NATIONAL QUALITY FORUM

National Voluntary Consensus Standards for Nursing-Sensitive Care: An Initial Performance Measure Set

A CONSENSUS REPORT

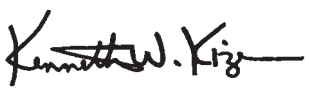
Foreword

Nursing is the largest healthcare profession in the United States, with nurses serving as the principal caregivers in hospitals and other institutional care settings and nursing time constituting the single largest operational expense in any healthcare delivery system. However, considering that nursing as an organized service and nurses as individual caregivers are critical to optimal healthcare system performance, it is surprising how little attention has been directed to date toward developing nursing care performance measures.

This report details 15 voluntary consensus standards for nursing-sensitive care. The National Quality Forum (NQF) has endorsed these measures through its formal Consensus Development Process. This is the first-ever set of national standardized performance measures to assess the extent to which nurses in acute care hospitals contribute to patient safety, healthcare quality, and a professional work environment.

These consensus standards can be used by consumers to assess the quality of nursing care in hospitals, and they can be used by providers to identify opportunities for improvement of critical outcomes and processes of care. Furthermore, these standards can be used by purchasers to incentivize and reward hospitals for better performance.

We thank NQF Members and the Nursing Care Performance Measures Steering Committee and its Technical Advisory Panel for their stewardship of this work and for their dedication to improving the quality of healthcare in American hospitals by standardizing performance measurement of the frontline provider of care, the nurse.



Kenneth W. Kizer, MD, MPH
President and Chief Executive Officer

Permissions
National Quality Forum
601 Thirteenth Street, NW, Suite 500 North
Washington, DC 20005
Fax 202.783.3434
www.qualityforum.org

NATIONAL QUALITY FORUM

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National Voluntary Consensus Standards for Nursing-Sensitive Care: An Initial Performance Measure Set

Executive Summary

Nurses, as the principal frontline caregivers in the U.S. healthcare system, have tremendous influence over a patient's healthcare experience. There is growing awareness that specific characteristics of the nursing workforce directly impact healthcare quality, including healthcare outcomes, patient safety, and the safety of the work environment. In recent years, the national shortage of nurses has led the healthcare community to study more closely the relationship between the number and type of nursing personnel—along with other variables—to healthcare outcomes and hospital performance. This has led to a growing body of evidence identifying certain healthcare processes and outcomes, as well as structural proxies of them, as "nursing sensitive."

This National Quality Forum (NQF) report details 15 national voluntary consensus standards for nursing-sensitive care endorsed by NQF, and it identifies principles for implementing them as well as priorities for research. This is the first-ever set of nationally standardized performance measures that assesses the extent to which nursing personnel in acute care hospitals contribute to healthcare quality, patient safety, and a professional and safe work environment.

These voluntary consensus standards consist of a collection of patient outcomes, nursing interventions, and system-level indicators. Viewed together, they provide consumers a way to assess the quality of nurses' contribution to inpatient hospital care, and they enable providers to identify critical outcomes and processes of care for continuous improvement that are directly influenced by nursing personnel. These

consensus standards also can be used by purchasers to reward hospitals that have higher performing nursing services.

Although endorsement of these consensus standards represents a notable step forward in improving healthcare quality, significant gaps in scientific evidence and research remain. Investigators, measure developers, and performance measurement organizations should review the endorsed research agenda as a roadmap to address these gaps.

National Voluntary Consensus Standards for Nursing-Sensitive Care*

FRAMEWORK CATEGORY	MEASURE
Patient-centered outcome measures	1. Death among surgical inpatients with treatable serious complications (failure to rescue) 2. Pressure ulcer prevalence 3. Falls prevalence** 4. Falls with injury 5. Restraint prevalence (vest and limb only) 6. Urinary catheter-associated urinary tract infection for intensive care unit (ICU) patients** 7. Central line catheter-associated blood stream infection rate for ICU and high-risk nursery (HRN) patients** 8. Ventilator-associated pneumonia for ICU and HRN patients**
Nursing-centered intervention measure	9. Smoking cessation counseling for acute myocardial infarction** 10. Smoking cessation counseling for heart failure** 11. Smoking cessation counseling for pneumonia**
System-centered measures	12. Skill mix (Registered Nurse [RN], Licensed Vocational/Practical Nurse [LVN/LPN], unlicensed assistive personnel [UAP], and contract) 13. Nursing care hours per patient day (RN, LPN, and UAP) 14. Practice Environment Scale—Nursing Work Index (composite and five subscales) 15. Voluntary turnover

* See full report for specifications, risk adjustment (if applicable), additional background, and reference material.

** Also an NQF-endorsed voluntary consensus standard for hospital care.

National Voluntary Consensus Standards for Nursing-Sensitive Care: An Initial Performance Measure Set

Introduction

Nurses, as the principal caregivers in any healthcare system, directly and profoundly affect the lives of patients and are critical to the quality of care patients receive. However, the growing demands of the hospital work environment and the aging of the U.S. population, along with other factors, have combined to result in a national shortage of the registered nurses (RNs) that are needed to attend to mounting patient and workforce demands.

Florence Nightingale, a lay architect of professional nursing, embodied both sympathy for the sick and knowledge of the role that information and measurement play in disease transmission and public health. It is with this same understanding that interest in measuring the contribution of nursing care has grown. The extent to which nursing contributes to the quality of U.S. healthcare and the degree to which the work environment contributes to a culture of safety have been the recent focus of significant professional, research, and policy attention.[1,2] A growing body of evidence demonstrates the influence of nursing personnel—and the stability of that personnel—on patient outcomes, healthcare costs, and the professional atmosphere in which care is provided. Yet, although interest in nursing-sensitive

[1] Needleman J, Buerhaus PI, Mattke S, Stewart M, Zelevinsky K. *Nurse Staffing and Patient Outcomes in Hospitals.* Health Resources and Services Administration (HRSA) Report No. 230-99-0021; February 28, 2001.

[2] Committee on the Work Environment for Nurses and Patient Safety. *Keeping Patients Safe: Transforming the Work Environment of Nurses.* Washington DC: National Academies Press; 2004.

performance measurement[3] is increasing, a lack of scientific research has hindered the development of knowledge in this area.

Given the clinical and social value of nurses and the growing trend of making healthcare quality information available to consumers and purchasers, the paucity of standardized nursing-sensitive performance measures[4] constitutes a major void in quality assurance and work system performance efforts. Without a standardized approach for measuring the environment of nursing practice and nursing's contribution to patient care and safety, it is impossible to consistently evaluate the extent to which the nurse shortage affects the quality of U.S. healthcare and to identify opportunities to improve nursing performance. Furthermore, as new approaches to delivering patient-centered care are developed, it will be essential to have standardized ways to measure the performance and effectiveness of nursing personnel—including those on nursing teams and on interdisciplinary care teams. A standardized set of nursing-sensitive voluntary consensus standards is needed for quality improvement, public accountability, and patient safety.

Voluntary Consensus Standards for Nursing-Sensitive Care

This report details the 15 National Quality Forum (NQF)-endorsed national voluntary consensus standards for nursing-sensitive care, including evidence-based nursing-sensitive performance measures, a framework for measuring

[3] For this report, nursing-sensitive performance measures are processes and outcomes—and structural proxies for these processes and outcomes (e.g., skill mix, nurse staffing hours)—that are affected, provided, and/or influenced by nursing personnel, but for which nursing is not exclusively responsible. Nursing-sensitive measures must be quantifiably influenced by nursing personnel, but the relationship is not necessarily causal.

[4] Voluntary consensus standards are defined as "common and repeated use of rules, conditions, guidelines or characteristics for products or related processes and production methods, and related management systems practices; the definition of terms; classification of components; delineation of procedures; specification of dimensions, materials, performance, designs, or operations; measurement of quality and quantity in describing materials, processes, products, systems, services, or practices; test methods and sampling procedures; or descriptions of fit and measurements of size or strength." U.S. Office of Management and Budget, Revised Circular A-119, *Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities;* February 10, 1998.

nursing-sensitive care, and related research recommendations. These consensus standards emphasize the care that is provided by nursing personnel in acute care hospitals (i.e., the mix of licensed and unlicensed personnel—RNs, licensed practical nurses, and nursing assistants—who deliver nursing services in acute care settings), with particular attention to those standards that are compatible across settings of care. These consensus standards are intended to be an initial set of measures that will, viewed collectively, begin to address the influence of nursing personnel on inpatient hospital care.

The consensus standards have undergone detailed vetting under the NQF formal Consensus Development Process (appendix G), which includes an assessment of the measures' alignment and compatibility with existing provider requirements, accreditation standards, and recommendations of advisory bodies to federal agencies (e.g., the Institute of Medicine [IOM]). To minimize the burden to providers, most of the endorsed consensus standards have their roots in national hospital and nursing initiatives (e.g., Centers for Medicare and Medicaid Services-Quality Improvement Organizations [CMS-QIOs], Joint Commission on Accreditation of Healthcare Organizations [JCAHO] efforts, the American Nurses Association-National Database of Nursing Quality Indicators [ANA-NDNQI], California Nursing Outcomes Coalition [CalNOC] database project, the Department of Veterans Affairs Nursing Outcomes Database [VANOD], and the Military Nursing Outcomes Database [MilNOD]).

Relationship to Other NQF-Endorsed Consensus Standards

This report does not represent the entire scope of NQF work relevant to the quality of hospital and/or nursing care. NQF has completed or is currently working on other projects that are relevant to nursing and its relationship to quality and patient safety. For example, *National Voluntary Consensus Standards for Hospital Care: An Initial Performance Measure Set*[5] identifies 39 hospital care performance measures (e.g., aspirin at arrival and discharge for acute myocardial infarction, neonatal mortality, cesarean section rates) that should be publicly reported by all acute care hospitals. Seven of the endorsed hospital measures, which have quantifiable links to nursing, also have been endorsed as voluntary consensus standards for nursing-sensitive care (i.e., falls prevalence, urinary catheter-associated urinary tract infection for intensive care unit [ICU] patients, central line catheter-associated blood stream infection rate for ICU and high-risk nursery [HRN] patients, ventilator-associated pneumonia for ICU and HRN patients, and smoking cessation for acute myocardial infarction, heart failure, and pneumonia patients). Another NQF report, *A Comprehensive Framework for Hospital Care Performance Evaluation,* details a framework for constructing a complete and enduring

[5] National Quality Forum (NQF). *National Voluntary Consensus Standards for Hospital Care: An Initial Performance Measure Set.* Washington, DC: NQF; 2003.

set of hospital care consensus standards; it recommends processes for reporting, implementing, maintaining, evaluating, and improving the set.[6] The NQF-endorsed framework for nursing-sensitive performance measurement builds on both this hospital framework and the hospital consensus standards previously endorsed by NQF.[7]

Serious Reportable Events in Healthcare identifies 27 serious adverse events (e.g., surgery performed on the wrong patient, infant discharged to the wrong person) that should be reported by all licensed healthcare facilities.[8] Some of these reportable events are directly relevant to nursing performance measurement, such as pressure ulcers and falls. Similarly, *Safe Practices for Better Healthcare* describes 30 healthcare "safe practices"[9] that should be universally employed in applicable clinical care settings to reduce the risk of harm resulting from processes, systems, or environments of care; among the practices are several relevant to nursing care quality—adequate nurse staffing levels and prevention of pressure ulcers, deep vein thromboses, and nosocomial infections.

These initiatives, along with the nursing-sensitive performance measures detailed in this report, provide a growing number of national voluntary consensus standards that, either directly or indirectly, reflects the importance of nursing in measuring and improving quality of care. Organizations that adopt these consensus standards will help promote the development of safer and improved levels of care for all patients.

Identifying the Initial Set

An NQF Steering Committee (appendix C) established the initial approach to identifying, assessing, and recommending the consensus standards. This approach included identifying a specific purpose, establishing a framework for measurement, defining scope and priority thresholds, and screening candidate measures through the application of standardized measure evaluation criteria (box A).

Purpose

The primary purpose of measuring nursing care delivered in U.S. hospitals is to promote the highest level of patient safety and healthcare outcomes in acute care hospitals. Secondarily, endorsed voluntary consensus standards for nursing care will help:

- enhance the clinical practice of nursing personnel, nursing teams, and patient care teams today and in the future;
- promote provider accountability to the public, including but not limited to public reporting and financial incentives (e.g., institutional pay-for-performance, monetary rewards, and performance-based contracting);
- facilitate the identification of priority areas for research needed in measuring nursing-sensitive care that will lead to improved patient safety and healthcare outcomes;
- address the need to educate and train the current and future workforce;

[6] NQF. *A Comprehensive Framework for Hospital Care Performance Evaluation.* Washington, DC: NQF; 2003.
[7] NQF. *A National Framework for Healthcare Quality Measurement and Reporting.* Washington, DC: NQF; 2002.
[8] NQF. *Serious Reportable Events in Healthcare.* Washington, DC: NQF; 2002.
[9] NQF. *Safe Practices for Better Healthcare.* Washington, DC: NQF; 2003.

- support benchmarking and sharing of best nursing care practices; and
- promote the translation of the state of the science of nursing care into the delivery of nursing care.

Framework for Nursing-Sensitive Performance Measurement

Establishing a conceptual model helps to organize measures into categories and shapes the nature and content of the recommended consensus standards. It also provides a framework that can be used to delineate the scope of measures that should be included later, once the state of research advances and the necessary body of evidence is established. The framework for nursing-sensitive performance measurement recognizes that:

- A subset of measures or a separate set of measures is appropriate for public accountability;[10]
- Adaptation of measures to non-hospital settings is highly desirable; and
- Stratification and/or segmentation of data by key factors such as nursing unit type, patient condition, and demographic population is essential.

Consistent with and building on work previously endorsed by NQF, the framework for nursing-sensitive performance measurement is based on three categories: patient-centered outcome measures that address the six NQF healthcare aims—i.e., safe, beneficial, patient centered, timely, efficient, and equitable;[11] nursing-centered intervention measures; and system-centered measures.

The general principles that drive the measurement framework, together with a visual representation of it, are provided in appendix D.

[10] Although designating a subset of measures for disclosure was permissible, all voluntary consensus standards for nursing-sensitive care as detailed in this report have been endorsed for public accountability.

[11] In *Crossing the Quality Chasm: A New Health System for the 21st Century* (2001), the Institute of Medicine (IOM) identifies six aims of the healthcare quality system: it should be safe, effective, efficient, timely, patient centered, and equitable. In October 2000, the NQF Board of Directors adopted a purpose statement that largely mirrors the IOM aims, but states that one aim should be care that is beneficial, which encompasses but also goes beyond effectiveness. These aims were subsequently endorsed by NQF in the consensus report *A National Framework for Healthcare Quality Measurement and Reporting* (2002).

Scope

To qualify for NQF endorsement as a voluntary consensus standard for nursing-sensitive care, a measure should:

- be open source;[12]
- be fully developed (e.g., precisely specified, tested, and in current use);
- apply to the set or the mix of licensed and unlicensed personnel who deliver nursing services in acute care settings;
- apply to acute inpatient and/or hospital emergency care; and
- reflect those aspects of care influenced but not necessarily controlled by nursing personnel.

Priority Areas for Nursing-Sensitive Performance Measurement

For this set, it was considered critical to address patient care functions that are typically directed by or distinctive to nursing personnel and that comprise nurses' dependent, independent, and interdependent functions.[13,14] These functions include conducting assessments and interventions, such as disease prevention, patient education, and care coordination. Additionally, the NQF-endorsed voluntary consensus standards are derived from the following priorities for measurement:

- measures that address nursing care delivered across multiple healthcare settings and that address people's needs across the continuum of care (e.g., prevention, diagnosis, treatment), including those that focus on integrated care, care coordination, and access to care;
- measures that address the six NQF aims, including those that address the stewardship of resources (i.e., care that is safe, beneficial, patient centered, timely, efficient, and equitable);

[12] On January 29, 2003, the NQF Board of Directors adopted a policy that NQF will endorse only fully open source measures.

[13] Irvine D, Sidani S, Hall LM. Linking outcomes to nurses' roles in health care. *Nursing Economics.* 1998;16:58-87.

[14] Doran DI, Sidani S, Keatings M, Doidge D. An empirical test of the Nursing Role Effectiveness Model. *J Adv Nurs.* 2002;38:29-39.

- measures that are consistent with other NQF-endorsed measures and practices;
- measures that address priority areas including but not limited to high-risk, high-volume, high-cost or problem-prone inpatient conditions identified by the IOM report *Priority Areas for National Action: Transforming Health Care Quality;*[15]
- measures that reflect priorities and areas for measurement described by the Agency for Healthcare Research and Quality in its *National Healthcare Quality Report*[16] and *National Healthcare Disparities Report;*[17]
- measures that are evidence based and that are in common, widespread use and/or required for other purposes (e.g., JCAHO ORYX Core Measures, ANA Magnet Status);
- for those measures intended for public reporting, measures that are useful to and useable by the public, including consumers and purchasers of healthcare;
- measures that promote the highest quality and safety of healthcare;
- measures at least some of which apply to **all** nursing personnel; and
- measures at least some of which apply to **all** hospital patients.

Criteria for Selection of Measures

Candidate measures were drawn from national hospital and nursing care performance measurement activities (e.g., CMS-QIO, ANA-NDNQI, VANOD, MilNOD, JCAHO[18]), prominent nursing outcomes initiatives (e.g., CalNOC), efforts by health plans and hospital systems, and published research. Additionally, candidate measures were solicited through a national call for measures that involved more than 70 professional organizations, 180 NQF Members, and public notice. Measures were evaluated based on the criteria endorsed by NQF as derived from the previous NQF work of the Strategic Framework Board (box A).[19,20,21]

[15] IOM, Committee on Identifying Priority Areas for Quality Improvement. *Priority Areas for National Action: Transforming Health Care Quality.* Washington, DC: National Academies Press; 2003.

[16] Agency for Healthcare Research and Quality (AHRQ). National Healthcare Quality Report (prepublication copy). Rockville, Md: AHRQ; December 2003. Available at www.qualitytools.ahrq.gov/qualityreport/download_report.aspx. Last accessed May 10, 2004.

[17] AHRQ. *National Healthcare Disparities Report* (prepublication copy). Rockville, Md; AHRQ; July 2003. Available at www.qualitytools.ahrq.gov/disparitiesreport/documents/Report%207.pdf. Last accessed May 10, 2004.

[18] Review of JCAHO activities was limited to ORYX Core Measures (which have not been tested by JCAHO for nursing-sensitive care) and clinical/service- and human resource-related indicators that comply with JCAHO's staffing effectiveness standards.

[19] The Strategic Framework Board's Design for a National Quality Measurement and Reporting System. *Med Care.* 2003;41(1)suppl:I-1–I-89.

[20] NQF. *A National Framework for Healthcare Quality Measurement and Reporting.* Washington, DC: NQF; 2002.

[21] NQF. *A Comprehensive Framework for Hospital Care Performance Evaluation.* Washington, DC: NQF; 2003.

Box A – Criteria for Evaluation and Selection of Measures in the Initial Performance Measure Set

Proposed measures should be evaluated for their suitability based on four sets of standardized criteria (e.g., important, scientifically acceptable, useable, and feasible). Not all acceptable measures will be strong—or equally strong—among each of the four sets of criteria, or strong among each of their related criteria. Rather, a candidate consensus standard should be assessed based on the extent to which it meets any of the desired criteria within the set:

1. **Important.** This set addresses the extent to which a measure reflects a variation in quality and low levels of overall performance. It also addresses the extent to which it captures key aspects of the flow of care.
   a. The measure addresses one or more key leverage points for improving quality.
   b. Considerable variation in the quality of care exists.
   c. Performance in the area (e.g., setting, procedure, condition) is suboptimal, suggesting that barriers to improvement or best practice may exist.

2. **Scientifically acceptable.** A measure is scientifically sound if it produces consistent and credible results when implemented.
   a. The measure is well defined and precisely specified. Measures must be specified sufficiently to be distinguishable from other measures, and they must be implemented consistently across institutions. Measure specifications should provide detail about cohort definition, as well as the denominator and numerator for rate-based measures and categories for range-based measures.
   b. The measure is reliable, producing the same results a high proportion of the time when assessed in the same population.
   c. The measure is valid, accurately representing the concept being evaluated.
   d. The measure is precise, adequately discriminating between real differences in provider performance.
   e. The measure is adaptable to patient preferences and a variety of contexts of settings. Adaptability depends on the extent to which the measure and its specifications account for the variety of patient choices, including refusal of treatment and clinical exceptions.
   f. An adequate and specified risk-adjustment strategy exists, where applicable.
   g. Consistent evidence is available linking the process measures to patient outcomes.

3. **Useable.** Usability reflects the extent to which intended audiences (e.g., consumers, purchasers) can understand the results of the measure and are likely to find them useful for decisionmaking.
   a. The measure can be used by the stakeholder to make decisions.
   b. The differences in performance levels are statistically meaningful.
   c. The differences in performance are practically and clinically meaningful.

Box A – Criteria for Evaluation and Selection of Measures in the Initial Performance Measure Set (continued)

d. Risk stratification, risk adjustment, and other forms of recommended analyses can be applied appropriately.

e. Effective presentation and dissemination strategies exist (e.g., transparency, ability to draw conclusions, information available when needed to make decisions).

f. Information produced by the measure can/will be used by at least one healthcare stakeholder audience (e.g., public/consumers, purchasers, clinicians and providers, policymakers, accreditors/regulators) to make a decision or take an action.

g. Information about specific conditions for which the measure is appropriate has been given.

h. Methods for aggregating the measure with other, related measures (e.g., to create a composite measure) are defined, if those related measures are determined to be more understandable and more useful in decisionmaking. Risks of such aggregation, including misrepresentation, have been evaluated.

4. **Feasible.** Feasibility is generally based on the way in which data can be obtained within the normal flow of clinical care and the extent to which an implementation plan can be achieved.

a. The point of data collection is tied to care delivery, when feasible.

b. The timing and frequency of measure collection are specified.

c. The benefit of measurement is evaluated against the financial and administrative burden of implementing and maintaining the measure set.

d. An auditing strategy is designed and can be implemented.

e. Confidentiality concerns are addressed.

The NQF-Endorsed National Voluntary Consensus Standards for Nursing-Sensitive Care

The initial set includes 15 measures that facilitate efforts to achieve higher levels of patient safety and better outcomes for patients. These measures are intended for public reporting.[22] Table 1 presents brief descriptions of each measure. (See page 14.) Because consensus standards must be consistently specified to meet the goal of standardization, each measure is further specified for risk adjustment and other components in appendix A.

Research Recommendations

During the course of consensus development, a number of high-priority areas for research and measure development were identified. Generally, these areas represent those for which high priorities exist, but for which candidate measures failed to meet the established evaluation criteria. These priority areas are viewed as significant gaps in the initial set of endorsed consensus standards. Without rapid advancements in research and measure development to fill these gaps, the healthcare quality chasm will only widen.[23]

Workforce Measures

To understand fully and differentiate the contribution of nursing services to healthcare, develop workforce measures and the empirical base to support their relationship to quality and patient safety. Specifically, research should be undertaken on the relationship between nursing variables including but not limited to staffing (e.g., turnover, educational preparation, experience, licensure, certification) and patient outcomes.

[22] Although designating a subset of measures for disclosure was permissible, all voluntary consensus standards for nursing-sensitive care have been endorsed for public accountability. (See appendix D.)

[23] IOM, Committee on the Quality of Health Care in America. *Crossing the Quality Chasm: A New Health System for the 21st Century.* Washington, DC: National Academies Press; 2001.

Pain Assessment and Management Measures

Because of its applicability to all patients and all nursing personnel, and because generic research in this priority area is pending, research to identify measures that specifically explore nursing's contribution to the assessment and management of pain should be undertaken immediately.

Nurse-centered Intervention Process Measures

Research should be undertaken to determine the relationship between patient outcomes and nurse-centered intervention process measures, including those that describe the distinctive contributions of nursing (e.g., assessment, problem identification, prevention, patient education) and the dependent, independent, and interdependent activities of nurses.

Measures for Other Gaps

To address significant gaps in nursing care performance measurement, additional research should be undertaken in a broad range of important areas (box B), including positive nursing-sensitive measures that promote the highest quality and safety of healthcare (e.g., symptom management, improved function), rather than measures that address adverse events and negative outcomes; measures that address all six NQF aims (i.e., care that is safe, beneficial, patient centered, timely, efficient, and equitable) and IOM priority areas;[24] and measures that address the role of patient care teams in achieving improved healthcare outcomes.

Sufficiency of Measures Against Evaluation Criteria

To inform implementation of the NQF nursing care consensus standards, research should continue to investigate and document each standard's adequacy against the evaluation criteria (e.g., the extent that each measure is important, scientifically acceptable, usable, and feasible).

Additional Recommendations

In addition to the voluntary consensus standards for nursing-sensitive care and the research recommendations, NQF recommends specific actions in five areas: data issues, implementation, use for quality improvement, use as a set, and improving the set.

Data Issues

There is a pressing need for providers, researchers, and information system vendors to develop better data systems to support nursing care monitoring functions and conduct research. Data availability (at the unit and institutional levels), integrity, and comprehensiveness should be high priorities. The standardization of limited, discrete nursing variables as data elements—educational level, licensure/certification, hospital service area (e.g., inpatient versus outpatient), type of nursing practice, work

[24] IOM. Committee on Identifying Priority Areas for Quality Improvement. *Priority Areas for National Action: Transforming Health Care Quality.* Washington, DC: National Academies Press; 2003.

Box B – Specific Priorities for Research

The following additional areas are essential for research, measure development, and investigation:

Other content areas for nursing-sensitive consensus standards development

- Care of all patient populations, including pediatric, geriatric, and chronically ill patients
- Care delivered longitudinally (across the continuum), including health promotion/disease prevention and end-of-life care
- Assessment, problem identification, care planning, and evaluation
- Patient education
- Coordination and integration of care, including case management
- Access to and equity of nursing care provided
- Efficiency of nursing care, including stewardship of resources
- Symptom management
- Patient comfort including but not limited to pain assessment, management, and control
- Functional outcomes
- Malnutrition and supplemental feeding
- Patient satisfaction with nursing care
- Nursing satisfaction measures, including those related to the work environment
- Nursing care hours as a portion of total hospital staffing
- Nursing work environment including administrative behavior, adequacy of support services, availability of technical assistance, human resource policies, overtime, average shift/work week length

Measure-specific opportunities

- Measures considered but excluded from these NQF consensus standards (appendix B details all measures considered but excluded)
- Application of each measure beyond existing, specified populations (e.g., failure to rescue in medical inpatient populations, intensive care unit (ICU)-specific measures to non-ICU populations)
- Measures that are currently under development

Empirical research, data availability, and technology innovation

- Innovative use of data that may not otherwise be used for nursing-sensitive performance research
- Interdisciplinary research that enhances the understanding of nurses' current and evolving roles within an increasingly complex and dynamic healthcare system
- Additional data elements—beyond those currently required on hospital discharge abstracts—on which nursing-sensitive performance research can be based (e.g., diagnoses present on admission, specific hospital-acquired secondary diagnoses)
- Integration of measurement into daily operations, including collaborative research with information system vendors, to minimize burden and improve data reliability
- Technologic advancements that support the capability of nursing practice to positively impact patient outcomes

Implementation and evaluation of nursing-sensitive consensus standards

- Application of the consensus standards to specific, additional populations and in non-hospital settings
- Performance of the consensus standards, testing the reliability and validity of the measures as a set, and developing a composite nursing care performance index
- Investigation of the effectiveness of the consensus standards in improving patient outcomes and the nursing work environment
- Evaluation of the implementation of the consensus standards by all stakeholders, including consumers' use of nursing-sensitive performance results

status (e.g., full-versus part-time status, employee versus contract/agency)—should be pursued immediately; such standardization will promote replication of research and greater comparability of study results.

Use for Quality Improvement

To be most useful for quality improvement purposes, measures should be collected and analyzed by providers at the hospital unit level, unless the sample size is so small that it would allow for the identification of individual nurses. To avoid a punitive environment, measures should be reported at the institutional level.

Implementation

The readiness of provider organizations to implement these consensus standards should be used as an overall indication of their commitment to provide quality patient care and an environment that is supportive of nursing.

Use as a Set

The NQF-endorsed voluntary consensus standards for nursing-sensitive performance should be viewed by healthcare stakeholders as a constellation of measures (i.e., measure set) that characterizes the influence of nursing personnel on healthcare processes and patient outcomes. No individual measure is intended to be a sole or stand-alone indicator of nursing care quality. Rather, stakeholders should use all of the consensus standards to gain a more comprehensive assessment of the quality of nursing care and its relationship to patient care and safety.

Improving the Set

NQF should review this initial set of voluntary consensus standards for nursing-sensitive care on a regular basis (at least once every three years) to revise, evaluate, and identify improvements.[25] Because forthcoming research is anticipated to result in fully developed, evidence-based performance measures vital to nursing care (e.g., pain assessment and control, satisfaction with nursing care), pending funding, NQF should pursue more rapid review and improvement of these selected areas.

Acknowledgments

NQF greatly appreciates the support provided by the Robert Wood Johnson Foundation and the Department of Veterans Affairs.

[25] In *A Comprehensive Framework for Hospital Care Performance Evaluation,* it is recommended that NQF should conduct an overall review of the national voluntary consensus standards for hospital care at least once every three years.

Table 1 – National Voluntary Consensus Standards for Nursing-Sensitive Care

FRAMEWORK CATEGORY	MEASURE	DESCRIPTION
Patient-centered outcome measures	1. Death among surgical inpatients with treatable serious complications (failure to rescue)	Percentage of major surgical inpatients who experience a hospital-acquired complication (i.e., sepsis, pneumonia, gastrointestinal bleeding, shock/cardiac arrest, deep vein thrombosis/pulmonary embolism) and die
	2. Pressure ulcer prevalence	Percentage of inpatients who have a hospital-acquired pressure ulcer (Stage 2 or greater)
	3. Falls prevalence*	Number of inpatient falls per inpatient days
	4. Falls with injury	Number of inpatient falls with injuries per inpatient days
	5. Restraint prevalence (vest and limb only)	Percentage of inpatients who have a vest or limb restraint
	6. Urinary catheter-associated urinary tract infection (UTI) for intensive care unit (ICU) patients*	Rate of UTI associated with use of urinary catheters for ICU patients
	7. Central line catheter-associated blood stream infection rate for ICU and high-risk nursery (HRN) patients*	Rate of blood stream infections associated with use of central line catheters for ICU and HRN patients
	8. Ventilator-associated pneumonia for ICU and HRN patients*	Rate of pneumonia associated with use of ventilators for ICU patients and HRN patients
Nursing-centered intervention measures	9. Smoking cessation counseling for acute myocardial infarction (AMI)*	Percentage of AMI inpatients with history of smoking within the past year who received smoking cessation advice or counseling during hospitalization
	10. Smoking cessation counseling for heart failure (HF)*	Percentage of HF inpatients with history of smoking within the past year who received smoking cessation advice or counseling during hospitalization
	11. Smoking cessation counseling for pneumonia*	Percentage of pneumonia inpatients with a history of smoking within the past year who received smoking cessation advice or counseling during hospitalization
System-centered measures	12. Skill mix (Registered Nurse [RN], Licensed Vocational/Practical Nurse [LVN/LPN], unlicensed assistive personnel [UAP], and contract)	• Percentage of RN care hours to total nursing care hours • Percentage of LVN/LPN care hours to total nursing care hours • Percentage of UAP care hours to total nursing care hours • Percentage of contract hours (RN, LVN/LPN, and UAP) to total nursing care hours
	13. Nursing care hours per patient day (RN, LVN/LPN, and UAP)	• Number of RN care hours per patient day • Number of nursing staff hours (RN, LVN/LPN, UAP) per patient day
	14. Practice Environment Scale-Nursing Work Index (PES-NWI) (composite and five subscales)	Composite score and mean presence scores for each of the following subscales derived from the PES-NWI: • Nurse participation in hospital affairs • Nursing foundations for quality of care • Nurse manager ability, leadership, and support of nurses • Staffing and resource adequacy • Collegial nurse-physician relations
	15. Voluntary turnover	Number of voluntary uncontrolled separations during the month for RNs and advanced practice nurses, LVN/LPNs, and nurse assistants/aides

* NQF-endorsed national voluntary consensus standard for hospital care.

Appendix A

Specifications of the National Voluntary Consensus Standards for Nursing-Sensitive Care

The following table summarizes the detailed specifications for each of the National Quality Forum (NQF)-endorsed nursing-sensitive performance measures. All information presented has been derived directly from measure sources/developers without modification or alteration (except when the measure developer agreed to such modification during the NQF Consensus Development Process) and is current as of September 5, 2004.

All NQF-endorsed voluntary consensus standards are open source, meaning they are fully accessible and disclosed. References to related risk-adjustment methodologies and definitions are provided to assure openness and transparency.

Issues regarding any NQF-endorsed consensus standard (e.g., modifications to specifications, emerging evidence) may be submitted to NQF for review and consideration by using the "Implementation Feedback Form" found at www.qualityforum.org/implementation_feedback.htm. NQF will transmit this information to the measure developers and/or compile it for consideration in updating the measure set.

Appendix A – Specifications of the National Voluntary Consensus Standards for Nursing-Sensitive Care

Framework Category	Measure	Source of Measure	Numerator	Denominator	Exclusions
PATIENT-CENTERED OUTCOME MEASURES	1. Death among surgical inpatients with treatable serious complications (failure to rescue)[1]	Needleman, et al. for the Agency for Healthcare Research and Quality (AHRQ)[2,3]	Surgical inpatients (with primary procedure within 2 days of admission) with complications of care whose discharge status is death	Major surgical discharges[4] with primary procedure within 2 days of admission AND with complications of care in secondary diagnosis field positions: ■ sepsis (ICD-9-CM codes 038.0, 038.1, 038.10, 038.11, 038.19, 038.2, 038.3, 038.40, 038.41, 038.42, 038.43, 038.44, 038.49, 038.8, 038.9, 790.7, 995.90, 995.91, 995.92, 995.93, 995.94) ■ pneumonia (ICD-9-CM codes 482.0, 482.1, 482.2, 482.3, 482.30, 482.31, 482.32, 482.39, 482.4, 482.40, 482.41, 482.49, 482.8, 482.81, 482.82, 482.83, 482.84, 482.89, 482.9, 485, 486, 507.0, 514, 997.3) ■ GI bleeding (ICD-9-CM codes 530.82, 531.00, 531.01, 531.20, 531.21, 531.30, 531.31, 531.90, 531.91, 532.00, 532.01, 532.10, 532.11, 532.20, 532.21, 532.30, 532.31, 532.90, 532.91, 533.00, 533.01, 533.10, 533.11, 533.20, 533.21, 533.30, 533.31, 533.90, 533.91, 534.00, 534.01, 534.10, 534.11, 534.20, 534.21, 534.30, 534.31, 534.90, 534.91, 535.01, 535.40, 535.41, 537.84, 578.9) ■ shock/cardiac arrest (ICD-9-CM codes 427.5, 785.5, 785.50, 785.51, 785.52, 785.59, 799.1, 93.93, 99.60, 99.63) ■ DVT/PE (ICD-9-CM codes 415.1, 415.11, 451.11, 451.19, 451.81, 453.8)	MDC code of 15 (newborns and other neonates) AND exclusions as noted for each complication of care[5]

[1] Patient-level factors that contribute to the risk of acquiring particular in-hospital complications are used in a logistic regression model to predict each patient's probability. See table 1 for the risk-adjustment coefficients as provided by Needleman, et al.

[2] Needleman J, Buerhaus PI, Mattke S, Stewart M, Zelevinsky K. *Nurse Staffing and Patient Outcomes in Hospitals*. Health Resources and Services Administration (HRSA) Report No. 230-99-0021; February 28, 2001.

[3] AHRQ has agreed to provide ongoing support through its Quality Indicators Software, specifically the Patient Safety Indicator module. Review of measure specifications and risk adjustment will be undertaken annually. Information will be posted at www.qualityindicators.ahrq.gov. Risk adjustment will be accomplished through use of the AHRQ co-morbidity software and covariates integrated into the AHRQ PSI module.

[4] Risk pools were constructed based on the diagnostic related group (DRG) codes found in table 2. AHRQ will post changes to the codes on its web site, www.ahrq.gov.

[5] See table 3 for exclusion codes for each complication of care.

Appendix A – Specifications of the National Voluntary Consensus Standards for Nursing-Sensitive Care (continued)

Framework Category	Measure	Source of Measure	Numerator	Denominator	Exclusions
PATIENT-CENTERED OUTCOME MEASURES *continued*	2. Pressure ulcer prevalence	California Nursing Outcomes Coalition (CalNOC)[6]	Inpatients with National Pressure Ulcer Advisory Panel (NPUAP) – Stage II or greater (II-IV + eschar) hospital-acquired pressure ulcers[7]	Inpatients in the prevalence study[8,9,10] NOTE: Quarterly reporting is recommended by the measure developer	■ Patients < 16 years of age ■ Skin breakdown due to arterial occlusion, venous insufficiency, diabetes neuropathy, or incontinence dermatitis is not reported in the numerator ■ Pressure ulcers present on admission (community acquired): ● Pressure ulcers discovered/documented on first day of hospitalization ● If the prevalence study is done on the first day of a patient's hospital stay and the patient's ulcer is already present ● If the prevalence study is done on the second day of a patient's hospital stay and the patient's Stage II+ ulcer is already present
	3. Falls prevalence[11]	American Nurses Association-National Database of Nursing Quality Indicators (ANA-NDNQI)	Number of inpatient falls[12] x 1,000	Total number of inpatient days[9,13] NOTE: Quarterly reporting is recommended by the measure developer	■ None
	4. Falls with injury	ANA-NDNQI	Number of inpatient falls[12] with injuries[14] x 1,000	Total number of inpatient days[9,13] NOTE: Quarterly reporting is recommended by the measure developer	■ None

[6] U.S. Department of Veterans Affairs Nursing Outcomes Database and the Military Nursing Outcomes Database initiatives also are using this measure.
[7] NPUAP/AHCPR classification (any lesion caused by unrelieved pressure resulting in the damage of underlying tissue); In *Pressure Ulcers in Adults: Prediction and Prevention.* Clinical Practice Guideline Number 3. AHCPR Pub. No. 92-0047; May 1992.
[8] CalNOC unit stratification: medical, surgical, medical-surgical combined (units with a mix of patients receiving acute medical and surgical care), critical care, step down (units that provide care to patients requiring a higher level of care than provided on an acute unit, yet not sufficiently intensive to require admission to an intensive care unit [ICU]; examples include progressive care, telemetry, and intermediate care); reported as three strata (medical-surgical combined, critical care, step down).
[9] Stratified by hospital size: < 100, 100-199, 200-299, 300-399, 400-499, 500 or more.
[10] This measure is derived from data collected during a quarterly one-day prevalence study on all patients in each unit on the day of the study.
[11] NQF-endorsed hospital care performance measure.
[12] A fall is defined as an unplanned descent to the floor.
[13] ANA-NDNQI unit stratification: medical, surgical, medical-surgical combined (units with a mix of patients receiving acute medical and surgical care); critical care, step down (units that provide care to patients requiring a higher level of care than provided on an acute unit, yet not sufficiently intensive to require admission to an ICU; examples include progressive care, telemetry, and intermediate care); reported as five strata (medical, surgical, medical-surgical combined, critical care, step down).
[14] Level of injury is defined as minor (results in application of a dressing, ice, cleaning of a wound, limb elevation, or topical medication), moderate (results in suturing, steri-strips, fracture, or splinting), major (results in surgery, casting, or traction), or death (as a result of the fall).

Appendix A – Specifications of the National Voluntary Consensus Standards for Nursing-Sensitive Care (continued)

Framework Category	Measure	Source of Measure	Numerator	Denominator	Exclusions
PATIENT-CENTERED OUTCOME MEASURES *continued*	5. Restraint prevalence (vest and limb only)	CalNOC[6]	Inpatients who have vest restraint and/or limb restraint (upper or lower or both)[15] on the day of the prevalence study	Inpatients in the prevalence study[8,9,10]	■ Patients < 16 years of age
	6. Urinary catheter-associated urinary tract infection (UTI) for intensive care unit (ICU) patients[11]	Centers for Disease Control and Prevention (CDC)	Number of indwelling urinary catheter-associated UTIs (defined by CDC case definitions of symptomatic UTI or asymptomatic bacteriuria, excludes other infections of the urinary tract[16,17]) x 1,000	Number of indwelling urinary catheter days for ICU patients ■ Reported by type of ICU (coronary, cardiothoracic, medical, medical-surgical [major teaching and all others], neurosurgical, pediatric, surgical, trauma, burn, and respiratory)	■ None
	7. Central line catheter-associated blood stream infection rate for ICU and high-risk nursery (HRN) patients[11]	CDC	Number of central line-associated blood stream infections (laboratory-confirmed bloodstream infection or clinical sepsis) x 1,000[16,17] Number of umbilical and central line-associated blood stream infections (laboratory-confirmed bloodstream infection or clinical sepsis) x 1,000[16,17]	Number of central line-days for ICU patients ■ Reported by type of ICU (coronary, cardiothoracic, medical, medical-surgical [major teaching and all others], neurosurgical, pediatric, surgical, trauma, burn, and respiratory) Number of central-line days for HRN patients ■ Reported for HRNs by birth weight category (<1,000, 1,001-1,500, 1,501-2,500, and >2,500g)	■ None

[15] Any manual method or physical or mechanical device, material, or equipment attached or adjacent to the patient's body that he or she cannot easily remove that restricts freedom of movement or normal access to the body.

[16] Definition for infections are given in Garner JS, et al. *CDC Definitions for Noscomial Infections.* In: Olmsted, RN, ed. APIC Infection Control and Applied Epidemiology: Principles and Practice. St. Louis: Mosby; 1996:A1-A20. Available at www.apic.org/pdf/cdcdefs.pdf.

[17] Personal communication, Linda McKibbin, MD, MPH, Medical Officer, CDC/NCID, Division of Healthcare Quality Promotion/Prevention and Evaluation Branch, October 21, 2002.

Appendix A – Specifications of the National Voluntary Consensus Standards for Nursing-Sensitive Care (continued)

Framework Category	Measure	Source of Measure	Numerator	Denominator	Exclusions
PATIENT-CENTERED OUTCOME MEASURES *continued*	8. Ventilator-associated pneumonia for ICU and HRN patients[11]	CDC	Number of ventilator-associated pneumonias x 1,000[16,17] Number of ventilator-associated pneumonias x 1,000[16,17]	Number of ventilator-days for ICU patients ■ Reported by type of ICU (coronary, cardiothoracic, medical, medical-surgical [major teaching and all others], neurosurgical, pediatric, surgical, trauma, burn, and respiratory) Number of ventilator days for HRN patients ■ Reported for HRNs by birth weight category (<1,000, 1,001-1,500, 1,501-2,500, and >2,500g)	■ None
NURSE-CENTERED INTERVENTION MEASURES	9. Smoking cessation counseling for acute myocardial infarction (AMI)[11]	Centers for Medicare and Medicaid Services (CMS)-Quality Improvement Organizations (QIO) and Joint Commission on Accreditation of Healthcare Organizations (JCAHO) (ORYX)	Inpatients who receive smoking cessation advice or counseling given during hospitalization	AMI inpatients (principal diagnosis) ICD-9-CM codes 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91 with a history of smoking cigarettes anytime during the year prior to hospital arrival	■ < 18 years of age ■ Transferred to another acute care hospital ■ Expired ■ Left against medical advice ■ Discharged to hospice
	10. Smoking cessation counseling for heart failure (HF)[11]	CMS-QIO and JCAHO (ORYX)	Inpatients who receive smoking cessation advice or counseling given during hospitalization	HF inpatients (principal diagnosis) ICD-9-CM codes 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.0, 428.1, 428.20, 428.21, 428.22, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43, 428.9 with a history of smoking cigarettes anytime during the year prior to hospital arrival	■ < 18 years of age ■ Transferred to another acute care hospital ■ Expired ■ Left against medical advice ■ Discharged to hospice

Appendix A – Specifications of the National Voluntary Consensus Standards for Nursing-Sensitive Care (continued)

Framework Category	Measure	Source of Measure	Numerator	Denominator	Exclusions
NURSE-CENTERED INTERVENTION MEASURES *continued*	11. Smoking cessation counseling for pneumonia [11]	CMS and JCAHO (ORYX)	Inpatients who receive smoking cessation advice or counseling given during hospitalization	Pneumonia inpatients (principal diagnosis) ICD-9-CM code 480.0-483.8, 485-486, or 487.0; or a principal diagnosis code of sepsis (038.xx) or 518.81 [18] (respiratory failure), and a secondary diagnosis code of pneumonia with a history of smoking cigarettes anytime during the year prior to hospital arrival	■ < 18 years of age ■ Transferred to another acute care hospital ■ Expired ■ Left against medical advice ■ Discharged to hospice ■ No working diagnosis of pneumonia on admission ■ Receiving comfort measures only
SYSTEM-CENTERED MEASURES	12. Skill mix (Registered Nurse [RN], Licensed Vocational Nurse/ Licensed Practical Nurse [LVN/LPN], unlicensed assistive personnel [UAP], and contract)	ANA-NDNQI [19]	Number of productive hours [20] worked by RN nursing staff (employee and contract) [21] with patient care responsibilities [22] Number of productive hours [20] worked by LVN/LPN staff (employee and contract) [21] with patient care responsibilities [22] Number of productive hours [20] worked by UAP staff (employee and contract) [21] with patient care responsibilities [22] Number of productive hours [20] worked by contract staff [21] (RN, LVN/LPN, and UAP) with patient care responsibilities [22]	Total number of productive hours worked by nursing staff (RN, LVN/ LPN, UAP) with direct patient care responsibilities (employee and contract) [9,13]	■ None

[18] Principal diagnosis code 518.84 (acute and chronic respiratory failure) can be added to 518.81.

[19] This measure is also a CalNOC measure; however, because the CalNOC unit stratification differs (three strata reported) from the ANA-NDNQI stratification (five strata reported), a single version has been endorsed.

[20] Productive hours are the actual direct hours, not budgeted or scheduled hours. Productive hours do not include vacation, medical leave, orientation, education, or committee time.

[21] Employees are the persons who are employed directly by the facility and are on the hospital payroll; contracted/agency staff includes temporary nursing staff who are not employed by the facility but are hired on a contractual basis to fill staffing needs for a designated shift or for a short-term contracted basis, or registry staff from outside the facility, or traveling nurse staff contracted to the facility for a designated period of time.

[22] Patient care responsibilities are patient-centered nursing activities carried out by unit-based staff in the presence of the patient (e.g., medication administration, nursing treatments, nursing rounds, admission/transfer/discharge, patient teaching, patient communication) and nursing activities that occur away from the patient that are patient related (e.g., coordination of patient care, documentation, treatment planning).

Appendix A – Specifications of the National Voluntary Consensus Standards for Nursing-Sensitive Care (continued)

Framework Category	Measure	Source of Measure	Numerator	Denominator	Exclusions
SYSTEM-CENTERED MEASURES *continued*	13. Nursing care hours per patient day (RN, LVN/LPN, and UAP)	ANA-NDNQI[19]	Number of productive hours[20] worked by RN nursing staff (employee and contract)[21] with direct patient care responsibilities[22] Number of productive[20] hours worked by nursing staff (RN, LVN/LPN, and UAP)[21] with direct patient care responsibilities (employee and contract)[22]	Inpatient days[9,13]	■ None
	14. Practice Environment Scale-Nursing Work Index (composite and five subscales)	Literature[23,24,25]	Composite score is the mean of all subscales[26] Subscales = mean of all items comprising each subscale: ■ Nurse participation in hospital affairs (items: 5, 6, 11, 15, 17, 21, 23, 27, 28) ■ Nursing foundations for quality of care (items: 4, 14, 18, 19, 22, 25, 26, 29, 30, 31) ■ Nurse manager ability, leadership, and support of nurses (items: 3, 7, 10, 13, 20) ■ Staffing and resource adequacy (items: 1, 8, 9, 12) ■ Collegial nurse-physician relations (items: 2, 16, 24)	Staff RNs NOTE: Random sample with a minimum response of 30 completed surveys (all items completed) is consistent with the NQF-endorsed consensus standard[27,28]	■ None

[23] Kramer M, Hafner LP. Shared values: impact on staff nurse job satisfaction and perceived productivity. *Nurs Res.* 1989;38:172-177.
[24] Aiken LH, Patrician P. Measuring organizational traits of hospitals: the revised nursing work index. *Nurs Res.* 2000;49:146-153.
[25] Lake ET. Development of the Practice Environment Scale of the Nursing Work Index. *Res Nurs Health.* 2002;25:176-188.
[26] See table 4 for the full instrument, subscales, and scoring instructions.
[27] National Quality Forum (NQF). *A Comprehensive Framework for Hospital Care Performance Evaluation.* Washington, DC: NQF; 2003.
[28] Although NQF's endorsed standard for a minimum sample size is 30, the measure developer acknowledges that a smaller number of completed surveys (i.e., a minimum of 15 to 25) retains the instrument's validity.

Appendix A – Specifications of the National Voluntary Consensus Standards for Nursing-Sensitive Care (continued)

Framework Category	Measure	Source of Measure	Numerator	Denominator	Exclusions
SYSTEM-CENTERED MEASURES *continued*	15. Voluntary turnover	VHA	Number of voluntary uncontrolled separations during the month for RNs and advanced practice nurses Number of voluntary uncontrolled separations during the month for LVNs/LPNs and nursing assistants/aides (NAs)	Number of employees (full time plus part time) on last day of the month for RNs and advanced practice nurses Number of employees (full time plus part time) on last day of the month for LPNs and NAs	■ Separation due to death, illness, pregnancy, relocation, retirement, performance or discipline, cutbacks due to mergers, cyclical layoffs, permanent reductions in force ■ Per diem, consultants, temporary, agency, non-salaried physicians, students in training

Table 1 – Adjustment Models for Failure to Rescue (Surgical Pool)

FAILURE, MAJOR SURGERY POOL, MW REGION*

LOGIT ESTIMATES:

Number of obs = 4993 LR chi2(65) = 379.85 Prob > chi2 = 0.0000 Pseudo R2 = 0.0820 Log likelihood = -2125.8077

nfailmaj	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
deaddrg	10.60517	9.78822	1.08	0.279	-8.579387	29.78973
agelt1	.0257042	.7243314	0.04	0.972	-1.393959	1.445368
age1_4	.1024038	.9237548	0.11	0.912	-1.708122	1.91293
age5_17	-1.543634	.8356606	-1.85	0.065	-3.181499	.0942309
age45_64	.280112	.2558986	1.09	0.274	-.2214401	.7816641
age65_74	.1452626	.3010137	0.48	0.629	-.4447134	.7352385
age75_84	.3761315	.3011335	1.25	0.212	-.2140793	.9663423
agegt85	.4167824	.3257098	1.28	0.201	-.2215971	1.055162
female	-.0828821	.112315	-0.74	0.461	-.3030154	.1372512
mcare	.8379613	.2096575	4.00	0.000	.4270401	1.248883
mcaid	.7330899	.2939045	2.49	0.013	.1570477	1.309132
selfpay	-.0622596	.4694048	-0.13	0.894	-.9822761	.857757
othpay	-.2744876	.9527953	-0.29	0.773	-2.141932	1.592957
govpay	1.445361	.6019974	2.40	0.016	.2654679	2.625254
cancer_p	.6076081	.6067672	1.00	0.317	-.5816338	1.79685
m_cancer	.6561176	.3303163	1.99	0.047	.0087095	1.303526
cad	-.5417273	.4732054	-1.14	0.252	-1.469193	.3857383
chf	.0836462	.2888599	0.29	0.772	-.4825089	.6498013
vascular	.8221159	.4601048	1.79	0.074	-.0796729	1.723905
liver	.767542	.5095234	1.51	0.132	-.2311055	1.76619
renal	.6528522	.4441605	1.47	0.142	-.2176864	1.523391
dementia	-1.086125	1.051707	-1.03	0.302	-3.147433	.9751831
function	.3241707	.5424553	0.60	0.550	-.739022	1.387363
diabetes	-.5645652	.5174085	-1.09	0.275	-1.578667	.4495367
pulmon	-.2579191	.2774322	-0.93	0.353	-.8016762	.285838
nutritio	.9357347	.29659	3.15	0.002	.354429	1.51704
emerg	.4462333	.1912925	2.33	0.020	.0713069	.8211597
mo	.0698692	.0824971	0.85	0.397	-.091822	.2315605
ra1844	-4.693275	3.902219	-1.20	0.229	-12.34148	2.954933
ra4564	-2.86424	3.799617	-0.75	0.451	-10.31135	4.582872
ra6574	1.995689	4.194037	0.48	0.634	-6.224474	10.21585
ra7584	2.435501	4.199199	0.58	0.562	-5.794777	10.66578
ragt85	3.847419	4.848246	0.79	0.427	-5.654969	13.34981
rsmal	-1.133019	1.256439	-0.90	0.367	-3.595594	1.329556

Source: Needleman J. UCLA School of Public Health, Los Angeles, CA. By e-mail, December 6, 2003, and December 12, 2003.

* Regions:
Midwestern (MW) region — Wisconsin and Missouri
Eastern (EA) region — New York and Massachusetts
Southeastern (SE) region — Maryland, Virginia, West Virginia, and South Carolina
Western (WS) region — Nevada, Arizona, and California

Table 1 – Adjustment Models for Failure to Rescue (Surgical Pool)

FAILURE, MAJOR SURGERY POOL, MW REGION* (continued)

LOGIT ESTIMATES

Number of obs = 4993 LR chi2(65) = 379.85 Prob > chi2 = 0.0000 Pseudo R2 = 0.0820 Log likelihood = -2125.8077

nfailmaj	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
rpmcare	-3.319749	9.252638	-0.36	0.720	-21.45459	14.81509
rpmcaid	-.8669506	9.373952	-0.09	0.926	-19.23956	17.50566
rpprivp	1.118011	9.198041	0.12	0.903	-16.90982	19.14584
rpselfp	4.527918	9.905796	0.46	0.648	-14.88709	23.94292
rgovpay	-2.452914	10.26711	-0.24	0.811	-22.57609	17.67026
rccanp	-4.318246	4.991355	-0.87	0.387	-14.10112	5.46463
rccanm	2.090172	2.911739	0.72	0.473	-3.616731	7.797075
rccad	-4.427162	2.576548	-1.72	0.086	-9.477102	.6227785
rcchf	-.7792235	1.550397	-0.50	0.615	-3.817945	2.259498
rcvasc	-5.499877	2.797766	-1.97	0.049	-10.9834	-.0163561
rcliver	2.47812	4.522819	0.55	0.584	-6.386442	11.34268
rcrenal	-2.945421	3.515052	-0.84	0.402	-9.834796	3.943954
rcdeme	3.03088	3.906053	0.78	0.438	-4.624843	10.6866
rcfunc	-4.682774	3.210685	-1.46	0.145	-10.9756	1.610054
rcdiab	9.961319	4.865213	2.05	0.041	.4256769	19.49696
rcpulm	-1.520955	1.648836	-0.92	0.356	-4.752614	1.710704
rcnutri	-6.135825	1.991701	-3.08	0.002	-10.03949	-2.232163
remerg	-1.962268	1.293023	-1.52	0.129	-4.496546	.5720096
ccanp65	-.0194357	.6099377	-0.03	0.975	-1.214892	1.17602
ccanm65	-.3443091	.328584	-1.05	0.295	-.9883219	.2997037
ccad65	.606219	.4700936	1.29	0.197	-.3151475	1.527586
cchf65	.2942637	.2782987	1.06	0.290	-.2511918	.8397192
cvasc65	-.4213015	.4448789	-0.95	0.344	-1.293248	.450645
cliv65	-.3232738	.5599779	-0.58	0.564	-1.42081	.7742626
ren65	.4014375	.4411685	0.91	0.363	-.4632369	1.266112
cdem65	.536716	1.055263	0.51	0.611	-1.531562	2.604994
cfunc65	.2504556	.5646391	0.44	0.657	-.8562167	1.357128
cdiab65	.1995672	.5227106	0.38	0.703	-.8249267	1.224061
cpulm65	.3134712	.2752072	1.14	0.255	-.225925	.8528674
cnutr65	-.3150852	.2982252	-1.06	0.291	-.8995958	.2694253
emerg65	-.0090368	.1894563	-0.05	0.962	-.3803642	.3622906
_cons	-3.148174	.2595026	-12.13	0.000	-3.65679	-2.639559

Source: Needleman J. UCLA School of Public Health, Los Angeles, CA. By e-mail, December 6, 2003, and December 12, 2003.

* Regions:
Midwestern (MW) region — Wisconsin and Missouri
Eastern (EA) region — New York and Massachusetts
Southeastern (SE) region — Maryland, Virginia, West Virginia, and South Carolina
Western (WS) region — Nevada, Arizona, and California

Table 1 – Adjustment Models for Failure to Rescue (Surgical Pool)

FAILURE, MAJOR SURGERY POOL, EA REGION*

LOGIT ESTIMATES:

Number of obs = 7063 LR chi2(66) = 915.68 Prob > chi2 = 0.0000 Pseudo R2 = 0.1256 Log likelihood = -3187.7727

nfailmaj	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
deaddrg	5.197165	2.445349	2.13	0.034	.4043695	9.98996
agelt1	1.348675	.4645889	2.90	0.004	.4380974	2.259252
age1_4	-.3070654	.8354498	-0.37	0.713	-1.944517	1.330386
age5_17	-.3412416	.5277429	-0.65	0.518	-1.375599	.6931156
age45_64	.5242741	.2045233	2.56	0.010	.1234157	.9251325
age65_74	.5207053	.2413296	2.16	0.031	.047708	.9937027
age75_84	.8686256	.2451043	3.54	0.000	.38823	1.349021
agegt85	1.126256	.2599512	4.33	0.000	.6167612	1.635751
female	-.0140685	.0864482	-0.16	0.871	-.1835039	.1553669
mcare	.1727217	.15174	1.14	0.255	-.1246832	.4701267
mcaid	.1798518	.1858234	0.97	0.333	-.1843554	.5440591
selfpay	.2365317	.3022537	0.78	0.434	-.3558747	.8289381
othpay	-.5810461	.3357356	-1.73	0.084	-1.239076	.0769836
unkpay	-.3730547	.2054073	-1.82	0.069	-.7756457	.0295362
govpay	.1550515	.8069318	0.19	0.848	-1.426506	1.736609
cancer_p	.7013328	.4139954	1.69	0.090	-.1100833	1.512749
m_cancer	.4258919	.2273916	1.87	0.061	-.0197875	.8715713
cad	-.3683642	.3577694	-1.03	0.303	-1.069579	.332851
chf	.7660714	.1898078	4.04	0.000	.3940549	1.138088
vascular	.1257182	.4182595	0.30	0.764	-.6940553	.9454916
liver	1.37157	.3999519	3.43	0.001	.5876791	2.155462
renal	.9859003	.282138	3.49	0.000	.4329201	1.538881
dementia	-2.636146	1.139208	-2.31	0.021	-4.868952	-.403339
function	.5866873	.3117184	1.88	0.060	-.0242695	1.197644
diabetes	-.0892849	.3816809	-0.23	0.815	-.8373657	.6587959
pulmon	-.0568577	.2043143	-0.28	0.781	-.4573062	.3435909
nutritio	.0695748	.2963035	0.23	0.814	-.5111694	.650319
emerg	.3588939	.1395081	2.57	0.010	.085463	.6323248
ny	.775021	.1274421	6.08	0.000	.5252391	1.024803
ra1844	1.625551	2.395472	0.68	0.497	-3.069489	6.32059
ra4564	2.2744	2.297342	0.99	0.322	-2.228308	6.777108
ra6574	1.63555	2.375002	0.69	0.491	-3.019368	6.290468
ra7584	1.951858	2.411339	0.81	0.418	-2.77428	6.677995
ragt85	2.069761	2.54113	0.81	0.415	-2.910762	7.050285

Source: Needleman J. UCLA School of Public Health, Los Angeles, CA. By e-mail, December 6, 2003, and December 12, 2003.

* Regions:
Midwestern (MW) region — Wisconsin and Missouri
Eastern (EA) region — New York and Massachusetts
Southeastern (SE) region — Maryland, Virginia, West Virginia, and South Carolina
Western (WS) region — Nevada, Arizona, and California

Table 1 – Adjustment Models for Failure to Rescue (Surgical Pool)

FAILURE, MAJOR SURGERY POOL, EA REGION* (continued)

LOGIT ESTIMATES:

Number of obs = 7063 LR chi2(66) = 915.68 Prob > chi2 = 0.0000 Pseudo R2 = 0.1256 Log likelihood = -3187.7727

nfailmaj	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
rsmal	-.680412	.6806679	-1.00	0.317	-2.014497	.6536727
rpmcare	-1.217198	1.359183	-0.90	0.371	-3.881149	1.446752
rpmcaid	-.2372839	1.487382	-0.16	0.873	-3.152499	2.677932
rpprivp	-.6812012	1.364535	-0.50	0.618	-3.355641	1.993239
rpselfp	.7423648	2.184124	0.34	0.734	-3.538439	5.023169
rgovpay	-.2457098	7.213942	-0.03	0.973	-14.38478	13.89336
rccanp	2.269562	2.836435	0.80	0.424	-3.289749	7.828872
rccanm	.3854396	1.479925	0.26	0.795	-2.51516	3.286039
rccad	1.015059	1.631568	0.62	0.534	-2.182756	4.212874
rcchf	-1.469334	.7948429	-1.85	0.065	-3.027198	.088529
rcvasc	2.368887	1.866019	1.27	0.204	-1.288443	6.026217
rcliver	-.9400092	3.213343	-0.29	0.770	-7.238045	5.358027
rcrenal	1.692382	1.644389	1.03	0.303	-1.530561	4.915324
rcdeme	5.257012	2.493407	2.11	0.035	.3700248	10.144
rcfunc	-2.5315	1.127014	-2.25	0.025	-4.740406	-.3225939
rcdiab	.6328954	2.609358	0.24	0.808	-4.481353	5.747143
rcpulm	-.0077628	.8950757	-0.01	0.993	-1.762079	1.746553
rcnutri	-3.404533	1.240129	-2.75	0.006	-5.835141	-.9739249
remerg	-.9884126	.7303708	-1.35	0.176	-2.419913	.4430879
ccanp65	-.1976347	.4334684	-0.46	0.648	-1.047217	.6519477
ccanm65	.0065438	.2385081	0.03	0.978	-.4609235	.4740112
ccad65	-.2892634	.3697854	-0.78	0.434	-1.014029	.4355027
cchf65	-.0106065	.1912423	-0.06	0.956	-.3854346	.3642216
cvasc65	.2287581	.4059629	0.56	0.573	-.5669145	1.024431
cliv65	-.1957261	.4379425	-0.45	0.655	-1.054078	.6626255
cren65	.1399601	.3072371	0.46	0.649	-.4622135	.7421338
cdem65	2.103853	1.111664	1.89	0.058	-.0749684	4.282675
cfunc65	-.1160486	.3111142	-0.37	0.709	-.7258211	.4937239
cdiab65	.000662	.407613	0.00	0.999	-.7982444	.7995691
cpulm65	.1672465	.2124529	0.79	0.431	-.2491534	.5836465
cnutr65	.606295	.3030352	2.00	0.045	.012357	1.200233
emerg65	.2095087	.147436	1.42	0.155	-.0794605	.498478
_cons	-3.757097	.2479678	-15.15	0.000	-4.243105	-3.271089

Source: Needleman J. UCLA School of Public Health, Los Angeles, CA. By e-mail, December 6, 2003, and December 12, 2003.

* Regions:
Midwestern (MW) region — Wisconsin and Missouri
Eastern (EA) region — New York and Massachusetts
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Western (WS) region — Nevada, Arizona, and California

Table 1 – Adjustment Models for Failure to Rescue (Surgical Pool)

FAILURE, MAJOR SURGERY POOL, SE REGION*

LOGIT ESTIMATES:

Number of obs = 6544 LR chi2(68) = 570.90 Prob > chi2 = 0.0000 Pseudo R2 = 0.0853 Log likelihood = -3061.5955

nfailmaj	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
deaddrg	12.27573	4.372822	2.81	0.005	3.705155	20.8463
agelt1	.5939335	.4884623	1.22	0.224	-.363435	1.551302
age1_4	.3134513	.5397998	0.58	0.561	-.7445369	1.371439
age5_17	-.0672141	.439453	-0.15	0.878	-.9285261	.7940979
age45_64	.3207648	.1888037	1.70	0.089	-.0492836	.6908133
age65_74	.7134402	.2263348	3.15	0.002	.2698321	1.157048
age75_84	1.050219	.2308023	4.55	0.000	.5978549	1.502583
agegt85	1.264341	.253624	4.99	0.000	.7672468	1.761435
female	-.1139447	.0933508	-1.22	0.222	-.2969089	.0690195
mcare	.2409263	.1573017	1.53	0.126	-.0673793	.549232
mcaid	.1491392	.2168775	0.69	0.492	-.2759329	.5742113
selfpay	.2759632	.2946401	0.94	0.349	-.3015208	.8534472
othpay	-.6845967	.5238111	-1.31	0.191	-1.711248	.3420542
unkpay	-.085194	.2698014	-0.32	0.752	-.613995	.443607
govpay	.6681023	.4809372	1.39	0.165	-.2745173	1.610722
cancer_p	1.135064	.4414926	2.57	0.010	.2697543	2.000373
m_cancer	.3370649	.2781572	1.21	0.226	-.2081133	.882243
cad	-.1639441	.3539668	-0.46	0.643	-.8577063	.5298181
chf	.404985	.2164074	1.87	0.061	-.0191656	.8291357
vascular	-.0405782	.4217141	-0.10	0.923	-.8671226	.7859662
liver	1.504723	.4202836	3.58	0.000	.680982	2.328463
renal	1.038641	.2705369	3.84	0.000	.5083986	1.568884
dementia	-1.197377	1.047973	-1.14	0.253	-3.251366	.856612
function	-.1973536	.4681265	-0.42	0.673	-1.114865	.7201576
diabetes	.1537326	.3496779	0.44	0.660	-.5316235	.8390887
pulmon	-.1030663	.2088886	-0.49	0.622	-.5124805	.3063478
nutritio	.5135741	.2841712	1.81	0.071	-.0433912	1.070539
emerg	.3241251	.157166	2.06	0.039	.0160854	.6321648
wv	-.0814047	.125377	-0.65	0.516	-.3271391	.1643297
va	-.0224501	.0915028	-0.25	0.806	-.2017924	.1568921
sc	-.0266507	.1031646	-0.26	0.796	-.2288495	.1755481
ra1844	1.645078	2.407791	0.68	0.494	-3.074106	6.364261
ra4564	2.062052	2.317715	0.89	0.374	-2.480586	6.60469
ra6574	1.914358	2.438315	0.79	0.432	-2.86465	6.693367

Source: Needleman J. UCLA School of Public Health, Los Angeles, CA. By e-mail, December 6, 2003, and December 12, 2003.

* Regions:
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Table 1 – Adjustment Models for Failure to Rescue (Surgical Pool)

FAILURE, MAJOR SURGERY POOL, SE REGION* (continued)

LOGIT ESTIMATES:

Number of obs = 6544 LR chi2(68) = 570.90 Prob > chi2 = 0.0000 Pseudo R2 = 0.0853 Log likelihood = -3061.5955

nfailmaj	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
ra7584	1.525149	2.488423	0.61	0.540	-3.35207	6.402367
ragt85	.2279492	2.84228	0.08	0.936	-5.342817	5.798715
rsfem	.8242686	.9619546	0.86	0.392	-1.061128	2.709665
rpmcare	-7.352637	4.024915	-1.83	0.068	-15.24132	.5360519
rpmcaid	-7.205862	4.165384	-1.73	0.084	-15.36987	.9581408
rpprivp	-6.580357	3.875781	-1.70	0.090	-14.17675	1.016034
rpselfp	-5.756945	4.431939	-1.30	0.194	-14.44339	2.929497
rgovpay	-14.27492	6.551409	-2.18	0.029	-27.11544	-1.434391
rccanp	-.7575503	3.628269	-0.21	0.835	-7.868827	6.353727
rccanm	-.1839209	2.580281	-0.07	0.943	-5.24118	4.873338
rccad	2.160822	2.248141	0.96	0.336	-2.245453	6.567097
rcchf	-.9100538	1.254009	-0.73	0.468	-3.367867	1.547759
rcvasc	-2.259938	2.342218	-0.96	0.335	-6.8506	2.330725
rcliver	.296561	3.958038	0.07	0.940	-7.461051	8.054173
rcrenal	-2.109648	2.180749	-0.97	0.333	-6.383838	2.164542
rcdeme	-1.107861	3.218523	-0.34	0.731	-7.416051	5.200329
rcfunc	-.8945558	2.352832	-0.38	0.704	-5.506021	3.71691
rcdiab	3.579787	2.980797	1.20	0.230	-2.262467	9.422041
rcpulm	-.8998367	1.231991	-0.73	0.465	-3.314495	1.514822
rcnutri	-1.564262	2.009016	-0.78	0.436	-5.501861	2.373338
remerg	-1.920655	1.093686	-1.76	0.079	-4.064241	.2229301
ccanp65	-.4782059	.4148036	-1.15	0.249	-1.291206	.3347942
ccanm65	-.1854858	.2890896	-0.64	0.521	-.7520911	.3811195
ccad65	-.2860806	.3653974	-0.78	0.434	-1.002246	.4300852
cchf65	-.0362276	.2066302	-0.18	0.861	-.4412154	.3687602
cvasc65	.4429129	.4142057	1.07	0.285	-.3689153	1.254741
cliv65	-.1999506	.4432473	-0.45	0.652	-1.068699	.6687982
cren65	-.0319692	.2841051	-0.11	0.910	-.5888049	.5248665
cdem65	.2809836	1.060265	0.27	0.791	-1.797098	2.359066
cfunc65	-.189119	.444816	-0.43	0.671	-1.060942	.6827044
cdiab65	-.8235154	.3831957	-2.15	0.032	-1.574565	-.0724656
cpulm65	.2096419	.2048049	1.02	0.306	-.1917683	.6110521
cnutr65	-.2579309	.275149	-0.94	0.349	-.797213	.2813511
emerg65	.1422053	.1497276	0.95	0.342	-.1512554	.4356661
_cons	-2.798581	.1898639	-14.74	0.000	-3.170708	-2.426455

Source: Needleman J. UCLA School of Public Health, Los Angeles, CA. By e-mail, December 6, 2003, and December 12, 2003.

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Table 1 – Adjustment Models for Failure to Rescue (Surgical Pool)

FAILURE, MAJOR SURGERY POOL, WS REGION*

LOGIT ESTIMATES:

Number of obs = 14110 LR chi2(68) = 1084.57 Prob > chi2 = 0.0000 Pseudo R2 = 0.0737 Log likelihood = -6818.021

nfailmaj	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
deaddrg	4.67451	4.589902	1.02	0.308	-4.321533	13.67055
agelt1	.0443716	.3031801	0.15	0.884	-.5498504	.6385936
age1_4	-.0506288	.3832706	-0.13	0.895	-.8018254	.7005678
age5_17	-.898651	.340062	-2.64	0.008	-1.56516	-.2321417
age45_64	.4913978	.1287731	3.82	0.000	.2390073	.7437884
age65_74	.8093096	.1584861	5.11	0.000	.4986826	1.119937
age75_84	.9957691	.159378	6.25	0.000	.6833939	1.308144
agegt85	1.118165	.1768313	6.32	0.000	.7715821	1.464748
female	-.0937953	.0612497	-1.53	0.126	-.2138425	.0262519
mcare	.0876353	.0888736	0.99	0.324	-.0865537	.2618243
mcaid	.3035434	.1168835	2.60	0.009	.0744559	.5326308
selfpay	.2393047	.2138048	1.12	0.263	-.1797451	.6583544
othpay	-.0712962	.5383707	-0.13	0.895	-1.126483	.983891
unkpay	.2781851	1.263936	0.22	0.826	-2.199084	2.755454
govpay	-.236639	.2564817	-0.92	0.356	-.7393339	.2660559
cancer_p	.8385326	.3380398	2.48	0.013	.1759868	1.501078
m_cancer	.4188278	.1832992	2.28	0.022	.0595681	.7780876
aids	2.326485	.8856465	2.63	0.009	.5906495	4.06232
cad	.048697	.2206404	0.22	0.825	-.3837502	.4811442
chf	.8385751	.1312719	6.39	0.000	.5812868	1.095863
vascular	-.0892648	.2769633	-0.32	0.747	-.6321028	.4535733
liver	1.176533	.2423655	4.85	0.000	.7015051	1.65156
renal	.514317	.2022507	2.54	0.011	.1179129	.9107211
dementia	-.4035866	.3815273	-1.06	0.290	-1.151366	.3441932
function	.2665469	.227077	1.17	0.240	-.1785158	.7116096
diabetes	-.0878176	.2237497	-0.39	0.695	-.526359	.3507237
pulmon	.1237733	.1294316	0.96	0.339	-.1299079	.3774546
nutritio	-.163878	.1963435	-0.83	0.404	-.5487042	.2209482
emerg	.5888212	.0979842	6.01	0.000	.3967757	.7808666
nv	-.1654503	.0842016	-1.96	0.049	-.3304824	-.0004182
az	-.1424548	.067363	-2.11	0.034	-.2744838	-.0104258
ra1844	-.5626443	1.976153	-0.28	0.776	-4.435833	3.310544
ra4564	.9714942	1.958791	0.50	0.620	-2.867666	4.810654
ra6574	1.554641	2.089376	0.74	0.457	-2.54046	5.649742

Source: Needleman J. UCLA School of Public Health, Los Angeles, CA. By e-mail, December 6, 2003, and December 12, 2003.

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Western (WS) region — Nevada, Arizona, and California

Table 1 – Adjustment Models for Failure to Rescue (Surgical Pool)

FAILURE, MAJOR SURGERY POOL, WS REGION* (continued)

LOGIT ESTIMATES:

Number of obs = 14110 LR chi2(68) = 1084.57 Prob > chi2 = 0.0000 Pseudo R2 = 0.0737 Log likelihood = -6818.021

nfailmaj	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
ra7584	.7147486	2.09915	0.34	0.733	-3.39951	4.829007
ragt85	4.938536	2.425669	2.04	0.042	.1843124	9.692759
rsfem	1.410577	.6464898	2.18	0.029	.1434805	2.677674
rpmcare	2.048773	4.212651	0.49	0.627	-6.207871	10.30542
rpmcaid	.6708424	4.247343	0.16	0.875	-7.653796	8.995481
rpprivp	.3533527	4.193201	0.08	0.933	-7.865169	8.571875
rpselfp	.8764345	4.442729	0.20	0.844	-7.831155	9.584024
rgovpay	1.521155	4.562344	0.33	0.739	-7.420874	10.46318
rccanp	-7.268976	2.521313	-2.88	0.004	-12.21066	-2.327292
rccanm	-.5713954	1.714222	-0.33	0.739	-3.931208	2.788417
rccad	-.7577314	1.484615	-0.51	0.610	-3.667523	2.15206
rcchf	-4.157619	.8406797	-4.95	0.000	-5.805321	-2.509917
rcvasc	-1.219719	1.637641	-0.74	0.456	-4.429436	1.989999
rcliver	-1.794866	2.241764	-0.80	0.423	-6.188642	2.598911
rcrenal	2.647041	1.658154	1.60	0.110	-.6028803	5.896963
rcdeme	-3.131036	2.024562	-1.55	0.122	-7.099104	.8370321
rcfunc	-2.472459	1.561157	-1.58	0.113	-5.532269	.5873522
rcdiab	.5042041	2.010371	0.25	0.802	-3.436051	4.44446
rcpulm	-.6880402	.7876462	-0.87	0.382	-2.231798	.8557181
rcnutri	-2.564538	1.10449	-2.32	0.020	-4.729298	-.3997779
remerg	-1.311626	.7391401	-1.77	0.076	-2.760314	.1370619
ccanp65	.0708786	.3442961	0.21	0.837	-.6039293	.7456866
ccanm65	-.1639307	.1833735	-0.89	0.371	-.523336	.1954747
ccad65	-.1492113	.2202692	-0.68	0.498	-.5809311	.2825084
cchf65	-.2633795	.1301252	-2.02	0.043	-.5184202	-.0083388
cvasc65	.3418326	.2693307	1.27	0.204	-.1860459	.8697111
cliv65	.0056079	.2433056	0.02	0.982	-.4712623	.4824782
cren65	.1685926	.2048967	0.82	0.411	-.2329976	.5701828
cdem65	.0953041	.3791931	0.25	0.802	-.6479006	.8385089
cfunc65	-.2716323	.2336044	-1.16	0.245	-.7294885	.1862238
cdiab65	.1274753	.2390174	0.53	0.594	-.3409903	.5959408
cpulm65	-.0092073	.1288086	-0.07	0.943	-.2616676	.2432529
cnutr65	.6583508	.1899768	3.47	0.001	.2860031	1.030699
emerg65	-.2341855	.1024308	-2.29	0.022	-.4349462	-.0334247
_cons	-2.880359	.1407151	-20.47	0.000	-3.156155	-2.604562

Source: Needleman J. UCLA School of Public Health, Los Angeles, CA. By e-mail, December 6, 2003, and December 12, 2003.

* Regions:
Midwestern (MW) region — Wisconsin and Missouri
Eastern (EA) region — New York and Massachusetts
Southeastern (SE) region — Maryland, Virginia, West Virginia, and South Carolina
Western (WS) region — Nevada, Arizona, and California

Table 2 – Major Surgical Risk Pools for "Death Among Surgical Inpatients with Treatable Serious Complications (Failure to Rescue)" (Diagnostic Related Groups)

Major Surgical Risk Pool	001-004, 005, 049, 075, 103-108, 110-111, 113-114, 146-151, 154-156, 159-160, 164-167, 191-200, 209-215, 218-219, 220, 221-222, 226-227, 230-231, 257-261, 263-266, 285-290, 302-307, 310-311, 334-337, 353-359, 392-393, 400-402, 406-407, 415, 439-440, 458-459, 468, 471-472, 476, 480-486, 488, 491, 493-504, 506-507, 512-515

Sources: Needleman J, Buerhaus PI, Mattke S, Stewart M, Zelevinsky K. *Nurse Staffing and Patient Outcomes in Hospitals*. HRSA Report No. 230-99-0021; February 28, 2001; and Needleman J, University of California and Stewart M, Brandeis University, personal communication, September 5, 2004.

Table 3 – Exclusion Codes for Complications of Care for "Death Among Surgical Inpatients with Treatable Serious Complications (Failure to Rescue)"

COMPLICATION	EXCLUSIONS
Sepsis	Discharges with an ICD-9-CM diagnosis code of sepsis in the principal diagnosis field; discharges with a DRG of infection (DRGs 020, 068, 069, 070, 079, 080, 081, 089, 090, 091, 126, 238, 242, 277, 278, 279, 302, 320, 321, 322, 350, 368, 416, 417, 418, 423); discharges with an ICD-9-CM diagnosis code of immunocompromised state (ICD-9-CM codes 042, 136.3, 279.00, 279.01, 279.02, 279.03, 279.04, 279.05, 279.06, 279.09, 279.10, 279.11, 279.12, 279.13, 279.19, 279.2, 279.3, 279.4, 279.8, 279.9, 795.71, V01.8, V01.81, V01.82, V01.83, V01.84, V01.89, V42.0, V42.1, V42.2, V42.3, V42.4, V42.5, V42.6, V42.7, V42.8, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9) in any diagnosis field; discharges with a length-of-stay (LOS) less than 3 days
Pneumonia	Discharges with an ICD-9-CM diagnosis code of pneumonia in the principal diagnosis field; discharges with an ICD-9-CM diagnosis code of viral pneumonia (ICD-9-CM codes 480.0, 480.1, 480.2, 480.8, 480.9, 481, 483, 483.0, 483.1, 483.8, 484.1, 484.3, 484.5, 484.6, 484.7, 484.8, 487.0, 487.1, 487.8) in any diagnosis field; discharges with an immunocompromised state DRG code (DRGs 103, 302, 480, 481, 488, 489, 490, 495, 512, 513); discharges with an ICD-9-CM diagnosis code of an immunocompromised state (ICD-9-CM codes 042, 136.3, 279.00, 279.01, 279.02, 279.03, 279.04, 279.05, 279.06, 279.09, 279.10, 279.11, 279.12, 279.13, 279.19, 279.2, 279.3, 279.4, 279.8, 279.9, 795.71, V01.8, V01.81, V01.82, V01.83, V01.84, V01.89, V42.0, V42.1, V42.2, V42.3, V42.4, V42.5, V42.6, V42.7, V42.8, V42.81, V42.82, V42.83, V42.84, V42.89, V42.9) in any diagnosis field; discharges with an MDC code of 4 (diseases & disorders of the respiratory system)
GI Bleeding	Discharges with an ICD-9-CM diagnosis code of GI hemorrhage or acute ulcer in the principal diagnosis field; discharges with an ICD-9-CM diagnosis code of anemia (ICD-9-CD codes 280.0, 285.1) or trauma (ICD-9-CM codes 800.00, 800.01, 800.02, 800.03, 800.04, 800.05, 800.06, 800.09, 800.10, 800.11, 800.12, 00.13, 800.14, 800.15, 800.16, 800.19, 800.20, 800.21, 800.22, 800.23, 800.24, 800.25, 800.26, 800.29, 800.30, 800.31, 800.32, 800.33, 800.34, 800.35, 800.36, 800.39, 800.40, 800.41, 800.42, 800.43, 800.44, 800.45, 800.46, 800.49, 800.50, 800.51, 800.52, 800.53, 800.54, 800.55, 800.56, 800.59, 800.60, 800.61, 800.62, 800.63, 800.64, 800.65, 800.66, 800.69, 800.70, 800.71, 800.72, 800.73, 800.74, 800.75, 800.76, 800.79, 800.80, 800.81, 800.82, 800.83, 800.84, 800.85, 800.86, 800.89, 800.90, 800.91, 800.92, 800.93, 800.94, 800.95, 800.96, 800.99, 801.00, 801.01, 801.02, 801.03, 801.04, 801.05, 801.06, 801.09, 801.10, 801.11, 801.12, 801.13, 801.14, 801.15, 801.16, 801.19, 801.20, 801.21, 801.22, 801.23, 801.24, 801.25, 801.26, 801.29, 801.30, 801.31, 801.32, 801.33, 801.34, 801.35, 801.36, 801.39, 801.40, 801.41, 801.42, 801.43, 801.44, 801.45, 801.46, 801.49, 801.50, 801.51, 801.52, 801.53, 801.54, 801.55, 801.56, 801.59, 801.60, 801.61, 801.62, 801.63, 801.64, 801.65, 801.66, 801.69, 801.70, 801.71, 801.72, 801.73, 801.74, 801.75, 801.76, 801.79, 801.80, 801.81, 801.82, 801.83, 801.84, 801.85, 801.86, 801.89, 801.90, 801.91, 801.92, 801.93, 801.94, 801.95, 801.96, 801.99, 802.0, 802.1, 802.20, 802.21, 802.22, 802.23, 802.24, 802.25, 802.26, 802.27, 802.28, 802.29, 802.30, 802.31, 802.32, 802.33, 802.34, 802.35, 802.36, 802.37, 802.38, 802.39, 802.4, 802.5, 802.6, 802.7, 802.8, 802.9, 803.00, 803.01, 803.02, 803.03, 803.04, 803.05, 803.06, 803.09, 803.10, 803.11, 803.12, 803.13, 803.14, 803.15, 803.16, 803.19, 803.20, 803.21, 803.22, 803.23, 803.24, 803.25, 803.26, 803.29, 803.30, 803.31, 803.32, 803.33, 803.34, 803.35,803.36, 803.39, 803.40, 803.41, 803.42, 803.43, 803.44, 803.45, 803.46, 803.49, 803.50, 803.51, 803.52, 803.53, 803.54, 803.55, 803.56, 803.59,803.60, 803.61, 803.62,803.63, 803.64, 803.65, 803.66, 803.69, 803.70, 803.71, 803.72, 803.73, 803.74, 803.75, 803.76, 803.79, 803.80, 803.81, 803.82, 803.83, 803.84, 803.85, 803.86, 803.89, 803.90, 803.91, 803.92, 803.93, 803.94, 803.95, 803.96, 803.99, 804.00, 804.01, 804.02, 804.03, 804.04, 804.05, 804.06, 804.09, 804.10, 804.11, 804.12, 804.13, 804.14, 804.15, 804.16, 804.19, 804.20, 804.21, 804.22, 804.23, 804.24, 804.25, 804.26, 804.29, 804.30, 804.31, 804.32, 804.33, 804.34,804.35, 804.36, 804.39, 804.40, 804.41,

Table 3 – Exclusion Codes for Complications of Care for "Death Among Surgical Inpatients with Treatable Serious Complications (Failure to Rescue)" (continued)

COMPLICATION	EXCLUSIONS
GI Bleeding *continued*	804.42, 804.43, 804.44, 804.45, 804.46, 804.49, 804.50, 804.51, 804.52, 804.53, 804.54, 804.55, 804.56, 804.59, 804.60, 804.61, 804.62,804.63, 804.64, 804.65, 804.66, 804.69, 804.70, 804.71, 804.72, 804.73, 804.74, 804.75, 804.76, 804.79, 804.80, 804.81, 804.82, 804.83, 804.84, 804.85, 804.86, 804.89, 804.90, 804.91, 804.92, 804.93, 804.94,804.95, 804.96, 804.99, 805.00, 805.01, 805.02, 805.03, 805.04, 805.05, 805.06, 805.07, 805.08, 805.10, 805.11, 805.12, 805.13, 805.14, 805.15, 805.16, 805.17, 805.18, 805.2, 805.3, 805.4, 805.5, 805.6, 805.7, 805.8, 805.9, 806.00, 806.01, 806.02, 806.03, 806.04, 806.05, 806.06, 806.07, 806.08, 806.09, 806.10, 806.11, 806.12,806.13, 806.14, 806.15, 806.16, 806.17, 806.18, 806.19, 806.20, 806.21, 806.22, 806.23, 806.24, 806.25, 806.26, 806.27, 806.28, 806.29, 806.30, 806.31, 806.32, 806.33, 806.34, 806.35, 806.36, 806.37, 806.38, 806.39, 806.4, 806.5, 806.60, 806.61, 806.62, 806.69, 806.70, 806.71, 806.72, 806.79, 806.8, 806.9, 807.00, 807.01, 807.02, 807.03, 807.04, 807.05, 807.06, 807.07, 807.08, 807.09 ,807.10, 807.11, 807.12, 807.13, 807.14, 807.15, 807.16, 807.17, 807.18, 807.19, 807.2, 807.3, 807.4, 807.5, 807.6, 808.0, 808.1, 808.2, 808.3, 808.41, 808.42, 808.43, 808.49, 808.51, 808.52, 808.53, 808.59, 808.8, 808.9, 809.0, 809.1, 810.00, 810.01, 810.02, 8100.3, 810.10, 810.11, 810.12, 810.13, 811.00, 811.01, 811.02, 811.03, 811.09, 811.10, 811.11, 811.12, 811.13, 811.19, 812.00, 812.01, 812.02, 812.03, 812.09, 812.10, 812.11, 812.12, 812.13, 812.19, 812.20, 812.21, 812.30, 812.31, 812.40, 812.41, 812.42, 812.43, 812.44, 812.49, 812.50, 812.51, 812.52, 812.53, 812.54, 812.59, 813.00, 813.01, 813.02, 813.03, 813.04, 813.05, 813.06, 813.07, 813.08, 813.10, 813.11, 813.12,813.13, 813.14, 813.15, 813.16, 813.17, 813.18, 813.20, 813.21, 813.22, 813.23, 813.30, 813.31, 813.32, 813.33, 813.40, 813.41, 813.42, 813.43, 813.44, 813.45, 813.50, 813.51, 813.52, 813.53, 813.54, 813.80, 813.81, 813.82, 813.83, 813.90, 813.91, 813.92, 813.93, 814.00, 814.01, 814.02, 814.03, 814.04, 814.05, 814.06, 814.07, 814.08, 814.09, 814.10, 814.11, 814.12, 814.13, 814.14, 814.15, 814.16, 814.17, 814.18, 814.19, 815.00, 815.01, 815.02, 815.03, 815.04, 815.09, 815.10, 815.11, 815.12, 815.13, 815.14, 815.19, 817.0, 817.1, 818.0, 818.1, 819.0, 819.1, 820.00, 820.01, 820.02, 820.03, 820.09, 820.10, 820.11, 820.12, 820.13, 820.19, 820.20, 820.21, 820.22, 820.30, 820.31, 820.32, 820.8, 820.9, 821.00, 821.01, 821.10, 821.11, 821.20, 821.21, 821.22, 821.23, 821.29, 821.30, 821.31, 821.32, 821.33, 821.39, 822.0, 822.1, 823.00, 823.01, 823.02, 823.10, 823.11, 823.12, 823.20, 823.21, 823.22, 823.30, 823.31, 823.32, 823.4, 823.40, 823.41, 823.42, 823.80, 823.81, 823.82, 823.90, 823.91, 823.92, 824.0, 824.1, 824.2, 824.3, 824.4, 824.5, 824.6, 824.7, 824.8, 824.9, 825.0, 825.1, 825.20, 825.21, 825.22, 825.23, 825.24, 825.25, 825.29, 825.30, 825.31, 825.32, 825.33, 825.34, 825.35, 825.39, 827.0, 827.1, 828.0, 828.1, 829.0, 829.1, 830.0, 830.1, 831.00, 831.01, 831.02, 831.03, 831.04, 831.09, 831.10, 831.11, 831.12, 831.13, 831.14, 831.19, 832.00, 832.01, 832.02, 832.03, 832.04, 832.09, 832.10, 832.11, 832.12, 832.13, 832.14, 832.19, 833.00, 833.01, 833.02, 833.03, 833.04, 833.05, 833.09, 833.10, 833.11, 833.12, 833.13, 833.14, 833.15, 833.19, 835.00, 835.01, 835.02, 835.03, 835.10, 835.11, 835.12, 835.13, 836.0, 836.1, 836.2, 836.3, 836.4, 836.50, 836.51, 836.52, 836.53, 836.54, 836.59, 836.60, 836.61, 836.62, 836.63, 836.64, 836.69, 837.0, 837.1, 838.00, 838.01, 838.02, 838.03, 838.04, 838.05, 838.06, 838.09, 838.10, 838.11, 838.12, 838.13, 838.14, 838.15, 838.16, 838.19, 839.00, 839.01, 839.02, 839.03, 839.04, 839.05, 839.06, 839.07, 839.08, 839.10, 839.11, 839.12, 839.13, 839.14, 839.15, 839.16, 839.17, 839.18, 839.20, 839.21, 839.30, 839.31, 839.40, 839.41, 839.42, 839.49, 839.50, 839.51, 839.52, 839.59, 839.61, 839.69, 839.71, 839.79, 839.8, 839.9, 850.0, 850.1, 850.2, 850.3, 850.4, 850.5, 850.9, 851.00, 851.01, 851.02, 851.03, 851.04, 851.05, 851.06, 851.09, 851.10, 851.11, 851.12, 851.13, 851.14, 851.15, 851.16, 851.19, 851.20, 851.21, 851.22, 851.23, 851.24, 851.25, 851.26, 851.29, 851.30, 851.31, 851.32, 851.33, 851.34, 851.35, 851.36, 851.39, 851.40, 851.41, 851.42, 851.43, 851.44, 851.45, 851.46, 851.49, 851.50, 851.51, 851.52, 851.53, 851.54, 851.55, 851.56, 851.59, 851.60, 851.61, 851.62, 851.63, 851.64, 851.65, 851.66, 851.69, 851.70, 851.71, 851.72, 851.73, 851.74, 851.75, 851.76, 851.79, 851.80, 851.81, 851.82, 851.83, 851.84, 851.85, 851.86, 851.89, 851.90, 851.91, 851.92, 851.93, 851.94, 851.95, 851.96, 851.99, 852.00, 852.01, 852.02, 852.03, 852.04, 852.05, 852.06, 852.09, 852.10, 852.11, 852.12, 852.13, 852.14, 852.15, 852.16, 852.19, 852.20, 852.21, 852.22, 852.23, 852.24, 852.25, 852.26, 852.29, 852.30, 852.31, 852.32, 852.33, 852.34, 852.35, 852.36, 852.39, 852.40, 852.41, 852.42, 852.43, 852.44, 852.45, 852.46, 852.49, 852.50, 852.51, 852.52, 852.53, 852.54, 852.55, 852.56, 852.59, 853.00, 853.01, 853.02, 853.03, 853.04, 853.05, 853.06, 853.09, 853.10, 853.11, 853.12, 853.13, 853.14, 853.15, 853.16, 853.19, 854.00, 854.01, 854.02, 854.03, 854.04, 854.05, 854.06, 854.09, 854.10, 854.11, 854.12, 854.13, 854.14, 854.15, 854.16, 854.19, 860.0, 860.1, 860.2, 860.3, 860.4, 860.5, 861.00, 861.01, 861.02, 861.03, 861.10, 861.11, 861.12, 861.13, 861.20, 861.21, 861.22, 861.30, 861.31, 861.32, 862.0, 862.1, 862.21, 862.22, 862.29, 862.31, 862.32, 862.39, 862.8, 862.9, 863.0, 863.1, 863.20, 863.21, 863.29, 863.30, 863.31, 863.39, 863.40, 863.41, 863.42, 863.43, 863.44, 863.45, 863.46, 863.49, 863.50, 863.51, 863.52, 863.53, 863.54, 863.55, 863.56, 863.59, 863.80, 863.81, 863.82, 863.83, 863.84, 863.85, 863.89, 863.90, 863.91, 863.92, 863.93, 863.94, 863.95, 863.99, 864.00, 864.01, 864.02, 864.03, 864.04, 864.05, 864.09, 864.10, 864.11, 864.12, 864.13, 864.14, 864.15, 864.19, 865.00, 865.01, 865.02, 865.03, 865.04, 865.09, 865.10, 865.11, 865.12, 865.13, 865.14,

Table 3 – Exclusion Codes for Complications of Care for "Death Among Surgical Inpatients with Treatable Serious Complications (Failure to Rescue)" (continued)

COMPLICATION	EXCLUSIONS
GI Bleeding *continued*	865.19, 866.00, 866.01, 866.02, 866.03, 866.10, 866.11, 866.12, 866.13, 867.0, 867.1, 867.2, 867.3, 867.4, 867.5, 867.6, 867.7, 867.8, 867.9, 868.00, 868.01, 868.02, 868.03, 868.04, 868.09, 868.10, 868.11, 868.12, 868.13, 868.14, 868.19, 869.0, 869.1, 870.0, 870.1, 870.2, 870.3, 870.4, 870.8, 870.9, 871.0, 871.1, 871.2, 871.3, 871.4, 871.5, 871.6, 871.7, 871.9, 872.00, 872.01, 872.02, 872.10, 872.11, 872.12, 872.61, 872.62, 872.63, 872.64, 872.69, 872.71, 872.72, 872.73, 872.74, 872.79, 872.8, 872.9, 873.0, 873.1, 873.20, 873.21, 873.22, 873.23, 873.29, 873.30, 873.31, 873.32, 873.33, 873.39, 873.40, 873.41, 873.42, 873.43, 873.44, 873.49, 873.50, 873.51, 873.52, 873.53, 873.54, 873.59, 873.60, 873.61, 873.62, 873.63, 873.64, 873.65, 873.69, 873.70, 873.71, 873.72, 873.73, 873.74, 873.75, 873.79, 873.8, 873.9, 874.00, 874.01, 874.02, 874.10, 874.11, 874.12, 874.2, 874.3, 874.4, 874.5, 874.8, 874.9, 875.0, 875.1, 876.0, 876.1, 877.0, 877.1, 878.0, 878.1, 878.2, 878.3, 878.4, 878.5, 878.6, 878.7, 878.8, 878.9, 879.0, 879.1, 879.2, 879.3, 879.4, 879.5, 879.6, 879.7, 879.8, 879.9, 880.00, 880.01, 880.02, 880.03, 880.09, 880.10, 880.11, 880.12, 880.13, 880.19, 880.20, 880.21, 880.22, 880.23, 880.29, 881.00, 881.01, 881.02, 881.10, 881.11, 881.12, 881.20, 881.21, 881.22, 882.0, 882.1, 882.2, 884.0, 884.1, 884.2, 887.0, 887.1, 887.2, 887.3, 887.4, 887.5, 887.6, 887.7, 890.0, 890.1, 890.2, 891.0, 891.1, 891.2, 892.0, 892.1, 892.2, 894.0, 894.1, 894.2, 896.0,896.1, 896.2, 896.3, 897.0, 897.1, 897.2, 897.3, 897.4, 897.5, 897.6, 897.7, 900.00, 900.01, 900.02, 900.03, 900.1, 900.81, 900.82, 900.89, 900.9, 901.0, 901.1, 901.2, 901.3, 901.40, 901.41, 901.42, 901.81, 901.82, 901.83, 901.89, 901.9, 902.0, 902.10, 902.11, 902.19, 902.20, 902.21, 902.22, 902.23, 902.24, 902.25, 902.26, 902.27, 902.29, 902.31, 902.32, 902.33, 902.34, 902.39, 902.40, 902.41, 902.42, 902.49, 902.50, 902.51, 902.52, 902.53, 902.54, 902.55, 902.56, 902.59, 902.81, 902.82, 902.87, 902.89, 902.9,903.00, 903.01, 903.02, 903.1, 903.2, 903.3, 903.4, 903.5, 903.8, 903.9, 904.0, 904.1, 904.2, 904.3, 904.40, 904.41, 904.42, 904.50, 904.51, 904.52, 904.53, 904.54, 904.6, 904.7, 904.8, 904.9, 925, 925.1, 925.2, 926.0, 926.11, 926.12, 926.19, 926.8, 926.9, 927.00, 927.01, 927.02, 927.03, 927.09, 927.10, 927.11, 927.20, 927.21, 927.3, 927.8, 927.9, 928.00, 928.01, 928.10, 928.11, 928.20, 928.21, 928.3, 928.8, 928.9, 929.0, 929.9, 940.0, 940.1, 940.2, 940.3, 940.4, 940.5, 940.9, 941.00, 941.01, 941.02, 941.03, 941.04, 941.05, 941.06, 941.07, 941.08, 941.09, 941.10, 941.11, 941.12, 941.13, 941.14, 941.15, 941.16, 941.17, 941.18, 941.19, 941.20, 941.21, 941.22, 941.23, 941.24, 941.25, 941.26, 941.27, 941.28, 941.29, 941.30, 941.31, 941.32, 941.33, 941.34, 941.35, 941.36, 941.37, 941.38, 941.39, 941.40,941.41, 941.42, 941.43, 941.44, 941.45, 941.46, 941.47, 941.48, 941.49, 941.50, 941.51, 941.52, 941.53, 941.54, 941.55, 941.56, 941.57, 941.58, 941.59, 942.00, 942.01, 942.02, 942.03, 942.04, 942.05, 942.09, 942.10, 942.11, 942.12, 942.13, 942.14, 942.15, 942.19, 942.20, 942.21, 942.22, 942.23, 942.24, 942.25, 942.29, 942.30, 942.31, 942.32, 942.33, 942.34, 942.35, 942.39,942.40, 942.41, 942.42, 942.43, 942.44, 942.45, 942.49, 942.50, 942.51, 942.52, 942.53, 942.54, 942.55, 942.59, 943.00, 943.01, 943.02,943.03, 943.04, 943.05, 943.06, 943.09, 943.10, 943.11, 943.12, 943.13, 943.14, 943.15, 943.16, 943.19, 943.20, 943.21, 943.22, 943.23, 943.24, 943.25, 943.26, 943.29, 943.30, 943.31, 943.32, 943.33, 943.34, 943.35, 943.36, 943.39, 943.40, 943.41, 943.42, 943.43, 943.44, 943.45, 943.46, 943.49, 943.50, 943.51, 943.52, 943.53, 943.54, 943.55, 943.56, 943.59, 944.00, 944.01, 944.02, 944.03, 944.04, 944.05, 944.06, 944.07, 944.08, 944.10, 944.11, 944.12, 944.13, 944.14, 944.15, 944.16, 944.17,944.18, 944.20, 944.21, 944.22, 944.23, 944.24, 944.25, 944.26, 944.27, 944.28, 944.30, 944.31, 944.32, 944.33, 944.34, 944.35, 944.36, 944.37, 944.38, 944.40, 944.41, 944.42,944.43, 944.44, 944.45,944.46, 944.47, 944.48, 944.50, 944.51, 944.52, 944.53, 944.54, 944.55, 944.56, 944.57, 944.58, 945.00, 945.01, 945.02, 945.03, 945.04, 945.05, 945.06, 945.09, 945.10, 945.11, 945.12, 945.13, 945.14, 945.15, 945.16, 945.19, 945.20, 945.21, 945.22, 945.23, 945.24, 945.25, 945.26, 945.29, 945.30, 945.31, 945.32, 945.33, 945.34, 945.35, 945.36, 945.39, 945.40, 945.41, 945.42, 945.43, 945.44, 945.45, 945.46, 945.49, 945.50, 945.51, 945.52, 945.53, 945.54, 945.55, 945.56, 945.59, 946.0, 946.1, 946.2, 946.3, 946.4, 946.5, 947.0, 947.1, 947.2, 947.3, 947.4, 947.8, 947.9, 948.00, 948.10, 948.11, 948.20, 948.21, 948.22, 948.30, 948.31, 948.32, 948.33, 948.40, 948.41, 948.42, 948.43, 948.44, 948.50, 948.51, 948.52, 948.53, 948.54, 948.55, 948.60, 948.61, 948.62, 948.63, 948.64, 948.65, 948.66, 948.70, 948.71, 948.72, 948.73, 948.74, 948.75, 948.76, 948.77, 948.80,948.81, 948.82, 948.83, 948.84, 948.85, 948.86, 948.87, 948.88, 948.90, 948.91, 948.92, 948.93, 948.94, 948.95, 948.96, 948.97, 948.98, 948.99, 949.0, 949.1, 949.2, 949.3, 949.4, 949.5, 952.00, 952.01, 952.02, 952.03, 952.04, 952.05, 952.06, 952.07, 952.08, 952.09, 952.10, 952.11, 952.12, 952.13, 952.14, 952.15, 952.16, 952.17, 952.18, 952.19, 952.2, 952.3, 952.4, 952.8, 952.9, 953.0, 953.1, 953.2, 953.3, 953.4, 953.5, 953.8, 953.9, 958.0, 958.1, 958.2, 958.3, 958.4, 958.5, 958.6, 958.7, 958.8) in the principal diagnosis field; discharges with a DRG code of trauma (DRGs 002, 027, 028, 029, 031, 032, 072, 083, 084, 235, 236, 237, 440, 441, 442, 443, 444, 445, 456, 457, 458, 459, 460, 484, 485, 486, 487, 491, 504, 505, 506, 507, 508, 509, 510, 511); discharges with an MDC code of 6 (diseases & disorders of the digestive system) or MDC code of 7 (diseases & disorders of the hepatobiliary system & pancreas) or MDC code of 20 (alcohol or drug use) or MDC code of 22 (burns)

Table 3 – Exclusion Codes for Complications of Care for "Death Among Surgical Inpatients with Treatable Serious Complications (Failure to Rescue)" (continued)

COMPLICATION	EXCLUSIONS
Shock/cardiac arrest	Discharges with an ICD-9-CM diagnosis code of shock or cardiac arrest in the principal diagnosis field; discharges with an ICD-9-CM diagnosis code of hemorrhage (ICD-9-CM code 459.0), GI hemorrhage (ICD-9-CM codes 456.0, 456.20, 530.7, 531.00, 531.01, 531.20, 531.21, 531.40, 531.41, 531.60, 531.61, 532.00, 532.01, 532.20, 532.21, 532.40, 532.41, 532.60, 532.61, 533.00, 533.01, 533.20, 533.21, 533.40, 533.41, 533.60, 533.61, 534.00, 534.01, 534.20, 534.21, 534.40, 534.41, 534.60, 534.61, 535.01, 535.11, 535.21, 535.31, 535.41, 535.51, 535.61, 578.0, 578.1, 578.9) or trauma (ICD-9-CM codes 800.00, 800.01, 800.02, 800.03, 800.04, 800.05, 800.06, 800.09, 800.10, 800.11, 800.12, 00.13, 800.14, 800.15, 800.16, 800.19, 800.20, 800.21, 800.22, 800.23, 800.24, 800.25, 800.26, 800.29, 800.30, 800.31, 800.32, 800.33, 800.34, 800.35, 800.36, 800.39, 800.40, 800.41, 800.42, 800.43, 800.44, 800.45, 800.46, 800.49, 800.50, 800.51, 800.52, 800.53, 800.54, 800.55, 800.56, 800.59, 800.60, 800.61, 800.62, 800.63, 800.64, 800.65, 800.66, 800.69, 800.70, 800.71, 800.72, 800.73, 800.74, 800.75, 800.76, 800.79, 800.80, 800.81, 800.82, 800.83, 800.84, 800.85, 800.86, 800.89, 800.90, 800.91, 800.92, 800.93, 800.94, 800.95, 800.96, 800.99, 801.00, 801.01, 801.02, 801.03, 801.04, 801.05, 801.06, 801.09, 801.10, 801.11, 801.12, 801.13, 801.14, 801.15, 801.16, 801.19, 801.20, 801.21, 801.22, 801.23, 801.24, 801.25, 801.26, 801.29, 801.30, 801.31, 801.32, 801.33, 801.34, 801.35, 801.36, 801.39, 801.40, 801.41, 801.42, 801.43, 801.44, 801.45, 801.46, 801.49, 801.50, 801.51, 801.52, 801.53, 801.54, 801.55, 801.56, 801.59, 801.60, 801.61, 801.62, 801.63, 801.64, 801.65, 801.66, 801.69, 801.70, 801.71, 801.72, 801.73, 801.74, 801.75, 801.76, 801.79, 801.80, 801.81, 801.82, 801.83, 801.84, 801.85, 801.86, 801.89, 801.90, 801.91, 801.92, 801.93, 801.94, 801.95, 801.96, 801.99, 802.0, 802.1, 802.20, 802.21, 802.22, 802.23, 802.24, 802.25, 802.26, 802.27, 802.28, 802.29, 802.30, 802.31, 802.32, 802.33, 802.34, 802.35, 802.36, 802.37, 802.38, 802.39, 802.4, 802.5, 802.6, 802.7, 802.8, 802.9, 803.00, 803.01, 803.02, 803.03, 803.04, 803.05, 803.06, 803.09, 803.10, 803.11, 803.12, 803.13, 803.14, 803.15, 803.16, 803.19, 803.20, 803.21, 803.22, 803.23, 803.24, 803.25, 803.26, 803.29, 803.30, 803.31, 803.32, 803.33, 803.34, 803.35,803.36, 803.39, 803.40, 803.41, 803.42, 803.43, 803.44, 803.45, 803.46, 803.49, 803.50, 803.51, 803.52, 803.53, 803.54, 803.55, 803.56, 803.59,803.60, 803.61, 803.62,803.63, 803.64, 803.65, 803.66, 803.69, 803.70, 803.71, 803.72, 803.73, 803.74, 803.75, 803.76, 803.79, 803.80, 803.81, 803.82, 803.83, 803.84, 803.85, 803.86, 803.89, 803.90, 803.91, 803.92, 803.93, 803.94, 803.95, 803.96, 803.99, 804.00, 804.01, 804.02, 804.03, 804.04, 804.05, 804.06, 804.09, 804.10, 804.11, 804.12, 804.13, 804.14, 804.15, 804.16, 804.19, 804.20, 804.21, 804.22, 804.23, 804.24, 804.25, 804.26, 804.29, 804.30, 804.31, 804.32, 804.33, 804.34,804.35, 804.36, 804.39, 804.40, 804.41, 804.42, 804.43, 804.44, 804.45, 804.46, 804.49, 804.50, 804.51, 804.52, 804.53, 804.54, 804.55, 804.56, 804.59, 804.60, 804.61, 804.62,804.63, 804.64, 804.65, 804.66, 804.69, 804.70, 804.71, 804.72, 804.73, 804.74, 804.75, 804.76, 804.79, 804.80, 804.81, 804.82, 804.83, 804.84, 804.85, 804.86, 804.89, 804.90, 804.91, 804.92, 804.93, 804.94,804.95, 804.96, 804.99, 805.00, 805.01, 805.02, 805.03, 805.04, 805.05, 805.06, 805.07, 805.08, 805.10, 805.11, 805.12, 805.13, 805.14, 805.15, 805.16, 805.17, 805.18, 805.2, 805.3, 805.4, 805.5, 805.6, 805.7, 805.8, 805.9, 806.00, 806.01, 806.02, 806.03, 806.04, 806.05, 806.06, 806.07, 806.08, 806.09, 806.10, 806.11, 806.12,806.13, 806.14, 806.15, 806.16, 806.17, 806.18, 806.19, 806.20, 806.21, 806.22, 806.23, 806.24, 806.25, 806.26, 806.27, 806.28, 806.29, 806.30, 806.31, 806.32, 806.33, 806.34, 806.35, 806.36, 806.37, 806.38, 806.39, 806.4, 806.5, 806.60, 806.61, 806.62, 806.69, 806.70, 806.71, 806.72, 806.79, 806.8, 806.9, 807.00, 807.01, 807.02, 807.03, 807.04, 807.05, 807.06, 807.07, 807.08, 807.09, 807.10, 807.11, 807.12, 807.13, 807.14, 807.15, 807.16, 807.17, 807.18, 807.19, 807.2, 807.3, 807.4, 807.5, 807.6, 808.0, 808.1, 808.2, 808.3, 808.41, 808.42, 808.43, 808.49, 808.51, 808.52, 808.53, 808.59, 808.8, 808.9, 809.0, 809.1, 810.00, 810.01, 810.02, 8100.3, 810.10, 810.11, 810.12, 810.13, 811.00, 811.01, 811.02, 811.03, 811.09, 811.10, 811.11, 811.12, 811.13, 811.19, 812.00, 812.01, 812.02, 812.03, 812.09, 812.10, 812.11, 812.12, 812.13, 812.19, 812.20, 812.21, 812.30, 812.31, 812.40, 812.41, 812.42, 812.43, 812.44, 812.49, 812.50, 812.51, 812.52, 812.53, 812.54, 812.59, 813.00, 813.01, 813.02, 813.03, 813.04, 813.05, 813.06, 813.07, 813.08, 813.10, 813.11, 813.12,813.13, 813.14, 813.15, 813.16, 813.17, 813.18, 813.20, 813.21, 813.22, 813.23, 813.30, 813.31, 813.32, 813.33, 813.40, 813.41, 813.42, 813.43, 813.44, 813.45, 813.50, 813.51, 813.52, 813.53, 813.54, 813.80, 813.81, 813.82, 813.83, 813.90, 813.91, 813.92, 813.93, 814.00, 814.01, 814.02, 814.03, 814.04, 814.05, 814.06, 814.07, 814.08, 814.09, 814.10, 814.11, 814.12, 814.13, 814.14, 814.15, 814.16, 814.17, 814.18, 814.19, 815.00, 815.01, 815.02, 815.03, 815.04, 815.09, 815.10, 815.11, 815.12, 815.13, 815.14, 815.19, 817.0, 817.1, 818.0, 818.1, 819.0, 819.1, 820.00, 820.01, 820.02, 820.03, 820.09, 820.10, 820.11, 820.12, 820.13, 820.19, 820.20, 820.21, 820.22, 820.30, 820.31, 820.32, 820.8, 820.9, 821.00, 821.01, 821.10, 821.11, 821.20, 821.21, 821.22, 821.23, 821.29, 821.30, 821.31, 821.32, 821.33, 821.39, 822.0, 822.1, 823.00, 823.01, 823.02, 823.10, 823.11, 823.12, 823.20,

Table 3 – Exclusion Codes for Complications of Care for "Death Among Surgical Inpatients with Treatable Serious Complications (Failure to Rescue)" (continued)

COMPLICATION	EXCLUSIONS
Shock/cardiac arrest *continued*	823.21, 823.22, 823.30, 823.31, 823.32, 823.4, 823.40, 823.41, 823.42, 823.80, 823.81, 823.82, 823.90, 823.91, 823.92, 824.0, 824.1, 824.2, 824.3, 824.4, 824.5, 824.6, 824.7, 824.8, 824.9, 825.0, 825.1, 825.20, 825.21, 825.22, 825.23, 825.24, 825.25, 825.29, 825.30, 825.31, 825.32, 825.33, 825.34, 825.35, 825.39, 827.0, 827.1, 828.0, 828.1, 829.0, 829.1, 830.0, 830.1, 831.00, 831.01, 831.02, 831.03, 831.04, 831.09, 831.10, 831.11, 831.12, 831.13, 831.14, 831.19, 832.00, 832.01, 832.02, 832.03, 832.04, 832.09, 832.10, 832.11, 832.12, 832.13, 832.14, 832.19, 833.00, 833.01, 833.02, 833.03, 833.04, 833.05, 833.09, 833.10, 833.11, 833.12, 833.13, 833.14, 833.15, 833.19, 835.00, 835.01, 835.02, 835.03, 835.10, 835.11, 835.12, 835.13, 836.0, 836.1, 836.2, 836.3, 836.4, 836.50, 836.51, 836.52, 836.53, 836.54, 836.59, 836.60, 836.61, 836.62, 836.63, 836.64, 836.69, 837.0, 837.1, 838.00, 838.01, 838.02, 838.03, 838.04, 838.05, 838.06, 838.09, 838.10, 838.11, 838.12, 838.13, 838.14, 838.15, 838.16, 838.19, 839.00, 839.01, 839.02, 839.03, 839.04, 839.05, 839.06, 839.07, 839.08, 839.10, 839.11, 839.12, 839.13, 839.14, 839.15, 839.16, 839.17, 839.18, 839.20, 839.21, 839.30, 839.31, 839.40, 839.41, 839.42, 839.49, 839.50,839.51, 839.52, 839.59, 839.61, 839.69, 839.71, 839.79, 839.8, 839.9, 850.0, 850.1, 850.2, 850.3, 850.4, 850.5, 850.9, 851.00, 851.01, 851.02, 851.03, 851.04, 851.05, 851.06, 851.09, 851.10, 851.11, 851.12, 851.13, 851.14, 851.15, 851.16, 851.19, 851.20, 851.21, 851.22, 851.23, 851.24, 851.25, 851.26, 851.29, 851.30, 851.31, 851.32, 851.33, 851.34, 851.35, 851.36, 851.39, 851.40, 851.41, 851.42, 851.43, 851.44, 851.45, 851.46, 851.49, 851.50, 851.51, 851.52, 851.53, 851.54, 851.55, 851.56, 851.59, 851.60, 851.61, 851.62, 851.63, 851.64, 851.65, 851.66, 851.69, 851.70, 851.71, 851.72, 851.73, 851.74, 851.75, 851.76, 851.79, 851.80, 851.81, 851.82, 851.83, 851.84, 851.85, 851.86, 851.89, 851.90, 851.91, 851.92, 851.93, 851.94, 851.95, 851.96, 851.99, 852.00, 852.01, 852.02, 852.03, 852.04, 852.05, 852.06, 852.09, 852.10, 852.11, 852.12, 852.13, 852.14, 852.15, 852.16, 852.19, 852.20, 852.21, 852.22, 852.23, 852.24, 852.25, 852.26, 852.29, 852.30, 852.31, 852.32, 852.33, 852.34, 852.35, 852.36, 852.39, 852.40, 852.41, 852.42, 852.43, 852.44, 852.45, 852.46, 852.49, 852.50, 852.51, 852.52, 852.53, 852.54, 852.55, 852.56, 852.59, 853.00, 853.01, 853.02, 853.03, 853.04, 853.05, 853.06, 853.09, 853.10, 853.11, 853.12, 853.13, 853.14, 853.15, 853.16, 853.19, 854.00, 854.01, 854.02, 854.03, 854.04, 854.05, 854.06, 854.09, 854.10, 854.11, 854.12, 854.13, 854.14, 854.15, 854.16, 854.19, 860.0, 860.1, 860.2, 860.3, 860.4, 860.5, 861.00, 861.01, 861.02, 861.03, 861.10, 861.11, 861.12, 861.13, 861.20, 861.21, 861.22, 861.30, 861.31, 861.32, 862.0, 862.1, 862.21, 862.22, 862.29, 862.31, 862.32, 862.39, 862.8, 862.9, 863.0, 863.1, 863.20, 863.21, 863.29, 863.30, 863.31, 863.39, 863.40, 863.41, 863.42, 863.43, 863.44, 863.45, 863.46, 863.49, 863.50, 863.51, 863.52, 863.53, 863.54, 863.55, 863.56, 863.59, 863.80, 863.81, 863.82, 863.83, 863.84, 863.85, 863.89, 863.90, 863.91, 863.92, 863.93, 863.94, 863.95, 863.99, 864.00, 864.01, 864.02, 864.03, 864.04, 864.05, 864.09, 864.10, 864.11, 864.12, 864.13, 864.14, 864.15, 864.19, 865.00, 865.01, 865.02, 865.03, 865.04, 865.09, 865.10, 865.11, 865.12, 865.13, 865.14, 865.19, 866.00, 866.01, 866.02, 866.03, 866.10, 866.11, 866.12, 866.13, 867.0, 867.1, 867.2, 867.3, 867.4, 867.5, 867.6, 867.7, 867.8, 867.9, 868.00, 868.01, 868.02, 868.03, 868.04, 868.09, 868.10, 868.11, 868.12, 868.13, 868.14, 868.19, 869.0, 869.1, 870.0, 870.1, 870.2, 870.3, 870.4, 870.8, 870.9, 871.0, 871.1, 871.2, 871.3, 871.4, 871.5, 871.6, 871.7, 871.9, 872.00, 872.01, 872.02, 872.10, 872.11, 872.12, 872.61, 872.62, 872.63, 872.64, 872.69, 872.71, 872.72, 872.73, 872.74, 872.79, 872.8, 872.9, 873.0, 873.1, 873.20, 873.21, 873.22, 873.23, 873.29, 873.30, 873.31, 873.32, 873.33, 873.39, 873.40, 873.41, 873.42, 873.43, 873.44, 873.49, 873.50, 873.51, 873.52, 873.53, 873.54, 873.59, 873.60, 873.61, 873.62, 873.63, 873.64, 873.65, 873.69, 873.70, 873.71, 873.72, 873.73, 873.74, 873.75, 873.79, 873.8, 873.9, 874.00, 874.01, 874.02, 874.10, 874.11, 874.12, 874.2, 874.3, 874.4, 874.5, 874.8, 874.9, 875.0, 875.1, 876.0, 876.1, 877.0, 877.1, 878.0, 878.1, 878.2, 878.3, 878.4, 878.5, 878.6, 878.7, 878.8, 878.9, 879.0, 879.1, 879.2, 879.3, 879.4, 879.5, 879.6, 879.7, 879.8, 879.9, 880.00, 880.01, 880.02, 880.03, 880.09, 880.10, 880.11, 880.12, 880.13, 880.19, 880.20, 880.21, 880.22, 880.23, 880.29, 881.00, 881.01, 881.02, 881.10, 881.11, 881.12, 881.20, 881.21, 881.22, 882.0, 882.1, 882.2, 884.0, 884.1, 884.2, 887.0, 887.1, 887.2, 887.3, 887.4, 887.5, 887.6, 887.7, 890.0, 890.1, 890.2, 891.0, 891.1, 891.2, 892.0, 892.1, 892.2, 894.0, 894.1, 894.2, 896.0,896.1, 896.2, 896.3, 897.0, 897.1, 897.2, 897.3, 897.4, 897.5, 897.6, 897.7, 900.00, 900.01, 900.02, 900.03, 900.1, 900.81, 900.82, 900.89, 900.9, 901.0, 901.1, 901.2, 901.3, 901.40, 901.41, 901.42, 901.81, 901.82, 901.83, 901.89, 901.9, 902.0, 902.10, 902.11, 902.19, 902.20, 902.21, 902.22, 902.23, 902.24, 902.25, 902.26, 902.27, 902.29, 902.31, 902.32, 902.33, 902.34, 902.39, 902.40, 902.41, 902.42, 902.49, 902.50, 902.51, 902.52, 902.53, 902.54, 902.55, 902.56, 902.59, 902.81, 902.82, 902.87, 902.89, 902.9,903.00, 903.01, 903.02, 903.1, 903.2, 903.3, 903.4, 903.5, 903.8, 903.9, 904.0, 904.1, 904.2, 904.3, 904.40, 904.41, 904.42, 904.50, 904.51, 904.52, 904.53, 904.54, 904.6, 904.7, 904.8, 904.9, 925, 925.1, 925.2, 926.0, 926.11, 926.12, 926.19, 926.8, 926.9, 927.00, 927.01, 927.02, 927.03, 927.09, 927.10, 927.11, 927.20, 927.21, 927.3, 927.8, 927.9, 928.00, 928.01, 928.10, 928.11,

Table 3 – Exclusion Codes for Complications of Care for "Death Among Surgical Inpatients with Treatable Serious Complications (Failure to Rescue)" (continued)

COMPLICATION	EXCLUSIONS
Shock/Cardiac Arrest *continued*	928.20, 928.21, 928.3, 928.8, 928.9, 929.0, 929.9, 940.0, 940.1, 940.2, 940.3, 940.4, 940.5, 940.9, 941.00, 941.01, 941.02, 941.03, 941.04, 941.05, 941.06, 941.07, 941.08, 941.09, 941.10, 941.11, 941.12, 941.13, 941.14, 941.15, 941.16, 941.17, 941.18, 941.19, 941.20, 941.21, 941.22, 941.23, 941.24, 941.25, 941.26, 941.27, 941.28, 941.29, 941.30, 941.31, 941.32, 941.33, 941.34, 941.35, 941.36, 941.37, 941.38, 941.39, 941.40,941.41, 941.42, 941.43, 941.44, 941.45, 941.46, 941.47, 941.48, 941.49, 941.50, 941.51, 941.52, 941.53, 941.54, 941.55, 941.56, 941.57, 941.58, 941.59, 942.00, 942.01, 942.02, 942.03, 942.04, 942.05, 942.09, 942.10, 942.11, 942.12, 942.13, 942.14, 942.15, 942.19, 942.20, 942.21, 942.22, 942.23, 942.24, 942.25, 942.29, 942.30, 942.31, 942.32, 942.33, 942.34, 942.35, 942.39,942.40, 942.41, 942.42, 942.43, 942.44, 942.45, 942.49, 942.50, 942.51, 942.52, 942.53, 942.54, 942.55, 942.59, 943.00, 943.01, 943.02,943.03, 943.04, 943.05, 943.06, 943.09, 943.10, 943.11, 943.12, 943.13, 943.14, 943.15, 943.16, 943.19, 943.20, 943.21, 943.22, 943.23, 943.24, 943.25, 943.26, 943.29, 943.30, 943.31, 943.32, 943.33, 943.34, 943.35, 943.36, 943.39, 943.40, 943.41, 943.42, 943.43, 943.44, 943.45, 943.46, 943.49, 943.50, 943.51, 943.52, 943.53, 943.54, 943.55, 943.56, 943.59, 944.00, 944.01, 944.02, 944.03, 944.04, 944.05, 944.06, 944.07, 944.08, 944.10, 944.11, 944.12, 944.13, 944.14, 944.15, 944.16, 944.17, 944.18, 944.20, 944.21, 944.22, 944.23, 944.24, 944.25, 944.26, 944.27, 944.28, 944.30, 944.31, 944.32, 944.33, 944.34, 944.35, 944.36, 944.37, 944.38, 944.40, 944.41, 944.42,944.43, 944.44, 944.45, 944.46, 944.47, 944.48, 944.50, 944.51, 944.52, 944.53, 944.54, 944.55, 944.56, 944.57, 944.58, 945.00, 945.01, 945.02, 945.03, 945.04, 945.05, 945.06, 945.09, 945.10, 945.11, 945.12, 945.13, 945.14, 945.15, 945.16, 945.19, 945.20, 945.21, 945.22, 945.23, 945.24, 945.25, 945.26, 945.29, 945.30, 945.31, 945.32, 945.33, 945.34, 945.35, 945.36, 945.39, 945.40, 945.41, 945.42, 945.43, 945.44, 945.45, 945.46, 945.49, 945.50, 945.51, 945.52, 945.53, 945.54, 945.55, 945.56, 945.59, 946.0, 946.1, 946.2, 946.3, 946.4, 946.5, 947.0, 947.1, 947.2, 947.3, 947.4, 947.8, 947.9, 948.00, 948.10, 948.11, 948.20, 948.21, 948.22, 948.30, 948.31, 948.32, 948.33, 948.40, 948.41, 948.42, 948.43, 948.44, 948.50, 948.51, 948.52, 948.53, 948.54, 948.55, 948.60, 948.61, 948.62, 948.63, 948.64, 948.65, 948.66, 948.70, 948.71, 948.72, 948.73, 948.74, 948.75, 948.76, 948.77, 948.80,948.81, 948.82, 948.83, 948.84, 948.85, 948.86, 948.87, 948.88, 948.90, 948.91, 948.92, 948.93, 948.94, 948.95, 948.96, 948.97, 948.98, 948.99, 949.0, 949.1, 949.2, 949.3, 949.4, 949.5, 952.00, 952.01, 952.02, 952.03, 952.04, 952.05, 952.06, 952.07, 952.08, 952.09, 952.10, 952.11, 952.12, 952.13, 952.14, 952.15, 952.16, 952.17, 952.18, 952.19, 952.2, 952.3, 952.4, 952.8, 952.9, 953.0, 953.1, 953.2, 953.3, 953.4, 953.5, 953.8, 953.9, 958.0, 958.1, 958.2, 958.3, 958.4, 958.5, 958.6, 958.7, 958.8) in the principal diagnosis field; discharges with a DRG code of trauma (DRGs 002, 027, 028, 029, 031, 032, 072, 083, 084, 235, 236, 237, 440, 441, 442, 443, 444, 445, 456, 457, 458, 459, 460, 484, 485, 486, 487, 491, 504, 505, 506, 507, 508, 509, 510, 511); discharges with an MDC code of 4 (diseases & disorders of the respiratory system) or MDC code of 5 (disease & disorders of the circulatory system)
DVT/PE	Discharges with an ICD-9-CM diagnosis code of DVT or PE in the principal diagnosis field; discharges with an ICD-9-CM code for abortion-related or postpartum obstetric pulmonary embolism in the principal diagnosis field (ICD-9-CM codes 673.20, 673.21, 673.22, 673.23, 673.24)

Sources: Needleman J, Buerhaus PI, Mattke S, Stewart M, Zelevinsky K. *Nurse Staffing and Patient Outcomes in Hospitals.* HRSA Report No. 230-99-0021; February 28, 2001; and Needleman J, University of California and Stewart M, Brandeis University, personal communication, September 5, 2004.

Table 4 – The Practice Environment Scale of the Nursing Work Index

For each item, please indicate the extent to which you agree that the item is PRESENT IN YOUR CURRENT JOB. Indicate your degree of agreement by circling the appropriate number.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1 Adequate support services allow me to spend time with my patients.	1	2	3	4
2 Physicians and nurses have good working relationships.	1	2	3	4
3 A supervisory staff that is supportive of the nurses.	1	2	3	4
4 Active staff development or continuing education programs for nurses.	1	2	3	4
5 Career development/clinical ladder opportunity.	1	2	3	4
6 Opportunity for staff nurses to participate in policy decisions.	1	2	3	4
7 Supervisors use mistakes as learning opportunities, not criticism.	1	2	3	4
8 Enough time and opportunity to discuss patient care problems with other nurses.	1	2	3	4
9 Enough registered nurses to provide quality patient care.	1	2	3	4
10 A nurse manager who is a good manager and leader.	1	2	3	4
11 A chief nursing officer who is highly visible and accessible to staff.	1	2	3	4
12 Enough staff to get the work done.	1	2	3	4
13 Praise and recognition for a job well done.	1	2	3	4
14 High standards of nursing care are expected by the administration.	1	2	3	4
15 A chief nurse officer equal in power and authority to other top-level hospital executives.	1	2	3	4
16 A lot of team work between nurses and physicians.	1	2	3	4
17 Opportunities for advancement.	1	2	3	4
18 A clear philosophy of nursing that pervades the patient care environment.	1	2	3	4
19 Working with nurses who are clinically competent.	1	2	3	4
20 A nurse manager who backs up the nursing staff in decisionmaking, even if the conflict is with a physician.	1	2	3	4
21 Administration that listens and responds to employee concerns.	1	2	3	4
22 An active quality assurance program.	1	2	3	4
23 Staff nurses are involved in the internal governance of the hospital (e.g., practice and policy committees).	1	2	3	4
24 Collaboration (joint practice) between nurses and physicians.	1	2	3	4
25 A preceptor program for newly hired RNs.	1	2	3	4
26 Nursing care is based on a nursing, rather than a medical, model.	1	2	3	4
27 Staff nurses have the opportunity to serve on hospital and nursing committees.	1	2	3	4
28 Nursing administrators consult with staff on daily problems and procedures.	1	2	3	4
29 Written, up-to-date nursing care plans for all patients.	1	2	3	4
30 Patient care assignments that foster continuity of care, i.e., the same nurse cares for the patient from one day to the next.	1	2	3	4
31 Use of nursing diagnoses.	1	2	3	4

SUBSCALES AND COMPONENT ITEMS

The Practice Environment Scale of the Nursing Work Index

SUBSCALE	COMPONENT ITEMS
Nurse Participation in Hospital Affairs	5, 6, 11, 15, 17, 21, 23, 27, 28
Nursing Foundations for Quality of Care	4, 14, 18, 19, 22, 25, 26, 29, 30, 31
Nurse Manager Ability, Leadership, and Support of Nurses	3, 7, 10, 13, 20
Staffing and Resource Adequacy	1, 8, 9, 12
Collegial Nurse-Physician Relations	2, 16, 24

SCORING DIRECTIONS

Score each item so that higher numbers indicate greater agreement. Thus, if "strongly agree" was coded 1, and "strongly disagree" was coded 4, you must first reverse code (by subtracting each answer from 5) before calculating subscale scores. Once the coding is in the right direction, calculate nurse-specific subscale scores as the mean of the items in the subscale. The mean permits easy comparison across subscales. For hospital-level scores, calculate the item-level means at the hospital level. Then proceed with the standard computation for subscale scores. This approach permits all nurse responses, including responses of nurses who did not answer all items, to be included in the hospital score.

Calculate an overall PES-NWI "composite" score as the mean of the five subscale scores. This approach gives equal weight to the subscales, rather than to the items.

Source: Lake ET. Development of the Practice Environment Scale of the Nursing Work Index. *Res Nurs Health.* 2002;25:176-188.

Appendix B
Members and Board of Directors

Members

CONSUMER COUNCIL

AARP
AFL-CIO
AFT Healthcare
American Hospice Foundation
California Health Decisions
Consumer Coalition for Quality Health Care
Consumers Advancing Patient Safety
Foundation for Accountability
Last Acts
March of Dimes
National Citizens' Coalition for Nursing Home Reform
National Coalition for Cancer Survivorship
National Consensus Project for Quality Palliative Care
National Partnership for Women and Families
Service Employees International Union

PROVIDER AND HEALTH PLAN COUNCIL

Alexian Brothers Medical Center
Alliance for Quality Nursing Home Care
America's Health Insurance Plans
American Academy of Family Physicians
American Academy of Nursing
American Academy of Orthopaedic Surgeons
American Academy of Physician Assistants
American Association of Homes and Services for the Aging
American Association of Nurse Anesthetists
American College of Cardiology
American College of Physicians - American Society of Internal Medicine
American College of Obstetricians and Gynecologists
American College of Radiology
American College of Surgeons
American Health Care Association
American Heart Association
American Hospital Association
American Medical Association
American Medical Group Association
American Nurses Association
American Optometric Association
American Osteopathic Association
American Society for Therapeutic Radiology and Oncology
American Society of Clinical Oncology
American Society of Health-System Pharmacists
Ascension Health
Baylor Health Care System
Beacon Health Strategies
Beverly Enterprises
BJC HealthCare
Blue Cross and Blue Shield Association
Blue Cross Blue Shield of Michigan
Bon Secours Health System
Bronson Healthcare Group

Catholic Health Association of the United States
Catholic Health Initiatives
Catholic Healthcare Partners
Child Health Corporation of America
CHRISTUS Health
CIGNA Healthcare
College of American Pathologists
Community Hospital of the Monterey Peninsula
Connecticut Hospital Association
Council of Medical Specialty Societies
Dialog Medical
Empire BlueCross/BlueShield
Exempla Healthcare
Federation of American Hospitals
First Health
Greater New York Hospital Association
HCA
HealthHelp
Healthcare Leadership Council
HealthPartners
Henry Ford Health System
Hoag Hospital
Horizon Blue Cross and Blue Shield of New Jersey
Hudson Health Plan
Illinois Hospital Association
INTEGRIS Health
John Muir/Mt. Diablo Health System
Kaiser Permanente
KU Med at the University of Kansas Medical Center
Los Angeles County-Department of Health Services
Mayo Foundation
MedQuest Associates
The Methodist Hospital
Memorial Health University Medical Center
Memorial Sloan-Kettering Cancer Center
National Association of Chain Drug Stores
National Assoc. of Children's Hospitals and Related Institutions
National Association Medical Staff Services
National Association of Public Hospitals and Health Systems
National Hospice and Palliative Care Organization
Nemours Foundation
New York Presbyterian Hospital and Health System
North Carolina Baptist Hospital
North Shore-Long Island Jewish Health System
Oakwood Healthcare System
PacifiCare
Partners HealthCare
Premier
Pro Healthcare
Robert Wood Johnson University Hospital-Hamilton
Robert Wood Johnson University Hospital–New Brunswick
Sentara Norfolk General Hospital
Society of Thoracic Surgeons
Sisters of Mercy Health System
South Nassau Communities Hospital
Spartanburg Regional Healthcare System
Spectrum Health
State University of New York-College of Optometry
Sutter Health
Tenet Healthcare
Trinity Health
UnitedHealth Group
University Health Systems of Eastern Carolina
University of Michigan Hospitals and Health Centers
US Department of Defense-Health Affairs
Vanguard Health Management
Veterans Health Administration
VHA Inc.
WellPoint
Yale New Haven Health System

PURCHASER COUNCIL

BoozAllenHamilton
Buyers Health Care Action Group
Centers for Medicare and Medicaid Services
Central Florida Health Care Coalition
Employers' Coalition on Health
Employer Health Care Alliance Cooperative (The Alliance)
Ford Motor Company
General Motors
Greater Detroit Area Health Council
HealthCare 21
Leapfrog Group
Maine Health Management Coalition
Midwest Business Group on Health
National Association of State Medicaid Directors
National Business Coalition on Health
National Business Group on Health
New Jersey Health Care Quality Institute
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Rockville, MD

Nancy-Ann Min DeParle, Esq.[4]
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JPMorgan Partners
Washington, DC

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Immediate Past President
American Health Quality Association
Washington, DC

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Boston, MA

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President and Chief Executive Officer
The National Quality Forum
Washington, DC

Norma M. Lang, PhD, RN[3]
Lillian S. Brunner Professor of Medical Surgical Nursing
University of Pennsylvania
Philadelphia, PA

Brian W. Lindberg
Executive Director
Consumer Coalition for Quality Health Care
Washington, DC

John R. Lumpkin, MD, MPH[5]
Director
Illinois Department of Public Health
Springfield, IL

Mark B. McClellan, MD, PhD[6]
Administrator
Centers for Medicare and Medicaid Services
Washington, DC

Debra L. Ness[3]
Executive Vice President
National Partnership for Women and Families
Washington, DC

Paul H. O'Neill[3]
Pittsburgh, PA

Christopher J. Queram
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Madison, WI

John C. Rother, JD
Director of Policy and Strategy
AARP
Washington, DC

Thomas A. Scully[7]
Administrator
Centers for Medicare and Medicaid Services
Washington, DC

Gerald M. Shea
Assistant to the President for Government Affairs
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Washington, DC

Janet Sullivan, MD
Chief Medical Officer
Hudson Health Plan
Tarrytown, NY

James W. Varnum[3]
President
Dartmouth-Hitchcock Alliance
Lebanon, NH

Marina L. Weiss, PhD
Senior Vice President for Public Policy and Government Affairs
March of Dimes
Washington, DC

Dale Whitney[8]
Corporate Health Care Director
UPS
Atlanta, GA

Liaison Members

Yank D. Coble, Jr., MD[9]
Immediate Past President
American Medical Association
Chicago, IL

Janet M. Corrigan, PhD
Director
Board on Health Care Services, Institute of Medicine
Washington, DC

David J. Lansky, PhD
President
Foundation for Accountability
Portland, OR

Nancy H. Nielsen, MD, PhD[10]
Speaker, House of Delegates
AMA for the Physician Consortium for Performance Improvement
Chicago, IL

Margaret E. O'Kane
President
National Committee for Quality Assurance
Washington, DC

Dennis S. O'Leary, MD
President
Joint Commission on Accreditation of Healthcare Organizations
Oakbrook Terrace, IL

Elias A. Zerhouni, MD[3]
Director
National Institutes of Health
Bethesda, MD

* During project period
[1] Through February 2004
[2] Since July 2003
[3] Since April 2003
[4] Since May 2004
[5] Through April 13, 2003
[6] Since April 2004
[7] Through November 2003
[8] Since February 2004
[9] Through May 2004
[10] Since June 2004

Appendix C
Steering Committee, Technical Advisory Panel, and Project Staff

Steering Committee

Lillee S. Gelinas, RN, MSN (Co-Chair)
VHA
Irving, TX

Mary D. Naylor, PhD, RN (Co-Chair)
University of Pennsylvania School of Nursing
Philadelphia, PA

G. Rumay Alexander, EdD, RN
University of North Carolina-Chapel Hill School of Nursing/ American Organization of Nurse Executives
Chapel Hill, NC

Linda Burnes Bolton, DrPH, RN
Cedars-Sinai Health System
Los Angeles, CA

Col. Laura R. Brosch, AN, PhD
U.S. Army Medical Research and Materiel Command
Fort Detrick, MD

Diane Storer Brown, PhD, RN
Kaiser Permanente—Northern California Region
Oakland, CA

Peter I. Buerhaus, PhD, RN
Vanderbilt University School of Nursing
Nashville, TN

Diane Ebersberger-McKeon
Catholic Healthcare Partners
Cincinnati, OH

Gaye J. Fortner, RN, BSN, MSN
HealthCare21 Business Coalition
Knoxville, TN

Theresa Helle
The Boeing Company
Seattle, WA

Stephen J. Horner, RN
HCA
Nashville, TN

Jerod M. Loeb, PhD
Joint Commission on Accreditation of Healthcare Organizations
Oakbrook Terrace, IL

Naomi Naierman, MPA
American Hospice Foundation
Washington, DC

Cathy Rick, RN
Department of Veterans Affairs
Washington, DC

Elmore F. Rigamer, MD, MPA
CHRISTUS Health
Metairie, LA

Bernard Rosof, MD
North Shore-Long Island Jewish Health System
Great Neck, NY

Diane Sosne, RN, MN
Service Employees International Union
Renton, WA

Wanda O. Wilson, PhD, MSN, CRNA
University of Cincinnati Medical Center
Cincinnati, OH

Liaison Members

Barbara A. Blakeney, MS, APRN,BC, ANP
American Nurses Association
Washington, DC

Yvonne Bryan, PhD, RN
National Institute of Nursing Research
Bethesda, MD

Judy Goldfarb, MA, RN
Centers for Medicare and Medicaid Services
Baltimore, MD

Barbara J. Hatcher, PhD, MPH, RN
American Public Health Association
Washington, DC

Technical Advisory Panel

Eileen Lake, PhD, RN
University of Pennsylvania School of Nursing
Philadelphia, PA

Margaret L. McClure, EdD, RN
New York University/American Academy of Nursing
New York, NY

Jack Needleman, PhD
University of California
Los Angeles School of Public Health
Los Angeles, CA

Project Staff

Kenneth W. Kizer, MD, MPH
President and Chief Executive Officer

Robyn Y. Nishimi, PhD
Chief Operating Officer

Ellen T. Kurtzman, RN, MPH
Senior Program Director

Lawrence D. Gorban, MA
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Elaine J. Power, MPP
Vice President, Programs

Christine M. Page-Lopez
Research Assistant

Reva Winkler, MD, MPH
Clinical Consultant

Merilyn D. Francis, RN, MPP
Assistant Vice President

Helen W. Wu, MSc
Program Director

Appendix D
Commentary

Introduction

In February 2003, the National Quality Forum (NQF) initiated a project to achieve consensus on an initial set of nursing-sensitive performance measures. Additionally, the project's purposes were to identify a framework for measuring nursing care performance, with particular attention on the performance of nurses on teams and their contributions to the overall healthcare team. To help guide the research and measure development communities, attention also focused on prioritizing unresolved issues and research needs.

As with other NQF consensus projects, a Steering Committee representing key healthcare constituencies—including consumers, providers, purchasers, and research and quality improvement organizations—was convened. In September 2003 the Committee recommended a set of measures that was forwarded to NQF Members and the public for comment, in accordance with NQF's Consensus Development Process (CDP).

In September 2003, prior to the comment period, a three-member Technical Advisory Panel (TAP) was consulted. The TAP's role was to provide additional technical review of the measures, as well as to advise NQF on specific scientific and research issues that might inform discussions on outstanding questions before the Committee. Issues on which the TAP deliberated were derived from concerns raised by the Steering Committee during its discussions, as well as from questions identified by NQF staff during the project. TAP members were recruited based on their expertise in nursing-sensitive performance measure development, research, and implementation.

Both the Steering Committee and the TAP discussed framework identification and measure recommendations, with discussion including the overall approach to measure screening and evaluation, and priorities for research. This appendix summarizes the deliberations of the Steering Committee and TAP, as well as relevant discussions or changes related to the Member and public review period, Member voting, and NQF Board of Directors' endorsement.

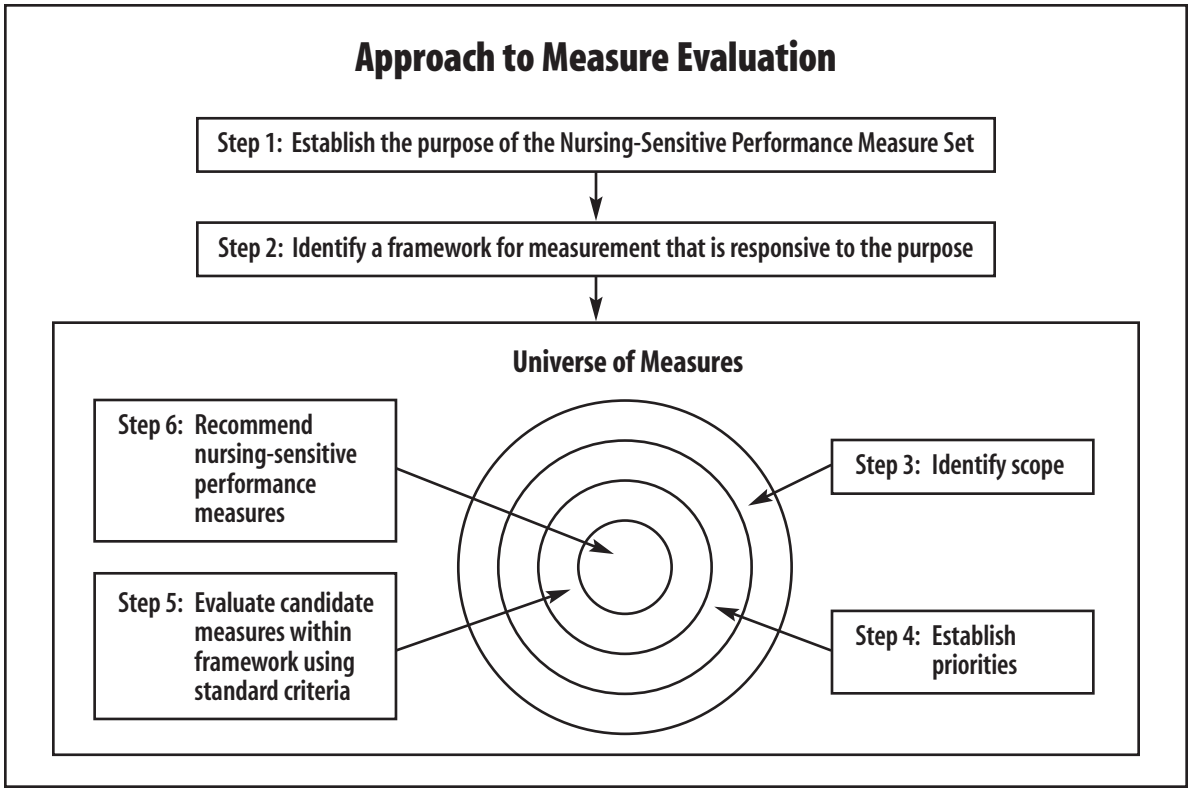
Approach to Measure Screening and Evaluation

The Steering Committee's overall approach to measure screening and evaluation followed a 6-step process. This process entailed establishing specific decision rules (i.e., thresholds) to screen candidate measures. This process is visually illustrated in the diagram below.

The application of these decision rules narrowed the inventory of measures from an extensive collection of all potential, candidate measures ("universe") to those that met the established boundaries.

Establishing the Purpose of the Initial Set

Before identifying candidate measures, the Steering Committee articulated specific purpose statements that would inform the measure selection and prioritization process. Measures that met one or more of the purposes would be considered for inclusion, while measures that might be adequate in other ways but that did not



satisfy one or more purposes were considered to be beyond the intent of the project. As articulated by the Steering Committee, the primary purpose of measuring nursing care delivered in U.S. hospitals is to:

- achieve the highest levels of patient safety and healthcare outcomes in acute care.

Additionally, endorsed, standardized nursing-sensitive performance measures will:

- enhance the clinical practice of nurses, nursing teams, and patient care teams today and in the future;
- promote public accountability, including, but not limited to the use of public reporting and financial incentives to distinguish and reward the relationship between nursing and quality outcomes;
- facilitate the identification of priority areas for research in measuring nursing care that will lead to improved patient safety and healthcare outcomes;
- stimulate enhancements to the education of the current and future workforce;
- support benchmarking and sharing of best nursing care practices; and
- promote the translation of the state of the science of nursing care into the nursing practice and the delivery of nursing care.

Identifying the Framework for Measurement

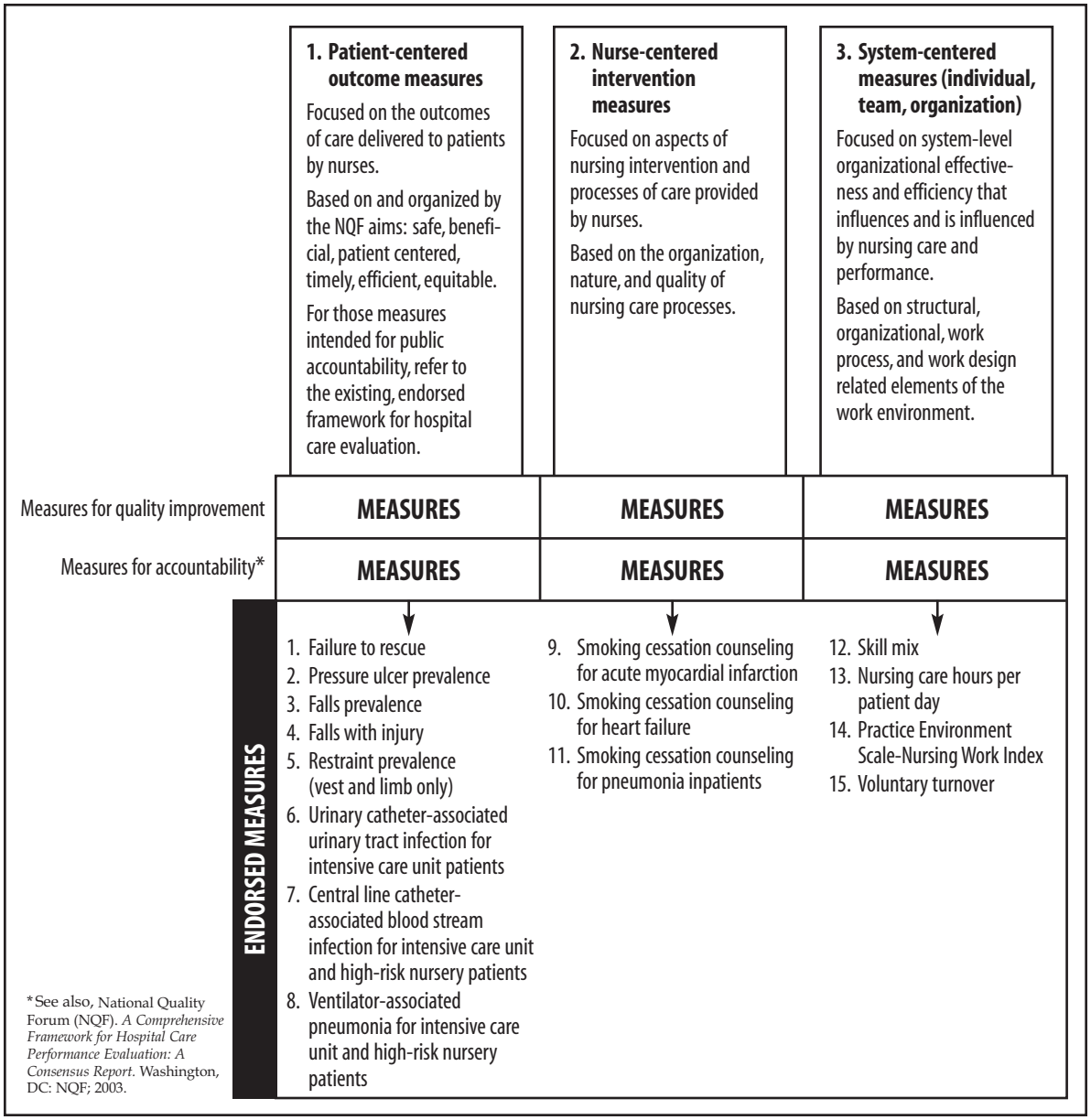
After determining the purpose of the measure set, the Steering Committee identified a conceptual model that served as the basis for measure selection. In determining its framework, the Steering Committee reviewed general research on organizing frameworks for healthcare quality, as well as nursing-specific literature, to determine whether existing frameworks might be adaptable to this purpose.

Based on this review of existing frameworks, the following principles were adopted to drive the development of a framework for nursing-sensitive performance measurement:

- adopt a framework that recognizes that a subset of and/or separate measures would be appropriate for public accountability;
- base the framework for nursing-sensitive performance measures on three categories of measures;
  - patient-centered outcome measures;
  - nursing-centered intervention measures; and
  - system-centered measures;
- incorporate the NQF aim areas into the framework for nursing-sensitive performance measurement as the components of patient-centered outcomes;
- establish a framework that recognizes that every measure need not be applicable to all patient populations, but that, collectively, at least some measures must apply to all patient populations;
- adopt a framework that easily adapts to non-hospital settings and facilitates the stratification and/or segmentation of results by key factors such as nursing unit type, patient condition, and demographic population;
- establish a framework that enables a focus on positive outcomes rather than negative ones; and

- adopt a framework that permits the incorporation of key elements, assuming they meet other established scope, priority, and evaluation criteria thresholds, such as:
  - setting-specific elements, such as hospital size, geographic location, and teaching status;
  - nursing team/multidisciplinary team elements, such as nursing's contribution to these teams; and
  - nursing delivery models such as primary nursing, team nursing, functional nursing, and patient-centered/focused care.

A visual representation of these principles follows, including a display of the 15 measures recommended by the Steering Committee within this framework.



Identifying the Scope of the Initial Set

Establishing the scope of the nursing-sensitive performance measure set required the Steering Committee to set boundaries in order to limit the evaluation of candidate measures to those that were most appropriate to the needs of the overall project. The scope for this initial effort was defined as measures that:

- are fully open source;
- are fully developed (e.g., precisely specified, tested, and in current use);
- are patient-centered outcome, nurse-centered intervention, or system-centered measures;
- apply to the set or mix of personnel who deliver nursing services in acute care settings (e.g., RNs, LVNs/LPNs, and nursing assistants);
- focus on the care of patients with acute care needs, with priority given to those measures that address nursing care delivered across settings and patients' needs across the continuum of care;
- apply to acute inpatient and/or hospital emergency care (note: to remain consistent with the NQF-endorsed hospital consensus standards); and
- reflect those aspects of care influenced, but not necessarily controlled, by nursing personnel.

Establishing Priorities for Measurement

Within the defined scope, the Steering Committee agreed to limit the measure set further by identifying priorities for measurement. By establishing priorities, the Steering Committee acknowledged that not all measures deserve equal consideration as candidates, particularly given the pressing need for measures in some areas and the undeveloped state of nursing-sensitive performance measurement. In the absence of quantitative mechanisms for determining priorities for nursing-sensitive performance measurement (e.g., logic maps or clinical algorithms), priorities were identified through Steering Committee discussion and consensus. As a result, the following general principles were adopted by the Steering Committee to drive measure prioritization:

- measures that address nursing care delivered across multiple healthcare settings and that address people's needs across the continuum of care, including those that focus on integrated care, care coordination, and access to care;
- measures that address the six NQF aim areas (safe, beneficial, patient-centered, timely, efficient, and equitable);
- measures that are consistent with NQF-endorsed measures and/or practices;
- measures that address clinical priority areas as identified by the Institute of Medicine (IOM) in its 2003 report, *Priority Areas for National Action: Transforming Health Care Quality;*
- measures that reflect priorities and areas for measurement as reflected in the Agency for Healthcare Research and Quality's (AHRQ) *National Healthcare Quality Report* and *National Healthcare Disparities Report;*

- measures that are evidence-based and in common, widespread use and/or required for other purposes (e.g., Joint Commission on Accreditation of Healthcare Organizations [JCAHO], Magnet Status);
- for those measures intended for public reporting, measures that are useable to the consumer/public;
- measures that promote the highest quality and safety of healthcare rather than focusing on the negative consequences of adverse events;
- at least some measures that apply to **all** nursing personnel; and
- at least some measures that apply to **all** hospital patients.

While the Steering Committee adopted these priority thresholds, as it began its selection of candidate measures for evaluation based on the universe identified, Committee members sometimes were inclined to include measures that did not meet the established priorities. As a result, the Committee considered whether its established priorities warranted refinement. For this purpose, the Committee considered additional priorities:

- high-risk, high-volume, high-cost, or problem-prone inpatient conditions;
- functions that are unique to nurses (e.g., assessment, prevention, patient education);
- nurses' dependent, independent, and interdependent functions;
- human resource measures and clinical outcomes;
- critical patient safety issues;
- specific populations (e.g., pediatric, elderly); and
- continuum of care (prevention, diagnosis, treatment).

In its review, the Committee affirmed the established priorities, but agreed that these additional areas were aligned with and provided more specific examples of the original priorities. For example, the Steering Committee's priority of "measures that address the six NQF aim areas (safe, beneficial, patient-centered, timely, efficient, and equitable)" included, and could be further articulated as, "critical patient safety issues" and priorities addressing "specific populations." As a result, the Steering Committee opted not to change the priorities it had previously identified, but it did adopt NQF staff's additional suggestions as narrative explanations for the established priorities in the consensus report.

Identifying Candidate Measures

Once the scope and priorities of the measure set were established, the Steering Committee used multiple and varied approaches to identify the universe of potential candidate measures:

- A literature review was conducted based on specific search parameters: published within the last 10 years, contains key words/phrases (e.g., nursing-sensitive, nursing performance, productivity, efficiency, staffing, nurse quality/performance measures, care teams, patient-focused teams, interdisciplinary teams, outcomes, nursing care), and/or authored by a known researcher in the field of nursing performance. This search resulted in the identification of nearly 300 articles and other publications.

- Members of professional organizations and experts in the field were interviewed to determine relevant activities and research in this area (i.e., American Nurses Association [ANA], National Institute of Nursing Research, JCAHO, IOM, Centers for Medicare and Medicaid Services [CMS]).
- Through discussions with the project's funder, the Robert Wood Johnson Foundation (RWJF), the extent to which other, related activities should be considered (e.g., RWJF projects in idealized design of nursing units) were discussed and identified.
- NQF-endorsed measures and other related, ongoing NQF consensus work were reviewed to identify nursing-sensitive measures within these other efforts.
- A "call for measures" was undertaken to solicit possible measures for review and evaluation. This call included a web site posting, e-mail communication to NQF Members and more than 800 other interested individuals and organizations, and correspondence with relevant nursing organizations and specialty societies. NQF received more than two dozen responses to the call, which resulted in the identification of approximately four dozen measures—including some that met the Steering Committee's purposes, framework, scope, and priorities.
- Steering Committee members were encouraged to circulate the list of candidate measures within their organizations to determine if additions could be made.
- Presentations by NQF staff at meetings to acquaint others with the project and encourage participation through measure submission (i.e., NQF Member meeting, AcademyHealth, National Business Coalition on Health) resulted in the identification of additional candidate measures.

Together, these efforts resulted in more than 100 measures that underwent further review.

Measure Screening, Evaluation, and Selection

Once measures were identified, the Steering Committee examined them for relevance to the purpose, framework, scope, and priorities.

Special Considerations for Exclusions

While Committee Members were inclined to apply the decision rules liberally to avoid rejecting any measure prematurely, measures that generally met the established thresholds became candidates, and those that did not were excluded from further review. Some candidate measures were excluded early by the Steering Committee because they did not meet the basic principles established. For example, measures that were under development or proprietary were excluded from further consideration. Two broad categories of measures—patient perception/satisfaction with nursing care and pain management—were ultimately excluded. Given the significant interest in them, however, the following sections present a more detailed rationale for the exclusion.

Patient Perception/Satisfaction with Nursing Care

As measures were being identified, a number of relevant patient perception tools were identified. Several were submitted by

their developers during the open call for measures (e.g., Oncology Patients' Perceptions of Quality of Nursing Care Scale, Schmidt Perception of Nursing Care Survey). The Committee viewed the recommendation of measures derived from these tools as highly desirable because of their relevance to the identified priorities (e.g., patient-centered measures, useful to the public, apply to all patients, etc.). However, in its review of these instruments and the measures derived from them, the Steering Committee identified several concerns:

- In some cases, the tools, and the measures derived from them, were designed for specific populations or were seeking patient feedback from patients on a highly specific aspect of nursing care (e.g., nurses role in surveillance), making them too narrow for the project's purpose.
- The Committee agreed that selected perception/satisfaction measures derived from an instrument from which other measures also are derived should not be separated for purposes of evaluation and/or endorsement (i.e., they should either all be included or all be excluded).
- The federal government has undertaken efforts to standardize a perception of care instrument for hospital patients. This effort is anticipated to result in HCAHPS® in 2004.
- Many of these tools/instruments are proprietary and would challenge NQF's policy on endorsing only open source measures.

Because of these considerations, the Steering Committee ultimately recommended that measures of patient perception of nursing care be excluded until the federal government's efforts to standardize a public inpatient perception of care tool are completed.

Pain Assessment/Management

In addition to patient perception of care, measures of pain management and/or control (e.g., Brief Pain Inventory – Short Form, Memorial Pain Assessment Card, McGill Pain Questionnaire) were considered by the Steering Committee. These were largely identified from published research and through the call for measures. Steering Committee members found these measures appealing because of their application to the established priorities for the measure set. In its review of the instruments and the measures derived from them, however, the Committee acknowledged the collaboration of JCAHO, the National Committee for Quality Assurance (NCQA), and the American Medical Association (AMA) to develop a common set of evidence-based measures for pain management in cancer, back pain, and arthritis—measures that are likely to be important to nursing care. Committee members agreed that, because of timing (the JCAHO-NCQA-AMA measures are expected to be finalized in 2004), any recommendation regarding pain management should be delayed and an expedited review of this area should be undertaken once the JCAHO-NCQA-AMA measures are final.

Evaluations and Recommendations

After the preliminary exclusions, the Steering Committee reviewed detailed evaluations of each remaining measure. Measures were evaluated based on NQF-endorsed criteria[1], as derived from the work of the NQF Strategic Framework Board[1,2] —i.e., importance, scientific acceptability, usefulness, and feasibility. These criteria were operationalized for purposes of conducting consistent, comprehensive measure reviews:

- Comprehensive evaluations based on the agreed upon criteria were conducted for 57 measures selected by the Steering Committee for evaluation. For each measure, evidence, documentation, citations, and other published references from the measure developer, as well as published practice guidelines, published evidence, and published research that supplemented what was supplied by the measure developer, were used to assess the measure's strength relative to each evaluation criterion. Together, this constituted the information that supported each individual evaluation. Once gathered, the evidence was reviewed and each measure was rated for each criterion. The extent to which evidence was found in support of the relationship of the measure to nursing care was noted.
- Once each measure had been evaluated for each criterion, a classification system was employed to rate each measure for the appropriateness of inclusion in the nursing-sensitive performance measure set. The following describes each of the classifications:

  Class Ia—Precisely specified, identifiable link to nursing care, feasible for implementation (i.e., scored high for feasibility), and scientifically supported (high or medium validity and reliability);

  Class Ib—Precisely specified, identifiable link to nursing care, feasible for implementation, but lack scientific support (low or unknown for reliability and validity);

  Class II—Precisely specified, but concerns about feasibility or no evidence of identifiable link to nursing care; and

  Class III—Not precisely specified nor feasible or measures with serious methodological concerns (e.g., risk adjustment inadequacies, unresolved proprietary considerations).

Measures Recommended for Inclusion in the Set[3]

Based on the deliberations, the Steering Committee recommended 13 measures[4] that it concluded clearly met the evaluation criteria. Of the these, two (identified

[1] National Quality Forum (NQF). *A Comprehensive Framework for Hospital Care Performance Evaluation.* Washington, DC: NQF; 2003.

[2] The Strategic Framework Board's design for a national quality measurement and reporting system. *Med Care.* 2003;41(1)suppl:I-1–I-89.

[3] Two measures were not initially recommended by the Steering Committee, but appeared on the ballot—voluntary turnover and nurses' educational preparation. These measures were reconsidered and recommended after the NQF Member and public comment period. Discussion related to these measures is found later in this report. Of additional note, only the voluntary turnover measure was ultimately approved and endorsed by NQF.

[4] The smoking cessation measures address three target populations and initially were grouped as a single measure. Based on comments during the review period and to align these measures completely with the hospital set, the measure for each population was treated individually for voting and endorsement purposes.

below) were recommended by a plurality, rather than a majority, of Committee members. As noted, following the Steering Committee's measure selection process, a TAP was convened to advise NQF staff and the Committee on technical matters; the TAP supported the inclusion of all of the measures recommended by the Steering Committee and did not recommend additional measures beyond these. A list of the measures recommended by the Committee, along with a summary of the key factors raised during the deliberations related to each, follows:

- **Failure to rescue**
  Because the research reviewed supported failure to rescue (FTR) as a nursing sensitive measure to major surgical patients only (versus medical patients), the Steering Committee agreed it should be recommended for the surgical subpopulation. Some concern was raised regarding the risk-adjustment methodology and the likelihood that resources would be available to update the risk adjustment. Additional concerns were raised that the AHRQ Patient Safety Indicator (PSI) version of the measure requires statistical software for risk adjustment and the knowledge to use such software. In considering the two versions of the measure, the Steering Committee believed that because the measure derived from the Needleman et al. report[5] was supported by strong and consistent evidence and due to the feasibility issues of the AHRQ PSI measure, the Needleman/Department of Health and Human Services measure was preferable.

  The Steering Committee believed that the public would not easily understand "failure to rescue" and suggested that this be noted along with the measure when it is recommended. Additionally, it believed that further investigation should be conducted concerning this measure's relationship to nursing for non-surgical populations.

  Of note, based on concerns raised during the CDP comment period, NQF secured ongoing support to keep this measure up to date. Specifically, AHRQ has stated it will provide support through its Patient Safety Quality Indicator software.

- **Pressure ulcer prevalence**
  In its review, the Steering Committee considered five different versions of pressure ulcer measures. Generally, the Steering Committee favored the inclusion of a pressure ulcer measure because of its clear relationship to nursing care and the widespread use of pressure ulcer prevalence in major national initiatives (e.g., California Nursing Outcomes Coalition [CalNOC], ANA-NDNQI, Military Nursing Outcomes Database [MilNOD], Department of Veterans Affairs Nursing Outcomes Database [VANOD]); however, there were pros and cons in recommending each version. For example, while the ANA-NDNQI/CalNOC version was considered burdensome because of its reliance on a 1-day prevalence study, it was considered to be more valid than a measure based on administrative data (e.g., AHRQ PSI). Concerns also were raised that any measure should be specific to

[5] Needleman J, Buerhaus PI, Mattke S, Stewart M, Zelevinsky K. *Nurse Staffing and Patient Outcomes in Hospitals.* Health Resources and Services Administration (HRSA) Report No. 230-99-0021; February 28, 2001.

hospital-acquired ulcers and should exclude those pressure ulcers acquired in long-term care facilities or non-hospital settings. Additionally, concerns were raised about the extent to which different definitions of pressure ulcer were relevant and different staging mechanisms were applied in the measure specifications. In the end, the Steering Committee agreed to include the ANA-NDNQI/CalNOC version of the pressure ulcer measure.

Of note, initially, the ANA-NDNQI and CalNOC measures were reported to NQF by both organizations as being equivalent. However, based on comments received during the CDP review phase and NQF staff queries, it was determined that the measures were, in most cases, different at the specification level. While ANA-NDNQI and CalNOC collect data enabling unit-based stratification, ANA-NDNQI reports five strata (medical, surgical, medical-surgical combined, critical care, step down), whereas CalNOC reports three (medical-surgical, critical care, step down). Additionally, ANA-NDNQI includes all patients on the pertinent units, whereas CalNOC excludes pediatric patients (16 years or younger). Further, CalNOC provides a documented algorithm to exclude community-acquired pressure ulcers. Because the Steering Committee specifically recommended pressure ulcers based on the in-hospital definition, the CalNOC version was recommended and ultimately endorsed.

- **Pneumonia (hospital-acquired) prevalence**[6,7]
  The measure was seen as strongly related to nursing care. Although concerns were raised that the measure included pre-existing pneumonias, it was clarified that the specifications narrowed the numerator to exclude, to the extent possible, community-acquired pneumonias. This measure was recommended by a plurality rather than a majority.

- **Falls prevalence and falls with injury**
  As this was a previously endorsed NQF hospital performance measure, the key consideration was the extent to which research supported it as a nursing measure. The Steering Committee found adequate science to support it as a nursing-sensitive measure and recommended its inclusion. Of note, however, during the Member and public review period, comments raised led to the separation of this measure into two distinct measures: "falls with injury" and "overall falls prevalence."

  Of note, initially the ANA-NDNQI and CalNOC measures were reported to NQF by both organizations as being equivalent. However, based on comments received during the CDP review phase and NQF staff queries, it was determined that the measures were, in most cases, different at the specification level. While ANA-NDNQI and CalNOC collect data enabling unit-based stratification,

[6] Ultimately, on January 29, 2004, during its consideration of pneumonia prevalence as a proposed consensus standard, it was disapproved by the NQF Board of Directors because of concerns raised by some board members about the underlying data source and evidence.

[7] Kovner C, Jones C, et al. Nurse staffing and post-surgical adverse events: an analysis of administrative data from a sample of U.S. hospitals, 1990-1996. *Health Serv Res.* 2002;37(3):611-629; Lichtig LK, Kanuf RA, Mulholland DK. Some impacts of nursing on acute care hospital outcomes. *JONA.* 1999;29(2):25-33; Needleman J, Buerhaus PI, Mattke S, Stewart M, Zelevinsky K. *Nurse Staffing and Patient Outcomes in Hospitals.* HRSA Report No. 230-99-0021; February 28, 2001.

ANA-NDNQI reports five strata (medical, surgical, medical-surgical combined, critical care, step down), whereas CalNOC reports three (medical-surgical, critical care, step down). Additionally, ANA-NDNQI includes all patients on the pertinent units, whereas CalNOC excludes pediatric patients (16 years or younger). Ultimately the ANA-NDNQI measure was endorsed.

- **Restraint prevalence**[8]
  The Steering Committee acknowledged the improved reliability of this measure if calculated based on observational studies. NQF staff also shared the concerns with this measure that were raised during the 'Hospital Care Performance Measures' project—namely that the measure is relatively burdensome because of its reliance on a 1-day prevalence study and the lack of consistency of side-rails as a restraint. Nevertheless, the Committee acknowledged the critical importance of this measure especially as it relates to the public and, in the end, recommended it for inclusion.

  During the review period for the CDP, there was significant concern about the application of the restraints measure to side rails. In response, CalNOC clarified its specifications, which include an overall restraint prevalence rate as well as a more limited numerator (vest and limb restraints only). Because of the definitional concerns raised during the review, the NQF Board of Directors endorsed the more limited measure of vest and limb restraint prevalence.

- **Urinary tract infection (UTI) prevalence**[9,10]
  Because of the concerns related to the definition of UTI, standardization of the measure was seen as a positive step in performance measurement. The

[8] The California Nursing Outcomes Coalition (CalNOC) 98 hospitals study, Jan 2002 to March 2003; Capezuti E, Strumpf NE, Evans LK, et al. The relationship between physical restraint removal and falls and injuries among nursing home residents. *J Gerontol A Biol Sci Med Sci.* 1998;53(1):M47-M52; Castle NG. Nursing homes with persistent deficiency citations for physical restraint use. *Med Care.* 2002;40:851-852; Castle NG, Foel B. Characteristics of nursing homes that are restraint free. *Gerontologist.* 1998;38(2):181-188; Donat DC. Impact of improved staffing on seclusion/restraint reliance in a public psychiatric hospital. *Psychiatr Rehabil J.* 2002;25:413-416; Gallinagh R, Nevin R, McIlroy D, et al. The use of physical restraints as a safety measure in the care of older people in four rehabilitation wards: findings from an exploratory study. *Int J Nurs Stud.* 2002;39:147-156; Neufeld RR, Libow LS, Foley WJ, et al. Restraint reduction reduces serious injuries among nursing home residents. *J Am Geriatr Soc.* 1999;47(10):1202-1207; Phillips CD, Hawes C, Mor V, et al. Facility and area variation affecting the use of physical restraints in nursing homes. *Med Care.* 1996;34(11):1149-1162; Sullivan-Marx EM, Strumpf NE, Evans LK, et al. Predictors of continued physical restraint use in nursing home residents following restraint education efforts. *J Am Geriatr Soc.* 1999;47:342-348; Whitman, et al. Staffing and pattern of mechanical restraint use across a multiple hospital system. *Nurs Res.* 2001;50:356-362; Whitman GR, Kim Y, Davidson LJ. The impact of staffing on patient outcomes across specialty units. *JONA.* 2002;32:633-639.

[9] Ultimately, on January 29, 2004, during its consideration of urinary tract infection prevalence as a proposed consensus standard, it was disapproved by the NQF Board of Directors because of concerns raised by some board members about the underlying data source and evidence.

[10] Garner JS, et al. CDC definitions for nosocomial infections. Olmsted, RN, ed. *APIC Infection Control and Applied Epidemiology: Principles and Practice.* St. Louis: Mosby; 1996:A1-A20. Available at www.apic.org. Last accessed September 19, 2004; Kover C, Jones C, et al. Nurse staffing and post-surgical adverse events: an analysis of administrative data from a sample of U.S. hospitals, 1990-1996. *Health Serv Res.* 2002;37:611-629; Larson E, Oram L, Hedrick E. Nosocomial infection rates as an indicator of quality. *Med Care.* 1988; 26(7):676-684; Lichtig LK, Knauf RA, Milholland DK. Some impacts of nursing on acute care hospital outcomes. *JONA.* 1999;29(2):25-33; Needleman J, Buerhaus P, et al. Nurse staffing levels and the quality of care in hospitals. *N Engl J Med.* 2002;346:1715-1722; Needleman J, Buerhaus PI, Mattke S, Stewart M, Zelevinsky K. *Nurse Staffing and Patient Outcomes in Hospitals.* HRSA Report No. 230-99-0021; February 28, 2001; Personal communication, Linda McKibbin, M.D., M.P.H., Medical Officer, Centers for Disease Control and Prevention/National Center for Infectious Diseases, Division of Healthcare Quality Promotion/Prevention and Evaluation Branch, October 21, 2002; Taunton RL, Kleinbeck SV, et al. Patient outcomes: are they linked to registered nurse absenteeism, separation or work load? *JONA.* 1994;45(4S):48-55; Unruh L. Licensed nurse staffing and adverse events in hospitals. *Med Care.* 2003;41(1):142-152.

Committee also noted that this measure is more relevant to all inpatients than the urinary catheter-associated UTI for intensive care unit (ICU) patients measure that also was recommended for inclusion. Further, testing of this measure had been conducted on a large number of inpatient discharge abstracts from close to 800 hospitals in 11 states supporting its validity as a nursing-sensitive measure. This measure was recommended by a plurality rather than a majority of the Committee.

- **Urinary catheter-associated UTI for ICU patients**
  As this was a previously endorsed NQF hospital performance measure, the key consideration was the extent to which research supported it as a nursing measure. The Steering Committee found adequate science to support it as a nursing-sensitive measure. Some concern was raised, however, that because it applies only to the ICU population, it may not be as relevant as a more general UTI measure.

- **Central line catheter-associated blood stream infection (BSI) for ICU patients and for high-risk nursery (HRN) patients**
  As this was a previously endorsed NQF hospital performance measure, the key consideration was the extent to which research supported it as a nursing measure. The Steering Committee found adequate science to support it as a nursing-sensitive measure. It was noted, however, that smaller hospitals might be challenged by tracking central line use, suggesting feasibility issues. JCAHO reported it intends to include this measure in its ICU measure set.

- **Ventilator-associated pneumonia for ICU patients and HRN patients**
  As this was a previously endorsed NQF hospital performance measure, the key consideration was the extent to which research supported it as a nursing measure. The Steering Committee found adequate science to support it as a nursing-sensitive measure. There also was general agreement that a growing body of evidence continues to support this measure's relationship to nursing care. Research conducted by VHA Inc., MilNOD (unpublished), and the Institute for Healthcare Improvement supports its relationship to nursing.

- **Smoking cessation counseling for acute myocardial infarction, pneumonia, and heart failure patients**
  It was noted that these are JCAHO core measures, CMS quality improvement organization (QIO) measures (7th Scope of Work) and NQF-endorsed measures. There was general agreement that the measure is influenced by nurses, as well as other professionals who offer smoking cessation counseling (respiratory therapists, physicians). However, because of the meta-analysis summarized by NQF staff and reviewed by the Steering Committee that supports nurse-directed counseling having a positive impact, it was generally agreed this is a nursing-sensitive performance measure.

  As noted previously, the smoking cessation measures address three target populations and initially were grouped as a single measure. Based on comments during the review period and to align these measures completely with the "hospital set," the measure for each population ultimately was treated individually for voting and endorsement purposes.

- **Skill mix**
  Nursing care hours per patient day
  Although evaluated separately, these measures were discussed by the Steering Committee together. The Committee acknowledged the possible negative effect the measure could have—namely enabling hospitals to reduce nurse staffing. The Committee noted that these are proxy measures for quality; evidence supports their relationship to patient outcomes. Still, while a relationship exists, the Committee acknowledged that measurement of both staffing level and mix do not necessarily inform hospital leadership about what immediate steps to take to resolve any unintended negative consequences. Nevertheless, the Committee believed that the relationship to patient outcomes was so well recognized that to exclude the measures would be a significant oversight. Clarification was made that the Steering Committee was recommending the measures but not a specific staffing ratio. Additionally, it was noted that the NQF-endorsed safe practices report[11] includes the specification of a protocol to ensure an adequate level of nursing care based on the patient mix and experience/training of staff. Thus, the Committee acknowledged that recommending these measures was consistent with the NQF practice.

  Of note, based on clarification following the CDP comment period and NQF staff inquiry, both the skill mix and nursing care hours per patient day measures were refined to be consistent with ANA-NDNQI definitions/specifications. It should be noted that these measures are also CalNOC measures, however, because the CalNOC unit stratification differs (three strata reported) from the ANA-NDNQI stratification (five strata reported), a single version has been endorsed.

- **Practice Environment Scale-Nursing Work Index (PES-NWI) and subscales**
  This measure was discovered by staff as an alternative to Magnet Status, a measure that had proprietary concerns and that was therefore excluded. The instrument has been well tested and validated in the literature.

  The Steering Committee viewed this as a work environment measure and thus of critical importance for standardization. The Committee recognized that the measure has feasibility issues because it relies on a multi-item survey. And, while concerns were raised about the implementation of this tool (e.g., response rate, raising expectations of action steps resulting from the survey), the Steering Committee recognized it could not dictate use once standardized. While multiple versions of the tool and associated subscales were reviewed, in the end, the Steering Committee opted to recommend the PES-NWI version.

Measures Not Recommended[12]

The Steering Committee recommended excluding 44 other measures it considered, although it noted additional research should be conducted to improve them.

[11] NQF. *Safe Practices for Better Healthcare.* Washington DC: NQF; 2003.

[12] Turnover and vacancy were measures that stimulated great debate. Although the Steering Committee voted to exclude these measures, clear division existed. Ultimately, turnover was included as a proposed consensus standard, and the NQF Board of Directors endorsed it as a national voluntary consensus standard for nursing-sensitive care. See the discussion regarding the turnover measure.

Many of these measures clearly were of interest to Committee members, but a variety of issues, including those involving feasibility, were raised and resulted in their exclusion. These measures and a brief summary of the rationale for excluding them follow:

- **Death in low mortality diagnostic-related groups (DRGs)**
  Because much of the research on this measure is focused on overall mortality versus mortality in only low-mortality DRG categories, concerns were raised that the evidence base linking this measure to nursing was not sufficient. The Steering Committee also believed that there were too many confounding variables—beyond the care that is provided by nursing staff—to comfortably recommend this measure as a nursing-sensitive performance measure. Lastly, the Steering Committee believed that because the FTR measure includes mortality related to specific hospital complications (i.e., sepsis, pneumonia) and because the FTR measure was recommended, this measure could be excluded.

- **Length of stay (LOS)**
  Generally, members of the Steering Committee thought this was an important measure—especially from efficiency and purchaser perspectives. Overall, however, the Steering Committee believed that although there was a growing body of evidence relating LOS to nursing care, this was not the best measure of nursing-sensitive performance because it was also clear that non-nursing factors contribute greatly to LOS (e.g., physician practice).

- **Lost work days**
  Modified duty days
  While evaluated separately, these measures were discussed by the Steering Committee together. The Steering Committee believed these measures would be captured by other recommended measures (e.g., skill mix, nursing hours per patient day). Additionally, these measures were not viewed as sufficiently related to patient outcomes. Finally, because various injuries influence these measures, they were viewed as unreliable.

- **Post-operative respiratory failure**
  Overall, the measure was seen as lacking specificity. Additionally, the measure developer rated the reliability as low, causing the Steering Committee to exclude it from its recommendations.

- **Upper gastrointestinal (UGI) bleeding**
  The measure was viewed by the Steering Committee as being more physician-sensitive than nursing-sensitive. Also, because the FTR measure includes UGI bleeding, the Steering Committee felt the outcome would be captured in that measure, which it had recommended.

- **Shock**
  The Steering Committee viewed this measure as has having multiple confounding variables, with nursing care as one of many related factors. Again, because the FTR measure includes UGI bleeding, the Steering Committee felt the outcome would be captured in that measure, which it had recommended.

- **Turnover (voluntary)**[12]
  The Steering Committee believed that, while important for human resource planning, this measure is not widely

accepted as a nursing-sensitive performance measure—evidence linking the measure to patient outcomes is growing, but not strong and consistent. There also were concerns that the public might misinterpret the results, because it is not clear whether turnover results in poor quality care or whether poor quality causes turnover. Questions were raised about the measure's specifications; whether RNs, LVN/LPNs, nurse aides are all included in the denominator population. There also was general agreement that clinical outcome measures are stronger indicators of nursing quality than administrative proxies. The Committee also noted that some turnover is often positive and that it does not differentiate preferable losses.

The Committee recognized that several organizations (e.g., VHA Inc., JCAHO) are studying the relationship between turnover and patient outcomes and that these investigations will further inform the deliberation. On the other hand, it was noted that while research is pending, this is one area in which standardization is needed, as many hospitals and hospital systems use different definitions of turnover. Thus, endorsing this measure could accelerate development of the evidence base. Additionally, because JCAHO requires hospitals to measure the human resource component of nursing staff effectiveness, concerns were raised that by excluding this measure (and other human resources-related measures) the Steering Committee would be missing an opportunity to standardize this area. Ultimately, however, the Steering Committee viewed this measure as a critically important area for further investigation, but it voted to exclude the measure.

Although the Steering Committee and TAP did not initially recommend including this measure, there was widespread support for workforce measures by NQF Members during the comment period. As a result, the Steering Committee reconsidered them and ultimately recommended turnover for endorsement by a majority vote. NQF Members approved the measure, and the Board of Directors endorsed it as a voluntary consensus standard.

- **Nursing needlestick injuries**
  The measure developer acknowledged concerns about the measure's reliability and validity. Additionally, concerns were raised regarding the measure's relevance in a needle-less healthcare system. Accordingly, the Committee agreed that the measure is not ready for adoption.

- **Staff tenure**
  Many of the same general human resources-related points raised for the turnover measure were raised for staff tenure. The Steering Committee also raised concerns about the possible misinterpretation of this measure—i.e., that longer tenure may be perceived to relate to poor-quality care. Additionally, concerns were raised regarding the usefulness of the measure, because it was not clear whether months of employment in a particular position were more beneficial than months of employment in a particular institution.

- **Average days to fill vacancies**
  Turnover costs/expense
  Vacancy[12]
  Recruitment rate
  Although evaluated separately, these measures were discussed by the Steering Committee together, and many of the same general human resources-related points were raised. Concerns were raised that efficiency is a vital aim of the healthcare system and that the Steering Committee would likely have few measures in this area. It was suggested that these measures might represent a missed opportunity to standardize nursing care efficiency. Overall, however, the Steering Committee viewed these measures as too immature for implementation; the TAP concurred with this assessment. Moreover, while the Steering Committee viewed all of them as important future measures, vacancy was considered a likely candidate for near-term standardization. Indeed, although there was significant support for various human resources-related measures from the comment period that led to the voluntary turnover measure and the nurses' educational preparation measure being forwarded to Members for consideration, there was less support for the vacancy measure, and it was not included for Member voting.

- **Nurse to patient ratio**
  The Steering Committee acknowledged that this measure is of vital importance to California hospitals (hence, the focus by CalNOC). It also was noted that the measure may benefit from standardization, but that addressing a standard ratio is beyond the project's purpose, and the Committee was strongly opposed to establishing any specific staffing ratio. Ultimately, the Steering Committee viewed the recommendation of nursing care hours and skill mix measures as an adequate surrogate for this measure.

- **Deep vein thrombosis/pulmonary embolism**
  The Committee noted that this outcome is more dependent on anticoagulation therapy than nursing care. As a result, it was not viewed as a nursing-sensitive performance measure.

- **Sepsis**
  It was noted that the Steering Committee had previously recommended several infection-related measures (BSI, UTI, pneumonia). Moreover, since the FTR measure includes sepsis, the Committee believed this measure was an appropriate surrogate. Additionally, although the measure was investigated in an extensive study (800 hospitals in 11 states), no consistent, strong evidence was found to support it as a nursing-sensitive measure.

- **Selected infections due to medical care**
  The Committee agreed that evidence linking this measure to nursing care was weak.

- **Post-operative hip fracture**
  Because the occurrence is infrequent and variation is low, the Steering Committee did not see the area as a priority for endorsement of a consensus standard. The Steering Committee also suggested that the denominator (post-operative inpatients) was too narrow and that the measure was more appropriate for the long-term care population.

- **Post-operative physiologic and metabolic derangements**
  The Steering Committee noted that the measure's exclusions consist of the most important derangements (ketoacidosis, hyperosmolarity, or other coma and a principal diagnosis of diabetes), making the measure less relevant.

- **Post-operative sepsis**
  The Steering Committee raised concerns about the appropriate coding of sepsis and the differentiation between nosocomial and pre-existing sepsis making the measure unreliable. Moreover, since the FTR measure includes sepsis, the Committee felt that this measure was an appropriate surrogate for post-operative sepsis.

- **Transfusion reaction**
  While the Steering Committee recognized that this measure is related to an NQF-endorsed serious reportable event,[13] the Committee perceived it to be an infrequent occurrence and of lower priority for nursing care measurement than other candidates. Concerns also were raised that the measure is not specific enough to distinguish improperly administered blood from blood administered that results in an allergic reaction.

- **Ventricular tachycardia/fibrillation management**
  Concerns were raised that the measure, as specified, was not supported by the evidence. Additionally, there was no evidence linking this measure to nursing care. Finally, it was noted that the administration of defibrillation/automatic external defibrillation by nurses generally is not consistent with hospital policies.

- **Risk-adjusted 30-day mortality rate**
  The Steering Committee raised concerns about the feasibility of risk adjustment for this measure, as well as the burden of collecting mortality at 30 days. There also was widespread agreement that nursing variables are not the only ones associated with mortality and that other aspects of care, even after adjusting for patient and hospital characteristics, have a direct influence. Nevertheless, the Steering Committee acknowledged that the link between nursing care and mortality was growing and would likely be more developed in the future.

- **Reintubation**
  While the Steering Committee regarded research in this area as sufficient, the measure was focused on very narrowly defined denominator populations (hepatic resection and resection of abdominal aorta with replacement), whereas the measure under consideration was applied to a broader population (all ICU patients) that had not been sufficiently investigated. Additionally, the authors of the various studies on reintubation raised concerns about the inadequacy of the risk-adjustment methodologies for this measure.

- **Infection control isolation compliance**
  Evidence reviewed by the Steering Committee was not sufficient to demonstrate this measure's link to nursing care. Moreover, although the measure is related to the Centers for Disease Control and Prevention's (CDC) isolation

[13] NQF. *Serious Reportable Events in Healthcare.* Washington DC: NQF; 2002.

precautions, the specifications are based on selected practices (rather than all precautions), raising concerns about the measure's validity. The Steering Committee opted not to recommend this measure, but asked NQF staff to further evaluate CDC's infection control personnel staffing measure.

- **Infection control personnel staffing**
  Initially, this measure was submitted by CDC during the open solicitation period as a measure that was not appropriate for endorsement, but that would inform the Steering Committee's research agenda. However, during the Steering Committee's review of measures, CDC presented more current research, allowing for full consideration. While the recent research facilitated comprehensive evaluation of the measure, the Steering Committee did not view the research as sufficient to support it as a nursing-sensitive voluntary consensus standard.

- **Nurse-committed medication errors**
  The Committee raised concerns that the measure does not differentiate between nurse-detected and nurse-committed medication errors. Additionally, because of the definitional issues and the likelihood that the measure would be perceived by nurses as punitive, reporting would likely be inconsistent, creating questionable reliability. The Committee also had difficulty suggesting a causal relationship between medication errors and nursing care because medication errors were viewed as system errors.

- **RN experience**
  The Steering Committee raised questions regarding the extent to which experience versus competency is related to outcomes. The measure is not sensitive enough to distinguish nurses who may be new to a unit (and therefore might be less experienced) from nurses who are new to the organization. And, while it was recognized that administrative measures (such as RN experience) would be important variables on which to study outcomes, this measure was not perceived to be fully developed and tested. Thus, without clear evidence, the Committee viewed the measure as immature for standardization. Additionally, because human resource databases are not consistent, there were feasibility/burden issues related to generating data on which the measure would be constructed.

- **RN education/nurses' educational preparation**[14]
  The Steering Committee raised many of the same concerns that were raised for RN experience. It also was noted that North Dakota recently overturned its

[14] Aiken LH, et al. Educational levels of hospital nurses and surgical patient mortality. *JAMA.* 2003; 290(12):1617-1623; Blegen MA, Vaughn TE, Goode CJ. Nurse experience and education: effect on quality of care. *JONA.* 2001;31(1):33-39; U.S. Department of Labor, Bureau of Labor Statistics. *Occupational Outlook Handbook, 2002-03 Edition,* "Registered Nurses." Available at www.bls.gov/oco/ocos083.htm. Last accessed August 5, 2003; Doran DI, Sidani S, Keatings M, Doidge D. An empirical test of the Nursing Role Effectiveness Model. *J Adv Nurs.* 2002;38(1):29-39; HRSA, Bureau of Health Professions, *National Center for Health Workforce Analysis. Projected Supply, Demand, and Shortages of Registered Nurses: 2000-2020.* Available at ahcawm.tempdomainname.com/research/rnsupply_demand.pdf. Last accessed August 5, 2003; JCAHO-Joint Commission Public Policy Initiative. *Health Care at the Crossroads, Strategies for Addressing the Evolving Nursing Crisis;* 2001; Mark BA, Sayler J, Smith CS. A theoretical model for nursing systems outcomes research. *Nurs Admin Q.* 1996;20(4):12-27; Mitchell P, Shortell SM. Adverse outcomes and variations in organization of care delivery. *Med Care.* 1997;35(11):NS19-NS32; Nelson, M. Education for professional nursing practice: looking backward into the future. Online *Journal of Issues in Nursing.* 7(3) Manuscript 3. Available at www.nursingworld.org/ojin/topic18/tpc18_3.htm. Last accessed August 5, 2003; Person S, et al. Nurse staffing and mortality for Medicare patients with acute myocardial infarction. *Med Care.* 2004;42(1):4-12; Silber JH, et al. Anesthesiologist direction and patient outcomes. *Anesthesiology.* 2000;93:152-163.

BSN-minimum entry-level into practice, an indication that states may be devaluing the education of nurses as a proxy for quality. The Committee ultimately decided that findings from emerging research should be taken into account before including this measure in the set; in its deliberations, the TAP also concurred with this assessment.

Although the Steering Committee and TAP did not initially recommend including this measure, there was widespread support for workforce measures by NQF Members during the comment period. As a result, the Steering Committee reconsidered them and recommended by a plurality that nurses' educational preparation be considered for the set. Ultimately, however, NQF Members did not approve the measure as a proposed consensus standard. The NQF Board of Directors did not reject the measure outright, but suspended its decision regarding endorsement at this time.

- **Absenteeism**
  The Steering Committee speculated about the relationship between absenteeism and quality—i.e., does absenteeism result in poor quality or does poor quality result in absenteeism? Additionally, the Committee believed this measure would be captured in other ways (e.g., skill mix, nursing hours per patient day).

- **Family-centered care core metric**
  Skin care core metric
  Vascular access device metric
  Patient safety core metric
  Feeding tube and care documentation metric
  These measures were evaluated individually, but were discussed by the Steering Committee as a group. In general, the Committee determined that these measures lacked sufficient evidence to support their reliability and validity. Furthermore, no testing of these measures for nursing sensitivity had been conducted. Finally, these measures were based on multi-item tools/instruments, making them burdensome.

- **Symptom management (pain, nausea, shortness of breath) for palliative care**
  While the measure was based on a validated instrument (ESAS), the Steering Committee raised concerns that it was constructed from selected elements extracted from the ESAS tool, without evidence of validity or reliability of these elements. Additionally, the measure's specifications were not precise, suggesting that the measure would benefit from further development and testing. For example, ESAS is used with patients who can and cannot respond; the measure developer modified the specifications during the NQF evaluation process to align it with the ESAS protocol.

- **Atelectasis (iatrogenic lung collapse)**
  This measure was excluded because of the proprietary risk-adjustment methodology on which it is based.

- **Magnet Status**
  This measure was excluded because of unresolved proprietary issues associated with it.

- **Unplanned extubation**
  Concerns were raised by the Steering Committee about the precision of the measure—specifically, the differentiation of self-extubations and accidental extubations in the numerator. Also, the validity, reliability, and link to nursing care were viewed as not sufficiently developed/studied. Lastly, the Steering Committee viewed other, confounding factors (e.g., respiratory therapy) as contributing to this outcome more than nursing care.

- **Suspected drug reaction**
  Patient complaint rate
  Medication/therapeutic near misses
  Although evaluated individually, the measures were discussed collectively by the Steering Committee. For all three measures, precision and specification issues were raised, causing the Steering Committee to exclude them. For example, patient complaints include all complaints, even those that are not patient care- and/or nursing care-related. Additionally, the definitions of "near miss" and "suspected drug reaction" were viewed as sufficiently vague, causing potential inconsistencies in the measure's use.

- **Pain management**
  Several different instruments and measures of pain assessment were reviewed by NQF staff—each with varying levels of validity and reliability. Through the CalNOC project, an extensive review of the pain assessment/management research has been conducted without evidence of a relationship between the actions nurses take to deal with patient pain and the outcome. On the other hand, it also was noted that research related to pain assessment/management was anticipated within the next year that would provide additional information on this issue.

  Because of its importance as a cross-cutting issue, there was strong support for including a pain measure. However, NQF staff recommended deferring a decision about any pain measure until JCAHO-NCQA-AMA have finalized their nine measures of pain, which are due in early 2004. The Steering Committee concurred with the recommendation and opted to defer recommendations on any pain-related measures for now.

Measures Recommended for Public Reporting

The Steering Committee agreed that any recommended measure that scored high in the usability criterion be recommended for public reporting. Of the measures that were recommended by the Steering Committee, all but the smoking cessation measures were rated high for usability. Since the Committee recognized that the smoking cessation measures will be reported publicly via other organizations' activities and are already recommended for public reporting through the NQF-endorsed "hospital set," the Steering Committee ultimately recommended that all of the proposed nursing-sensitive consensus standards be for public reporting purposes.

Establishing a Research Agenda

During the course of measure identification and selection, a number of high priority areas for measurement were identified, but were found to lack measures that were appropriate for inclusion based on their insufficiency with respect to the evaluation criteria. As part of the project's objectives, the Steering Committee identified gaps in measurement, described measure development opportunities, and made explicit recommendations to the NQF membership regarding research that could enhance the state of science and the maturity of candidate consensus standards of nursing-sensitive performance.

To construct the proposed research agenda, the Steering Committee employed various approaches including:

- examining the purpose, framework, scope, and priority principles and disaggregating them to determine existing gaps;
- reviewing the measure evaluation criteria to determine the extent to which measure developers and/or researchers were providing the type of evidence that is needed to adequately evaluate measures;
- detailing measure-specific refinements that would translate to measure improvements;
- reviewing measures that were beyond the scope thresholds and determining the extent to which these measures should be translated into priorities for research; and
- suggesting, by expert opinion, other important areas for research and development.

Based on this approach, the Committee recommended the following research priorities:

- workforce measures and an empirical base to support them;
- measures that promote the highest quality and safety of healthcare rather than those that focus on negative consequences;
- measures that address all NQF aims and all IOM priority areas;
- nurse-centered intervention process measures, including those that describe the unique contributions of nursing (e.g., assessment—especially pain assessment, problem identification, prevention, patient education) and the dependent, independent, and interdependent roles of nurses;
- measures that address the role of nursing care teams and patient care teams; and
- measures that address specific content areas (e.g., patient education, care coordination and integration, efficiency of nursing care, symptom management, pain assessment and management, functional outcomes, malnutrition and supplemental feeding, patient satisfaction with nursing care, and nurse satisfaction).

In addition to these recommendations, the Steering Committee described some general principles for framing the research agenda:

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National Quality Forum
601 Thirteenth Street, NW, Suite 500 North
Washington, DC 20005