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# Teaching Trainees the Tenets of Quality and Safety: An Annotated Bibliography

Eric J. Moskowitz

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The issues of health care quality and safety have received significant attention from all health care stakeholders since the Institute of Medicine (IOM) estimated in its 1999 report, titled *To Err Is Human: Building a Safer Health System*, that between 44 000 and 98 000 patients die annually from avoidable medical errors. In light of their principal fiduciary responsibility to ensure quality and safety to their patients, and in view of initiatives such as pay for performance, governing boards of health care organizations have begun to recognize the need to make quality and safety top priorities to ensure their organizations' success.<sup>1</sup> With regard to those individuals on the front line of health care, initial research and interventions for improvement concentrated primarily on the inpatient setting, but care providers in the ambulatory environment have followed suit.<sup>2</sup>

In addition, preliminary efforts have been forged to teach the tenets of quality and safety to those currently receiving their clinical education. Graduate medical education has begun to focus more closely on teaching and evaluating residents' competence in providing high quality and safe medical care after the Accreditation Council for Graduate Medical Education (ACGME) implemented 2 nontraditional competencies beginning in 1999.<sup>3</sup> These competencies, referred to as "practice-based learning and improvement" and

"systems-based practice," incorporate elements of care management that complement residents' clinical training. Furthermore, curricula to change medical students' attitudes and beliefs about medical errors and patient safety have involved preclinical courses, family medicine clerkships, and most recently, interclerkship programs.<sup>4</sup>

Nonetheless, no modern reference material exists that adequately defines the core competencies for quality and safety from an educational perspective. However, a few major institutions in the United States have begun to offer graduate-level degree programs in health care quality and safety and, as a result, have placed themselves at the forefront of the development of these competencies. This annotated bibliography was created to highlight those articles in the literature that focus on teaching a spectrum of health care trainees these key tenets of quality and safety.

The articles identified were organized to reflect 5 content areas of a program in health care quality and safety that are particularly relevant to health care trainees, specifically medical residents, medical students, and nursing students. These include: (1) health care as a complex socio-technical system; (2) the legal, regulatory, and ethical environment affecting quality and safety; (3) methods for measuring health care safety; (4) methods for improving health care quality and safety; and (5) application of quality and safety measurement and improvement methods in specific health care settings. The 33 selected references from 2004 onward were obtained through a review of the MEDLINE literature database, the authors' personal library, and references in key articles. Additional articles that are relevant not only to these 5 content areas but also specifically to the ACGME's competencies of practice-based learning and improvement and systems-based practice have been previously reviewed in the authors' annotated bibliography on these competencies.<sup>3</sup>

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## ALPHABETIC LIST OF REFERENCES

1. Aggarwal R, Undre S, Moorthy K, Vincent C, Darzi A. The simulated operating theatre: comprehensive training for surgical teams. *Qual Saf Health Care*. 2004;13:i27-i32.
2. Attree M, Cooke H, Wakefield A. Patient safety in an English preregistration nursing curriculum. *Nurse Educ Pract*. 2008;8:239-248.
3. Coyle YM, Mercer SQ, Murphy-Cullen CL, Schnmeider GW, Hynan LS. Effectiveness of a graduate medical education program for improving medical event reporting attitude and behavior. *Qual Saf Health Care*. 2005;14:383-388.
4. Currie LM, Desjardins KS, Stone PW, et al. Near-miss and hazard reporting: promoting mindfulness in patient safety education. *Stud Health Technol Inform*. 2007;129:285-290.
5. Garbutt JM, Highstein G, Jeff DB, Dunagan WC, Fraser VJ. Safe medication prescribing: training and experience of medical students and house staff at a large teaching hospital. *Acad Med*. 2005;80:594-599.
6. Gibbs KA. Teaching student nurses to be culturally safe: can it be done? *J Transcult Nurs*. 2005;16:356-360.
7. Gould BE, O'Connell MT, Russell MT, Pipas CF, McCurdy FA. Teaching quality measurement and improvement, cost-effectiveness, and patient satisfaction in undergraduate medical education: the UME-21 experience. *Fam Med*. 2004;36:S57-S62.
8. Gregory DM, Guse LW, Dick DD, Russell CK. Patient safety: where is nursing education? *J Nurs Educ*. 2007;46:79-82.
9. Halbach JL, Sullivan LL. Teaching medical students about medical errors and patient safety: evaluation of a required curriculum. *Acad Med*. 2005;80:600-606.
10. Henneman EA, Cunningham H. Using clinical simulation to teach patient safety in an acute/critical care nursing course. *Nurse Educ*. 2005;30:172-177.
11. Henneman EA, Cunningham H, Roche JP, Curnin ME. Human patient simulation: teaching students to provide safe care. *Nurse Educ*. 2007;32:212-217.
12. Hughes KH, Hood LJ. Teaching methods and an outcome tool for measuring cultural sensitivity in undergraduate nursing students. *J Transcult Nurs*. 2007;18:57-62.
13. Jones A. Putting practice into teaching: an exploratory study of nursing undergraduates' interpersonal skills and the effects of using empirical data as a teaching and learning resource. *J Clin Nurs*. 2007;16:2297-2307.
14. Kane JM, Brannen M, Kern E. Impact of patient safety mandates on medical education in the United States. *J Patient Saf*. 2008;4:93-97.
15. Lindquist LA, Gleason KM, McDaniel MR, Doeksen A, Liss D. Teaching medication reconciliation through simulation: a patient safety initiative for second year medical students. *J Gen Intern Med*. 2008;23:998-1001.
16. Madigosky WS, Headrick LA, Nelson K, Cox KR, Anderson T. Changing and sustaining medical students' knowledge, skills, and attitudes about patient safety and medical fallibility. *Acad Med*. 2006;81:94-101.
17. Milligan FJ. Establishing a culture for patient safety—the role of education. *Nurse Educ Today*. 2007;27:95-102.
18. Page K, McKinney AA. Addressing medication errors—the role of undergraduate nurse education. *Nurse Educ Today*. 2007;27:219-224.
19. Patey R, Flin R, Cuthbertson BH, et al. Patient safety: helping medical students understand error in healthcare. *Qual Saf Health Care*. 2007;16:256-259.
20. Reid-Searl K, Moxham L, Walker S, Happell B. Shifting supervision: implications for safe administration of medication by nursing students. *J Clin Nurs*. 2008;17:2750-2757.
21. Rodriguez-Paz JM, Kennedy M, Salas E, et al. Beyond “see one, do one, teach one”: toward a different training paradigm. *Qual Saf Health Care*. 2009;18:63-68.
22. Sachdeva AK, Philibert I, Leach DC, et al. Patient safety curriculum for surgical residency programs: results of a national consensus conference. *Surgery*. 2007;141:427-441.
23. Sandars J, Bax N, Mayer D, Wass V, Vickers R. Educating undergraduate medical students about patient safety: priority areas for curriculum development. *Med Teach*. 2007;29:60-61.
24. Sherwood G, Drenkard K. Quality and safety curricula in nursing education: matching practice realities. *Nurs Outlook*. 2007;55:151-155.
25. Smith EL, Cronenwett L, Sherwood G. Current assessments of quality and safety education in nursing. *Nurs Outlook*. 2007;55:132-137.
26. Sorokin R, Riggio JM, Hwang C. Attitudes about patient safety: a survey of physicians-in-training. *Am J Med Qual*. 2005;20:70-77.
27. Spear SJ. Fixing healthcare from the inside: teaching residents to heal broken delivery processes as they heal sick patients. *Acad Med*. 2006;81:S144-S49.
28. Tess AV, Yang JJ, Smith CC, Fawcett CM, Bates CK, Reynolds EE. Combining clinical microsystems and an experiential quality improvement curriculum to improve residency education in internal medicine. *Acad Med*. 2009;84:326-334.
29. Thompson DA, Cowan J, Holzmueller C, Wu AQ, Bass E, Pronovost P. Planning and implementing a systems-based patient safety curriculum in medical education. *Am J Med Qual*. 2008;23:271-278.
30. Varkey P, Karlapudi S, Rose S, Nelson R, Warner M. A systems approach for implementing practice-based learning and improvement and systems-based practice in graduate medical education. *Acad Med*. 2009;84:335-339.
31. Varkey P, Natt N. The objective structured clinical examination as an educational tool in patient safety. *Jt Comm J Qual Patient Saf*. 2007;33:48-53.
32. Vohra PD, Johnson JK, Daugherty CK, Wen M, Barach P. Housestaff and medical student attitudes toward medical errors and adverse events. *Jt Comm J Qual Patient Saf*. 2007;33:493-501.
33. Wakefield A, Attree M, Braidman I, Carlisle C, Johnson M, Cooke H. Patient safety: do nursing and medical curricula address this theme? *Nurse Educ Today*. 2005;25:333-340.

## HEALTH CARE AS A COMPLEX SOCIOTECHNICAL SYSTEM

## House Officers and Medical Students

1. Spear SJ. Fixing healthcare from the inside: teaching residents to heal broken delivery processes as they heal sick patients. *Acad Med*. 2006;81:S144-S49.

The author makes the case for teaching residents the basics of process design, operation, and

improvement by illustrating the important similarities between the work of health care providers and the work of the world's leading manufacturers. Essentially, both involve the integration of individual elements into complex work processes that comprise many interdependent elements. Examples of pilot projects at hospitals illustrate that the application of these process management principles and skills to health care delivery can lead to better outcomes with much less effort. The author envisions a future in which residency programs could realistically include 4- to 6-week rotations in process design, operation, and improvement due to the productive time that could be gained by improving work processes. More importantly, he identifies the need for individuals with expertise in these skills to teach these concepts.

2. Thompson DA, Cowan J, Holzmueller C, Wu AQ, Bass E, Pronovost P. Planning and implementing a systems-based patient safety curriculum in medical education. *Am J Med Qual.* 2008;23:271-278.

Thompson et al describe the development and evaluation of a 10-hour patient safety course for first-year medical students at the Johns Hopkins University School of Medicine. An established 6-step approach to medical curriculum development was utilized to develop this systems-based patient safety elective, which contained 7 learning objectives based in part on students' perceptions of patient safety after reading *To Err Is Human*. The course sought to provide a practical framework to identify systems-based defects so that students would (1) learn to identify hazards in patient care that pose risk to patient safety, (2) learn how to investigate an adverse event, and (3) understand the value of incident reporting to improve patient safety. The teaching methods of experiential learning, lecture, case investigation, team project, role play, video analysis, and observation effectively improved students' awareness of the negative and positive impact of system factors on patient outcomes. The authors also identify the need for individuals with expertise in systems-based learning to teach these concepts. Most residency program directors at the Johns Hopkins Hospital felt they lacked the skills to teach these concepts, and over two thirds requested a centralized curriculum.

## THE LEGAL, REGULATORY, AND ETHICAL ENVIRONMENT AFFECTING QUALITY AND SAFETY

### Nursing Students

1. Gibbs KA. Teaching student nurses to be culturally safe: can it be done? *J Transcult Nurs.* 2005;16:356-360.

In this article, Gibbs, a third-year student nurse about to graduate in New Zealand, describes the complexities of teaching and learning the concept of cultural safety for educators and student nurses. According to the Nursing Council of New Zealand, during the 3 years of nurse training, students are assessed on their ability to progress from cultural awareness, to cultural sensitivity, to cultural safety, whereby cultural safety "is an outcome of nursing and midwifery education that enables safe service to be defined by those who receive the service." However, experiences of cultural safety educators in New Zealand reveal a feeling of unpreparedness to teach cultural safety, a dichotomy between enjoying teaching and the lack of energy to continue, and a lack of support. As a result, the Nursing Council guidelines suggest integrating cultural safety education throughout the undergraduate program, but the author points out that limited time and students' inherent capacity to learn cultural safety may make this unrealistic. The author concludes that a standardized curriculum can only be produced by a collaboration of ideas between nursing organizational authorities, educators, and students.

2. Hughes KH, Hood LJ. Teaching methods and an outcome tool for measuring cultural sensitivity in undergraduate nursing students. *J Transcult Nurs.* 2007;18:57-62.

Nursing education faces a major challenge of preparing future nurses with skills in transcultural nursing as the United States continues to grow more diverse over time. Hughes and Hood describe a multicultural curriculum for baccalaureate nursing students that is divided into 3 levels and sequenced around 3 interrelated principals that consist of knowledge development and use, the client system, and the roles of the professional nurse. Teaching strategies in level 1 courses introduce

nursing process with the emphasis on learning the steps of the process, as well as awareness that cultural assessments and principles should be included in all aspects of care. Students culminate their experience by becoming experts on a particular culture in the community via methods such as field trips, interviews, and music, so that they can present what they believe a culturally sensitive nurse should know about the care of clients for a specific culture. By using the Cross-Cultural Evaluation Tool, the authors substantiate the teaching strategies' impact on changing student attitudes and behaviors related to cultural diversity. Overall, the authors successfully illustrate this evaluation tool's utility in documenting changes in nursing student cultural sensitivity after receiving education in transcultural nursing theory.

### METHODS FOR MEASURING HEALTH CARE SAFETY

#### House Officers and Medical Students

1. Coyle YM, Mercer SQ, Murphy-Cullen CL, Schnmeider GW, Hynan LS. Effectiveness of a graduate medical education program for improving medical event reporting attitude and behavior. *Qual Saf Health Care*. 2005;14:383-388.

Coyle et al highlight some of the key challenges that educators face in creating a patient safety educational program that can effectively improve graduate medical trainees' attitudes and behaviors related to medical event reporting in the ambulatory care setting. The educational program described in this article is tailored toward family medicine residents and consists of six 1-hour conferences on patient safety and near misses, held monthly, preceded by a 1-hour introductory lecture on medical error. The authors found that the median change in medical event reporting attitude and behavior was zero and not statistically significant, in part due to lack of time, extra paperwork, and concern about career and personal reputation. However, these results underscore the need for faculty to be role models for their trainees by reporting medical events themselves, encouraging their trainees to report medical events, and providing emotional support to trainees affected by medical events.

#### Nursing Students

1. Currie LM, Desjardins KS, Stone PW, et al. Near-miss and hazard reporting: promoting mindfulness in patient safety education. *Stud Health Technol Inform*. 2007;129:285-290.

A critical factor to reduce medical errors is the promotion of a safe culture, in which the identification of dangerous situations and near misses is seen as an opportunity to improve the system. Currie et al describe a curricular innovation whereby baccalaureate nursing students were provided with a Web-based reporting system to document dangerous situations and near misses observed during their clinical experiences in multiple sites in a large metropolitan area. The authors found that dangerous situations (eg, infection control practices) accounted for more than twice as many reports as near misses (eg, medication mishaps), indicating that dangerous situations may be more visible and easier to report for entry-level students. In general, these findings suggest that encouraging students to participate in reporting can contribute to the generation of a safe culture.

### METHODS FOR IMPROVING HEALTH CARE QUALITY AND SAFETY

#### House Officers and Medical Students

1. Gould BE, O'Connell MT, Russell MT, Pipas CF, McCurdy FA. Teaching quality measurement and improvement, cost-effectiveness, and patient satisfaction in undergraduate medical education: the UME-21 experience. *Fam Med*. 2004;36:S57-S62.

Gould et al summarize the curricula pertinent to quality improvement, cost-effectiveness, and patient satisfaction developed by 11 Undergraduate Medical Education for the 21st Century (UME-21) schools. The authors collect and integrate into tabular form data regarding types of curriculum developed, medical school years affected, learning objectives addressed, general and specific teaching methods used, the use of practical experiences (continuous quality improvement projects), and the duration of the intervention or curriculum. The 11 schools are also stratified into groups based on the intensity of their new educational program devoted to

quality assurance. In comparison to the 7 UME-21 schools that did not introduce a new curriculum for quality improvement, the 11 UME-21 schools that did introduce a new curriculum reported a significantly higher increase in senior medical students' ratings of instructional time devoted to quality assurance as adequate. Most importantly, a review of lessons learned at each participating school reveals the need for clinical faculty and administrative staff with knowledge of and enthusiasm for quality measurement and improvement to serve as mentors for students to ease the implementation of these projects.

2. Halbach JL, Sullivan LL. Teaching medical students about medical errors and patient safety: evaluation of a required curriculum. *Acad Med.* 2005;80:600-606.

Halbach and Sullivan evaluate the first 3 years of a brief curriculum about patient safety and medical errors that was integrated into a required third-year family medicine clerkship. The 4-hour curriculum sought to introduce students to avenues for communication about medical errors, to expose them to the prevalence and origins of errors, and to increase awareness of the physician's responsibility for patient safety. The authors provide specific details regarding the curriculum's 3 components, which included an introductory lecture, brief required readings, and a videotaped simulation with a standardized patient. The authors' comparison of before and after questionnaire data revealed statistically significant increases in the self-reported awareness of students' strengths and weaknesses in communicating medical errors to patients. The program's success highlights the importance of having committed faculty who are willing to disclose their own experiences with medical errors in practice to medical students.

3. Kane JM, Brannen M, Kern E. Impact of patient safety mandates on medical education in the United States. *J Patient Saf.* 2008;4:93-97.

Kane et al's descriptive study illustrates the need for additional emphasis on patient safety in all areas of medical education before the 1999 IOM recommendations regarding patient safety can be fully realized. The authors assessed the impact of

the IOM recommendations regarding patient safety initiatives on medical education by quantifying patient safety content in popular medical textbooks and undergraduate and graduate medical education curricula. The authors found that only half of the most recent editions of core medical textbooks reviewed contained any patient safety-related content. Furthermore, only 10.4% of all US medical schools at the time of publication formally offered any specific courses covering patient safety. In addition, although the ACGME now requires patient safety education to meet one of the core competencies, this study reveals that the scope and breadth of requisite material remains undefined by the ACGME and is highly variable among different residency programs.

4. Madigosky WS, Headrick LA, Nelson K, Cox KR, Anderson T. Changing and sustaining medical students' knowledge, skills, and attitudes about patient safety and medical fallibility. *Acad Med.* 2006;81:94-101.

Madigosky et al's study of the effects of a patient safety and medical fallibility curriculum on second-year medical students' knowledge, skills, and attitudes, provides unique insight by examining why all of the changes were not sustained at 1 year, why all of the changes were not in the desired direction, or why all of the changes were not supported by students' self-reported behaviors. The innovative curriculum, developed at the University of Missouri-Columbia School of Medicine, takes place during the last 2 blocks of the second-year Introduction to Patient Care course, which is an 8-block course spanning the first 2 years of medical school. The authors describe the content and educational modalities utilized to address the following 5 main themes: (1) patient safety overview, (2) error reporting, (3) system versus human approach, (4) safety tools, and (5) ethics/disclosure. Analysis of before and after student questionnaires, and questionnaires completed 1 year after the curriculum, enable the authors to explore several curriculum characteristics contributing to these results, including the course content, instructor effectiveness, educational modalities, timing and integration of topics within the overall curriculum, planned redundancy, and evaluation methods. In addition, the authors discuss how the questionnaire results reflect the other formal and informal

learning experiences within the preclinical and clinical years and how they also reflect the study design, questionnaires, and evaluation tools used. Madigosky et al's experience clearly suggests that to achieve lasting results, the clinical educational environment and the hidden curriculum of academic institutions need to be addressed.

5. Patey R, Flin R, Cuthbertson BH, et al. Patient safety: helping medical students understand error in healthcare. *Qual Saf Health Care*. 2007;16:256-259.

Patey et al describe the development and initial evaluation of a module on patient safety delivered as part of the core curriculum in a United Kingdom medical school. The 5-hour module that was introduced in the final year of the curriculum covered the following material: the ubiquitous nature of error, the nature of the problem in health care, the situation in other high-risk domains, learning from the experience of others, what happens after health care errors, and disclosure of error. Specific training needs were determined from literature on the psychology of error, but the module focused primarily on the factors influencing adverse events and the skills required to deal with error. Student questionnaires completed before and approximately 1 year after the module indicated that, 1 year later, only knowledge and the perceived personal control over safety had improved. Overall, the authors argue that the knowledge, skills, and attitudes targeted in this undergraduate module provide an excellent basis for the core competencies in patient safety that are specified in the education and training in the first 2 years after graduation in the United Kingdom.

6. Rodriguez-Paz JM, Kennedy M, Salas E, et al. Beyond "see one, do one, teach one": toward a different training paradigm. *Qual Saf Health Care*. 2009;18:63-68.

Rodriguez-Paz et al perform an informal literature review on the impact of current training methods on patient safety and subsequently advocate for a training model more robust than the current "see one, do one, teach one" model. The authors propose a training model that integrates knowledge and skills-based learning with a culture of patient safety in both simulated and "real" environments.

This type of model would enable trainees to learn that errors are an integral part of medical training and would also enable time for trainee reflection before practicing on real patients. Such a model reinforces the need for both a culture focused on patient safety and quality improvement and for clinicians who view their work as a process.

7. Sachdeva AK, Philibert I, Leach DC, et al. Patient safety curriculum for surgical residency programs: results of a national consensus conference. *Surgery*. 2007;141:427-441.

In May 2005, the American College of Surgeons (ACS) and the ACGME sponsored a national consensus conference to initiate the development of a patient safety curriculum for surgical residency programs. The conference's planning committee decided to focus specifically on the patient safety issues within the context of the ACGME's 6 core competencies. Within the framework of these core competencies, Sachdeva et al present the results of the conference's curriculum matrix, which includes listings of topics, teaching and learning strategies, and assessment methods. The authors also expand on ideas relating to the organizational culture, educational interventions (eg, team training), special items of interest in patient safety (eg, analyses and discussions of near-misses), and new assessment methods (eg, objective structured clinical examinations [OSCE]) that may help program directors and the faculty take the initial steps toward implementing the curriculum content. Overall, this work of the ACS and ACGME represents a significant step in helping define the curriculum content relating to patient safety.

8. Sandars J, Bax N, Mayer D, Wass V, Vickers R. Educating undergraduate medical students about patient safety: priority areas for curriculum development. *Med Teach*. 2007;29:60-61.

Sandars et al present key recommendations for patient safety education that were developed at a 2006 Association for Medication Education in Europe symposium. The priorities especially emphasize human factors (eg, develop self-awareness of the situations in which patient safety is compromised) and organizational culture (eg, develop teamwork skills), rather than concentrating on incident reporting and analysis.

9. Sorokin R, Riggio JM, Hwang C. Attitudes about patient safety: a survey of physicians-in-training. *Am J Med Qual.* 2005;20:70-77.

The IOM's 1999 report, *To Err Is Human*, drew significant national attention to the issue of patient safety, but the viewpoints of medical students and residents remained a small part of the conversation. Because residents are often the first to respond to an adverse event and are therefore key individuals in the implementation of error reduction strategies, Sorokin et al surveyed house staff and fourth-year medical students from 1 academic institution about their perceptions of adverse events. Key findings from the survey indicated that most trainees believed that adverse events were preventable and thought that improved teamwork, better procedural training, and improved sign-out would reduce medical mishaps. Furthermore, over three quarters of trainees agreed that physicians must disclose adverse events to patients and grow more comfortable with disclosure as training progresses. As a whole, these findings should suggest to educators in health care quality and safety that physicians-in-training will be supportive of systematic changes proposed for patient safety.

10. Tess AV, Yang JJ, Smith CC, Fawcett CM, Bates CK, Reynolds EE. Combining clinical microsystems and an experiential quality improvement curriculum to improve residency education in internal medicine. *Acad Med.* 2009;84:326-334.

Tess et al report on the first 18 months of their internal medicine residency's Education Innovation Project, an ACGME alternative pathway to accreditation for high-performing programs based on educational and clinical outcome measures, the centrality of patient safety and quality of care, and creativity. Two major interventions are described. The authors reconfigured their inpatient medical service to function around geographically based units where residents, nurses, and staff function as integrated teams physically colocated around shared patients. The authors also mandated and expanded a quality improvement rotation in which residents are required to generate a patient safety portfolio consisting of an adverse event review and a detailed quality improvement project. An assessment of the intervention thus far highlights how fundamental change at an academic center can occur with few

resources on a short timeline and can spur residents to become agents of effective change.

11. Varkey P, Karlapudi S, Rose S, Nelson R, Warner M. A systems approach for implementing practice-based learning and improvement and systems-based practice in graduate medical education. *Acad Med.* 2009;84:335-339.

While most strategies have been limited to individual or related groups of specialty programs, Varkey et al describe the implementation of an institution-wide practice-based learning and improvement (PBLI) and systems-based practice (SBP) curriculum across 115 residency and fellowship programs. To facilitate implementation of the curriculum, the appointed director of the quality improvement program met 1-on-1 with all program directors, organized a program director workshop on teaching PBLI and SBP, developed a centralized curriculum Web site, and facilitated institution-wide didactic sessions for learners on topics including insurance systems and systems thinking. The authors' interim analysis shows that the majority of the residency programs had all or some of their graduates involved in a quality improvement project and that all program directors were confident in demonstrating resident competency in PBLI and SBP. The system-wide initiative clearly offers a means of overcoming issues related to scarce faculty resources and expertise and may also prove to be cost-effective.

12. Varkey P, Natt N. The objective structured clinical examination as an educational tool in patient safety. *Jt Comm J Qual Patient Saf.* 2007;33:48-53.

Varkey and Natt report a pilot study on the development and implementation of an OSCE station for the communication and management of prescription errors. The prescription-error OSCE station was integrated into the well-established clinical skills exam held toward the end of the third year. Over two thirds of students taking part in the pilot study agreed that the OSCE station enhanced their awareness of medication errors and felt that their comfort level with communicating prescription errors to patients increased. What makes this OSCE station particularly unique and valuable to students is the opportunity for them to communicate not only with the standardized



patient but also with a standardized pharmacist, which helped students to understand the importance of teamwork in complex systems.

10. Vohra PD, Johnson JK, Daugherty CK, Wen M, Barach P. Housestaff and medical student attitudes toward medical errors and adverse events. *Jt Comm J Qual Patient Saf.* 2007; 33:493-501.

Vohra et al present the results of a survey of medical residents and senior medical students at an urban teaching hospital, which suggest that efforts to better incorporate patient safety culture and enhance patient safety training are clearly needed. The authors found that respondents who reported exposure to adverse events demonstrated a lower awareness of both human factor errors and the hospital's approach to safety. In addition, trainees exposed to medical errors were not only likely to report a significantly negative attitude toward patient safety, but also learned not to discuss the experience with others. The authors clearly present the case for teaching trainees how to report errors and adverse events in a safe way and to seek counseling when adverse events occur. Equally as important is the need for senior faculty who appreciate the importance of sharing their experience with medical errors and how they have learned from them.

### Nursing Students

1. Attree M, Cooke H, Wakefield A. Patient safety in an English preregistration nursing curriculum. *Nurse Educ Pract.* 2008;8: 239-248.

Given the importance of education in developing the knowledge, skills, and attitudes that promote patient safety and learning from errors, Attree et al explored patient safety through a case study of an English preregistration degree nursing curriculum. The authors' analysis of data from students, educators, and key stakeholders found that the curriculum implicitly focused on the patient safety-related concepts of safe practice, competency, health and safety, safe environment, and risk. In addition, the educational culture was characterized as defensive and closed, and as having an individual versus a systems approach to safety. These

findings highlight the importance of developing teaching, learning, and assessment strategies that explicitly focus on patient safety and consider all of the human and organizational factors that affect individuals' performance.

2. Gregory DM, Guse LW, Dick DD, Russell CK. Patient safety: where is nursing education? *J Nurs Educ.* 2007;46:79-82.

To improve patient safety, Gregory et al argue that educators need to identify latent errors or systems-based factors among teaching-learning approaches and examine how these contribute to nursing student errors, near misses, and adverse events in the clinical setting. In addition, the authors encourage educators to address discontinuities between the education and practice sectors. Patient safety will continue to be undermined, the authors argue, unless student data related to documented errors, adverse events, and near misses are analyzed and acted on by educators in partnership with clinical units.

3. Henneman EA, Cunningham H. Using clinical simulation to teach patient safety in an acute/critical care nursing course. *Nurse Educ.* 2005; 30:172-177.

Henneman and Cunningham describe 1 nursing program's decision to develop a clinical simulation experience using SimMan in an acute/critical care elective for senior nursing students, in light of the theory-practice gap. The authors explain how crisis resource management principles (ie, be prepared, prioritize, practice good communication, delegate, call for help early) were utilized to develop a framework to ensure that each simulation included common elements, adhered to teaching principles, and had a clear rationale. Practical information regarding a structured debriefing process allowing students to reflect on their experiences is also provided.

4. Henneman EA, Cunningham H, Roche JP, Curnin ME. Human patient simulation: teaching students to provide safe care. *Nurse Educ.* 2007;32:212-217.

Henneman and Cunningham describe a human patient simulation scenario for senior-level nursing students, the purpose of which was to provide

students with an opportunity to participate in the assessment and management of a patient who complains of chest pain after being in a motor vehicle accident. The authors explain details regarding simulation objectives, student and instructor preparation, simulation roles, supplies and setup, and the reflective discussion/debriefing process following the simulation. These authors' experience offers practical information to help guide educators interested in adopting this technology.

5. Jones A. Putting practice into teaching: an exploratory study of nursing undergraduates' interpersonal skills and the effects of using empirical data as a teaching and learning resource. *J Clin Nurs*. 2007;16:2297-2307.

While policy initiatives and literature promote patient-centered communication as an indicator of high-quality health care, Jones highlights that little research exists that discusses interpersonal skills of student nurses. In light of this gap in the research literature, the author describes a research project that was devised to explore nursing students' communication with patients during the initial assessment interview as well as to evaluate the effectiveness of using tape recordings/transcripts of clinical encounters as a teaching aid in the classroom. The study found that student nurses have an understanding of the principles of interpersonal skills and patient-centeredness within the classroom, but their interaction with patients on the wards does not reflect this knowledge base. Ultimately, the author believes that utilizing a wider range of resources, such as the innovative teaching methods described in this study, together with traditional didactic approaches, will encourage the development of nursing communication skills curricula from a variety of perspectives, which should have a positive effect on bridging the theory-practice gap.

6. Milligan FJ. Establishing a culture for patient safety—the role of education. *Nurse Educ Today*. 2007;27:95-102.

Milligan explores the role of education in creating a safety culture through the inclusion of issues such as human factors theory from the outset of health care providers' education. The author explains how human factors theory focuses on human performance and interaction with equipment, systems,

and organizations, with the goal of enhancing performance, increasing safety, and improving user satisfaction. After describing the use of human factors theory in other safety-critical industries (eg, aviation), the author applies the human factors analysis and classification system model to illustrate the origins of error in health care by using the drug administration process as an example. This example clearly highlights the importance of a systems approach to create a patient safety culture and supports the inclusion of aspects of human factors theory from the beginning of health care providers' education.

7. Sherwood G, Drenkard K. Quality and safety curricula in nursing education: matching practice realities. *Nurs Outlook*. 2007;55:151-155.

Using the work proposed by the Robert Wood Johnson Foundation-funded *Quality and Safety Education for Nurses* (QSEN) faculty, Sherwood and Drenkard examine current views of quality and safety, describe applications of quality and safety competencies in practice, and propose implications for redesigning nursing education programs to match patient and practice needs. The proposed implications specifically reflect 6 quality and safety competencies for nurses identified by QSEN: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics. Finally, the authors introduce 10 potential first steps (eg, integrating quality and safety competencies into job descriptions and performance evaluations for nurses in health care settings and the clinical faculty who teach students in those settings) for thought leaders in academia and practice to transform quality and safety for nursing. These steps emphasize the authors' call to nurse executives and nurse educators to work together to address the need to transform nursing curricula with quality and safety content.

8. Smith EL, Cronenwett L, Sherwood G. Current assessments of quality and safety education in nursing. *Nurs Outlook*. 2007;55:132-137.

To assess the extent to which educators believed content related to the QSEN's 6 core competencies were already integrated in prelicensure curricula, the QSEN project team surveyed program leaders from a national sample of baccalaureate and

graduate entry programs and an additional convenience sample of associate degree nursing community college programs. Smith et al present the survey results, which assess the following: (1) curricular content, (2) pedagogical strategies, (3) satisfaction with student competency development, (4) faculty expertise to teach the competencies, and (5) preference for curricular resources. On the whole, the results reflect a relatively high rate of adoption of the QSEN core competencies across nursing curricula, and the greatest opportunities for improvement relate to competency in informatics, quality improvement, and evidence-based practice. However, the authors briefly point out that faculty focus groups, which later reviewed the QSEN draft knowledge, skills, and attitudes (KSAs) expected of prelicensure nursing students, had drastically different reactions. The participants did not understand concepts related to the competencies and could not identify pedagogical strategies for teaching the KSAs. This contrast between the results of the survey and the focus groups reinforces Sherwood and Denker's (article #7 of this section) call to nurse executives and nurse educators to work together to transform nursing curricula.

9. Wakefield A, Attree M, Braidman I, Carlisle C, Johnson M, Cooke H. Patient safety: do nursing and medical curricula address this theme? *Nurse Educ Today*. 2005;25:333-340.

While recent research and policy initiatives in the United Kingdom have focused on patient safety, Wakefield et al find that there is little evidence that nursing and medical curricula provide students with the skills to examine patient safety issues as an integral part of their practice. Through a review of curricular guidelines of the Nursing and Midwifery Council and the General Medical Council, the authors illustrate how both cover a comprehensive range of topics but do not identify how educators can address the themes outlined. Subsequently, the authors articulate a need for health care providers to use a systems approach to analyzing the context of adverse events so that when these methods are incorporated into curricula, they will be addressed in a meaningful and effective manner. Only then, the authors argue, will trainees be able to improve patient care, reduce the burden on an overstretched health care system, and engage in dynamic as opposed to defensive practice.

## APPLICATION OF QUALITY AND SAFETY MEASUREMENT AND IMPROVEMENT METHODS IN SPECIFIC HEALTH CARE SETTINGS

### House Officers and Medical Students

1. Aggarwal R, Undre S, Moorthy K, Vincent C, Darzi A. The simulated operating theatre: comprehensive training for surgical teams. *Qual Saf Health Care*. 2004;13:i27-i32.

Aggarwal et al describe a simulated operating theater project that enables training and assessment of technical and nontechnical skills (ie, interpersonal communication, judgment, leadership, teamwork) of the entire surgical team. The authors examine a systems approach to error reduction and the cultures and attitudes of surgical staff, and they also explain how the integration of the simulated operating theater into a stepwise approach to surgical training can enable the surgical team to function in a safer and more efficient manner when actual crises do occur.

2. Garbutt JM, Highstein G, Jeff DB, Dunagan WC, Fraser VJ. Safe medication prescribing: training and experience of medical students and house staff at a large teaching hospital. *Acad Med*. 2005;80:594-599.

Garbutt et al sought to assess housestaff's and medical students' knowledge, attitudes, and behaviors regarding safe prescribing as a first step to reducing prescribing errors prior to full implementation of computerized physician order entry (CPOE). The questionnaires administered addressed training in and attitudes about safe prescribing and prescribing errors, current prescribing behaviors, use of reference sources, knowledge of dangerous abbreviations, factors perceived to contribute to prescribing errors, and personal experience with medication errors. The authors found that routine use of safe prescribing behaviors by housestaff and medical students in a large teaching hospital was poor. Explanations for poor compliance with safe prescribing behaviors included lack of knowledge of important prescribing rules and a culture that does not support safe prescribing. The authors urge the need for new system-level solutions to change the culture of prescribing and highlight learning strategies such as role modeling, feedback, and a chance for trainees to learn from their mistakes in a non-threatening environment.

3. Lindquist LA, Gleason KM, McDaniel MR, Doeksen A, Liss D. Teaching medication reconciliation through simulation: a patient safety initiative for second year medical students. *J Gen Intern Med.* 2008;23:998-1001.

Lindquist et al detail an interactive curriculum to teach second-year medical students how to obtain accurate medication histories and perform medication reconciliation. The curriculum entailed 4 components: (1) a lecture by a pharmacist on the necessities of obtaining an accurate medication history and tools available for acquiring more information from pertinent sources, (2) an actress "accidentally" entering the room and interrupting the lecture trying to find her doctor or pharmacist as she had questions about her medications, (3) student participation in the medication reconciliation process, and (4) review of the medication list with the pharmacist. This curriculum is generalizable to other institutions, and the authors believe it could serve as the foundation for further expansion of patient safety education in the medical school curriculum.

### Nursing Students

1. Page K, McKinney AA. Addressing medication errors—the role of undergraduate nurse education. *Nurse Educ Today.* 2007;27:219-224.

In light of 2 reports by the United Kingdom's Department of Health that emphasize a commitment to reducing medication errors and improving patient safety, Page and McKinney declare that it is imperative to strengthen nursing education and training in pharmacology. The authors present a review of literature that not only highlights nurses' important role in medication management but also illustrates the inadequacy of the pharmacology content in nurse education curricula. The authors subsequently describe an educational

initiative titled "Medication Safety Day" that focuses on the causes of medication errors (ie, system failures) via a lecture and workshops focusing on interpretation of prescriptions, drug calculations, the importance of identifying allergy status, and high risk medicines.

2. Reid-Searl K, Moxham L, Walker S, Happell B. Shifting supervision: implications for safe administration of medication by nursing students. *J Clin Nurs.* 2008;17:2750-2757.

There is a paucity of research on factors contributing to medication errors made specifically by nursing students. Reid-Searl et al sought to explore the process of medication administration by Australian nursing students in the clinical setting, in which guidance and personal supervision by registered nurses is necessary and legally required to ensure patient safety. Through interviews with final-year undergraduate nursing students, the authors found that registered nurses did not always provide students with a level of supervision when administering medications that would meet clinical excellence, legislation within Queensland, or requirements set by the university specific to this study. The authors argue that these findings support the urgent development of new strategies to ensure adequate supervision is always available to nursing students administering medications.

### REFERENCES

1. Clough J, Nash DB. Health care governance for quality and safety: the new agenda. *Am J Med Qual.* 2007;22:203-213.
2. Moskowitz EJ, Nash DB. The quality and safety of ambulatory medical care: current and future prospects. *Am J Med Qual.* 2007;22:274-288.
3. Moskowitz EJ, Nash DB. Accreditation Council for Graduate Medical Education competencies: practice-based learning and systems-based practice. *Am J Med Qual.* 2007;22:351-382.
4. Moskowitz E, Veloski JJ, Fields SK, Nash DB. Development and evaluation of a 1-day interclerkship program for medical students on medical errors and patient safety. *Am J Med Qual.* 2007;22:13-17.