to the quality of care, much of what nurses "do" remains essentially invisible.

▶ It is vital to recognize the need for a paradigm shift in nursing that utilizes new informatics tools required for optimum use of evidence related to the delivery of quality nursing care.

▶ Embedding nursing language within informatics structures is essential to make the work of nurses visible, and articulate evidence about the quality and value of nursing in the care of patients, groups, and populations.

FIVE YEARS HAVE PASSED since the Institute of Medicine's (IOM) Committee on Quality Health Care in America launched its initiative on health care quality. One of the products of the committee was a series of quality reports identifying gaps in overall quality in health care in such areas as patient safety, racial and ethnic disparities, and nurses' work environments (IOM, 2000, 2001, 2002, 2003). Each of these reports included problems with health care, an extensive assessment and evaluation of the evidence of the problems including statistical data, and recommendations for closing the gap and improving quality care for all Americans.

With both quality and cost in mind, public and private sector organizations have used these reports

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to examine the evidence base for quality and to drive quality improvements in various areas of the health care delivery system (Swan & Boruch, 2004). For example, the Leapfrog Group (2004), a coalition of purchasers, has advanced three specific quality improvement strategies for metropolitan hospitals, as well as developed a quality index of 27 safe practices. The National Quality Forum (NQF, 2004) has developed over a dozen sets of performance measures, including a "never practices" (adverse conditions that should never happen) program. The goal of NQF is to enable national quality measurement and reporting. The Joint Commission on Accreditation of Health Care Organizations (2004) instituted its "sentinel event" program and more recently its tracer methodology. The National Committee on Quality Assurance (2004) measures the quality of the nation's managed care plans and recently introduced its "Quality Plus" program for Web-enabled health plans. The Agency for Healthcare Research and Quality (2004) supports the National Guidelines Clearinghouse (NGC), the National Quality Measures Clearinghouse, and a quality tools inventory.

In January 2004, the Institute of Medicine held its first summit in followup to the *Crossing the Quality Chasm* (2001) report. The IOM convened a public/private multidisciplinary group to offer strategies to overcome the barriers, both nationally and locally, that confront the health care sector when attempting to improve the delivery of high-quality care to people with chronic diseases. The five diseases targeted were asthma, depression, diabetes, heart failure, and pain control. The recommended strategies were categorized as: (a) measurement, (b) information and communications technology, (c) care coordination, (d) patient self-management support, (e) financing, and (f) community coalition building (IOM, 2004). Specific strategies relevant to accessing quality care in this article are improving information technology infrastructure (measurement), focusing on patient-centered outcomes (measurement), improving public reporting (measurement), using standardized systems (information and communication technology), identifying and disseminating evidence-based self-management practices (patient self-management support), performance-based payment models (financing), and implementing evidence-based benefit design (financing) (IOM, 2004).

National nursing organizations have also used these reports to guide their contributions to quality initiatives (Lang & Mitchell, 2004; Mitchell & Lang,

2004; Vahey, Swan, & Lang, & Mitchell, 2004). For example, the American Academy of Nursing's Expert Panel on Quality convened three state-of-the-science conferences since 1996. Recommendations from the conferences reflected five major areas for strategy development including: (a) information technology, (b) nursing language, (c) research, (d) evidence-based practice, and (e) public visibility of nursing (Lamb, Jennings, Mitchell, & Lang, 2004). Related to information technology, for example, current clinical information systems rarely include data elements considered sensitive to nursing care problems and interventions and rarely measure the impact of nursing on patient outcomes.

The purposes of this article are to describe, from a nursing perspective, the relationships between public reporting, performance indicators, guidelines, evidence, information technology, language, and accessing quality care; and to propose ways for leveraging the relationships between these multiple quality components.

Quality Perspectives

In 1974, Lang proposed a model for quality assurance in nursing (Lang, 1975, 2003). The model took the form of a continuous feedback loop beginning with the formation of values, informed by societal and professional values and scientific knowledge. Next, criteria for nursing care and structure, process, and outcome standards were established. The degree of discrepancy between the standards and criteria and the current level of nursing practice was assessed; followed by selecting and implementing an alternative for changing nursing practice, ultimately, leading to improving nursing practice. Terminology for nursing and for quality assurance has changed over the past 30 years, but the process remains the same.

The IOM defines quality as, "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (1990, p. 21). This definition identifies the concepts of individual, populations, health services and outcomes, and current professional knowledge. The IOM's quality definition does not include cost; however, its 1974 statement on quality assurance does include the concept of "...resources...chosen to spend for that care" (IOM, 1990, pp. 20-21). Cost concerns often compete with the desire and ability to delivery quality care. Similar concepts are used to define evidence-based nursing practice. In addition, current descriptions of evidence-based nursing practice take into account cost and resources, as well as clinical decision making (Swan & Boruch, 2004).

Scientific nursing knowledge is the link connecting the origins of nursing quality assurance to today's evidence-based nursing practice movement made increasingly possible by information technology.

Evidence

Evidence-based nursing, "is the process by which nurses make clinical decisions using the best available research evidence, their clinical expertise, and patient preferences, in the context of available resources" (DiCenso, Cullum, & Ciliska, 1998, p. 38). Evidence can be located in a variety of ways, and each source is important. As there has been a dramatic increase in nursing research, there have been increases in ways to use this research. Finding usable evidence requires considerable effort. Methods include searching library and Internet databases and the Internet, as well as hand searching: tracking down gray or "fugitive" literature, such as quality organizations' consensus documents on standards, guidelines, indictors, and measures. The reader is referred to Swan, McGinley, and Lang (2002) for a further discussion of evidence. The NGC and the Cochrane Collaboration are examples of growing resources to find interdisciplinary evidence. Journals such as *Evidence-Based Nursing* and *WORLDviews on Evidence-Based Nursing*, begun in the past several years, offer many kinds of evidence for nursing practice. Examples of available evidence resources can be found on Table 1. What is still needed is that each researcher think of disseminating research via these Web sites and journals.

Nurses in all clinical settings make hundreds of clinical decisions every day. Patients are sometimes assessed from minute to minute and sometimes over a period of months depending on the nature of the practice. In so doing, nurses identify patient problems/diagnoses based on assessment and collection of patient data. Next, nurses decide on and provide complex interventions. Many of these decisions are strongly influenced by organizational clinical practice guidelines together with professional and personal values. Accurate diagnosis and selection of interventions based on searching and evaluating evidence and research literature at the point of care occurs minimally (Thompson, McCaughan, Cullum, Sheldon, & Raynor, 2002; Thompson, McCaughan, Cullum, Sheldon, & Mulhall, 2001). Therefore, the provision of some nursing care interventions is based on opinion-based decision making with limited attention to evidence-based decision making. For nurses to incorporate higher percentages of evidence-based nursing into their practice, several important components must be in place.

The process and issues to consider when implementing evidence-based practice include: (a) identifying the clinical problem based on analysis of current nursing knowledge and practice, (b) searching the published and unpublished literature for applicable and significant research and evidence and ask-

Table 1.
Selected Internet-Based Evidence Resources

Evidence Resource	URL Address
National Guideline Clearinghouse	http://www.guideline.gov
Evidence-Based Nursing	http://evidencebasednursing.com
Sigma Theta Tau International	http://stti.iupui.edu/library
WORLDviews on Evidence-Based Nursing	http://www.blackwellpublishing.com/journals
Global Evidence	http://www.globalevidence.com
Cochrane Collaboration	http://www.cochrane.org
Campbell Collaboration	http://www.gse.upenn.edu/campbell
Joanna Briggs Institute for Evidence Based Nursing and Midwifery	http://www.joannabriggs.edu.au
Sarah Cole Hirsh Institute for Best Nursing Practices Based on Evidence	http://fpb.cwru.edu/hirshinstitute/about
Welch Library Online: Evidence-Based Resources	http://www.welch.jhu.edu/about
Centre for Evidence-Based Nursing	http://www.york.ac.uk/healthsciences
Royal College of Nursing	http://www.rcn.org.uk
Registered Nurses Association of Ontario	http://rnao.org/bestpractices
Gerontological Nursing Interventions Research Center Centre for Transcultural Studies in Health	http://www.nursing.iowa.edu/centers/gnirc
Centre for Transcultural Studies	http://www.mdx.ac.uk/www/rctsh/ebp/main.htm

ing if sufficient research has been published on the specific clinical problem or issues, (c) evaluating the evidence using established rating schema and asking do nurses have the knowledge and skills to analyze and evaluate the strength of different levels of evidence, (d) choosing nursing interventions based on the quality and strength of the evidence, and (e) developing an evidence-based care plan (Olade, 2004; Swan & Boruch, 2004). Examples of available evidence-based resources related to nursing quality initiatives are listed in Table 2. It is necessary to point out that nurses in clinical practice will never have time to find the appropriate evidence at the time of need unless there is a clinical information and decision support system available at the point of use. There is little time in an active practice to run down the hall to search the Internet or locate hard copies of evidence-based articles. Every health organization must have quick access to available evidence-based information, along with the computerized clinical information system. Dropdown options, alerts, and reminders offering the best nursing evidence are the goals for every clinical information system. If the clinician wishes linkages to more evidence about a topic, this information should be programmed into the system.

In addition, in the past 2 decades, nursing research and measurement of nursing quality in acute and nonacute settings has increased markedly (Rantz, 1995; Rantz, Bostick, & Riggs, 2002). This research not only answers questions about clinical components of the practice, but also about the structure components of the practice. Acute care examples include research on nurse staffing and quality indicators (Aiken, Clarke, & Sloane, 2002a, 2002b; Aiken, Sochalski, & Lake, 1997; Dunton, Grajewski, Taunton, & Moore, 2004; Needleman & Buerhaus, 2003; Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002), educational level of hospital nurses and relationship to patient outcomes (Aiken, Clarke, Cheung, Sloane, & Silber, 2003), nurse work environment and nurse burnout on patients' satisfaction with their nursing care (Vahey, Aiken, Clarke, Sloane, & Vargas, 2004), nurse staffing and the quality of nursing care in hospitals (Sochalski, 2004), and the working hours of nurses and patient

Table 2.
Selected Evidence-Based Resources Related to Nursing Quality Initiatives

American Academy of Nursing http://www.aannet.org	Expert Panel on Quality Quality Health Outcomes Model State of the Science Conferences 1999, 2002, 2004
American Nurses Association http://www.nursingworld.org/quality http://www.nursingworld.org/quality/database http://www.nursingquality.org	Patient Safety and Nursing Quality Initiative (1994) National Database of Nursing Quality Indicators (NDNQI) (1997) Acute Care Indicators: 10 indicators Non-Acute Care Community-Based Indicators National Center for Nursing Quality
National Quality Forum http://www.qualityforum.org	Quality Nursing Performance Measures: 15 indicators

safety (Rogers, Hwang, Scott, Aiken, & Dinges, 2004).

Nonacute care examples include measuring nursing care quality and using large datasets (Rantz & Connelly, 2004; Ryan, Stone, & Raynor, 2004), advanced practice nurse workforce and patient outcomes and health care costs (Brooten et al., 2001; Brooten, Youngblut, Deatrick, Naylor, & York, 2003; Brooten, Brooks, Madigan, & Youngblut, 1998; Brooten, Youngblut, Kutcher, & Bobo, 2004; Naylor et al., 1999).

Nursing Language

Despite this evidence on nursing's contribution to the quality of care, much of what nurses "do" remains essentially invisible. Lang repeatedly challenges that "If we cannot name it (nursing) we cannot control it, teach it, finance it, research it, or put it into public policy" (Clark & Lang, 1992). How can nurses continue to improve their diagnosing and interventions in practice so that health care consumers are accessing and receiving quality care and nurses' interventions are identifiable and measurable? One way is to use a unified or standardized language to describe the care that is provided and also to be able to take advantage of exploding clinical information system technology.

Nurses around the world have been working on developing nursing language (Baernholdt & Lang, 2003; Lang & Clark, 1997). Standardized nursing language "names" the elements of nursing care and facilitates communication among nurses and between nurses and other health care providers. Implementing a standardized nursing language is critical to making the work of nurses visible to health care professionals, health care consumers, payers and regulators of health care, as well as health and public policymakers. Nurses' work must be included in clinical information systems. Nursing language describes the care delivered by nurses in a variety of settings. It enables comparison of nursing data across clinical populations, settings, geographical areas, and time. It demonstrates or projects trends in providing nursing interventions and allocating resources to patients according to their needs, based on nursing diagnoses. It stimulates nursing research through links to data available in nursing information and it provides data about nursing practice in order to influence policy (Baernholdt & Lang, 2003; Coenen, Marin, Park, & Bakken, 2001; Coenen, McNeil, Bakken, Bickford, & Warren, 2001; Elfrink, Bakken, Coenen, McNeil, & Bickford, 2001; Wake & Coenen, 1998). Ultimately, nursing language also makes it possible to easily access evidence-based knowledge stored in national and international databases.

Commonly used and recognized standardized nursing language terminologies are listed in Table 3. The reader is referred to original sources listed in the reference section and the American Nurses Association Web site for a detailed description and explanation of each.

Using standardized language for nursing diagnosis and nursing interventions allows nurses' activities to be described along side medical diagnoses and medical interventions, and their impact measured in relation to patient outcomes. For example, chronic renal failure is a medical diagnosis identified by ICD-9 code #585. Chronic renal failure is linked with the following nursing diagnoses: activity intolerance, chronic sorrow, death anxiety, decreased cardiac output, excess fluid volume, fatigue, imbalanced nutrition, impaired comfort, impaired urinary elimination, ineffective coping, risk for infection, risk for injury, risk for noncompliance, and risk for powerlessness.

Each North American Nursing Diagnosis Association (2004) nursing diagnosis can be connected to a series of Nursing Interventions Classification (NIC) nursing interventions. Nursing interventions for activity intolerance related to

Table 3.
Recognized Nursing Terminology

Datasets
Nursing Minimum Data Set (NMDS) (Werley & Lang, 1988)
Nursing Management Data Set (NMMDS) (Huber & Delaney, 1998)

Classification Systems
Alternative Billing Codes (ABCcodes) (ABC Coding, 2004)
Home Health Care Classification (HHCC) (Saba, 1992)
North American Nursing Diagnosis Association (NANDA) (NANDA International, 2004)
Nursing Interventions Classification (NIC) (McCloskey & Bulecheck, 2000)
Nursing Outcomes Classification (NOC) (Johnson, Maas, & Moorhead, 2000)
Omaha System for Community Health (Martin & Scheet, 1992)
Perioperative Nursing Data Set (PNDS) (Beyea, 2002)
International Classification for Nursing Practice (ICNP) (International Council of Nurses, 2001)

Nomenclatures
Logical Observation Identifiers Names and Codes (LOINC) (Matney, Bakken, & Huff, 2003)
Patient Care Data Set (PCDS) (Ozbolt, 1997; Ozbolt, 1999)
Systemized Nomenclature of Medicine Clinical Terms (SNOMED CT) (Bakken, Warren et al., 2002; College of American Pathologists, 2002)

chronic renal failure may include activity therapy and/or energy management. Each nursing intervention can be evaluated on the basis of the available evidence and its applicability to the individual patient, group, or population. For example, NIC activities related to energy management are ensuring that the patient changes position slowly and monitoring for symptoms of inactivity tolerance. Patient outcomes may include activity tolerance, endurance, and energy conservation (Ackley & Ladwig, 2003). What is the evidence supporting these nursing interventions in patients with chronic renal failure? What is the evidence supporting the accurate diagnosis, the selection of the right intervention, and the predicted outcome? The ideal clinical information system is connected to a best evidence resource so that nurses need only to click to find it.

In all care settings, it is essential to have structure/administrative data, as well as the clinical data for nursing care. In other words, cost-effectiveness determination requires that data are available about the nurses, the hours of care, severity of illness of the patient, as well as the nursing care components (Werley & Lang, 1988). In addition to the importance of standardized clinical language to describe and measure the structure of care, there is a need for accurate description and measurement of the process and outcomes of care (Gallagher & Rowell, 2003). Bolton and Goodenough (2003) describe the debilitating effects of stroke and that the nurse is the "center and the coordinator of the interdisciplinary team" (p. 350). They point out that there are some studies that address resource use in stroke care but are limited because of lack of clinical and financial data.

Nursing Informatics

Nursing informatics is the vehicle that enables evidence of the effects of nursing interventions to be linked with the outcomes of care in relation to the problems identified for a specific patient or groups of patients (Swan et al., 2002). Nursing informatics addresses the management and processing of data, information, and knowledge to support nursing practice and the delivery of care (Bakken, Cimino, & Hripcsak, 2004; Delaney, 2001). Graves and Corcoran (1989) define nursing informatics as "a combination of computer science, information science, and nursing science designed to assist in the management and processing of nursing data, information, and knowledge to support the practice of nursing and the delivery of nursing care" (p. 227). The Division of Nursing uses this same definition for nursing informatics and adds "...to deliver quality care to the public, particularly to disadvantaged and underserved populations" (National Advisory Council on Nurse Education and Practice, 1997, p. 7). The integration of computer science, information science, and nursing science requires a sustainable technology infrastructure to achieve nursing goals related to quality patient care.

Computer science or literacy refers to hardware, software, computing power and speed, interconnected networks, understanding of basic concepts, formal representation of evidence in computer-based systems, and the machinery used to access data and information systems. *Information science* refers to information retrieval, database searching, accessing unpublished studies, coordinating, utilizing, evaluating data and information systems, information management, hand searching, and direct communication with sources. *Nursing science* includes evidence, guidelines, research, knowledge generation, knowledge integration, decision making, and integration. Management of the outcomes of nursing care that contribute to nursing science is accomplished through the use of information systems, technology, and databases (Plocher & Wilson, 2002). Literacy in these areas of computer science and information science is a basic and fundamental requirement for

nursing informatics competency.

Core informatics knowledge and computer skills are essential for all nurses to function effectively in the current health care environment (Carty & Phillip, 2001; Travis & Brennan, 1998). Basic computer skills are not the same as being computer literate in managing clinical and administrative information, which is essential for nurses to deliver quality care (Vanderbeek et al., 1994). What is also needed is the involvement of administrative and practicing nurses in the design and implementation of information systems. Often these systems are left to the informatics experts with little or no input from nurses. Even more distressing is that as health systems purchase information systems from vendors, no nursing executive is present at the table (Simpson, 2003).

As information systems are developed, the first inclusion has been administrative and financial data. The second wave of content has been physician orders and execution, and use of pharmaceuticals. Simultaneously, much development is underway for virtual use and documentation of radiology tests. Last and rarely included in the information technology priority list is nursing care, especially the nursing problems, interventions, and outcomes in a standardized format to be stored in administrative and clinical data repositories. This lack severely limits science/evidence-based practice, quality improvement activities, cost-effectiveness studies, and the use of the data for nursing research (Maas & Delaney, 2004); for example, nursing information and data set evaluation, integration of nomenclature, clinical content, and clinical data repositories. Technologic and informatics literacy are critical in the 21st century workplace.

Information technology has dramatically changed the way nurses work. It is clear that advances in technology and the Internet have transformed consumer and professional access to information and have influenced changes in public policy and the public's role in its health care. The public's expectations are presenting both challenges and opportunities for professionals and communities addressing health issues. Patients will identify more health information online and will take more responsibility for their care. Nurses and other health professionals will assist patients to assess the quality of information (Delaney, 2001; Kassirer, 2000; Stead, 1998; Stead & Lorenzi, 1999).

Using evidence and standardized nursing language embedded in information technology systems allows nurses and health care providers to act individually or collectively in performing a wide array of information creation and processing activities (Bakken & McArthur, 2001). Health organization information systems must provide the technology environment that enables nurses to use clinical information systems to access and synthesize information and evidence from a wide variety of sources, to evaluate the quality and importance of accessed information and evidence, to perform relevant manipulations of the information to describe best evidence, and to disseminate the results of their activities. In addition, the clinical data must be aggregated and stored in a data repository where it can be used for clinical research. When clinical data are added to administrative and financial data, cost effectiveness can be determined. As Simpson stated so well, "now more than ever, health care organizations need to understand the costs and how properly to assign resources to patients and they need to track outcomes — and few decision support systems can help them do that" (Simpson, personal communication, June 28, 2004). This process can be illustrated by the same continuous feedback loop Lang used to describe quality assurance.

It is vital to recognize the need for a paradigm shift in nursing that utilizes new informatics tools required for optimum use of evidence related to the delivery of quality nursing care. An example of these tools, predictive modeling, uses information about health status to predict future health care needs. Evidence is then used to translate that patient information to a predictor of health risks and outcomes (Celebi, 2003). Through the use of artificial intelligence, predictive modeling and evidence-based practice algorithms are being used for disease management (Solz, Liachenko, & Gilbert, 2002). Similar strategies must be developed and implemented for nursing management of patient problems.

The speed with which scientific nursing knowledge can not only be generated, but used to improve the quality of health care can be greatly accelerated by linking easily accessible computerized evidence to clinical information systems, and in turn capturing and storing the documented nursing data for new quality improvement and research studies. Informatics is the vehicle to facilitate this linkage. Embedding nursing language within informatics structures is essential to make the work of nurses visible, and articulate evidence about the quality and value of nursing in the care of patients, groups, and populations.**$**

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Editorial

removed from the hospital staff? How could they not suspect that something had to be really, really wrong for the nurses to join together, get the problem to the administration, and then have the evidence and persistence to achieve the resolution of removal from the medical staff?

As is often the case, the board members were intelligent, sophisticated, and dedicated individuals.

Creating a Code of Civility

As nurse leaders we are either part of the solution or we are part of the problem. Most of us are focused on creating work environments that employ, develop, and retain our staff members effectively. It is in that spirit of becoming employers of choice that we should educate board members. We should honestly share the real exit interview data, identify the negative issues in the work environment, and share our approaches to correcting the problems. Sexual harassment is just one problem that should be addressed by creating a "Code of Civility" that applies to employees, medical staff, patients, vendors, etc. Many of our board members are experienced in creating great places of employment; we can learn from their experiences.

As we finish this calendar year, and formulate New Year's resolutions, it seems appropriate to take sexual harassment out of the closet and bring it into the board room. Join me in being part of the solution!$