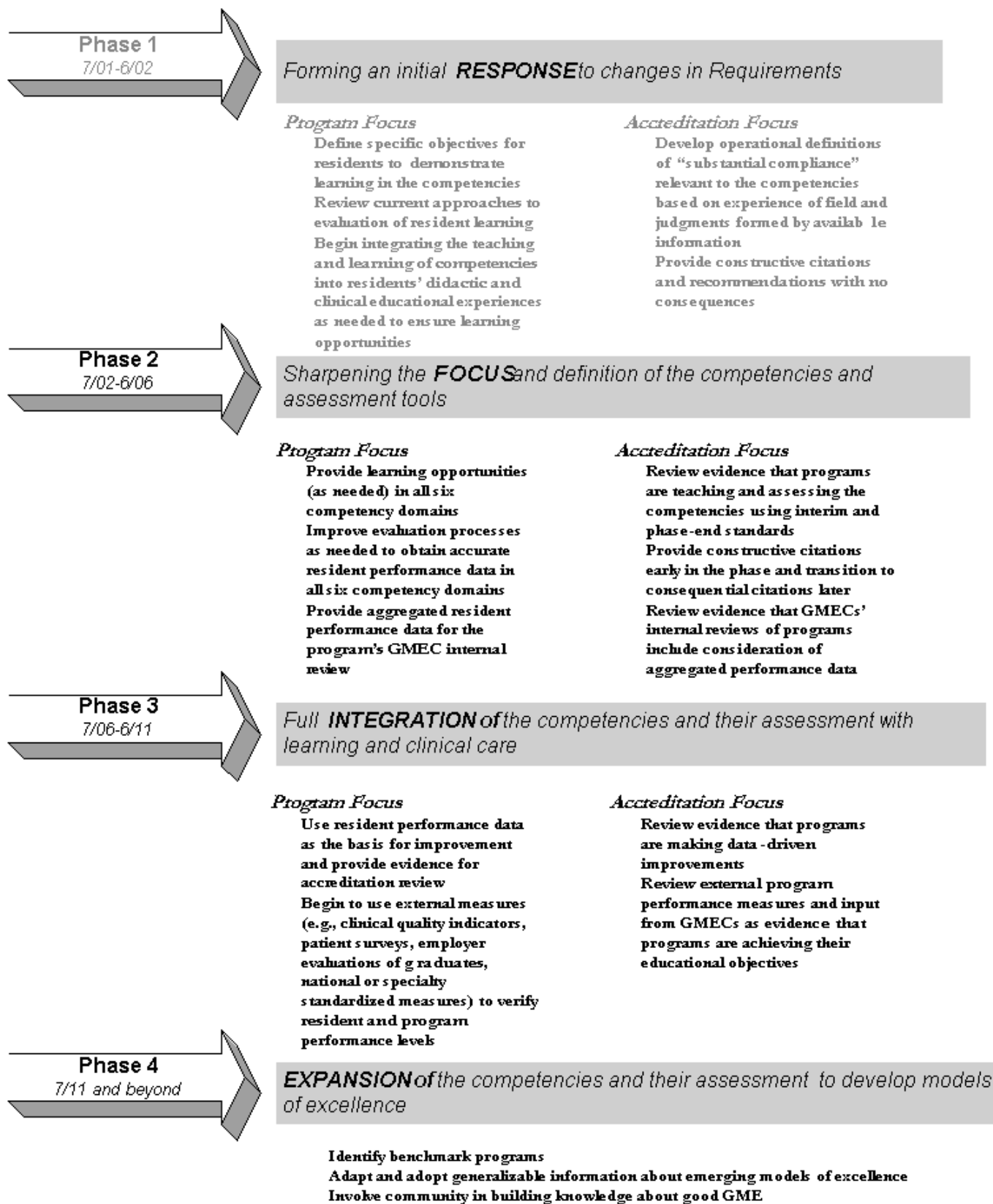


# TIMELINE--WORKING GUIDELINES

08/01/03



# regionsemquality: FrontPage

---

## EM Residency Quality Wiki

Welcome to the EM Residency Quality wiki. I would like to use this tool to be the repository for the EM residency quality program. I suggest the following:

1. Develop guiding principles for the residency quality program.
2. Open the wiki to others.
3. Determine content experts by EM topic.
4. Develop process for EM residency projects.

I have attached some of the files from the 2008 Residency Retreat and files from a quality course that may be of interest to you. I'm looking forward to your feedback.

Felix



[Quality Binder Fall08.pdf](#)



[GME Knowledge Translation from AEM.pdf](#)



[Begin to Use Clinical Outcomes from Acad Med.pdf](#)



[Using Pt Care Quality Measures from AEM.pdf](#)



[2004 06 25 Bulding a quality educational program \(2\).ppt](#)



[Kim QI Project.pdf](#)



[2008 10 23 quality GME integration.xls](#)



[Ankel email of 2005 03 11 \(3\).pdf](#)



[QI bottom up vs top down.pdf](#)

[CORD emails re IOM Report.txt](#)



[Coming Soon Quality Fair 2009!.txt](#)

[MatrixTutorial.pdf](#)

[schneider.pdf](#)

### Free help:

1. Learn how to use PBwiki: [The PBwiki Manual](#)
2. If you prefer video, watch a recording of our popular webinar, [PBwiki 101: Your Guide to Wiki Basics](#).
3. Need more help? Sign up for a [Free introductory webinar](#)

## Felix Ankel

---

From: Felix Ankel [ankel001@tc.umn.edu]  
Sent: Friday, March 11, 2005 11:00 AM  
To: 'robert knopp'; 'Brent.R.Asplin@HealthPartners.com'  
Cc: 'Won.G.Chung@HealthPartners.com'  
Subject: RE: clinical variation among staff

This is an area close to my heart and one that Brad G and I have been discussing from time to time. Brad calls this nodes of expertise. To get on my soapbox

"My vision is to increase the amount of medical knowledge that is effectively translated from what is known and what is practiced. My goal is to develop curricula and lead educational systems that are learner centered, multi-disciplinary, web based, "open source", continuously available and accessible, experientially focused, and outcomes based. I believe creating innovative curricula, continuously mentoring students, residents, and faculty, and systematically capturing the wisdom of learners and teachers for dissemination best achieve this."

I think this translation piece is the rate limiting factor for quality care and have been setting the groundwork for a Regions EM defined best practice in care (rather than relying on interpretation of former clinician of external proprietary guidelines)

This is what is set so far.

1. EMREL library to archive and search residency wisdom (e.g. can search Knopp + UTI)
2. Emres listserve that facilitates dialogue between practitioners inside and outside the department
3. 18 month curriculum that addresses breadth of EM content
4. 20+ faculty with defined core content "expert" designation

This is what we have but haven't tapped into for this

1. Education volunteer willing to focus speakers to ensure didactics are of appropriate breadth AND depth and facilitate wisdom posted on emrel in organized manner
2. EMR implementation with ability to link potential diagnosis to Regions defined best practices

These are thoughts I've considered

1. Each resident (27) is a core content expert when they start the residency and is paired with the core content expert faculty. One of their administrative projects is to develop one best practice guideline/per year with their faculty expert. They also review the other guidelines with their faculty on a yearly basis. This will allow each graduating resident to have the breadth of EM knowledge with and area of specified depth plus the experience of writing clinical guidelines
2. The clinical guidelines are living documents where proposed updates are presented on the emres list. Residents and faculty can be instructed to use JADE for this (journal articles delivered electronically) in a push me method.
3. The regions clinical guidelines are cross referenced and linked to our EMR
4. All 27 areas are reviewed in conference as a state of the art panel with the resident and faculty. E.g. we would have a state of the art panel every two weeks (state of the art panels would be 10-15% of all conference time, this will still allow for "core" board type material)

I think great discussion piece for strategic plan. This is one way of reducing MD variation and falls in nicely within the IOM, IHI, Leapfrog, ?Partners for health indicatives (the GE leapfrog equivalent). I think it would be more robust than milliman or Interqual, it addresses acgme issues such as systems based practice and practice based learning, it ultimately will help patient care and health care education, and can serve as the foundation of our academic research, educational, and operational initiatives for our department.

Thoughts??

Felix

-----Original Message-----

From: robert knopp [mailto:knopp003@umn.edu]  
Sent: Tuesday, March 08, 2005 11:43 AM

To: Brent.R.Asplin@HealthPartners.com  
Cc: Felix Ankel; Won.G.Chung@HealthPartners.com  
Subject: clinical variation among staff

Over the past six months, a recurring question has been posed to me: a resident or staff indicates that they recently reviewed a state of the art paper or attended a conference that reviewed best practices in a certain area and that there is substantial variation in how we do things in our ED regarding clinical condition X such that we are not achieving what we should be doing. Most recently the issue raised was management of CHF. But examples of other issues include aspects of trauma care, mesenteric ischemia, appropriate use of heparin for PE, airway management, antibiotic use.

I know that there are other issues consuming a lot of time. However, I do think for the more common clinical problems we need a strategy to narrow the variability and increase the frequency with which patients are treated with the latest information.

Bob



Regions Hospital

## Acute Myocardial Infarction (AMI) Measures:

- Aspirin on arrival
- Aspirin at Discharge
- Beta blocker at discharge
- ACEI or ARB medications for Left Ventricular Systolic Dysfunction (LVSD)
- ♥ Smoking Cessation Advice/Counseling-RN
- Time to PCI and Mortality Rate

## Outpatient Chest Pain Measures

- Aspirin on arrival
- ED median time to EKG (10 minute benchmark)

## Surgical Care Improvement Project (SCIP) Measures:

- Appropriate VTE (Venous Thromboembolism) prophylaxis ordered
- Appropriate VTE (Venous Thromboembolism) prophylaxis started w/in 24 hrs prior to or 24 hrs after surgery
- ♥ Pts on Beta blockers receive a Beta blocker within 24 hrs prior to surgery to arrival in PACU
- ♥ Prophylactic antibiotic started w/in 1 hr of incision
- Prophylactic antibiotic d/c'd w/in 24 hrs of surgery end
- Appropriate antibiotic selection
- ♥ Clip-never shave-surgical site
- ♥ Normothermia (>96.8 F) w/in 15 min of arrival to PACU for colon surgery

## Outpatient Measures for SCIP

- Appropriate antibiotic selection
- Antibiotic given w/in 1 hr of incision/procedure start time

## What are Core Measures?

Core Measures are standardized sets of reliable, evidence based measures that are proven to make hospitals safer and improve patient outcomes. They are a “checklist” of best practices, and impact how we care for each and every patient, every time.

**Optimal care means that ALL patients receive ALL the core elements ALL of the time.**

## Heart Failure Measures:

- ♥ Discharge Instructions: Includes activity level, diet, discharge medications, weight monitoring, follow up appointment, symptom management
- Left Ventricular Systolic Dysfunction (LVSD) Assessment
- ACEI or ARB medications for Left Ventricular Systolic Dysfunction (LVSD)
- ♥ Smoking Cessation Advice/Counseling-RN

## Community Acquired Pneumonia Measures:

- ♥ Pneumococcal Vaccination (year round)
- ♥ Blood culture 24 hrs prior to/after arrival-ICU
- ♥ Blood cultures performed in ED prior to initial antibiotic
- ♥ Adult Smoking Cessation Advice/Counseling
- ♥ Antibiotic within 6 hrs of arrival
- Antibiotic selection for ICU patients
- Antibiotic selection for Non-ICU patients
- ♥ Influenza vaccination (Oct 1-March 31)

### KEY:

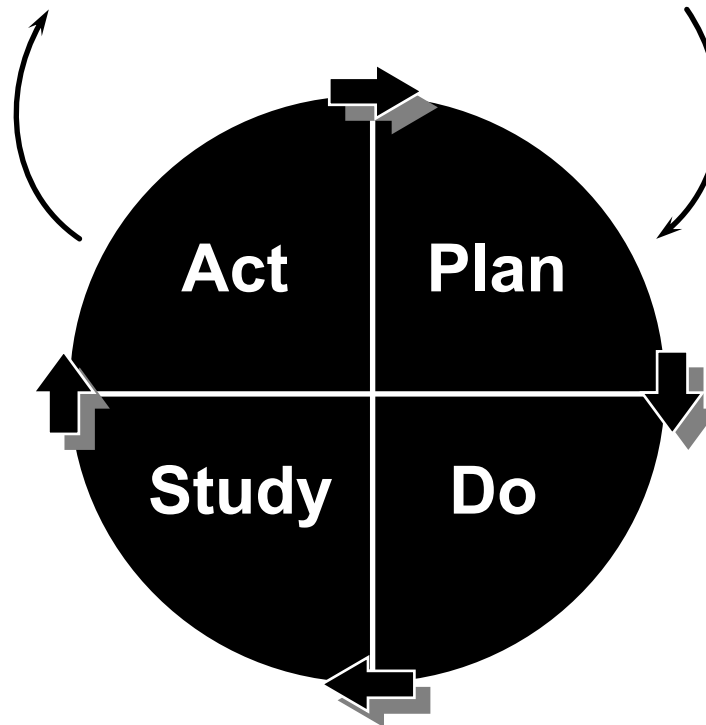
- = Provider
- ♥ = Nursing Measures

# Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?



---

# Using Patient Care Quality Measures to Assess Educational Outcomes

Susan R. Swing, PhD, Sandra Schneider, MD, Ken Bizovi, MD, Dane Chapman, MD, PhD, Louis G. Graff, MD, Cherri Hobgood, MD, Thomas Lukens, MD, PhD, Martha J. Radford, MD, Arthur Sanders, MD, Rebecca Smith-Coggins, MD, Linda Spillane, MD, Laura Hruska, MEd, Robert L. Wears, MD

---

## Abstract

**Objectives:** To report the results of a project designed to develop and implement a prototype methodology for identifying candidate patient care quality measures for potential use in assessing the outcomes and effectiveness of graduate medical education in emergency medicine.

**Methods:** A workgroup composed of experts in emergency medicine residency education and patient care quality measurement was convened. Workgroup members performed a modified Delphi process that included iterative review of potential measures; individual expert rating of the measures on four dimensions, including measures quality of care and educational effectiveness; development of consensus on measures to be retained; external stakeholder rating of measures followed by a final workgroup review; and a post hoc stratification of measures. The workgroup completed a structured exercise to examine the linkage of patient care process and outcome measures to educational effectiveness.

**Results:** The workgroup selected 62 measures for inclusion in its final set, including 43 measures for 21 clinical conditions, eight medication measures, seven measures for procedures, and four measures for department efficiency. Twenty-six measures met the more stringent criteria applied post hoc to further stratify and prioritize measures for development. Nineteen of these measures received high ratings from 75% of the workgroup and external stakeholder raters on importance for care in the ED, measures quality of care, and measures educational effectiveness; the majority of the raters considered these indicators feasible to measure. The workgroup utilized a simple framework for exploring the relationship of residency program educational activities, competencies from the six Accreditation Council for Graduate Medical Education general competency domains, patient care quality measures, and external factors that could intervene to affect care quality.

**Conclusions:** Numerous patient care quality measures have potential for use in assessing the educational effectiveness and performance of graduate medical education programs in emergency medicine. The measures identified in this report can be used as a starter set for further development, implementation, and study. Implementation of the measures, especially for high-stakes use, will require resolution of significant measurement issues.

ACADEMIC EMERGENCY MEDICINE 2007; 14:463–473 © 2007 by the Society for Academic Emergency Medicine

**Keywords:** outcome and process assessment (health care), quality indicators, educational measurement, internship and residency, program evaluation, emergency medicine

---

From the Department of Research and Education, Accreditation Council for Graduate Medical Education (SRS, LH), Chicago, IL; Department of Emergency Medicine, University of Rochester School of Medicine and Dentistry (SS, LS), Rochester, NY; Emergency Department, Providence St. Vincent Health Center (KB), Portland, OR; Emergency Department, Sanpete Valley Hospital/Intermountain Health Care (DC), Mt. Pleasant, UT; Departments of Emergency Medicine and Internal Medicine, University of Connecticut School of Medicine (LGG), Farmington, CT; Department of Emergency Medicine, New Britain General Hospital (LGG), New Britain, CT; Office of Educational Development, Department of Emergency Medicine, University of North Carolina School of Medicine (CH), Chapel Hill, NC; Department of Emergency Medicine, MetroHealth Medical Center (TL), Cleveland, OH;

Department of Medicine, New York University School of Medicine (MJR), New York, NY; Department of Emergency Medicine, Arizona Health Sciences Center (AS), Tucson, AZ; Department of Emergency Medicine, Stanford University Medical Center (RS-C), Palo Alto, CA; and Department of Emergency Medicine, University of Florida College of Medicine (RLW), Jacksonville, FL. Received October 2, 2006; revision received November 28, 2006; accepted December 3, 2006.

Supported by grant 034768 from the Robert Wood Johnson Foundation (to SRS).

This work represents the perspectives of the authors and not those of their affiliated organizations.

Contact for correspondence and reprints: Susan R. Swing, PhD; e-mail: [srs@acgme.org](mailto:srs@acgme.org).

Graduate medical education (GME) programs are expected to graduate residents who can practice competently and independently.<sup>1</sup> Ideally, the newly graduated, competent physician will be able to provide quality care: care that is effective, safe, efficient, timely, equitable, and patient centered.<sup>2</sup> An assumption of the Accreditation Council for Graduate Medical Education's (ACGME's) general competency and outcome assessment initiative is that resident physician competence results when GME programs provide learning opportunities that foster residents' development in the six general competency domains established by the ACGME<sup>3</sup> and the American Board of Medical Specialties.

Patient care settings are a primary venue for resident learning. Acquisition of competency occurs as residents care for patients with the assistance of more experienced physician teachers. This includes applying input and feedback from their teachers and modeling their teachers' care processes. Therefore, quality of care for patients treated and managed in learning environments is directly attributable, at least in part, to the capabilities and competence of residents and their teachers and is indirectly attributable to other features of the educational program that contribute to learning.

Hospital and practicing physician performance are already being assessed using quality-of-care measures, such as desired patient outcomes and condition-specific care processes associated with desired outcomes.<sup>4,5</sup> Similar measures, selected or adjusted for use in educational environments, could function as educational outcomes. These indices would directly measure the extent to which residents have learned to provide quality care and indicate the educational effectiveness of the program. These measures could add value by indicating specific ways patient care performance needs to change. This type of feedback is not an inherent quality of the current, most commonly used methods for assessing resident learning and performance, that is, clinical performance ratings and written examinations. The patient care quality measures could also function as indicators of the educational potential of the patient care and learning environment.

Use of patient care process and outcome measures for assessment by residency programs would align with the ACGME's phase 3 implementation guideline for the Outcome Project.<sup>6</sup> The phase 3 goal is to integrate the general competencies and patient care and to begin using external measures, such as quality-of-care indicators, to assess program performance. Associating competencies with quality-of-care measures and linking competencies with educational experiences whereby they are fostered could help elucidate ways to improve education, resident performance, and patient care.

Candidate measures for assessing emergency department (ED) care quality have been presented in three recently published reports.<sup>7-9</sup> They include some of the disease- and condition-specific measures currently used at a national level for hospital performance assessment and improvement. To the best of our knowledge, however, no one has examined whether these or other patient care quality measures would be appropriate or useful for assessing emergency medicine (EM) residency education. This article reports the results of a project designed to develop and implement a prototype methodology for

identifying and evaluating candidate patient care quality measures for potential use in assessing the outcomes and effectiveness of GME in EM.

## METHODS

The measure identification and evaluation activity took place through the following activities: 1) construction and orientation of the GME and Patient Care Quality Workgroup that functioned as the expert panel; 2) performance of a six-phase modified Delphi process, involving the workgroup and external stakeholders as raters of the candidate measures; and 3) construction and application of a framework for examining the validity of the measures for assessing residency educational effectiveness. Figure 1 presents a more detailed overview of the steps.

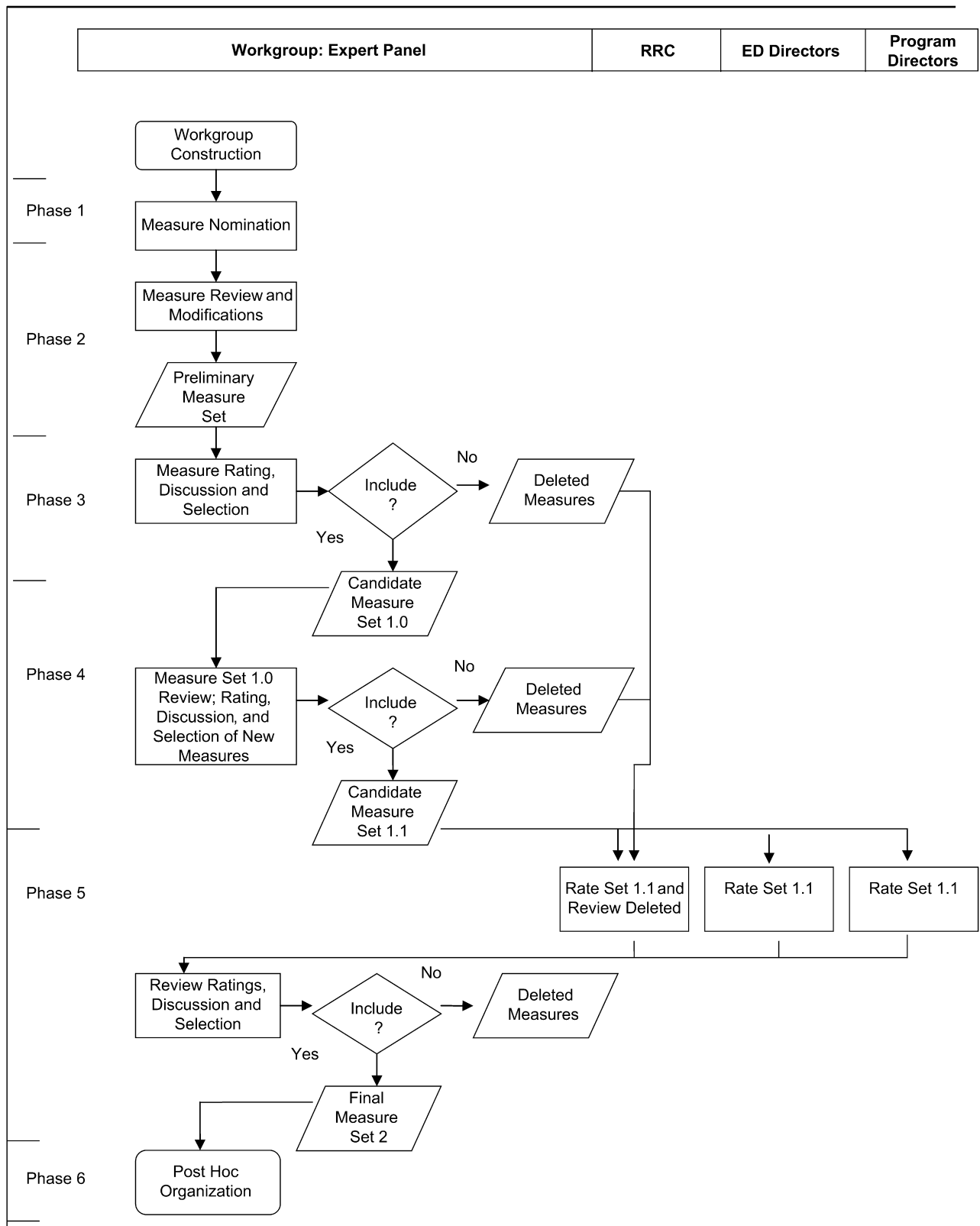
### Construction and Orientation of the Workgroup

The GME and Patient Care Quality Workgroup was the primary development group. The main selection criteria for group members was expertise in residency education and/or quality measurement. A criteria for the overall group composition was representation of the major stakeholder groups in EM: the Residency Review Committee (RRC), American Board of Emergency Medicine, American College of Emergency Physicians, Society for Academic Emergency Medicine, and Council of Emergency Medicine Residency Directors. Potential members were identified through peer nominations, publication records, their involvement in high-profile activities in residency education, or physician performance measurement. Members were invited to participate by the workgroup chair.

The workgroup exhibited the following characteristics. There were four members of the RRC from three appointing bodies. Six of the workgroup members had one or more primary organizational affiliations, as determined by board or committee membership within the organization; the other members were not actively engaged in EM organizations. Including the RRC members, organizational representation in the workgroup was as follows: American College of Emergency Physicians ( $n = 3$ ), American Board of Emergency Medicine ( $n = 1$ ), Society for Academic Emergency Medicine ( $n = 6$ ), and Council of Emergency Medicine Residency Directors ( $n = 3$ ). Among the Council of Emergency Medicine Residency Directors members were a current program director, an associate program director, and a distinguished educator. An American Board of Emergency Medicine executive staff member attended and observed the workgroup meetings. All workgroup members had expertise in quality and performance measurement, residency education, or both, as evidenced by records of scholarly publication and positions held (e.g., residency program director, chief of hospital quality, or representative to the American Medical Association's Consortium on Physician Performance Improvement [ $n = 2$ ]). One of the quality experts was a cardiologist. Nine of the workgroup members (all physicians) participated in all aspects of the measure identification and discussion as described in the following text. The remaining members participated in a subset of the processes.

Orientation of the workgroup consisted of presentation of the project aims and the rationale for considering patient care quality and outcome measures for assessing





**Figure 1. Modified Delphi process flow. RRC = Residency Review Committee Members.**

resident and residency program performance. This was followed by a structured exercise during which workgroup members generated and discussed factors that could account for good and poor patient care process

and outcome measures in an ED where resident physicians were learning and providing care. Five readings that discussed quality of care measurement in EM were provided in advance of the meeting.

### Modified Delphi Process

The workgroup adapted the modified Delphi methodology used by Lindsay et al.<sup>7</sup> to this project's unique aim of exploring the link of the patient care quality measures to residency education. A modified Delphi methodology was selected because it allows a group to develop consensus by systematically assessing an expert panel's agreement or disagreement on complex issues. Two or more rounds of voting on issues are conducted, and areas of disagreement are resolved by discussion within the expert group.<sup>10–12</sup> This study's approach also included features from the RAND appropriateness methodology (RAM), specifically, a relatively small Delphi panel of nine members and the RAM quantitative definition and criterion for establishing agreement.<sup>13</sup>

#### Phase 1: Nomination of Measures for a Preliminary Set

The first phase of the workgroup's activity was to construct a list of potential measures appropriate for assessing quality of care provided by resident physicians in the ED. Individual workgroup members submitted their recommended measures. These measures were compiled into a preliminary list. During a conference call, the workgroup reviewed this compilation of potential measures and made additional suggestions. No items were removed from consideration at this phase of the activity. The list was then further refined by linking measures to clinical conditions (where appropriate) and by organizing the measures into four categories: clinical conditions, medications, tasks and procedures, and departmental efficiency.

#### Phase 2: Review of the Preliminary Measure Set against Criteria and Refinement of the Preliminary Measure Set

In phase 2 of measure development, during a second conference call, workgroup members reviewed the preliminary list of measures again to determine whether 1) the measures were representative of the spectrum of ED clinical conditions for patients of various ages and clinical acuity and 2) the clinical conditions identified were common reasons for which emergency care is sought and treated in most EDs. Measures were refined during the course of the group discussion, and gaps were identified. Individuals generated additional measures after the meeting to fill the gaps in accordance with assignments made during the conference call. During the conference call, the workgroup also identified the three critical dimensions of an appropriate measure: 1) importance, 2) measures quality of care, and 3) measures educational effectiveness. The degree to which a measure fit the dimensions was used as the basis for including or excluding individual measures in the next phase of the Delphi process. The group identified a fourth dimension, "feasible to measure," to collect input on the probability that a measure could be implemented.

#### Phase 3: Workgroup Ratings, Discussion, and Selection of Candidate Measures for Set 1.0

In the third major phase of the measure identification process, workgroup members individually rated each of the conditions, procedures, and specific measures. Each condition, procedure, and departmental efficiency mea-

sure was rated from 1 (not important) to 9 (very important) on the importance dimension. This dimension indicated high prevalence in the ED. Specific measures were rated on "measures quality of care" and "feasible to measure" using a scale of 1 (strongly disagree) to 9 (strongly agree). Response options for "measures educational effectiveness" ranged from 1 (not at all) to 9 (to a great extent). "Measures educational effectiveness" was defined as the extent to which the measure is attributable to effectiveness of teaching and learning and clinical performance within the residency (and not external factors).

The ratings were aggregated and provided to the workgroup members at a face-to-face meeting where the results were reviewed and discussed. Each member also received his or her own ratings. A mean score of 5 on the three dimensions of importance, quality of care, and educational effectiveness was set as a screening criterion for measure retention. The workgroup agreed to discuss measures with borderline mean scores with the understanding that criterion-based decisions could be overridden by a consensus of the group. Feasibility was not considered for purposes of measure selection and retention, because the aim was to identify measures that were substantively appropriate. In addition, the workgroup believed that feasibility would depend on local resources. As a result of this review and the accompanying discussion, 40 measures were dropped and 50 measures were retained, including three new measures defined and voted on during the meeting.

#### Phase 4: Review of Candidate Measure Set 1.0 for Representativeness; Rating, Discussion, and Selection of New Measures; and Location of Evidence

Two workgroup members conducted a postmeeting review of the measures for representativeness against the Model of the Clinical Practice of EM.<sup>14</sup> The measures identified as a result of the review along with other previously identified but unrated measures were scored and aggregated and later reviewed and discussed utilizing the same approach described previously. Two new clinical conditions and 15 measures were retained. Two members of the workgroup compiled external evidence for the measures as measures of patient care quality. The search for evidence was limited to evidence-based reviews and documented development, use, or endorsement of the measures by major medical or quality improvement organizations.

#### Phase 5: External Stakeholder Ratings, Workgroup Discussion, and Construction of Final Candidate Measure Set

Because the project goals were novel, external validation of the workgroup's ratings and selections was sought. Thirty-four individuals from three stakeholder groups were invited to participate by rating the candidate set of measures. The 20 individuals who accepted the invitation and completed the ratings were seven RRC members, five ED directors, and eight program directors. The RRC members were those who had not participated in the workgroup; the ED directors were volunteers from a larger group of 14 who were invited because of their participation in a focus group convened by the American College of Emergency Physicians to discuss recent

graduates' performance. The program directors were from a larger group of 13 nominated by workgroup members. The external stakeholder raters composed a convenience sample associated with major stakeholder groups in EM. None of the participants had seen results from earlier phases of the measure identification process.

Each of the external stakeholder group members individually rated the phase 4 candidate measure set 1.1 on the four dimensions. The RRC group was asked to review the measures that had been dropped in the preceding phases and to identify any that should be put back. Three previously dropped measures were recommended for re-inclusion. All raters were also asked to suggest additional measures.

Mean ratings were calculated for each group separately. At its final meeting, the workgroup reviewed and compared the mean ratings from each of the three stakeholder groups and the mean across all three groups with the workgroup's own mean ratings and the previously defined criteria. As a result of the consensus discussion, three measures were dropped. Six measures suggested by the stakeholders were added to a list of new measures for future consideration.

### Phase 6: Post Hoc Analysis and Stratification of the Measures

After the workgroup had completed its decision making, the measures were organized post hoc into four groups based on strength of support for the measures overall across the dimensions of importance and measures quality of care and educational effectiveness. The purpose of the post hoc analysis was to better prioritize measures for future development. The post hoc groupings were made based on the classic definition of agreement or disagreement from the RAM.<sup>13</sup> According to this approach, agreement occurs when approximately 67% of the ratings fall into the same three-point range on a nine-point Likert scale (either 1–3, 4–6, or 7–9) as the median of the ratings. Replicability of results across rating groups is expected when this definition is used.

In this study, a measure was classified as a priority for future development when raters agreed that it is important, measures quality of care, and measures educational effectiveness. Agreement was indicated when at least 67% of the ratings for each of the three dimensions across all raters from the workgroup and external stakeholder groups were in the 7–9 point range on the scale. For the practical purpose of further distinguishing the most strongly supported measures, those measures receiving ratings of 7–9 by at least 75% of raters on all three dimensions were classified into a high agreement group. Measures were included in an "uncertain" group if the agreement criteria was not reached for one or more dimensions and ratings on the other dimensions displayed uncertainty rather than disagreement when the RAND definition was applied. Measures meeting the RAND disagreement definition on one or more dimensions were put into the disagreement group.

**Structured Exercise for Exploring the Linkage of Education, Competencies, and Patient Care Quality**  
After constructing the final version of the preliminary set of measures, the workgroup performed a structured

exercise to explore linkages among education, competencies, and patient care quality. Establishment of causal relationships is a necessary step for demonstrating the validity of the measures for assessing educational outcomes. The exercise consisted of selecting a sample of measures and identifying for each of them: 1) specific competencies (knowledge and skills from the six general competency domains) needed to successfully treat the condition or perform the procedure being assessed using the measure, 2) educational activities likely to occur in residency programs to foster development of the competencies, and 3) factors extraneous to the educational program that might intervene to affect patient care and the associated quality-of-care measures.

## RESULTS

A set of 62 measures in four categories was identified through the workgroup and external stakeholder ratings and selection process. They included 43 measures for 21 clinical conditions; eight medication measures, including four specific high-priority drug interactions; seven measures for six tasks or procedures; and four measures of department efficiency.

Twenty-six measures met the stricter quantitative criteria for agreement applied post hoc using the RAM. These measures are presented in the high and moderate columns in Table 1 and the Data Supplement under "Agree" (available as an online Data Supplement at <http://www.aemj.org/cgi/content/full/j.aem.2006.12.011/DC1>). For these measures, a minimum of 67% of raters provided ratings of 7–9 on the scale for each of the dimensions. For the 19 measures in the high agree column, a minimum of 75% of ratings were in the 7–9 point range on the scale. Because the raters agreed that the measures rate highly on the dimensions, these measures can be considered the most appropriate for further development. From 26% to 93% of the workgroup and external stakeholder group members rated the measures between 7 and 9 on the "feasible to measure" dimension. Fourteen of these met the RAM criteria for agreement. These results are presented in Table 1 and the online Data Supplement. Among the measures rated most difficult to measure were the following: for deep vein thrombosis or pulmonary embolism, measuring whether pretest probability was assessed; for headache, percent of subarachnoid hemorrhage diagnosis missed (first 72 hours); and for C-spine, conformance with Canadian C-spine or National Emergency X-Radiography Utilization Study (NEXUS) rules.

All but four of the remaining measures were classified in the uncertain category. These 32 measures received less than 67% of ratings in the 7–9 point range for at least one of the three dimensions. For nine of these, the ratings were below the agreement criteria only for the educational effectiveness dimension. There was disagreement across raters on all four departmental efficiency and effectiveness measures. Six additional measures suggested by members of the external stakeholder groups but not rated during the course of the project were retained for future consideration. These are presented in Table 2.

Documentation supporting use of 15 measures associated with six clinical conditions and one procedure was

Table 1  
Summary of Measure Ratings across Critical Dimensions

	Agree	
	High	Moderate
Clinical condition		
Acute myocardial infarction		Percent administered aspirin within 24 hours*
Pneumonia	Appropriate initial antibiotic Percent high risk admitted (Pneumonia Severity Index class 4 or 5)	
Asthma	Percent administered anti-inflammatory drugs (corticosteroids)*	
Abdominal pain	Percent administered relievers* Unscheduled return with ruptured ectopic pregnancy within 72 hours	
Headache		Percent subarachnoid hemorrhage diagnosis missed (first 72 hours)
Syncope/dizzy/shortness of breath		Electrocardiography for patients older than 50 years
Deep vein thrombosis/pulmonary embolism	Percent of patients with deep vein thrombosis/pulmonary embolism receiving anticoagulation in the ED* Pretest probability assessed	
C-spine		Conformance with Canadian C-spine or NEXUS rules
Meningitis	Time to antibiotics in documented meningitis*	
Pregnancy	Rh screening done on threatened abortion and trauma with pregnancy*	
Seizures		Percent head computed tomographic scan for seizure patients (first-time seizure) excluding febrile seizure
Toxicology: unknown ingestion	Acetaminophen level* Pregnancy test if patient is a female of childbearing age*	ASA level*
Pediatrics: fever in an infant younger than 1 month old	Documentation of suicidality Lumbar puncture with cerebrospinal fluid culture and Gram stain* Urinalysis and urine culture* Blood culture* Antibiotics administered in the ED*	
Medication	Medication orders that are contraindicated due to patient allergy	
Procedures		
Intubation	Successful endotracheal intubation*	
Central lines		Complication of central lines
Sedation	Preparation airway assessment in conscious sedation	

A complete version of this table is provided as an online Data Supplement at <http://www.aemj.org/cgi/content/full/j.aem.2006.12.011/DC1>. Agree means that at least 67% of raters provided ratings on the measure in the 7–9 point range on the nine-point Likert scale for the importance/relevance, quality of care, and educational effectiveness dimensions. Classification as “high agree” required 75% of ratings in the 7–9 range on the Likert scale for the three dimensions.  
NEXUS = National Emergency X-Radiography Utilization Study; ASA = acetylsalicylic acid.  
\* At least 67% of the ratings for “feasible to measure” were between 7 and 9 on the scale.

located (see Table 3). All measures are derived from expert consensus or scientific studies.<sup>15–21</sup> Six measures for two conditions currently are among the performance measures used in national hospital reporting and quality improvement initiatives, and five more are candidate measures.<sup>15,16</sup> Three measures are included in guidelines

developed by the EM community.<sup>19–21</sup> Seven measures in the groups designated as appropriate for further development are supported by this evidence as quality-of-care measures.

A sample of results from the structured exercise designed to explore the linkage of educational activities

and competencies to patient care process measures is presented in Table 4. For each of the measures, competencies from four to six of the general competency domains were identified as the knowledge and skills needed to provide quality patient care. Also, for each measure, numerous factors were identified that could intervene to influence patient care and associated quality-of-care measures. Typically, these factors were related to the system. They included resource (equipment, drug, and staff) availability, protocols and policies, patient mix, ED crowding, and hospital volume. The results illustrate that quality patient care (measured by the indicators identified in this study) could be a result of educational activities and residents' acquisition and performance of essential competencies but that intervening variables will need to be ruled out as causal factors.

## DISCUSSION

A reliable level of agreement among raters was attained for 26 measures that received high ratings on the importance, quality of care, and educational effectiveness dimensions. These results support the conclusion that there are patient care quality measures that are appropriate for assessing the educational effectiveness of GME in EM. As measures of educational effectiveness and patient care quality, they would indicate whether patient care provided by ED residents and faculty involved appropriate diagnostic testing and treatment processes, correct diagnoses, and successfully performed procedures. Ratings for feasibility of measurement for these 26 indicators suggest that many programs should be able to collect these performance data.

Defining quality indicators using the best available evidence is a goal of this and any performance measurement initiative. Some of the indicators identified in this project were derived previously by others following systematic study of the evidence. Even so, not everyone agrees with these measures. Evolution and refinement of these measures are expected as further research is conducted.

It is appropriate in consensus studies to set selection criteria at whatever level best suits the purpose of the study.<sup>11</sup> This study was an initial inquiry into the appropriateness of using patient care quality measures to assess the effectiveness of GME. Relaxed criteria were used initially to enable a broad set of measures to be identified. The application of the stricter criteria post hoc enabled identification of the most strongly supported measures for future development.

The 19 highest rated measures (i.e., those in the high agree category) could be used as the focus of next development steps involving collection and use of these measures in residency programs. Later, the seven other measures in the agree category could be added to make the set of measures more representative of care in the ED.

The measures in this set already being collected for national performance measurement initiatives (i.e., those related to pneumonia and asthma) will require limited, if any, additional development before collection in the ED. Further research and development are needed before use of the other measures. This might include 1) identifi-

Table 2  
Additional Measures Recommended for Inclusion

Condition	Measure
Asthma	Percent discharged with inhaled corticosteroids
Extremity injuries	Documentation of distal N/V examination
Productivity	Patients per hour, RVU per patient, RVU per hour
Testicular torsion	Documentation of genitourinary examination
Vital signs abnormalities	Documentation of reassessment or rationale for patient release
Wound repair	Documentation of tetanus status

RVU = relative value unit; N/V = neuro-vascular.

cation of clinical cases that should be excluded from the measures, 2) study of the reliability and validity of the measures, 3) development of data collection instruments, and 4) study of the evidence base. For all measures, it will be important to further investigate effects of contextual variables that are not elements of the educational program and to develop measurement approaches that adjust or control for these intervening variables.

The initial recommended use for the measures, following essential development activities, is for quality measurement and improvement at the residency program level. Program-level patient care process data indicating, for example, that low percentages of patients with asthma were administered relievers, or low percentages of patients with deep vein thrombosis or pulmonary embolism received anticoagulation therapy, or patients suspected of ingesting toxic substances were not tested for acetaminophen, could indicate deficits in local knowledge about current guidelines or standards of care, inadequacies in the transmission of this knowledge to residents, or inadequate supervision. The performance data would be useful in alerting both residents and ED faculty of the gaps and in signaling that changes in both clinical performance and educational processes are needed.

When collected before and after an educational intervention designed to improve care, the measures would provide evidence simultaneously of whether patient care improved and whether the education intervention was effective. Studies in practice settings have shown that providing feedback on patient care performance to providers can contribute to improved care of patients with acute myocardial infarction and pneumonia<sup>22</sup> and that quality-of-care measures (for asthma) are sensitive to pre-post change following interventions that include education of health care providers.<sup>23-25</sup>

Eventually, though, it will be desirable to use the measures to assess the educational effectiveness of GME programs by considering how well residents collectively perform on these measures. This use is consistent with

Table 3  
Evidence and Support for Patient Care Quality Measures

Clinical Conditions	Support for Use	
	Used Nationally for Hospital Performance Measurement	Published Literature Review
Acute myocardial infarction		
Percent administered aspirin within 24 hours	CMS, HQA, JCAHO, APU	
Percent administered beta-blockers within 24 hours	CMS, HQA, JCAHO, APU	
Percent administered thrombolytics within half an hour	CMS, HQA, JCAHO	
Percent undergoing percutaneous coronary intervention within 90 minutes	CMS, JCAHO, HQA (120 minutes)	
Pneumonia		Mandell et al. <sup>17</sup>
Appropriate initial antibiotic	CMS, JCAHO, HQA	
Time to antibiotic (percent less than four hours)	CMS, JCAHO, HQA, APU	
Percent high risk admitted (Pneumonia Severity Index class 4 or 5)		
Asthma		Williams et al. <sup>18</sup>
Percent administered anti-inflammatory drugs (corticosteroids)	JCAHO candidate measure	
Percent administered relievers	JCAHO candidate measure	
Percent measured lung function (peak flow, forced expiratory volume in 1 second)		
Percent return within seven days following ED or observational visit (children)	JCAHO candidate measure	
Head injury		Jagoda et al. <sup>19</sup>
CT scan of the head conforming with NEXUS II head CT or Canadian rules		
Pregnancy		Clinical policy <sup>20</sup>
Rh screening performed on threatened abortion and trauma with pregnancy		
Seizures		Practice parameter <sup>21</sup>
Percent undergoing CT scan of the head for seizure patients (first-time seizure) excluding febrile seizure		
Tasks/procedures		
Complication of central lines	JCAHO candidate measure	

CMS = Centers for Medicare & Medicaid Services; HQA = Hospital Quality Alliance; JCAHO = Joint Commission on Accreditation of Healthcare Organizations; APU = Reporting Hospital Quality Data for Annual Payment Update; CT = computed tomography; NEXUS II = National Emergency X-Radiography Utilization Study II.

the aim of GME, to prepare new physicians to provide high-quality patient care, and with the goal of phase 3 of the ACGME's Outcome Project. Measurement strategies that control for patient mix and other system variables are required before high-stakes use of the data or across-program comparisons, however. Furthermore, programs will require assistance putting into place data collection mechanisms.

Using the measures to assess individual resident performance is desirable but presents additional measurement challenges and considerations. In addition to benefits already mentioned, the use of patient care quality measures potentially would result in more precise measures of residents' ability to provide quality care than those currently obtained based on global ratings

or focused observations of resident-patient encounters that lack agreed upon performance standards. Second, as illustrated by the results of the structured exercise, the patient care quality measures could serve as indicators that essential competencies have been acquired, integrated, and applied. Last, assessment using the measures will better prepare residents for practice settings where similar measures are or will be used.

Appropriate use of the measures will require thoughtful interpretation of the results because of the mediating variables the workgroup identified. For example, to conclude that high performance on acute myocardial infarction is due to educational effectiveness, the program will need to rule out high levels of external contribution by specialized units. A conclusion of educational

Table 4  
Sample Educational Processes, Competencies, and Intervening Variables that Contribute to Patient Care Quality

Condition: Measure	Educational Processes	Resident Competencies	Intervening Variables
Acute myocardial infarction: percent missing diagnosis of acute myocardial infarction (first 72 hours)	Didactic sessions	Information gathering from patient (PC and ICS)	Inadequate number of monitored or observational beds
	Bedside teaching Analysis of practice patterns	Knowledge of guidelines, indications, and contraindications (MK)	Triage (or mistriage) ED protocol
	Patient follow-up	Ability to accurately interpret electrocardiogram (PC and MK)	Practice patterns (regional variations in care regarding whether an electrocardiogram is obtained)
	Independent reading	Decision-making and judgmental bias toward diagnosis of myocardial infarction (PC) Ability to recognize atypical presentation (PC and MK) Knowledge of testing limits (MK) Coordination of care in ED and with consultants (ICS and SBP)	Resource availability (chest pain unit, stress testing, and imaging)
Otitis media: correct antibiotic prescribed	Didactic sessions	Knowledge of local flora (MK)	Equipment availability (otoscope and insufflator)
	Bedside teaching Analysis of practice patterns	Diagnostic skill (PC and MK) Skill with insufflator (PC and MK)	Formulary (drug availability) Patient mix (socioeconomic status, cultural norms, and relationship to patient preferences)
	Patient follow-up	Knowledge of guidelines (MK)	Patients' likelihood and ability to comply
	Independent reading	Consideration of costs vis-à-vis patient (PC and SBP) Therapeutic relationship (ICS) Counseling/education (PC and ICS) Analysis of practice patterns (PBLI)	
Intubation: successful endotracheal intubation	Didactic sessions	Knowledge of drugs used for rapid sequence induction (MK)	ED protocol (preprinted drug list)
	Bedside teaching		Patient mix (e.g., patients with head and neck cancer, trauma)
	Analysis of practice patterns Patient follow-up	Knowledge of difficult airway algorithms (MK) Recognition of indications and contraindications (PC and MK)	Resource and staff availability Equipment availability and location
	Independent reading	Prior experience resulting in procedural skill (PC and MK)	Hospital volume (opportunity to practice)
	Simulation (models, animal labs, cadavers)	Team coordination (ICS and SBP)	
Departmental efficiency/effectiveness: patient length of stay in the ED	Analysis of practice and improvement projects	Knowledge and skills related to practice improvement (PBLI)	ED crowding

Table 4  
(Continued)

Condition: Measure	Educational Processes	Resident Competencies	Intervening Variables
	Participation on hospital committees	Ability to work with others to improve care (ICS and SBP)	Resource availability (ED and hospital staffing levels, trauma or other specialized centers, diagnostic test availability, on-call consultant availability, clinic and subspecialists' appointments, hospital equipment)
	Case reviews of outliers (i.e., patients with especially long stays)	Willingness to take on care improvement activities (P)	Patient mix (elders)  Diversion policy Hospital flow Hospital financing Community resources availability (home visit nurses, social services, hospice, emergency housing, and beds in shelters)
<p>Bedside teaching: case presentation and resident/attending physician discussion; attending physician confirms residents' observations through patient interview/examination and provides feedback to the resident. Analysis of practice patterns: examination of a sample of cases related to the same symptoms or condition for care processes and outcomes.</p> <p>Accreditation Council for Graduate Medical Education general competencies: PC = patient care; ICS = interpersonal and communication skills; MK = medical knowledge; SBP = systems-based practice; PBLI = practice-based learning and improvement; P = professionalism.</p>			

effectiveness based on high success rates of resident-performed intubations may need to be qualified if residents treat only selected and uncomplicated patients. Obtaining a large enough sample of performance for each resident for each measure and separating team and system effects from individual performance through exclusions or adjustments are the major measurement challenges.<sup>26</sup>

Relying exclusively on patient care quality measures to assess resident competence is not desirable, because not all competencies are assessed using these measures. One example is the extent to which care is patient centered, compassionate, and respectful. Furthermore, observing and assessing individual competencies during the initial learning stages is a more direct way of ascertaining the extent of attainment of individual competencies that comprise good patient care and of identifying additional improvements needed in fundamental skills and knowledge.

Timeliness and efficiency are among the dimensions of quality of care identified by the Institute of Medicine.<sup>1</sup> In this study, measures related to timeliness of care for individual patients received high ratings on quality of care, but measures of departmental efficiency received low ratings. However, all of these were among the measures rated lowest as indicators of educational effectiveness. Factors external to the ED will significantly affect these measures. Nonetheless, it is important to retain these measures for consideration. Failure to utilize these measures could perpetuate "normalized deviance,"<sup>27</sup> whereby residents learn to accept overcrowding, inefficiencies, and care delivered too late to be of optimal benefit to the patient. Instead, demonstrated improvements in these mea-

asures could be the basis for special commendation for excellence in systems-based practice, assuming significant resident involvement in or leadership of multidisciplinary improvement initiatives that produce increases in timeliness and efficiency.

## LIMITATIONS

The modified Delphi approach used in this study departed from recommendations in two ways. First, the mean rather than the median rating was used as the initial screening criteria. A post hoc examination revealed that use of the mean or median produced comparable decisions. Second, the workgroup did not complete a second round of voting. The external stakeholder group ratings functionally served instead as the second-round vote. A comparison of final results showed no difference in selection decisions based on combined workgroup and external stakeholder ratings versus external stakeholder ratings alone. Last, given the large number of potential patient care quality measures, different measures could be identified in the initial measure nomination phase of future studies. This would not invalidate the current findings, but rather expand the potential measure set.

## CONCLUSIONS

Patient care quality measures, when carefully developed and collected, provide direct measures of the desired outcomes of education: provision of high-quality care. Thus, they have the potential to increase the validity of inferences made about the educational effectiveness of



GME. Further activities to develop and test these measures should be undertaken. The measures identified in this article can be used as a starter set for further development, implementation, and study. Implementation of the measures, especially for high-stakes use, will require resolution of significant measurement issues.

## References

1. Accreditation Council for Graduate Medical Education (ACGME). Common Program Requirements. Available at: [http://www.acgme.org/acWebsite//dutyHours/dh\\_dutyHoursCommonPR.pdf](http://www.acgme.org/acWebsite//dutyHours/dh_dutyHoursCommonPR.pdf). Accessed Nov 23, 2006.
2. Institute of Medicine. Crossing the Quality Chasm: A New Health System for the 21<sup>st</sup> Century. Washington, DC: National Academy Press, 2001.
3. The ACGME Outcome Project. The General Competencies. Available at: <http://www.acgme.org/outcome/comp/compFull.asp>. Accessed Nov 23, 2006.
4. National Quality Forum. Available at: <http://www.qualityforum.org/mission/home.htm>. Accessed Jan 23, 2006.
5. Centers for Medicaid and Medicare Services. Hospital Quality Initiatives. Available at: [http://new.cms.hhs.gov/HospitalQualityInits/01\\_Overview.asp#TopOfPage](http://new.cms.hhs.gov/HospitalQualityInits/01_Overview.asp#TopOfPage). Accessed Jan 23, 2006.
6. ACGME Outcome Project Timeline. Available at: [http://www.acgme.org/outcome/project/timeline/TIMELINE\\_index\\_frame.htm](http://www.acgme.org/outcome/project/timeline/TIMELINE_index_frame.htm). Accessed Jan 23, 2006.
7. Lindsay P, Schull M, Bronskill S, Anderson G. The development of indicators to measure the quality of clinical care in emergency departments following a modified-Delphi approach. *Acad Emerg Med*. 2002; 9:1131-9.
8. Beattie E, Mackway-Jones K. A Delphi study to identify performance indicators for emergency medicine. *Emerg Med J*. 2004; 21:47-50.
9. Graff L, Stevens C, Spaite D, Foody J. Measuring and improving quality in emergency medicine. *Acad Emerg Med*. 2002; 9:1091-107.
10. Coben JH. Measuring the quality of hospital-based domestic violence programs. *Acad Emerg Med*. 2002; 9:1176-83.
11. Fink A, Kosecoff J, Chassin M, Brook RH. Consensus methods: characteristics and guidelines for use. *Am J Public Health*. 1984; 74:979-83.
12. Jones J, Hunter D. Consensus methods for medical and health services research. *BMJ*. 1995; 311:376-80.
13. Fitch K, Bernstein SJ, Aguilar MD, et al. The RAND/UCLA Appropriateness Method User's Manual. Available at: <http://www.rand.org/health/tools/appropriateness.html>. Accessed Apr 22, 2004.
14. Hockberger RS, Binder LS, Graber MA, et al. The model of the clinical practice of emergency medicine. *Ann Emerg Med*. 2001; 37:745-70.
15. Joint Commission on Accreditation of Healthcare Organizations (JCAHO). Performance Measurement: Core Measures. Available at: <http://www.jcaho.org/pms/core+measures/candidate+core+measure+sets.htm>. Accessed Jan 24, 2006.
16. Centers for Medicaid and Medicare Services. The Hospital Quality Alliance (HQA) Ten Measure "Starter Set." Available at: [http://new.cms.hhs.gov/HospitalQualityInits/01\\_Overview.asp#TopOfPage](http://new.cms.hhs.gov/HospitalQualityInits/01_Overview.asp#TopOfPage). Accessed Jan 23, 2006.
17. Mandell LA, Bartlett JG, Dowell SF, File TM Jr, Musher DM, Whitney C. Update of practice guidelines for the management of community-acquired pneumonia in immunocompetent adults. *Clin Infect Dis*. 2003; 37:1405-33.
18. Williams SG, Schmidt DK, Redd SC, Storms W. Key clinical activities for quality asthma care. Recommendations of the National Asthma Education and Prevention Program. *MMWR Recomm Rep*. 2003; 52:1-8.
19. Jagoda AS, Cantrill SV, Wears RL, et al. Clinical policy: neuroimaging and decisionmaking in adult mild traumatic brain injury in the acute setting. *Ann Emerg Med*. 2002; 40:231-49.
20. American College of Emergency Physicians. Clinical policy: critical issues in the initial evaluation and management of patients presenting to the emergency department in early pregnancy. *Ann Emerg Med*. 2003; 41:123-33.
21. American College of Emergency Physicians, American Academy of Neurology, American Association of Neurological Surgeons, American Society of Neuroradiology. Practice parameter: neuroimaging in the emergency patient presenting with seizure (summary statement). *Ann Emerg Med*. 1996; 28:114-8.
22. Schade CP, Cochran BF, Stephens MK. Using statewide audit and feedback to improve hospital care in West Virginia. *Jt Comm J Qual Saf*. 2004; 30:143-51.
23. Boychuk RB, Demesa CJ, Kiyabu KM, et al. Change in approach and delivery of medical care in children with asthma: results from a multicenter emergency department educational asthma management program. *Pediatrics*. 2006; 117:S145-51.
24. Cabana MD, Slish KK, Evans D, et al. Impact of physician asthma care education on patient outcomes. *Pediatrics*. 2006; 117:2149-57.
25. Schonlau M, Mangione-Smith R, Chan KS, et al. Evaluation of a quality improvement collaborative in asthma care: does it improve processes and outcomes of care? *Ann Fam Med*. 2005; 3:200-8.
26. Kirk SA, Campbell SM, Kendell-Webb S, et al. Assessing the quality of care in multiple conditions in general practice: practical and methodological problems. *Qual Saf Health Care*. 2003; 12:421-7.
27. Croskerry P, Chisholm C, Vinen J, Perina D. Quality and education. *Acad Emerg Med*. 2002; 9:1108-15.

# Residents Learn to Improve Care Using the ACGME Core Competencies and Institute of Medicine Aims for Improvement: the Health Care Matrix

DORIS C. QUINN, PHD  
 JOHN W. BINGHAM, MHA  
 G. WALDON GARRISS, MD  
 E. ASHLEY DOZIER, BA

## Abstract

**Objectives** This article describes how internal medicine residents at Vanderbilt University Medical Center learn to assess and improve care using the Institute of Medicine aims for improvement and the Accreditation Council for Graduate Medical Education core competencies combined in a tool called the *health care matrix*. The most important and popular use of the health care matrix has been with suboptimal care, in which care is not safe, timely, effective, efficient, equitable, or patient centered.

**Background** The core competencies provide a means of defining why care was not safe, timely, effective, efficient, equitable, or patient centered. The Institute of Medicine aims for improvement are also important because they are used to frame most publicly reported measures of quality. Few residents have an understanding of these public measures and how their futures will be affected by the growing trend toward quality report cards.

**Intervention** To help the residents understand the significance of public measures of quality, they learn to

assess their patients as a “panel,” looking at the care they provide for patients with coronary artery disease and diabetes mellitus. Residents use the health care matrix to analyze 1 of their patients, and then as a group they select a health care matrix for their improvement project. The way the health care matrix is formatted and the sequencing of the core competencies allow for the analysis of the cells to lead to the final question “What was learned and what needs to be improved?” The residents are then taught the tools and methods of quality improvement and complete their project. Some of these projects have had a significant influence on external measures of quality for this organization. The article describes the 8-week course that residents complete, the use of the health care matrix, the analysis of the patient panel, and finally an example of a completed project in which they improve the timeliness of antibiotics administration to patients with pneumonia (a public measure of quality).

## Introduction

The ultimate obligation in health care education is to develop clinicians who are competent to practice medicine, while teaching them to lead the transformation necessary in health care delivery and education. The Institute of Medicine (IOM) believes that our medical education systems have not kept pace with the changing face of health

care.<sup>1</sup> To address this challenge, Vanderbilt University Medical Center began using a performance-based diagnostic tool called the *health care matrix*, which guides users to scrutinize the care of patients using the IOM aims for improvement and the Accreditation Council for Graduate Medical Education (ACGME) core competencies. The pilot work began with internal medicine residents in November 2003 and has continued since then. Each year, second-year residents during their ambulatory rotation spend 2 hours per week learning to analyze and improve care. To date, 1442 residents have taken this course. From December 2003 to December 2006, 674 residents focused on care of patients with coronary artery disease (CAD). From December 2006 to April 2009, 768 residents focused on patients with diabetes mellitus (DM).

**Doris C. Quinn, PhD**, is Director of Process Improvement and Quality Education, Department of Performance Improvement, University of Texas MD Anderson Cancer Center; **John W. Bingham, MHA**, is Vice President for Performance Improvement and Chief Quality Officer, University of Texas MD Anderson Cancer Center; **G. Waldon Garriss, MD**, is Associate Director of the Internal Medicine–Pediatrics Residency Program and Associate Director of the Internal Medicine Residency Program, Department of Internal Medicine–Pediatrics, Vanderbilt University Medical Center; and **E. Ashley Dozier, BA**, is Program Coordinator of the Office of Graduate Medical Education, Vanderbilt University Medical Center.

Corresponding author: Doris C. Quinn, PhD, Department of Performance Improvement, University of Texas MD Anderson Cancer Center, 1100 Holcombe Boulevard, Unit 141, Houston, TX 77030-4009, 713.745.2579, dcquinn@mdanderson.org

DOI: 10.4300/01.01.0020

## Why Use the IOM Aims for Improvement?

The IOM aims for improvement are being used to frame most publicly reported measures of quality. Phase III of the ACGME Outcomes Project asks programs to focus on

TABLE 1 INSTITUTE OF MEDICINE (IOM) AIMS FOR IMPROVEMENT	
IOM Aim for Improvement	Example of External Metrics
Care should be safe	Overall ratio of observed to expected mortality
	Use of central-line bundle
	Use of ventilator-associated pneumonia bundle
	National patient safety goals
Care should be timely	National Quality Forum's 30 safe practices <sup>2</sup>
	Antibiotic administration for pneumonia within 6 h
	Administration of aspirin and $\beta$ -blockers on arrival or discharge for acute myocardial infarction or congestive heart failure
Care should be effective	Timely communication of mammogram results
	Acute myocardial infarction, congestive heart failure, and pneumonia measures <sup>3</sup>
	National Quality Forum's Ambulatory Care Quality Alliance measures <sup>4</sup>
	The 439 clinical measures published in 2003 by McGlynn <sup>9</sup>
Care should be efficient	American Medical Group Association's 2006 recommendations for structural, process, and outcomes measures <sup>5</sup>
	CMS organ donation measures <sup>6</sup>
	Cost per visit
	Cost per discharge
	Salary cost per visit or discharge
	Supply cost as a percentage of revenue
	Rate of increase in revenue vs expenses
Care should be equitable	Cost of poor quality, work-arounds, waste, and rework
Care should be patient centered	Agency for Healthcare Research and Quality's 2005 <i>National Healthcare Disparities Report</i> on the disparity of care for blacks, Asians, Hispanics, and poor people <sup>7</sup>
Care should be patient centered	HCAHPS and CMS patient perception-of-care survey results <sup>7</sup>

Abbreviation: CMS, Centers for Medicare & Medicaid Services.

external measures of quality for programs and for individual residents. These measures will become vital to residents as they transition from their learning role to practicing clinicians. TABLE 1 gives a description of the IOM aims for improvement, with examples of external metrics for which hospitals and their medical staffs are being held accountable.<sup>2-8</sup>

Residents usually have little exposure to external measures of quality, despite the fact that as frontline clinicians they could have the most influence in improving them. This will be demonstrated in the example herein of improving the time to antibiotic therapy for patients arriving in the emergency department (ED) who have a diagnosis of pneumonia.

Academic medicine is being challenged to modify the structure and content of medical education, particularly the relationship between medical training and practice. It is necessary to teach clinicians to continually ask if the care they provide is safe, timely, effective, efficient, equitable,

and patient centered (IOM aims for improvement) and to equip them with a method to capture their answers as data and report these analyses to organizational and educational leaders. As medical educators, we must ask ourselves how their education prepares them to face the health care crisis, how they will respond to demands for publicly reported measures of quality in their hospitals and of their own performance, and, most important, how they will learn to lead the transformation needed in the current health care culture. Ashton states that “When we treat our residents as if they are ‘invisible’ in our quality improvement programs, we in some measure abdicate our responsibility for their education and for the well-being of our current and future patients”.<sup>10</sup> But who will teach these residents? Audet and colleagues found that “quality improvement still hasn’t permeated the professional culture of medicine, although progress is evident.”<sup>11(p843)</sup>

Documentation of health care improvement began in the early 1990s. Headrick and colleagues<sup>12-16</sup> have provided

some of the best examples of clinical improvement in the setting of medical students and residents. Increasing curricula are being developed to teach systems-based practice and practice-based learning and improvement.<sup>17,18</sup> The ACGME core competencies have launched a “quiet revolution,”<sup>19</sup> begun by those who understood the importance of teaching quality improvement to medical students and residents. There continues to be insightful literature on the core competencies in general and on improvements in particular; however, what is not as prevalent among the literature is how to use all the core competencies together in a way that clearly drives improvements.

### Statement of Purpose

This article describes a means of assessing care using the IOM aims for improvement and the ACGME core competencies combined in the health care matrix.<sup>20</sup> This analysis provides valuable information that would not be captured using the core competencies alone. For example, the analysis begins with the question “Is care safe?” If it is not, the core competencies provide a means of identifying why care was not safe: was it medical knowledge, communication, professionalism, or system issues? However, the bottom-line question for practice-based learning and improvement if care was not safe is “What was learned and what needs to be improved?” Patient safety is a major issue in health care today, but each of the IOM aims for improvement highlights a different component of care. If care is not timely, this requires process analysis. If care is not effective, evidence-based medicine, guidelines, protocols, and variation must be examined. If care is not efficient, cost issues and the value of care must be considered. If care is not equitable, it is necessary to examine the cultural and socioeconomic issues. Finally, if care is not patient centered, the team must take a critical look at how it treats its patients. In essence, the health care matrix becomes a “forcing function” for quality improvement by bringing together 2 well-vetted sets of concepts. The residents are then taught the tools and methods of quality improvement and select a project that is often linked to public measures of quality, although some projects not directly linked to these measures are important to the residents. Residents can have a significant influence on the improvement of care in an immediate and pragmatic way.

### Methods

The internal medicine residents at Vanderbilt University Medical Center are involved in an 8-week course (2 hours per week) during their ambulatory rotation in which they learn about the IOM aims for improvement and the ACGME core competencies. The course begins by asking the residents how their program provides education that develops each of the core competencies and the effectiveness of that training. Although the residents have had numerous

evaluations based on the core competencies, their answers inform us that they still lack the understanding of systems-based practice and practice-based learning and improvement. The chief residents then introduce the health care matrix as a means of assessing the care of patients by using an example of a patient with a complex disease such as CAD and DM or a geriatric patient (FIGURE 1).

This case sets the stage to ask the residents how effective they think they are in providing care to their patients with CAD and DM. Each resident identifies his/her patients with CAD or DM and enters the patients and information in a database. Once residents have their panels identified, they are asked to review the care using accepted evidence-based practice. A report is generated for each class, which is compared with classes before them.

Each resident is then told to select 1 patient to present to his/her colleagues using the health care matrix. This serves the following 2 objectives: (1) to teach the core competencies in the context of the IOM aims for improvement and (2) to provide valuable data to the program about care and educational issues. After all the residents have presented their patients, they select 1 case to become the group’s improvement project. This provides an educational opportunity for residents to understand how to systematically improve the systems that govern the care of a population of patients.

### Results

The teaching case identifies many issues that physicians face in caring for patients. For example, a particular patient may highlight that care is patient centered (she is happy with her physician and the attention she gets); she can see her physician when she wants (timely). However, her physician may be frustrated with the lack of progress in getting her DM and hypertension under control (not effective or efficient because she comes more often than she would need). She may need to rely on medication samples because of socioeconomic status (equity). In addition, her cultural lifestyle is one that revolves around church gatherings with a strong focus on meals. She desires only the care that is necessary to keep her out of the hospital, not to improve her glycosylated hemoglobin level or her hypertension, which is a dilemma for the physician. Therefore, much time is spent at each visit trying to get sample medications, taking valuable time away from dealing with her many health problems. This type of teaching case outlines the dilemma of measuring physician performance that does not take into account system and patient issues. This is especially important with the new requirement by the Joint Commission for ongoing professional performance evaluation.<sup>21</sup>

To teach residents about assessing their patients as a panel, they are taught to view patients in the aggregate. Residents from December 2003 to December 2006 focused on CAD, and residents from December 2006 to the present

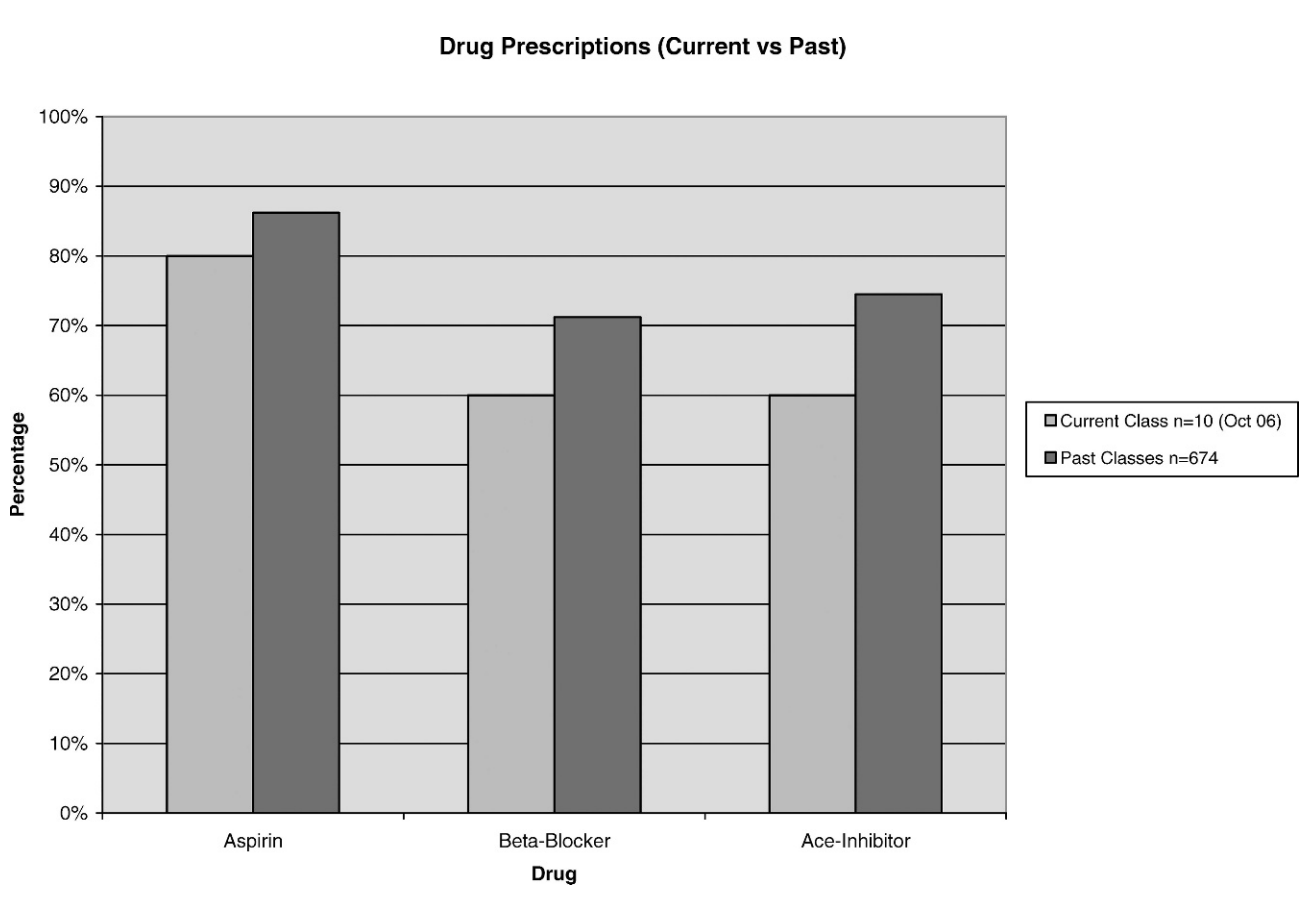
FIGURE 1 CURRICULUM DEVELOPMENT MATRIX FOR THE CARE OF GERIATRIC PATIENTS						
Care of a Patient with Chest Pain (CAD and DM) Ambulatory Rotation; Internal Medicine Residents						
Competencies	SAFE	TIMELY	EFFECTIVE	EFFICIENT	EQUITABLE	PATIENT-CENTERED
<b>Assessment of Care</b>						
<b>PATIENT CARE</b> (Overall Assessment) Yes/No	No (Socio-economic issues.) Yes from VUMC	Yes	No	No	No (Socio-economic issues) Yes from VUMC	Yes
<b>MEDICAL KNOWLEDGE</b> (What must we know)	Co-morbidities (CA, diabetes, GERD, Hypertension), and multiple medications.		What is organ and disease progression for a 70-year-old with unstable angina and diabetes. Previous visit for reflux 3 weeks before the hospitalization.	Past medical records were not available.		Does she really want to change her lifestyle? The ideal care plan may not suit her.
<b>INTERPERSONAL AND COMMUNICATION SKILLS</b> (What must we say)	Should we communicate the negative effects of uncontrolled diabetes? How? When?	Ensure patient understands the signs of angina and not delay reporting.	Frustrating to have many problems to address and insufficient time during the office visit.	Care of this patient requires more time. Changing medications is time-consuming.	Patient cannot afford her medications. She needs samples.	She has already out-lived most of her older family members. What are her goals for her disease?
<b>PROFESSIONALISM</b> (How must we act)	When to be blunt with a non-compliant patient?		Culture barriers that preventing this patient from being compliant.	When it is appropriate to stop seeing this patient to have more time for others?		Shared decision-making important because of her lifestyle
<b>SYSTEM-BASED PRACTICE</b> (On whom do we depend and who depends on us)	Patient needs other resources to manage her diseases, especially her medications.	Patient can be seen when she wants	Attended DIP program but HbA1c still is not well controlled. Relies on samples for her medications.	Intermittent appointments do not work well for chronic disease.	Different life-style of a minority individual whose husband is a musician and works late hours.	No case manager involved to help find resources for this patient.
<b>Improvement</b>						
<b>PRACTICE-BASED LEARNING AND IMPROVEMENT</b> (What have we learned? What will we improve?)	Provide high risk education, especially on medication management. Create card to give older patient something she can refer to.	Could visiting nurses be involved to be sure her health status is monitored?	Create an agenda at the beginning of the visit to ensure all important issues are addressed.	Know how the sample pharmacy works. We do not know what comes in generic form that could help her.	Use nurses through her church/parish since this is very important to her.	Clarify patient's goals before frustrating both the patient and the provider. Could we get a "contract" with this patient about her care?
© 2004 Bingham, Quinn						

assess care of patients with DM. TABLE 2 gives data on the performance of residents in the care of patients with CAD using aspirin, β-blockers, and angiotensin-converting enzyme inhibitors. For the care of patients with DM, residents look at glycosylated hemoglobin level and preventive care. Each class is compared with all previous classes. There exercise is usually the first time that residents are exposed to patients' data in this manner. Their first reaction is that they are not doing as well as they thought. However, they are reminded that the system either supports or hinders their efforts and reflect on how they must often work around the system to get care for their patients such as getting sample medications. The residents realize that they will need to take a proactive approach to measuring patient care once they are practicing clinicians. This can simply begin by placing their patients in a “panel” with identified measures of quality (process and outcomes).

The residents each present a patient using the health care matrix. By reflecting on the core competencies for each IOM aim and hearing similar stories from their colleagues, the

residents soon become familiar with the core competencies and the contributions that these core competencies make to patient care. The residents then select 1 case as their improvement project. The following is an example of an improvement effort undertaken by residents for a patient with pneumonia in whom the first dose of antibiotics was delayed. An important “external measure of quality” for patients with pneumonia is the time to antibiotic therapy, and this metric is featured on the Centers for Medicare & Medicaid Services website (<http://www.hospitalcompare.hhs.gov>). We were not meeting the standard 240 minutes (at the time of this project, the metric was 240 minutes; it is now 360 minutes). A health care matrix on a patient with pneumonia had already provided information about the issues related to the care of these patients and the need for a system alert that a patient could have pneumonia. The first step was for the residents to flowchart the care of patients who came to the clinic having a possible diagnosis of pneumonia (FIGURE 2). They knew that these patients could not be treated in the clinic because there was no quick access

**TABLE 2 DATA FROM A CLASS OF RESIDENTS ARE COMPARED WITH THOSE FROM PREVIOUS CLASSES ON THE CARE OF PATIENTS WITH CORONARY ARTERY DISEASE USING ASPIRIN,  $\beta$ -BLOCKERS, AND ANGIOTENSIN-CONVERTING ENZYME INHIBITORS**



to intravenous antibiotics and no place to start treatment in the clinic while waiting for an inpatient bed. Like other patients who are very ill or febrile, these patients are always sent to the ED. Some faculty members thought that internal medicine residents should select the correct antibiotic; however, with the delay in getting an inpatient bed, this proved problematic for delivering the first dose of antibiotics within the specified time frame. In collaboration with his internal medicine colleagues, the ED resident initiated the writing of an algorithm for the order entry system so that ED physicians could indeed order the correct drug. Another ED resident and a few nurses became involved in the improvement project for patients with DM and helped flowchart the process from the perspective of the ED staff. They identified delays that could prevent the patient from getting the correct treatment within the prescribed 240-minute window.

This work attracted the attention of senior leaders, including the head of information technology, chief of staff, and chairs of internal medicine and emergency medicine. As

a result, a workshop was held at which the residents' flowcharts of internal medicine and ED processes were used as the basis to create an "ideal" process flow. An action plan was created, and improvements were initiated. TABLE 3 summarizes the performance metrics for the care of patients with pneumonia, which show improvement in time to antibiotic therapy from almost 600 minutes to the required 240-minute window. The continued improvement is posted on the Centers for Medicare & Medicaid Services website (<http://www.hospitalcompare.hhs.gov>).

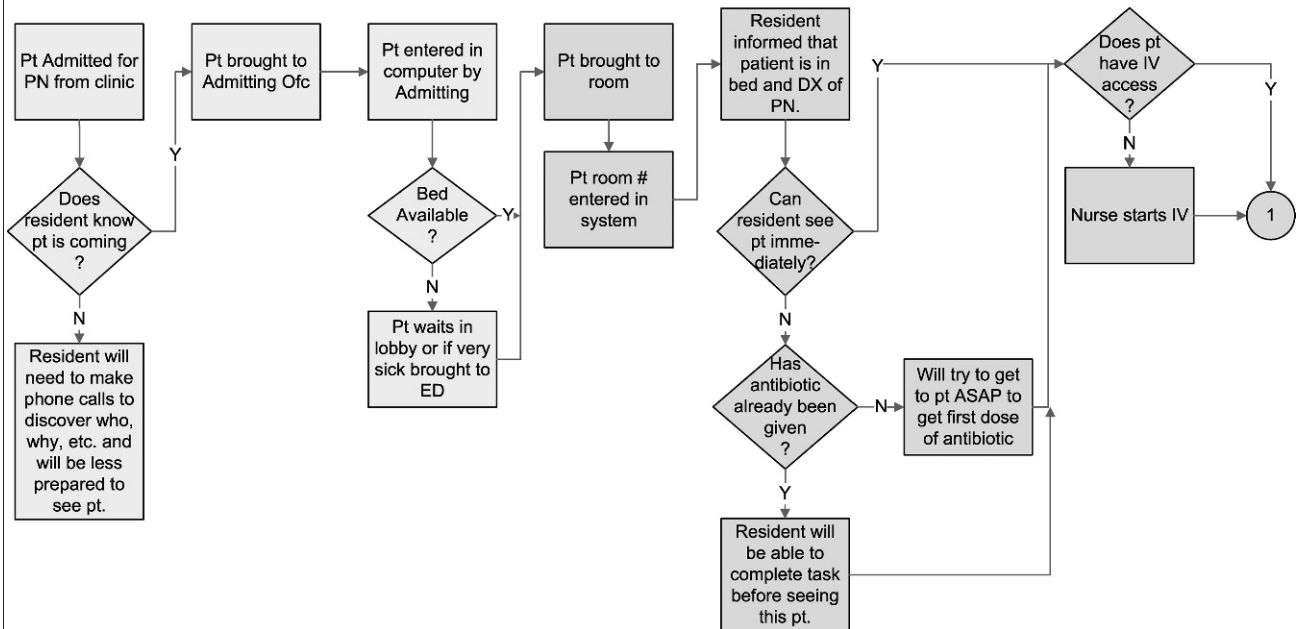
Over the years, residents have been able to improve many processes of care, including time out for invasive procedures on the units, delays in discharging patients, Veterans Affairs medication issues, clinic efficiencies, working with home health nurses to prevent readmission within 30 days, and many others. Each of these improvements has helped reinforce how residents can improve care if given the proper tools and methods. At the end of the 8-week training program, the residents presented their project to their faculty, the head of internal medicine,

FIGURE

**FIGURE 2 A RESIDENT WORKED WITH NURSES IN THE EMERGENCY DEPARTMENT TO UNDERSTAND THE PROCESS FOR PATIENTS WITH PNEUMONIA**

## Care of Patients with Pneumonia in Clinic

Medicine Residents 5/06



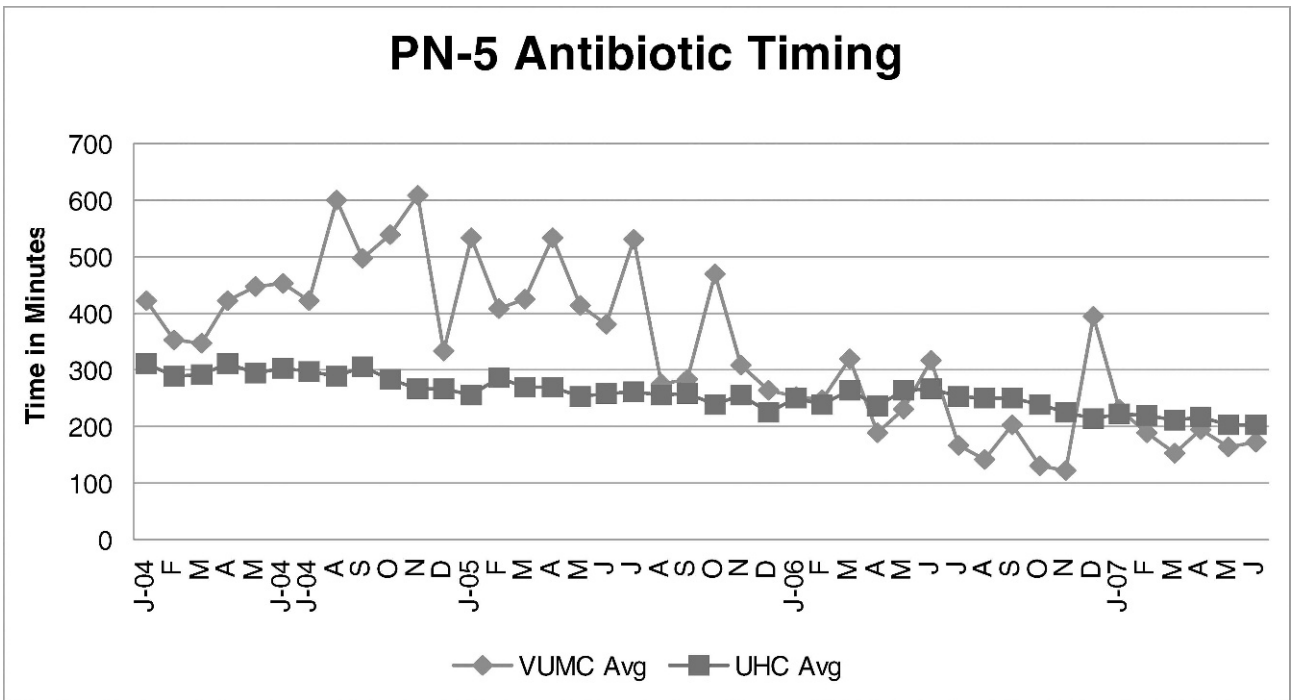
the chief medical officer, and anyone else who was involved or could attend the session. If nurse colleagues or other clinicians participated in the improvement effort, they are also invited to the presentation. This “graduation” is important to the residents, as evidenced by the significant effort that went into their presentations.

### Discussion

When residents use the health care matrix to assess patient care, they are able to identify problems with care and competency development issues that might have been previously unrecognized. Many traditional patient presentations or morbidity and mortality conferences focus primarily on medical knowledge. Even with a focus on the 6 core competencies, there is still a richness of detail that is missing if the IOM aims for improvement are not used. Residents have the most knowledge of the waste, delays, and work-arounds in our systems, so their voices (and those of all front-line clinicians) need to be encouraged, heard, documented, and acted on. The health care matrix is a tool that allows for this to happen. The best summary for this work is from a former chief resident who offered the following comments guiding postgraduate year 2 residents in using the health care matrix:<sup>22</sup>

By considering the care of this patient in terms of the IOM aims for care and the ACGME core competencies in a systematic fashion, I learned some significant things about my care for the patient: I realized that on most levels I have been well trained from a standpoint of medical knowledge. It was in other areas where I observed either the holes in my training or the gaps in my understanding of how to care for my patients. I realized that, while I believed I was communicating with the patient well, I was not addressing her issues from the patient-centered perspective. It was eye-opening to realize that I might not know what her goals were and that they were probably strikingly different from my own. This might have played an enormous role in my effectiveness if we could have addressed shared goals. Finally, in comparing my care of this patient to the management of my entire patient panel, I realized that my care was much less systematic than I thought. It seemed that more often than not I was looking at each patient as an “outlier.” I have much to learn about systems-based practice, particularly regarding the management of a group of patients with chronic disease. Only when I understand how to apply this knowledge will I know how to effect systems-based learning and improvement.

**TABLE 3** VANDERBILT UNIVERSITY MEDICAL CENTER (VUMC) PERFORMANCE ON PUBLICLY REPORTED METRICS OF QUALITY CARE FOR PATIENTS WITH PNEUMONIA



The applications of the health care matrix are predicated on the notion that practice-based learning and improvement are the bottom line, the synthesis of all other cells. This must be linked to an action plan, with some individual or team being accountable for improvements. Another benefit of the health care matrix is that it can be used by clinicians in all disciplines. Nurses, respiratory therapists, audiologists, and others can use this tool to analyze their patients or to contribute to the analysis of patient care that might have been suboptimal. The residents learned this when they completed a health care matrix and realized that they did not have all the facts about the care of patients if they did not consult other team members.

**Limitations**

Validation of the health care matrix has not yet been undertaken because of the difficulties inherent in data collection and analysis without an Internet-based application. Funding has been provided by the University of Texas System to create an Internet-based application of the health care matrix. A plan has been created to validate the health care matrix with many other institutions who have been using it since 2004.

**Next Steps**

The health care matrix seems to be a practical heuristic for framing the care of patients and the core competencies in a way that leads to improvements. The residents who use the

health care matrix remember the core competencies and can easily link them to issues of care. The most common use has been in morbidity and mortality conferences; however, additional applications are being discovered by those using this tool. For example, internal medicine residents in Taiwan are using the health care matrix to prepare for patient care, not just to analyze the care.<sup>23</sup> Once the health care matrix is Internet based, it will be possible to attach educational materials (such as a brief quality improvement course linked to practice-based learning and improvement), to input data (from the literature or from analysis of multiple matrices), and to produce reports by specialty, diagnosis, and other institutions that are using the health care matrix.

**References**

- Greiner A, Knebel E (Eds) *Health Professions Education: A Bridge to Quality*. Institute of Medicine. Washington, DC: National Academies Press, 2003.
- Safe Practices for Better Health Care: Fact Sheet*. Rockville, MD: Agency for Healthcare Research and Quality; March 2005. AHRQ publication 05-P007. Available at: <http://www.ahrq.gov/qual/3osafe.htm>. Accessed August 1, 2009.
- Development of Robust Prioritized Strategic Measures Set for Hospital Public Reporting: Final Report for 2004 CMS Listening Sessions*. Lake Success, NY: IPRO; November 2004.
- Agency for Healthcare Research and Quality. Recommended starter set: the Ambulatory Care Quality Alliance: clinical performance measures for ambulatory care. Rockville, MD: Agency for Healthcare Research and Quality. Available at: <http://www.ahrq.gov/qual/aqastart.htm>. Accessed July 31, 2009.
- Delivery Systems Matter! A Summary of Research*. Oakland, CA: Council of Accountable Physician Practices, American Medical Group Association; 2006.



- 6 Guadagnoli E, Christiansen CL, Beasley CL. Potential organ-donor supply and efficiency of organ procurement organizations. *Health Care Financ Rev.* 2003;24(4):101–110.
- 7 *National Healthcare Disparities Report.* Rockville, MD: Agency for Healthcare Research and Quality, US Dept of Health and Human Services; December 2005. AHRQ publication 06-0017.
- 8 *CAHPS Hospital Survey (HCAHPS) Fact Sheet.* Baltimore, MD: Centers for Medicare & Medicaid Services; 2006.
- 9 McGlynn E, Ash S, Adam S et al. The Quality of Health Care Delivered to Adults in the US. *NEMJ*, 2003;348(26):2635–2645.
- 10 Ashton CM. “Invisible” doctors: making a case for involving medical residents in hospital quality improvement programs. *Acad Med.* 1993;68(11):823–824.
- 11 Audet AMJ, Doty MM, Shamasdin J, Schoenbaum SC. Measure, learn, and improve: physicians’ involvement in quality improvement. *Health Aff (Millwood).* 2005;24(3):843–853.
- 12 Headrick L, Neuhauser D, Melnikow J, Vanek E. Introducing quality improvement thinking to medical students: the Cleveland asthma project. *QRB Qual Rev Bull.* 199;117(8):254–260.
- 13 Baker GR, Gelmon S, Headrick L, et al. Collaborating for improvement in health professions education. *Qual Manag Health Care.* 1998;6(2): 1–11.
- 14 Headrick LA, Neuhauser D, Schwab P, Stevens DP. Continuous quality improvement and the education of the generalist physician. *Acad Med.* 1995;70(1)(suppl):S104–S109.
- 15 Headrick LA, Knapp M, Neuhauser D, et al. Working from upstream to improve health care: the IHI Interdisciplinary Professional Education Collaborative. *Jt Comm J Qual Improv.* 1996;22(3):149–164.
- 16 Batalden PB, Berwick D, Bisognano M, Splaine M, Baker GR, Headrick LA. *Knowledge Domains for Health Care Students Seeking Competency in the Continual Improvement and Innovation of Health Care.* Boston, MA: Institute for Health Care Improvement; 1998.
- 17 Coleman MT, Nasraty S, Ostapchuk M, Wheeler S, Looney S, Rhodes S. Introducing practice-based learning and improvement ACGME core competencies into a family medicine residency curriculum. *Jt Comm J Qual Saf.* 2003;29(5):238–247.
- 18 Mohr JJ, Randolph GD, Laughon MM, Schaff E. Integrating improvement competencies into residency education: a pilot project from a pediatric continuity clinic. *Ambul Pediatr.* 2003;3(3):131–136.
- 19 Strauss RW. The quiet revolution in postgraduate training. *Acad Emerg Med.* 2003;9(11):1222–1226.
- 20 Bingham JW, Quinn DC, Richardson MG, Miles PV, Gabbe SG. Using a healthcare matrix to assess patient care in terms of aims for improvement and core competencies. *Jt Comm J Qual Patient Saf.* 2005;31(2):98–105.
- 21 Joint Commission Resources. 2009 Accreditation standards. Available at: [http://www.jointcommission.org/AccreditationPrograms/Hospitals/Standards/og\\_FAQs/MS/Ongoing\\_Professional\\_Practice\\_Evaluation.htm](http://www.jointcommission.org/AccreditationPrograms/Hospitals/Standards/og_FAQs/MS/Ongoing_Professional_Practice_Evaluation.htm). Accessed July 31, 2009.
- 22 Melissa Hixson, MD, Personal Communication, September 2005.
- 23 Quinn D, Bingham, J, personal visit to China Medical University and Hospital, Taichung, Taiwan, April 26, 2008.

# Non-Clinical Shift Discussion

## **Current NCS responsibilities**

Student workshops at 12:30 OR  
Sim center student workshops at 8:00

GME meeting at 7AM, third Tuesday

?Critical case presentation for the following Wednesday  
Current seniors voted to have day-shift on conference day do Crit Case

Intermittently, UMN teaching labs for students  
?if for pay or if \$\$ goes into residency funds

+/- Anesthesia, US, other focused study (?reading)

Catch-up on paperwork, logs, scholarly activity

## **NCS problems**

Physical presence not always happening  
NCS on Tuesday may not be Day shift on Thursday for Critical Case  
?skipping conference if not working that day  
Variability of experience depending on the day  
No accountability besides student workshops

## **NCS redefinition?**

Change days to Wednesday?  
Would involve changing student workshops, sim center  
Would miss GME meetings  
May mesh with UMN labs better  
Then need to clarify \$\$ and time issues  
Keep NCS Tuesday?  
Change scheduling so NCS resident is on Days Thursday, or keep separate?  
Require physical presence? How long?  
Require plans submitted to Asst Director 1 week in advance?  
Put in portfolio

**Need to disseminate/clarify expectations for residents**

**Barrett, Lori J**

---

**From:** Dahms, Rachel A  
**Sent:** Monday, August 13, 2007 2:44 PM  
**To:** EMD Residency Committee  
**Subject:** Non-clinical shift discussion

All,

There has been some drift in what the 3rd year non-clinical shift (NCS) is supposed to be (see attached for current duties and a bit more info). I met with a Chief recently and we discussed some of the possible changes and issues these changes would generate. It seems that with the changing of conference to Thursdays, it makes sense to switch the NCS to Wed. Cullen has preliminarily OK'd switching the student workshops to Wed also starting in January, and there is a preliminary OK from the Sim folks to switch student sim to Wed also.

*My thoughts (and I welcome any discussion about this, or bringing up alternatives or issues) are that:*

**NCS changes to Wednesday starting Jan 1**

**NCS resident is in charge of Critical Case discussion the following Thursday**

**NCS resident remains in charge of student workshops or sim activities that day**

**NCS resident is expected to be physically present for some time period (how long? I think 4-6 hours, but this is open for discussion) on the NCS day**

**If working on research or other duties, could be excused from this requirement in advance to work at home for part of the day**

**(FYI, amion counts an NCS as a 10-hr shift, just like any other—this is up for debate also!)**

**The remainder of time on the NCS day could be used for elective educational or admin duties—extra US experience, anesthesia practice, directed reading, etc. This needs to be arranged by the resident prior to the shift.**

**NCS resident is required to submit plans for the NCS day to us (?Cullen or me?) by the Friday prior to the NCS shift. If not submitted then... (lightning smites the offending resident—or perhaps an extra shift or make-up duty somewhere?)**

**NEW—NCS resident is responsible for student interviews/lunch/tours as needed that Wednesday, when not doing the workshop/sim activities?**

**The resident on Admin or Tox is responsible for attending the GME meeting on the 3<sup>rd</sup> Tuesday of the month at 7 AM—this would cover 7-8/12 months but leave 4-5 unattended. ?if the extra 4-5 would be uncovered, covered by the chiefs, or covered by a free second or third-year depending on schedules?**

I was going to bring this up for discussion at the ResComm meeting but we ran over. Feel free to reply to the group with your thoughts!

**Rachel Dahms, MD**  
*Assistant Residency Director*  
*Emergency Medicine*  
*Regions Hospital*

## Barrett, Lori J

---

**From:** Fritzlar, Sandy J  
**Sent:** Wednesday, July 19, 2006 3:28 PM  
**To:** Colletti, James E; Patten, Lane C; Klinkhammer, Martin D; Fritzlar, Sandy J; 'sandyfritzlar@hotmail.com'  
**Cc:** Ankel, Felix K; Gunnarson, Teri M; Hegarty, Cullen B  
**Subject:** NCS Proposal - Needs discussion!

Hi All. Here is a revision of the current NCS proposal. Included are all options for the NCS shift during the first half of this academic year. Nothing has been decided about what will be the NCS resident responsibility and what will not be their responsibility. Please note the conflicts already seen with the current proposal. This is a long and somewhat painful email - but PLEASE read it and give input... Sandy

### NON-CLINICAL SHIFT

#### PURPOSE:

To enhance and diversify the residents' experience and knowledge base in a variety of areas through the implementation and maintenance of a scheduled Non-Clinical Shift (NCS) on every Tuesday.

#### GENERAL GUIDELINES:

- The G3 Resident scheduled on Amion as "NCS" will start their shift no later than 8:00AM.
- The resident will assume the responsibility for teaching the education workshops to medical students, interns, and rotators.
- The NCS resident on Tuesdays will also be the facilitator for one of the critical case presentations the following day. The resident will be responsible for the brief presentation accompanying their critical cases. The resident is also encouraged to gather other information, follow up data, equipment, or anything else which would augment the educational experience of the critical case(s).

#### THE MORNING SCHEDULE WILL CONSIST OF ONE OF THE FOLLOWING:

1. **Regions Medical Student/Rotator Workshops:** The resident will be responsible for teaching the medical student workshop from 2-3:30PM. The following dates are scheduled for the 1<sup>st</sup> half of the year:

Aug 1 <sup>st</sup>	Med trauma (AKA Sim Center, see below)	Kevin Smith
Aug 8 <sup>th</sup>	Ortho	Beth Wicklund
Aug 15 <sup>th</sup>	C-spine	Lane Patten
Aug 22 <sup>nd</sup>	Eye	No NCS resident???
Aug 29 <sup>th</sup>	Med trauma (AKA Sim Center, see below)	Sandy Fritzlar – volunteering to cover NCS
Sept 5 <sup>th</sup>	Ortho	Beth Wicklund
Sept 12 <sup>th</sup>	C-Spine	Emily Mason
Sept 19 <sup>th</sup>	Eye	Sandy Fritzlar
Sept 26 <sup>th</sup>	Med trauma (AKA Sim Center, see below)	Martin Klinkhammer
Oct 3 <sup>rd</sup>	Ortho	Heidi Lako
Oct 10 <sup>th</sup>	C-spine	Heidi Lako
Oct 17 <sup>th</sup>	Eye	Kevin Smith
Oct 24 <sup>th</sup>	Med trauma (AKA Sim Center, see below)	Emily Mason
Oct 31 <sup>st</sup>	Ortho	Joe Madigan
Nov 7 <sup>th</sup>	C-Spine	No NCS resident???
Nov 14 <sup>th</sup>	Eye	Martin Klinkhammer
Nov 21 <sup>st</sup>	Med trauma (AKA Sim Center, see below)	Roseanne Ekstrom
Nov 28 <sup>th</sup>	Ortho	Joe Madigan
Dec 5 <sup>th</sup>	C-Spine	Sandy Fritzlar
Dec 12 <sup>th</sup>	Eye	Kevin Smith
Dec 19 <sup>th</sup>	Med trauma (AKA Sim Center, see below)	Joe Madigan
Dec 26 <sup>th</sup>	none	

2. **Simulation Center:** On designated Tuesdays, the resident will report to the Sim Center at 8:00 a.m. for simulation training and/or teaching sessions. The simulation experience will be coordinated by one of the staff physicians intimately involved in sim center teaching, training, and experience. The lead physician is Cullen Hegarty. The following dates (8a-4pm) are scheduled for the 1<sup>st</sup> half of the year:

July 11 <sup>th</sup>	2 sessions	Sandy Fritzlar
Aug 1 <sup>st</sup>	2 sessions	Kevin Smith
Aug 29 <sup>th</sup>	2 sessions	Sandy Fritzlar – volunteering to cover NCS
Sept 26 <sup>th</sup>	2 sessions	Martin Klinkhammer
Oct 24 <sup>th</sup>	2 sessions	Emily Mason
Nov 21 <sup>st</sup>	2 sessions	Roseanne Ekstrom (also covering Rotator Orientation?)
Dec 19 <sup>th</sup>	1 session	Joe Madigan (also covering Rotator Orientation?)

3. **GMEC Meetings:** The resident will attend the monthly GMEC meeting if they are scheduled for a NCS on that Tuesday. The meetings are held at 7AM in the Board Room on the 3<sup>rd</sup> Tuesday of the month. The follow dates are scheduled for the 1<sup>st</sup> half of the year:

Aug 15 <sup>th</sup>	Lane Patten
Sept 19 <sup>th</sup>	Sandy Fritzlar
Oct 17 <sup>th</sup>	Kevin Smith
Nov 21 <sup>st</sup>	Roseanne Ekstrom
Dec 19 <sup>th</sup>	Joe Madigan

4. **Rotator Orientation:** The resident will teach a wound care / suture workshop for the off-service rotators as part of the rotators orientation to the emergency department. These workshops will start at 8AM in the EMD and will take ~60 to 90 minutes depending upon the skill level of the rotating residents. The following dates are scheduled for suture workshops for the 1<sup>st</sup> half of the year:

July 25 <sup>th</sup>	Emily Mason
Aug 22 <sup>nd</sup>	No NCS resident – will need PA coverage???
Sept 19 <sup>th</sup>	Sandy Fritzlar
Oct 3 <sup>rd</sup>	Heidi Lako
Nov 14 <sup>th</sup>	Martin Klinkhammer
Nov 21 <sup>st</sup>	Roseanne Ekstrom (also covering Sim Center?)
Dec 12 <sup>th</sup>	Kevin Smith
Dec 19 <sup>th</sup>	Joe Madigan (also covering Sim Center?)
Jan 9 <sup>th</sup>	Roseanne Ekstrom

5. **UMN Procedure Labs:** The resident will teach procedure labs at the UMN to medical students.

There are NO Tuesday procedure labs scheduled at the UMN.

6. **IF NCS resident does not have a mandatory experience scheduled for that morning, that resident is responsible for determining their morning experience.** They should email Jim Colletti to inform him of their selected morning experience. The following are examples of possible activities or experiences they could pursue:

- a. ILMA experience: The resident could gain ILMA experience if there are any available ILMA patients at the outpatient surgery center.
- a. Ultrasound experience: The resident may check to see if a staff physician involved with ultrasound education is available for ultrasound teaching (Kurt Isenberger and Peter Kumasaka). The resident could also teach medical student(s) and/or intern(s) the basics of ultrasound and performing the FAST exam. Ultrasound could be performed on ED patients, inpatients, or volunteers. The other participants must have available free time and participation must be acceptable to the off-service attending physician(s) or emergency department staff physician responsible for supervising that participant.
- a. Radiology experience: The resident could choose to read plain films or CT's with one of the morning radiologists with their approval.
- a. They could contact one of the ultrasound technicians and observe formal ultrasound technique to enhance their ultrasound experience and expertise.

- a. Research Project: The resident could use their time to work on their research project (i.e. collect data, chart review, data analysis, etc).
- a. Other: They may arrange or organize another experience that would be beneficial to their residency experience and future career. This must be pre-approved by Asst Residency Director Jim Colletti.

The resident may need to make arrangements prior to the start of the NCS on Tuesday (i.e. contact intern on anesthesia or an interested medical student to arrange ultrasound teaching, contacting Pat or Outpt surgery center about available ILMA's, etc).