The Nursing Value Model: A Structured Approach to Measuring Nursing Care

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Abstract

Value is defined as outcomes/cost of care [1]. *Although nurses contribute significantly within the interdisciplinary care team, we struggle to measure the value of nursing care or the added value of each nurse caring for a patient. This presentation reveals findings of the Nursing Value Workgroup (Workgroup), a multi-year component of the Big Data and Nursing Knowledge Initiative* [2]. *Panelists will discuss: Construction of a common model to provide a basis for developing nursing business intelligence and analytics; development and publication of definitions and metrics for nursing value; creation of user stories to measure nurse sensitive phenomena; and establishment of a data warehouse to facilitate research. Initial findings from a multi-hospital study on pain management and value of care will be presented.*

Keywords: Nursing, Value-Based Purchasing, Patient Outcome Assessment

Introduction

Nurses are significant contributors to the interdisciplinary care team model. Yet, how do we measure nursing care value – or the added value of each nurse caring for a patient? Value is defined as the relationship between outcomes of care and the costs to produce that care [3]. Analysis of big data from existing clinical and operational electronic systems, enables us to examine short term changes in patient status. Historically, nursing sensitive outcomes have been measured at the unit level [4]. The value of nursing is demonstrated through the patient response to interventions, as well as the effects of the characteristics of individual nurses, such as experience and certifications; this presentation will focus on the nursing process at the individual nurse to patient level.

Nursing Value Model

Nursing is both a science and an art. The science of nursing is easily noticeable as nurses keep up to date on new diseases, policies, practices, and procedures. The art of nursing is demonstrated as independent actions s/he considers in response to patient needs, often referred to as interventions. Patient and organizational outcomes reflect the value of the care provided. The Nursing Value Model was developed to measure the science, art and value provided by the individual nurse for the individual patient [5,6]. The Nursing Value Model (Figure 1.) is used to extract and integrate key data from disparate electronic systems, including electronic health records (EHR), staffing, human resources information systems (HRIS), education, financial records, and cost outcomes, to inform evidence-based staffing. The model is setting neutral (acute, primary, public health, school) and software agnostic.

Within the Nurse Value Model there is a direct association between a nurse and patient so analysis can be conducted on patient characteristics such as age, gender, diagnosis, but also allows more granular analysis by acuity, pain intensity, interventions implemented, and outcomes. The demographics and characteristics data of each nurse (education, experience, certification) will further allow exploration into the value of the cognitive decision-making nurses do. The assignment of the individual nurse to the individual patient provides transparency to the dose of interventions and the direct cost of care. These data have unique properties including a time and date stamp, a patient identifier, and a nurse identifier. This allows a range of possibilities such as investigating the overall costs of nursing care for each patient or studying the experience level of each nurse caring for a patient and the outcomes of care [6].

Despite speculation that clinical information technologies will improve clinical and financial outcomes, few studies have examined this relationship at the individual level or across many hospitals. Using a large amount data with sequential time recorded measures of outcomes will be useful to understand nurses' effect in patient outcomes and support staffing decisions.

Sharable and Comparable Data

Many of the data elements in the Nursing Value Model are defined and used inconsistently within and across health systems. To ensure that data is sharable and comparable, the Workgroup developed a dictionary that structurally and operationally defines individual nursing value data elements mapped to standardized terminologies, such as SNOMED CT and LOINC. To reduce redundancies, the Nursing Value Model dictionary uses existing definitions from established dictionaries, including the Centers for Medicare/Medicaid Services (CMS), the Nursing Management Minimum Data Set (NMMDS), the National Database of Nursing Quality Indicators (NDNQI) and others [7,8]. Nursing terminologies, including NANDA NIC and NOC, Clinical Care Classification and Omaha were cross-walked to facilitate studying nursing practice across care settings. The framework recognizes facility preferences, but permits data sharing and benchmarking. Finally, the Workgroup proposes value sets for standards organizations, to approve and use for the measurement of nursing care across inpatient, outpatient, home care and public health domains.

Figure 1. Nursing Value Model [6]
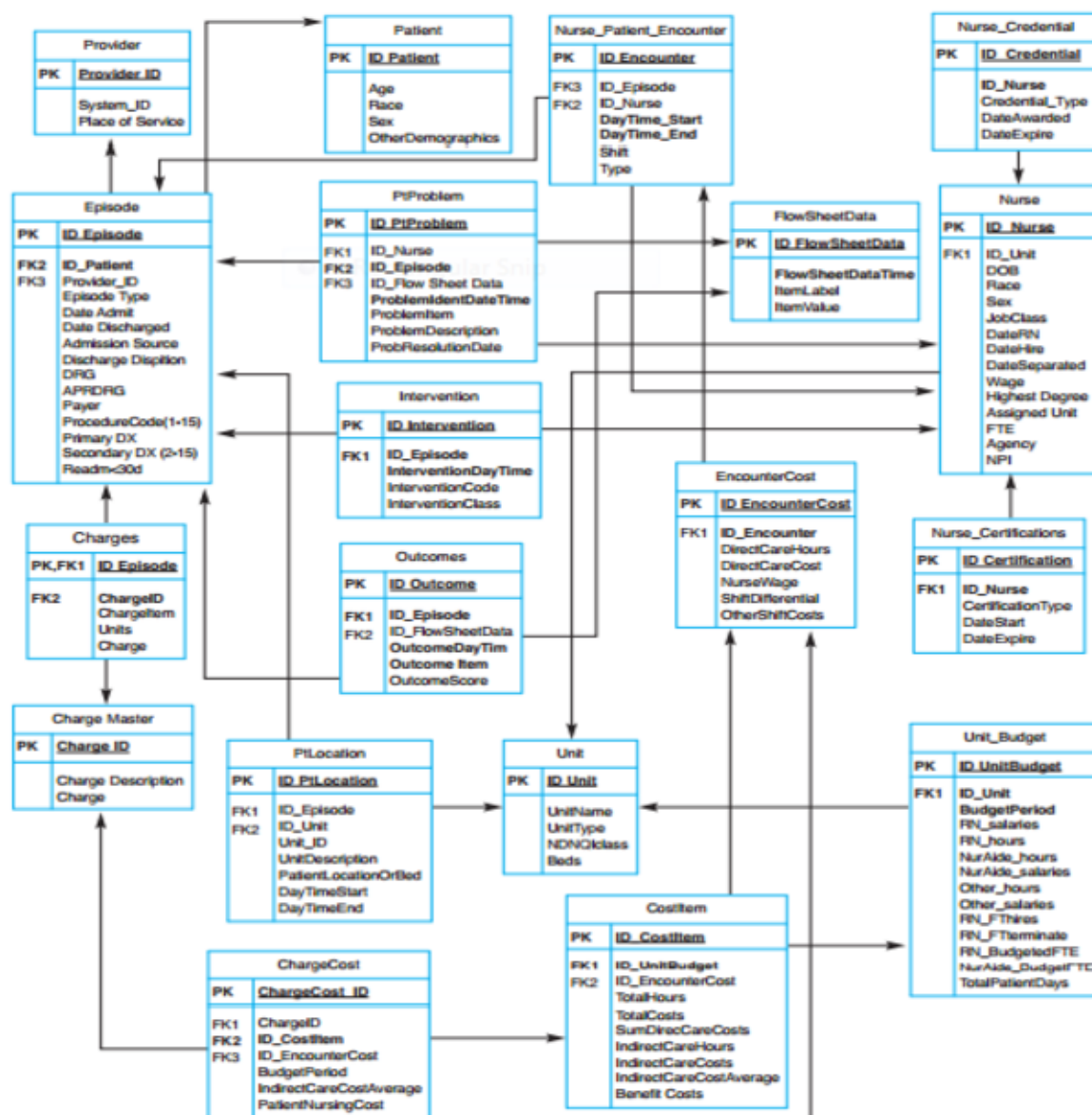
Nursing Value Data Warehouse

Funding was obtained to build a data warehouse at the University of Colorado. Governance is provided through a consortium of the Schools of Nursing at the Universities of Colorado, Kansas and Minnesota. An appointed board represents a range of stakeholders, including the community. The goal of the founders is to facilitate research on the value of nursing. Multi-year data sets from pediatric, community, suburban and urban hospitals are being imported and normalized. Data from the four elements of the model – context of care, the patient, the nurse and finances are linked within the warehouse via unique nurse and patient identifiers, and the assignment of the nurse to the patient within the staffing system or the EHR [6,7].

User Stories

User stories are a way to succinctly convey information system requirements from the perspective of the customer/user. Typically found in business process analysis, a user story is meant to be a short notation written in the language of the customer. Nursing user stories can be helpful for linking nursing essential actions (intervention and activities) to desired patient outcomes. In simple terms, a user story is a set of standard features (role, value, assessment, essential nursing actions, outcome and quality measure) that act as variables of interest needed to answer the research questions.

Initial Studies

The first studies are being done with an urban pediatric hospital and a rural, community hospital. Researchers are interested in establishing new micro-costing models to understand the direct cost of care at the individual patient and nurse level.

Another research team is studying patient response to nursing interventions. Nurses document sequential time-based assessments and reassessments. The frequent, sequential standardized measures are useful to studying patterns of the patient need for care [9]. With each assessment, an essential nursing action is assigned until the desired outcome is achieved – namely, remittance of unrelenting pain symptoms – the outcome metric.

The Workgroup and partner hospitals developed a user story for pain during the first 24 hours following surgery. The nurse (role) uses assessments to identify a patient at risk of prolonged acute pain (value - NIPS/NPASS, FLACC; Wong-Baker Faces Pain Scale, Numerical Rating Scale, FACES, FSP-Revised, Pain Behaviors Tool), evaluating the aggravating and relieving factors of pain (assessment) to predict patients with unrelieved pain (outcome) and assign nursing actions (essential nursing actions - including comfort measures, alternative therapies, medication, characteristics of the nurse, dose of nurse staffing) to decrease the intensity, character, onset, duration of discomfort (quality metric). The user story deconstructs these essential actions into direct and indirect measures that are used to map nurse interventions to desired patient outcomes. The studies are in process; panelists will discuss initial findings at NI 2018.

Comment

The Nursing Value Model needs to be tested across the continuum of care, and hopefully within the global community. We are eager to explore the model and our initial results with nurse informaticists who bring different perspectives to the same problem – how to use data to optimize patient care.

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