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- Nursing Genomics: Practice Implications Every Nurse Should Know** 499
 Reba Umberger, Ezra C. Holston, Sadie P. Hutson, and Margaret Pierce
- Twenty-first century nurse clinicians, scientists, and educators must be informed of and become proficient in genetic competencies to provide the best available evidenced-based patient care. This article presents a historical context and basic applications of genetics, along with the attendant legal and ethical issues, to provide a framework for understanding genetics and the genomics applications used in clinical nursing practice. The implications of genomics are relevant to all areas of nursing practice, including risk assessment, education, clinical management, and future research.
- Nursing Genomics: Its Role in Health Trajectory** 523
 Pei-Ying Chuang, Ching Hsiu Hsieh, and Bashira Addullah Charles
- The human genome, which is the complete set of human genetic information, significantly contributes to the health of an individual; it can lead to single or complex medical conditions (including cancer and heart disease) also affected by environmental and behavioral risk factors. To date, the challenges related to human genomics and nursing science focus on the following areas: (1) curriculum application, (2) advanced clinical practice in specific fields, and (3) hands-on bioscience laboratory skills. This review article summarizes current efforts and addresses critical components in nursing genomics.
- How Advances in Genomics are Changing Patient Care** 557
 Elizabeth K. Bancroft
- The completion of the Human Genome Project has led to a greater understanding of the role of genetics/genomics in the development of all common diseases, which is leading to the routine integration of genetics and genomics into all aspects of health care. This change in practice presents new challenges for health care professionals. This article provides an overview of how genetics/genomics has the potential to improve health care within many different clinical scenarios, and highlights the key issues for nurses working in a variety of settings.
- Hypertrophic Cardiomyopathy** 571
 Kim Subasic
- Hypertrophic cardiomyopathy (HCM) is an autosomal dominant, cardiovascular disorder that carries the risk of sudden cardiac death. The prevalence of HCM is 1:500 persons. The purpose of this article is to provide an

overview of the pathophysiology, symptoms, complications, diagnostic testing, and treatment. The silent presentation of HCM presents unique diagnostic challenges and complicates prompt identification. Diagnostic testing and management strategies for the care of a person with HCM are discussed. HCM has individualized presentation and therefore requires individualized therapy.

The Impact of Genomics on Oncology Nursing

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Laura Curr Beamer, Lauri Linder, Bohua Wu, and Julia Eggert

Since 2003, genetics and genomics information has led to exciting new diagnostics, prognostics, and treatment options in oncology practice. Profiling of cancers offers providers insight into treatment and prognostic factors. Germline testing provides an individual with information for surveillance or therapy that may help them prevent cancer in their lifetime and options for family members as yet untouched by malignancy. This offers a challenge for oncology nurses and other oncology health care providers to become comfortable with incorporating education about genetics/genomics into their clinical practice and patient education.

Genetics' Influence on Patient Experiences with a Rare Chronic Disorder: A Photovoice Study of Living With Alpha-1 Antitrypsin Deficiency

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Pamela Holtzclaw Williams, Lucinda Shore, Marvin Sineath, Jim Quill, Barbara Warner, Jamila Keith, Deirdre Walker, Sara Weinke, Susan Flavin, and Charlie Strange

Patients with rare chronic disorders and their caregivers increasingly form communities to support and exchange social experiences. Because up to 10% of the United States population is affected by one of 5000 to 6000 rare disorders, efforts to understand the individuals and affected communities are important. This study was conducted using community-based participatory research approaches within a community of patients and caregivers living with alpha-1 antitrypsin (AAT) deficiency. Patient populations at some risk for lung transplant include individuals who smoked cigarettes and patients who underwent liver transplant in infancy and later adulthood due to accumulation of misfolded AAT within hepatocytes.

Nursing and Genetic Biobanks

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Jennifer E. Sanner, Erica Yu, Malini Udtha, and Pamela Holtzclaw Williams

Biobanks function as vital components in genetic research, which often requires large disease-based or population-based biospecimens and clinical data to study complex or rare diseases. Genetic biobanks aim to provide resources for translational research focusing on rapidly moving scientific findings from the laboratory into health care practice. The nursing profession must evolve as genetic biobanking practices advance. Nursing involvement in genetic biobanking practices comes with a distinct set of educational, ethical, and practice competencies. In response to these growing competency standards, nursing science developed a conceptual framework and continues to study ethical considerations to guide genetic biobanking initiatives.

An Overview of Epigenetics in Nursing

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Ashley Erin Clark, Maria Adamian, and Jacquelyn Y. Taylor

Epigenetic changes to the genome are biochemical alterations to the DNA that do not change an individual's genome but do change and influence gene expression. The nursing profession is qualified to conduct and integrate epigenetic-focused nursing research into practice. This article discusses current epigenetic nursing research, provides an overview of how epigenetic research relates to nursing practice, makes recommendations, and provides epigenetic online resources for nursing research. An overview of major epigenetic studies in nursing (specific to childbirth studies, preeclampsia, metabolic syndrome, immunotherapy cancer, and pain) is provided, with recommendations on next steps.

Integrating Genetics and Genomics into Nursing Curricula: You Can Do It Too!

661

Sandra Daack-Hirsch, Barbara Jackson, Chito A. Belchez, Betty Elder, Roxanne Hurley, Peg Kerr, and Mary Kay Nissen

Rapid advances in knowledge and technology related to genomics cross health care disciplines and touch almost every aspect of patient care. The ability to sequence a genome holds the promise that health care can be personalized. Health care professionals are faced with a gap in the ability to use the rapidly expanding technology and knowledge related to genomics in practice. Yet, nurses are key to bridging the gap between genomic discoveries and the human experience of illness. This article presents a case study documenting the experience of five nursing schools/colleges of nursing as they work to integrate genetics and genomics into their curricula.

Cytochrome p450, Part 1: What Nurses Really Need to Know

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Stephen D. Krau

Although knowledge about the impact of cytochrome p450 on individual variations in drug response has been known for decades, the transition to clinical practice has not evolved. Nurses who administer and prescribe medications have a responsibility to their patients to understand the responses to medications that are mediated by this family of enzymes. An overview of the variations seen in drug responses based on genetics is presented with discussion focusing on the current prescriptive practices and limitations in clinical drug trials.

Cytochrome p450 Part 2: What Nurses Need to Know About the Cytochrome p450 Family Systems

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Stephen D. Krau

To provide the best patient care related to medication administration and prescription, an understanding of the specific enzymes is essential. Enzymes affect the metabolizing of most medications that nurses administer and that nurse practitioners and physicians prescribe on a regular basis. More specifically, the most important p450 enzymes in drug metabolism are cytochrome p450 (CYP) 1A2, the CYP2C family, CYP2D6, and CYP3A4. In addition, the enzymes are instrumental in the body's reaction to environmental factors, some of which are carcinogens.

Cytochrome p450 Part 3: Drug Interactions: Essential Concepts and Considerations 697

Stephen D. Krau

The most important considerations related to understanding cytochrome p450 enzymes is the appreciation that all drug effects vary among individuals and, although there are multiple causes of these variations, drug effects are strongly influenced by genes. Nurses who administer and monitor, or prescribe, these medications can only be safe if there is understanding of these processes. The same enzyme may display a variety of functions and alterations, which can range from ultrarapid activity to no activity. Foods given with medications also can affect the metabolism of the medication. Each cytochrome p450 subfamily is instrumental in the metabolism of numerous drugs.

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