

# Knowledge and Attitudes of Oncology Nurses Regarding Pharmacogenomic Testing

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More than 20 different pharmacogenomic tests are being used in the oncology field. The current descriptive study was conducted with 368 oncology nurses in North Carolina to identify and test key elements of Rogers' Diffusion of Innovation Theory that play a role in the adoption of pharmacogenomic testing. Oncology nurses who participated in this study had limited knowledge of genomics and pharmacogenomic testing. Attitudes toward pharmacogenomic testing were positive overall, and the study revealed that oncology nurses in this study routinely use pharmacogenomic testing information. Variable selection methods revealed that total genomic knowledge was more accurately predicted by prior experience and personality variables, pharmacogenomic knowledge was more accurately predicted by personality variables, and attitude was more accurately predicted by prior experience and perceived need of innovation. Based on these findings, several factors play key roles in the diffusion of pharmacogenomic testing within the oncology nursing field. Therefore, assessment of these variables may benefit the widespread adoption of pharmacogenomic testing. Further research should be conducted with these variables to assess the adoption of the innovation.

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The term *genomic testing* covers an array of sophisticated techniques, including direct examination of DNA, RNA, or protein, and has dramatically increased since the 1990s (National Human Genome Research Institute, 2014). Genomic testing can be used to confirm a suspected diagnosis, detect the presence of a carrier state in individuals who appear unaffected, predict a patient's response to different types of therapy, and screen for genomic conditions in embryos, fetuses, and newborns (National Human Genome Research Institute, 2014). According to GeneTests (2014), a publicly funded medical genomics information resource, genomic testing is currently available for more than 4,400 diseases. Genomic testing will soon become available for a growing number of diseases.

Pharmacogenomic testing is a particular type of genomic testing that is used to guide a patient's drug therapy based on his or her genomic makeup (Foley & Quigley, 2010). Pharmacogenomic testing allows for the assessment of drug toxicity and effectiveness prior to the initiation of a specific drug (Benhaim, Labonte, & Lenz, 2012; Kitzmiller, Groen, Phelps, & Sadee,

2011; McLeod, 2004). Several healthcare fields are currently benefiting from the use of pharmacogenomic testing, and one of those fields is oncology. Pharmacogenomic tests are divided into two categories within the oncology field: testing for chemotherapy toxicity and testing responsiveness to treatment, such as in tumor profiling (Genetic Diagnostic Network, 2014). Commonly used oncology drugs with pharmacogenomic testing information in their package inserts include trastuzumab, tamoxifen, cetuximab, vemurafenib, and imatinib (U.S. Food and Drug Administration [FDA], 2014). Tamoxifen is an agent used in breast cancer treatment that has three different pharmacogenomic biomarker labels, which are associated with specific tests based on enzymes (e.g., CYP2D6) or hormone receptors (FDA, 2014).

The FDA (2014) has approved 140 drugs with pharmacogenomic information in their labels. Of those drugs, 42 are directly related to oncology. Nurses are at the forefront of patient care, which makes them well positioned to educate patients about new and innovative technologies associated with their health care. Therefore, nurses could play a critical role in the incorporation