



PRIOR TO THE 1990s, medical students and residents were not taught clinical skills in a uniform, structured way. Instead, they were expected to “pick up” these skills through on-the-job training in the high-stakes environment of the hospital ward, where patients were “real” and the learning curve was often precipitous for everyone involved.

In contrast, students and residents today are the beneficiaries of changes in medical education that ensure they are taught clinical skills in an incremental and systematic way, starting with their first year of medical school and continuing through residency training. Key to this new approach is the opportunity they have to work in a highly structured environment with standardized patients—individuals specially trained to simulate actual patients.

Wired *for* Learning

RENOVATED CLINICAL COMPETENCY CENTER IS A TECHNOLOGICAL TOUR DE FORCE



After examining a standardized patient, second-year student Snehal Patel completes the written portion of the Clinical Practice of Medicine II clinical skills exam.

BY S. A. UNGER

In the modern-day lexicon of medical educators, the ultimate goal is for students to attain “clinical competency”—a clearly defined, measurable outcome for which medical schools are now held accountable. Furthermore, beginning in 2004, as part of Step II of the United States Medical Licensing Exam (USMLE), all students are required to pass a one-day exam that evaluates their clinical skills based on their interactions with standardized patients.

Fifteen years ago, in anticipation of these changes in medical education, the UB School of Medicine and Biomedical Sciences established a Standardized Patient Clinical Competency Program, which subsequently earned a national reputation as a model program.

While this program continued to flourish throughout the 1990s, the school’s Clinical Competency Center—where students train and test with standardized patients—began to lose ground because funds were not available to purchase the state-of-the-art equipment and technology essential to providing an optimal teaching environment.

In recent years, it became increasingly evident that a major investment in the Clinical Competency Center was needed if UB was to maintain its reputation as a place where medical students and residents receive some of the best clinical skills training available in the United States.

Last fall, as a result of collaborative efforts among alumni, faculty, staff and school administrators, the much-needed upgrades in equipment and technology were funded, and in December 2005 a completely renovated Clinical Competency Center was opened, as was a proud new chapter in medical education at UB.

21st Century Learning Tools

Anyone touring the new Clinical Competency Center will see firsthand how computers and audiovisual technologies have come of age as sophisticated learning tools.

Each of the center’s 12 patient exam rooms essentially doubles as a miniature movie studio, where the words and actions of students and standardized patients are digitally recorded while being fed live to two locations in the center: a Monitor Room, where faculty can view on a computer screen what is taking place in a particular room, and to a centralized Control Room, where staff from the Clinical Competency Center can simultaneously see and hear each

scene in all 12 rooms on two large screens, as well as communicate with each room via an intercom system.

In addition, cameras are imbedded in the center’s otoscopes to digitally capture what the students are viewing as a means to train them in how to properly visualize structures of the ear, nose and throat.

In the exam rooms, students interact with standardized patients based on case scenarios that are written in advance by faculty members working closely with Karen Zinnerstrom, PhD, coordinator of the Clinical Competency Center, and her staff.

The objective of the cases—both in the teaching and the testing phases—is to elicit and reinforce responses from students that are appropriate to a broad range of clinical scenarios, whether it be taking a history, performing a physical exam, communicating management and treatment options, or discussing the diagnosis of a terminal illness.

In addition to the data that is recorded via camera and microphone, at the close of each case—depending on the exam format—the student and standardized patient may fill out a computerized checklist created by the faculty member as a means to evaluate the attainment of course objectives.

This checklist is automatically fed to the appropriate exam room, where the student and standardized patient complete it on separate laptops.

Supervising faculty also complete the checklist, either while sitting in the exam room or by going to the Monitor Room and interfacing with the same large touch-screen computer monitor on which they are viewing the case.

The Monitor Room, located at one end of the center, is shaped like a long hallway, down which a row of computers are mounted, one for each of the 12 exam rooms.

On test day, faculty sit side-by-side at a counter in front of the computers and wear headsets that link them

with the audio portion of the case they are observing. From where they sit, they can remotely control the angle of the two cameras mounted in the exam room they are viewing, or can zoom in and out on the scene as needed.

The computers in the Monitor Room are not hard-wired, so any one of the 12 exams rooms can be displayed on each monitor, or, conversely, one room can be displayed on all 12 monitors. If a particular computer malfunctions, faculty can simply switch to a different station, with no disruption to the evaluation process.

If a standardized patient wishes privacy at any time, he or she can push a privacy-mode button that tilts the cameras to the ceiling while simultaneously muting sound.

At the close of each case, the checklists completed by all three parties—faculty member, student and standardized patient—are automatically collated and stored along with the digitized video and audio recording on several large servers in the medical school.

Using video-on-demand technology, these records can then be accessed by faculty, professional staff and students any time of the day and from any location, given they have appropriate security clearance and Internet connections. (Students cannot access the videos at will, but must receive permission from a faculty member or center staff.)

While reviewing the recordings, faculty can annotate them digitally, providing on-screen notes and suggestions to students about where in a particular interaction,

for example, they could have done something differently. These notes can be “bookmarked” by the faculty member so that the student can skip ahead to critiqued sections without having to view the entire recording.

Room for Improvement

All these capabilities, and more, are light years ahead of the center’s former technology, and the changes have been much appreciated by faculty, staff and students, according to David Milling, MD ’93, assistant dean in the Office of Medical Education and director of the center.

“Faculty and students are very pleased with the renovations,” says Milling, who also is director of the Clinical Practice of Medicine II course. “The faculty are of course a little impatient to have all the technology in place and up and running, but we are making good headway and, overall, we are seeing that the new center is even better than we thought it would be.”

Prior to the renovation, each room had only one camera, and it was mounted in a fixed position. In the new center, each room has two pan-tilt zoom cameras that can be pre-programmed to angles best suited for the type of case scheduled to take place in a particular room.

“Before, when there was just the one camera, in order to change its angle between sessions, we used to have to get up on chairs, manually turn the camera, and aim it in a different direction,” says Jack Freer, MD ’75, professor

“Each of the center’s 12 patient exam rooms essentially doubles as a miniature movie studio, where the words and actions of students and standardized patients are digitally recorded while being fed live to two locations in the center.”



LEFT TO RIGHT: Hekmat Hakiman, Class of 2008, examining standardized patient Mechelle Lumpkin; view of the two camera angles as seen in the Clinical Competency Center’s Monitor Room; and faculty and staff in the Monitor Room, with Peter Coates, an instructor, pictured in the foreground.

of clinical medicine, who teaches a fourth-year elective in palliative medicine. "In some cases, because of where the camera was, we also had to move the furniture around the room because in one session you might have the patient on the exam table and, in another, he might be at a table and chair at the other end of the room."

Judy Smith, MD, associate professor of clinical surgery, uses the center to train third-year students completing their surgical clerkships. "We used to have to leave the doors to the exam rooms open and actually have people watching parts of the interaction that the camera's single angle couldn't capture," she explains. "The students move around, and if they didn't happen to be in the right spot, you couldn't see what was going on."

In addition to benefiting from a significant improvement in the quality of the video itself, faculty can use the remote-controlled pan-and-zoom features of the cameras to capture and store valuable "teaching moments."

"We have a lot more flexibility in what we record," notes Freer. "Over the years we've been doing this, we've seen some great examples of students doing really

remarkable things in which they demonstrate a particular communication skill or they connect with the patient in a way that we thought was valuable. However, without being able to bookmark that, we usually lost it."

Using the new technology, Freer plans to compile such "teaching moments" on a training DVD.

The on-demand Internet access to the recorded material is another great leap forward. "In the past, the VHS cassettes were stacked in boxes in a storeroom," explains Freer, "and they probably didn't get fully used because they were so inaccessible."

One of the most significant changes to the center is the addition of the Control Room, where staff from the Clinical Competency Center can coordinate up to 12 testing scenarios simultaneously from a central location.

"In the old center, we didn't have a control room," says Zinnerstrom. "So, for example, if someone was having a problem in one of the rooms—the standardized patient wasn't quite ready to start at the planned time, or a student forgot a pen—they would have to open the door and call down the hall. There was just no way to interact without

either their leaving the room, or our walking down the hall."

With the new system, staff in the Control Room can view and hear what is taking place in each room on two 40-inch plasma screens and, if needed, can zoom in on the interactions taking place in a particular room. In addition, they have bi-directional audio capabilities with each room and so can resolve glitches in "production" in a much more efficient and coordinated way.

Another notable upgrade to the center are the report-writing tools built into the system's software. These tools not only automatically collate data that used to have to be manually collated, they produce a wide variety of customized reports that faculty and staff can use to track trends and improve teaching.

"One of the things this allows us to do," says Milling, "is to build portfolios for an individual student or an entire class over a four-year period. With this information, we can track their performance and pick out patterns where they excel or where they might benefit from further teaching and reinforcement."

Richard Pretorius, MD, MPH, director of the Clini-

cal Practice of Medicine I Course, emphasizes that the center's testing and evaluation procedures are only as helpful to students as they are demanding.

"We ask a lot of our students," he notes. "It's sometimes hard to step out of an exam room and watch yourself in action—in fact, we could present any physician with a clinical scenario that would stretch his or her ability, and it's no different with the students. It's our intention to stretch them as much as we can and to help them grow with formative feedback."

Expert Synergy

One of the primary reasons why the medical school was able to incorporate such sophisticated, well-integrated technology into the Clinical Competency Center is because staff in the Office of Medical Computing were partners in the project from the outset.

"In some ways, this collaboration is an accident of geography," explains Raymond Dannenhoffer, PhD, director of the office. "The Competency Center is right down the hall from us and so we know intimately what they do,

The Fine Art of Professionalism

BY
S. A.
UNGER

RESIDENTS HONE THEIR INTERPERSONAL SKILLS

MEDICAL STUDENTS aren't the only ones who benefit from an opportunity to train in the Clinical Competency Center.

In recent years, residents have begun working in the center to update and improve their interpersonal skills in the clinical setting.

"A number of our program directors have their residents work with standardized patients during orientation to assess their interviewing and communication skills," explains Roseanne Berger, MD, senior associate dean for Graduate Medical Education at UB. "This assessment provides a baseline from which to measure progress."

"Communication is one of the six core competencies of physicians," she adds, "and residency programs are now required by accrediting agencies to use objective measures to assess

this skill. The Clinical Competency Center provides us with an effective way to do this."

In addition, faculty use the center if it is determined that a resident is in need of remedial work.

Some faculty, including James Hassett, MD, director of UB's surgical residency training program, use the center to measure residents' progress over time. Hassett requires that all incoming residents be evaluated at the Clinical Competency Center during orientation week and then again at the end of the year.

"We make maximum use of the center," he says. "The standardized patients allow us an opportunity to evaluate things that are important to the practice of medicine—such as interpersonal skills and communications—but which are not easy to assess."

The word that encapsulates these intangible

skills is "professionalism," explains Hassett. "It's how you see me as a doctor. For example, do I respect your needs? Do I listen to your problems? Do I understand and respond to the things that you need to have done or want to have done?"

Professionalism, and the teaching of it, has moved to the forefront of medical education in recent years because the medical community now understands that there is a direct correlation between patient dissatisfaction and poor interpersonal skills on the part of physicians.

"Where doctors fail—and how malpractice suits arise—is not so much in the delivery of a critical clinical skill; instead, it's almost always in communication," says Hassett. "The baseline is not that you're not smart enough, but that you don't listen."

Across the board, Hassett has found that most residents do need to work on their interper-

sonal skills. He has also found that they "don't self-evaluate well."

A resident's ability to exhibit professionalism is closely linked to whether or not he or she will be successful, he says, and key to the develop-

ment of professionalism is the ability to self-evaluate and self-correct.

"If I realize that an interaction with a patient didn't go well—or if I listen to a patient when he says, 'You know, Doc, you didn't handle that well'—and I try to fix it, that's good. But if I can't self-assess well, or I don't listen, I can never do the self-correction, and that's where the standardized patient comes in, because we find that doctors usually don't self-correct."

The tendency to not self-evaluate and self-correct—while arguably very human—is something that's particularly endemic to the physician community, says Hassett, who adds that surgeons, in his opinion, are especially challenged in this area.

"It has to do with how one perceives oneself, and many doctors have a concept of 'special-

ness," he observes. "The attitude is, 'Can't you see how special I am? I don't necessarily have to do certain things; I'm too special.'"

"And what you have to do," he continues, "is to train someone to provide service without losing the ability to do things in the service model. What it really comes down to, is you have to train them to be active listeners."

The Clinical Competency Center has been, and continues to be, a very effective tool for Hassett in his efforts to train surgical residents in the fine art of professionalism.

"We can talk about assessing technical skills, like learning to tie a knot, but the big issue for success is the type of competency we can evaluate in the center," he concludes. "Finding any way to measure this is hard, but the interactions residents have with standardized patients provide much useful feedback."

Other UB residency programs that assess residents during orientation to gain a baseline measurement of their clinical skills include: Family Medicine, Medicine, Orthopaedics, Psychiatry, and Rehabilitation Medicine. **BP**



LEFT TO RIGHT are standardized patients Nancy Sorci, Lester Wood, Geza Csonka and Barbara Breckenridge, enjoying a cup of coffee prior to a testing session.

LEFT TO RIGHT: prospective medical students touring the Clinical Competency Center; student Mariam Imnadze logging in prior to examining a standardized patient; Karen Zinnerstrom, PhD, coordinator of the Clinical Competency Center; student Stephanie Gauder discussing a case with standardized patient Ron Storfer; and David Milling, MD '93, assistant dean in the Office of Medical Education and director of the Clinical Competency Center, talking with prospective students.



“One of the things this allows us to do,” says Milling, “is to build portfolios for an individual student or an entire class over a four-year period. With this information, we can track their performance and pick out patterns where they excel or where they might benefit from further teaching and reinforcement.”

and they know us, so this allowed us to be significantly more involved in the process compared to what happens at most schools.

“Since we are IT experts,” he continues, “we knew what was possible technically and were able to work with the system’s manufacturer, B-Line Medical, to get the technology in place and, in some cases, to have it customized to our needs.

“At the same time, Karen [Zinnerstrom] and her staff in the Clinical Competency Center, are very cutting edge in terms of what they do—they are right up there, if not way ahead of most programs in the country—so by combining our areas of expertise, we have been able to put in place a clinical skills system that few schools in the country today can match.”

Ironically, by working so closely with the Office of Medical Computing to set up their new system, faculty and staff working in the Clinical Competency Center now can do their jobs with less IT assistance than ever before.

“In the past, they would write a case but then had to hand it over to an IT person who would convert it into HTML code that could get displayed,” says Dannenhoffer. “Also any changes or updates to a case had to get programmed in. With the new system, they can

create an exam and all the support material without the assistance of IT staff in our office. It’s our job to keep the system working in terms of software, but we’re no longer involved with content.”

Clinically Competent Students

While the new Clinical Competency Center is a boon to faculty and staff who are responsible for teaching clinical skills, ultimately, it is the students who are benefiting from the upgrades—a fact that is not lost on them.

“The new center presents the students with excellent facilities and brings us another step closer to the ideal doctor-patient relationship,” says Mohammed Faraz Khan, who just completed his second year. “With the new cameras that can cover almost every angle of the room and through easy access to digital recordings, we can now obtain accurate and detailed feedback from supervisors regarding all aspects of the interview process. With the new technology, we can better immerse ourselves in the clinical role by examining our interactions and developing valuable skills in self-reflection.”

Technology aside, the students also appreciate the fact that the upgrades would not be nearly as advantageous as they are if they had not been incorporated into as robust

and well-implemented a Standardized Patient Program as the one in place at UB.

Students such as Jessica Shand, MD '06, who worked in both the old and the new center, are especially aware of this.

“While most medical schools have adopted a model of clinical education in the first two years that is akin to our Clinical Practice of Medicine Course, many do not have as organized and as comprehensive a Standardized Patient Program as we do at UB,” she explains.

Shand and her fellow UB medical students have ample opportunity to gain such comparative insights when they travel to regional centers around the country in order to complete Step II of the USMLE, which tests their clinical skills with standardized patients.

“Most students I talked to who had clinical competency exercises in preparation for the national exam, did not have the benefit of the rigorous feedback process that we had,” notes Shand. “Too, not all institutions require that students pass a level-appropriate clinical competency exam for promotion to the third year, as UB does.”

Since the Step II clinical skills exam was instituted in 2004, UB medical students have sailed through with a 100 percent pass rate, giving outside validity to what they know to be a stellar training program.

“I think the clinical competency training at UB is one

of the gems of the school in general,” says Troy Pittman, MD '06. “Dr. Zinnerstrom and her staff have really put together an experience in the Clinical Competency Center that mimics the actual exam closely.

“As a matter of fact,” he adds, “I think the exam we are required to take at UB [to be promoted to the third year] is a bit more comprehensive and detailed than the Step II

exam. When I speak with friends at other schools, it seems like the curriculum at UB is quite advanced and innovative.”

On December 8, 2005, when faculty, staff, alumni and administrators—many of whom had made generous gifts to the new Clinical Competency Center—gathered for the ribbon-cutting ceremony that marked the official opening of the center, second-year student Hekmat Hakiman spoke on behalf of all the students about what the new facility means to them.

“I’ve been thinking about all of you since last Saturday, when we took our Clinical Practice of Medicine final exam in these rooms,” he told the group. “Although we have been using the center since last year, this time it felt different.

“Maybe it was the new equipment and computers. Maybe it was the excitement of the faculty and staff. But, more likely, I think it was because of the assurance we felt that somebody out there cares enough about our medical education—somebody wants to help us become better doctors—enough to make such generous donations to this center.

“This assurance makes us all work hard and makes us all try to learn how to give the best care for our future patients.”

While it’s difficult to know how UB medical students could possibly improve on a 100 percent pass rate on their national clinical skills exam, it’s a safe bet that faculty and staff in the Clinical Competency Center are already hard at work trying to figure out a way to do just that, something the future patients of UB medical students will no doubt appreciate. **BP**

In addition to the technology updates described in this article, the purchase of a state-of-the-art computerized mannequin was made possible by Margaret Paroski, MD '80, and her husband, Peter S. Martin, Sr. A report on this new life-size “simulator” will be published in the next issue of Buffalo Physician.