Genetic and genomic science directly affects oncology nursing care. Many resources are available to enable oncology nurses to better understand and deliver competent genomic care to patients and families. This article relays resources for germline genetic testing, tumor profiling, pharmacogenomics, and nursing education.

AT A GLANCE

- Oncology nurses need to know when to refer patients for germline genetic testing and how to support patients with suspected hereditary cancer syndromes.
- Somatic genetic testing of tumors and pharmacogenomics are emerging strategies to personalize treatment of disease.
- Many resources are available to nurses and educators to better understand genetic and genomic science and to promote safe, comprehensive patient care.

KEYWORDS
genetics; genomics; personalized medicine; prevention and detection

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Apply Resources to Practice

Use current genetics and genomics content in oncology

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The genetics revolution is rapidly and continually changing the practice of oncology care. Many nurses received little instruction on basic principles of genetics in basic or graduate training. Practicing in oncology without an understanding of genetics is becoming increasingly difficult because genomic care is now central to the care of most patients with cancer (Santos et al., 2013). Genomic and genetic information in oncology care affects risk assessment, prognostic information, therapeutic decisions about medications based on pharmacogenomics and tumor profiling, and preventive care (Boucher, Habin, & Underhill, 2014). Oncology nurses are using this information in research studies with the goal of improving patient care (Munro, 2015). Oncology nurses can access many resources to increase their knowledge of genetic and genomic care and share additional resources with patients and families for better understanding of how genetics and genomics affect oncology care. With the expansion of knowledge about genetics and genomics, nurses can now readily access reliable information and continuing education.

Background

The Human Genome Project was completed in 2003, which involved sequencing 3 billion base pairs in thousands of genes (Weitzel, Blazer, MacDonald, Culver, & Offit, 2011). That paved the way for research about how subtle differences as small as the substitution of one base pair can influence health and responses to treatment (Munro, 2015). Genetics is the study of the transmission of single genes within families and the analysis of more complex types of inheritance. Genomics is the study of the entire DNA content present within an organism.

In the past, genetic testing has focused on small areas, such as single genes within the genome. The recent development of newer, more efficient, and more cost-effective techniques to evaluate the human genome has led to the identification and clinical understanding of many new genes that affect all aspects of oncology care. The All of Us Research Program, launched in 2015, has a short-term goal of developing personalized treatments tailored to individuals. The long-term goal of the initiative is to use what is gleaned from genetic and genomic information from oncology to generate knowledge applicable to many areas of health (Collins & Varmus, 2015). From a scientific perspective, the identification of genetic and genomic differences that affect health provides information regarding the biology of disease, resulting in new and more personalized therapies that are more likely to be effective for individual patients (Calzone, Jenkins, Bakos, et al., 2013).

Germline Mutation Genetic Testing Resources

An estimated 10% of all cancers have a hereditary component (Weitzel et al., 2011). The provision of germline genetic testing for single or multiple genes to understand hereditary susceptibility to developing cancer