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## A Strategic Plan to Thread Genomics Competencies into Undergraduate Curriculum

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# A STRATEGIC PLAN TO THREAD GENOMICS COMPETENCIES

A Strategic Plan to Thread Genomics Competencies into Undergraduate Curriculum

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### Abstract

**Problem:** Genomics in undergraduate nursing education has experienced slow adoption in the United States. Various approaches have been proposed but do not address barriers to successful implementation.

**Methods:** A strategic plan was developed to increase the amount of genetics and genomic content in the curriculum of an undergraduate nursing program. A gap analysis was performed on the curriculum revealing a paucity of content. A SWOT analysis informed the strategic plan, which included a faculty education program using the ANA/ISONG's *Essentials of Genetic and Genomic Nursing: Competencies, Curricula Guidelines and Outcome Indicators (2<sup>nd</sup> ed.) (2009)* as a foundation.

**Results:** Faculty developed 18 activities and evaluation methods by which students could acquire essential genetics and genomics competencies that can be threaded into the curriculum. Faculty interest in learning about genetics and genomics increased from 47.8% to 81.8% of attendees. Confidence in knowledge of genetics and genomics increased as well. A team approach to the idea of a faculty champion was identified.

**Implications:** This project demonstrated that a strategic plan tailored to a school, involving faculty members in the process, and working as a team to develop curriculum threads is a successful approach to increasing genomics curriculum threads for use in undergraduate curriculum. This project also demonstrated that a team approach increased faculty confidence of knowledge and interest in genetics and genomics and fostered the idea that a team of faculty champions may be superior to one individual in such a role.

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### A Strategic Plan to Thread Genomics Competencies into Undergraduate Curriculum

One of the most exciting discoveries of the 21st century was the completion of the Human Genome Project in 2003. The National Human Genome Research Institute (NHGRI, 2018) describes the human genome as a cross between a shop manual and a history book giving a detailed description of how every human cell is constructed. Human Genome Project researchers discovered the sequence of all the base pairs in human DNA, mapping locations of all the genes that produce traits that manifest themselves in appearance, function, and structure of the human organism (NHGRI, 2018). These genes trace our ancestry and are used in “Precision Medicine”.

Precision Medicine is a term that describes the use of an individual’s genomic information in screening, diagnosis, treatment, as well as to inform selection of medications for pharmacological management of specific conditions (NIH, 2018). Clinicians may also use this information to tailor general lifestyle recommendations to an individual patient (Sloand, Burguet, Engle-Pratt, & Bodurtha, 2018). Precision medicine has the potential to affect the work of every practicing nurse in the U.S, as population health becomes incorporated into nursing practice (American Nurses Association, n.d.). Precision Medicine, founded on genomics, is the future of individual healthcare and of population health.

Advances in healthcare grow exponentially as more information about genetics becomes known (Calzone et al., 2010; Sloand et al., 2018). This explosion of information has created a gap between research, practice and what is included in nursing education. Understanding the implications of genetics and genomics is how population health will

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be addressed in the future (Calzone et al., 2010). Nurses need to understand genetics and genomics and apply that knowledge in practice.

The American Nurses Association (ANA) included genetics and genomics in nursing's scope of practice in 1998 when the initial *Scope and Standards for Clinical Genetics Nursing Practice* was published (Montgomery et al., 2017). When the ANA published the *Essentials of Genetic and Genomic Nursing: Competencies, Curricular Guidelines and Outcome Indicators (the Essentials of Genetic and Genomic Nursing)* in 2006, it was endorsed by forty-eight nursing and specialty organizations including the American Nurses Credentialing Center, the American Association of College of Nursing's (AACN) and the International Society of Nurses in Genetics (ISONG) (NIH, 2010). The second edition "Consensus Model" was released in 2009. Genetics and genomics are included in Healthy People 2020 and 2030 recommendations and in the AACN accreditation standards for the Bachelor of Science Nursing Essentials (AACN, 2020; ODPHP, 2019). Nursing faculty, however, may be overwhelmed with conflicting priorities such as maintaining practice, research, publishing requirements, and prioritizing already full curriculum content (Brownell, 2012). Teaching unfamiliar genetics and genomics content falls to the wayside, to the detriment of student knowledge.

The purpose of this project was to develop a strategic plan to increase the amount of genetics and genomic content in the curriculum of an undergraduate nursing program.

The question for the study was:

In a midwestern undergraduate nursing program, will a strategic plan using the *Essentials of Genetic and Genomic Nursing: Competencies, Curricular Guidelines and Outcome*

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*Indicators* increase the number of genetics/genomics threads included in undergraduate curriculum?

### **Review of Literature**

A comprehensive literature search was conducted using CINAHL, Medline and Pubmed. Keywords included *nursing, education, genetics and genomics*. Over 100 articles appeared, so keywords *family health history* and *risk assessment* were added. Finally, the search was narrowed to *faculty and education, faculty knowledge, skills and attitudes* about genetics and genomics. Exclusion criteria included *graduate-level curriculum* and *graduate faculty*. Articles from the past 15 years were included to inform the historical process due to the evolving history of genetics and genomics, to verify the failure of nursing to uptake the innovation over time and to trace the process of genetics and genomics education from discovery to implementation resulting in 43 articles for final review with 11 selected for application.

In 1962, genetics and genomics were recognized by nursing leaders as an important science that should be included in nursing education (Read, Dylis, Mott, & Fairchild, 2004). The National Human Genetics Research Institute (NHGRI), in collaboration with the ANA and ISONG developed *the Essentials of Genetic and Genomic Nursing* to help faculty incorporate genetics and genomics content into education and to guide continuing education for practicing nurses (Consensus Panel, 2009). This publication “reflects the thinking of the nursing profession” and was meant to be used in combination with individual state boards of nursing (p. ii). Over the ensuing years, nursing research in genetics and genomics has continued, but calls for including these topics in nursing curriculum have failed (Daack-Hirsch, Dieter, & Griffin, 2011).

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Chronic disease management is becoming increasingly necessary as our population ages. The top fifteen chronic diseases have a genetic basis (Heron, 2018). Calzone et al. (2010) state that preventive care is the hallmark of nursing and is an integral part of genetics and genomics but for people to benefit, nurses must understand and apply concepts of genetics and genomics in their practice. Genetics and genomics in nursing practice is no longer limited to advanced practice nurses, or specialty nursing roles (Aiello, 2017; Calzone et al., 2010; Daack-Hirsch et al., 2011). Every nurse in practice today should be able to provide competent genetic and genomic-based care, counseling and education to patients considering or undergoing genetics and genomics testing, or who have concerns regarding genetics and genomics issues.

Other health professionals have already recognized the need for genetics and genomics education and have become knowledgeable in the field. Nurses are the largest and most trusted members of the healthcare team, but nurses at all levels of experience are unprepared to meet patients' genetic and genomic needs (Aiello, 2017; Brenan, 2018). "It is critical that healthcare providers are able to use genetics and genomics information to care for their patients" (NIH, 2010, para. 2).

Nursing faculty recognize that including genetics and genomics in curriculum is important, but too many have failed to incorporate content thus far. Several reasons have been postulated for why nursing faculty have been slow to incorporate genomics content into curriculum. Ward, Purath, and Barbosa-Leiker (2016) declare inadequate faculty education as the problem. Numerous studies have identified that nursing faculty lack training in genetics and genomics (Aiello, 2017; Munroe & Loerzel, 2016; Read & Ward, 2018). Calzone, Jenkins, Culp and Caskey (2014) reported 70% of faculty self-rating

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their genetics and genomics skills as poor. They reported a surprising 91% of faculty had not heard of the *Essentials of Genetic and Genomic Nursing*. The lack of presence of genetics and genomics on NCLEX may play an important role in this attitude (Aiello, 2017).

The nursing faculty workforce is aging with the average age of faculty members somewhere between 50.9 and 62.2 years of age (AACN, 2017). These experienced clinicians received their basic education well before the Human Genome Project was begun and may not recognize the opportunities available through Precision Medicine (Montgomery 2017; Calzone, Jenkins, Culp, Bonham & Badzek, 2013). They may view the field of genomics as the purview of medicine and not nursing's role. Nursing, however, must be able to collaborate as an integral part of the health care team, which requires learning about genetics and genomics applications and patient impacts.

Family health history and risk assessment for genetics are considered the standard of care to be included in nursing genetics education (Aiello, 2017). Although the AACN has included genomics competencies in the BSN Standards, a review of the National Council Licensure Examination's NCLEX-RN® exam reveals no testing of any genomic competency except performing a family history (Aiello, 2017; NCSBN, 2019). As a result, faculty may not identify genetics and genomics education as important. Complicating this is the fact, except for maternal-child health and pediatrics specialty texts, few textbooks contain genetics and genomics information (Aiello, 2017). A search of the internet for genomics education for continuing nursing education (CNE) credit revealed few programs containing sound scientific content and are often at a cost to the learner. Other websites such as the NHGRI and ISONG offer reputable information but



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do not offer CNE credit for the content. Confounding the issue is that continuing education for graduated nurses is not required in all states. Nurses currently in practice are encouraged to learn about genetics and genomics through continuing education but for students, exposure to genetics and genomics content must begin during basic nursing education (Donnelly, Nersesian, Foronda, Jones & Belcher, 2017). Therefore, faculty members must become familiar with the curriculum competencies in the field of genetics and genomics to be able to educate students in the content.

Barriers to teaching new ideas include lack of time, training, and incentive to develop new content, and the failure of administration to endorse the inclusion of new ideas (Brownell & Tanner, 2012). Faculty barriers also include curricular content saturation (Aiello, 2017; Kronk, Colbert & Lengetti, 2018). Conflicting priorities such as the need to maintain currency in practice, perform research, attend departmental meetings, publish, and find funding for research create time limitations on faculty (Brownell & Tanner, 2012). Finally, there may be no incentive from administration to improve genetics and genomics skills as many nursing schools provide no or low tuition reimbursement for continuing education (Brownell & Tanner, 2012; Jenkins & Calzone, 2014).

In 2011, Daack-Hirsch, Dieter, and Griffin compared approaches to incorporating genetics and genomics into nursing curriculum and stated that since it is no longer considered a specialty area of nursing, it must be incorporated into the curriculum. They determined that a stand-alone class has limitations such as needing a dedicated faculty member with an interest in and knowledge of the topic to teach it (Ward et al., 2018). A stand-alone genetics course has the potential drawback of being relegated to an elective

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course that not all students might take and be viewed as adding credit hours to an already saturated curriculum (Kronk et al., 2018). A reasonable alternative is to examine *the Essentials of Genetic and Genomic Nursing* through the lens of existing course content and using a strategic plan, collaborate with faculty members who teach the courses to identify content to be included within existing curriculum (Daack-Hirsch et al., 2013).

Organizational change can be difficult and obtaining critical support from interested stakeholders, encouraging employee participation, and evaluating the process are necessary for successful implementation and maintenance of a proposed change. Planning for change in an organization requires an approach that unites the mission, vision and values, identifies strengths, weaknesses, opportunities, and threats to the plan. A strategic plan is “a disciplined and thoughtful process that links the values, mission, and goals of a school system with a set of coherent strategies and tasks designed to achieve” goals (Reeves, 2008), and provides a focus and direction for the organization.

### **Methods**

#### **Design and Setting**

This project developed a strategic plan using a gap analysis instrument designed to identify genetics and genomics content in the current curriculum before and after plan implementation and a Strengths, Weakness, Opportunities, and Threats (SWOT) analysis to identify and mitigate potential barriers to the plan’s success. The strategic plan included an educational presentation about genomics to faculty. The goal of this strategic plan was to incorporate genetics and genomics competencies into existing curriculum content. The project took place at a college of nursing in a metropolitan region that employs approximately 56 full time faculty. The study was done on a convenience

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sample of 23 faculty members. The college of nursing is loosely affiliated with a medical school renowned for its genetics department.

### **Approval process**

Approval for the project was sought and received from the University of Missouri- St. Louis (UMSL) doctoral committee and from the UMSL Institutional Review Board. A formal letter of approval and support was received prior to starting the project by the Dean of the college at which the plan was implemented.

### **Data Collection/Analysis**

Data related to the SWOT (Appendix A), gap analysis of the curriculum (Appendix B) and results from the faculty program (Figures 1 & 2) were analyzed using descriptive statistics. All data were maintained on password-protected computers.

### **Procedures**

After consent to conduct the study was received, a strategic plan (Appendix C) was initiated. A gap analysis instrument based on the AHRQ Gap Analysis tool and the Essentials of Genetic and Genomic nursing was developed to identify baseline curricular genetics and genomics content. (AHRQ, n.d., Consensus Model, 2009). The analysis was performed using the college's curriculum map and faculty-submitted genetics and/or genomics curriculum artifacts used in the previous term to augment the data. Strengths, weaknesses, opportunities, and threats (SWOT) analysis to identify strengths related to genomics program implementation was performed, repeated with school leaders, and leveraged to promote the success of the strategic plan. As a result of the gap and SWOT analyses, an educational program was developed to address the weaknesses and threats to the successful implementation of the strategic plan at the college (Appendix D). An

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informal third SWOT discussion included faculty members present at the educational presentation. A site-specific toolkit of Genetics/Genomics resources was developed and used at the presentation.

Several invitations to attend the genetics education presentation were distributed to all faculty via institutional email. Three Continuing Nursing Education hours were granted to all attendees as an inducement to increase attendance. Faculty members completed the three-hour program, which was held online on one evening.

After informed consent was signed, participants were granted electronic access to the resources, including an electronic copy of the *Essentials of Genetic and Genomic Nursing*. A local genetics nurse practitioner reviewed basic tenets of genetics and genomics as applied to nursing practice. An overview of genetic science was presented, and faculty then worked in small groups to create genetic and genomic curriculum threads with feasible didactic and clinical experiences. During the meeting, the modified gap analysis tool was used to guide the development of genetics and genomics content ideas.

### **Results**

Results of the gap analysis using the curriculum map and faculty-provided class artifacts revealed that genetics and genomics information currently being taught is not correlated to the learning outcomes presented in *Essentials of Genetic and Genomic Nursing*. Ten curriculum artifacts used in the previous term requested from faculty were received for review of which three could be categorized using domains from *the Essentials of Genetic and Genomic Nursing*. Results of this analysis revealed that genetics and genomics information currently being taught was either rudimentary

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genetics, disease processes related to genetic mutations and a genogram, none of which were consistently taught between different class sections.

A SWOT analysis to identify barriers and strengths related to genetics and genomics program implementation was performed three times using the literature review, college leadership and again with faculty members. The SWOT analysis with college leaders identified potential faculty limitations but leaders indicated support for faculty development, especially in genomics. An opportunity to collaborate with a nearby medical school was identified. Concerns about faculty resistance to change were identified as a potential weakness, confirming Brownell and Tanner's (2012) findings, as was staff turnover. A weakness identified by leadership was a concern that the school lacked a faculty champion for genomics as recommended by Jenkins and Calzone (2014), however interest in encouraging a champion from the faculty was expressed. Opportunities and weaknesses identified through the literature review were validated by the leaders of the college.

During the faculty arm of the SWOT analysis, themes like those in the literature and from leadership arose, including feeling intimidated by the complexity of genetics and genomics information, conflicting priorities, and feeling unprepared to undertake the work required to implement a change. Concern was voiced by faculty that genomics does not have a place in nursing curriculum since it is not on the NCLEX exam, which was identified in the literature (Aiello, 2017). Strengths identified excellent college library services, a local nationally renowned genetics research center, a well-educated faculty willing to learn, and a small cadre of faculty who self-identified as having interest and training in genetics and/or genomics.

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Forty-one percent of the college's faculty attended the educational presentation ( $N=23$ ). Attendees ranged from 30-70 years of age with the majority (82.6%) of attendees in the 50 to 69-year-old range (Figure 1). Ninety-six percent were female, 100% white. Approximately 26% of participants were aware of *the Essentials of Genetic and Genomic Nursing* before the education program started. After the program, 100% of participants felt they had increased their knowledge of genetics either fully (81.8%) or at least partially (18.2%). Most attendees felt their confidence to develop genetics and genomics curricular threads had increased (68.2%). Eighty-two percent of participants felt the program increased their actual knowledge of genomics and 100% of participants stated increased confidence in their knowledge of genomics. In this project, 18 new threads were developed, and nearly 82% of faculty stated a new interest in including these genomics threads in their course (Figure 2).

Faculty developed curriculum threads during the small group breakout sessions. Of the 18 threads, 50% ( $N=9$ ) had an evaluation method included. Domain 1 of *the Essentials of Genetic and Genomic Nursing* had the most ideas ( $N=13$ ), while Domains had the least (Domain 2 ( $N=3$ ) and Domain 4 ( $N=2$ )). Domains 3 and 5 had no thread developed, likely due to a difficulty in assigning breakout rooms online. Domain 1's subpoint, "advocacy for client access to services and support groups" had the greatest number of threads ( $N=5$ ) developed.

### **Discussion**

A curriculum strand, or "thread" is content that is included throughout the student's educational experience from domains within a learning area or discipline (IBE 2020). Genomics has experienced slow adoption in undergraduate nursing education.

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Various approaches to implementing “novel” concepts have been proposed but do not address barriers to successful implementation. A strategic plan tailored specific to a college of nursing can overcome such barriers. Rheinecker (2015) states leadership and faculty support as vital contributors to a strategic plan’s success.

Discussions prior to developing the strategic plan allowed school leaders to articulate their vision for genomics in curriculum. Involving leaders in the SWOT analysis, planning the approach, and encouraging their presence at the educational program demonstrated their interest in the project. Finally, the school leadership’s involvement with the plan and interest in developing future genomics champions at the school demonstrated to faculty the importance of the plan.

Faculty adherence to curriculum and willingness to update curriculum are key to improving and maintaining content. The literature review reveals that the faculty workforce is aging (AACN, 2017), but younger faculty members may provide two potential benefits. Younger faculty members may have a longer expected duration of employment, and they may have had more recent exposure to genetics and genomics in their education, which may improve their ability to present this material. Faculty feel intimidated by the complexity and perceived difficulty of the subject of genetics and genomics (Ward, Purath, & Barbosa-Leiker, 2016). The strategic plan overcomes these barriers by having faculty use *the Essentials of Genetic and Genomic Nursing* in combination with genetics education and collaborative thread development. It is not necessary for faculty to become experts in genomics but using the threads developed provides a way for faculty to easily present competencies to students and collaborate on where in the curriculum the threads might best be placed. Providing faculty with genetics

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and genomics education and working in teams allows idea sharing and reinforces the sense of community. Comments after the program involved feeling “excited to learn”, enjoying the chance to network with friends and improve curricular content. Results of the program indicate that this is an effective way to involve faculty in the process.

The “faculty champion” concept (Jenkins, & Calzone, 2014) has been proposed, but this has limitations. High turnover rates increase the risk of losing that one valuable faculty member. Conflicting priorities may cause one faculty member to feel overwhelmed, whereas a team can work together to maintain progress. A team of individuals has a larger circle of colleagues, effectively increasing faculty and staff awareness and support for the content. This strategic plan addresses this by developing a team of champions.

The next step in the strategic planning process is to convene those faculty members who expressed interest in genomics. This group should continue to develop potential curricular threads, and mentor faculty who teach the classes in which the threads have been included. The team should continue to promote faculty interest in genetics and genomics. A strategic planning approach may assist with implementation of future projects.

### **Conclusion**

This project demonstrated that developing a strategic plan, providing resources and education to nursing faculty members, and working as a team to develop curriculum threads based on *the Essentials of Genetic and Genomic Nursing* is a successful approach to developing genomics curriculum threads to include in undergraduate curriculum. This project also demonstrated that a team approach increased faculty interest in genetics and



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genomics and fostered the idea that a team of faculty champions may be superior to one individual in such a role. Strategic planning is a potential avenue to accomplish change.

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A STRATEGIC PLAN TO THREAD GENOMICS COMPETENCIES

Appendix A

SWOT Analysis

<b><i>Strengths</i></b>	<b><i>Weaknesses</i></b>	<b><i>Opportunities</i></b>	<b><i>Threats</i></b>
<p><b>Literature</b>                      Leaders who value project.                      School reputation – voted a Best Nursing School (Nursing Schools Almanac).</p> <p><b>Leadership: President/Dean</b>                      Faculty are competent.                      Plans to strengthen faculty by intentional hiring of educated nurse faculty.                      Subject is of personal interest to President of school.</p>	<p><b>Literature</b>                      Skills gaps are not recognized.                      Change fatigue.                      Faculty lack genetics education in their education.                      Research department leadership needs.</p> <p><b>Leadership: President/Dean</b>                      Faculty resistance to change.                      Over-ownership of courses.                      History of silos.                      SLOs overdue to be improved.                      Curriculum drift.</p>	<p><b>Literature</b>                      Evidence-based: AACN/BSN, HP 2020, ANA and CCNE.                      New tech developments.                      Precision Med/Pop Health model.                      May hire a genetics/genomics expert faculty champion.                      Younger students may have better genetics/genomics education.                      May strengthen relations with local genetics experts.                      Increased student awareness of genetics/genomics.                      Recent CCNE accreditation occurring with focus on meeting standards.</p> <p><b>Leadership: President/Dean</b>                      Other schools are already teaching genetics/genomics.                      Personalized medicine is happening now!</p>	<p><b>Literature</b>                      Textbooks lack content from the Essentials of genetics/genomics.                      Finding reliable resources is challenging and time-consuming.</p> <p><b>Leadership: President/Dean</b>                      Will students attend other schools if they are more prestigious?</p>

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<p>Motivation to have college be competitive with other area schools. Genetics/genomics content is an imperative.</p> <p><b>Faculty</b> CIPE. Excellent library resources. Well educated faculty. Faculty interest and willingness to teach content. Students with life-stories to share. College offers BSN, MSN, DNP and PhD education</p>	<p>Faculty turnover Faculty development lags behind new faculty acquisition.</p> <p><b>Faculty</b> Content saturation. Intimidated by the topic. Faculty education needs. Not a priority content add. Lack of clarity of what other faculty members are teaching. No faculty expert identified. Genetics/genomics does not “belong” in nursing.</p>	<p><b>Faculty</b> NINR’s symptom-based science. Med School affiliation. Foundation money resources. Strong Alumni group. Local Sigma chapter.</p>	<p><b>Faculty</b> IT and administrative assistants/ faculty support staff often overwhelmed with conflicting priorities.</p>
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Appendix B

Modified Gap Analysis Tool: Analysis of practice gap, with newly developed curricular threads and possible curriculum placement

Desired Practice	Current Practice	Barriers to desired practice, if identified	Outcome	Possible class placement
<i>Describe the desired “Best Practice” state</i>	<i>Describe the current state of practice</i>	<i>Check which type of gap has been identified.</i> <input type="checkbox"/> <b>Knowledge</b> <input type="checkbox"/> <i>Skills</i> <input type="checkbox"/> <i>Attitudes</i>	<i>List identified curricular thread in terms of Essentials of Genetics and Genomics Competencies Domains</i>	
<b>Domain 1: Professional Responsibilities</b>				
1a. Recognize when one’s own attitudes and values related to genetic and genomic science may affect care provided to clients.	No evidence found	A	1. Students examine attitudes and beliefs - add self-reflection in Foundations class Evaluation: Turn in journal; faculty reviews for appropriateness  2. Give Values Clarification Survey to collect information regarding student attitudes.	Foundations/Intro to nursing  Maternal/Child  Mental Health  Senior Capstone/Synthesis

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			Eval: Students to write their reflection of how their attitudes may impact their care.	
1b. Advocate for clients' access to desired genetic/genomic services and/or resources including support groups.	No evidence found	S	<ol style="list-style-type: none"> <li>1. Develop a Template for identifying clients who would benefit from genetic services</li> <li>2. Ask a person to talk about their personal dilemma of whether or not to get genetic testing.</li> <li>3. Students research Individually: <ul style="list-style-type: none"> <li>· cost of genetic testing/affordability</li> <li>· GINA legislation</li> <li>· Possible negative consequences of having a positive genetic test</li> <li>· Support groups that may be able to provide guidance in this decision</li> <li>· Resources that might be able to provide direction on what to do</li> </ul> </li> <li>4. Group Work Go over the above information and talk about the advantage of having others with the same issues to talk to about their genetic testing dilemma.</li> </ol>	Adult, Maternal/Child, Mental Health

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			5. Look at the availability of resources for various genetic disorders. Are some better supported than others based on how common they are?	
1c. Examine competency of practice on a regular basis, identifying areas of strength, as well as areas in which professional development related to genetics and genomics would be beneficial.	No evidence found	K	1. Tie into exam questions and critical thinking discussions - start in term 2 UD and term 1 Accelerated, then thread and build on throughout all Adult Health, OB, Psych, and Peds theory courses Evaluation: Exam scores for questions with that content area; remediation of weaknesses	Introduction through Senior Capstone/Synthesis
1d. Incorporate genetic and genomic technologies and information into registered nurse practice.	No evidence found	K,S	1. EMR Documentation during clinicals; use of online resources for information-based research, such as Genetic Home Reference website – Intro to Adult Health Evaluation: Care Plans submitted as assignments; Clinical instructor review of EMR documentation	Adult Health, Maternal/Child Mental Health Senior Capstone/Synthesis

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<p>1e. Demonstrate in practice the importance of tailoring genetic and genomic information and services to clients based on their culture, religion, knowledge level, literacy, and preferred language.</p>		<p>S</p>	<p>1. Family history-taking - Health Assessment course            Evaluation: Presentation to class that incorporates culture, religion, knowledge level, literacy, and preferred language into their narrative with a patient</p> <p>2. Role Play/Simulation: Geneticist and Person being tested. The person was adopted but knows she was from an Ashkenazi Jewish (or other high-risk) Family on one side. The geneticist gives her the choices that she has based on her probable family history. Students look up the data regarding genetic issues in the Ashkenazi Jewish group.            Evaluation: Discuss any biases they might have on what to do based on their own life experiences.</p>	<p>Health Assessment, Foundations/Introduction to Nursing            Adult Health</p>
<p>1f. Advocate for the rights of all clients for autonomous, informed genetic- and genomic-</p>	<p>Community Health: GINA            Genetic Discrimination Laws</p>	<p>S</p>	<p>1. Clinical conference in Synthesis course            Evaluation: Clinical instructor gives students feedback about their participation in conference;</p>	<p>Mental Health            Maternal/Child</p>

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<p>related decision-making and voluntary action.</p>			<p>synthesis preceptor and clinical instructor then address this competency during final evaluation</p> <p>2. Provide a case study example where the client was not given all of the information/appropriate counseling to make an informed decision. They were told what to do. Then give an example of a case study that had the appropriate information and counseling given. The person had a personal choice.</p> <p>Evaluation: Students are asked if they think the person in the case study was given all of the information that was needed? If not, what information should have been given. Did it seem like the person had a choice?</p> <p>The students identify the things that were different and appropriate in this case. Students are asked to identify the consequences if the genetic test results are positive that would influence what the client chose.</p>	
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			What if the family does not agree? Students discuss difficult choices.	
<b>Domain 2: Professional Practice</b> <b>Essential Competency:</b> <b>Nursing Assessment:</b> <b>Applying/Integrating Genetic and Genomic Knowledge</b>				
2a. Demonstrates an understanding of the relationship of genetics and genomics to health, prevention, screening, diagnostics, prognostics, selection of treatment, and monitoring of treatment effectiveness.	Acquired or Congenital conditions (WH) “Genetics” (Peds) “Cancer” Adult Health II Mental health	K		Continue in Maternal/Child, Mental health and Adult Health
2b. Demonstrates ability to elicit a minimum of three-generation family health history information.	Reference to genogram exist in Intro Ad Health and Health Assmt	S		Health Assessment
2c. Constructs a pedigree from collected family history information using standardized symbols and terminology.	No evidence found	S		Health Assessment

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<p>2d. Collects personal, health, and developmental histories that consider genetic, environmental, and genomic influences and risks.</p>	<p>No evidence found</p>	<p>S</p>		<p>Health Assessment</p>
<p>2e. Conducts comprehensive health and physical assessments which incorporate knowledge about genetic, environmental, and genomic influences and risk factors.</p>	<p>No evidence found</p>	<p>S</p>		<p>Adult Health</p>
<p>2f. Critically analyzes the history and physical assessment findings for genetic, environmental, and genomic influences and risk factors.</p>	<p>No evidence found</p>	<p>K,S</p>	<ol style="list-style-type: none"> <li>1. Review a completed genogram (provided by faculty), look for red flags and trends in the family health that may indicate a genetic disorder. Identify conditions that may have been indicated by newborn screening.</li> <li>2. Create an informational handout on that condition, create a video of nurse providing family education.</li> <li>3. As a group, create an informational handout on that condition, create a video of</li> </ol>	<p>Adult Health, Senior Capstone/Synthesis</p>

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			nurse providing family education.	
2g. Assesses clients' knowledge, perceptions, and responses to genetic and genomic information.	No evidence found	K,S		
2h. Develops a plan of care that incorporates genetic and genomic assessment information.	No evidence found	S		
<b>Domain 3 Professional Practice Essential Competency: Identification</b>				
3a. Identifies clients who may benefit from specific genetic and genomic information and/or services based on assessment data.	Pediatric and WH newborn screenings	K,S		Continue in Maternal/Child Health
3b. Identifies credible, accurate, appropriate, and current genetic and genomic information, resources, services, and/or technologies specific to given clients.	No evidence found	K,S		
3c. Identifies ethical, ethnic/ancestral, cultural,	No evidence found	K,S		



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religious, legal, fiscal, and societal issues related to genetic and genomic information and technologies.				
3d. Defines issues that undermine the rights of all clients for autonomous, informed genetic- and genomic-related decision-making and voluntary action.	No evidence found	K,S		
<b>Domain 4: Professional Practice Essential Competency: Referral Activities</b>				
4a. Facilitates referrals for specialized genetic and genomic services for clients as needed.	No evidence found	S	<ol style="list-style-type: none"> <li>1. Construct a list of resources and referral documents to educate the client. Have students work in small group with each group to identify 2 local and 1 regional and national resources Evaluation: Faculty would evaluate the ability to identify each resource as accurate.</li> <li>2. Develop a plan for follow up post genetic referral. Student can identify if the patient or family followed up on the</li> </ol>	Adult Health Maternal/Child Mental Health

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			<p>assessment and understanding of importance of genetic testing. Collaborates with interprofessional team. Have students do a follow up questionnaire online with clients to ascertain understanding of genetic referral.</p> <p>Evaluation: Follow a rubric. Looking at response rate of greater than 40% with questionnaire. Follow up by phone with clients.</p>	
<p><b>Domain 5: Professional Practice Essential Competency: Provision of Education, Care and Support</b></p>				
<p>5a. Provides clients with interpretation of selective genetic and genomic information or services.</p>	<p>No evidence found</p>	<p>K,S</p>		<p>Senior Capstone/Synthesis</p>
<p>5b. Provides clients with credible, accurate, appropriate, and current genetic and genomic information, resources, services, and/or technologies</p>	<p>No evidence found</p>	<p>K,S</p>		

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that facilitate decision-making.				
<p>5c. Uses health promotion/disease prevention practices that:</p> <ul style="list-style-type: none"> <li>• Consider genetic and genomic influences on personal and environmental risk factors.</li> </ul> <p>Incorporate knowledge of genetic and/or genomic risk factors (e.g., a client with a genetic predisposition for high cholesterol who can benefit from a change in lifestyle that will decrease the likelihood that the genetic risk will be expressed)</p>	No evidence found	K,S		
5d. Uses genetic- and genomic-based interventions and information to improve clients' outcomes.	No evidence found	K,S		
5e. Collaborates with healthcare providers in providing genetic and genomic health care.	No evidence found	K,S		
5f. Collaborates with insurance providers/payers to facilitate reimbursement for	No evidence found	K,S		

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genetic and genomic healthcare services.				
5g. Performs interventions/treatments appropriate to clients' genetic and genomic healthcare needs.	No evidence found	K,S		
5h. Evaluates impact and effectiveness of genetic and genomic technology, information, interventions, and treatments on clients' outcome.	No evidence found	K,S		

# A STRATEGIC PLAN TO THREAD GENOMICS COMPETENCIES

## Appendix C

### Strategic Plan

<b>ABOUT US</b>
<b>PAST</b> - where we have been
A genomics champion faculty member resigned from the school three years ago. Since then, no faculty member rose to take on the role. Now, concern is raised that the college does not include genomics content
<b>TODAY</b> - where we are now
One curriculum thread, genogram is included in curriculum. Two other threads also present. Other classes discuss diseases related to genetic causes.
<b>VISION</b> - where we should go and why
To be a national academic leader in nursing education, research and scholarship, we should educate undergraduate nursing students so they will understand genomics and be educated to understand their role in the team delivering culturally sound, ethical evidence-based care.
<b>MISSION</b> - who we are, how we work toward our vision, what makes us unique
“ We prepare exceptional nurse leaders in an academic learner-centered environment.” We educate learners within a rigorous, evidence-based curriculum designed to advance nursing knowledge and ultimately enhance health-related outcomes and engage in the development, implementation, and dissemination of research to improve professional practice, patient outcomes, and advance nursing practice.
<b>CORE VALUES</b> - guiding principles of our work and how we operate
<b>Community:</b> We are one community, working together to deliver our best strengths for advancing, serving and sustaining health care work and success. <b>Caring Ways:</b> We deliver, discover, teach, establish, sustain and support healing and restorative pathways, for both the community and all of us. <b>Mutual Respect:</b> We hold each other in highest mutual regard, honoring our diverse gifts, to promote healthy engagement and exchange. <b>Empowerment:</b> We are authorized, prepared and positioned to deliver our best thinking, skills, energy and contributions for our mission success and impact.
<b>GOALS</b>
Engage in the development, implementation, and dissemination of research to improve professional practice, patient outcomes, and advance nursing practice. <ul style="list-style-type: none"><li>• Quality of Professional Preparation</li><li>• Evidence Based Practice</li><li>• Community Impact</li></ul>

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<p><b>OBSTACLES</b> - what could prevent us from realizing our vision</p> <p>Unawareness of evidence-based practices (Essentials of Genetics and Genomics Nursing), curriculum oversaturation and drift, faculty inertia, turnover and faculty feeling inadequate to teach complex new concepts, conflicting priorities for faculty, unpredictable changes within the school, proprietary mindset related to courses, overdue update of curricular learning objectives, faculty development process could be improved</p>
<p><b>SHORT-TERM GOALS</b> - what we will do to begin the process</p> <p>Perform a Gap Analysis to discover needs            Perform a SWOT analysis with leaders and faculty to determine potential strengths and weaknesses            Develop and deliver a program to educate faculty, create a team of faculty interested in genetics and genomics, and promote genomics content in curriculum using <i>Essentials of Genetic and Genomic Nursing: Competencies, Curricular Guidelines and Outcome Indicators and the National Institute of Health Method for Introducing New Competency: Genomics</i>            Create interest and momentum towards adapting genomics into curriculum: education presentation and faculty meeting,            Form a group of interested faculty – Team Genomics            Disseminate faculty-developed curriculum threads and seek any additional ones</p>
<p><b>LONG-TERM GOALS</b> - what we will do to realize our vision</p> <p>Work with Directors of each program to develop faculty who are interested in participating on the genomics team,            Continue meeting with Team Genomics faculty members to continue interest in the project            Identify faculty interested in attending the Summer Intensives Program in Genomics at NINR</p>
<p><b>MEASUREMENTS OF SUCCESS</b> - what benchmarks will be used as indicators of success</p> <p>Curriculum threads will be developed and maintained in courses as designated            Faculty development in genetics and genomics</p>
<p><b>STRATEGY</b></p>
<p><b>RESOURCE ASSESSMENT</b> - infrastructure required to realize vision</p> <p>Faculty hired should have high quality education            Director roles at school remain in place            Faculty genomics team will need meeting time and space, and administrative support.            Undergraduate subcommittee will oversee curriculum threads match stated program learning outcomes</p>

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<b>IMPLEMENTATION</b> - plan what will be done along with timeline
<ul style="list-style-type: none"><li>• Contact Dean and President of the college to ascertain interest and support for the project – November</li><li>• Contact Faculty organization and Curriculum committee chair to garner support for potential project – November</li><li>• Evaluate Mission, Vision, Values of the organization – November</li><li>• Evaluate Strategic Plan of the organization - November</li><li>• Separate Essentials of Genetics and Genomics Domains into threads – December</li><li>• Request artifacts of genetics/genomics content used in previous term from faculty -February</li><li>• Obtain college’s curriculum map</li><li>• Gap Analysis - January</li><li>• SWOT January, February and March</li><li>• Invite faculty to program – January, February and March via email and in person during faculty bi-monthly meeting – February</li><li>• Contact genetics expert to speak at the program - January</li><li>• Contact Continuing education department/obtain CNE for program, Feb - March</li><li>• Design flyer to advertise program, obtain permission to use, display at college</li><li>• Faculty education and thread development Program – March</li><li>• Handouts for the program included the Agenda, speaker handouts, How to draw a genogram with standard symbols and relationship lines, threads from the Essentials of Genetics and Genomics for Nurses, the entire document for the same, Red Flags, a list of referrals, and a list of genetics continuing education resources.</li><li>• Disseminate handouts from program to all faculty – April</li><li>• Post Genetics Presentation online for all faculty - April</li><li>• Form Team Genomics - May</li><li>• Submit to Undergraduate curriculum subcommittee for approval</li><li>• Submit to Curriculum committee for approval</li><li>• Submit to Faculty Organization for Approval</li><li>• Course content reviews (annual follow-up)</li></ul>
<b>EVALUATION</b>
Curriculum threads developed in faculty meeting in year one will be maintained in course content at year two Formation of a faculty genetics/genomics team of champions Curriculum threads will be reevaluated, and new ones developed in year two, which will be continued in Yr3. At least one faculty member will apply to attend the NINR SIG Genetics Program
<b>NEXT STEPS</b>
Convene faculty with interest in genomics. Continue to develop potential curricular threads Mentor faculty who teach the classes in which the threads will be included Continue to promote faculty interest in genetics and genomics What other projects could benefit from a strategic planning approach?

# A STRATEGIC PLAN TO THREAD GENOMICS COMPETENCIES

## Appendix D

Agenda for faculty education program

### Genomics Competencies for Undergraduate Curriculum

#### Agenda

- 5:00-5:20**      **Introduction**, objectives for evening  
Discussion of implementing genetics/genomics into undergraduate curriculum at Goldfarb (small group discussion)
- 5:20--6:00**      **Featured Speaker: Caroline Mohrman PhD, RN**  
Basic DNA and RNA structure and function  
Common terminology used in genetics and genomics:  
    gene vs genome  
    epigenetics  
    mutation vs polymorphism  
    germline vs somatic  
Relevance of genetics/ genomics to nursing practice (Domain 2)  
Using genetic tests for diagnosis, treatment, and monitoring (Domain 2 and 5)  
Basic epigenetics
- 6:00- 6:30**      **Overview of the Outcome Indicators of *Essentials of Genetic and Genomic Nursing: Competencies, Curricular Guidelines and Outcome Indicators (by Domain)***  
**Speaker: Holly Mathis, MSN, RN**  
    Discussion  
1. **Professional Responsibilities - The influence of culture, attitudes and beliefs in genetics**  
    Recognizing when one's own attitudes and values may affect patient care  
2. **Professional Practice -Applying & Integrating Genetic/Genomic Knowledge**  
3. **Professional Practice - Identification Current Sources of Genetic/genomic information**  
    Ethical considerations, GINA  
4. **Professional Practice - Referrals and Resources**  
5. **Professional Practice - Health Promotion/Disease Prevention**
- 6:30--7:00**      **Learn and practice Family History pedigree charts and Red Flags**
- 7:00- 7:45**      **Practice incorporate genetics and genomics essentials into curriculum**  
    Small group work
- 7:45- 8:00**      **Summary and Wrap up**



# A STRATEGIC PLAN TO THREAD GENOMICS COMPETENCIES

Figure 1. Ages of Attendees at Faculty Program

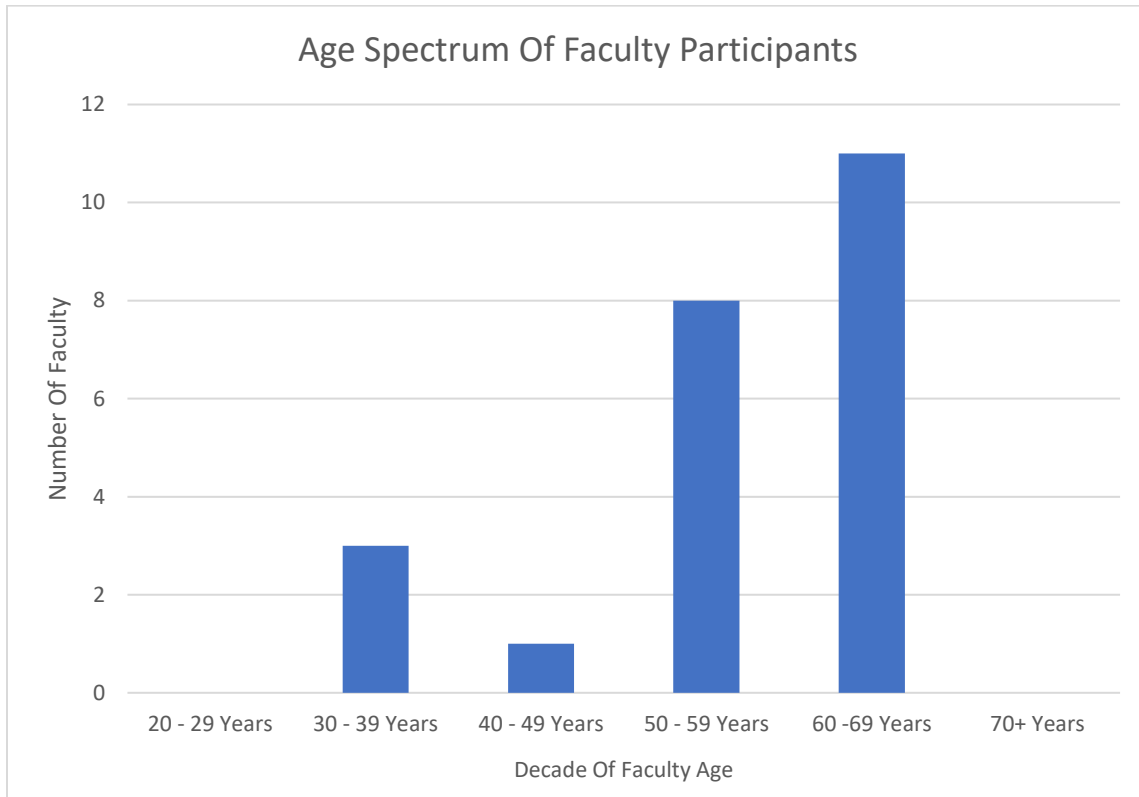


Figure 2. Percent of Faculty Interested in Making Curriculum Changes

