

## CLINICAL SCHOLARSHIP

## Methods of Genomic Competency Integration in Practice

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### Abstract

**Purpose:** Genomics is increasingly relevant to health care, necessitating support for nurses to incorporate genomic competencies into practice. The primary aim of this project was to develop, implement, and evaluate a year-long genomic education intervention that trained, supported, and supervised institutional administrator and educator champion dyads to increase nursing capacity to integrate genomics through assessments of program satisfaction and institutional achieved outcomes.

**Design:** Longitudinal study of 23 Magnet Recognition Program<sup>®</sup> Hospitals (21 intervention, 2 controls) participating in a 1-year new competency integration effort aimed at increasing genomic nursing competency and overcoming barriers to genomics integration in practice.

**Methods:** Champion dyads underwent genomic training consisting of one in-person kick-off training meeting followed by monthly education webinars. Champion dyads designed institution-specific action plans detailing objectives, methods or strategies used to engage and educate nursing staff, timeline for implementation, and outcomes achieved. Action plans focused on a minimum of seven genomic priority areas: champion dyad personal development; practice assessment; policy content assessment; staff knowledge needs assessment; staff development; plans for integration; and anticipated obstacles and challenges. Action plans were updated quarterly, outlining progress made as well as inclusion of new methods or strategies. Progress was validated through virtual site visits with the champion dyads and chief nursing officers. Descriptive data were collected on all strategies or methods utilized, and timeline for achievement. Descriptive data were analyzed using content analysis.

**Findings:** The complexity of the competency content and the uniqueness of social systems and infrastructure resulted in a significant variation of champion dyad interventions.

**Conclusions:** Nursing champions can facilitate change in genomic nursing capacity through varied strategies but require substantial training in order to design and implement interventions.

**Clinical Relevance:** Genomics is critical to the practice of all nurses. There is a great opportunity and interest to address genomic knowledge deficits in the practicing nurse workforce as a strategy to improve patient outcomes. Exemplars of champion dyad interventions designed to increase nursing capacity focus on improving education, policy, and healthcare services.

Nurses, as reflected in the Institute of Medicine's (IOM's) Report on the Future of Nursing (IOM, 2011), are an integral part of the interprofessional care team directly affecting public welfare and safety. Nursing leaders can enhance safe personalized health care as designers of delivery systems that include a prepared workforce and policies that deliver responsible, effective, and accountable care that includes new competencies. One example of a new competency with the potential to redefine the nature of healthcare is genomics (Calzone, Jenkins, Culp, Caskey, Badzek, 2014). Genomics is increasingly relevant to health care, necessitating support for nurses to incorporate genomic competencies into practice (Consensus Panel on Genetic/Genomic Nursing Competencies, 2009; Greco, Tinley, & Seibert, 2012). Genomics, which is inclusive of genetics, is the study of how genetic variation influences health. Genomics applications encompass risk identification, disease screening, prevention, diagnosis, prognostics, and therapeutic decision making (Green, Guyer, & National Human Genome Research Institute, 2011).

## Background

### Implications of Genomics to Nursing Practice

The current context of a rapidly changing healthcare environment spurred by technology and new scientific discoveries has produced expansion in healthcare information that impacts public welfare, patient safety, and cost containment. One challenge is how to introduce new competencies related to clinically relevant science into patient care. Introducing a complex competency, such as genomics, into the nursing scope of practice has ramifications for institutional systems, policies, and workforce preparation. Expanding nursing competency is critical to growing the larger system's ability to diffuse new information into practice to improve health outcomes and patient safety (Calzone et al., 2014; Calzone, Jenkins, Nicol, et al., 2013). For example, getting new knowledge to bedside nurses that improves their ability to collect and interpret family history information to identify someone at risk for disease; to know how to refer a person starting a new medication for pharmacogenomic testing when indicated; or to be able to explain to a patient why the person with the same type of cancer next to them in clinic is receiving a different treatment. Expanding nursing competency requires support to nursing leaders to become aware of, plan for, and begin to incorporate innovation in practice.

## Theoretical Framework

The theoretical framework used for this study was Rogers Diffusion of Innovations (Rogers, 2003). The innovation in this case is genomics. According to Rogers, adoption of an innovation is hinged on adequate knowledge as well as the social system and infrastructure to help sustain the adoption. In this case, there is ample evidence that there are significant workforce genomic knowledge deficits, including baseline data collected as part of this study and reported elsewhere (Calzone et al., 2014; Calzone, Jenkins, Culp, Bonham, & Badzek, 2013). The social system and infrastructure in this case is the healthcare institution in which these nurses practice.

## Value of Champions

Behavior change through diffusion of innovation is facilitated by the inclusion of organizational key leaders and respected members of the organization leadership (i.e., champions; Valente & Davis, 1999), in this case Magnet Recognition Program<sup>®</sup> Hospital champion dyads. Champions are those leaders within an organization who pave the way for change.

Two educational models provided guidance for consideration when designing this project. An end-of-life study (Ferrell, Virani, & Malloy, 2006) and a faculty champion initiative (Jenkins & Calzone, 2014) provided the authors options and models to present to the dyads for consideration. However, there was no precedent for interventions used or evidence of outcomes of specific competency initiatives specific to genomics in nursing practice. In this article, we provide an overview of the descriptive data on the institutional-specific intervention methods or strategies used by the champion dyads to increase nursing awareness, competency, and integration and utilization of genomic information in nursing healthcare delivery.

## Methods

### Aims

The primary aim of this project was to develop, implement, and evaluate a year-long genomic education intervention that trained, supported, and supervised institutional administrator and educator dyads (champion dyads) to increase nursing capacity to integrate genomics through assessments of program satisfaction and institutional achieved outcomes. The study was approved by the West Virginia University (WVU) Institutional Review Board (IRB) with a reliance agreement established between the WVU IRB and the National Institutes of

Health Office of Human Subjects Research. Participating institutions had varied regulatory requirements, with some relying on the WVU IRB, some defining the study as exempt based on the Code of Federal Regulations (45 CFR 46), and some requiring full institution-specific IRB review and approval.

## Design

This is a longitudinal study of Magnet hospitals (21 intervention and 2 control) participating in a 1-year genomic nursing competency integration effort utilizing institution-specific administrator and educator dyads (champion dyads) in the intervention hospitals. The Magnet Recognition Program<sup>®</sup>, developed by the American Nurses Credentialing Center, recognizes healthcare organizations internationally for research and quality patient outcomes, nursing excellence in professional practice, and innovative visionary leadership (<http://nursecredentialing.org/Magnet.aspx>).

## Sample and Participants

Invitation letters were emailed to all Magnet hospitals, providing a summary of the goals for the competency initiative, application procedures, and the requirements for participants. Applicants were informed that they were expected to: inform colleagues about the relevancy and need to include genomics in policy, education, and practice; consult with individual leadership and staff to provide assistance in integrating genomics into policy, education, and practice; implement education interventions to address genomic nursing knowledge deficits; serve as a hospital-wide resource; and determine opportunities to accelerate the change process. The intervention institutional commitment to participate included identification of an administrator and educator to serve as the champion dyad team in a year-long intervention of education, support, networking, and follow-up. Champion dyads were required to complete a pre-assessment online survey to determine their personal level of genomic competency and an institutional status survey.

This pre-assessment survey was a shortened version of the Genetic/Genomic Nursing Practice (GGNPS) instrument, which also included questions reflective of stages of change consistent with the survey utilized for faculty champions (Jenkins & Calzone, 2014). They were requested to administer the GGNPS survey (Calzone et al., 2012) to all institutional registered nursing (RN) staff at baseline and at the conclusion of the intervention period; attend an in-person kick-off training meeting;

create an institutional-specific action plan and provide quarterly updates on the status of their policy and education initiatives that included genomics; participate in monthly webinars for education, updates, networking, and support; participate in three virtual site visits, which included both champions and the chief nursing officer (CNO) for at least one visit; participate in a 1-year follow-up summary meeting; and complete an overall program evaluation.

One application per institution provided champion dyad demographic information, champion dyad curriculum vitae, institutional information, and a letter of support from the highest nursing officer in the institution documenting awareness and support for the application. Champion dyads also stated why they felt this initiative was important for their organization and provided an overview of the level of commitment they would provide to support change within their institution. Champion dyad applicants provided statements on interest in this initiative, description of how change was approached within their Magnet hospital, an overview of a recent change initiative and their respective roles, and an example of how the champion dyad applicants had previously worked together.

The application evaluation and selection committee consisted of members of the study advisory group, which included academic and genomic experts. Each application was scored by two reviewers. Criteria for application review used by the evaluation team included: magnet status; individual educator and administrator characteristics, including personal objectives and capacity to influence institutional change; interest in the change process as evidenced by plans provided and institutional support; plus hospital descriptors that indicated diverse populations, scope, and locations. Twenty-one Magnet hospitals were selected to participate in the intervention arm of the study consisting of a total of 42 champions (21 educators and 21 administrators). Each institution champion dyad as well as the CNO received written notification of acceptance or nonacceptance. The sites were compensated to a maximum set amount for travel to the kick-off meeting. Dyads also benefited from study team support and guidance as well as monthly educational webinars, group networking, and resource exchange at no charge.

Two additional hospitals were recruited as control hospitals for the study. These two Magnet hospitals were recruited by personal contact to the CNO by the study's principal investigator. The control sites did not participate in the kick-off or any other intervention meetings, did not create action plans, and did not implement any formal educational interventions beyond those they would have conducted as part of normal operations.

## Intervention

A champion dyad kick-off meeting was held at the start of the project. The meeting was designed to inform selected project participants about the relevancy of genomic information to clinical, policy, and delivery infrastructure, and provide an orientation to the champion dyad of study expectations. Expert speakers addressed the gap between genome research and clinical care; the role of Magnet champion dyads; basic genetic and genomic concepts; implications of genomics for nursing practice, education, and policy; models of genomic institutional integration; highlights of the practicing nurse surveys; study expectations; and resources for establishing an institutional specific action plan addressing competency needs. An introduction to both the *Essentials of Genetic & Genomic Nursing: Competencies, Curricula Guidelines, and Outcome Indicators* (Consensus Panel on Genetic/Genomic Nursing Competencies, 2009) and competencies for nurses with graduate degrees (Greco et al., 2012) provided the framework for developing interventions to address competency needs.

Ongoing education and support addressing champion dyad group learning needs identified through individual needs assessments administered following the kick-off meeting were delivered through monthly webinars composed of education content, champion dyad presentations about their institutional interventions, and group discussion. These monthly sessions facilitated networking and sharing of successful interventions. Discussion about an institution's progress during the calls provided champion dyads with intervention options to consider adding to or modifying of their own action plans as they moved along. Evaluation of progress made and interventions used were key aspects of this collaborative research initiative.

Champion dyads designed one institution-specific action plan for genomics integration that was required to address the following domains: champion dyad member personal development; practice assessment; policy content assessment; staff knowledge needs assessment; staff development; plans for integration; anticipated obstacles and challenges; and any other methods or strategies they were to perform. Champion dyads were provided with an in-person orientation to the action plan template with domains to be addressed, and a supplemental webinar was held to reinforce the expectations and details required. The aim of creating institutional-specific action plans was based on the hypothesis that what will work for one institution may not work for another. This allowed flexibility and specificity so that Magnet sites employing anywhere from 80 to 3,000 nurses could design a plan specific to their infrastructure, resources, expertise, and constituency. Action plans outlined objectives,

strategies, or methods to achieve aims, and timeline allocated to accomplish tasks. Progress was tracked using quarterly reports in which the champion dyads reported on progress made in achieving their institution-specific objectives. They also had the opportunity quarterly to update, add to, or modify their action plans as needed. Obstacles encountered and strategies to overcome those obstacles were also included.

Virtual site visits conducted with the investigators, champion dyads, and the CNO were used to obtain more detailed information about their plans and monitor institutional progress. The purpose of the site visit was to review identified goals, progress made, and issues encountered, and to offer education, support, and guidance when indicated. Virtual site visits were conducted at baseline once the action plan had been submitted, at approximately 6 months, and again at the end of the intervention period to gather and offer additional feedback on institutional objectives, strategies, and outcomes achieved. Repeated site visits permitted tracking of progress with the percentage of goal achievement assessed.

A champion dyad realization meeting was held at the end of the intervention year (September, 2013) in which selected champion dyads presented their institutional change initiatives, achievements, obstacles, and strategies employed to overcome those obstacles. The purpose of the realization meeting was to hear from the champion dyads about progress made; what they would have done differently; what advice they had for other champions planning to do this; and how we could use what they learned to create resources and tools for other nurses.

## Data Collection

A database of activities planned by each hospital based on their action plan was utilized to assess overall institutional achieved outcomes. Data were collected on all strategies or methods planned and executed, and on the timeline for achievement per institution. Action plans were reviewed with investigators at the time of submission, and written feedback was provided back to the champion dyads within 4 weeks of submission. If weaknesses (i.e., unclear methods or strategies) were identified in the action plans, champion dyads were required to revise and resubmit. Quarterly action plan reports with validation by virtual site visits provided details about the status of method or strategy attainment and the addition or deletion of any new methods or strategies.

This study had a number of quantitative assessments performed at baseline, throughout the study, and at study completion. Those results are not included in this article since the focus of this article is to specifically report on

institutional interventions, not on champion dyads or institution staff.

## Data Analysis

Data were analyzed using content analysis. Strategies or methods were extracted from the institutional-specific action plan and site visit reports. Identified strategies or methods were grouped in the study database by one of the seven genomic categories required by the plan: (a) champion dyad member personal development; (b) practice assessment; (c) policy content assessment; (d) staff knowledge needs assessment; (e) staff development; (f) plans for integration; and (g) anticipated obstacles and challenges. At the conclusion of the 1-year study period, two investigators grouped methods and strategies into clusters of similar activities per category followed by two separate investigators reviewing all clusters for agreement. Discrepancies were discussed by the entire investigation team to achieve consensus. Clusters of methods or strategies were quantified to ascertain the frequency with which institutions utilized these approaches. No data are reported on the control cohort since the controls were not designing or implementing interventions during the study year.

## Results

### Study Sample

The nursing workforce within the 21 intervention Magnet hospitals participating totaled 25,814 (range 80–3,382 nurses/site). Participating hospitals included diverse facilities, with one rural, three children's, one Veteran's Administration, one cancer center, and one psychiatric hospital. All 21 hospitals were nonprofit, with the majority located in urban areas (95%); most were teaching (62%), and the majority consisted of one-site (57%) versus multisite systems (43%). The size of the hospitals varied, with numbers of beds ranging from 100 to 1,061, and average daily census ranging from 62 to 870.

The champion dyad leadership teams included an educator and an administrator member of whom the majority were female (93%). The majority of champion dyads were master's (51%) or doctorally (23%) prepared. Only 28% reported having genetics in their academic preparation, and 30% had previously taken continuing education courses that included genetics content.

Educators held positions such as departmental educator, education specialist, clinical nurse educator (CNE), clinical nurse specialist (CNS), joint CNS/CNE position, coordinator of family risk assessment program, clinical

practice manager, clinical supervisor, nurse practitioner, director of professional development, director of practice, research and professional development, and manager of education and development. These educator team members had been a nurse for an average of 25.9 years (range 5–41 years) and had been in the educator role for an average of 7.2 years (range 0.33–25 years).

Administrator team members also held a variety of leadership positions, including five CNOs. Others held positions such as director of professional practice and education, nurse manager, director of accreditation and clinical practice development, clinical leader, administrative director, director of clinical information and professional practice, director of nursing or Magnet program director, director of nursing research and quality outcomes, director of patient care, administrative director of women and child services, associate chief for nursing research, director oncology services, associate chief nurse officer adult inpatient services, director nursing cancer center, and clinical manager. Administrator team members were all nurses and had been a nurse for an average of 31.6 years (range 9–43 years) and served in the administrator role for an average of 7.16 years (range 0.58–22 years). Additional details about study participants are available (Calzone et al., 2014).

Two institutions elected to withdraw from the study because (a) of competing demands and (b) they did not feel they had the capacity to design their own interventions. The one institution with competing demands returned to complete the project once those challenges were overcome.

### Interventions Used to Improve Genomic Competency

Champion dyads utilized their institution baseline results of the GGNPS, which they received at the kick-off meeting and reviewed with the investigators, to assist in planning interventions specific to the deficits identified in the survey. The GGNPS was utilized to assess nursing workforce attitudes, practices, receptivity, confidence and competency in genomics of common disease, and utilization of family history at each institution.

### Champion Dyad Personal Development

Most champions (37%) at baseline reported their understanding of the genetics of common diseases as fair, 35% as good, 14% as poor, 12% as very good, and 2% as excellent. Most expressed the need to improve their personal knowledge about the relevancy of genomics to practice before beginning to influence peers and other staff about the value of genomic information for



**Table 1.** Champion Dyad Personal Development Resources

Resource	Weblink
Genomic educational resources	
The National Genetics Education and Development Centre (United Kingdom)	<a href="http://www.geneticseducation.nhs.uk">http://www.geneticseducation.nhs.uk</a>
Genetic and Genomic Competency Center for Education (G2C2)	<a href="http://www.g-2-c-2.org/">http://www.g-2-c-2.org/</a>
National Coalition of Health Professional Education in Genetics (NCHPEG)	<a href="http://www.nchpeg.org">http://www.nchpeg.org</a>
Global Genetics and Genomics Community (G3C)	<a href="http://www.g-3-c.org/">http://www.g-3-c.org/</a>
Genetics Home Reference	<a href="http://ghr.nlm.nih.gov/">http://ghr.nlm.nih.gov/</a>
Disease-specific content	
PDQ® Cancer Information Summaries: Genetics	<a href="http://www.cancer.gov/cancertopics/genetics">http://www.cancer.gov/cancertopics/genetics</a>
Continuing education	
Six Weeks to Genomic Awareness offered by the Michigan Public Health Training Center	<a href="https://practice.sph.umich.edu/mphtc/site.php?module=courses_one_online_course&amp;id=108">https://practice.sph.umich.edu/mphtc/site.php?module=courses_one_online_course&amp;id=108</a>
Cincinnati Children's Hospital independent self-paced modules: Interpreting Family History, Ethical and Social Issues Related to Genetic Testing, Nurses' Role in Pharmacogenetics/Pharmacogenomics, and Promoting Informed Decision Making about Genetic Testing	<a href="http://www.cincinnatichildrens.org/education/clinical/nursing/genetics/cont/self/default/">http://www.cincinnatichildrens.org/education/clinical/nursing/genetics/cont/self/default/</a>
Coursera courses, Useful Genetics Parts 1 and 2	<a href="https://www.coursera.org/course/usefulgenetics">https://www.coursera.org/course/usefulgenetics</a> , <a href="https://www.coursera.org/course/usefulgenetics2">https://www.coursera.org/course/usefulgenetics2</a>
Other learning strategies	
23andMe personal genetic test	<a href="https://www.23andme.com">https://www.23andme.com</a>
Personal family pedigree using My Family Health Portrait	<a href="https://familyhistory.hhs.gov/FHH/html/index.html">https://familyhistory.hhs.gov/FHH/html/index.html</a>
Literature	
<i>Journal of Nursing Scholarship</i> special issue on genomics	<a href="http://www.genome.gov/27552093">http://www.genome.gov/27552093</a>
<i>Essentials of Genetic &amp; Genomic Nursing: Competencies, Curricula Guidelines, and Outcome Indicators</i> , 2nd edition	<a href="http://www.genome.gov/Pages/Careers/HealthProfessionalEducation/geneticscompetency.pdf">http://www.genome.gov/Pages/Careers/HealthProfessionalEducation/geneticscompetency.pdf</a>
Skloot, R. <i>The Immortal Life of Henrietta Lacks</i> , 2010	
Professional organization membership	
International Society of Nurses in Genetics	<a href="http://www.isong.org">http://www.isong.org</a>

patient care. Champions sought out additional genomic education after the kick-off meeting (Table 1), with the most frequent on-line website used for personal learning reported as The National Genetics Education and Development Centre (United Kingdom). Champions explored general genomic sites to identify educational resources, general genetic information, and specific disease content. Champions also sought out online courses for personal learning. The most accessed online course was "Six Weeks to Genomic Awareness," offered by the Michigan Public Health Training Center. Many completed the Cincinnati Children's Hospital independent self-paced modules as well as Coursera courses. Other learning strategies used by champions included completing a 23andMe personal genetic test, or a personal family pedigree. Considering the ethical and behavioral implications of knowing such genetic information was reported as a valuable application. Professional literature was a good source of clinical information for the champions, such as the *Journal of Nursing Scholarship* special issue on genomics; the *Essentials of Genetic & Genomic Nursing: Competencies, Curricula Guidelines, and Outcome Indicators* (2nd

ed.); and lay literature (Skloot, 2010). Less frequently used champion dyad personal development interventions included attendance at in-person courses, participation in specialty societies, and pursuit of certification as an advanced practice nurse in genetics.

### Genomics in Practice Assessment

Following the kick-off meeting, champion dyads reported making plans to inform their colleagues about their participation in the grant-funded project, A Method for Introducing a New Competency into Nursing Practice (MINC). Most recognized the need to communicate with their leadership and peers about the project and plans, gain their support, as well as answer questions. Champion dyads attended leadership meetings to communicate MINC information and ongoing updates to administrators, boards of directors, advanced practice nurses, specialty clinics (i.e., cardiology, oncology, and pediatrics), departments (i.e., cardiology, general medicine, genetics, oncology, pathology, pediatrics, pulmonary, and pharmacy), ethics teams, researchers, schools of nursing and

public health faculty, and informatics staff. Champion dyads noted that many times they had to justify the initiative to others sharing the relevancy of genomics for their hospital. Such information sharing and persuasion of other leadership was crucial to the successful strategizing and utilization of educational interventions.

Communication with nursing staff at unit-based councils and unit-based meetings was used to share outcomes of their nurses' GGNPS baseline results. Champion dyads also provided baseline GGNPS results with shared governance chairs, Magnet coordinating committees, physician staff, operating room staff, and pediatric staff. Additional educational assessments to provide supplementary information beyond the GGNPS were completed to identify gaps in survey findings, gather additional information, find available resources, and determine options and methods that champion dyads could utilize for education purposes. Champion dyads expressed the importance of keeping staff informed and bringing them into the discussion about plans for the next steps within their organization.

Other evaluations champion dyads conducted in preparation for designing educational interventions included practice assessments (i.e., established a benchmark of genetic referrals) and nurses (i.e., requested a show of hands to validate GGNPS results; reviewed GGNPS results to identify preferred education methodologies). Outreach to universities and schools of nursing were pursued to assess college affiliate inclusion of genomics in the academic curriculum. New graduate nurses were assessed to determine what classes should be added to residency program curricula. Recommendations for new content included introduction to genetics/genomics; pedigrees; pharmacogenomics; and cancer genetics: ethical issues in genetics. Patients and family materials were also included by some in this education assessment, such as fact sheets, educational videos, and referral contacts to determine needs for development of resources to meet healthcare consumer genetic and genomic informational needs.

Assessment of existing technology available to support the genomics competency in practice intervention efforts included detailed reviews of the capacity of the electronic health record (EHR) to document family history information. The EHR was not ideally configured to facilitate desired family history collection and documentation. EHR family history gaps were identified at every hospital, which resulted in the formation of a champion dyad subgroup (i.e., consisting of those using a specific EHR system) to compose a letter to their common EHR vendor to request consideration of their suggestions for optimization and consideration of infrastructure modifications. This effort is still in process.

## Staff Genomic Knowledge Needs Assessment

Additional staff knowledge gap analysis was completed by champion dyads to inform intervention efforts. Several utilized focus groups to solicit more details from target audiences, including ambulatory care, advanced practice nurses, operating room nurses, pediatrics, diabetes educators, oncology, and maternal child health nurses to name a few. Champion dyads piloted their strategies for education and tried innovative methodologies such as walking rounds and specialty presentations with subgroups of staff prior to full staff participation.

The majority of sites created internal working groups recruiting additional staff to serve as part of their workgroup to assist in planning and implementation of interventions. Facilitation of education analysis and planning was possible through assembled workgroup teams that often met weekly for planning, implementation, and evaluation of progress. Several champion dyads engaged additional supporters, including those from other disciplines. These included chief medical officers, the hospitalist, chief nursing officers, and others within the nursing department that could facilitate their success.

## Policy Development

Policy that aids in the utilization of genomics in practice and that is supported by the healthcare system infrastructure is needed to integrate genomics into healthcare. A beginning step by all (100%) champion dyads was completing an institutional policy assessment. Only one champion dyad was able to identify a policy that applied to genomics within their setting (i.e., policy on lethal congenital disorders). However, admission criteria that included family history; educational materials including Plavix<sup>®</sup> (clopidogrel) pharmacogenomics guidance; and genetic testing procedure policies were found at six sites.

Determining the institutional process for policy development and approval was part of planning for the next steps. Based on identified policy gaps, champion dyads considered policies that were needed to support their genomic competency and integration efforts. Several identified potential collaborators for policy development, including advanced practice nurses; clinical staff councils; genetics specialists (i.e., genetic counselors); pharmacists; and quality and safety councils. One champion dyad formed a genomic steering committee to guide plans for policy development. To inform policy development, champion dyads sought policies with genomic content from other sources including articles, books, and a Healthstream library search. Policies were drafted or changed, including admission assessment criteria, family history profile, pain management, pediatrics (infant and

child), pathology specimen testing, and specialty care in oncology and cardiology clinics. Such efforts initiated discussion about the value of policies versus guidelines, and other procedural documents to provide delineation of expectations within the practice setting.

### Staff Development Interventions

The priority emphasis for most champion dyad efforts was on staff development, building on the strengths within their institutional environment. Varied methods were used to reach out to improve staff awareness about implications of genomics for care and opportunities to learn more. Experiences and strategies from other change initiatives including the genomic faculty champion initiative were provided to champion dyads as model strategies for consideration. However, since there was no precedent for interventions used or outcomes of specific competency initiatives specific to genomics in nursing practice, champion dyads were encouraged to also develop novel interventions that they deemed suitable for their constituency.

Champion dyads utilized awareness campaigns to gain momentum for accelerating the change process within their nurses. Several teams worked with their institutional marketing team to develop campaigns highlighting the value of genomics for patient care. Two teams created a logo to be used as part of their branding of all messages and events sponsored for this initiative. Table cards were used as part of marketing for a family history campaign in two facilities. Other methods of sharing information included distribution of materials such as competency booklets, pocket cards with indications for referrals, consultation lists, and educational handouts.

The most popular staff development interventions were provision of educational sessions and workshops. Topics selected were matched to the needs of their nurses, with many offered in-person, saved for online access, and provided with continuing education units (CEUs). Topics presented included: Basic genetics and genomics: what do nurses need to know?; genes are fun; breast cancer symposium; common hereditary syndromes such as colorectal cancer and prostate cancer; DNA day; personalized medicine; pharmacogenomics; importance of family history taking; family history red flags; ethical, legal, and social issues; understanding genetic evaluation and testing; and stroke and genomics, to list a few. Quite a few champion dyads worked to establish genetic curricula for staff. Several champion dyads offered incentives such as prizes or raffles to increase attendance and participation at the workshops.

Grand rounds were also a vehicle for genomics presentations focusing on clinical application issues such as

screening of newborns, the Genetic Information Nondiscrimination Act (GINA), and assessing for cancer genetic mutations in a community hospital population. Workshops were offered by internal and external experts, as well as panels of interprofessional teams. Sessions reached out to small numbers of nurses (i.e., during orientation; unit and department presentations) or to the entire nursing staff as a required activity.

Communication to staff was a key aspect of staff development interventions. Newsletters promoted the value of genomic information, explained terminology, and marketed events and opportunities to staff. Champion dyads provided monthly publications in their nursing department or other internal newsletters, such as facts about particular diseases, top 10 genetic findings, and WINKS (What I Need to Know). One of the most popular communication approaches was a one-page monthly series called GeneSplash, which was adopted by most of the champion dyads for use in their settings. GeneSplash was adapted from a similar communication approach utilized by faculty champions (Jenkins & Calzone, 2014). Postings around the institutions on bulletin boards, in common areas, and on lunchroom tables were also mechanisms used to highlight genomic information for nurses.

The champion dyad used technology to advance their outreach to all shifts, all units, and even to external audiences such as local schools of nursing. Workshops were archived and made accessible on internal websites, many created specifically for this initiative. Online modules were developed, CDs and DVDs created to share through learning packets or via independent Internet study for nurses. Social media was also used for internal notifications about upcoming events. YouTube videos were accessed by champion dyads for teaching about specific topics, including BRCA mutations, epigenetics, and "Ghost in Your Genes" (PBS Nova, 2015).

Posters were an intervention chosen for both internal and external communication highlighting genomics relevancy to staff. Unit-based posters, roving posters, and even a poster day served as ways to create a competition for poster presenters. Posters were also used to inform unit-based councils about MINC and other genomic information. Some of the topics covered in posters included addiction; Alzheimer's disease; bipolar, depression, and schizophrenia; connecting the alleles; genetic tumor profiling; newborn screening; pharmacogenomics; specific cancers such as familial adenomatous polyposis and Lynch syndrome; familial hypercholesterolemia; and stroke and genomics.

Innovative staff development methods were also utilized by champion dyads. Book clubs, skills fairs, tours of genetic laboratories, and movie viewing with discussions brought out staff participants for events. Such creativity



as a rap song sung by nurse unit leaders on YouTube, creation of genomic screen savers, genomic cheerleaders, and games (i.e., spin the wheel and crossword puzzles) made the learning interactive and entertaining. One champion dyad chose to use local media headlines on genomics to begin conversations about the initiative, while another presented a mock genetics ethics case to the ethics consult team.

Champion dyads reached out to their interprofessional colleagues and explored opportunities for collaboration. The response was largely positive, with joint recognition of genomic knowledge deficits within diverse disciplines. Recognized areas where interprofessional groups could benefit from learning together were family history and pharmacogenomics. Three teams successfully reached out to include physician, nurse, educator champions for their educational intervention planning and implementation. Some teams coordinated education presentations, newsletters, and grand rounds with interprofessional colleagues. However, others encountered conflicting priorities and difficulty with the availability of sufficient time for interprofessional colleagues to join in the MINC efforts.

One of the identified motivations for improving staff attention to genomics in several sites was integration of genetic education into their Professional RN Achievement program. For example, hospital champion administrators considered professional practice models and options for integration of genomics as a component of the nursing clinical ladder. The goal of creating an annual competency requirement for genomics was identified, but was not achieved within the intervention year. The majority of champion dyads (98%) had plans to continue their intervention efforts beyond the funded 1-year period, recognizing the value of continuing what they had started and completing some goals still in process.

## Obstacles and Challenges

Champion dyads were asked to anticipate obstacles and challenges as part of their action plans so that potential solutions could be contemplated. The most commonly identified challenge was the need for administrative backing and interprofessional collaborative support. There were concerns that if staff perceived there was a lack of nursing leadership support, there would be decreased receptiveness to planned interventions. They recognized the value of having nurse-leader buy-in and recommended frequent meetings with the CNO to keep them informed and to gain their input. Informing interprofessional colleagues about champion dyad plans highlighted the nurses' efforts and facilitated early problem solving. Such communication was important

for anticipating staffing implications of nurses integrating genomics into practice for other hospital resources (i.e., increased referral of patients for risk assessment to specialists) when reaching out to create links with genetics specialists. Forty-three percent of the teams reached out to identify genetic specialists in their hospitals for referrals and collaborative education opportunities.

Financial costs were also an identified barrier to their work to integrate genomics into practice. Champion dyads anticipated needing financial support to implement action plan ideas and activities. The need for incentives to enhance survey participation at the beginning and end of their project year required financial support. Several sought out grants and were successful in obtaining funds for education events and celebrations associated with their genomic nursing competency integration efforts.

Champion dyads were concerned about the potential for conflicting priorities and lack of time to focus on genomics. Administrator commitment to mandated time for the champion dyad to be part of this initiative often provided the extra support needed. However, unexpected competing priorities occurred, requiring innovativeness to solve personnel-related issues. Life issues such as personal injury, retirement, and doctoral studies did require some modification and team changes at selected sites (19%). Hospital-wide issues such as response to local disasters (i.e., Hurricane Sandy) and mergers created additional obstacles for several teams (10%). Plus, Magnet redesignation applications posed an institutional challenge for several champion dyads during this time period (33%). How these challenges affected the overall response of the teams has not yet been analyzed.

Technology emerged as a barrier to successful implementation of interventions. A technological challenge occurred when a government hospital encountered security issues when attempting to access external educational webinars and meetings. Additionally, champion dyads required audiovisual and information technology support for lectures to access online educational series and to improve accessibility to educational videos. Infrastructure and resource support across the hospital needed to be anticipated, requiring networking and partnerships as part of problem solving for genomic competency integration endeavors.

## Discussion

The purpose of this article is to report on the strategies and interventions utilized by Magnet hospitals to implement a year-long genomic education effort to increase nursing capacity to integrate genomics. Given

the significant competency deficit identified in the entire nursing workforce (Calzone, Jenkins, Culp, et al., 2013), this challenge required a broad-scale initiative focused on identifying options for individual institutional interventions. There has not been another such study reported identifying options that focus on developing genomic competency in the hospital practice environment.

Champion dyads used creativity to design interventions that supported their staff to advance a new complex competency, genomics, within their facilities. They informed interprofessional colleagues about the value of nursing leadership in advancing genomic healthcare translation and supporting provision of safe, quality care delivery that integrates new knowledge. Developing policies to facilitate responsible translation of genomics into nursing practice is an effective strategy for nursing leaders who accept the responsibility to design systems and infrastructure that support the translation of genomics into health care.

The complexity of the competency content and the uniqueness in social systems and infrastructure resulted in significant variation of champion dyad interventions. Oversight was provided by the team to assure quality of the information selected by the dyads to be used to inform their nursing colleagues. Dyads were instructed to identify and utilize resources that had been peer reviewed through an online education resource repository, the Genetics/Genomics Competency Center (G2C2, <http://g-2-c-2.org/>). Additional approaches used to assure the quality of the information taught by the dyads included virtual site visits, which were used as a way to review plans and progress with additional institutional leadership; reports provided to the entire group on monthly calls; action plan quarterly reports of what they were doing; and tracking outcomes. Following the intervention year, champion dyads reported that additional time, support, and continued genomic nursing education are still needed to mobilize change within these complex healthcare settings and that ongoing long-term intervention efforts are required to expand the nursing workforce's ability to integrate genomics in practice.

Results provided may not be representative of the general population of nurses because they are limited to nursing interventions used in Magnet hospitals in the United States. Although Magnet hospital certification recognizes healthcare organizations internationally, strategies and interventions reported here were offered in the context of the U.S. healthcare system. Additionally, in the United States, a higher proportion of baccalaureate-prepared nurses are employed at Magnet hospitals compared with other healthcare institutions. In this study, approximately 60% of the respondents were baccalaureate prepared, which does not reflect the national nursing

workforce (Budden, Zhong, Moulton, & Cimiotti, 2013). However, as established leaders in the nursing practice environment, these champion dyads exemplified change initiatives with different change strategies that have led the way to improving nursing competency and the infrastructure required for successful integration of genomics in practice. Such information is applicable to nurses worldwide. Funding has been approved for development of a toolkit based on strategies and management best practices that facilitated adoption of genomic information within these institutional settings. The champion dyad exemplar interventions reported here will be available in 2015 for use by other institutions planning genomics competency integration efforts.

## Conclusions

As described in this article, nurse champions have the potential to shape health care through leadership to integrate genomic interventions into education, policy, and practice. All champion dyads required additional personal genomic training beyond that provided by the study. Institutional leadership and peer communication were critical to the support and success of the interventions. The varied interventions utilized in the Magnet hospital setting are applicable to other nursing leaders working to achieve healthcare quality and safety through effective and efficient translation of genomics into clinical care.

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## Clinical Resources

- Genetics/Genomics Competency Center (G2C2; United States). Open source repository of curricular materials and resources dynamically linked to competency frameworks and learning outcomes for diverse healthcare providers. <http://www.g-2-c-2.org>
- Global Genetic/Genomic Community (G3C; United States). Interactive unfolding case scenarios for use by students and practicing healthcare providers learning basic genetic/genomic concepts. Self-

paced and self-directed using simulated patients. <http://www.g-3-c.org/en>

- Six Weeks to Genomics Awareness (Michigan Public Health Training Center; United States). This self-paced course builds a foundation for understanding genomic advances and identifying the relevance of genomics to public health. Content is presented online and structured in six (6) weekly units. [https://practice.sph.umich.edu/mphtc/site.php?module=courses\\_one\\_online\\_course&id=108](https://practice.sph.umich.edu/mphtc/site.php?module=courses_one_online_course&id=108)
- Telling Stories, Understanding Real Life Genetics (United Kingdom). Over 100 real stories in written and video format linked to U.K. genetic competence framework for nurses. Teaching/learning resources include activities, points for reflection and guidance on relevance to practice. <http://www.tellingstories.nhs.uk>

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