

# *Utility of Educating Pre-licensure Students on Genetic and Genomic Competencies*

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# Terms

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## Genetics

- Study of individual genes and their relationship to relatively rare diseases that are a direct result of abnormal genes

## Genomics

- Study of all genes in the human genome including the ways genes interact with each other, the environment, and psychosocial factors

# What are competencies?

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U.S. Office of Personnel Management (OPM) defines a competency as

"a measurable pattern of knowledge, skills, abilities, behaviors, and other characteristics that an individual needs to perform work roles or occupational functions successfully."

U.S. Department of Labor -Employment and Training Administration

"A competency is the capability to apply or use a set of related knowledge, skills, and abilities required to successfully perform "critical work functions" or tasks in a defined work setting."

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Learning objective or intellectual content or specific literacy

# What are genetics/genomics competencies?

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*Essentials of Genetic and Genomic Nursing: Competencies, Curriculum Guidelines, and Outcome indicators, 2<sup>nd</sup> Edition*

- *First edition 2006 published by ANA*
- *Second edition with outcome indicators 2008*
- *28 statements defining essential knowledge and skills all registered nurses are expected to master in regards to genetics and genomics*

“The public will increasingly expect that the registered nurse (RN) will use genetic and genomic information and technology when providing care. These expectations have direct implications for RN preparatory curricula, as well as for the 2.9 million practicing nurses.”

# What will staff nurses in acute-care hospitals need to know/do to care for persons, families, or populations?

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- Understand the genetic and genomic basis of the illness for which a person is seeking care
- Recognize a newborn at risk for disease or death from genetic metabolism errors
- Identify an asymptomatic adolescent at high risk for hereditary colon cancer
- Identify a couple at risk for having a child with a genetic disease
- Guide interventions to prevent cardiovascular disease in young adults
- Facilitate drug selection or dosage for adults with cancer based on molecular markers
- Identify individuals who are candidates for specific genetic testing

# Goal of G/G competency consensus statement

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The primary purpose of this document is to define essential genetic and genomic competencies for all registered nurses.

This document is intended to guide nurse educators in the design and implementation of learning experiences that help learners (students and practicing nurses) achieve these genetic and genomic competencies.

**The goal is to prepare the nursing workforce to deliver competent genetic- and genomic focused nursing care.**

# Applying the G/G competencies

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“The genetic and genomic competencies are integral to the practice of all registered nurses regardless of academic preparation, practice setting, role, or specialty.”

# Research Question and Purpose

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Background question: Are G/G competencies really “integral” to the practice of all registered nurses?

Primary objective:

- The purpose of this study was to describe the utilization of genetic/genomic nursing competencies in contemporary acute-care hospitals



# Design

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This cross-sectional study

Examined survey responses from 796 bedside nurses practicing in two of the largest private hospital networks in north Texas in 2014-2015

# Measures

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No existing instrument to measure nurse understanding or use of genetic/genomic competencies

Research team used the published competencies themselves to develop an instrument  
38-item questionnaire including demographic items.

Participants rated each competency on a scale of 1-7 for frequency of use in the respondent's own practice.

- **something I never do: \_\_\_ 1 \_\_\_ : \_\_\_ 2 \_\_\_ : \_\_\_ 3 \_\_\_ : \_\_\_ 4 \_\_\_ : \_\_\_ 5 \_\_\_ : \_\_\_ 6 \_\_\_ : \_\_\_ 7 \_\_\_ : a daily activity**

Each item also included the following options:

- "I do not understand the statement."
- "The competency does not apply to my practice."

# Results

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Measure was highly reliable (Cronbach's alpha = 0.98)

- If survey was not complete: likely to fail to complete demographic items at the end of the survey
  - Therefore interpret demographic differences between groups cautiously
- Hospital in the networks are similar in respect to populations served, hospital sizes, nursing practice models, and medical services provided.
- In previous studies in which the two networks have collaborated, nursing personnel did not differ significantly.
- Target population was bedside staff nurses
- Nurses who report they do incorporate genetics/genomics technologies and information into practice frequently
  - were significantly more likely to report they work in a mother-baby unit and
  - Were significantly more likely to be older than 40 years of age.

# Results

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A small group of non-bedside nurses with advanced degrees participated in both networks

Examined category “Master’s degree” for incidental findings

- Nurses with master’s degrees reported performing several competencies significantly more often than their colleagues with bachelor's or technical degrees.
- Identifying clients who may benefit from specific genetic/genomic information or services based on assessment data ( $p = 0.008$ )
- Advocating for client access to desired genetic/genomic services or resources ( $p = 0.009$ )
- Developing plans of care...that incorporate genetic/genomic assessment information ( $p = 0.008$ )
- Providing clients with ...genetic/genomic information, resources, services, and technology ( $p = 0.003$ )
- Critically analyzing client history and physical assessment ...for genetic/genomic and environmental influences and risk factors ( $p = 0.005$ )
- Nurses with Master’s degrees reported participating in continuing education related to genetics/genomics significantly more often than other nurses

# Results

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Our data did not support the hypothesis that hospital staff nurses use the published genetics/genomics competencies; but rather support the contrary conclusion. In summary uptake of the G/G competencies has been slow.

Mean score of every item was lower than 2.5. Only 5 competencies were EVER performed (score greater than 1) by a majority of respondents.

- Recognizing when my own attitudes and values related to genetic and genomic science may be affecting care I provide to clients (n = 657)
- Thinking about my beliefs and values about client care that relate to genetics and genomics (n = 656)
- Considering genetic and genomic influences on personal and environmental risk factors in health promotion or disease prevention activities (n = 610)
- Understanding how genetics and genomics relates to health, prevention, screening, diagnostics, prognostics, selection of treatment, and monitoring of treatment effectiveness (n = 584)
- Being aware of the potential impact of genetic information on clients or their family members (n = 583)
  
- Claims that respondents could not understand the competency statements ranged from 4-12%.

# Results – Family history

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Obtaining accurate 3-generation family history is a genetics/genomics competency.

Obtaining family histories has been taught as a fundamental nursing skill for many decades.

Nevertheless, 59% of respondents never obtained a 3-generation health history from clients

Constructing pedigrees was even less frequent with 73% of respondents never constructing pedigrees.

# Associations

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(linear) Regression modeling

OUTCOME: reported incorporation of genetic/genomic technologies into nursing practice

ASSOCIATED COMPETENCIES:

- 1) showing the importance of tailoring genetics and genomic information and services to clients based on their culture, religion, knowledge level, literacy, and preferred language
  - 2) performing interventions and/or treatments appropriate to clients' genetic and genomic health care needs in practice
  - 3) recognizing when her/his own (nurses') attitudes and values related to genetic and genomic science may be affecting client care.
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- $R^2 = 0.394$

# Discussion

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## Role of nurses in personalized medicine

- Some nursing leaders tend to situate genetics and genomics at the center of nursing
- Is the genetic perspective appropriate for ALL registered nurses in the contemporary healthcare industry?  
should competencies be job related? Or should they be instituted as a political statement about the profession?
- Or is the genetic perspective more appropriate for advanced practice nurses?
- Are the G/G competencies essential for ALL nurses or are they a call for improved genomic literacy across healthcare?
- If G/G competencies are perceived by nursing itself as essential, how will regulatory bodies hold nurses accountable for the competencies they do not use or master?



# Contact

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