

PATIENT SIMULATION

Simulation and Introductory Pharmacy Practice Experiences

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Submitted October 1, 2010; accepted April 7, 2011; published December 15, 2011.

This paper reviews the literature on the various types of simulation and their incorporation into health professions curricula, describes how simulation training is recognized in other professions, and evaluates the feasibility of integrating simulation into experiential education programs of colleges and schools of pharmacy. The Accreditation Council for Pharmacy Education (ACPE) Board of Directors develop standards and guidelines on the use of simulation as part of introductory pharmacy practice experiences within the doctor of pharmacy (PharmD) curriculum.

Keywords: simulation, experiential education, introductory pharmacy practice experience

INTRODUCTION

The Accreditation Council for Pharmacy Education Professional Degree Program Standards 2007 presented new requirements that introductory pharmacy practice experiences (IPPEs) must be at least 5% of the curriculum or a minimum of 300 hours. IPPEs involve a variety of actual practice experiences in community, institutional, and other practice settings. ACPE has been asked by experiential education directors whether simulation has a role within IPPEs.

Simulation, as defined by Dr. David Gaba, is “an instructional process that substitutes real patient encounters with artificial models, live actors or virtual reality patients.”¹ The use of simulation in health professions education has increased dramatically. However, the use of simulation in pharmacy education has not advanced to the same degree as in nursing and medical education. Thus, the content of this paper, literature review on the use of simulation in other professions, and the feasibility of integrating simulation into an introductory experiential program was used to assist the ACPE Board to evaluate and develop guidance for the Academy on the use of simulation as part of IPPEs.

TYPES OF SIMULATION

Simulation in health professions education varies in the level of technology used and in which skills features are emphasized. The most technically advanced form of

simulation is the high-fidelity patient simulator or mannequin. Simulation training in health professions' education is traditionally associated with the use of high-fidelity patient simulators. These high-fidelity simulators require that data first be entered into them for them to be able to mimic human actions and physiology (eg, heart and breath sounds, sweating, blood pressure) and respond to physiologic and pharmacologic interventions.¹ Depending on the model, the mannequins may be disease-specific (eg, Harvey, a cardiopulmonary simulator) or capable of a variety of disease states (eg, METIman). Pediatric and infant high-fidelity simulators are available as well (eg, BabySIM).^{2,3}

Another type of simulation device is a *task trainer*. These devices are designed to help learners practice specific skills and do not have the extensive programming capabilities of high-fidelity models.¹ These trainers also may be referred to as *low-fidelity simulators* or *moderate-fidelity simulators* depending on the complexity of the model. For example, the AccuTouch endoscopy surgical simulator is a moderate-fidelity simulator that lets students practice inserting an endoscope into the upper and lower gastrointestinal system.^{2,3} Some institutions use animal models to train students. For example, at the Technical University of Munich, medical students practice suturing skills on preserved pig tissue.⁴

Standardized patients are live people who are coached to portray patients (eg, present history, exhibit emotions, and project personality).¹ Standardized patients are one of the most commonly used forms of simulation by all health disciplines. Because healthy actors are used and physical examination findings cannot be easily simulated, this form of simulation usually targets development of a students' communication and intervention skills.^{2,3}

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Virtual reality simulation is a videogame-type simulation to aid students in the learning of specific tasks or situations.¹ One advantage of virtual reality is that there is no limit to what can be modeled as the virtual patient and the environment are designed on and executed from a computer. For example, students can conduct a clinical assessment on a virtual patient, practice following the correct protocol during a trauma code, or explore a pharmacy clean room. Virtual reality is also one of the more accessible forms of simulation because virtual reality software can be used on most computers.^{2,3}

Full environment simulation is the incorporation of high-fidelity mannequins, standardized patients, health-care professionals, and ancillary equipment to recreate a real-life clinical environment.^{2,3} Because of the expense and extensive planning required to execute full environment simulation, this type of simulation has been implemented in some academic health centers and is shared by multiple health professions.

SIMULATION IN HEALTH PROFESSIONS EDUCATION

Simulation is used in the education of a number of health disciplines. Medical and nursing schools predominantly use high-fidelity mannequins and low-fidelity mannequins as a way for students to practice clinical skills while standardized patients are used to develop students' communication skills. Standardized patients are also used to assess clinical skills. The United States Medical Licensing Examination uses standardized patients in Step 2 of the licensure examination process to test students' comprehension and application of medicine through replication of cases likely encountered in clinics and doctors' offices.^{4,5} The medical profession also uses simulation for continuing education.

Anesthesiology is one of the main fields of medicine to incorporate simulation into its practice. The first high-fidelity patient simulator was an anesthesiology model and the specialty has played a large role in promoting the use of simulation in medical education. The American Society of Anesthesiologists endorses simulation centers at medical institutions and anesthesiologists that receive training at these centers not only receive continuing medical education credit but their training is recognized as American Board of Anesthesiology Maintenance of Certification in Anesthesiology (MOCA) credit.⁶

SIMULATION IN PHARMACY EDUCATION

Several pharmacy colleges and schools have incorporated simulation as part of their core curricula. At the University of Pittsburgh School of Pharmacy, high-fidelity simulators are used to reinforce therapeutics (Seybert A.

Telephone conversation, November 12, 2009). The University of Rhode Island College of Pharmacy's simulation program is integrated into the pharmacology and medicinal chemistry coursework (Chichester C. Telephone conversation, November 5, 2009). In both programs, pharmacy students participate in simulation laboratories with nursing and medical students.⁷

Temple University School of Pharmacy uses simulated patients as part of their second and third year pharmacy curriculum. Pharmacy students practice obtaining medication histories from and honing counseling skills with standardized patients. These encounters are recorded, which allows students to watch the videos and self-assess and reflect on their skills.⁸

Some pharmacy colleges and schools host virtual reality and full environment simulation programs. For example, Purdue University School of Pharmacy and the university's Envision Center for Data Perceptualization collaborated with a United States Pharmacopeia (USP) panel member to create a virtual clean room that is USP 797 standards compliant (Abel S. Telephone conversation, November 11, 2009). The virtual clean room is projected on walls and students wearing 3D glasses and head gear navigate and manipulate the virtual environment with a handheld controller.⁹

The University also created a virtual clean room program that can be run on individual computers. As students navigate through the clean room on the computer screen, the program asks questions on key concepts to assess and reinforce the students' learning. Purdue plans to adapt the virtual clean room program to teach nuclear pharmacy and how to handle radioactive drugs.^{10,11}

The University of Minnesota sponsors a half-day interprofessional workshop for medical, nursing, public health, and pharmacy students entitled Disaster 101 that reproduces a mass-casualty incident at an office building using standardized patients and mannequins. The program's objective is "to assess the effectiveness of live simulations for teaching emergency response skills" while emphasizing skills that correspond to national standards and best practices for individual and team response.^{10,11}

The Association for Experiential Education defines experiential education as a methodology in which educators engage learners in direct experience and targeted reflection in order to increase knowledge and to develop skills, behaviors, and values.¹² Experiential education is an integral component of the pharmacy curriculum and is required in the accreditation standards issued by the ACPE.¹³

In 2007, the ACPE revised the accreditation standards for PharmD programs, which stated that IPPEs should comprise "not less than 5% of the curricular length."

Subsequent clarification from the ACPE Board of Directors noted this translates to 300 hours of practice experience. Appendix C in the standards suggests activities to be encouraged and developed in IPPE programs.¹³

Many colleges and schools of pharmacy have inquired about the possibility of substituting simulation for some aspects of IPPEs; however, the standards specifically state that, "introductory pharmacy practice experiences must involve actual practice experiences in community and institutional settings." To date, this standard has precluded use of any simulation experience, regardless of the quality and nature of the simulation, as acceptable for IPPE credit.¹³

Some colleges and schools of pharmacy have found it difficult to identify adequate and acceptable practice sites for IPPEs. Other schools have integrated healthcare-related, service-learning programs to meet the 300-hour IPPE requirement. Some administrators of colleges and schools of pharmacy have argued that simulation should be considered an alternative for some portion of the required IPPEs.¹³ Most educators would agree that a student's ability to learn and retain how to treat a patient with an acute myocardial infarction is best served by being involved with actual patients. However, such experiences are not always part of an IPPE or APPE. Thus, experiencing the situation via a high-fidelity simulator is likely a superior method of learning compared to a preceptor explaining what should be done.

ADVANTAGES OF SIMULATION IN HEALTH CARE EDUCATION

The advantages of simulation in medical and nursing education are widely acknowledged in the literature (Table 1). One of the key arguments for using simulation in health professions education is patient safety. Simulation allows students to practice clinical skills with no risk to live patients. Theoretically, the additional practice that simulation provides might also reduce the number of errors committed in practice.^{2,3,12,14}

This same argument also applies to pharmacy colleges and schools. Some clinical pharmacists may be hesitant to let students apply their knowledge in the clinical practice setting independently in fear students may harm patients, provide misinformation, or disrupt their practice. When students make changes to simulated patients' medicine regimens, they are able to apply their pharmacologic knowledge, defend their decisions, and observe the results.

Simulation also can address any gaps in clinical learning. For example, a medical student planning to go into emergency medicine may graduate without ever participating in a cardiac resuscitation. By participating in a full-environment simulation or with a high-fidelity

simulator, a student can learn and practice the skills involved in such a situation. The Liaison Committee on Medical Education (LCME), the accrediting body for medical schools in the United States, states in their standards that a student ". . . should be able to remedy [any gaps in exposure to clinical conditions] by a simulated experience."^{2,15} This same perspective on use of simulation should be considered in pharmacy education. Depending on the variability of pharmacy schools' hospital affiliations and what services those hospitals provide, pharmacy students may not encounter certain patients (eg, pediatric patients, intensive care unit patients).¹⁶

Another advantage of simulation in health professions education is that simulation can alleviate problems related to faculty shortages. Due to the nationwide nursing faculty shortage, nursing schools are struggling to find adequate clinical practice sites for their students.¹⁴ This is also a problem for pharmacy colleges and schools that are facing increased competition from other schools for pharmacy practice sites or that are located in regions with minimal preceptors.

Another advantage of simulation is the controlled environment that it offers. With simulation, all students are exposed to the same situation in the same setting and evaluated by the same faculty members. In contrast, pharmacy students may experience a high level of variability in the types of patients encountered at their pharmacy practice sites and the quality of feedback they receive from preceptors. With simulation, students are provided immediate feedback on their performance, and if the simulation is recorded, have the opportunity to self-reflect and assess their performance.^{2,17}

Students in medical, nursing, and pharmacy schools tout the safe learning environment as one of best features of simulation. Going into a simulation, students know it is not dangerous if mistakes are made. Moreover, with simulation, students have the capability to repetitively practice skills they feel they are lacking in. This not only strengthens a student's knowledge but builds confidence and decreases performance anxiety for future encounters. This repetition also has the potential to decrease the amount of time for mastering a clinical competency or skill.^{2,17,18}

DISADVANTAGES OF SIMULATION IN HEALTH CARE EDUCATION

Despite the enthusiasm of health professions educators for the use of simulation, simulation still has its disadvantages and its critics. The most obvious disadvantage of simulation is that it is not real. No matter how advanced and sophisticated the technology is, participating in a simulation is not the same for students as working with real patients. Humanistic factors such as emotions and personality and

environmental distractions are not conveyed or portrayed the same in simulations as they are in the real world.¹⁹

Because students are aware that simulations are a replication of a clinical scenario, how much they take away from the experience is dependent on their individual/personal level of participation. If students are fully engaged and committed to the simulation, then they will likely benefit from the experience. However, if the students think the simulation is unrealistic and therefore are minimally engaged, the simulation experience probably will not result in the student's optimal learning. Another key disadvantage of simulation is that it typically focuses on specific competencies. For example, a simulation exercise using a blood pressure arm task trainer can improve students' blood pressure measuring technique but does little to develop their communication or assessment skills.^{19,20}

A significant disadvantage of the use of simulation in health professionals' education is the cost of sophisticated equipment. An individual high-fidelity simulator costs on average \$30,000. That fee does not include maintenance, training, and technical support. In addition, institutions may purchase ancillary equipment such as vital sign monitors and beds to complement the high-fidelity simulator. Implementing a high-fidelity simulator initially can cost an institution up to \$100,000. An institution will also need space to conduct the simulation and house the equipment.^{3,14,20}

Although one of the key advantages of simulation is the ability to provide immediate feedback to students, to do so requires adequate faculty resources to conduct the simulation and assess the students. Not only do faculty members need to be trained in conducting the simulation but they also must have the clinical knowledge to teach and assess students. Some institutions may not have the faculty resources required.³

The most talked about disadvantage of simulation is its questionable return on investment. Institutions spend significant resources to change their curricula without knowing what the actual benefits of the technology will be in terms of student learning, eg, whether graduates actually perform better as health care practitioners because of simulation training or no better than current experiential and training protocols. Much of the published literature in support of simulation is subjective. However, some studies have demonstrated that students who receive simulation training in combination with clinical experiential education exhibit better assessment and management skills than students who receive only 1 form of training.²¹⁻²³

SIMULATION TRAINING IN OTHER PROFESSIONS

The use of simulation in the aviation industry, much like in health care, is to improve safety and pilot training.

The first flight simulator was created in 1929 and today simulation is considered standard practice for pilot training. According to Federal Aviation Regulators, individuals applying for a pilot certificate need at least 1,500 training hours as a pilot. Of the 1,500 hours, 75 hours must be from instrument flight time "in actual or simulated instrument conditions." A maximum of 50 hours in a flight simulator can be credited toward the 1500 hours if the training occurs at a certified center.²⁴

As mentioned before, the LCME does not state in their standards that simulation can or cannot replace direct patient care in medical education. Rather, the standards imply that simulation should be used to bridge any gaps in clinical knowledge that a student may otherwise have. The standards also state that the basic sciences curriculum include "laboratory or other practical opportunities for the direct application of the scientific method." Opportunities could include "hands-on or simulated exercises."¹⁸

While simulation is used for the purposes outlined in the LCME standards, medical schools have used high-fidelity simulators as a learning resource outside of the classroom. At Columbia University and New York Medical College, high-fidelity simulators are available through the schools' libraries for additional clinical assessment skills practice. Even though simulation is not formally recognized as a substitute for pre-licensure clinical training in medicine, its use is becoming more conventional for pre- and post-license training (eg, USLME examination, MOCA credit).

In 2005, the National Council of State Boards of Nursing (NCSBN) issued a policy statement clarifying that simulation was not a substitute for clinical hours. However, in 2009, the NCSBN published a study comparing the effectiveness of simulation to clinical training; specifically, the effect on knowledge retention, self-confidence and clinical performance.

Students were divided into 3 groups: simulation only, simulation and clinical teaching, and clinical teaching only in a critical care setting. Their knowledge was assessed with pre- and post-simulation and/or clinical experience examinations and clinical skills were assessed through observation of 3 clinical scenarios. Students in all 3 groups scored similarly on the post-experience examination, indicating that there was not a significant difference with regard to knowledge retention in any of the 3 groups. There were also no significant differences in the mean scores for all 3 groups with regard to the patient scenarios; however, students in the combination simulation/clinical experience group received the highest scores overall with respect to knowledge retention and evaluation of clinical skills.²⁵

The results of this study suggest that the most effective teaching methodology is a combination of simulation

with direct patient care experience. Given the advantages of simulation in nursing education (eg, patient safety, faculty shortage), 17 state boards of nursing recognize simulation for clinical hours.²⁶

Most state boards of nursing stipulate that simulation exercises/experiences can be substituted for no more than 20% of clinical hours; however, they vary in how simulation is defined and what types of simulation are recognized. In Florida, “simulated clinical experience” is clearly defined in the Nurse Practice act as “nursing care experience with the Human Patient Simulator or its substantial equivalent.” Standardized patients and virtual reality simulation would not count for clinical hours.²⁷

Conversely in Guidance Document #90-24 issued by the Virginia Board of Nursing, simulation is defined as “an active event in which students are immersed into a realistic clinical environment or situation. During this [clinical experience] learners are required to integrate and synthesize core concepts and knowledge and apply appropriate interpersonal and psychomotor skills.” Moreover, the document goes on to define the high-fidelity and low-fidelity simulation. The Virginia Board of Nursing also mandates that every simulated clinical experience “must have clearly stated objectives that are presented to the student prior to engaging in the simulation experience” and specifies documentation accompanying each simulated experience for clinical hours credit.²⁸

Not all state boards of nursing that recognize simulation as equivalent to clinical experience have documentation on what types of simulation are acceptable. In Maryland, schools must apply to the state’s board of nursing if they would like to substitute simulation for patient care experience. As part of their application process, schools must present how many hours a student would be engaged with a particular type of simulation (high-fidelity vs. low-fidelity) and the credentials of the faculty facilitators (Ambush-Burris P. Telephone conversation. November 9, 2009).

QUESTIONS TO CONSIDER

Simulation is not just an innovative form of teaching in the health professions. It is becoming conventional practice and is already recognized by national medical and nursing organizations as comparable to direct patient care experience and a valuable teaching and assessment tool. It seems only a matter of time until pharmacy education and regulatory communities adopt this position. As discussed earlier, simulation could replicate activities done in IPPEs. However, before simulation can be substituted for IPPEs, there are a number of issues that must be addressed. First and foremost is what the definition of simulation in pharmacy education is and who will define

Table 1. Advantages and Disadvantages of Simulation in Health Professions Education

Summary of Advantages
Patient Safety and Quality
Addresses gap in clinical conditions/settings
Structured feedback
Controlled environment
Safe learning environment
Ability to practice skills/build confidence
Faster time to competence
Fills need for faculty/clinical site resource
Summary of Disadvantages
Unrealistic
Requires full participation/engagement of learner
Focuses on specific competencies
Financial resources
Spatial resources
Faculty resources
Questionable return on investment

it. Without a concrete definition of simulation in the pharmacy curriculum, the discussion surrounding simulation for IPPEs cannot progress. Based on its use in medicine and nursing, one possible definition of simulation in pharmacy would be the replication of a clinical experience using a patient simulator. This would make standardized patients, virtual reality, and high-fidelity patient simulators acceptable forms of simulation in pharmacy education.

There are also questions about the logistics of implementing simulation for introductory pharmacy practice experiences, such as the limit to which simulation can be used in place of IPPEs. All health professions educators would agree that simulation cannot wholly replace direct patient care experience, but it is not clear whether ACPE or colleges and schools of pharmacy should set the limit. Table 2 lists other questions that must be addressed before simulation could be substituted for IPPEs.

Once these details are determined, what an IPPE program with simulation would look like and why a college or school would integrate simulation into its IPPE

Table 2. Issues Raised by Simulation for Introductory Pharmacy Practice Experiences (IPPEs)

Questions to Consider
Who defines simulation for IPPE?
What types of simulation are acceptable for IPPE?
Is there a limit to the number of hours for simulation in IPPE?
Do colleges and schools need prior approval before incorporating simulation into IPPE?
Is there maximum faculty to student ratio for simulation?
Should simulation facilitators be assessed?

curriculum would need to be determined. Given the variability in preceptors and serviced-based learning projects, a college or school of pharmacy could use simulation to ensure that every student had the opportunity to develop counseling and communication skills. Ideally, a student would have plenty of opportunities to counsel patients in the community pharmacy setting where it is a fundamental activity, but that is not always the case. With standardized patients, instructors and the actors can assess students' communication skills and provide immediate constructive feedback.

Additionally, a program could use high-fidelity simulation to address any gaps in clinical exposure. Working with high-fidelity simulators lets students begin to apply pharmacologic and therapeutic concepts that are typically taught in the second year of pharmacy school. This not only helps students but also helps instructors know which clinical concepts are harder for students to comprehend and apply. Table 3 is an example of how an IPPE program with simulation might look.

In the third year of the PharmD program, standardized patients and high-fidelity simulation could be used to strengthen essential skills and competencies that students should have before starting APPEs. It could also be used to prepare students for any specialized clinical knowledge they may need for an APPE. For example, prior to beginning a critical care practice experience, a student could work with a high-fidelity patient simulator of an intensive care unit patient to better understand ventilator settings and what drugs can cause acid-base disorders. A college or school could integrate simulation into their program to better meet the primary objectives of the curriculum without significantly decreasing the time that students' spend in pharmacy care settings and in alternative IPPE learning programs (ie, service based, longitudinal learning).

The merits of simulation in health care education have been argued extensively; simulation can boost student confidence, fill gaps in clinical knowledge, and provide

a controlled learning environment. Also, as demonstrated by the University of Pittsburgh, University of Rhode Island, and University of Minnesota, simulation coursework can be interprofessional. While there are notable disadvantages to using simulation (eg, financial and faculty resources, return on investment), these disadvantages do not necessarily outweigh the benefits of simulation coursework.

ACPE POLICY ON SIMULATION IN IPPE

Based on this literature review and requests from the pharmacy education community, in January 2010, the ACPE Board of Directors appointed an ad hoc committee that included members of the ACPE Board and staff, along with appointees from ACPE's 3 sponsoring organizations (American Association of Colleges of Pharmacy, American Pharmacists Association, National Association of Boards of Pharmacy) to draft a policy regarding the use of simulation in IPPEs. The following policy was approved in June 2010 by the ACPE Board of Directors:

Simulation is defined as an activity or event replicating pharmacy practice. For the purpose of satisfying IPPE expectations, simulation includes multiple types of scenarios based on the utilization of high-fidelity manikins, medium fidelity manikins, standardized patients, role playing, Objective Structured Clinical Evaluations (OSCE), and computer based simulations. Simulation as a component of IPPE should clearly connect the pharmacy activity or delivery of a medication to a patient (whether simulated patient, standardized patient, or virtual patient).

Colleges and schools may choose to include structured simulation as part of their overall IPPE experience to meet their IPPE program goals and objectives. Colleges and schools are not required to include simulation experiences if IPPE objectives are achieved by other experiences. In addition to utilizing simulation as a component of IPPE, colleges and schools may choose to include simulation experiences within the didactic curricula.

Colleges and schools are encouraged to develop inter-professional simulations.

Simulation experiences are deemed appropriate when they meet the following criteria:

- involve learning experiences that are difficult to achieve in actual practice, such as:
 - high risk, low occurrence medical situations (eg, CPR, medical emergencies, medications errors);
 - when a state's pharmacy practice act limits certain patient care activities (eg, immunization training); and
 - hands-on learning opportunities that enhance student learning experiences (eg, insuring

Table 3. Sample Introductory Pharmacy Practice Experience Program That Includes Simulation

Practice Setting	First Year	Second Year	Third Year	Total Hours
Community Pharmacy	85	-	-	85
Institution/Hospital Pharmacy	-	20	85	105
Service/Longitudinal Learning	20	20	20	60
Standardized Patients	10	-	10	20
High Fidelity Simulation	-	20	20	40
Total Hours	115	60	135	310

student pharmacists are exposed to important disease states which they may or may not experience in “real” patient care settings);

- are structured around a set of specific learning objectives;
- involve structured assessment activities to assure that students have met the stated learning objectives; and
- are supervised by pharmacy educators, practitioners, or other appropriately trained faculty/facilitators.

Table 4 provides a comparison of more specific current IPPE activities as compared to possible simulations. The amount of simulation included in IPPEs will vary from program to program based on needs and expectations. The ACPE Board presently has a policy statement indicating that “Introductory pharmacy practice experiences must account for not less than 300 hours (over the first three professional years). The majority of students’ time (minimum of 150 hours) must be balanced between community pharmacy and institutional health system settings.”

Simulation may not be used to supplant or replace the minimum expectation for time spent in actual pharmacy practice settings as set forth in the previously established

policy. Beyond the majority of time in actual pharmacy practice settings, colleges and schools may use simulation to account for no greater than 20% (eg, 60 hours of a 300 hour IPPE program) of total IPPE time.

Prior approval is not needed, and guidance should be provided by this policy statement. Colleges and schools must document, however, during typical ACPE monitoring and evaluation processes, that their simulation experiences meet stated criteria for appropriate simulation experiences.

The ratio of students to faculty/facilitators in simulation will likely vary from experience to experience based on the characteristics of the simulation experience, the need for student supervision/monitoring, and the ability to appropriately assess student achievement of stated learning objectives. The qualifications of faculty/facilitators will be assessed much in the same manner as other faculty members are evaluated under Standard 25.²⁹

In July 2010, development of Guidelines 2.0 for ACPE Standards 2007 was begun in response to stakeholder feedback for clarifications and to incorporate quality improvement additions and Board adopted interpretation of Standards 2007. The intent of this revision was that the standards remained the same; only selected guidelines on

Table 4. Possible Simulations for Specific Current Introductory Pharmacy Practice Experience Activities

IPPE Activity Stated in ACPE Standards	Possible Simulation
Communication and Team Interactions:	
Interviews with real patients	Interviews with standardized patients Interviews with high-fidelity patient simulators Interviews with virtual patients
Communicating with patients and other health care providers (care-givers)	Communicating with standardized patients and care-givers Communicating with other health care providers in full-environment simulation Communicating with care-givers in full-environment simulation
Interacting with other health care professionals	Full environment simulation Interdisciplinary simulation labs between school of pharmacy and school of medicine or nursing schools
Patient Assessment:	
Conducting physical assessments	Assessing high fidelity patient simulators Assessing standardized patients
Interpreting and evaluating patient information	Interpreting and evaluating patient information in the medical record
Triaging and assessing the need for treatment or referral	Triaging and assessing standardized patients Triaging and assessing high-fidelity patient simulators
Medication Therapy Management:	
Identify patient specific factors that affect health, pharmacotherapy and/or disease state management	Designing and recommending appropriate drug therapy regimens for standardized patients Designing and recommending appropriate drug therapy regimens for high-fidelity patient simulators
Creating patient profiles using information obtained	Creating profiles for virtual patients

how to achieve specific standards were clarified or updated, including the standards related to IPPEs. In January 2011, Guidelines 2.0 of Standards 2007 were released. A number of Board interpretations related to Standards 2007 and associated guidelines were adopted, including: clarification of the hour requirements for IPPE and APPE; the need for the majority of IPPE hours to be balanced between community and institutional health-system pharmacy practice; and the acceptance of simulations as IPPE hours.²⁹

SUMMARY

Use of simulation in the health professions has grown rapidly in recent years. Based on a careful review of existing literature, ACPE has modified its IPPE policy to allow simulation to be included. Monitoring of the effect of this policy change will be instituted to ensure that simulation is effectively integrated in IPPEs.

ACKNOWLEDGMENTS

The authors wish to acknowledge Amy Seybert, Brenda Bray, Matt Osterhaus, and Eileen Lewalski for their contributions in this topic area.

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