JOURNAL OF NURSING SCHOLARSHIP

GUEST EDITORIAL

Relevance of Genomics to Healthcare and Nursing Practice

Much has been learned over the past 10 years about the relevance of genomic variation to health, to the risk for both rare and common diseases, and to treatment responsiveness (Feero, Guttmacher, & Collins, 2010). The identification of genomic differences that play a role in disease provides information that is enhancing our understanding about the biology of disease, resulting in new and more personalized therapies and influencing healthcare decisions. Experts predict that expanding research discoveries coupled with new technologies will be effectively translated into approaches for clinical care (Green & Guyer, 2011). As this Journal of Nursing Scholarship (JNS) issue illustrates, it is important for the practicing nurse to be aware of this information now. Through its focus on health promotion, caring, and the understanding of individuals, including their relationships with families, the community, and society, nursing brings an important perspective to the application of genomics. Nurses have a responsibility to be informed and to inform other healthcare professionals, individuals, families, and communities of the potential benefits and challenges of genomics.

Understanding the genomic science behind care decisions for conditions commonly seen by the practicing nurse has the potential to improve care outcomes. Many of these opportunities already exist (**Figure**), but much work remains to ensure the effective integration of genomic information in routine clinical practice. For example, the hypothetical patient Gabe has been admitted to the hospital for atrial fibrillation and is a candidate for pharmacogenomic testing to inform his warfarin dosing. The patient asks the nurse whether or not he should have this test. That nurse needs to know about the nature of the test, whether the results will influence decisions made about Gabe's treatment, the potential implications of test results for his family, and where to find more information to answer his questions and to contribute to his plan of care. Evidence suggests that the majority of nurses are unprepared to deal with these questions (Thompson & Brooks, 2011). Nurses play a role in creating an infrastructure that supports the delivery of services that utilize genomic information. They can also influence policies related to the utilization of genomic information through appreciation of the associated ethical, legal, and social issues. With a full understanding of the relevance as well as limitations of genomic information, nurses can play an important role in the application of genomics to clinical care.

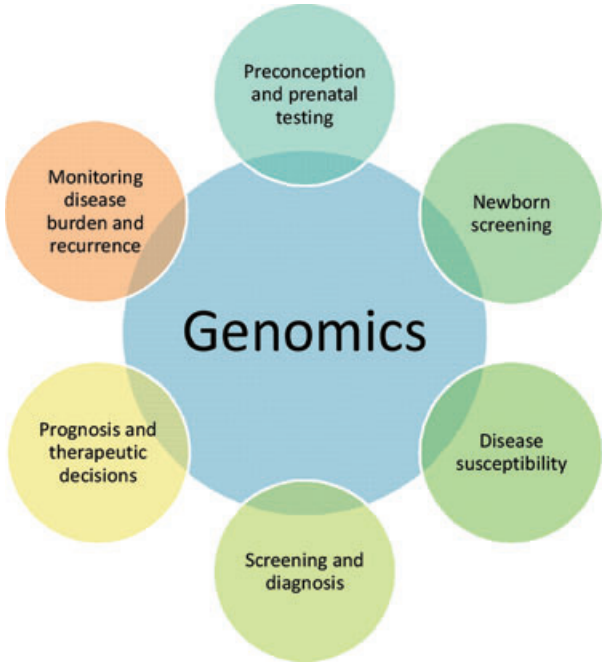

Figure. Areas of integration of genomic information in clinical practice.

In the past, genetic and genomic testing was focused on small areas within the genome. However, the advent of "next-generation" DNA sequencing methods has led to remarkable reductions in the costs of genome sequencing (Pettersson, Lundeberg, & Ahmadian, 2009; Snyder, Jiang Du, & Gerstein, 2010). Indeed, we are entering the era of the "$1,000 genome"– that is, the ability to sequence someone's entire genome for $1,000 or less (National Human Genome Research Institute, 2010), a cost rivaling many diagnostic tests and thus deemed realistic for routine clinical application. While these technology advances have to date outpaced our capacity for harnessing this information to improve health, the coming decade will bring a steady stream of examples where genomic information is shown to be a valued component of clinical practice (Phimister, Feero, & Guttmacher, 2012).

The purpose of this Genomic Special Issue is to provide evidence reviews about the genomics of common healthcare conditions with relevance for nursing practice and services. This issue consists of articles that provide an overview of:

- the current and emerging science and technology, such as whole-genome sequencing (with implications for international healthcare);
- the state of the evidence about genomic variation and clinical applications for common diseases (e.g., cardiovascular diseases, metabolic syndrome, and cancer), as well as other pediatric and adult conditions, and;
- the ethical, legal, social, and nursing research issues associated with the translation of genomics into health care.

This Special Issue provides a world perspective on the impact of new genomic knowledge on clinical nursing practice and health care in general, examining the role of the nurse based on guidelines, position statements, and exemplars from various countries. The editors of this issue appreciate that some of this content is complex, so you may need to seek additional resources. We refer you to the JNS 2011 Genomic Education Series, which concluded with an article on genomic resources for nursing education (Tonkin, Calzone, Jenkins, Lea, & Prows, 2011).

The responsible translation of genomics into health care requires that all clinical disciplines, including nursing, continue educating their practicing workforce in genomics. In tandem, the preparation of future nurses with essential genetic and genomic competencies will help facilitate the effective use of genomic information in clinical care while promoting and protecting the public's health (Consensus Panel on Genetic/Genomic Nursing Competencies, 2009). This Special Issue is intended to provide a platform for preparing both the practicing and academic communities for that new reality.

Kathleen A. Calzone, PhD, RN, APNG, FAAN
National Cancer Institute, National Institutes of Health, Bethesda, MD
calzonek@mail.nih.gov

Jean Jenkins, PhD, RN, FAAN
National Human Genome Research Institute, National Institutes of Health, Bethesda, MD;

Nick Nicol, PhD, FCN
Universal College of Learning, Palmerston North, New Zealand

Heather Skirton, PhD, RGN, RGC, QMW
Plymouth University, Taunton, United Kingdom

W. Gregory Feero, MD, PhD
National Human Genome Research Institute, National Institutes of Health, Bethesda, MD

Eric D. Green, MD, PhD
National Human Genome Research Institute, National Institutes of Health, Bethesda, MD

References

Consensus Panel on Genetic/Genomic Nursing Competencies. (2009). *Essentials of genetic and genomic nursing: Competencies, curricula guidelines, and outcome indicators* (2nd ed.). Silver Spring, MD: American Nurses Association.

Feero, W. G., Guttmacher, A. E., & Collins, F. S. (2010). Genomic medicine– An updated primer. *New England Journal of Medicine*, *362*(21), 2001–2011.

Green, E. D., & Guyer, M. S. (2011). Charting a course for genomic medicine from base pairs to bedside. *Nature*, *470*(7333), 204–213.

National Human Genome Research Institute. (2010). The road to the $1000 genome– A roundup of sequencing technology developments. Retrieved September 1, 2011, from http://www.genome.gov/27540667.

Pettersson, E., Lundeberg, J., & Ahmadian, A. (2009). Generations of sequencing technologies. *Genomics*, *93*(2), 105–111.

Phimister, E. G., Feero, W. G., & Guttmacher, A. E. (2012). Realizing genomic medicine. *New England Journal of Medicine*, *366*(8), 757–759.

Snyder, M., Jiang Du, J., & Gerstein, M. (2010). Personal genome sequencing: Current approaches and challenges. *Genes and Development*, *24*, 423–431.

Thompson, H. J., & Brooks, M. V. (2011). Genetics and genomics in nursing: Evaluating essentials implementation. *Nurse Education Today*, *31*(6), 623–627.

Tonkin, E., Calzone, K., Jenkins, J., Lea, D., & Prows, C. (2011). Genomic education resources for nursing faculty. *Journal of Nursing Scholarship*, *43*(4), 330–340.