The use of simulation in nursing education is not a new phenomenon. Mrs. Chase has been used to teach fundamental nursing skills since the early 1900s, when the Chase Company made an adult-sized nursing skills mannequin incorporating the same characteristics of realism and durability as the play dolls they manufactured. Simulation refers to any number of strategies used to reproduce the essential aspects of a clinical situation for the purpose of facilitating learning. As technology improves, so do the tools available for simulating patient care encounters. Simulation methods occur along a continuum from very-low-fidelity examples, such as using injection pads to help with a student’s first injection, to high-fidelity patient simulators, such as SimMan and MetiMan, with realistic anatomy and clinical function, or Noelle, which provides a complete birthing simulation. In regard to high-fidelity simulation, without a structured plan for when, why, and how simulation will be used, the simulator is no more than an expensive and rarely used adjunct to traditional teaching/learning practices.

Simulation is defined as any method used to simulate an actual patient care encounter. High-fidelity computer simulation provides students with an opportunity to practice skills, increase self-confidence, improve communication, and develop critical thinking skills in a safe environment, without compromising patient safety. Standardized patients, by definition, use an actor or patient stand-in to reproduce a scripted clinical scenario, which includes predetermined learning objectives. Faculty charged with implementing simulation may well ask “We bought a computerized patient simulator, now what?”

Faced with an expensive high-fidelity simulator, unused after nearly a year, 2 faculty members in our department of nursing became early and enthusiastic proponents of its use. Over the course of 3 years, several other faculty and ever increasing numbers of students expressed interest in expanding the use of simulation. After much discussion, faculty agreed to implement a formal simulation plan rather than using simulation as an innovative but randomly used teaching strategy. As we began planning to expand our use of simulation, the following questions were posed: (a) What are our student learning goals? (b) Where in the curriculum does simulation best fit? (c) What concepts are best addressed using simulations? and (d) What are the logistics of implementation? Other topics of note included the need for continued faculty development as well as formulation of a plan for evaluating the use of simulation.

**Resources**

This plan was developed in a small baccalaureate nursing program, with 10 full-time, tenure-track faculty and limited resources. Students enter the nursing program in their sophomore year. There are approximately 240 full-time prelicensure and 80 RN-BSN students enrolled in the program. The clinical simulation laboratory is composed of a 6-bed learning resource center and 2 small anterooms, used to house the high-fidelity patient simulators. The simulation rooms are adjacent to each other with a 1-way mirror and intercom system to facilitate observation and communication. Simulation resources include 2 adult and 1 infant high-fidelity patient simulators, obstetrical and virtual intravenous moderate fidelity simulators, as well as a variety of traditional low-fidelity simulation aids.

**Developing the Curriculum Map**

The first step toward integration involved developing a curriculum map. This process included identifying key concepts and student learning outcomes that we wanted to facilitate through the use of simulation. Next, we determined where in the curriculum these concepts would best fit. Based on a comprehensive review of the literature, evaluation of our curriculum, and specific student learning outcomes, we decided to focus on the following curricular concepts: therapeutic interventions, assessment, communication, and critical thinking/clinical reasoning.
Simulation scenarios of increasing complexity would be used throughout the program to reinforce and/or expand on these concepts.

The next task was to specify learning objectives for each concept and map those learning objectives across the curriculum. Faculty identified existing scenarios or developed scenarios designed to meet specific learning objectives. Table 1 provides an abbreviated example of the concepts, student learning outcomes, and scenarios used throughout the curriculum.

Following are examples of how simulation is used throughout the curriculum to facilitate the development of selected curricular concepts. At this point, several of the examples are fully implemented, whereas others are planned for implementation over the next 2 years.

### Key Concepts

#### Therapeutic Interventions

Low- to moderate-fidelity simulation is used extensively early in the program to facilitate skill acquisition. As students move through the curriculum, high-fidelity computerized patient simulators provide students with an opportunity to practice nursing interventions in a realistic and supportive environment. In each of the computerized patient simulation scenarios, students are expected to demonstrate safe and competent nursing practice. The scenarios increase in complexity and number as students progress through the nursing program.

Health assessment is taught during the first semester of the nursing program. In the laboratory component of this course, high-fidelity patient simulation is used to augment material taught during the didactic component and also to evaluate students’ learning. For example, after a lecture on heart sounds, simulation is used to facilitate students’ ability to identify and differentiate normal versus abnormal heart sounds, as well as assisting with correct placement of the stethoscope while assessing these sounds. During the midterm and final evaluations, simulation may be used to evaluate the students’ ability to assess and differentiate between normal and abnormal sounds. Before using simulation in this approach, students from our RN-BSN track were asked to verify the sound quality of our simulators.

After completing the health assessment course and before their first clinical experience, students must demonstrate competency in performing a head-to-toe bedside assessment. With the use of simulation, it is possible to program the simulator with selected abnormalities, which the student is expected to correctly identify and document. Thus, clinical faculty can use simulation to evaluate each student’s bedside assessment skills before beginning their first clinical experience.

During the second year of the nursing program, prelicensure students must demonstrate a newborn assessment. After the students read the related chapter, view a video on neonatal assessment, and have the corresponding lecture, they perform an assessment and assign an APGAR score on SimBaby, who is programmed to respond like a newborn, immediately after delivery. The students execute the skill in groups of 4. Two of the 4 students perform the assessment and related documentation as the second pair observes. The student pairs then reverse the roles of caregiver and observer. In this experience, students work together to analyze what worked effectively, identify opportunities for improvement, and provide support to each other. After the simulation, the 4 students meet with the instructor. The instructor acts as a facilitator and intermediary during the debriefing to ensure that necessary points are discussed and that the

### Table 1. Abbreviated Curriculum Map

<table>
<thead>
<tr>
<th>Placement</th>
<th>Concepts</th>
<th>Student Learning Objectives</th>
<th>Simulation Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year of nursing program</td>
<td>Assessment</td>
<td>Perform accurate bedside assessment</td>
<td>Postoperative appendectomy</td>
</tr>
<tr>
<td></td>
<td>Written communication</td>
<td>Differentiate normal and abnormal bowel sounds</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assess dressing, IV site, and pain</td>
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<tr>
<td></td>
<td></td>
<td>Accurately document findings</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Accurately administers induction medications</td>
<td>Labor induction leading to delivery of infant and newborn assessment</td>
</tr>
<tr>
<td></td>
<td>Newborn assessment</td>
<td>Explains rationale, interventions, and expected outcomes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Written communication</td>
<td>Obtains accurate maternal, newborn, and delivery history</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Critical thinking Interventions</td>
<td>Performs basic newborn assessment and documents appropriately</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hispanic woman with chest pain</td>
<td></td>
</tr>
<tr>
<td>Second year of nursing program</td>
<td></td>
<td>Assessment (risk factors for acute coronary syndrome)</td>
<td></td>
</tr>
<tr>
<td>Third year of nursing program</td>
<td>Communication</td>
<td>Identification of resources for communicating with limited</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cultural differences</td>
<td>English-speaking patients/families</td>
<td></td>
</tr>
</tbody>
</table>
process remains a positive learning experience for the students.

Regardless of where nurses practice, the chances that they will encounter patients who are mentally as well as physically ill are great. Patients presenting with symptoms of depression, delusions, suicidal ideation, and uncontrolled anger are common. Determining whether a patient’s psychiatric symptoms are caused by a mental or physical problem is difficult because many physiological diseases can mimic psychiatric disorders. A thorough physical and psychological assessment is needed. The use of patient simulators with clinical case scenarios that include psychological components is an effective and efficient way of augmenting the mental health nursing curriculum. Clinical simulation can be used to integrate mental health content by including scenarios that blend physical and psychological symptoms. An example is using a scenario in which the patient experiences anxiety, confusion, and visual hallucinations that can be a result of either a physical cause, such as an adverse reaction to medication, or a psychological cause, such as schizophrenia.

By the final semester of the program, students are expected to demonstrate much greater proficiency in their assessment skills. For example, the computerized patient simulation scenario may involve a patient who presents to the emergency department with a complaint of chest pain. Students rapidly assess the patient, obtain a health history, initiate cardiac monitoring, verbalize abnormal findings, and intervene appropriately.

Communication

Teaching strategies involving written and verbal communication are enhanced by simulation. Role playing, which is considered a type of simulation, has been historically used in nursing to teach therapeutic communication. Simulation with a “standardized patient” can be used to facilitate acquisition of therapeutic communication techniques. Rather than using high-fidelity patient simulation, a student volunteer from another nursing class, member of the faculty, or student actor from the drama department simulates a standardized patient. The standardized patient is expected to come prepared for the role, using a standard script, thus providing students with a consistent and realistic experience. As students progress, more challenging scenarios are implemented. Examples of scenarios requiring skilled communication and practice include (a) diffusing a hostile situation, (b) handling inappropriate sexual overtures, and (c) dealing with a grieving family. The use of simulation provides students the opportunity to practice therapeutic communication during emotionally charged situations in a safe and supportive environment. These practice sessions can be videotaped, giving the student an opportunity to evaluate their performance.

In addition to therapeutic communication, nursing students must be able to communicate effectively with patients of all ages, backgrounds, and cultures. It is critical that students learn to care for an increasingly diverse population with the ability to provide racially, ethnically, and culturally sensitive healthcare. Although nurses receive education about cultural values and practices, many remain inadequately prepared to care for, or communicate with clients from cultures and races different from their own. There is a void between the cultural information received and a true understanding about race and ethnicity and how discrimination influences healthcare. The use of standardized patients as well as computerized patient simulators, with clinical scenarios that include racial and ethnic components, can be used to facilitate the development of culturally competent nursing care.

Culturally competent clinical scenarios are integrated into the medical-surgical simulation laboratories. For example, a “standardized female Vietnamese patient” is quiet while not making eye contact but may be in pain, distraught, or unhappy. The student is expected to understand that people of Vietnamese heritage may be perceived as passive. When interviewing this patient, the student should consider that, even though a patient is stoic, he/she may still experience pain. This scenario assists the student in understanding that a patient’s culture may influence how the patient experiences pain and his/her illness. Educational experiences in a safe environment that simulate cultural diversity are useful in preparing nursing students for the current global healthcare environment.

Critical Thinking/Clinical Reasoning

Facilitating the development of critical thinking and clinical decision making are important concepts for which simulation can be used most effectively. Early in the curriculum, use of computerized patient simulation for clinical decision making focuses on patient safety. In this example, students working in groups of 4 provide care to a “simulated patient” admitted with pneumonia. Students have access to the patient’s chart, including physician orders and nursing notes. During their assessment, the “patient” complains of feeling short of breath with vital sign changes, including an increase in respiratory rate. The objective is that the students should consider the patient’s underlying condition, identify possible causes for abnormal findings, and intervene appropriately by elevating the head of the bed, assessing the patient’s oxygen saturation, and assuring that oxygen is being administered as ordered. In this particular scenario, the oxygen is either not hooked up or the patient has removed it.

While rotating in Reproductive Health, which includes Labor and Delivery, Postpartum, Nursery, and Neonatal care, the first simulation the students encounter is a labor induction, including the delivery of an infant. The students have assigned readings and a series of lectures over the course of 5 weeks that prepare them to participate in a simulated induction on Noelle. In the simulation laboratory, the students receive a patient chart, which includes a prenatal history and physician orders that direct them to carry out a labor induction. The induction proceeds to labor and, eventually, to the delivery of the infant. The students are grouped in units of 4 students. Each student is assigned 1 of the following roles: team leader, intervention nurse, secondary nurse, and documentation nurse. The simulation includes an assessment of the mother and the fetus, patient teaching regarding labor induction, initiation of an IV, the administration of Pitocin, collection of admitting laboratory results, Foley catheter placement, fetal
and maternal vital sign monitoring, and documentation. The students use standardized hospital policies for labor induction and IV insertion in this scenario. The simulation requires that the students think critically and intervene under various conditions throughout the case scenario. At the conclusion of the scenario, the students have a debriefing with the instructor to provide feedback regarding the students’ performance.

Pediatric simulation scenarios require critical thinking and problem solving in caring for an infant with gastroenteritis and dehydration. The students are once again placed in groups of 4, with each student carrying out 1 of the following roles: the primary nurse, the secondary nurse, the documentation nurse, and the patient’s parent. The students begin this simulation with a call from the admitting department informing them of an admission. They are required to perform an admission assessment, obtain past medical history, call the physician with the findings, and obtain appropriate orders. The student starts an intravenous line and draws blood for laboratory analysis. Interpretation of laboratory results related to dehydration is an important part of this simulation, which requires critical thinking. Finally, the scenario necessitates parent teaching regarding the hospitalization, patient diagnosis, and expected treatment regimen. After completion of the scenario, the students debrief with the instructor and feedback is provided.

In their final medical-surgical course, offered during the third year of the curriculum, students participate in a minimum of three 2-hour simulation sessions. With the increased number of nursing students and increased competition for clinical sites, students are not always able to care for challenging and/or complex patients. The use of simulation can provide students with an opportunity to care for these types of patients by using scenarios to develop both the necessary critical thinking skills and a beginning comfort level when critical situations arise. The simulation sessions occur at the beginning, middle, and end of the semester. The purpose of these strategically placed times is to assess growth over the semester. All sessions consist of students working in small groups. During the first session, students are expected to demonstrate proficiency in assessment and organization. As the semester progresses, students participate in more complex scenarios challenging their critical thinking, clinical decision making, and communication skills. Thus, a scenario might start with a comatose patient admitted to the emergency department with no other information available. Students are expected to conduct an assessment of the patient, including a neurological assessment. Critical thinking skills would include identifying possible causes such as metabolic disequilibrium, drug or alcohol overdose, or an adverse neurological event, such as a head injury or stroke, as well as being able to anticipate potential medical and nursing interventions. Effective communication and teamwork must be used as the patient’s condition deteriorates.

**Logistics of Implementation**

After much discussion, the faculty decided that clinical courses are the most appropriate area in which to implement simulation, with agreement that no more than 10% of clinical hours would be used for simulation. We decided that, initially, simulation would be used primarily as a teaching strategy, and as faculty become more comfortable with simulation, it could be used for testing clinical competence. Previous research shows that additional faculty time and resources are required to implement simulated clinical scenarios. Depending on complexity, it takes approximately 30 to 60 minutes to run each scenario. Although having 2 faculty members available would be optimum, this is usually not feasible. Thus, there is generally only 1 faculty who runs the scenario while simultaneously observing students’ performance through the 1-way mirror. Two options for freeing up time for the simulations have been identified. With each, a set amount of clinical hours are devoted to simulation, and these hours are spread throughout the semester. The first option has each clinical faculty responsible for running his/her own simulations, with responsibility for as many as 4 different simulations. With the second option, each instructor develops and implements one simulation and is responsible for running that simulation with all students, not just the students in their clinical section. For example, the clinical instructor with expertise in respiratory care would conduct the respiratory failure simulation for all students in the course, whereas the cardiac expert would run the acute coronary syndrome simulation. In this way, each instructor has to become adept at only 1 simulation, whereas students have the opportunity to experience up to 4 different simulations.

Regardless of which option is chosen, each clinical instructor is ultimately responsible for his/her own students. Use of simulation provides an opportunity to assess each student’s skills and knowledge in a way that is not always possible in the hospital setting. Thus, clinical faculty may be better able to identify students at risk of failure and to provide remediation as needed.

One major obstacle identified was “fear of the unknown.” Faculty frequently expect too much of themselves and want to be perfect; therefore, they delay implementation until they feel more comfortable. Because learning simulation involves a major learning curve, frequency and repetition are important to increase comfort levels. Spending time observing other faculty and attending simulation workshops and conferences are critical. It is important to support each other and accept that mistakes will be made. Scenarios can change as we go along because this is a fluid teaching strategy. Just as patients vary, so do the simulation experiences.

With the many factors and steps involved, creating a scenario may initially be overwhelming. Simulation scenarios can be purchased, or schools of nursing can work together to share scenarios they have developed. Creating a template to assure that everything is covered has proven to be very helpful. The most time-consuming aspect is the research needed to develop the case and the critical-thinking component. Keeping the focused learning goals in mind is key.

In the ideal world, a designated clinical simulation coordinator would be available for scheduling, maintaining equipment, and assisting faculty new to simulation. But in the absence of such a
coordinator, having 1 or 2 faculty passionate about the use of simulation can provide the necessary support.

Summary
Planning for integration of simulation throughout the nursing curriculum is an ongoing process that must include input from faculty and students alike. Faculty must work together to assure that this valuable technology is more than an expensive piece of equipment waiting for someone to turn it on and that simulation experiences do not replace experiences in which students provide care to real patients in actual clinical settings. The challenge with integrating simulation is to find a balance between essential clinical experiences and time spent in the simulation laboratory. Actual clinical experience is essential for application and learning, and students must spend an appropriate number of hours with patients to develop the qualities needed to become a successful nurse. Integrating simulation throughout the curriculum has the potential to provide students with a safe environment in which they can develop proficiency in therapeutic interventions, assessment, communication, and critical thinking.1

REFERENCES

Current Policies Will Not Avert Health Workforce Crisis

Without immediate action to develop an integrated, comprehensive, national health workforce policy, the U.S. is at risk of losing its status as the global health care leader, states a new report released by the Association of Academic Health Centers (AAHC). The report was funded in part by the Josiah Macy, Jr. Foundation. Out of Order, Out of Time: The State of the Nation’s Health Workforce warns that the nation is running out of time to ensure an adequate health workforce to meet the needs of our aging population, such as the increased demand for health services and other critical socioeconomic challenges for health care.

Key recommendations in the report include:
• Making health workforce a priority domestic policy issue;
• Developing an integrated, comprehensive national health workforce policy that recognizes and compensates for the inherent weaknesses and vulnerabilities of current decentralized multi-stakeholder decision-making; and
• Establishing a national planning body to create a national workforce agenda and promote a national health workforce policy that ensures the nation’s health and economic well-being.
Diverse federal and state agencies, along with multiple public and private stakeholders, should participate.

To download an electronic copy of the report, visit http://www.aahcdc.org/policy/workforce.php. The AAHC is a national non-profit association dedicated to advancing the nation’s health and well-being through leadership in health professions education, patient care, and research.