An Innovative Approach to Teaching Genetics to Graduate Nursing Students Using Interprofessional Teaching Modalities

Dorothy S. Lee, PhD, RN, ANP-BC, FNP-BC, CME
Sharon Panepucci, MSN, RNC-OB,CHSE
Saginaw Valley State University

Disclosure

- Dorothy S. Lee, PhD, RN, ANP-BC, FNP-BC, CME, Saginaw Valley State University reports no conflict of interest and no sponsorship or commercial support.
- Sharon Panepucci, MSN, RNC-OB,CHSE, CLC, Saginaw Valley State University reports no conflict of interest and no sponsorship or commercial support.

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Learner Objectives

- Describe how to incorporate current and emerging genetic/genomic evidence into the Masters' Curriculum to promulgate a meaningful, interactive, and motivating approach to graduate level learning.
- Explore design and implementation of interprofessional simulations, concept mapping, and panel discussions to increase confidence, critical thinking and clinical decision making in graduate nursing students

How can faculty ensure that graduate nursing clinicians have the necessary genetic knowledge to apply genetics/genomics in a clinical setting?

Theoretical Framework

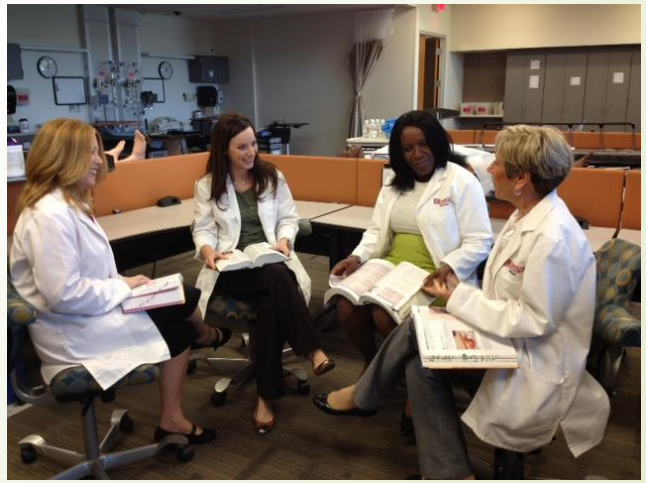
- NLN/Jeffries Simulation Framework
- Phenomenology
- Situated Cognition

Focus Interprofessional Team

Family Nurse Practitioner

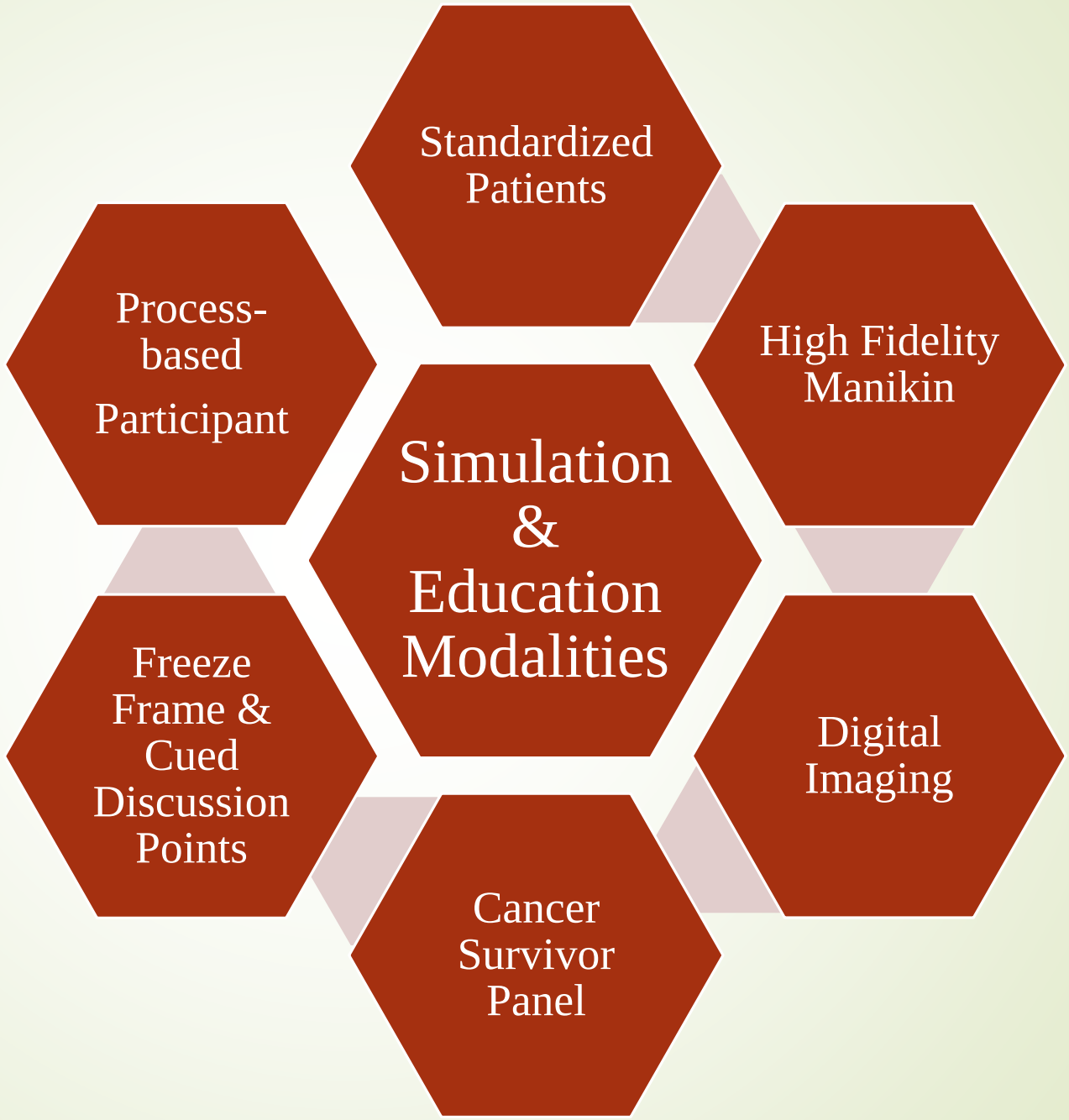
Biology Professor

Simulation Educators



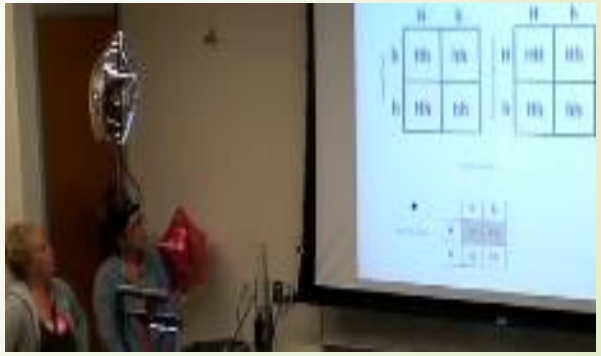
Development

- Weekly Meetings and Timeline
- Simulation Modality
- Design Characteristics
- Technology requirements
- Outcomes


Standardized Patients
High Fidelity Manikin
Digital Imaging
Cancer Survivor Panel
Freeze Frame & Cued Discussion Points
Process-based Participant
Simulation & Education Modalities

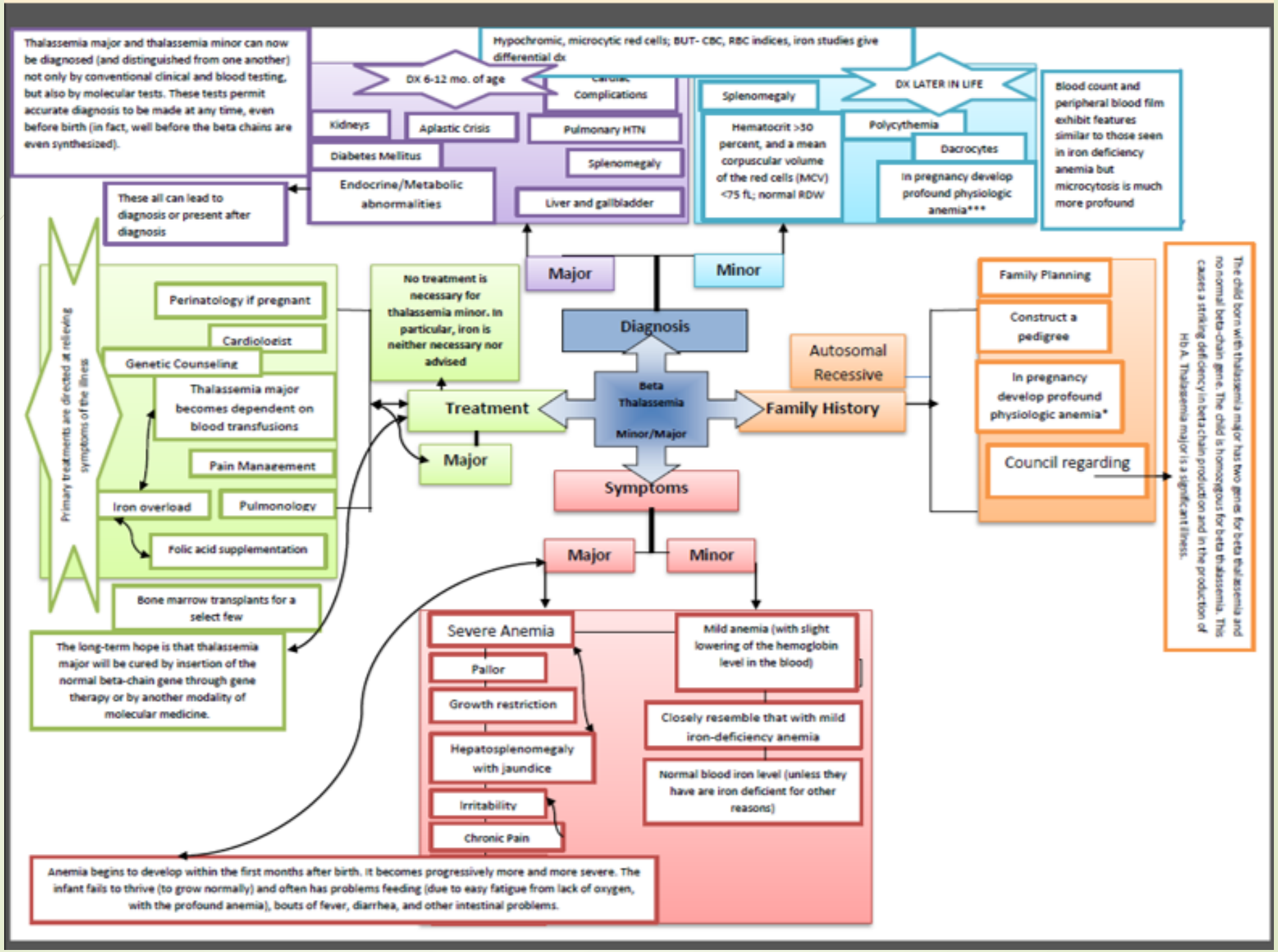
Simulated Learning Experiences

- Down Syndrome Simulation
- Sickle Cell Simulation
- Huntington Simulation
- Breast Cancer Panel



Kirkpatrick's Four-Level Training Evaluation Model

- Reaction
  - Student Feedback
  - Simulation Debriefing
  - Reflection Assignments
- Learning
  - Concept Maps
- Behavior
- Results


Thalassemia major and thalassemia minor can now be diagnosed (and distinguished from one another) not only by conventional clinical and blood testing, but also by molecular tests. These tests permit accurate diagnosis to be made at any time, even before birth (in fact, well before the beta chains are even synthesized).
Hypochromic, microcytic red cells; BUT- CBC, RBC indices, iron studies give differential dx
DX 6-12 mo. of age
Complications
Kidneys
Aplastic Crisis
Pulmonary HTN
Diabetes Mellitus
Splenomegaly
Endocrine/Metabolic abnormalities
Liver and gallbladder
DX LATER IN LIFE
Splenomegaly
Hematocrit >30 percent, and a mean corpuscular volume of the red cells (MCV) <75 fL; normal RDW
Polycythemia
Dacrocytes
In pregnancy develop profound physiologic anemia***
Blood count and peripheral blood film exhibit features similar to those seen in iron deficiency anemia but microcytosis is much more profound
These all can lead to diagnosis or present after diagnosis
Major
Minor
Diagnosis
Primary treatments are directed at relieving symptoms of the illness
Perinatology if pregnant
Cardiologist
Genetic Counseling
Thalassemia major becomes dependent on blood transfusions
Pain Management
Iron overload
Pulmonology
Folic acid supplementation
No treatment is necessary for thalassemia minor. In particular, iron is neither necessary nor advised
Treatment
Major
Beta Thalassemia Minor/Major
Autosomal Recessive
Family History
Family Planning
Construct a pedigree
In pregnancy develop profound physiologic anemia*
Council regarding
The child born with thalassemia major has two genes for beta thalassemia and no normal beta-chain gene. The child is homozygous for beta thalassemia. This causes a striking deficiency in beta chain production and in the production of Hb A. Thalassemia major is a significant illness.
Bone marrow transplants for a select few
The long-term hope is that thalassemia major will be cured by insertion of the normal beta-chain gene through gene therapy or by another modality of molecular medicine.
Symptoms
Major
Minor
Severe Anemia
Pallor
Growth restriction
Hepatosplenomegaly with jaundice
Irritability
Chronic Pain
Mild anemia (with slight lowering of the hemoglobin level in the blood)
Closely resemble that with mild iron-deficiency anemia
Normal blood iron level (unless they have are iron deficient for other reasons)
Anemia begins to develop within the first months after birth. It becomes progressively more and more severe. The infant fails to thrive (to grow normally) and often has problems feeding (due to easy fatigue from lack of oxygen, with the profound anemia), bouts of fever, diarrhea, and other intestinal problems.

Student Feedback

- “The concept maps allowed us to feel the investment of the sim character’s viewpoint.”
- “The debriefing after the cancer panel was very powerful & emotional. The panelists gave us a valuable glimpse into their journeys, I learned a lot.”
- “The simulations complemented the genetics info well”.
- “Having sim be interactive was helpful in making connections and further my understanding.”
- “Sims were helpful and provided another method of learning.”
- “Enjoyed lab sims esp. br ca panel good to have hands on involvement and learn about genetic applications too.”

Future Recommendation

- Add graduate students from other disciplines (e.g. Social Work, Occupational Therapy, Medical Laboratory Science)
- Qualitative data collection in the form of focus groups, to be conducted after clinical and prior to graduation regarding application of genetic knowledge in clinical setting.
- Incorporation of telemedicine as an additional modality of education and practice.

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