

COLUMN

Developing nurse practitioner associated metrics for outcomes assessment

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Abstract

As nurse practitioners (NPs) assume an increasing role in providing care to hospitalized patients, measuring the impact of their care on patient outcomes and quality of care measures becomes a necessary component of performance evaluation. Developing metrics that relate to quality of care measures as well as patient outcomes based on the specific practices of an NP can help to specifically identify the impact of NP care in hospital and ambulatory care settings. New opportunities have arisen for highlighting NP outcomes that can be used to structure NP-associated metrics including the Hospital Value-Based Purchasing Program and the Joint Commission's practice evaluation standards. This manuscript discusses the use of NP-associated metrics for assessing the outcomes of NP care on patient care as well as on quality of care measures.

The measurement of outcomes in health care has become mandatory as federal and state regulatory agencies, institutional guidelines, employers, and consumer groups advocate for quality health care focusing on improving patient outcomes. Healthcare organizations now actively monitor outcomes of care to evaluate performance as well as to comply with accreditation and certification requirements. Contributing to the increased focus on improving outcomes are entities such as the Joint Commission, the National Quality Forum, and the Agency for Healthcare Research and Quality. Mandatory state reporting of hospital quality measures and other initiatives for improving healthcare quality have also prompted a greater focus on outcomes measurement. As nurse practitioners (NPs) assume an increasing role in providing care to hospitalized patients, measuring the impact of their care on patient outcomes and quality of care measures becomes a necessary component of performance evaluation. This article discusses the use of NP-associated metrics for assessing the outcomes of NP care on patient care as well as quality of care measures.

Focusing on outcomes

A number of studies have demonstrated the impact of NP care on patient outcomes, highlighting that NP care promotes patient access to care, reduces complications, and results in improved patient knowledge, self-care management, and patient satisfaction (Newhouse et al., 2011). Yet, while measuring the outcomes of NPs is important, it is not a standard part of institutional practice. In a recent survey conducted by the University Health System Consortium, a large national group formed from the association of 103 academic medical centers, 25 organizations were surveyed on their use of NPs (Moote et al., 2011). Survey responses indicated that productivity was measured with a variety of metrics, including patient encounters, number of procedures, gross charges, collections of professional fees, number of shared visits (Medicare), number of indirect billing visits (Blue Cross), and number of visits billed under the NP provider number. Few organizations had defined productivity targets, and most reported that they did not measure the impact of NP-led interventions, citing

difficulties with linking providers to patients or difficulties with quantifying outcomes. A few organizations reported tracking several specific outcomes, often overall by service, including length of stay (15%); readmission rates (12%); family and patient satisfaction (12%); and specific clinical outcomes, such as ventilator days (8%), urinary tract infection (UTI) rates (4%), ventilator-associated pneumonia rates (4%), skin breakdown rates (4%), venous thromboembolism prophylaxis rates (4%), and catheter-related bloodstream infection rates (4%) (Moote et al., 2011). The results of the study revealed that even in institutions that employ large numbers of NPs (i.e., 200 or more), no focused effort to assess outcomes had been implemented. Assessing the outcomes of NPs and their contributions to care is an essential component of their utilization. Yet it is often challenging to develop focused processes to capture NP contributions to care.

Developing NP-associated metrics to measure outcomes

To date, the literature on the outcomes of NP care have focused on comparing NPs to other providers including medical residents or fellows, physicians, or physician assistants; or have focused on traditional medical outcomes such as functional status, blood glucose, serum lipids, blood pressure, emergency department visits, hospitalization, duration of mechanical ventilation, length of stay, and mortality, among others (Newhouse et al., 2011). While these types of outcome studies have been useful to delineate the impact of NP care, they provide limited information on the unique contributions of NP care. Formulating NP-associated metrics can be used as one strategy for assessing outcomes of NP practice that result from unique components of the NP role. Developing metrics that relate to quality of care measures as well as patient outcomes based on the specific practices of an NP can help to specifically identify the impact of NP care.

New opportunities have arisen for highlighting NP outcomes that can be used to structure NP-associated metrics. The Hospital Value-Based Purchasing (VBP) Program, authorized by the Affordable Care Act, is one recent initiative that is focused on improving performance that has an impact on NP practice. The VBP program focuses on a hospital’s performance on 25 quality measures related to clinical process of care measures and patients’ experience of care.

Under the program, payment incentives will be made based on the performance of several clinical process of care measures, as well as patient reports of the care experience (Table 1). The VBP program will impact payments

Table 1 Centers for Medicare & Medicaid Services Hospital Value-Based Purchasing Program sample measures

Clinical processes of care measures	
Acute myocardial infarction: aspirin prescribed at discharge	
Heart failure: discharge instructions	
Healthcare-associated infections: prophylactic antibiotics discontinued within 24 h after surgery	
Hospital-acquired condition measures	
Air embolism	
Pressure ulcer stages III and IV	
Vascular catheter-associated infection	
Catheter-associated UTI	
Patient experience-of-care measures	
Communication with nurses	
Communication with physicians	
Responsiveness of hospital staff	
Pain management	
Communication about medicines	
Discharge information	

Source: Centers for Medicare & Medicaid Services.

in 2013 for discharges occurring on or after October 1, 2012 (Centers for Medicare & Medicaid Services, 2011).

Under the initiative, a portion of hospital payments will be withheld each year (1% in fiscal year 2013 and gradually increasing to 2% by fiscal year 2015 and beyond) and redistributed as incentive payments to hospitals based on their performance on a number of clinical process-of-care measures and patient experience-of-care dimensions. Patient satisfaction will determine 30% of incentive payments while improved clinical outcomes will decide 70% (Centers for Medicare & Medicaid Services, 2011). As a number of the measures such as infection prevention, venous thromboembolism prophylaxis, glycemic control, and patient satisfaction among others are impacted by NP care, using the concepts of the VBP can be one strategy to develop NP-associated metrics to measure outcomes.

Another resource for developing NP-associated metrics is the Joint Commission practice evaluation standards. The Joint Commission has developed standards for measuring success in the NP role. These standards are actually for all licensed healthcare providers and create a framework on which to build a successful practice evaluation program. The Joint Commission divides practice evaluation into two main categories, ongoing professional practice evaluation (OPPE) and focused professional practice evaluation (FPPE; Joint Commission Resources, 2009). The fundamental premise for OPPE is for a provider’s practice to be measured for quality on an ongoing or continual basis rather than once a year with an annual evaluation or once every 2 years when an inpatient NP requires reappointment for privileges within the institution. The OPPE program must be consistently

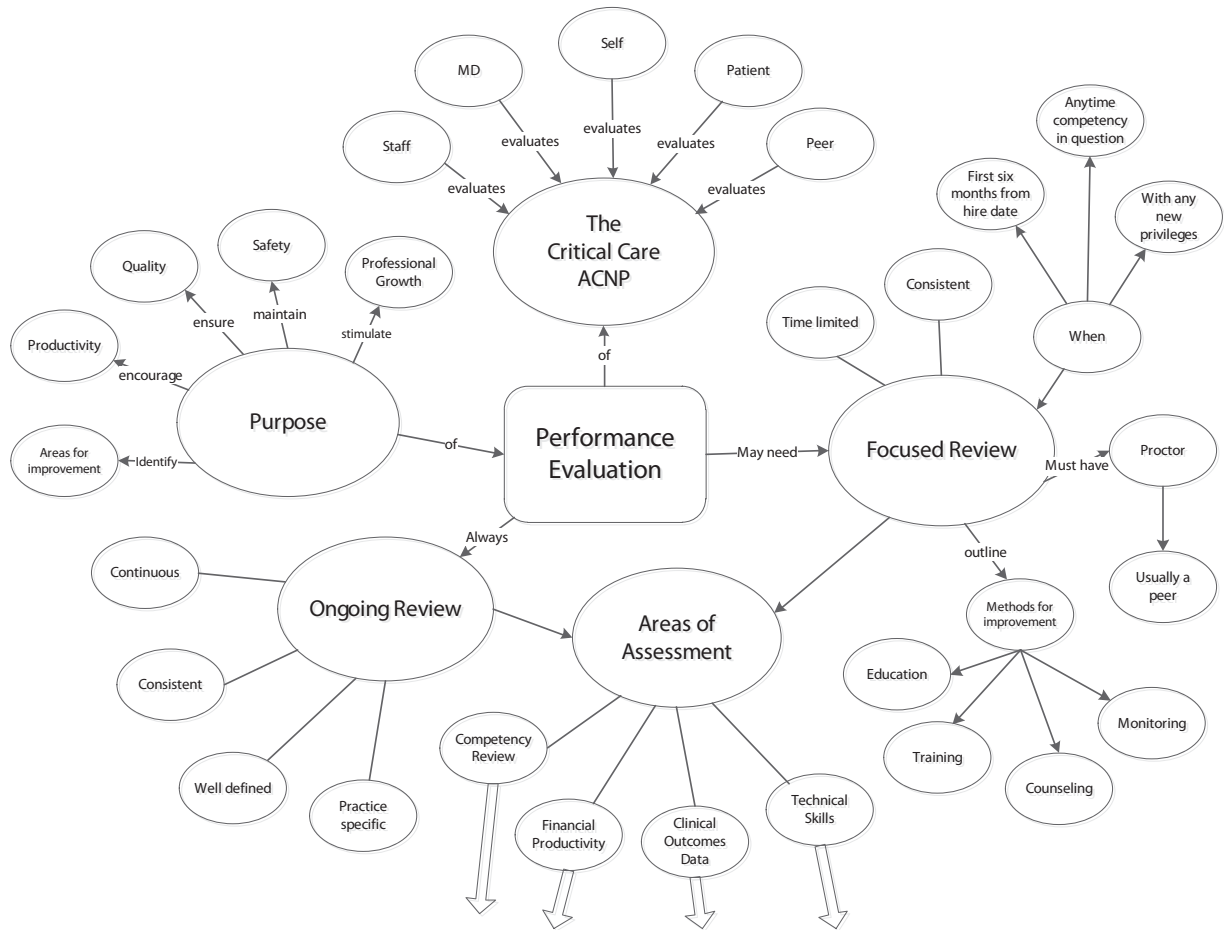


Figure 1 Purpose and definition of critical care NP professional practice evaluation.

implemented, occur more than once a year, and contain metrics that cover the six Accreditation Council for Graduate Medical Education (ACGME) categories of: professionalism, patient care, interpersonal communications, medical/clinical knowledge, systems-based practice, practice-based learning and improvement (The Joint Commission, 2012).

**Developing NP-associated metrics:
The process**

While care is often provided in teams, especially in the hospital-based setting, identifying outcomes that are impacted by NP-led initiatives can help to facilitate the process of assessing outcomes of NP care. As NPs are not the only providers, or the primary providers for patients in hospital and ambulatory care settings, examining components of the NP role that may be associated with outcomes of care can be a starting point. A simple approach to defining NP-sensitive metrics is to first determine what

outcomes are essential to the practice and the organization as a whole. Here, it is critical for the NP to look beyond direct patient care and capture the broad vision of a successful practice. This may include financial goals, clinical outcomes, systems improvement, and customer and employee satisfaction. Once the NP understands the overall vision for success, he or she can examine each goal and determine how the process toward obtaining the goal is affected by the NP. Specifically, exploring the key functions of the NP can provide insight into the ways in which the impact on outcomes can be maximized. For instance, if the goal is to provide cost-effective, quality, and safe care within an intensive care unit (ICU) and the process involves having a prescriptive provider immediately available, one might consider a critical care physician or an NP. Weighing the pros and cons of each, the decision might be to have an accessible critical care physician with a staff of critical care NPs. The perception might be that this arrangement could meet the institutional goals; however, the proof that this arrangement is effective would

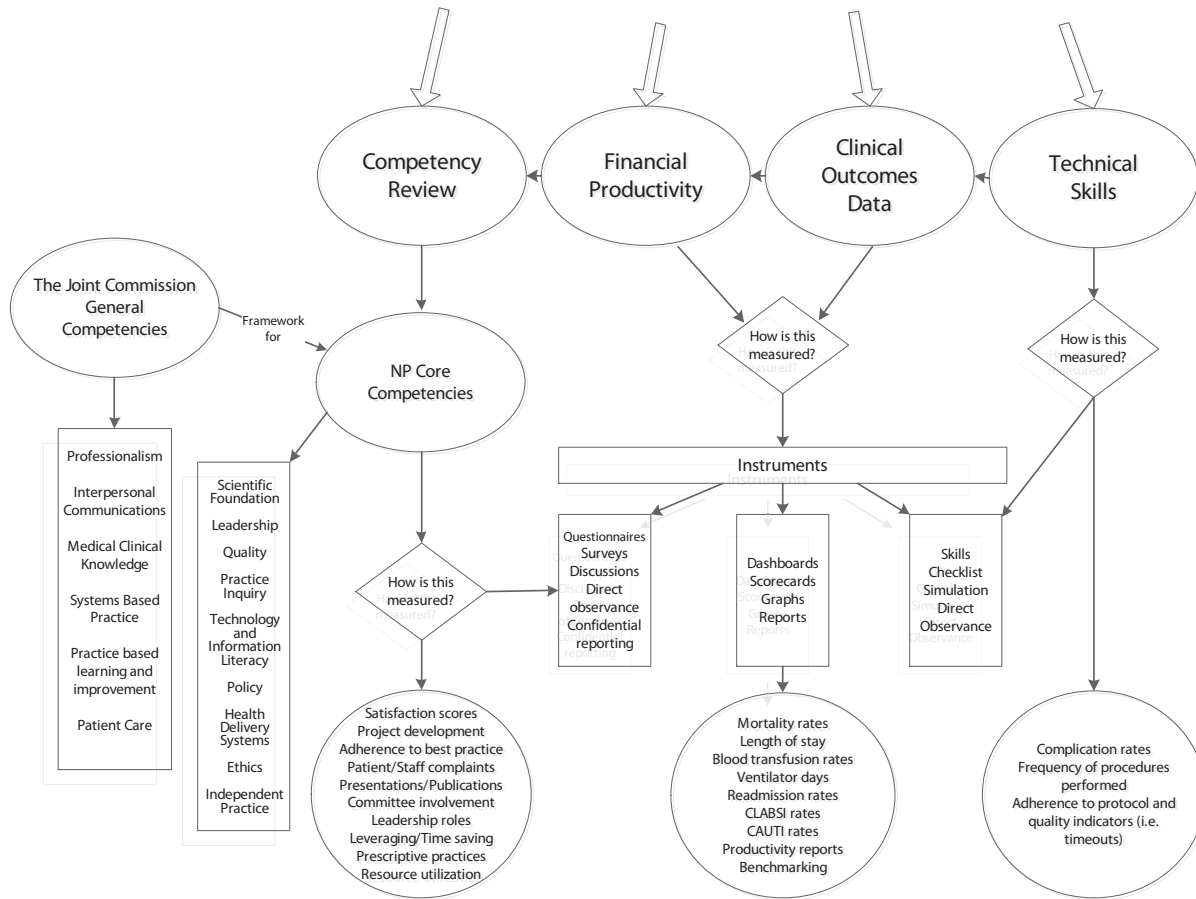


Figure 2 Implementation of critical care NP professional practice evaluation.

be in data supporting cost savings, quality, and safety targets.

A second approach to defining NP metrics would be to begin with measurable goals based on competency. Determining a basic set of core competencies that can be made NP and practice specific can lead to measurable assessment of expertise within the competency. Measurement can be both qualitative and quantitative but

must include defined targets. The key is to start simple, develop a set of core competencies, and identify one or two NP-associated metrics within each competency. However, choosing NP-associated metrics that measure a single competency can be challenging.

Grouping outcomes by type can often be easier than grouping outcomes into particular core competencies because many outcomes cross multiple competencies. For

Table 2 Examples of NP-specific metrics

Unit	Metric	Definition
All ICUs	Central line days	Time of placement to time of removal.
	Foley days	Time of placement to time of removal.
Surgical ICU	Early nutrition	Time of arrival to ICU, post procedure, to any form or amount of nutrition started.
	Early mobility	Time of arrival to ICU, post procedure, to any type of mobility exercise begun.
Medical ICU	Spontaneous breathing trial	Performed at least once every 24 h for patients meeting criteria.
	Stress ulcer prophylaxis	Ordered every 24 h for mechanically ventilated patients meeting criteria.
	Deep vein thrombosis prophylaxis	Ordered for all patients meeting criteria.
	CODE status addressed	Addressed on every patient every 24 h.
Neuroscience ICU	Cognitive screening and swallow consultation	Ordered with 24 h of tracheostomy placement for patients meeting criteria.

instance, if an NP would like to develop a protocol to lead clinical practice and uses evidence to build this protocol, he or she is developing competency in scientific inquiry, medical and clinical knowledge, patient care, and practice-based learning and improvement. Furthermore, if metrics are developed to measure the success of using a protocol as well as adherence to the protocol, quantifiable outcomes data are generated to demonstrate quality in practice. Jennings, Stagers, and Brosch (1999) organized outcomes based on whether they were care related, such as length of stay or readmission rates; patient re-

lated, such as patient satisfaction or assessment of functional status; and performance related, such as procedural complications, documentation, or adherence to evidence-based guidelines. Figure 1 outlines The Joint Commission guidelines recommended for OPPE and FPPE. Using these guidelines as a starting point, the OPPE can be tailored to the NP role. Figure 2 provides an example of one institution’s framework for grouping NP-associated outcomes into the categories of financial productivity, qualitative reviews of competency, clinical outcomes data, and technical skill along with suggested measures. As outlined in

NP Associated Critical Care Metrics		
Quality Metric Template – What the NP sees when they input the data	Data Definitions – Numerator, denominator, specific guidelines	Dashboard – Drill-down association with NP
Foley insertion date/time Foley removal date/time	Total days – Time of foley insertion to time of removal	ICU, NP Provider, Patient
CVC 1 insertion date/time CVC 1 removal date/time	Total days – Time of line insertion to time of removal	ICU, NP Provider, Patient
CVC 2 insertion date/time CVC 2 removal date/time	Total days – Time of line insertion to time of removal	ICU, NP Provider, Patient
Nutrition start date/time	Total days from ICU admission date/time until Nutrition Started (define what constitutes starting nutrition)	ICU, NP Provider, Patient
Early Mobility start date/time and type (passive ROM, physical therapy, ambulation, etc.)	Total days from ICU admission date until mobility addressed (define what constitutes mobility)	ICU, NP Provider, Patient
ST – Swallow study/Cognitive Screen date or choose does not apply	Total days from tracheostomy placement date until swallow evaluation ordered	ICU, NP Provider, Patient
DVT Prophylaxis – choose from SCDs or pharmacological	Percentage of DVT prophylaxis for all patients since ICU admission date	ICU, NP Provider, Patient
Stress Ulcer Prophylaxis – choose yes, no or does not apply	Percentage of applicable patients since ICU admission date	ICU, NP Provider, Patient

Figure 3 Data definitions.

Sample ICU Dashboards

March, 2011 – Code Status							
Dept.	Code Status	Code Status Numerator	Code Status Denominator	Code Status YTD	Code Status Numerator YTD	Code Status Denominator YTD	Actions
SICU	97%	156	161	92%	1138	1231	In Range
MICU	93%	170	190	95%	1200	1300	In Range
TICU	95%	150	180	96%	1156	1200	In Range
CTICU	92%	156	161	92%	1199	1222	In Range

March, 2011 – CVC Days					
Dept.	CVC Avg. Days	CVC Cases	CVC YTD Avg. Days	CVC YTD Cases	Actions
SICU	3.5	150	3.9	5001	In Range
MICU	3.8	175	4.0	4999	In Range
TICU	2.9	145	3.2	3490	In Range
CTICU	4.2	160	4.0	4521	In Range

March, 2011 – DVT Prophylaxis						
Dept.	DVT Prop.	DVT Prop Numerator	DVT Prop Denominator	DVT Prop Numerator YTD	DVT Prop Denominator YTD	Actions
SICU	97%	156	161	1138	1231	In Range
MICU	93%	170	190	1200	1300	In Range
TICU	95%	150	180	1156	1200	In Range
CTICU	92%	156	161	1199	1222	In Range

March, 2011 – Spontaneous Awakening Trial / Spontaneous Breathing Trial					
Dept.	% Mech. Vent Pts. receiving SAT/SBT	Mech. Vent Cases	% Mech. Vent Pts. receiving SAT/SBT YTD	Mech. Vent Cases YTD	Actions
SICU	74%	34	80%	348	Out of Range
MICU	90%	42	92%	400	In Range
TICU	85%	52	89%	320	Out of Range
CTICU	74%	34	80%	348	Out of Range

Figure 4 Sample ICU dashboards.

the example, the general competencies of the Joint Commission’s FPPE and OPPE processes can be integrated to delineate NP core competencies and related outcomes. Systematic development of outcomes related to a specific NP role can then help to highlight the direct impact of the role. Using quantitative data that reflects the care oversight areas of the NP such as days of foley catheter device use and days of central line device use provide measurable metrics that demonstrate the impact of care. For example, an NP hired to work with neurosurgical patients in the ICU could select outcomes such as total days from ICU admission to start of nutrition, total days from ICU admission until swallow evaluation ordered, and percent of patients with deep vein thrombosis prophylaxis to demonstrate the impact on outcomes associated with the role.

Qualitative competency-based assessment involves qualitative measures such as observation, discussions with members of the healthcare team, and descriptions of committee involvement, project development, education, and leadership.

Many NPs perform procedures that require training under supervision, adherence to procedural protocols, competency checklists and for most inpatient NPs, completion of the privileging process to perform these procedures independently. These outcomes are termed as assessment of *technical skill*.

Although *financial productivity* is not always directly associated with quality in patient care, it does demonstrate the revenue generating value of the NP to the organization that in turn can support additional resources, process, and quality improvement. Charges and collections can be followed for billable NP services. Documentation coding can be easily measured and closely monitored for compliance. Relative value units or use of the NP’s time resourced to a particular patient are also measurable. Tools for measurement may include chart audit, spreadsheets, graphs, and electronic database reports.

Clinical outcomes data for NPs are data that are generated as a result of NP-sensitive metrics. Understanding systems and clinical processes that are affected by NPs

Table 3 Points to consider in developing NP-associated outcome metrics

NP associated outcomes data—where to start?
 What are outcomes valued by your institution?
 What are outcomes valued by your practice?
 Are any of your outcomes clinical and if so, are they evidence based?
 Are any of these outcomes (clinical and other) directly affected by NPs?
 Choose 2–4 outcomes directly affected by the NPs in your practice.
 What are the core competencies required by your NPs?
 How do the outcomes chosen measure your NP core competencies?
 This will establish the basis of OPPE for your NPs.
 Define your outcome and goal. Example: For all patients with “X” disease, begin “Y” medication if not contraindicated for the individual patient.
 Goal would be 100%
 How will the outcome be measured?
 Is there data already being collected on this metric? If so, how will the data be mined and presented in a meaningful reader format?
 Can informatics be created to automatically collect the data? If not, how will the NP collect the data?
 If the NP is collecting the data, can the collection process be integrated into the current workflow to maintain efficiency? Can the data be collected manually on a checklist and entered by an assistant into a spreadsheet? Or can a simple survey be created and easily accessible for the NP to complete on each case? Or can the data collection be built into an existing electronic system, such as an electronic progress note; where the data can feed a spreadsheet, table, or dashboard?
 For the measures where the goal is a value other than 100%, what is the target value? What is a reach value? What is an unacceptable value?
 What is the process for addressing consistent unacceptable values? For example, will there be a systems review or a focused review with the NP?
 How will the NPs and others in the practice be able to view the data?
 Example: graphs, dashboards, scorecards
 For practice and institutional review, how are the outcomes data quantified for value?

will help to form the basis for development of quality metrics. A common measure is to evaluate quality pre- and post-adding NPs to the practice. Although a true comparison must rule out as many variables as possible, pre- and post-comparisons are oftentimes justification for adding NPs to a practice. Meyer and Miers (2005) showed that by adding NPs to a cardiovascular surgery service, length of stay was decreased by 1.9 days and costs of care decreased by over \$5000 per patient. Comparing NP-managed teams to other teams or to a previous team compilation that did not utilize NPs is another effective means of quantifying the NP's contribution to quality. A study in 2003 measured consistency in practice guidelines by showing that surgical patients managed by NPs resulted in decreased length of stay, earlier mobility, lower rates of UTIs, decreased urinary catheter days, and decreased incidents of skin breakdown (Garcias et al., 2003). Hylka and Beschie (1995) showed that NP influence on compliance with specific guidelines was significantly higher when compared to a surgical team that did not utilize

Table 4 Additional considerations for capturing NP impact

Involvement in unit-based projects: role and focus of project
 Involvement in departmental-based projects: role and focus of projects
 Involvement in medical center wide projects: role and focus of project
 Spearheaded evidence-based practice change: describe
 Spearheaded research project: describe
 Spearheaded practice change: describe
 Committee membership(s) and role
 Professional organization membership (s)
 Professional organization committee membership(s) and role
 Publications
 Presentations
 Precepting students: type of student; type of clinical precepting; duration of precepting
 Lecture in formal courses: topic and class

NPs. Many physician practices are able to equate mortality rates and readmission rates directly to the physician. This is often more difficult for the inpatient NP as the NP is often one of many providers that have participated in the patient's care along the continuum. However, there are many quality initiatives in which the NP directly affects the outcome. It is by defining the key component directly affected by the NP that determines the quality metric. For instance, the length of time a device, such as a urinary catheter or central venous catheter, remains in place is associated with a higher risk for nosocomial infection. For the NP who determines the insertion and removal date of the device, the NP is directly associated with device days; thereby affecting the risk for infection.

Institutional case example

Scorecards and dashboards are effective methods for displaying ongoing outcomes of NP practice. In 2011, metrics were chosen by critical care NPs in three ICUs at Vanderbilt University Hospital (Table 2). These metrics were chosen based on the following criteria: NP directly affected the process, prioritization to the practice, in line with evidence-based institutional goals. A small number of clearly defined metrics were chosen by each group of NPs, prioritized by improvement need. Two metrics, central line days and urinary catheter days, transcended all units. At least two of the three units chose the remaining metrics with the potential to add or change metrics as the process evolved.

To maintain efficiency, it was important to incorporate data collection into the regular routine of the NP; therefore electronic progress notes were developed for them to write their daily notes but also capture data for their particular metrics. The goal was for the data collected from the note to be transferred to a viewable dashboard, where the NPs could view their both their individual and team

progress. The development of the dashboard first required that each team define the data definition for each metric. These definitions were driven by evidence-based clinical practice guidelines that the NPs had developed in partnership with the physicians in their area. A statistician then programmed the pathways for data transfer and display on the dashboards (Figures 3 and 4). Once the NPs were able to view the results of their adherence to quality guidelines, it was necessary to define what constituted a negative variance that would warrant a focused review. For instance, if the NP's target for average central line days was 4 days, the negative variance might be an average of 5 days or greater; whereas an achieved goal might be an average of 3.9 days or less.

The development of NP-associated metrics can enhance data capture of the outcomes of NP care. A number of strategies can be used to identify and develop NP-associated outcome metrics including identifying high priority outcomes, outlining how the outcomes chosen measure NP core competencies, determining if currently existing data sets that can be used to abstract metrics, and evaluating if informatics can be created to automatically collect the data. Table 3 lists several questions to ask when determining and developing NP-associated outcome metrics. A review and analysis of the specific role components of an NP position can often assist in the identification of outcomes that are directly impacted by NP care. Assessing how data can be collected and whether there are current data sources from which outcome measures can be identified related to the NP role are important phases in the process.

Additional measures including involvement in quality improvement, research, and professional-based contributions are other metrics that can be used to capture NP impact (Table 4). These can be added to the OPPE reporting processes to facilitate aggregate data collection.

Conclusions

NPs are impacting outcomes in a number of ways, yet the importance of tracking outcomes has not consistently been highlighted as an essential component of NP role evaluation. Examples of how NP-specific metrics are being developed and used can provide useful information as well as strategies for integrating outcomes assessment into NP performance evaluation. As NP roles continue to expand, identifying metrics that relate to quality of care measures as well as patient outcomes based on the specific practices of the NP can help to highlight the impact of NP care. Assessing the impact of NPs can no longer be considered optional, but rather should become a mandatory part of integrating new NP roles as well

as in the ongoing evaluation of existing roles (Kleinpell, 2012).

Summary

As outcomes of care are now being used for benchmarking hospital performance as well as to designate reimbursement, integrating NP-specific metrics to highlight the impact of NP care provides value added data. Business plans for the development of new NP roles could then be made based on considerations including savings that potentially could be realized through decreased length of stay, decreased readmissions, decreased complications, adherence to best practices, and throughput, among other outcomes (Kapu, Moote, Stewart, Thomson-Smith, & Hartman, 2012). As NPs assume an increasing role in providing care to hospitalized patients, the use of NP-associated metrics holds much potential for further delineating the scope of influence on patient care as well as quality of care measures.

References

- American Council on Graduate Medical Education. (2012). *Common program requirement: General competencies*. Retrieved from <http://www.acgme.org/outcome/comp/GeneralCompetenciesStandards213.07.pdf>
- Centers for Medicare & Medicaid Services. (2011). *Hospital quality initiatives: Hospital value-based purchasing program*. Retrieved from <https://www.cms.gov/hospitalqualityinits/>
- Garcias, V. H., Sicoutris, C. P., Meredith, D. M., Haut, E., et al. (2008). Critical care nurse practitioners improve compliance with clinical practice guidelines in the surgical intensive care unit. *Journal of Nursing Care Quality*, *24*, 338–344.
- Hylka, S., & Beschle, J. (1995). Nurse practitioners, cost savings, and improved patient care in the department of surgery. *Nursing Economics*, *13*, 349–354.
- Jennings, B., Stagers, N., & Brosch, L. (1999). A classification scheme for outcome indicators. *Image, The Journal of Nursing Scholarship*, *31*, 381–388.
- Joint Commission Resources. (2009). Are you on board with The Joint Commission's FPPE/OPPE requirements? *Hospital Peer Review*, *34*, 137–141.
- Kapu, A. N., Moote, M., Stewart, E. S., Thomson-Smith, C., & Hartman, L. (2012). Forming centers for advanced practice. In R. M. Kleinpell, T. Buchman, & W. A. Boyle (Eds.), *Integrating nurse practitioners and physician assistants in the ICU: Strategies for optimizing contributions to care* (pp. 99–114). Society of Critical Care Medicine.
- Kleinpell, R. M. (2012). Assessing outcomes of nurse practitioners and physicians assistants in the ICU. In R. M. Kleinpell, T. Buchman, & W. A. Boyle (Eds.) *Integrating nurse practitioners and physician assistants in the ICU: Strategies for optimizing contributions to care* (pp. 73–86). Society of Critical Care Medicine.
- Meyer, S. C., & Miers, L. J. (2005). Cardiovascular surgeon and acute care nurse practitioner: Collaboration on postoperative outcomes. *AACN Clinical Issues*, *16*, 149–158.
- Moote, M., Krsek, C., Kleinpell, R., et al. (2011). Physician assistant and nurse practitioner utilization in academic medical centers. *American Journal of Medical Quality*, 1–9.
- Newhouse, R. P., Stanik-Hutt, J., White, K. M, et al. (2011). Advanced practice nursing outcomes 1990–2008: A systematic review. *Nursing Economics*, *29*, 230–250.
- The Joint Commission, Comprehensive Accreditation Manual for Hospitals (2012). Medical Staff Standards MS.08.01.01; MS 08.01.03