Nursing Shortages in the OR: Solutions for New Models of Education

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ABSTRACT

The professional literature predicts worldwide perioperative nursing shortages. Compounding this is the absence of perioperative curricula in most nursing programs, which reduces new graduate interest in and awareness of employment opportunities in the OR environment. Educators at a university and a large hospital system formed an innovative partnership to create a pilot undergraduate nursing course to better prepare nurses for the surgical setting. The course was offered in a condensed-semester format and included online activities, simulation experiences, classroom discussions, and clinical experiences in a small group setting. Two of the four nursing students in the course were hired directly into the perioperative setting after graduation, decreasing hospital costs related to recruitment and orientation. The success of the course led to its integration into the undergraduate curriculum, thus providing a valuable elective option for junior and senior nursing students, as well as achieving a new model for perioperative nursing education. *AORN J* 101 (January 2015) 115-136. © AORN, Inc, 2015. http://dx.doi.org/10.1016/j.aorn.2014.03.015

Key words: *bachelor of science in nursing students, BSN students, BSN curriculum, perioperative nursing students, simulated learning, perioperative skills, nursing shortage.*

There is a critical shortage of perioperative nurses,[1-5] and the demand for perioperative nurses in the United States is growing steadily by 1% to 2% each year.[4,6-8] Only a small percentage of all nurses practice in the perioperative arena, and it is estimated that nearly 20% of those currently employed in this specialty area will retire in the next five years.[4] As a result, many health care environments are beginning to experience the effects of this long-anticipated perioperative nursing shortage.[4]

The shortages in perioperative nursing can be summarized as the result of many trends that are intensifying in the workplace today. These include

- decreased exposure to perioperative nursing in both the classroom setting and the clinical environment,[1,4]
- a perioperative workforce that is aging and nearing retirement,[9]
- a patient population that requires more intense nursing care and complex interventions,[1,4] and

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- technological advancements that require intense education and skill adaptations.[1,4]

EFFECTS OF CLINICAL NURSING EDUCATION

Surgical nursing requires specialized training and skills that are not routinely offered as part of the curricula in most nursing schools. Instead, the extent of many nursing students' exposure to perioperative nursing is limited to the occasional observation assignment, which prevents them from comprehending the role of circulating, scrubbing, or first assisting during surgical procedures. This creates a knowledge gap in clinical nursing education. As a result, nurse graduates are not aware of the full scope of the perioperative specialty and therefore do not apply for perioperative positions. The limited number of nursing school faculty members with perioperative experience also contributes to the lack of perioperative nursing education in academia. In addition, even nurses who have been in practice for several years often are unaware of what perioperative nursing practice entails as a result of the limited exposure to perioperative practices.

Many OR managers have encouraged new nurse graduates interested in working in the OR to gain one to two years of medical-surgical unit experience before applying for a position in the surgical environment (D. Doyle, MS, RN, CNOR, NE-BC, administrative director of surgery and anesthesia, Grant Medical Center, Columbus, Ohio; in-person communication; December 12, 2013). The rationale for recommending medical-surgical experience is that it helps the novice nurse develop critical thinking skills. However, as the new nurse becomes part of the culture on the medical-surgical unit, the probability of transfer to the OR decreases, thus contributing to the already existing perioperative nursing shortage. When nurses lack perioperative knowledge and skills and have limited exposure to this environment, even after gaining medical-surgical unit experience, they can be uninterested in practicing perioperative nursing. Furthermore, if these nurses are hired into the OR, they may have unrealistic expectations that can lead to dissatisfaction and disappointment about the perioperative nurse's role and the reality of perioperative nursing.[10]

Another factor to consider is that nurses with no previous exposure to perioperative nursing may decide to quit midway through an intensive orientation program. This in turn creates a financial burden on the health care facility because orienting a nurse to the perioperative environment can cost upward from $59,000 (D. Doyle, MS, RN, CNOR, NE-BC; in-person communication; December 12, 2013).[4] Thus, nurses who quit during an orientation program can be a tremendous loss for a facility, not only in dollars but also in human resources (as discussed more in depth later in this article).

Results from a survey of OR leaders, which was conducted at a 2012 perioperative nurse leader conference, confirmed the potential for a future shortage of perioperative nurse leaders.[5] Respondents (73.4%) reported that they are current OR nurses who are older than 50 years of age, 76% of respondents reported 20 or more years of nursing experience, and approximately 65% of respondents reported that they plan to retire in 10 years or less. These results suggest that the anticipated demand for nurse leaders aligns with other nursing research related to the perioperative nursing shortage.[1,4,6,7,9]

Changes in curricula standards for nursing education amplify concerns about the perioperative nursing shortage.[1,11,12] Because programs for an associate degree in nursing (ADN) and a bachelor of science in nursing (BSN) contain vast amounts of professional and clinical information, educational institutions offer fewer courses in clinical specialty areas.[9] Rotations for clinical observation experiences in the perioperative environment have been eliminated from many BSN programs, and in most cases, undergraduate nursing students are not exposed to perioperative nursing at all during their clinical or practicum experiences.[1,4,9,11] Many individuals being oriented into specialty nursing practice are recent graduates, and hospital administrators experience difficulty successfully filling

perioperative nursing positions if nursing student candidates were not introduced to surgical environments during their schooling.[1,6] Researchers have noted that school exposure to perioperative nursing influences whether nurses choose the OR as their area of practice.[3,9]

ECONOMICS OF THE NURSING SHORTAGE

Surgery departments are often referred to as the economic engines of health care facilities because they can generate as much as 60% of a hospital's revenue.[13] Perioperative nurses have reported that surgical volumes have continued to increase from 14% in 2009,[14] and Sherman et al[5] note that a recent nationwide survey reports that surgical volumes have increased in 2012. Because baby boomers are living longer and experiencing more complex health issues, surgical volumes are predicted to continue their steady increase.[5] This precipitates an increased demand for perioperative nurses and an even greater demand for nurse leaders in the surgical specialty practice.[5] Succession planning does not appear to be a priority for OR directors and managers (eg, lack of planning strategies and administrative support, no expectation that nurse leaders participate in this planning), and this results in a universal need to strategize about how to fill this predicted void.[5]

The cost of recruiting, hiring, and orienting nurses to a specialty area is difficult to calculate. According to the literature, the cost to orient a nurse to the OR is estimated to start at $59,000, but can rise well above that amount when including the cost of the application process, recruitment, and interviewing and hiring processes.[1,4,6,7,11] Additional costs associated with hiring new nurse graduates include the extensive time and practical experience required to help them transition from student to professional nurse and to establish them as productive members of the surgical team.[1,4,6,7,11] Historically, only half the perioperative nursing workforce remains in a surgical setting for longer than two to three years because of the need for extensive orientation and professional development.[7] These estimated data do not take into account the effects of turnover common to all nursing specialty areas, such as stress on the remaining workforce and lack of patient care continuity.

The challenges and barriers for training, recruiting, hiring, and retaining qualified perioperative nurses are numerous. Solutions to reduce or meet these challenges are critical to maintaining a perioperative workforce that can meet projected demands. For example, aggressive recruiting is being used to attract nurses to fill perioperative nursing positions. Creative recruitment strategies include sign-on and bonus incentives. However, hiring interested nurses into roles that they may not fully understand to address capacity issues may have an adverse effect on safe patient care, which is the ultimate goal of perioperative nursing. Other trends in recruiting include traveling nurse companies that are recruiting more and more nurses to fill vacant perioperative roles as a result of hospitals that are shifting nurses from other similar positions, such as in gastrointestinal laboratories or obstetrics units, to work in the OR. Some facilities are conducting tours and educational programs for existing nurses to pique their interest and to urge them to enter the field of perioperative nursing. Finally, health care facilities and nursing schools are forming collaborative partnerships to revise nursing education models by introducing detailed perioperative nursing courses with clinical experiences into the already packed nursing curricula.[9]

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CREATING A PERIOPERATIVE NURSING PROGRAM

In 2012, the director of surgery at a Midwestern hospital system attended a presentation at the annual AORN Congress about the recruitment of nursing students into the perioperative specialty through a partnership with an academic nursing program. In response to this presentation, this director of surgery recognized the need to create a pool of potential perioperative nurses to fill staffing needs and saw an opportunity to address the growing perioperative nursing shortage in her hospital system. She approached the dean of nursing at a local university and suggested a partnership between her hospital system and the university to pilot a simulation-based elective course to increase interest, knowledge, and skills in perioperative nursing among senior students. The dean then contacted one of the university faculty members who is a perioperative nurse to lead this initiative.

A partnership between the hospital system and university had previously existed with the creation of a nurse anesthesia program. That program was so successful that faculty at the university expected a partnership for the proposed perioperative nursing course to be a resounding success. The university involved in this partnership is located in a residential community of approximately 36,000 residents and is highly acclaimed, ranking 14th among 146 peers in the "Universities—Masters (Midwest)" category of the 2012 edition of *America's Best Colleges* by *U.S. News & World Report*.[15] Annual student enrollment at the university is more than 3,000 students, who have a choice of 73 majors and 44 minors along with individualized courses of study. The university offers programs for students to earn bachelor's, master's, and doctoral degrees in nursing. Approximately 60 to 70 students graduate each year from the undergraduate program for nursing.

The hospital system is a not-for-profit charitable health care organization that *Fortune* magazine has recognized as one of the "100 Best Companies to Work For."[16] As one of the top five largest health systems in America, it comprises a network of 11 hospitals, more than 50 ambulatory sites, hospice and home-health services, medical equipment supply, and other health services that span a diverse rural, urban, suburban, and Appalachian 40-county area across the state.[16,17] With more than 22,000 employees, this hospital system has several facilities that range in size from 100 beds to more than 1,000 beds. Each hospital and several satellite care sites in this system offer surgical services in their facilities.

Determining the Stakeholders

Administrators at both facilities approved the partnership between the university and the hospital system. The first step of this collaborative effort involved determining the stakeholders who would be directly involved with the creation of the course. The OR director and the university perioperative faculty member chose staff members to join them at the planning table. Selected staff members included four perioperative educators from three of the hospital facilities, one OR manager, and one simulation laboratory expert. Although there was only one faculty member at the university with perioperative experience, other faculty members volunteered to help with the course as needed.

These initial stakeholders determined the major steps in the process of creating and conducting the perioperative educational experience. These included

- establishing the course description and goals,
- developing a curriculum and schedule,
- implementing the course, and
- evaluating the success of the program.

They developed a pilot perioperative elective course and offered it during a condensed semester, referred to as a J-term because it was held in January 2013. The J-term consisted of an intensive three-week learning experience that offered three credit hours, which is the same number of credit hours offered by courses that are conducted during a full semester.

Although the collaborative relationship among these specific stakeholders was new to all, they formed an immediate bond. The success of this close partnership would demonstrate the need, opportunity, and quality of future cross-disciplinary joint ventures for both the university and the hospital system. The planning committee hoped that the pilot course would increase academic opportunities in specialty nursing courses offered by the university and that it would help address staffing needs within the hospital. For example, the success of this collaborative partnership could not only ensure future staffing for the ORs, but also serve as a model to provide staffing and reduce orientation time for other specialty nursing areas.

Planning Meeting Initiatives

The university faculty member created a description of the perioperative course to market it to senior nursing students. Included in the course description was the following statement:

> *This perioperative nursing course will introduce perioperative nursing, including aseptic technique principles, equipment used in the OR, perioperative patient care considerations, and other critical surgical topics. A strong foundation of perioperative knowledge and skills will be provided in classroom, simulation, Internet, and clinical experiences. At the end of this course, the student will realize if perioperative nursing is a specialty area that is attractive to the student for future employment.*

The planning team reviewed the course description and determined the following goals for this collaborative effort:

- Integrate experiential learning and simulation into the learning/training environment for perioperative nursing students.
- Develop a course that enhances the recruitment of nurses into the perioperative environment.

An anticipated indirect outcome of this course was to shorten the overall OR orientation process for newly hired graduate nurses who participated in this perioperative elective.

The university faculty member also introduced a comprehensive list of course objectives for the planning team to review. The six course objectives (Table 1) aligned with the nursing accreditation standards (ie, Essentials)[18] and AORN perioperative standards[19] and established a framework to direct lecture, simulation, and clinical experiences. After review and approval of the course description and objectives, the next detail for committee members to address was determining teaching methodology for the course.

Teaching Methodology

Traditional approaches to nursing education, including classroom lectures, laboratory return demonstrations, and basic memorization, often lead to technical mastery but may not promote critical thinking.[20] Because critical thinking acquisition is related to structured practice, the design of teaching and learning strategies needs to promote active rather than passive learning. According to Kolb,[21] learning is a continuous process, and the way a person thinks and behaves can be changed by imprinting experiences into existing intellectual frameworks. Although Kolb's theory is not recognized as a specific nursing theory, it can be used as a firm foundation for the creation and implementation of a perioperative nursing course.

Research shows that undergraduate nursing curricula should prepare students in the skills required to function effectively on medical teams.[22] Therefore, members of the committee chose a collaborative, experiential, group learning environment to present a valuable teaching atmosphere and enhance the learning of perioperative knowledge and skills. Committee members hoped that this type of learning environment would increase the students' understanding of group processes, roles, communication skills, and self-awareness in a manner conducive to professional growth. Because teamwork is the foundation of perioperative practice, students' exposure to collaborative

TABLE 1. Perioperative Course Objectives and Essentials

Course objective with nursing essential	Topics
1. Identify leadership skills needed to promote a safe perioperative environment and high-quality surgical care (Essential II: Basic Organizational and Systems Leadership for Quality Care and Patient Safety)[1]	Control measures to enforce proper attire and traffic patterns within different perioperative zones, patient safety practices for quality surgical care, hazards in the OR, emergencies in the OR
2. Describe current evidence and best practices that provide the foundation for perioperative nursing practice (Essential III: Scholarship for Evidence-Based Practice)[1]	Infection prevention practices, use of the *Perioperative Nursing Data Set*,[2] anesthesia options
3. Explain patient care technology (eg, surgical devices, equipment) needed during surgical procedures to maximize clinical outcomes (Essential IV: Information Management and Application of Patient Care Technology)[1]	Energy devices used in surgery, instrumentation, sterilization equipment, positioning devices, airway management technology
4. Discuss the importance of meaningful communication and active collaboration among the different surgical team members to enhance high-quality and safe perioperative patient care (Essential VI: Interprofessional Communication and Collaboration for Improving Patient Health Outcomes)[1]	Different roles and responsibilities of perioperative team members, the art of communication in a stressful environment, effects of active collaborative activities
5. Exhibit the ethical and caring attributes of having a surgical conscience when functioning in the perioperative environment (Essential VIII: Professionalism and Professional Values)[1]	Clinical experiences in different areas of the perioperative environment, professionalism, ethics
6. Assess the complexity and variations in the physical and behavioral responses of patients and their families or significant others to the surgical experience (Essential IX: Baccalaureate Generalist Nursing Practice)[1]	Preoperative assessment, distinguishing perioperative care involved with different age groups, involvement of family members or significant others before, during, and after the surgical experience

1. *American Association of Colleges of Nursing.* The Essentials of Baccalaureate Education for Professional Nursing Practice. *Washington, DC: American Association of Colleges of Nursing; 2008.*
2. *Petersen C.* Perioperative Nursing Data Set. *3rd ed. Denver, CO: AORN, Inc; 2011.*

learning environments in the classroom and skills laboratories is critical to becoming effective team players in their nursing careers.

Critical thinking. Critical thinking is a core skill in perioperative nursing and can be practiced through the use of simulation and the application of adult learning theory.[23] Simulation experiences can help novice students understand specific patient care situations that may change the manner in which nursing care is delivered. The student can feel an increased sense of self-efficacy and confidence in the clinical practice setting when simulation experiences are provided.[22,24,25] Being able to apply learning and theoretical principles in a simulation setting has been demonstrated to improve communication, confidence, and clinical judgment[25,26] and enhance performance.[24] By providing simulation opportunities in nursing education, students are able to practice skills and apply nursing care theoretical principles in a safe environment.[24,25] Advances in technology during the past decade have generated opportunities to create realistic simulations during which nursing students can develop and demonstrate skills and clinical judgment without endangering real patients.[1]

Simulation. Although ultimate clinical proficiency was not an objective of this course, planning team members agreed that simulated clinical experiences provide nursing students with the link between nursing theory and practice. Through simulated learning activities, nursing students can provide safe care even if they are novices.[25] These

simulated experiences that demonstrate specific perioperative skills, which are often missing in the traditional clinical skills laboratory setting, were deemed a requirement for this nursing specialty.

Nursing courses that integrate simulation with didactic learning contribute to improved self-efficacy and confidence levels[25] and may be identified as an early factor in whether nurse students will go on to select perioperative nursing as a career focus. The planning team agreed that experiential learning in the simulation laboratory, which considers reflection and conceptualization during practice, would serve as a framework for the course, thus allowing a focus on hands-on simulation experiences to increase student engagement and learning retention.

Collaborative Curriculum

During six planning meetings, members of the committee created a skeleton perioperative curriculum. They began development of the curriculum by discussing current and best practices, facility options, and technology capabilities. The program planners needed to align their attitudes and ideas about the course before they could develop a collaborative curriculum. University faculty and OR educators toured the simulation centers to observe the training technology and facility capabilities. This aspect of planning the simulation segment of the course was critical because students would need creative simulation scenarios to develop actual perioperative skills.

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The planning team also explored how to best prepare the students for the simulation experiences. After reviewing and discussing different learning opportunities, members of the planning team selected eight AORN *Periop 101*®[27] training modules for the students to review before participating in simulation classes. These modules would be used to enhance the students' knowledge of the perioperative skills that they would practice during their simulation experiences. Reviewing these modules before the simulation experience would help students feel more comfortable with the skill expectations. Included module topics were

- anesthesia;
- perioperative assessment;
- scrubbing, gowning, and gloving;
- positioning the surgical patient;
- safety in the surgical suite,
- skin prep;
- surgical instruments; and
- sterilization and disinfection.[27]

The planning team chose these specific modules because they could be coupled with the simulation experiences and be used as the main instructional tools. Faculty alternated among online, didactic, simulation, and clinical learning experiences over the three-week J-term to provide a comprehensive educational experience.

The university assigned three credit hours to the course. At the university, credit hours are measured as follows: 14 hours of "learning" (ie, didactic) is worth one credit hour, with one hour equal to 60 minutes; courses worth three credit hours must reflect a course schedule with 42 hours of "learning" time. At this university, four clinical hours are equal to one didactic hour (ie, a 4:1 ratio) so the students were assigned to five days (40 actual hours) in the clinical environment (with one day being a tour of the perioperative facilities), which equates to 10 didactic hours. Table 2 illustrates the final schedule, with an outline of the various learning methodologies and assignments integrated into the course curriculum and the number of didactic and clinical hours for each session.

TABLE 2. Schedule for the Perioperative Nursing Course[a]

Day	Date/day/time	Clinical education (clinical hr)	Didactic hr[b]	Assignments/continuing education credit
1	January 3 Thursday 7 AM–3:30 PM	Class 1: Simulation	8	*Periop 101®* ■ Anesthesia (1.3 CE) ■ Perioperative assessment (2.0 CE) ■ Scrubbing, gowning, and gloving(1.0 CE)
2	January 4 Friday 7 AM–3:30 PM	Clinical: Groups 1 and 2 tour hospitals, including simulation laboratories and the perioperative environment	2	Skin Preps (1.5 CE) Positioning the Surgical Patient (2.5 CE)
3	January 7 Monday 7 AM–3:30 PM	Class 2: Simulation	8	Safety in the Surgical Suite (3.0 CE)
4	January 8 Tuesday 7 AM–3:30 PM	Clinical, day 1: Group 1 (8 clinical hr)	2	
5	January 9 Wednesday 7 AM–3:30 PM	Clinical, day 1: Group 2 (8 clinical hr)		
6	January 10 Thursday	(Snow day backup)		
7	January 11 Friday 7 AM–3:30 PM	Class 3: Simulation	8	Surgical Instruments (2.0 CE) Sterilization and Disinfection (2.5 CE)
8	January 14 Monday 7 AM–1:30 PM	Clinical, day 2: Group 1 (8 clinical hr)	2	
9	January 15 Tuesday 7 AM–3:30 PM	Clinical, day 2: Group 2 (8 clinical hr)		
10	January 16 Wednesday 7 AM–3:30 PM	Clinical, day 3: Group 1 (8 clinical hr)	2	
11	January 17 Thursday 7 AM–3:30 PM	Clinical, day 3: Group 2 (8 clinical hr)		

TABLE 2. *(continued)* Schedule for the Perioperative Nursing Course[a]

Day	Date/day/time	Clinical education (clinical hr)	Didactic hr[b]	Assignments/continuing education credit
12	January 18 Friday 8 AM–2:30 PM	Class 4: Simulation and student presentations	6	Prepare for presentations
	January 21 Monday	Holiday (snow day backup)		
13	January 22 Tuesday 7 AM–3:30 PM	Clinical, day 4: Group 1 (8 clinical hr)	2	
14	January 23 Wednesday 7 AM–3:30 PM	Clinical, day 4: Group 2 (8 clinical hr)		
15	January 24 Thursday 8–10:00 AM	Class 5: Review and practice perioperative skills and reflections on perioperative experience by students	2	Prepare for the final examination (simulation)
16	January 25 Friday 8–11:00 AM	Examination (simulation)		

Periop 101 *is a registered trademark of AORN, Inc, Denver, CO.*

[a] *This three-week elective course was offered during the month of January, also known as the J term.*

[b] *Total didactic hours = 42, which is equivalent to three university credits; four clinical hours = one didactic hour.*

Challenges

Committee members identified and discussed the challenges of this new perioperative course at the planning meetings. These challenges included

- marketing a new elective course to senior nursing students who have other options for their between-semester break,
- J-term time limits and the unpredictability of weather because the course would be conducted during a winter month,
- limiting the number of students who could be accommodated while identifying suitable clinical experiences, and
- creating perioperative preceptor criteria.

J-term. The J-term is an intensive experience for students that is offered each year during the month of January, which is strategically placed between the fall and spring semesters. As an optional enrollment opportunity, many innovative electives that the university offered during J-term (eg, study abroad, service-type courses) could be seen as competition for the new course. The planning team knew that marketing of the new course and J-term time and enrollment limits could make it difficult to attract students. Additionally, participating in a J-term course reduces time off between semesters from six to two weeks. Students often use this time off to work, travel home, or take vacations, and it represents the last academic break for senior students. Intense marketing for the perioperative J-term course to address these challenges included describing the details and benefits of this exciting new course at some of the fall senior nursing classes, conducting individual meetings with students by the perioperative faculty member to determine interest, and answering e-mail questions posed by potential students. The passion displayed by the faculty member for perioperative nursing was evident to the students and created an enthusiasm for this course that was demonstrated when it immediately filled to capacity.

Weather. The next challenge involved the unpredictability of weather during the month of January in this midwestern state. Any course offered during the winter has the potential for being adversely affected by the weather. Even though the course schedule was very intense to allow it to be completed in three weeks, the planning team identified, published, and reserved alternate dates for students to attend backup classes if any were missed because of inclement weather. If the university had to close because of weather, the simulation or clinical day also would be cancelled. In the event of a cancelled class due to inclement weather, students bore the responsibility of contacting their assigned preceptors so that rescheduling could be accomplished.

Enrollment limits. The planning team spent considerable time discussing the limitations created by the number of students who could be accommodated and the clinical experiences they would have. Hospital-site restrictions for staffing and the space necessary to accommodate the students were also considered. Across the United States, student access to perioperative clinical rotations has been prevented by the high volume of surgical procedures being performed, limitations on the number of professionals allowed to be present during specific procedures, the need for extra scrub attire to clothe students, and the number of nurses already being oriented who have priority for experience in surgical rooms.[1] This course represented the first time that students were allowed to have a clinical experience in the OR within this hospital system's campuses. Therefore, ensuring that personnel in the various perioperative areas were accepting of the students was extremely important. The planning team worked to help ensure that the students had a positive learning experience, but they also worked hard to see that OR personnel were supportive of these experiences, saw them as valuable, and were minimally burdened by the students' presence. The planning team used education and change management strategies to discuss student presence in the OR and to identify

TABLE 3. Detailed Schedule for Perioperative Nursing Course

Class 1 (8 hr)		Class 2 (8 hr)		Class 3 (8 hr)	
7–7:30 AM	Introductions	7–9 AM	Simulation experience with RN educators, simulation experts, university faculty ■ Scrubbing ■ Gowning ■ Gloving	7–11:30 AM	Energy presentations and demonstrations 7–7:30 AM Hazards of surgical smoke (university faculty) 7–10:30 AM Electrosurgical and ultrasonic energies (industry representative) ■ Electrosurgery ■ Monopolar ■ Bipolar ■ Advanced bipolar ■ Ultrasonic energy 10:30–11:30 AM Laser energy (industry representative)
7:30–10 AM	General overview and basic information Presentation by university faculty: ■ Overview of course ■ Perioperative environment ■ Recommended practices and standards (AORN) ■ PNDS, ethics, professionalism ■ Terminology ■ Where surgery is performed ■ Roles in the OR ■ Surgical attire ■ Zones, traffic patterns ■ Patient flow through the OR ■ Emergencies in the OR (fire safety, radiation safety, respiratory or cardiac arrest) ■ Perioperative assessment	9–11 AM	Simulation experience, continued Positions: ■ Supine ■ Prone ■ Lateral ■ Lithotomy Positioning devices		

(table continued)

TABLE 3. *(continued)* Detailed Schedule for Perioperative Nursing Course

Class 1 (8 hr)		Class 2 (8 hr)		Class 3 (8 hr)	
10 AM–noon	Simulation laboratory tour and experience with RN educators, simulation experts, and university faculty ■ Zones, traffic patterns, attire ■ Surgical setup ■ Equipment introduction ■ Where different surgical team members stand or function; role of team member (role play)				
Noon–12:30 PM	Lunch	11–11:30 AM	Lunch	11:30–12:30 PM	Lunch
12:30–2:30 PM	Simulation experience, continued ■ Opening packs and supplies ■ What is sterile, what is not sterile ■ How to move around in a sterile environment ■ Communication ■ Universal Protocol™ (time out) ■ Among surgical team members ■ Documentation (eg, operative records)	11:30 AM–1:30 PM	Simulation experience, continued Skin preps ■ Different types of skin preps ■ Skin prep techniques	12:30–1:30 PM	Airway management and assisting the anesthesia professional Presentation and simulation experience (anesthesia professional)
2:30–3:30 PM	Anesthesia types presentation by anesthesia professional	1:30–3:30 PM	Simulation experience, continued Identifying different instrument groups and their uses ■ Instrument groups ■ Instrument uses Counts ■ Sponges ■ Instruments ■ Needles	1:30–3:30 PM	Simulation experiences (university faculty, RN educators, simulation experts) ■ Laparoscopic mentor ■ Laparoscopic box

TABLE 3. *(continued)* Detailed Schedule for Perioperative Nursing Course

Class 4 (6 hr)		Class 5 (2 hr)		Final Examination (3 hr)	
8–10 AM	Simulation laboratory (university faculty, RN educators, simulation experts) ■ Simulation quiz: identify what is wrong in an OR room (setup, practices) ■ Students individually identify inconsistencies (eg, room setup, practices) ■ Class discussion	8–10 AM	Review and practice for simulation experience final examination (university faculty, RN educators, simulation experts) Class discussion, debriefing	8–11 AM	Simulation laboratory examination (university faculty, RN educators, simulation experts) Role play and skills assessment ■ Students individually demonstrate the roles of the RN circulator and scrub person
10–10:30 AM	Student presentation no. 1				
10:30–11 AM	Student presentation no. 2				
11–11:30 AM	Student presentation no. 3				
11:30 AM–noon	Lunch				
Noon–12:30 PM	Student presentation no. 4				
12:30–2:30 PM	Reflections on and discussion about clinical experiences				

The Universal Protocol for Preventing Wrong Site, Wrong Procedure, Wrong Person Surgery is a trademark of The Joint Commission, Oakbrook Terrace, IL.

PNDS = Perioperative Nursing Data Set.

the advantages of this new elective in various meetings with OR personnel and surgeons throughout the planning phase of the course. The planning committee published articles in the hospital newsletter to communicate progress of planning for this course within the department. The committee's decision to maintain a low enrollment, with a maximum of four students, was to minimize disruption to OR personnel and enable a smooth transition to a new learning model.

Preceptor criteria. The inclusion of students in the perioperative areas for their clinical experiences was new for the hospital system; therefore, the planning team had to review the academic and hospital campus preceptor requirements. The university requires that preceptors have an unencumbered professional nursing license (ie, no violations, no restrictions on practice) and at least two years of perioperative experience with a demonstrated competence in this area of clinical practice. Additionally, the OR managers at the hospital campuses would need to provide these staff member preceptors during the student's scheduled clinical days. The ongoing challenges of nursing shortages in the OR, the limited number of nurses willing to serve as preceptors, and the need to provide a consistent learning experience for the students presented barriers that had to be addressed before the start of the course. To address these issues, the course educators met with each potential preceptor to discuss the role of the preceptor, student assignments and skills laboratory experiences, and other expectations to provide a consistent and effective clinical experience.

IMPLEMENTING THE PILOT COURSE

The university faculty member along with a team of OR nurse educators and the simulation laboratory expert led the entire curriculum, as outlined in detail in Table 3. A variety of teaching methods were used during the course, including lecture, discussion, case studies, group presentations, Internet assignments, audiovisuals, demonstration, simulations, observation, and clinical experiences.

Because each segment of the course was built on the previous segment (eg, the assignments using the AORN *Periop 101* online modules prepared the student for the classroom presentations), the classroom presentations reinforced this new information and allowed students to discuss the material and ask questions. By the time students entered the simulation laboratory to practice a specific skill, they had the foundational information to demonstrate their understanding of the concepts presented in class. The simulation laboratory also provided a safe setting for practice without the negative consequences of performing a skill incorrectly in the clinical setting. The skills could be practiced over and over until the student felt comfortable and exhibited competence. Finally, the student entered the clinical environment to perform the newly learned perioperative skills in the real setting with real surgical patients. The students' clinical time also allowed them to expand their knowledge of perioperative nursing by experiencing the sequences of events during the actual care of a surgical patient, which cannot be learned in the simulation laboratory.

During the course's first day of class, university faculty introduced students to various settings in the perioperative environment and the role of the perioperative nurse. Perioperative practices are evidence based; therefore, instructors explained how to use the AORN *Perioperative Standards and Recommended Practices*[20] as a valuable resource and also discussed ethics, professionalism, and other expectations of a perioperative nurse. Other topics covered were surgical attire, traffic patterns, patient flow, responding to emergencies, and perioperative assessment. The students visited the simulation laboratory to review zones within the OR and identify routine surgical furniture and equipment. The hospital educators enacted a simulated exercise portraying the different roles within the surgical suite, along with how each professional functions during a procedure. The students were taught what is sterile and what is not sterile and how to move within a surgical suite. Later in the

day, the students practiced opening different types of packs and supplies while demonstrating a surgical conscience. A simulation along with reflection was held at the end of the day to discuss time outs, surgical counts, and documentation principles. This first day culminated with a presentation by a nurse anesthetist on general, regional, and local anesthesia.

With this introduction to perioperative nursing, the next day the students then toured two hospitals and visited the different preoperative areas, intraoperative rooms, postanesthesia care units, and sterile processing departments. The students were able to note the different surgical settings, attire to be worn, sterile technique, patient communication, and other basic perioperative practices. Each student was able to see his or her assigned clinical site, which helped the student feel more comfortable for the first day of the clinical experience.

The preceptors understood what the students had covered in the classroom and simulation laboratory and were able to build on that knowledge by ensuring that the students were able to perform some of those skills under the direct supervision of the preceptor.

The second class provided intense simulation experiences to practice the skills of scrubbing, gowning, and gloving; patient positioning; patient skin preps; and surgical instrumentation. Four educators were present, and each student had his or her own educator to review the simulated skills to be practiced. This one-on-one relationship fostered quick learning by the students because immediate attention could be given to assist the students and answer questions. The students were able to observe one other, which gave them a sense of pride and accomplishment when a skill was performed well. The university faculty member was also present to answer questions and offer information on best practices. After the students learned to scrub, gown, and glove, they were expected to gown and glove one another. Patient positioning included supine, prone, lateral, and lithotomy positions. Instructors demonstrated the proper use of various positioning devices and identified pressure points, after which the students practiced positioning a simulated patient while using padding when necessary. Faculty also demonstrated different skin prepping solutions, prepping kits, and techniques. The students were expected to perform an abdominal prep using two different types of prep kit applications. Instructors reviewed instrument categories, and the students were able to handle and examine the various instruments in a general surgery set. One of the goals of this activity was to prepare the students for their first day of clinical experience.

For the first clinical day, students were assigned to one of three surgical sites on two hospital campuses. Clinical time was spent one on one with a nurse preceptor experienced in surgery orientation. The preceptors understood what the students had covered in the classroom and simulation laboratory and were able to build on that knowledge by ensuring that the students were able to perform some of those skills under the direct supervision of the preceptor. The clinical experiences offered reinforcement of the group learning activities gained in the classroom and simulation laboratory. The students had a total of four clinical days during this J-term course, each lasting eight hours.

The third classroom/simulation day began with a presentation about the hazards of surgical smoke by the university faculty member. An industry representative then described electrosurgical energy and gave a general presentation about how electrical energy is used to cut and coagulate tissue. The representative then conducted a skills laboratory to demonstrate the electrosurgical energy. Three students were allowed to practice cutting and ablating different substances, including steak, chicken, and apples, while one student was in

charge of smoke evacuation. An industry representative from a laser company provided information about laser biophysics and safety. The students again returned to the laboratory to observe the setup of a carbon dioxide laser and then to practice using this energy by writing their names on wet tongue blades. They also compared the action of the laser beam on the tissue with the electrosurgical energy. Instructors discussed other energies used in surgery, including ultrasonic and thermal (heat and cryotherapy) energies. Next, the director of the nurse anesthetist program along with a senior student nurse anesthetist presented a session about airway maintenance and discussed how the perioperative nurse can best assist an anesthesia professional during induction. The students were then shown the basics of intubation and were allowed to try to intubate a simulation manikin to help understand how to best help an anesthesia professional during intubation. At the end of the class, the students were able to use a laparoscopic simulator while trying to perform a laparoscopic cholecystectomy. The students quickly realized the difficulty maneuvering instruments during laparoscopic simulation.

During the J-term, the students were able to use their perioperative knowledge and skills in the surgical setting. The preceptors managed the students as they circulated and scrubbed for a variety of different procedures. During the last week of the course, the students took the final examination, which was simulated. The four educators set up a surgical scene portraying the roles of circulating nurse, scrub nurse, surgeon, and anesthesia professional, with a simulator manikin as the patient. The students were instructed to write down every infraction noted (eg, attire, sterile technique, sterile environment, communication) and were expected to find at least 15 errors during this scenario. Some of the errors included

- hair hanging out of the surgical cap,
- uncovered dangling earrings worn by the scrub nurse,
- the RN circulator handling bloody sponges with bare hands,
- the anesthesia professional wearing her mask under her nose,
- the patient's arm abducted too much,
- the patient's feet uncovered,
- the electrosurgical unit (ESU) pencil dangling below the sterile field,
- no goggles worn by the surgeon,
- the count written incorrectly on the white board, and
- a coffee cup on the anesthesia machine.

At the end of the session, after each student had completed the quiz, instructors held a debriefing session to discuss each infraction. This experience not only provided a great learning experience, but the students stated that they really had fun with this type of learning.

In the afternoon of the fourth class session, each student delivered a presentation on a surgical patient he or she followed during a clinical experience. The students were instructed to pick a patient during one of their clinical days and visit with the patient preoperatively to learn about the patient's physical, emotional, and mental states and discuss the surgery to be performed. The student was expected to accompany the patient into the surgery suite and assist with the circulating duties. The student then accompanied the patient to the postanesthesia care unit area and observed the patient's experience in this area until discharge. After obtaining the patient's permission and referring only to the patient as "my patient," the student prepared and presented the case study to the other students, educators, OR director, and university faculty members in the audience. The student also reflected on this perioperative experience and how it affected him or her.

The day before the end of the course, faculty members scheduled a practice time for students in the simulation laboratory so that they could practice any skills they felt weak in performing. The four educators assisted the students in performing

all the skills taught during this course and the skills they would be expected to perform in the final simulation examination the next day. The students practiced all the skills, but seemed to focus on gowning and gloving, along with patient preps, because these tasks seemed to be more difficult for the students to perform. After the practice session, the students returned to the classroom to discuss the final examination expectations with the four educators and the university faculty member.

On the last day of the course, the students took the final simulation examination in the presence of the four educators and the university faculty member. Instructors took two students at a time into the simulation room and observed as one student performed the role of the scrub nurse while the other served as the RN circulator. Then the students switched roles so that each student had an opportunity to perform in each role. In the scrub nurse role, the student was expected to perform the following skills:

- open gown and gloves for donning after the scrub,
- scrub,
- dry their hands after the scrub,
- don a gown and use closed glove technique to don gloves,
- gown and glove another member of the team,
- request a contaminated glove be removed and then re-glove,
- participate in a sponge and sharps count,
- receive liquids onto the sterile field and label the liquid,
- participate in the time out, and
- remove a contaminated gown and gloves.

Students were not asked to demonstrate passing instruments; however, this will be included in the next class. The student in the RN circulator role was expected to perform the following skills:

- open sterile packs and supplies,
- greet the patient,
- identify the patient,
- move the patient onto the surgical bed (with help from others),
- position the patient for a procedure,
- apply the ESU pad,
- tie up the scrub person's gown,
- remove the scrub person's contaminated glove,
- open another sterile glove for the scrub nurse,
- participate in the count,
- record the count on the white board,
- pour liquid onto sterile field, and
- conduct the time out.

The most notable outcome was the increased interest in perioperative nursing that led to two of the four senior nursing students who completed the course being hired by two of the hospital campuses.

The educators asked questions during the examination to test the student's knowledge of a particular skill or practice. After the first two students were finished, the other two students experienced the same method of examination. After completion of the final examination, instructors held a debriefing to highlight the experience while answering any questions from the students.

The university requires that a student achieve at least a 77% total average for the coursework. In the clinical environment, the student also must achieve at least a satisfactory rating from the preceptor, on a scale of outstanding, satisfactory, and unsatisfactory, to pass the course. All students performed well according to their clinical preceptors and received "A" grades for this part of the course. Each of the three simulation classes was worth 15 points, the student presentation of a case study was worth 15 points, the simulated quiz was worth 15 points, and the final simulation examination was worth 25 points, for a total of 100 possible points for the entire course. The university faculty member, together with input from the OR educators,

rated the student's success during the simulation experiences and classroom activities. Class and simulation laboratory and clinical experiences were mandatory. If a student missed any class or clinical experience, a make-up plan had to be implemented to ensure that the student gained the required skills and clinical experiences needed to pass the course.

The university faculty member, OR educators, and preceptors were able to work very closely with the students because there were only four students in this pilot class. The individualized attention was critical in the careful instruction and assessment of each perioperative skill needed to successfully complete the course. Reflections shared by the students also were extremely valuable to faculty to help promote positive student attitudes and also intermingling of the students within the culture of the OR.

EVALUATING THE PROGRAM

This innovative elective course resulted in many positive outcomes. These include

- development of an elective perioperative course option for undergraduate nursing students,
- increased interest in perioperative nursing,
- identification of potential OR and/or surgical nurse new hires for the hospital campus ORs,
- a reduction in orientation and precepting time needed for new hires, and
- a reduction in hiring and orientation costs to the hospital system.

The university added this course to the undergraduate nursing curriculum for a second J-term in 2014 and may consider offering it as a full semester class in the future. Additionally, the university intends to use this planning model to pilot other elective courses for alternate specialty areas, such as case management. The course's success has increased the effectiveness of the partnership between the university and hospital system. The cross-section of experience and knowledge within the planning team offered a dynamic and diverse group to help meet the program's goals.

Although a larger number of students completing this pilot course would offer increased validity of the identified outcomes, the positive effects of this partnership are evident. The most notable outcome for the hospital system was the increased interest in perioperative nursing that led to two of the four senior nursing students who completed the course being hired by two of the hospital campuses. Hiring these graduating nursing students reduced the human resource costs of recruiting and hiring nurses for the perioperative area. Orientation time for new perioperative nurses can be extensive. Although the nurse staffing numbers and vacancies may be lower than within other hospital departments, the orientation length in the perioperative environment is often five to six times longer (eg, the average orientation time usually reported in this hospital system for perioperative nurses is approximately six to 12 months because of the intensity of skills required; D. Doyle, MS, RN, CNOR, NE-BC; in person communication; December 12, 2013). Following the course experiences and interactions with perioperative leaders and staff members, the orientation time for these two newly hired nurses was determined to be four to eight months. The reduced orientation time resulted in the newly hired nurse becoming functional much sooner, which resulted in improved productivity for both the preceptor and the new nurse. Additionally, because the course also eliminated the talent search process and reduced the application process, the hospital system also realized a reduced cost in human resource efforts. The exact dollar figure is undetermined, but includes human resource and OR manager staffing time for recruitment, interviewing, and the application process. The two students who did not chose perioperative nursing went into other areas. One went into intensive care nursing while the other student is currently pursuing ministry with plans that include also working as a perioperative nurse in the future.

Additional outcomes of this perioperative nursing course included opportunities to offer senior practicum and nursing electives in various specialty

Amb Ambulatory Takeaways

Ambulatory Perioperative Nursing Programs

The shortage of nurses is critical in all practice settings, but especially in perioperative practice. Approximately 75% of perioperative nurses are 50 years of age or older, and 65% will retire within the next 10 years.[1] Experts anticipate a perioperative nursing shortage if some type of clinical education is not introduced to nursing students. Ball et al[2] have described a program to address these issues.

Current education models do not offer an adequate amount of perioperative clinical experience to nursing students. This lack of clinical exposure (eg, two days of observation versus four to six weeks of clinical training for other specialties) combined with the limited resources and busy schedules of managers in ambulatory surgical centers (ASCs) lead to new or inexperienced nurses not being qualified for perioperative positions. Solutions are needed to address this issue of staffing ORs with qualified perioperative nurses, but especially in the ASC setting.

One approach to recruiting nurses to a particular specialty practice area is to expose student nurses to the specialty to gain skills and evaluate whether the specialty interests them. Many hospitals have started offering specialty practice apprentice programs to student nurses during summer break to introduce them to a specialty area. In a perioperative apprenticeship program, students undergo four weeks of didactic learning on sterile technique, OR hazards, and basic OR skills. The students are then assigned to participate, with supervision, in surgical procedures. Graduates of these programs often apply for positions in the OR at which they apprenticed. Personnel in ASCs can implement programs like these to expand their pool of nurses to recruit. Although these graduate nurses would need further clinical orientation after being hired, they would have knowledge of the specialty and some practical skills, thus reducing the amount of time required for their orientation. Another approach to recruiting ambulatory nurses is for ASCs to partner with nursing schools to provide students with clinical opportunities in the ambulatory setting. Students could elect to participate in these programs during their last six weeks of clinical experiences.

Ambulatory surgery centers often have less training and orientation resources available compared with hospitals (eg, hiring outside educators, paying for staff members to attend conferences or programs) and therefore must find economical yet effective solutions for orienting new staff members. A perfect resource is AORN's *Periop 101: A Core Curriculum*™.[3] The training modules in this education program can serve as a didactic resource for ASC personnel to use together with mentoring from experienced nurses in providing new nurses with the cross-training needed to work in an ASC. In this manner, ASCs can participate in educating students to the OR and also be proactive in responding to the perioperative nursing shortage.

Editor's note: Periop 101: A Core Curriculum *is a trademark of AORN, Inc, Denver, CO.*

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areas within the hospital system and improved communication among and within perioperative areas across the participating hospital campuses. The improved communication included exciting discussions regarding a systems approach to perioperative orientation, ongoing training, hiring, and on-boarding practices.

Another opportunity arose as a result of the J-term perioperative nursing course. During the spring semester (which is the final semester before graduation), the OR director allowed one senior student who had not taken the J-term perioperative course to take a senior practicum rotation in surgery. This practicum is fifteen weeks in length because it extends across the entire spring semester. This is different from the abbreviated three-week J-term elective course; it offers more clinical experiences and the student has an assigned preceptor and attends orientation sessions at the hospital facility to learn perioperative skills. The OR director, who saw the value in the J-term course along with the participating students' excitement about perioperative nursing, allowed this senior practicum to occur. As with the students who took the J-term pilot course, the senior practicum student was also offered a position in the OR on graduation and has been assigned to the reduced orientation program. This resulted in an additional savings because the new nurse becomes a functioning member of the team sooner.

The nursing students, university faculty, and hospital system staff members all evaluated the J-term perioperative course positively. Pre- and posttest results of a survey given to the students indicated increased confidence levels associated with performing the perioperative skills introduced during the course. Those skills involved basic OR preparation, including gloving, gowning, and room setup. Competent skill demonstration aligned with the reported increase in confidence for OR roles, equipment use, and patient positioning. Preceptors and educators indicated increased student knowledge and abilities throughout the three-week term for the course participants. Surgical educators and preceptors indicated reduced personal anxiety related to hiring new graduates. The students consistently reported that the relationships developed with the preceptors and the OR educators contributed to their increased confidence and their plans to seek employment in a perioperative environment. Different from other perioperative courses, the application of Kolb's experiential learning theory to simulated course experiences may have fostered the students' higher level of thinking and reflection and therefore may have affected the faculty and staff member's positive observations and feedback.

The students also rated each of the AORN *Periop 101* modules they reviewed. Analysis of the data showed that all modules received ratings from 3.25 to 4 on a 4-point Likert scale, with 4 being the highest. The highest-rated module was Perioperative Assessment, and the lowest-rated modules (even though these ratings were still very positive) were Positioning the Surgical Patient and Surgical Instruments. The students suggested that videos be used to help understand the positioning practices and devices in more detail. The students rated the simulation experiences as the best learning activities in the course. They also rated the quiz that challenged their knowledge to pick faulty practices very highly and settings in the simulated intraoperative scene as contributing to the students' sense of a surgical conscience. One student, who delivered the university's 2013 student commencement address, proclaimed his experience as "exceptional." Another student remarked, "The course brings in a breath of new, fresh air as we never were given the opportunity to be fully exposed to the OR in other courses." Yet another commented, "I would greatly recommend this course to other students." The students also rated the clinical experiences very high and stated that they provided valuable learning opportunities about the role of the perioperative nurse. Students also gave the final examination high ratings. They said that they much preferred simulated testing compared with completing a written test. Faculty members are using these comments along with face-to-face interviews

with the students completing the course to refine future perioperative courses that will be offered at the university.

Faculty identified two unforeseen outcomes during the course implementation and evaluation

- opportunities to offer a senior practicum and nursing electives in various other specialty areas within the hospital system, and
- ways to improve communication among perioperative areas across the participating hospital campuses.

Other specialty areas within the hospital system also are experiencing nursing shortages, and faculty are exploring and conducting preliminary discussions to offer senior practicums and/or nursing electives in these areas that follow the model of the perioperative nursing course. These added courses and experiences may assist in elevating the students' interest in other nursing specialty areas that are experiencing shortages.

The OR director and clinical educators also reported improved communication among their various surgical areas. This collaboration expanded across three hospital systems and four surgical departments that were used to implement this perioperative nursing course. Because of the regular and open communication, the OR educators found commonalities among the different hospital clinical sites, but more important, they found unexpected differences in practices and policies. In an attempt to standardize across all hospital campuses, the educators are collaboratively striving to create consistency. This, in turn, could save the hospital system money, time, and energy by reducing inconsistencies and redundancies in practice. In addition, this unique collaboration can creatively help to meet staffing needs in the OR for all campuses within the hospital system, even those not directly involved with the course.

CONCLUSION

Members of the course planning committee added advanced simulation technology to the perioperative nursing coursework to create realistic perioperative scenarios, and the nursing students involved with this elective perioperative J-term course were able to develop and demonstrate clinical judgment without endangering real patients. The perioperative skill simulations appeared to contribute to the students' improved self-efficacy and confidence levels which, in turn, was a factor for these students in selecting perioperative nursing as a career focus. If the university offers more courses that incorporate experiential learning theory methods and simulation that align with clinical experiences, positive outcomes could affect the current and anticipated nursing shortages in this specialty area and others. This pilot course enabled the OR director to identify and hire nurses more quickly and move them from new graduate status to full employment status in a shorter time. Partnerships between academia and hospital systems together with innovative methods of teaching and learning can help solve the major challenge of staffing ORs in the future. AORN

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