The Colorado Collaborative for Nursing Research: Nurses shaping nursing’s future

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ABSTRACT

Nurses in the present health care environment have been reduced too often to being providers of safe, competent care rather than quality care. In response, the Institute of Medicine has recommended that nurses become more involved in making changes to the health care system and use data more effectively. If nursing intends to follow these recommendations, the profession needs (a) fresh perspectives to assist in making health care system changes, (b) partnerships between nurse scientists and nurse clinicians to generate and implement data, and (c) capture of the proper value of nursing as distinct from other elements of health care delivery. The Colorado Collaborative for Nursing Research is an effort to meet the recommendations of the Institute of Medicine. The Colorado Collaborative for Nursing Research has a three-arm structure: a research forum where nurse academicians and nurse clinicians can launch collaborative projects; a research support services arm from which nurse collaborators can obtain help with modeling, statistics, writing, and funding; and a data extraction/data sharing mechanism to inform the decision making of nurse leaders.


Background

The State of the Nursing Profession

Academic and service leaders in the Colorado health care system perceive that nursing has been slow to make change, assert its place at the health care table, and maximize/optimize its use of data (University of Colorado Summit of Denver Area Chief Nursing Officers and Nurse Scientists, personal communication, January 15, 2013). These nurse leaders simply do not know how well the nursing profession is performing, nor are they sure what metrics they should use to evaluate overall nursing performance (University of Colorado [CU] Summit of Western Region Chief Nursing Officers and Nurse Scientists, personal communication, August 14, 2013).

In today’s acute care environment, new registered nurses are being called on to (a) prevent acute care episodes and disease progression, (b) master technology and information management systems, (c) coordinate care with a variety of health care professionals, (d) expand leadership opportunities, and (e) engage in collaborative improvement efforts (Institute of Medicine [IOM], 2010). Furthermore,
nurses must perform all of these tasks at early points in their careers while treating patients with increasing acuity levels (Benner, Sutphen, Leonard, & Day, 2010).

**An Opportunity to Quantify Nursing Quality and Nursing Value**

Passage of the Patient Protection and Affordable Care Act (PPACA) in 2010 changed the U.S. health care system in ways that cannot be fully comprehended yet. Also, in 2010, the IOM issued four recommendations for the future of nursing, with the last two being the most pertinent to this topic. IOM recommendation number three is that nurses form partnerships with physicians and other health care professionals to improve health care; the fourth IOM recommendation is that nurses use data much more effectively. At the same time as the PPACA creates a chance to redesign the U.S. health care system, the IOM advises nurses to help shape the U.S. health care system by using data more effectively and being more proactive.

So, in this opportune moment, nursing leaders and the whole nursing profession must have robust, real-time nursing data and expertise in using data to maximize high-quality, nursing-specific outcomes. This article describes a new nurse empowerment vehicle called the Colorado Collaborative for Nursing Research (CCNR).

**The Basic Structure and Mission of the CCNR**

The CCNR’s three-part structure addresses the IOM’s (2010) recommendations. The first part is a research forum where nurse academicians and nurse clinicians can discuss and launch collaborative projects. The second part is a research support services component in which external stakeholders can get help with modeling, analysis, writing, funding, and more. The third part is a data extraction/data sharing mechanism to inform nurse leaders’ decision making. The overall structure of the CCNR gives nurses a place to convene and develop their own agendas. It offers full material and logistical support in performing nursing research projects. It is currently developing the capability of delivering the data nurses say they need, when they need it, to improve nursing care quality. Each part of the CCNR (in particular, the nursing data extraction and sharing mechanism) is described in more detail later.

The mission of the CCNR is (1) to quantify and champion the discrete contributions of nursing to the U.S. health care system by performing leading-edge nursing research and (2) to make nursing research more robust by generating better nursing-specific data.

**The Need for the CCNR in the Present-day Context**

A sea change in nursing practice requires a sea change in nursing viewpoint: a shift from focusing on present circumstances to focusing on potential ones. The profession of nursing has been living in the actual (Porter-O’Grady & Malloch, 2007) for too long. Living in the actual means basing actions mainly on awareness of the present, planning for the future by extrapolating from current conditions, and focusing primarily on one’s own work rather than system-level work. The traditional funding mechanisms for nursing research have typified this living-in-the-actual emphasis. Whether submitting a proposal to the National Institutes of Health for outcomes-centered research, the Agency for Healthcare Research and Quality for health systems research, or the Patient-centered Outcomes Research Institute (PCORI) for patient-centered research, developing the proposal and receiving funding takes 2 to 3 years, and completing a study takes an additional 3 to 5 years. This 5- to 8-year cycle for completing a single study is not nearly nimble enough to remain relevant in a health care system that displays consistent policy change and constant technological innovation (Sung et al., 2003; Woolf, 2008). This 5- to 8-year research cycle ensures that our future data are based on current conditions, that our scholarship is born virtually obsolete, and that we continue as a profession to live in the actual. Nursing needs a shift to living in the potential (Porter-O’Grady & Malloch, 2007), which means anticipating future reality and emphasizing outcomes, change, and teamwork. To live in the potential, nursing care systems must be efficient, effective, productive, data driven, and value driven (Welton, 2013). Shared funding resources and pooled, large data sets are essential. The vision of the CCNR is to facilitate the shift from living in the actual to living in the potential by developing rapid-cycle prototyping and evaluation measures. The CCNR is in the process of doing this, as will be described later.

**The Need to Isolate and Quantify the Discrete Value of Nursing**

The PPACA of 2010 attaches government reimbursement to health care facilities’ ability to meet quality care benchmarks. The PPACA specifically identifies 30-day readmission rates and health-related quality of life (HRQOL) as benchmarks of quality care (PPACA, 2010). To function in the new PPACA health care system, health care facilities are working toward (a) documenting and tracking metrics such as 30-day readmission rates and HRQOL and (b) understanding those metrics’ responsiveness to specific patient care practices. Although nurses comprise the largest percentage...
of the health care workforce and have the greatest amount of contact with patients, information systems within health care facilities do not isolate data that link specific nursing care practices to desired patient outcomes. Information systems within health care facilities do not make one-to-one connections between specific nurses and specific patients. Therefore, health care facilities are collecting data that do not capture the discrete contributions of nurses and then making decisions based on those incomplete data.

The Challenge of Nursing Valuation

Nurses practice “deliberately in the in-between social spaces of medical diagnosis and treatment and the patient’s lived experience of illness or prevention of illness in their particular life, family, and community” (Benner et al., 2010; p. 31). It is difficult to put a dollar figure on (a) access to the patient’s unique relationship with illness, (b) occupation of the gaps in medical diagnosis, (c) assessment of patient status at multiple points, (d) efficacy of various methods of delivering therapeutic intervention, and (e) skill in coordinating and integrating care (IOM, 2004). Therefore, monetizing nursing practice is a challenge. However, plotting points on the patient health trajectory and anticipating/projecting future points on that trajectory fall within nursing’s purview. Knowing the future points on a patient’s health trajectory is of substantial value to health care providers.

The added value that nurses contribute to a patient’s health is increasingly relevant as we move toward a value-based rather than a volume-based health care system. Greater scrutiny is being placed on both nursing quality and the associated costs of nursing care (Pappas, 2013). Data contained within the electronic health record (EHR) can provide new insights on the delivery of nursing care and the performance of individual nurses (Welton, 2014). A health care system that produces targeted patient outcomes requires nursing-specific data based on metrics identified by nurses, and those data are in the EHR, but they are not being extracted or used.

**HRQOL and 30-Day Readmission Rate as Primary Patient Health Trajectory Indicators**

Patient perception of symptom status is well established as a key dimension of HRQOL (Chang, Hwang, Feuerman, Kasimis, & Thaler, 2000; Desbiens, Mueller-Rizner, Connors, Wenger, & Lynn, 1999; Portenoy et al., 1994; Wang & Bourbeau, 2005). Also well established is the fact that patient perception of symptom status, as a leading indicator of HRQOL, is what prompts a person to seek acute care admission, leads that person to seek subsequent acute care readmission for continued unresolved symptoms (often within 30 days), and the cycle continues.

This cycle contributes to spiraling health care costs. That is why HRQOL and 30-day readmission have been singled out by both the PPACA and the CCNR. Nurses are instrumental in breaking this cycle. Therefore, capturing and measuring the discrete impact of nursing (i.e., placing a tangible value on nursing) is important both for the nursing profession and the health care system. This is where the CCNR comes in.

**CCNR Function**

**CCNR Funding**

Through financial and/or time commitments, the University of Colorado College of Nursing (CU CON) and community partners are funding the CCNR's initial developmental phase. The current breakdown of CCNR financial support is 75% CU CON and 25% community partners. We are expecting this to change to 25% CU CON, 25% community partners, and 50% foundations and philanthropic individuals/organizations.

**The Three Components of the CCNR**

In January 2013, representatives of the CU CON and the chief nursing officers from several health care systems formed the CCNR. The CCNR has (a) a co-operative research platform, (b) a research support shop, and (c) a shared data environment for patient-initiated data (in development). The synthesis of these several components makes the CCNR unique.

**CCNR1: Co-operative Research Platform**

The CCNR provides a co-operative research platform, a virtual as well as brick-and-mortar forum where health care partners and CU CON faculty match interests and produce collaborative research for funding and publication. This co-operative “think tank” meets monthly to generate new strategies and metrics for capturing quality nursing care. In addition to launching collaborative projects at monthly meetings, external CCNR stakeholders may begin the CCNR1 co-operative research process through the CU CON’s research Web pages (http://www.ucdenver.edu/academics/colleges/nursing/research).

**CCNR2: Research Support Services**

CCNR members have access to the CU CON’s world-class research support services, research support facilities, and research support faculty. Table 1 lists a full menu of CCNR2 services.

For health care facilities that lack research infrastructure but want to cultivate nurse scientists,
perform quality improvement studies, or pursue Magnet designation, the CCNR is a ready-made nursing research center. External stakeholders may use CCNR2 on a fee-for-service basis or on a year-to-year contract basis, but the primary function of CCNR2 is to support CCNR1.

**CCNR3: CU Patient-initiated Data**

CCNR3 processes data for CCNR1 and CCNR2 to use. To answer operational research questions, nursing has a need for a distributed data sharing system that enables analysis of patient data aggregated from multiple hospitals. The CU CON and regional hospitals/stakeholders collaboratively launched CU Patient-Initiated Data to (a) extract near real-time patient outcome metrics from the EHR, (b) return trending data to hospitals for operational decision making, and (c) yield superior patient care quality and efficiency. The design approach leverages existing systems and infrastructure to meet system goals through reusable design philosophy (Reeder, Hills, Demiris, Revere, & Pina, 2011). Figure 1 depicts the CCNR3 general process flow, and Figure 2 provides a sample trend report.

Nurse leaders in health systems, operations, and informatics are working within the CU Patient-Initiated Data system to process and manage structured, semistructured, and unstructured data found within the EHR. The objective is to extract various data from different EHR systems and then translate those data into a uniform, CU Patient-Initiated Data nomenclature. Again, doing this will allow CCNR3 to isolate the impact of nursing care practices on patient outcomes from EHR fields, EHR drop-down menus, and EHR narrative entries and then return the data to facilities for real-time decision making. CCNR members agreed from day 1 that no new data would be collected. The CCNR conducts research and evidence-based projects using data already captured in the EHR.

Three ongoing CCNR3 proof-of-concept projects address, respectively, each data structure type found in the EHR—structured, semistructured, and unstructured. A brief description of each of those projects follows.

**First Proof of Concept (Structured Data): Cost and Quality Project**

Very little is known about patient-level nursing costs in hospitals or across the spectrum of health care. The goal
of this proof of concept is to measure direct nursing care costs per patient, beginning in the acute care setting. The study is framed by the emerging abilities (a) to identify and link nurses to each patient and (b) derive within the EHR data actual direct care time and associated costs for each patient. Data are captured within the assignment of nurses to patients from the electronic nurse scheduling and staffing modules. When these data are combined with other quality, operational, finance, and outcomes data, they can provide a robust and near real-time information environment for nurses, managers, and nursing leaders to improve decision making (Caspers & Pickard, 2013; Pickard & Warner, 2007). This approach overcomes weaknesses in traditional cost accounting practices (e.g., nursing hours and costs per patient day) that average nursing time and costs across many nurses and many patients. These traditional department or cost center-level metrics have been criticized as being antiquated and measuring the wrong thing in the wrong way (Kaplan & Porter, 2011). Nursing labor costs consume a substantial portion of health care dollars expended each year; therefore, new metrics and processes to identify actual patient-level costs, as opposed to department-level nursing costs, will provide new insights into how nursing resources are expended and provide guidance to improve or optimize costs without diminishing the quality or outcomes of nursing care.

**Second Proof of Concept (Semistructured Data): 30-day Readmission Project**

CCNR3 is looking at readmission rates to hospitals within 30 days of discharge. Recent data show an average cost of $7,400 per readmission (Friedman & Basu, 2004), much of which, for Medicare patients, will not be reimbursed to hospitals. Patient care or lack thereof has been implicated as a factor in 30-day readmissions; the European RN4CAST study identified missed care practices (e.g., patient and family teaching, pain management, and preparing patients for discharge) related to high nursing workloads (Ausserhofer et al., 2014). On the other hand, hospitals with better patient care as measured by nurse staffing levels have been associated with lower hospital readmission rates (McHugh, Berez, & Small, 2013; McHugh & Ma, 2013; Tubbs-Cooley, Cimiotti, Silber, Sloane, & Aiken, 2013). Although nurse staffing has been linked to readmission, there are few data on whether nursing quality in hospitals is a major contributing factor (e.g., the possible association of nursing interventions such as patient education, discharge planning, and pain assessment/management with 30-day hospital readmission rates).

Although patient demographics are found in structured fields within the EHR, data points such as “education on discharge,” “pain management,” and “discharge planning” are in semistructured fields. This study negotiates both data formats in a cross-sectional, retrospective observational study across several hospital systems. The CCNR3 30-day Readmission Study will help
inform nursing practice and identify potential additional predictors of hospital readmission. In addition, the study aligns with CCNR efforts to build collegiality among participating hospitals and health care systems.

**Third Proof of Concept (Unstructured Data): Symptom Status/Trajectory Project**

Existing research establishes the need to improve processes for symptom assessment documentation (Fan, Filipczak, & Chow, 2007). Furthermore, Fan et al. (2007) suggest that documenting assessments of symptom clusters may reveal more reliable information about an individual’s health status than documenting assessments of single symptoms (such as pain). The CCNR3 Symptom Status proof of concept is currently assessing the type and level of symptom data documented in the EHR. Clinical colleagues in the CCNR record much of their symptom data in nurse narrative notes rather than specified fields (M. B. Makic, personal communication, May 20, 2014). Because so many of the symptom-related data are unstructured in EHR narratives, CCNR3 is collaborating with natural language processing consultants in developing a data extraction algorithm to seek and find words/constructs within the EHR.

**CCNR3 Proof-of-Concept Projects: Near-term Goals**

These current CCNR3 proof-of-concept projects are assembling a national, nursing-focused research community around full exploitation of EHR data. This community has three near-term aims.

- **Aim 1** is to convene senior nursing research, operations, and informatics experts for a 2014–2015 summit. The assembled cohort will (a) define essential nursing information needs related to EHR data use for decision making about patient care delivery, (b) develop additional priority-use cases that leverage EHR data to address real-world nursing issues in acute care settings, and (c) identify sociotechnical barriers and facilitators to EHR data sharing among multiple organizations to enable population-based research studies of nursing interventions on patient health outcomes.

- **Aim 2** is to continue developing the CCNR3 data extraction/streamlining prototype (CU Patient-Initiated Data) based on identified information needs and a selected use case. This prototype will leverage development staff and the existing data-distributed health network infrastructure on the CU Anschutz Medical Campus.

- **Aim 3** is to disseminate key findings and recruit a broader community of stakeholders. This will be accomplished through panel presentations and prototype demonstrations at the Western Institute of Nursing, American Medical Informatics Association, and Academy Health conferences.

In sum, the CCNR3/CU Patient-Initiated Data initiative is (a) establishing data sharing agreements between various health systems that use various EHRs and (b) producing new, significant nursing quality metrics. Ongoing projects will allow the CCNR to extract data from the EHR, process those data, and stream data to participating facilities in real time for real-time, informed responses.

**Conclusion**

The CCNR provides a platform for holistic understanding of the impact of nursing care on the health and wellness of patients, especially with regard to future integration of nursing care left undone in European hospitals: Results from the multicountry cross-sectional RN4CAST study. BMJ Quality and Safety, 23(2), 126–135. http://dx.doi.org/10.1136/bmjqs-2013-002318.


**References**


