

## Precision Medicine: Preparing Nurses in Genomics for Today's Healthcare

Lisa Aiello  
Kathleen Calzone

**P**recision Medicine, which represents the individualization of healthcare in an unprecedented capacity through the use of genomics, is revolutionizing healthcare and healthcare systems, creating a new paradigm of healthcare in the United States and globally (Ginsburg & Phillips, 2018). Never in the history of healthcare, have we stood at the precipice of being able to improve healthcare quality and safety while reducing costs and overuse of vital resources such as diagnostic testing and treatments. The continued scientific discoveries resulting from the completion of the sequence of the human genome have occurred at an exponential rate, allowing *genomic* – the entire genome of an organism – information and technology to rapidly translate into clinical care applications that span the entire healthcare continuum (Calzone et al., 2013). Remarkably, genomic sequencing is a technology that has undergone a substantial reduction in cost, bringing this not only into healthcare but directly into the hands of the consumer with direct to consumer genomic tests (Roychowdhury & Chinnaiyan, 2016).

The evidence-based applications of genomics to healthcare are staggering. For instance, the Food and Drug Administration has over 300 approved drugs with pharmacogenomics indications (U.S. Food and Drug Administration, 2018). These include common medications such as Clopidogrel, Warfarin, Codeine, proton pump inhibitors, common targeted cancer agents, a wide range of selective serotonin reuptake inhibitors, as well as many others. The appropriate evidence-based application



Lisa Aiello

Kathleen Calzone

of pharmacogenomics improves patient outcomes by selecting the right drug for the right patient and reducing adverse drug reactions, thereby maximizing efficacy and safety while controlling costs by avoiding the trial and error approach.

Consider some of the most common complex diseases all healthcare practitioners encounter, such as cardiovascular disease and cancer. Uncontrolled hypercholesterolemia leads to coronary artery disease and yet familial hypercholesterolemia (FH) is common in the general population, with a prevalence of approximately one in every 200-250 for FH associated with a variant in a single

gene, which represents the most common single gene disorder in humans (Hopkins, 2017). Unfortunately, despite the prevalence, FH is under-diagnosed leading to increases of as much as 20-fold, for cardiovascular events that may have been prevented if the high plasma levels of lipoproteins resulting from FH were treated (Foody, 2013). Genomics has completely transformed cancer care providing the opportunity to: identify individuals at substantially increased risk; use of genomics in cancer screening such as DNA stool tests; using tumor genomics to inform prognosis and determine the need for adjuvant therapy; and the development of therapies targeting the genomic variations found in the tumor (Roychowdhury & Chinnaiyan, 2016).

In 2018, the National Council of State Boards of Nursing (NCSBN) identified Precision Medicine as one of the most significant healthcare advances with considerable implications for the entire nursing workforce (NCSBN, 2018). Recognizing the consequences of genomics for nursing practice, the NCSBN has indicated the need for a thorough assessment of existing undergraduate and graduate curricula for changes

**Lisa Aiello, RN, PhD, AOCNS**, is an Assistant Clinical Professor, Drexel University, College of Nursing and Health Professions, Philadelphia, PA. She may be contacted at [lbaiello@juno.com](mailto:lbaiello@juno.com)

**Kathleen Calzone, PhD, RN, AGN-BC, FAAN**, is a Research Geneticist, National Cancer Institute, Center for Cancer Research, Genetics Branch, Bethesda, MD. She may be contacted at [calzonek@mail.nih.gov](mailto:calzonek@mail.nih.gov)

Genomics is already revolutionizing healthcare and is limited primarily by the capacity of the healthcare workforce to understand and utilize this information and technology when appropriate. Integration of genomics into clinical practice improves patient safety and outcomes while controlling healthcare costs.

and additions (NCSBN, 2018). Historically, genomics has not been included in nursing curriculum, except in maternal health and when covering specific illnesses, such as cystic fibrosis and sickle cell disease. However, nurses need to have a broader understanding of genomics to function safely and effectively in the era of Precision Medicine.

Foundational to any genomic-specific curricular assessment and recommendations for change necessitates faculty with a sufficient understanding of genomics. However, current evidence indicated that faculty knowledge is limited and equivalent to the students, and faculty exhibited genomic misconceptions consistent with the students (Read & Ward, 2016; 2018). Therefore, nursing schools that have not done so already must develop and implement a genomic faculty education initiative. Model strategies are available describing faculty training mechanisms to draw upon for this effort (Donnelly, Nersesian, Foronda, Jones, & Belcher, 2017; Jenkins & Calzone, 2014; Williams et al., 2011).

Once faculty are knowledgeable in genomics, curricular changes need to be integrated. To guide genomic content integration, competencies in genomics for all nurses, as well as competencies leveled for graduate level nurses, have been established (Consensus Panel on Genetic/Genomic Nursing Competencies, 2009). These competencies represent the minimum genomic knowledge, skills, and attitudes required for a competent future nursing workforce practicing in the Precision Medicine era. Peer

reviewed resources to assist faculty in curricular content integration are also available through the Genetics and Genomic Competency Center (G2C2) at [genomicseducation.net](http://genomicseducation.net) (Calzone et al., 2011; Donnelly et al., 2017).

Genomics is already revolutionizing healthcare and is limited primarily by the capacity of the healthcare workforce to understand and utilize this information and technology when appropriate. Integration of genomics into clinical practice improves patient safety and outcomes while controlling healthcare costs. Crucial to the success of this effort is for nursing to leap into the genomic era of Precision Medicine and prepare the future and current nursing workforce to be competent providers of healthcare that integrates evidence-based genomic applications. **DN**

#### References

- Calzone, K.A., Jenkins, J., Nicol, N., Skirton, H., Feero, W.G., & Green, E.D. (2013). Relevance of genomics to healthcare and nursing practice. *Journal of Nursing Scholarship, 45*(1), 1-2. doi:10.1111/j.1547-5069.2012.01464.x
- Calzone, K.A., Jerome-D'Emilia, B., Jenkins, J., Goldgar, C., Rackover, M., Jackson, J., ... Feero, W.G. (2011). Establishment of the genetic/genomic competency center for education. *Journal of Nursing Scholarship, 43*(4), 351-358. doi:10.1111/j.1547-5069.2011.01412.x
- Consensus Panel on Genetic/Genomic Nursing Competencies. (2009). *Essentials of Genetic and Genomic Nursing: Competencies, Curricula Guidelines, and Outcome Indicators, 2nd Edition*. Silver Spring, MD: American Nurses Association.
- Donnelly, M.K., Nersesian, P.V., Foronda, C., Jones, E.L., & Belcher, A.E. (2017). Nurse faculty knowledge of and confidence in teaching genetics/genomics: Implications for faculty development. *Nurse*

- Educator, 42*(2), 100-104. doi:10.1097/nne.000000000000297
- Foody, J.M. (2013). Familial hypercholesterolemia: An under-recognized but significant concern in cardiology practice. *Clinical Cardiology, 37*(2), 119-125. doi:10.1002/clc.22223
- Ginsburg, G.S., & Phillips, K.A. (2018). Precision Medicine: From science to value. *Health Affairs, 37*(5), 694-701. doi:10.1377/hlthaff.2017.1624
- Greco, K.E., Tinley, S., Seibert, D. (2012). Essential genetic and genomic competencies for nurses with graduate degrees. Retrieved from [https://www.genome.gov/pages/health/healthcareprovidersinfo/grad\\_gen\\_comp.pdf](https://www.genome.gov/pages/health/healthcareprovidersinfo/grad_gen_comp.pdf)
- Hopkins, P.N. (2017). Putting into perspective the hazards of untreated familial hypercholesterolemia. *Journal of the American Heart Association, 6*(6). doi:10.1161/jaha.117.006553
- Jenkins, J., & Calzone, K.A. (2014). Genomics nursing Faculty Champion initiative. *Nurse Educator, 39*(1), 8-13. doi:10.1097/nne.0000000000000011
- National Council of State Boards of Nursing (NCSBN). (2018). The nursing regulatory environment in 2018: Issues and challenges. *Journal of Nursing Regulation, 9*(1), 52-67. doi:10.1016/S2155-8256(18)30055-3
- Read, C.Y., & Ward, L.D. (2016). Faculty Performance on the Genomic Nursing Concept Inventory. *Journal of Nursing Scholarship, 48*(1), 5-13. doi:10.1111/jnu.12175
- Read, C.Y., & Ward, L.D. (2018). Misconceptions about genomics among nursing faculty and students. *Nurse Educator, 43*(4), 196-200. doi:10.1097/nne.0000000000000444
- Roychowdhury, S., & Chinnaiyan, A. M. (2016). Translating cancer genomes and transcriptomes for precision oncology. *CA: A Cancer Journal for Clinicians, 66*(1), 75-88. doi:10.3322/caac.21329
- U.S. Food and Drug Administration. (2018). Table of pharmacogenomic biomarkers in drug labels. Retrieved from <https://www.fda.gov/Drugs/ScienceResearch/ucm572698.htm>
- Williams, J.K., Prows, C.A., Conley, Y.P., Eggert, J., Kirk, M., & Nichols, F. (2011). Strategies to prepare faculty to integrate genomics into nursing education programs. *Journal of Nursing Scholarship, 43*(3), 231-238. doi:10.1111/j.1547-5069.2011.01401.x

# From Punishment to Permission – What a Difference a Policy Can Make!

Carol Toussie Weingarten

**NSNA received the following question from a school chapter faculty advisor:**

**Q:** *The current attendance policy at our college marks students absent for attending either state or national conferences. I am wondering what other schools do? It seems a shame to mark a student absent when they are at a professional conference and attending classes all day, and we encourage them to get involved. Would you know of any language other schools use to encourage students to attend without being penalized? I remember discussing this with other faculty members at the last national conference, but I wanted to get the NSNA's stance on this issue to strengthen my argument with changing our existing policy. Our students love to attend, but do not like that they are penalized for attending. Any help/guidance you can give me would be greatly appreciated.*

**A:** The world of 2018 has changed, and nursing students today must graduate prepared for a new and ever-changing practice environment, opportunities, and career paths that did not exist. New grads and nurses must understand how to work effectively in complex organizations like health systems and know how to advocate for patients, families, and communities.

Participation in conventions and conferences brings visibility and credibility to schools of nursing. The National Student Nurses Association has a membership growing beyond 60,000 members and convention attendance of thousands. Schools without representation lose visibility on state and national levels.

Every nursing program has clinical experiences for students, and simulation is now a standard of nursing education. The student nurses' association conventions and conferences bring together students from diverse programs, ages, and backgrounds (just as in the real world) through educational and professional development sessions and a student Congress (House of Delegates). Experiences like these are a type of simulation for future leadership as well as practica for theory courses in leadership and professional development.



The Exhibit Hall at the conferences and conventions not only include publications and items related to nursing, but now showcases student scholarship. The student poster sessions feature projects done by chapters and individuals. The poster sessions have grown to include research and other scholarly projects done by students and students collaborating with faculty through courses and independent studies. NSNA sponsors the ONLY national showcase dedicated to the scholarship of pre-licensure NURSING students.

Involvement in the chapter, state, and NSNA is not a frill or a vacation, but a necessary co-curricular component of nursing education now and in the future. Students meet leaders in nursing and healthcare and form networks that result in jobs and opportunities for themselves and their schools.

Just about every nursing program takes pride in their alumni who are leaders. Schools routinely excuse athletes on award winning teams. Why should nursing students who want to be part of nursing student events representing the highest student level of involvement and leadership be treated differently and be punished for representing their schools?

NSNA now offers continuing education credit for faculty who come to the conventions; they can now earn credit for learning about advisement and other areas related to teaching and the nursing profession. The advisor's role can be isolating. Networking with other advisors and building advisement skills benefits students and the nursing program.

Without support from the dean/director/faculty, negative dynamics take place. Arguments among faculty on such issues as 'who is a student advocate,' and the 'sanctity of a clinical day,' breed discord among faculty, and between faculty and students who then see some faculty as advocates and other faculty as obstructive.

**Forming a policy can be simple. Here's a suggestion:**

Students in good standing (i.e. not on probation of any kind) are encouraged to participate in the student nurses' conferences and conventions without grade or other penalty. In consultation with their professors (specify how much in advance), they may account for their participation in ways that might include:

- 1) Viewing participation as an option for course requirements.
- 2) Sharing the experience of professional involvement through a presentation, clinical group discussion, journal reflection or other assignment.
- 3) Completing a realistic assignment that is not punitive or a deterrent to attendance.

By attending a conference or convention, students must communicate with their professors in advance; participate in the conference by attending sessions; involvement in convention activities (presenting a poster, presenting a resolution for the chapter; being a candidate for NSNA office); comporting themselves according to the NSNA Code of Conduct, and sharing their experiences as agreed upon return.

A policy supporting student attendance demonstrates a school's commitment to student involvement. By having a policy, students and faculty are clear about expectations. Faculty and administration are free to provide permission rather than punishment to students who bring the presence and voice of their nursing programs to state and national levels. **DN**

**Carol Toussie Weingarten, PhD, RN, ANEF,** is an Associate Professor and NSNA Chapter Advisor, M. Louise Fitzpatrick College of Nursing, Villanova University, Villanova, PA.

Volume 40, No. 2 • Fall 2018

**Editor**

Diane J. Mancino, EdD, RN, CAE, FAAN

**President, NSNA**

Wesley Oster

**Executive Director**

Diane Mancino, EdD, RN, CAE, FAAN

**Art Director**

Jack Bryant

**Managing Editor**

Kaytlyn Mroz

**Layout and Design Specialist**

Darin Peters

**Publisher**

Anthony J. Jannetti

**Advisory Board**

G. Rumay Alexander, EdD, RN, FAAN

Michael L. Evans, PhD, RN, NEA-BC, FAAN

Florence L. Huey, MS, FNP

Mary P. Tarbox, EdD, RN

Rebecca M. Wheeler, PhD, RN

**Dean's Notes** is indexed in Cumulative Index to Nursing & Allied Health Literature.

*Dean's Notes* is published four times a year (winter, spring, summer, and fall) by Anthony J. Jannetti Inc., East Holly Avenue, Box 56, Pitman, New Jersey 08071-0056. Telephone 856.256.2300. FAX 856.589.7463. All rights reserved. No part of this publication may be reproduced without the express written permission of the publisher. Address changes should include mailing label and be forwarded to the publisher.

Anthony J. Jannetti, Inc.  
East Holly Avenue, Box 56  
Pitman, NJ 08071-0056

CHANGE SERVICE  
REQUESTED

PRSR STD  
US Postage  
PAID  
Deptford, NJ  
Permit #142



[www.facebook.com/NSNAinc](http://www.facebook.com/NSNAinc)



[www.twitter.com/NSNAinc](http://www.twitter.com/NSNAinc)

© Anthony J. Jannetti, Inc., 2018

## 2019 NSNA Convention Preview *Ignite Your Passion—Lighting the Way for Excellence*

### Opening Ceremony Wednesday, April 3, 2019



G. Rumay Alexander

The Salt Palace Convention Center is in the heart of downtown Salt Lake City, UT, and is an integral part of the vibrant downtown scene that will make the 67<sup>th</sup> Annual NSNA Contention unforgettable. The Keynote Speaker, G. Rumay Alexander, EdD, RN, FAAN, President of the National League

for Nursing (NLN), will ignite the passion of an expected 3,000 nursing students and faculty. The NLN has over 40,000 nurse educators and 1,200 schools of nursing as members. Dr. Alexander is Chief Diversity Officer and Associate Vice Chancellor of the University of North Carolina at Chapel Hill and Professor at the university's School of Nursing serving over 30,000 students in the first public university and 8,000 faculty. She is also a member of the Tri-Council of Nursing which sets the leadership agenda for the nation and has a compelling record of leadership and advocacy for diversity and inclusive excellence in academia, the workplace, in national nursing professional organizations, and in her consultant activities. Her passion centers on intentional efforts to resource the proper understanding and judicious application of equity and multicultural concepts for students, faculty, personnel, and patients.

This includes the facilitation of system-wide efforts for giving respect to the many dimensions of human difference as well as the lived experience of difference. **DN**

