

## It's in the Genes

*The ANA and nurse leaders want RNs and students to practice with genetics and genomics in mind.*

When researchers completed the mapping of the human genome in 2003, many health care professionals viewed it as an amazing accomplishment. But a larger question loomed within the nursing community: What does it mean for the practice of nursing?

Leaders of the ANA and nurse experts who've been involved in issues related to genetics—and the broader science of genomics—have an answer: plenty.

“The last big ‘explosion’ that influenced nursing practice was technology,” explains Laurie Badzek, MS, RN, JD, LLM, director of the ANA's Center for Ethics and Human Rights and professor at the West Virginia University School of Nursing. “It's now the genetics revolution. And as advances in genetics and genomics continue, it will affect how nurses practice in every setting, from neonatal care to the care of older adults. So they have a lot to learn.”

Genetics is the study of individual genes and their impact on relatively rare single-gene disorders, such as cystic fibrosis. The study of genomics looks at all the genes together, including the way they interact with each other, and takes in such elements as the environment and cultural and psychosocial factors.

Although many nurses may fear a steep learning curve when it comes to genomics issues, nurse experts and professional nursing groups have outlined a way to help nursing students and practicing RNs get up to speed to provide effective patient care.

In fall 2005, the ANA hosted a meeting of representatives from educational institutions, profes-

sional associations, certifying bodies, and regulatory agencies to discuss the implications of genetics and genomics information on nursing practice, establish consensus on draft genetic and genomic core competencies, and develop a plan to communicate these competencies and win the endorsement of the greater nursing community. Other partners were the National Human Genome Research Institute, the Office of Rare Diseases, the Health Resources and Services Administration, and the International Society of Nurses in Genetics (ISONG).

Now that the competencies won the approval of some 50 representatives attending the meeting, it's a matter of getting a wide range of groups to endorse them and, more important, work toward implementing them. The ANA's board of directors endorsed the competencies at its December 2005 meeting.

### WHY IT MATTERS

Cynthia Prows, MSN, RN, works as a clinical nurse specialist in genetics at Cincinnati Children's Hospital Medical Center. She's excited by advances in genetics and genomics that can lead to breakthroughs in the treatment of numerous disorders.

But she also realizes that some nurses may be wary of what appears to be a complex topic and may wonder exactly how it might change the way they practice at the bedside. So she offers an example.

The standard protocol for children undergoing tonsillectomy is to administer codeine-containing medication post-operatively to relieve pain.

Recently, Children's Hospital began offering testing for cer-

tain mutations in the gene associated with the cytochrome P-450 (CYP) enzyme CYP206 that can prevent codeine from being metabolized normally or lead to other complications.

“So instead of relieving a child's pain, administering codeine could either make the child sick or lead to a whopping dose of morphine fast if he or she has too many copies of the *CYP2D6* gene,” Prows says. As a result of this new information, professional staff at her facility are considering implementing a plan to screen all children undergoing tonsillectomy for *CYP2D6* mutations so treatment can be effective, she says.

Prows says many advances have already been made in pharmacogenetics, which is helping health care professionals determine the correct drugs and dosages for their patients.

Beyond medications, nurses can help their patients live healthier lives by assessing them for heritable risk factors for certain conditions, such as cardiovascular disease or colon cancer, and providing them with the information they need to make better choices.

“The potential for what genetic research can tell us is almost unimaginable,” Badzek says. “If we can predict so many things, then as nurses we can be very prescriptive about what we ask patients to do.”

Yet when assessing the current state of nurses' knowledge about this science, Kathleen Calzone, MSN, RN, APNG, senior nurse research specialist at the National Cancer Institute, asks, “How can nurses educate others or explain targeted therapy if they don't understand, themselves, what a gene is?”

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That's where the core competencies come into play.

Calzone, Prows, and Jean Jenkins, PhD, RN, FAAN, senior clinical adviser, and Dale Lea, MS, RN, MPH, FAAN, both with the National Human Genome Research Institute, wrote the competencies for genetics and genomics, along with curricular guidelines.

"When we were developing the competencies we really tried to determine the key things that nurses need to know," says Calzone, recent past president of ISONG. "We wanted the competencies to be manageable, tangible, and measurable."

Adds Jenkins, "Nurses are very practical. They like to focus on what they need to know to provide care at the bedside. What we're saying is that having this basic, specific knowledge is fundamental to patient care."

If RNs have these essential competencies, they should, for example, be able to understand the genetic and genomic basis for an illness when patients come in through the door seeking care, recognize a newborn who's at risk for illness or death because of genetic metabolism errors, and guide interventions that will prevent young adults from developing cardiovascular disease.

### A CLOSER LOOK AT THE COMPETENCIES

When looking at the document, "Essential Nursing Competencies and Curricula Guidelines for Genetics and Genomics," nurses will see that it is broken down into "professional responsibilities," such as advocating clients' access to desired genetics and genomics services and resources, and "professional practice domain." (The document is available at [www.nursingworld.org/ethics/genetics/competencies.htm](http://www.nursingworld.org/ethics/genetics/competencies.htm).)

The professional practice domain outlines competencies

surrounding nursing assessment, identification, and referral activities, and provision of education, care, and support to patients and their families.

Although nurses who wrote the competencies believe that they should all be embraced, they're willing to highlight a few that can help RNs quickly make a difference in patient care.

One competency requires nurses to have the ability to obtain a family history going back at least three generations, and another, the skill to construct a "pedigree" using information from that history along with standardized symbols and terminology.

Jenkins reports that the U.S. Surgeon General's Office has launched a campaign to help consumers create a "family health portrait" that can be shared with health care providers at the agency's Web site, [www.hhs.gov/familyhistory](http://www.hhs.gov/familyhistory). There also is information available at the site for health care professionals.

Prows points to another crucial competency, which involves nurses being able to provide patients with credible, accurate, and appropriate genetic and genomic information, and other resources for that information.

And yet another key competency focuses on nurses' ability to consider genetic and genomic influences when creating health promotion and disease prevention plans with their patients.

"Prevention becomes extremely important for disease management," Jenkins says. "For example, if nurses determine that patients are at an increased risk for colon cancer because of a family history, they can discuss the importance of having a colonoscopy before age 50. Nurses also need to stress that genetics is only one component of a patient's overall

health—so they can effectively explain to patients the importance of reducing risks, as well as how to do it."

### THE NEXT STEPS

Nurse experts say that the core competencies must reach two target groups: nursing students and practicing nurses.

In a 2005 survey of nursing school deans, Prows discovered that nearly one-third of respondents indicated that genetics was not taught within their entry-level nursing programs. Furthermore, the majority of nursing programs only devoted one to five hours to genetics content.

To reach students, nurse experts believe they must have the support of nursing leaders and academic faculty to develop a solid plan that incorporates genetics and genomics information into both basic and advanced curriculums. They also believe that much of the information can be woven into existing courses.

To reach practicing nurses, nurse leaders say they must develop online and other continuing education courses. That will require ongoing support from hospital associations, health care administrators, and even consumers who want their health care professionals to have access to up-to-date, relevant genetics information.

Nurse representatives who oversaw the development and consensus around the core competencies will continue to meet over the upcoming year to distribute the core competencies document, promote implementation strategies, and gain support among other organizations that may have an interest in promoting genetics and genomics issues.

"We're not expecting nurses to become geneticists," concludes Badzek. "This is about improving nursing practice." ▼