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■ **Nursing students in the product development lab:**

An academic/corporate collaboration that advances clinical informatics

University of Kansas (KU) nursing students can now track, trend, assess and plan patient care electronically through a simulated electronic medical record. The program is called Simulated E-hHealth Delivery System, or SEEDS, and it was jointly developed by the university and the Cerner corporation.

SEEDS and the subsequent product have their roots in reports from the Institute of Medicine (IOM). The IOM's recommendations clearly mandate curriculum changes and integration of information technology for core clinical competencies of all health professionals.

A 34-student pilot group was formed, led by a group of five instructors. They created a tight feedback loop to collect and measure information and opinions from the students and the instructors. Once project leadership was convinced the system was ready for rollout, they introduced it to several foundation classes and clinical units.

"An evidence-based practice is about accessing information at the point of care. With thousands of nurse-relevant clinical trials forming the knowledge base, and more being added each year, keeping your textbook handy simply isn't going to work. There has to be a way for students to learn these informatics processes alongside their clinical content," said one member of the leadership group.

Now, based on the KU experiment, there is a product for all schools of nursing to evaluate. Learn about the process, the implications and the opportunities that are created when an innovative clinical information system is

■ **In This Issue**

In [Excellence in Clinical Practice](#)

Kids at school. Nurses at work. Lives at stake.
One group of nurses practices in a setting where the delivery of care intersects with many of the most complex issues in pediatrics, and even within society at large. School nurses are at the center of issues as diverse as how to treat attention-deficit disorder, to the distribution of condoms. This issue of Excellence will explore how school nurses are responding to the challenges of keeping children safe and healthy.
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In [Excellence in Nursing Administration](#)

What nurses want: Transforming evidence on workplace satisfaction into effective retention strategies

Evidence-based retention strategies used at Children's Hospital of Philadelphia have reduced



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brought into the lecture hall.

[Read the feature](#)

Greg Perry
Editor

A note from the editor:

This feature in *Excellence in Nursing Education & Research* explores a collaboration between a major university and a for-profit corporation, Cerner. It's important to note that this article is not an endorsement of Cerner or any of their products. The company cooperated in offering sources and background materials, and nothing more. It is our belief that the challenges faced by nursing and health care are larger than one idea or one institution. It is through innovative collaborations like this—and a myriad of others underway—that the serious issues we face can be effectively addressed.

Also in Excellence

**Breathing to the beat
Nurse-led research suggests music eases labor pains**

A new study by Case Western Reserve University provides hope for women seeking to lessen labor pain without medications. The study found that music can reduce the sensation of labor pain and decrease and delay the emotional distress that accompanies it. The data was gathered in Thailand, led by Sasitorn Phumdoung, a recent graduate of Case's Frances Payne Bolton School of Nursing. According to Phumdoung's dissertation advisor, Marion Good, RN, PhD, there was a gap in the literature that she herself was helping to fill.

Read about two studies on how music and relaxation can be incorporated to lessen pain sensation and distress.

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[Ordinary People, Extraordinary Lives](#) The Stories of Nurses. NEW

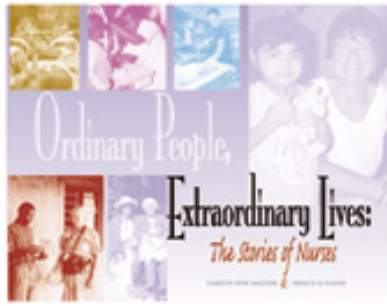
Edited by Carolyn Hope Smeltzer, RN, EdD, FAAN and Frances R. Vlasses, RN, PhD
Available November 15, 2003

the nurse turnover rate from 23 to 13 percent. Nurse leadership in the hospital developed a comprehensive survey of nurses that developed baseline data in the areas of job stress, worksite cohesion, professional satisfaction, physician relationships and more. Read about the interventions that were established at the institutional and unit levels that continue to result in lower turnover and higher job satisfaction.

[Read the feature.](#)



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Third Quarter 2003 - Volume 4, Number 3

■ **Nursing students in the product development lab:**

An academic/corporate collaboration that advances clinical informatics



The [University of Kansas](#) (KU) School of Nursing and [Cerner®](#) have jointly developed a clinical information system (CIS) to educate future

nurses. KU nursing students can now track, trend, assess and plan patient care electronically through a simulated electronic medical record. They can also access relevant clinical evidence instantly with the click of a mouse. The program is called Simulated E-hEalth Delivery System, or SEEDS.

The goal of the collaboration was twofold: to enhance the decision-making skills of student nurses, and create a viable CIS product that schools of nursing can incorporate into their educational processes.

According to people on both sides of the collaboration, the project is an unqualified success.

“I kept waiting for the sabotage that never occurred,” says [Judith J. Warren](#), RN, PhD, C, FAAN. She was recruited by KU to lead the informatics component of the project. “There was some uncertainty and initial

■ **The Critical issues and strategic direction**

The IOM reports that are powering change at KU

The Institute of Medicine (IOM) of the National Academy of Sciences established a Committee on the Quality of Health Care in America in 1998 to identify ways to achieve substantial improvement in the quality of health care over the next 10 years. The committee’s first report in 2000, *To Err is Human: Building a Safer Health System*, identified significant problems in patient safety.

The second report, *Crossing the Quality Chasm: A New Health System for the 21st Century*, was issued in 2001. It provided a strategic direction for fundamental redesign of health care so that it will yield the highest quality results and better meet the needs of patients.

The Institute of Medicine

reluctance among the faculty, but students engaged the system immediately and energetically. Their reactions and responses told us we were on the right track. Then their evaluations and scores confirmed it.”

According to [Charlotte Weaver](#), RN, PhD, Cerner’s vice president and chief nursing officer, the partnership’s first obligation was “to do no harm.” She adds, “We had no road map. How this system would impact the instructors’ ability to teach or students’ ability to learn was a complete unknown. We had to move with appropriate caution.”

That caution took the form of a 34-student pilot group, five instructors and a tight feedback loop that kept information and opinions flowing from the students to their instructors and to project leadership. “We measured our progress by triangulating a number of different measures,” says Judith Warren. The school ran focus groups for both students and faculty that were led by impartial moderators to encourage a candid dialogue. They did frequent class evaluations. They watched trends in quizzes, tests and final grades.

And, in several of the classes supported by SEEDS, they set up video cameras.

“That was when the teaching advantages really crystallized for us,” says [Helen Connors](#), RN, PhD, FAAN. She is KU’s associate dean of academic affairs and the director of educational innovation in the nursing school. “What we saw on the tapes was a much higher degree of interaction between instructors and students. Students were probing for more clinical information on the cases presented—more than we had available, frankly, which told us something about how the system encourages and supports a more detailed assessment.”

Because SEEDS also aggregates the students’ chart inputs for the instructor to monitor in real time, there is a constant awareness of what everyone is doing. In the foundation classes taught by [Kathy Fletcher](#), RN, PhD, that meant she could see which students needed some immediate direction. “When I’m writing on the board, I’m completely disconnected from what the students are

cites four underlying reasons for inadequate quality of care: the growing complexity of science and technology; increases in chronic conditions, which are now the leading cause of illness, disability and death; a poorly organized delivery system; and constraints on exploiting the revolution in information technology.

Crossing the Quality Chasm emphasizes that these quality problems cannot be addressed simply by working harder or by trying to do better within the current system. Instead, it defines these as systemic problems requiring a systemic solution. To quote from the report’s Executive Summary, “Health care has safety and quality problems because it relies on outmoded systems of work. Poor designs set the workforce up to fail, regardless of how hard they try. If we want safer, higher quality care, we will need to have redesigned systems of care.”

The IOM’s work on health care quality can be reviewed at www.iom.edu.

The Crossing the Quality

entering into their notes or paper charts. Unless they asked, I didn't know who needed help.

According to Fletcher, SEEDS cases also generated a thirst for data that the original cases did not. "They kept probing for more. More data. More research. More evidence. I've never seen undergraduates appreciate research to that extent."

Appreciation for research in student nurses strengthens the foundation for a practice that makes good decisions based on evidence, not assumptions. "An evidence-based practice is about accessing information at the point of care," says Cerner's Charlotte Weaver. "With thousands of nurse-relevant clinical trials forming the knowledge base, and more being added each year, keeping your textbook handy simply isn't going to work. There has to be a way for students to learn these informatics processes alongside their clinical content."

How it works

The CIS used in SEEDS was adapted from a Windows-based Cerner system that is widely used in health care organizations throughout the U.S. Clinical information on an imaginary, three-generation Hispanic family and their diverse medical conditions forms the core examples of the system.

Patient assessments are documented in narrative clinical notes or on forms with structured data entry using standard terminology. Nursing diagnoses as well as medical diagnoses are entered. Patient goals are determined and then entered in clinical notes. Nursing interventions are selected from a multidisciplinary order entry screen.

The system is incorporated into the first semester Critical Thinking course, as well as the Client Assessment and Clinical Techniques courses. To facilitate those courses, screens have been designed to support examination and assessments through structured charting with reference text that directs the student to useful Web sites, documents evidence that supports the approach to documentation, and provides a glossary for unfamiliar terms, accessible with a simple

Chasm report is available at the Web site of [The National Academies Press](#).

Institute of Medicine, Committee on Quality of Health Care in America. *To Err Is Human: Building a Safer Health System*. Linda T. Kohn, Janet M. Corrigan, and Molla S. Donaldson, eds. Washington, DC: The National Academies Press, 2000.

Institute of Medicine, Committee on Quality of Health Care in America. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: The National Academies Press, 2001.

right mouse click.

Origins in the Institute of Medicine recommendations

The impetus for this partnership arises from the Institute of Medicine (IOM) published reports in late 1999 and early 2001 addressing the quality, error and waste in the U.S. health care system. The IOM's recommendations clearly mandate curriculum changes and integration of information technology for core clinical competencies of all health professionals. (See accompanying sidebar.)

The reports found that avoidable medical errors cause as many as 98,000 American deaths per year. The reports also found that waste, inefficiencies and misused economic incentives were thought to cost the health care system more than \$30 billion annually. Information technology has been recognized as a key tool to improve the redundancy, efficiency, safety and overall quality of health care. The reports conclude that today's nursing students should graduate with a strong understanding of how technology will be integrated into their workflow and serves as an important tool to manage the health of their future patients.

"Clinical IT really is not happening in nursing schools now, and the collaboration with Cerner is a response... I'd encourage every school to move in this direction," said Helen Connors, referring to the IOM recommendations. "In fact, the university is migrating the system into the med school (The KU School of Medicine will begin its SEEDS program during the 2004-2005 academic year) and looking at the allied health schools. Its most compelling advantages emerge when it becomes a multidisciplinary teaching tool that mirrors the multidisciplinary nature of the health care environment."

The KU School of Nursing also incorporates Boyer's scholarship model as a template for professional development because of its applicability to overall excellence in nursing and nursing education. Faculty contributions to the SEEDS program are recognized as tenure-building activities.

In the current issue: *Reflections on Nursing Leadership*

A 160-hospital study completed in 1983 revealed that some hospitals attract nurses like magnets attract iron filings. What made the difference?

Kammie Monarch, RN, MS, JD, former director of the ANCC Magnet Recognition Program and now chief operating officer for Sigma Theta Tau International, identifies the 14 "forces of magnetism" described in the study and profiles the 82 health care facilities that have gained Magnet designation as of Aug. 1, 2003. Is your hospital among them?

The theme for the 4th Qtr. issue of RNL is "**Nursing: A view of the future.**" Other articles include:

— "March to Magnet" ... One hospital's experience in achieving Magnet status

— "Nursing in the NIS-CEE region: Its changing face" ... The role of nurses in the New

Still, Connors acknowledges the difficulties of changing cultures in nursing schools, as well as in health care, saying “There are a lot of unused computers in patient rooms.” Yet, she also asks educators to focus on the benefits that follow when students are, in her words, “acculturated in a process that relies on more data and fewer assumptions. Frankly, this generation of nursing students has an expectation of technological integration. They’re ready. We should be too.”

A collaboration of innovators, with differing cultures

It’s not surprising that a collaboration of this depth and expense would require leadership from the top. Indeed, the SEEDS development reflected the shared vision of the KU School of Nursing dean, Karen Miller, RN, PhD, FAAN, and Neal Patterson, Cerner’s chairman of the board and CEO. The proximity of the two institutions was a factor in the decision to develop the system (Cerner and KU School of Nursing are both based in Kansas City), but there was also a clear parallel in how innovation was driving each organization.

“KU is one of the nation’s top nursing schools, and they have an IT infrastructure and a faculty eager to integrate clinical technology into nursing education,” said Weaver. Cerner defines itself as a company working to fundamentally transform health care through technology products that deliver vital data for effective decision-making.

And while there was a shared vision, there were also real differences in how the two approached key aspects of the development, beginning with the timeline, according to Helen Connors. “Academic timelines are set—they can’t be moved to accommodate a product, no matter how important it is to us. Either it’s ready on August 20 or we don’t have it this semester. Cerner had to adjust to that, and they did.” Weaver echoed the cultural differences with the same willingness to adapt, “There was a difference in approach which actually served to strengthen the collaboration. The school was methodical, and we learned from that. Academic budgets are developed significantly farther in advance than in the private sector, and that will shape our

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New journal from Sigma

dialogues with nursing schools in the future.”

From student nurse to working nurse

After learning about SEEDS and how it reshaped the processes of teaching clinical content, the next questions are for the students. We asked [Ann Barrows](#), RN, a member of the SEEDS pilot program and recent KU graduate to put the program in perspective. “I’m a believer!” she exclaims. “Being a part of the pilot program was a fantastic opportunity. KU and Cerner listened very carefully to everything we said about how the system worked and what we wished it did. Some of it was pie-in-the-sky of course, but you can look at the SEEDS product now and see where ideas developed by pilot student nurses—and teachers—are incorporated. That’s satisfying, but the real rewards come from just using the system in your assessments and planning.”

Barrows continues, “It helps me think more critically by helping me prioritize and organize input. I can see more easily what’s most relevant to the care and what’s irrelevant at this moment. It gave me a lot of confidence.”

When asked if there might also be an over-reliance on a system that prevents a student or new nurse from drawing on his or her own knowledge, she offered this: “It depends on the student, but this is not a substitute for your clinical knowledge, and using this system also creates a similar kind of approach to an assessment whether you have it on your floor or not. Right now, in the telemetry unit where I work, we don’t have an electronic charting system, but I still organize my work and my approach as if we did.”

When we told Cerner’s Weaver of Barrows’ reflections on the SEEDS system now that she had begun her practice, she said it affirmed what they knew about how people learn. “A process like this imprints on an early learner...they see the world through the structure provided, which is an evidence-based model. We’re teaching nurses to be the best nurses they can be.”

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Now SEEDS has grown. The new Cerner product, called Academic Education Solution, is the company's first for an academic setting. "This product is a salute to the educators and students at KU," said Weaver. "And an acknowledgement that nurses are driving innovation in most institutions. When nurses move forward, they have a way of bringing the rest of the people, physicians included, along with them.

Looking ahead at KU

What's next for SEEDS? "What's not?" seems to be the answer. Everyone Excellence spoke to had ideas about how to continue the evolution. New cases in congestive heart failure, transplant and others will be added to go with the med/surg cases already in the system.

Senior research students will be incorporating their research literature surveys into the system's database to expand the clinical evidence at the ready with a right click. And the system is already finding use as a student management tool in much the same way it has proven itself a case management tool, according to Judith Warren. "We're using SEEDS to track our students' certifications now. If they have completed CPR or HIPPA, we note that in their SEEDS file, and everyone who needs to know has access to that information.

Others, like Kathy Fletcher, see the advantages of interdisciplinary use. "In care settings, there's a movement toward clinical information systems that work like those environments—many users and multiple functions, from physician orders to physical therapy charting. We're working to make SEEDS more like that here in our school."

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■ **Breathing to the beat**

Nurse-led research suggests music eases labor pains

Many women approach childbirth labor fearful of the pain they may experience but are also unwilling or unable to take medication to ease the pain. However, a new study by [Case Western Reserve University](#) provides hope for those seeking to lessen delivery pain without medications: through the use of music.

The study, which appeared in the June 2003 issue of *Pain Management Nursing*, found that music can reduce the sensation of labor pain and decrease and delay the emotional distress that accompanies it. The study was led by Sasitorn Phumdoung, a recent graduate of Case's [Frances Payne Bolton School of Nursing](#).

[Marion Good](#), RN, PhD, associate professor of nursing at the Bolton School, was Phumdoung's dissertation advisor. Good's previous research, in an NIH-funded study, had found that this same music reduced pain after surgery. (See accompanying sidebar.) "There was some evidence on non-pharmaceutical methods at easing labor pain, but it came from small samples, was compiled decades ago, and frankly, was not done with a high level of rigor," says Good. "There was a clear gap in the literature."

■ **Postoperative pain relief**

Evidence of effective adjuncts

In 1999, *Pain*, the journal of the International Association for the Study of Pain, published a study led by Marion Good, RN, PhD. In that study, Good and her researchers concluded that relaxation and music were effective adjuncts to medication for postoperative pain. This research was the foundation for a 2003 study led by Sasitorn Phumdoung, a recent graduate of Case Western Reserve University Frances Payne Bolton School of Nursing.

The abstract to Good's study is presented here. The full text is available [here](#).

Relief of postoperative pain with jaw relaxation, music and their combination

Marion Good, Michael Stanton-Hicks, Jeffrey A. Grass, Gene Cranston Anderson, Charles Choi, Laree J. Schoolmeesters and Ali Salman

The aim of this randomized controlled trial was to determine the effect of jaw relaxation, music and the combination of relaxation and music on postoperative pain after major abdominal surgery during ambulation

The study took place in two hospitals in Phumdoung's home country of Thailand where she is on the faculty of the College of Nursing at Prince Songkla University. In those two hospitals, the standard of care was to not give analgesic medication to laboring mothers because of its effect on the infant.

Phumdoung studied two groups of laboring women, age 20-30, who were all having their first babies. One group chose from among five types of calming music and listened to it for the first three hours in the hospital after active labor began. The comparison group had the standard care during labor. The study started when the women were 3-4 cm dilated.

The group receiving music used a tape recorder and earphones to listen to the music, with 10-minute breaks each hour; the control group did not listen to any music. Phumdoung measured the women's reports of labor pain before the study began and hourly for the next three hours. During the three hours and at each hourly measure, the music group had significantly less sensation and distress pain than the control group.

"These findings have significant implications for women preparing to give birth," Good said. "Many women are afraid of the pain associated with childbirth but are reluctant to take medication because of its possible effects on the baby and progress of labor. Soft music does not have these effects and has the potential as an effective alternative to medication for easing pain during early active labor."

"Labor is severe pain. Obviously music can't just make it disappear. But the effects are consistent," adds Good.

and rest on postoperative days 1 and 2. Opioid medication provided for pain, following abdominal surgery, does not always give sufficient relief and can cause undesired side effects. Thus, additional interventions such as music and relaxation may provide more complete relief. Previous studies have found mixed results due to small sample sizes and other methodological problems. In a rigorous experimental design, 500 subjects aged 18-70 in five Midwestern hospitals were randomly assigned by minimization to a relaxation, music, relaxation plus music, or control group. Interventions were taught preoperatively and tested postoperatively. The same amount of time was spent with subjects in the control group. Pain was measured with the visual analogue sensation and distress of pain scales. Demographic and surgical variables, and milligrams of parenteral or oral opioids in effect at the time of testing were not significantly different between the groups, nor did they correlate with pain scores. Controlling for pretest sensation and distress, orthogonal a priori contrasts and multivariate analysis of covariance indicated that the three treatment groups had significantly less pain than the controls, ($P=0.028-0.000$) which was confirmed by the univariate analysis of covariance ($P=0.018-0.000$). Post hoc multivariate analysis revealed that the combination group had significantly less sensation and distress of pain than the control group on all post-tests ($P=0.035-0.000$), and the relaxation and music groups had significantly less on all tests ($P=0.022-0.000$) except after ambulation. At post ambulation those using relaxation did not have significantly

Soft music decreased both sensation and distress of active labor pain in the first three hours and delayed increases in the distress of pain for an hour. For some participants, relief was fairly substantial. Phumdoung has found that it can reduce the laboring mother's perception of pain and also her distress. Better pain management may speed recovery from childbirth and improve the mother-infant relationship.

The study was supported by Alpha Mu Chapter of Sigma Theta Tau and the Frances Payne Bolton School of Nursing Alumni Association.

less pain than the controls on both days and those using music did not on day 1, although there were some univariate effects. A corresponding significant decrease in mastery of the interventions from pre to post ambulation suggests the need for reminders to focus on the intervention during this increased activity. Physicians and nurses preparing patients for surgery and caring for them afterward should encourage patients to use relaxation and music as adjuvants to medication for postoperative pain.

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