Redesigning the Baccalaureate Curriculum to Address Population Health Using Simulation

Ann Marie P. Mauro, PhD, RN, CNL, CNE, FAAN
Debora L. Tracey, DNP, RN, CNE
Maria Torchia Lo Grippo, PhD, RN
Sharon Anderson, DNP, NNP-BC, APNG
Angelica Bravo, MPH, MSW
Claire Byrne, MSN, RN, NE-BC
Bonnie Geissler, MS, RN
Lori Ann Escallier, PhD, RN, CPNP, FAAN

(1)School of Nursing, Rutgers, The State University of New Jersey, Newark, NJ, USA
(2)RWJ Barnabas Health, Short Hills, NJ, USA
(3)School of Nursing, SUNY at Stony Brook, Stony Brook, NY, USA

Background

Today's healthcare environment is largely focused on illness treatment in an aging population with increasingly complex health needs resulting in rising healthcare costs. To promote health and well-being, there must be a shift toward improving population health outcomes, enhancing the patient care experience, and reducing per capita costs (Institute for Healthcare Improvement, 2017). To address social determinants and health disparities in populations, nurses require sophisticated knowledge and skills in cultural competence, health promotion, self-management of chronic illnesses, care coordination, data translation, and use of technology (Cronenwett et al., 2007; Institute of Medicine, 2010; Interprofessional Education Collaborative Expert Panel, 2016).

Literature Review

There is a critical need to redesign baccalaureate curricula to promote better integration and attainment of essential population health competencies (American Association of Colleges of Nursing, 2008; Benner, Sutphen, Leonard, & Day, 2010; Cronenwett et al., 2007; Institute of Medicine, 2000, 2003; Interprofessional Education Collaborative Expert Panel, 2016). Simulation based learning provides realistic clinical experiences that promote competencies and readiness for professional nursing practice (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). Flipped classroom assignments, online activities, and academic-practice partnerships have been reported to increase student population health learning (Ezeonwu, Berkowitz, & Vlasses, 2014; Randolph, Evans, & Bacon, 2016; Simpson & Richards, 2015). Research is lacking regarding effective strategies to promote baccalaureate population health competencies across the curriculum.

Purpose

The study aim was to evaluate use of high-fidelity patient simulation to redesign our baccalaureate nursing curriculum to address population health through an academic-practice partnership.

Method

Theoretical framework. Using the NLN Jeffries Simulation Theory as a framework (Jeffries, 2016), our academic-practice partner team developed two patient cases using de-identified patient data that unfolded over the adult health I/II, pediatrics, and community courses: 1) an 82-year-old African American female with heart failure, diabetes, and 2) a 9-year-old Hispanic Latino boy with chronic asthma. Multiple, innovative learning strategies comprised of five videotaped simulated patient encounters (VSE), five high-fidelity simulation (HFS) experiences, five faculty/student guides, flipped classroom activities, and population health resources were developed and implemented in didactic and simulation settings. Six
population health competency based learning outcomes were addressed: delivers culturally competent care, advances self-management of chronic illnesses, facilitates transitions in care, promotes culture of health, collects meaningful use data to address care gaps, and utilizes an electronic health record for assessment.

**Sample.** A pretest/posttest, descriptive, electronic survey design was used to collect data from 585 baccalaureate students and 78 faculty on three statewide campuses at a large US public university in fall 2016 and spring 2017.

**Outcomes measures.** Investigator developed evaluation surveys were used by students and faculty to assess student attainment of population health competencies using a 4-point Likert scale. Qualitative themes were extracted from additional comments. Cultural competence was assessed using the Inventory for Assessing the Process of Cultural Competence Among Healthcare Professions—Student Version (IAPCC-SV©) (Campinha-Bacote, 2007).

**Procedure.** University institutional review board exemption approval and informed consent were obtained. Didactic simulation activities involved a student guide pre-assignment (1-2 hrs) with a VSE (10-15 mins), activities (e.g., care plan), and resources. The faculty guide included the student assignments and resources along with a debriefing activity for a class VSE discussion (1.25-1.5 hours). The HFS experience with manikins or standardized patients occurred approximately one week later, and included: student guide pre-assignment (1-2 hrs) activities (e.g., online modules), and resources; and dedicated simulation team and clinical faculty guides for the pre-briefing (1 hour), simulation (2 hours), and debriefing (1 hour) activities. Students and faculty were allotted instructional time to complete the electronic surveys.

**Results**

**Sample.** There was a 100% student (n = 585) and 87% faculty (n = 68) response rate. Students were ethnically diverse (48%), predominantly female (81%), and mostly between 20-25 years-old (61% fall 2016, 68% spring 2017). Faculty were primarily white (59%), Asian (13%), Black/African American (12%), female (96%), and over age 40 (55%).

**Population health competencies.** Students overwhelmingly agreed/strongly agreed (90% to 100%) that they met the population health competencies for all VSE and HFS activities across all courses. Faculty also agreed/strongly agreed (89% to 100%) that student groups met four to six population health competencies for the VSE and HFS activities across all courses, with slightly less agreement/strong agreement (75% to 80%) that students improved outcomes through culturally competent care and facilitating connections to community resources for the patient in the unfolding pediatrics case. No difference in population health competencies was noted between VSE and HFS activity learning outcomes across courses.

**Cultural competence.** Reliabilities for the IAPCC-SV© showed excellent to good internal consistency (.93 overall, subscales .67 to .87). Students’ cultural competence increased in both fall 2016 [mean diff (SD) = 1.25 (7.62), t (df) = 2.996 (335), p = .003], and spring 2017 [mean diff (SD) = 1.64 (8.11), t (df) = 4.577 (510), p = .000]. ANOVA results showed no differences in outcomes based on ethnicity, race, gender, or course enrollment.

**Student and faculty qualitative feedback.** Four themes consistent with quantitative findings were revealed: student population health learning outcomes achievement, active/engaging collaborative learning experiences, skills gained, and faculty facilitator characteristics.

**Discussion**
Didactic VSE discussions and HFS experiences with flipped classroom pre-assignments and structured debriefing were equally effective in advancing student population health competencies. Rigorous, systematic study design enabled successful, large scale integration of population health competencies across the curriculum on all campuses. Benefits to students and faculty included: new opportunities to engage in culturally competent care in multiple settings across the continuum, collection of electronic health information to avoid care gaps, electronic health record documentation, increased understanding of big data, and a shift toward a population health focus. The clinical partner stated the realistic clinical experiences were enriched through our academic-clinical partnership and provided support to new nurses for a smoother transition to practice. Rapid cycle quality improvements were made to improve communication with students and faculty, and to address internal and external challenges (e.g., survey software and new email systems glitches).

Conclusions

Students and faculty perceived simulation based learning strategies to be effective in advancing baccalaureate students' knowledge and skills to address population health. A strong project design and widespread support led to successful student outcomes. Enhanced academic-practice partnerships aimed at ongoing, collaborative efforts to integrate population health competencies into baccalaureate curricula and future research on actual patient outcomes are needed.

Title:
Redesigning the Baccalaureate Curriculum to Address Population Health Using Simulation

Keywords:
Culturally Competent Care, Nursing Education and Patient Simulation

References:


Abstract Summary:
There is a critical need to redesign baccalaureate curricula to promote population health competencies. Improved student learning outcomes and increased population health competencies were found among 585 baccalaureate nursing students across the curriculum using high-fidelity simulation based learning activities in didactic and lab settings developed through an academic-practice partnership.

Content Outline:
I.   Introduction
   1. Aging population with increasingly complex health needs
   2. Need for shift toward improving population health outcomes
   3. Nurse competencies required to address social determinants and health disparities

II. Literature Review
   1. Critical need to redesign baccalaureate nursing curricula to address population health
   2. Faculty need to link population health to clinical practice across nursing program
   3. Strong evidence high-fidelity simulation promotes competence and readiness for practice
   4. Integrative teaching and learning methods have been suggested to foster students’ population health knowledge and skills
   5. Research is lacking regarding effective strategies to integrate population health competencies across the baccalaureate nursing curriculum

III. Theoretical Framework
   - NLN Jeffries Simulation Theory
     o Dynamic interactions between the facilitator and participant in a learner-centered, interactive, collaborative environment of trust
     o Context, background, and design preceded filming of the videotaped simulated patient encounter (VSE) and implementation of high-fidelity patient simulation (HFS) experiences with manikins and faculty/student actors
Clinical partner added significant knowledge and depth to our project team of faculty and simulation experts as we considered system (population health), patient (individual), and participant (student) outcomes.

Six population health competency based learning outcomes: delivers culturally competent care, advances self-management of chronic illnesses, facilitates transitions in care, promotes a culture of health, collects meaningful use data to address care gaps, and utilizes an electronic health record for assessment.

IV. Method

- **Setting and participants**
  - Pretest/posttest, descriptive design was used to collect data from 585 baccalaureate students and 78 faculty on three nursing school campuses of a large US public university during 2016-2017 academic year.

- **Population health simulation innovation**
  - Academic-practice partnership
  - Development of two unfolding cases across four courses
    - 82-year-old African American female with heart failure, hypertension, and diabetes
    - 9-year-old Hispanic Latino boy with chronic asthma
    - Multiple, innovative learning strategies: flipped classroom assignments, didactic VSE discussions, HFS experiences, and varied population health resources were created and implemented.

- **Population health learning outcomes**
  - Investigator developed evaluation surveys to assess student learning using a 4-point Likert scale

- **Cultural competence**
  - Assessed using electronic Inventory for Assessing the Process of Cultural Competence Among Healthcare Professions-Student Version (IAPCC-SV®)

- **Procedure**
  - University institutional review board exemption approval
  - Informed consent
  - Recruited students and faculty in fall 2016 and spring 2017 adult health I & II, pediatrics, and community courses
  - VSE pre-assignment/didactic discussion (2.5-3.5 hours) and HFS pre-assignment/experience (5-6 hours)
  - Pre/post-test IAPCC-SV and post VSE discussion/HFS evaluation surveys

V. Data Analysis

1. Descriptive statistics of sample demographics and measurement scores
2. IAPCC-SV reliability
3. Paired t-tests and analysis of variance (ANOVA)
4. Level of significance set at .05
5. Minimum of 198 students was required to set power set .80 for small effect size (.20) using a 2-tailed paired t-test (α = .05)

VI. Results

- **Sample**
  - Students were ethnically diverse (48%), predominantly female (81%) and between 20-25 years-old (61% fall 2016, 68% spring 2017)
Faculty were primarily white (59%), Asian (13%), Black/African American (12%), and female (96%) and over age 40 (55%)

100% student and 87% faculty response rates

**Population health competencies**
- Students overwhelmingly agreed/strongly agreed (90% to 100%) that they met the population health competencies for all VSE and HFS activities across all courses.
- Faculty also agreed/strongly agreed (89% to 100%) that student groups met four to six population health competencies for the VSE and HFS activities across all courses, with slightly less agreement/strong agreement (75% to 80%) that students improved outcomes through culturally competent care and facilitating connections to community resources for the patient in the unfolding pediatrics case.
- No difference in population health competencies between VSE and HFS activity learning outcomes across courses.

**Cultural competence**
- IAPCC-SV reliability .93 overall and subscales .67 to .87
- Students’ cultural competence increased in both fall 2016 [mean diff (SD) = 1.25 (7.62), t (df) = 2.996 (335), p = .003] and spring 2017 [mean diff (SD) = 1.64 (8.11), t (df) = 4.577 (510), p = .000]
- ANOVA results showed no differences in outcomes based on ethnicity, race, gender, or course enrollment.

**Student and faculty qualitative feedback**
- Revealed four themes consistent with quantitative findings: student population health learning outcomes achievement, active/engaging collaborative learning experiences, skills gained, and faculty facilitator characteristics

**VII. Discussion**

1. Didactic VSE vs. HFS experiences
2. Rigorous, systematic study design
3. Integration of population health competencies across curriculum
4. Benefits to students and faculty
5. Value added to clinical partner
6. Rapid cycle quality improvements
7. Internal and external challenges
8. Study limitations

**VIII. Conclusions**

1. Simulation based learning strategies were effective
2. Strong design and widespread support led to success
3. Future academic-practice collaboration and need for further research

First Primary Presenting Author

**Primary Presenting Author**

Ann Marie P. Mauro, PhD, RN, CNL, CNE, FAAN
Rutgers, The State University of New Jersey
School of Nursing
Assistant Dean, Professor, & Director, Center for Educational Research and Innovation
Newark NJ
USA

**Professional Experience:** Dr. Ann Marie P. Mauro is Assistant Dean, Professor, and Director for the Center for Educational Research and Innovation at Rutgers School of Nursing. A National League for
Nursing Board of Governors member and American Academy of Nursing fellow, she is a certified nurse educator and clinical nurse leader with expertise in diversity, educational policy, innovative teaching strategies and curricula. Dr. Mauro has been recognized by the Robert Wood Johnson Foundation/American Association of Colleges of Nursing with a New Careers in Nursing Innovation Award and an Above and Beyond Award, and received two New York University College of Nursing teaching awards. She has multiple peer-reviewed grants, publications, and national/international presentations. Dr. Mauro earned her BSN and MSN in nursing education from Seton Hall University, her PhD in research and theory development from New York University, and a certificate from the Wharton Nursing Leaders Program at the University of Pennsylvania.

**Author Summary:** Dr. Ann Marie P. Mauro is Assistant Dean, Professor, and Director for the Center for Educational Research and Innovation at Rutgers School of Nursing where she provides leadership for teaching excellence, interprofessional education collaborations and advancing nursing education science. A National League for Nursing Board of Governors member and American Academy of Nursing fellow, she is a certified nurse educator and clinical nurse leader with expertise in diversity, educational policy, innovative teaching strategies and curricula.

Second Secondary Presenting Author

**Corresponding Secondary Presenting Author**
Debora L. Tracey, DNP, RN, CNE
Rutgers, The State University of New Jersey
School of Nursing
Assistant Professor & Director, Center for Clinical Learning
Newark NJ
USA

**Professional Experience:** Dr. Debora L. Tracey is an Assistant Professor and Director of the Center for Clinical Learning at the Rutgers School of Nursing. She guided the integration of the simulation programs and resources with the merger of the University of Medicine and Dentistry of NJ (UMDNJ) and Rutgers, The State University of New Jersey. Debora has been instrumental in the School’s simulation space renovations and the integration of simulation-based education into the curriculum of the undergraduate and graduate programs.

**Author Summary:** Dr. Debora L. Tracey is an Assistant Professor and Director of the Center for Clinical Learning at Rutgers School of Nursing. She guided the integration of the simulation programs and resources with the merger of the University of Medicine and Dentistry of NJ and Rutgers University. Dr. Tracey has been instrumental in school simulation space renovations and integration of simulation-based education into undergraduate and graduate programs. She also assists in implementing interprofessional simulation experiences.

Third Author

Maria Torchia Lo Grippo, PhD, RN
Rutgers, The State University of New Jersey
School of Nursing
Assistant Professor & Co-Director, RN to BSN in Nursing Program
Newark NJ
USA

**Professional Experience:** Maria Torchia LoGrippo, PhD, RN, Assistant Professor and Co-Director of the RN to BSN Program at Rutgers University, Newark, N.J. was one of 10 nurses named in 2014 as recipients of the new Breakthrough Leaders in Nursing Award created by the Future of Nursing: Campaign for Action, a joint initiative of AARP and the Robert Wood Johnson Foundation.

**Author Summary:** Maria Torchia LoGrippo, PhD, RN, Assistant Professor and Co-Director of the RN to BSN Program at Rutgers University, Newark, N.J. was one of 10 nurses named in 2014 as recipients of the new Breakthrough Leaders in Nursing Award created by the Future of Nursing: Campaign for Action, a joint initiative of AARP and the Robert Wood Johnson Foundation.
Fourth Author
Sharon Anderson, DNP, NNP-BC, APNG
Rutgers, The State University of New Jersey
School of Nursing
Assistant Professor and Co-Director, RN to BS in Nursing Program
Newark NJ
USA

**Professional Experience:** Sharon Anderson, DNP, NNP-BC, APNG is Assistant Professor, Co-Director, RN to BS in Nursing Program in the Division of Entry to Baccalaureate Nursing at Rutgers School of Nursing. Dr. Anderson attended the summer Genetics Institute at the National Institutes of health and specializes in Pediatrics, neonatology, newborn screening, inborn errors of metabolism, and genetics.

**Author Summary:** Sharon Anderson, DNP, NNP-BC, APNG is Assistant Professor, Co-Director, RN to BS in Nursing Program in the Division of Entry to Baccalaureate Nursing at Rutgers School of Nursing. Dr. Anderson attended the summer Genetics Institute at the National Institutes of health and specializes in Pediatrics, neonatology, newborn screening, inborn errors of metabolism, and genetics.

Fifth Author
Angelica Bravo, MPH, MSW
Rutgers, The State University of New Jersey
School of Nursing
Research Assistant
Newark NJ
USA

**Professional Experience:** Angelica Bravo, MPH, MSW is a Research Assistant at Rutgers School of Nursing. Her professional experiences and academic coursework have emphasized administration, coordination and the monitoring and quality control of public health programs and research projects. She has gained a firm foundation in scientific and behavioral research, data and policy analysis, and evaluation, while honing my communication, presentation and organizational abilities.

**Author Summary:** Angelica Bravo, MPH, MSW is a Research Assistant at Rutgers School of Nursing. Her professional experiences and academic coursework have emphasized administration, coordination and the monitoring and quality control of public health programs and research projects. She has gained a firm foundation in scientific and behavioral research, data and policy analysis, and evaluation, while honing my communication, presentation and organizational abilities.

Sixth Author
Claire Byrne, MSN, RN, NE-BC
Rutgers, The State University of New Jersey
School of Nursing
Research Assistant, PhD Student, and Adjunct Instructor
Newark NJ
USA

**Professional Experience:** Claire J. Byrne MSN, RN, NE-BC is a Research Assistant, PhD Student, and Adjunct Instructor at Rutgers School of Nursing. Claire has had a variety of clinical nursing administrative leadership role, most recently as Assistant Vice President at Newark Beth Israel Medical Center. She is an ANCC certified nurse executive.

**Author Summary:** Claire J. Byrne MSN, RN, NE-BC is a Research Assistant, PhD Student, and Adjunct Instructor at Rutgers School of Nursing. Claire has had a variety of clinical nursing administrative leadership role, most recently as Assistant Vice President at Newark Beth Israel Medical Center. She is an ANCC certified nurse executive.

Seventh Author
Bonnie Geissler, MS, RN
RWJ Barnabas Health
Interim Acting Chief Nursing Officer, Clara Maass Medical Center and Vice-President, Perioperative and Emergency Services for RWJBarnabas Health
Short Hills NJ
USA

**Professional Experience:** Bonnie Geissler, MS, RN is Interim Acting Chief Nursing Officer, Clara Maass Medical Center and Vice-President, Perioperative and Emergency Services for RWJBarnabas Health. Bonnie has assumed multiple levels of senior nursing administration leadership, and has advanced nursing utilization of clinical information systems.

**Author Summary:** Bonnie Geissler, MS, RN is Interim Acting Chief Nursing Officer, Clara Maass Medical Center and Vice-President, Perioperative and Emergency Services for RWJBarnabas Health. Bonnie has assumed multiple levels of senior nursing administration leadership, and has advanced nursing utilization of clinical information systems.

Eighth Author
Lori Ann Escallier, PhD, RN, CPNP, FAAN
SUNY at Stony Brook
School of Nursing
Professor and Associate Dean for Assessment, Evaluation, & Outcomes
Stony Brook NY
USA

**Professional Experience:** Dr. Lori Escallier has developed and directed multiple programs. She served as Director of the Registered Nurse Baccalaureate Program from 2001 – 2008. This innovative program was one of the first distance education programs and developed into an international program that provides employed civilian registered nurses as well as registered nurses in the military with the ability to attain their baccalaureate degree. Dr. Escallier also developed graduate and post graduate programs; Child Health Nurse Practitioner Program (1998), DNP Program (2006), CE Certificate Program in Nursing Administration (2007), Masters in Nursing Administration (2007), SUNY School of Nursing Mentorship Program (2006). She has secured over nine million dollars to provide funds for underrepresented nursing students. In 2008, she received the National Health Service Corporation Leading by Example Award. In 2011, she received the coveted National Champions of Diversity Award in Washington, DC recognizing her commitment to health care and work in diversity.

**Author Summary:** Lori A. Escallier, PhD, RN, CPNP-PC, FAAN, was recently named the new Dean of the College of Nursing at SUNY Downstate Medical Center. Her innovative work developing educational engagement strategies for diverse students has been nationally recognized by the American Association of Colleges of Nursing and the Robert Wood Johnson Foundation. She has been the recipient of numerous grants totaling more than nine million dollars that have supported the academic success of underrepresented, minority students.