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Integrating quality and safety science in nursing education and practice

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Abstract

Worldwide, health care delivery systems are applying new quality and safety science in response to startling reports of negative patient outcomes. Many health care professionals lack the knowledge, skills and attitudes to change the systems in which they work, calling for radical redesign of nursing education to integrate new safety and quality science. This paper describes the transformation underway in nursing education in the United States to integrate quality and safety competencies through the Quality and Safety Education for Nurses (QSEN) project. A national expert panel defined the competencies and surveyed US schools of nursing to assess current implementation. To model the changes needed, a 15-school Pilot Learning Collaborative completed demonstration projects and surveyed graduating students to self-assess their achievement of the competencies. A Delphi process assessed level and placement of the competencies in the curriculum to offer educators a blueprint for spreading across curricula. Specialty organisations are cross-mapping the competencies for graduate education, educational standards have incorporated the competencies into their essentials documents, and a train the trainer faculty development model is now helping educators transform curriculum. Two key questions emerge from these findings: Are any of these projects replicable in other settings? Will these competencies translate across borders?

Keywords

competencies, evidence-based practice, informatics. nursing education, patient-centred care, quality, safety, teamwork and collaboration

Introduction

Global attention to improving quality and safety in health care is driving policy development both in regulating practice improvements and in transforming health professions education.

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Health care systems and their workers, as well as patients and families, pay a high price for poor quality from an economic, moral and ethical perspective, which leads to erosion of trust as well as worker disengagement and dissatisfaction. The Institute of Medicine (IOM), a prestigious think tank in the United States, issued stunning reports (Kohn et al., 2000) that demonstrate the urgency of applying quality and safety science to address problems in the system and support significant changes in health professions education (Greiner et al., 2003). Medication errors are one of the most frequent mistakes, with at least 1.5 million preventable adverse drug events occurring each year in the United States alone (Aspen et al., 2007). Education is regarded as the bridge to quality, the link to creating the changes needed in the system. Aims to improve quality and safety demand transformation of health professions education by integrating quality and safety science into curricula. To achieve these changes, the IOM (Griener et al., 2003) recommended that all health professionals should be educated with six competencies in order to be able to deliver patient-centred care as members of interdisciplinary teams, emphasising evidence-based practice, quality improvement and safety supported by informatics.

The purpose of this paper is to describe the work of a national expert panel and advisory council to identify, define and integrate these six quality and safety competencies into pre-licensure and graduate nursing education in the United States. The paper will present outcomes of a pilot school learning collaborative, two surveys assessing use of the competencies, a Delphi to assess placement in the curriculum, and evidence-based policy changes, and will raise the question of the universality of these competencies.

The imperative to transform health professions education

Quality and safety are inherent universal values on which health care is based. Health care providers report higher satisfaction when working in systems which embrace a quality culture and disengagement when quality erodes (Ulrich et al., 2007). Joy in work diminishes (Hall, Moore, & Barnsteiner 2008) when systems are not focused on quality (Page, 2004). Challenges to communication and relationships among health professionals are the underlying cause of 70% of health care errors (Kohn et al., 2000), yet increasingly complex care requires coordination across disciplines.

To achieve the ambitious goals for quality and safety identified by the IOM (2001) demands radical redesign of health professions education (Griener et al., 2003) in order to produce graduates who base their practice on a spirit of inquiry and continuous quality improvement, who ask questions about what and how they deliver care and who monitor outcomes (Sherwood and Drenkard, 2007). To address issues in health care quality and safety, we must assess and redesign what and how we teach healthcare professionals so that they understand the factors that help ensure safe, quality care. A radical shift in health professions education is imperative to prepare providers who can use scientific evidence to determine good care, measure current care and implement strategies to close any gaps. The nature of nurses' work positions them to be able to identify gaps between current care and 'what should be', and help design changes to close gaps. Health care systems that implemented new regulations to improve quality and safety also had longer and more complicated orientations for new graduate nurses with a discrepancy emerging between nursing role expectations in practice settings and educational preparation (Sherwood and Drenkard, 2007).

Quality and Safety Education for Nurses (QSEN): transforming nursing education

The Quality and Safety Education for Nurses (QSEN) project was developed to bridge the gap that became increasingly evident between nurses' education and the expectations in practice roles and responsibilities (Cronenwett et al., 2007). Funded by the Robert Wood Johnson Foundation, the goal is to prepare nurses with the knowledge, skills and attitudes to participate in continuously improving the health care systems in which they work. Launched in 2005, a National Expert Panel has assessed current nursing curricula through an online survey and focus groups, reached consensus on definitions of the competencies for pre-licensure and graduate education, guided a pilot learning collaborative to model implementation, completed a Delphi study on placement in the curriculum, and assessed student achievement. Outcomes of the project helped leverage changes in educational standards and have been cross-mapped with credentialling requirements for advanced practice nurses. Each phase of the project will be described to illustrate how the outcomes at each stage leveraged continuing changes in education in academia and practice settings and have contributed to energising nurses.

Defining the competencies: an iterative process

To determine the competencies needed to improve quality and safety in health care, the three member QSEN steering team selected 10 faculty experts recognised for their expertise as thought leaders in at least one of the competencies identified by the IOM or in nursing pedagogy. An Advisory Panel represented groups who influence educational policy, nursing practice and resident medical education. The project included the three types of pre-licensure educational entry programmes in the United States: namely, hospital-based diploma programmes, two-year community college associate degree programmes (ADN) and four-year university-based baccalaureate programmes (BSN), because all graduates must pass the same licensing exam and meet similar expectations concerning quality and safety as registered nurses. Practice partners were an integral part of all phases of the project to underscore the imperative to bridge the gap between education and practice by designing clinical learning experiences that matched practice role expectations.

The Faculty Expert Panel and Advisory Panel employed an iterative process in face-to-face workshops and varied electronic communications to reach consensus on the six competencies adapted from the IOM (Greiner et al., 2003) report on the future of health professions education: patient-centred care, teamwork and collaboration, evidence-based practice, quality improvement, safety and informatics (Cronenwett et al., 2007). The QSEN panel separated quality and safety based on the science underpinning each competency, whereas the IOM combined quality and safety into one competency. No single competency is by itself discrete; all are inter-related, giving depth and breadth for improving quality and safety. The literature related to systems-thinking that guides improvement and error reduction, human factors theory and safety science, and the evidence base from current health professions reports was examined and synthesised to identify the knowledge, skills and attitudes for each competency. Examples are provided in Tables 1–6.

Rather than a prescriptive curricular content approach, the Panel identified learning objectives to convey expectations for each competency so that faculty and clinical educators had flexibility in how the competencies are applied in their individual settings. Pedagogical experts on the panel helped develop exemplar classroom, clinical and simulation-based

Table 1. *Patient-centred care definition: Recognise the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patient's preferences, values, and needs

**Knowledge examples	**Skills examples	**Attitudes examples
Analyse multiple dimensions of patient-centred care: patient/family/community preferences, values	Elicit patient values, preferences and expressed needs as part of clinical interview, *diagnosis,* implementation of care plan and evaluation of care	Value seeing health care situations 'through patients' eyes'
Coordination and integration of care information, communication, and education physical comfort and emotional support involvement of family and friends transition and continuity	Provide patient-centred care with sensitivity, empathy and respect for the diversity of human experience	*Seek to understand* one's personally held attitudes about working with patients from different ethnic, cultural and social backgrounds
Integrate knowledge of psychological, spiritual, social, developmental and physiological models of pain and suffering	*Assess and treat pain and suffering in light of patient values, preferences, and expressed needs*	*Seek to understand one's personally held values and beliefs about the management of pain or suffering*
Analyse ethical and legal implications of patient-centred care	*Acknowledge the tension that may exist between patient preferences and organizational and professional responsibilities for ethical care*	*Value* shared decision-making with empowered patients and families, even when conflicts occur
Analyse reasons for common barriers to active involvement of patients and families in their own health care processes	*Create or change organizational cultures so that patient and family preferences are assessed and supported*	*Honour* active partnerships with patients or designated surrogates in planning, implementation, and evaluation of care
Integrate principles of effective communication *with knowledge of quality and safety competencies*	*Continuously Analyse and improve* own level of communication skill in encounters with patients, families, and teams	Value continuous improvement of own communication and conflict resolution skills
Describe process of reflective practice	*Incorporate reflective practices into own repertoire*	*Value the process of reflective practice*

*Complete, open source tables available at www.qsen.org
**Selected examples of knowledge, skills and attitudes (KSAs). Bold, italicised text indicates changes for graduate level compared with pre-licensure KSAs.

learning strategies that could be applied with interprofessional student groups to help educators envision the changes in role expectations (Barnsteiner et al., 2007; Day and Smith, 2007; Durham and Sherwood, 2008). While some of the competencies appear to be long-held nursing values and expectations, advances from new science call for changing knowledge, behaviours and attitudes. To manage the work of the project and disseminate information,

Table 2. *Teamwork and collaboration definition: Function effectively within nursing and interprofessional teams, fostering open communication, mutual respect and shared decision-making to achieve quality patient care

**Knowledge examples	**Skills examples	**Attitudes examples
Analyse own strengths, limitations and values as a member of a team	Demonstrate awareness of own strengths and limitations as a team member	Acknowledge own contributions to effective *or ineffe*ctive team functioning
Describe scopes of practice and roles of all health care team members	Function competently within own scope of practice as a member of the health care team Assume role of team member or leader based on the situation	Respect the unique attributes that members bring to a team, including variation in professional orientations, competencies and accountabilities
Analyse strategies for identifying and managing overlaps in team member roles and accountabilities	*Solicit input from other team members to improve individual, as well as team, performance*	Respect the centrality of the patient/family as core members of any health care team
Analyse strategies that influence the ability to initiate and sustain effective partnerships with members of nursing and interprofessional teams	Communicate with team members, adapting own style of communicating to needs of the team and situation	Appreciate importance of interprofessional collaboration
Analyse differences in communication style preferences among patients and families, *advanced practice* nurses and other members of the health team	*Communicate respect for team member competence in communication* Initiate actions to resolve conflict	Value different styles of communication
Analyse authority gradients and their influence on teamwork and patient safety	Follow communication practices that minimise risks associated with handoffs among providers, and across transitions in care	Appreciate the risks associated with handoffs among providers and across transitions in care
Identify system barriers and facilitators of effective team functioning	*Lead or* participate in the design *and implementation* of systems that support effective teamwork	Value the influence of system solutions in achieving team functioning

*Complete, open source tables available at www.qsen.org
**Selected examples of knowledge, skills and attitudes (KSAs). Bold, italicised text indicates changes for graduate level compared with pre-licensure KSAs.

a website (www.qsen.org) was developed from the outset with the goal to share definitions and knowledge, skills and attributes, periodically update annotated bibliographies for each competency, post peer-reviewed teaching strategies, and distribute project information.

Baseline assessment using an online survey and focus groups

To assess the scope of the curricular change needed, the QSEN project team designed a national online survey distributed to the 572 US baccalaureate schools of nursing and

Table 3. *Evidence-based practice definition: Integrate best current evidence with clinical expertise and patient/family preferences and values for delivery of optimal health care

**Knowledge examples	**Skills examples	**Attitudes examples
Describe evidence-based practice to include the components of research evidence, clinical expertise and patient/family values	*Role model clinical decision making* based on evidence, clinical expertise and patient/family preferences and values	Value *all components of evidence-based practice*
Identify efficient and effective search strategies to locate reliable sources of evidence	*Employ efficient and effective search strategies to answer focused clinical questions*	*Value development of search skills for locating evidence for best practice*
Summarise current evidence regarding major diagnostic and treatment actions within the practice specialty	*Exhibit contemporary knowledge of best evidence related to practice specialty*	*Value knowing the evidence base for practice specialty*
Determine evidence gaps within the practice specialty	*Initiate changes in approaches to care when new evidence warrants evaluation of other options for improving outcomes or decreasing adverse events*	*Value public policies that support evidence-based practice*
Analyse how the strength of available evidence influences the provision of care (assessment, diagnosis, treatment and evaluation)	*Develop guidelines for clinical decision making* regarding departure from established protocols/standards of care	Acknowledge own limitations in knowledge and clinical expertise before determining when to deviate from evidence-based best practices

*Complete, open source tables available at www.qsen.org
**Selected examples of knowledge, skills and attitudes (KSAs). Bold, italicised text indicates changes for graduate level compared with pre-licensure KSAs.

a convenience sample using the 57 associate degree nursing programmes in North Carolina (Smith et al., 2007). At this stage only the competency definition was the reference point for the survey questions, which asked whether the school's curriculum had content and learning experiences aimed at the six competencies according to the definitions presented, whether pedagogical strategies were being used for each competency, the satisfaction with student level of achievement, the perceived level of faculty preparedness to teach each competency and the preferences for access to faculty development. The 195 responses represented a 30% return rate for BSN and 40% for ADN programmes (Smith et al., 2007). Faculty reported patient-centred care (95%) as the competency most frequently threaded throughout several courses, followed by safety (89%) and teamwork and collaboration (82%); these were also the competencies where respondents felt most satisfied with student achievement and which faculty were most prepared to teach. The three lowest ratings were evidence-based practice (73%), quality improvement (54%) and informatics (48%); these were also the areas where faculty felt the most need to improve. The most frequently reported student learning experiences across all competencies were readings, lectures and clinical practicum, followed by case studies, paper assignments, web-based learning and course modules.

Table 4. *Quality improvement definition: Use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of health care systems

**Knowledge examples	**Skills examples	**Attitudes examples
Describe strategies *for improving* outcomes of care in the setting in which one is engaged in clinical practice	*Use a variety of sources of information to review outcomes of care and identify potential areas for improvement*	Appreciate that continuous quality improvement is an essential part of the daily work of all health professionals
Describe features of quality improvement projects that overlap sufficiently with research, thereby requiring IRB oversight	*Maintain confidentiality of any patient information used to determine outcomes of quality improvement efforts*	Value the need for ethical conduct of quality improvement
Describe the benefits and limitations of quality improvement data sources, and measurement and data analysis strategies	*Design and use databases as sources of information for improving patient care* *Select and use relevant benchmarks*	*Appreciate the importance of data that allows one to estimate the quality of local care*
Explain common causes of variation in outcomes of care in the practice specialty	*Select and* use tools (such as control charts and run charts) that are helpful for understanding variation Identify gaps between local and best practice	Appreciate how unwanted variation affects outcomes of care processes
Describe common quality measures in the practice specialty	*Use findings from* root cause analyses to design and implement system improvements	Value measurement and its role in good patient care
Analyse the differences between micro-system and macro-system change	*Use principles of change management to implement and evaluate care processes at the micro-system level*	*Value local systems improvement (in individual practice, team practice on a unit, or in the macro-system) and its role in professional job satisfaction*
Understand principles of change management	Design, *implement and evaluate* tests of change in daily work (using an experiential learning method such as Plan-Do-Study-Act)	

*Complete, open source tables available at www.qsen.org
**Selected examples of knowledge, skills and attitudes (KSAs). Bold, italicised text indicates changes for graduate level compared with pre-licensure KSAs.

Problem-based learning, interprofessional experiences, simulation and return demonstrations were used infrequently. Faculty indicated interest in all forms of faculty development including website, teaching manuals, face-to-face sessions, and DVD.

Concurrent with the on-line survey, the Faculty Expert Panel and the Advisory Panel identified the knowledge, skills and attitudes (KSAs) for each competency. The project

Table 5. *Safety definition: Minimise risk of harm to patients and providers through both system effectiveness and individual performance

**Knowledge examples	**Skills examples	**Attitudes examples
Describe human factors and other basic safety design principles as well as commonly used unsafe practices (such as workarounds and dangerous abbreviations)	**Participate as a team member to design, promote and model effective use** of technology and standardised practices that support safety and quality	Value the contributions of standardization and reliability to safety
Describe the benefits and limitations of selected safety-enhancing technologies (such as barcodes, Computer Provider Order Entry, and electronic prescribing)	**Promote a practice culture conducive to highly reliable processes built on human factors research**	**Appreciate the importance of being a safety mentor and role model**
Delineate general categories of errors and hazards in care	Communicate observations or concerns related to hazards and errors to patients, families and the health care team	Value own role in reporting and preventing errors
Identify best practices for organizational responses to error	**Identify and correct system failures and hazards in care**	**Value systems approaches to improving patient safety in lieu of blaming individuals**
Describe factors that create **a just culture** and culture of safety	**Engage in a systems focus** rather than blaming individuals when errors or near misses occur	**Value the use of organizational error reporting systems**
Describe processes used to Analyse causes of error and allocation of responsibility and accountability (such as root cause analysis and failure mode effects analysis)	Participate appropriately in analyzing errors and designing, **implementing and evaluating** system improvements	Value vigilance and monitoring of care, including one's own performance, by patients, families and other members of the health care team
Describe methods of identifying and preventing verbal, physical and psychological harm to patients and staff	**Prevent escalation of conflict** **Respond appropriately to aggressive behaviour**	**Value prevention of assaults and loss of dignity for patients, staff, and aggressors**

*Complete, open source tables available at www.qsen.org
**Selected examples of knowledge, skills and attitudes (KSAs). Bold, italicised text indicates changes for graduate level compared with pre-licensure KSAs.

steering team then distributed the KSAs in faculty focus groups at nine nursing conferences that included school programme leaders, as well as faculty and practice partners. Discussions in the focus groups revealed different results from the survey data (Cronenwett et al., 2007; Smith et al., 2007). As focus group participants read the learning objectives for each competency they stated they now had different perceptions about the meaning of each, as they realised the goal was implementation of new definitions of familiar concepts that are not

Table 6. *Informatics definition: use information and technology to communicate, manage knowledge, mitigate error, and support decision making

**Knowledge examples	**Skills examples	**Attitudes examples
Contrast benefits and limitations of common information technology strategies used in the delivery of patient care	*Participate in the selection, design, implementation and evaluation of information systems* *Communicate the integral role of information technology in nurses' work*	*Value the use of information and communication technologies in patient care*
Formulate essential information that must be available in a common database to support patient care in the practice specialty	*Promote access to patient care information for all professionals who provide care to patients* *Serve as a resource for how to document nursing care at basic and advanced levels*	*Appreciate the need for consensus and collaboration in developing systems to manage information for patient care* *Value the confidentiality and security of all patient records*
Describe and critique taxonomic and terminology systems used in national efforts to enhance interoperability of information systems and knowledge management systems	*Access and evaluate high quality electronic sources of healthcare information* *Participate in the design of clinical decision-making supports and alerts* *Search, retrieve, and manage data to make decisions using information and knowledge management systems*	*Value the importance of standardised terminologies in conducting searches for patient information* *Appreciate the contribution of technological alert systems*

*Complete, open source tables available at www.qsen.org
**Selected examples of knowledge, skills and attitudes (KSAs). Bold, italicised text indicates changes for graduate level compared with pre-licensure KSAs.

part of current nursing curricula. Faculty confirmed the need for change by reporting that nursing students often graduate without having had a meaningful patient-centred conversation with a physician, having participated in a quality improvement change process or practiced electronic health record entry. Faculty stated they felt a lack of preparation to teach many KSAs (particularly safety, informatics and quality improvement), stating, 'we're not doing it – but we want to - tell us how'.

Two focus groups were held with senior nursing students and newly graduated students who reported, 'Not only did we not learn this content, our faculty could not have taught it' (Cronenwett et al., 2007; Smith et al., 2007). For example, while students demonstrated mastery of the five rights of medication administration they lacked the language and common concepts derived from safety science or quality improvement strategies applied to medication administration safety.

A pilot school learning collaborative to apply the competencies

The results of the faculty and student focus groups demonstrated the need for extensive educator development of the content, as well as of how to teach it. Knowing that nursing curricula tend to already overflow with content and there was no evidence base for effective teaching strategies, the Faculty Expert and Advisory Panels wanted evidence that the competencies could be successfully integrated into curricula. A year-long Pilot School Learning Collaborative based on innovation and early adopters was designed to ask what and how to guide student learning to achieve the competencies. Fifteen pre-licensure schools representing the three pre-licensure educational entry programmes were selected from a national call for proposals to engage faculty in modelling integration of the competencies into their curricula (Cronenwett, Sherwood, & Gelmon, 2009). Each school engaged a practice partner and completed mapping to determine how to integrate the KSAs into their curriculum; evaluated one cohort of graduating students' perceptions of how well they achieved the competencies; and developed, evaluated and shared teaching strategies for classroom, clinical and simulation/skills laboratories. Project reports are disseminated on the QSEN website (www.qsen.org/pilot/) and other publications (Armstrong et al., 2009). The project steering team facilitated workshops at the beginning and end of the year and also led telephone conferences on specific topics.

Teaching strategies covered a wide range (Cronenwett et al., 2009):

- Guide unfolding case studies both in classroom and in simulated learning
- Use reflection and mindfulness to increase safety awareness
- Share level of evidence in presentations
- Invite clinical experts to help design case studies
- Include quality and safety in clinical orientations
- Rethink the fundamentals of nursing, when and how they are taught
- Model teamwork competencies such as check backs so that information is verified between sender and receiver, checklists, peer monitoring and support, SBAR (standardised communications based on Situation, Background, Assessment, and Recommendations), and handoffs or handovers
- Focus on safety standards in medication administration
- Invite patients and families to share stories
- Consider safety applications in electronic health records
- Lengthen the time students remain in one site to lessen the confusion of a new setting.

Faculty teams were energised by the experience of setting goals and attaining outcomes that can make a significant impact in health care outcomes (Armstrong et al., 2009). Sharing lessons learned and evidence-based teaching strategies helped advance the implementation of the competencies in other schools and settings.

A Delphi study to assess placement in pre-licensure curriculum

Questions surfaced as faculty implemented the six competencies into curricula during the Pilot School Learning Collaborative. Questions included when particular KSAs were most appropriately placed in the curriculum. Barton et al. (2009) led a Delphi study into a developmental approach moving from beginning to advanced levels of competencies by answering two questions: (1) Which of the total 162 knowledge, skills and attitudes from

the six competencies should be introduced in the beginning, which in the intermediate stage and which at the advanced stage of a nursing curriculum? (2) Which KSAs should be emphasised at each of the three stages? Eighteen of 29 faculty from the learning collaborative schools and Faculty Expert Panel invited to participate joined the web-based study.

Results indicated KSAs from the six competencies are introduced and emphasised throughout the curriculum, although with variability. Most KSAs recommended for early introduction were from patient-centred care (34 of the 46 KSAs) and safety (13 of 20). KSAs for evidence-based practice and informatics were recommended to be spread evenly throughout the curriculum. KSAs for teamwork and collaboration and for quality improvement were recommended for intermediate placement, with greater emphasis in the advanced stage of the curriculum. Consistent and progressive exposure was recommended for reinforcement of practice habits.

Student Evaluation Survey

The electronic Student Evaluation Survey (SES) was distributed to 1665 graduating students from the 15 pilot schools plus two additional schools representing QSEN faculty; the aim was to determine student perceptions of whether and in what manner they were exposed to the KSAs in their nursing programme, their level of preparedness to perform quality and safety skills and their attitudes about the importance of learning the competencies (Sullivan et al., 2009). The majority of the 595 students who completed the survey reported that quality and safety knowledge and skills were addressed in their nursing programmes, although there was wide variability among the 17 schools in the level of inclusion.

Patient-centred care, safety and evidence-based practice represented the highest concentration related to knowledge objectives. The topics covered least were teamwork and collaboration and quality improvement. Students also reported high levels of achievement for the skill objectives for patient-centred care and informatics, but students reported lower achievement in being able to guide quality improvement strategies. Students felt they lacked skill in knowing how to consult experts before deviating from evidence-based practice protocols, evaluate the effect of practice changes using quality improvement methods and measures, and use organisational systems for near-miss and error reporting. The highest rated skills were assessing pain, communicating the care provided and needed at each transition in care (hand-offs[1]), and demonstrating effective use of strategies to reduce risk of harm to self or others. Students felt they also needed more experience in knowing how to use quality improvement tools, locate evidence reports for clinical practice guidelines, and evaluate the effect of practice changes from implementation of quality improvement strategies. In summary, students reported they value the efforts to meaningfully and effectively incorporate the QSEN competencies and understand the implications for practice.

Quality and Safety Education for Nurses: Graduate competencies

The Faculty Expert and Advisory Panels questioned whether the competencies were consistent across levels of education. A workshop was held with representatives from the major advanced practice registered nursing (APRN) organisations (including nurse practitioners, clinical nurse specialists, midwives and nurse anaesthetists) responsible for

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[1]In the UK, the term used is 'hand-overs'.

standards of practice, accreditation of education programmes and certification of APRNs (Cronenwett et al., 2009). The workshop focused on advanced practice rather than on specific roles and educational programme type. The group was unanimous that the competencies are essential to all educational programmes and practice but are applied at different levels of achievement. A small expert panel representing graduate education and practice adjusted verbs in the KSA learning objectives to match expectations of advanced practice nurses and add KSAs; none were removed but many were adjusted to a higher level of achievement. Examples are in Tables 1–6. While the pre-licensure competencies were appropriate for new graduates transitioning to practice, it is expected that nurses will develop expertise and move to accomplishment of the graduate level competencies as they move from novice to expert. A task force from the National Organization of Nurse Practitioner Faculties (NONPF) are cross-mapping the graduate level KSAs to determine how well knowledge learning objectives are aligned with specialty content, specialty and role certification and credentialling for advanced practice (Pohl et al., 2009). Ongoing work indicates high congruence but cross-mapping for skills and attitude learning objectives continues.

Evidence-based policy changes

The results of this series of QSEN initiatives have helped guide changes in educational standards that inform curriculum development, which ultimately will impact the standards on which accreditation of US nursing schools is based. To help lead the changes, leaders representing physician education, nursing accreditation and credentialling organisations, nursing care delivery settings, interprofessional education projects, exemplar national change projects and varied educational entry programmes were part of the Advisory Council and Faculty Expert Panel. The competencies have now been referenced in the essential content that guides curriculum for Baccalaureate (AACN, 2006, 2009), Master's (AACN, 2008a) and the Doctor of Nursing Practice programmes (AACN, 2008b). Integration of the competencies into the profession is acknowledged through inclusion of questions in licensure examinations, transition to practice orientations and staff development programmes to assure that all nurses embrace quality and safety in their daily work.

Continuing educator development

Faculty development is the key to transforming nursing education to reflect quality and safety competencies in nursing practice (Thornlow and McGuinn, 2009). Outcomes from these QSEN led initiatives are the basis for faculty development through a series of regional workshops using a train-the-trainer model and annual national forums to promote discussion and shared learning. A cohort of 40 early adopters were selected as QSEN facilitators (www.qsen.org), primarily faculty who participated in the Pilot School Learning Collaborative, with additional facilitators selected from other related projects, to help teach, coach and mentor professionals in schools, hospitals or organisations seeking to implement quality and safety competencies. The QSEN project team is working with publishers to incorporate the competencies in nursing textbooks, and also to clarify nursing role identity so that it includes the capacity to improve the quality and safety of the systems in which they work.

Curricular shifts based on the six quality and safety competencies and the changes in education and practice standards may best be accomplished by threading through existing

courses or educator programmes rather than creating new courses. Questions can be embedded in case studies, simulated learning, clinical learning experiences and debriefings in post-clinical conferences to coach and mentor in the competencies, thus placing reduced potential burden on already overloaded curricula. A shift in student learning from focusing on the individual to mindfully considering the patient within the system of care is the first step in broadening the scope of one's practice to include quality and safety (Day and Smith, 2007; Armstrong et al., 2008; Durham and Sherwood, 2008; Barton et al., 2009; Sherwood, 2010).

Conclusions

The QSEN project has promoted innovation in the way nurses are educated across all educational levels. Faculty report being energised by participating in a national effort to improve health care quality that reinforces core values and reasons for wanting to be a nurse (Armstrong et al., 2008). It satisfies a moral commitment and desire to do our work well (Hall, Doran, & Pink, 2008). Evidence must continue to be collected to assess how well the competencies are integrated across nursing programmes, how well they are incorporated into practice settings and their impact on patient outcomes. Several considerations may guide the future (Sherwood, 2010). Are any of these projects replicable in other settings? Are these competencies universal to help achieve goals of numerous global agencies and national mandates for nurses to participate in improving quality and safety of the health care systems in which they work? What changes need to be incorporated into existing educational standards and policies? What are cultural considerations in matching with local nurse roles and responsibilities? Sharing faculty development strategies and evidence-based pedagogy that helps learners achieve lasting changes. Opening dialogue on local and global innovative partnerships can improve quality and safety and contribute to improved patient outcomes, nurse satisfaction, and professional advancement.

Key points

- Following a series of IOM reports on poor quality outcomes, the Quality and Safety Education for Nurses (QSEN) project has led the integration of quality and safety competencies into nursing education and practice.
- Improving quality and safety requires faculty development to create educational strategies that prepare engaged nurses with a mindful, attentive presence who can create the climate and infrastructure to achieve the radical changes needed.
- 21st century nurses can help lead changes in patient outcomes by practicing from a spirit of inquiry, using evidence-based standards and interventions, investigating outcomes and critical incidents from a systems perspective and collaborating across teams with patient and family partners.

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None declared.

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