Application of Curriculum Mapping Concepts to Integrate Multidisciplinary Competencies in the Care of Older Adults in Graduate Nurse Practitioner Curricula

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A B S T R A C T

The number of Americans ages 65 and older is projected to more than double over the next four decades and to equal nearly one-fourth of the entire population by 2060. Recognizing that the health care workforce in the United States is not sufficiently prepared to meet the care needs of this growing population, the National Academy of Medicine has recommended curricular enhancements for health professional educational programs. To meet this challenge, the University of South Florida College of Nursing applied curriculum mapping principles and concepts to examine and align Family Nurse Practitioner and Adult-Gerontology Primary Care Nurse Practitioner program curricula for congruence with Partnership for Health in Aging multidisciplinary geriatric competencies. Through this process, we developed a geriatric-specific curriculum map and threaded geriatric-specific content, learning experiences, and learning assessment strategies to promote attainment of all 23 competencies. Given the growing role that nurse practitioners are projected to play in the delivery of primary care for older adults in the future, it is imperative that colleges and schools of nursing provide students with learning experiences to support attainment of the knowledge and skills graduates will need to care for older adults in practice. The techniques and strategies described here represent our approach.

Introduction

The remarkable and consistent aging of the United States population is expected to continue for at least four decades. Approximately 98 million individuals in the U.S., or roughly one quarter of the nation's population, will be 65 years of age or older by 2060 (Colby & Ortman, 2015). Aging in America has profound implications for all aspects of society and, most particularly, a health care workforce that is inadequately prepared to meet the unique care needs of the older adult population (Institute of Medicine [IOM], 2008). Recognizing the necessity for health care providers to exemplify skills in geriatrics and to manage age-related disease and declining function, in 2008 the IOM, now the National Academy of Medicine (NAM), recommended significant enhancements in educational curricula for health professions.

Given the key and evolving role that nurse practitioners play in the delivery of primary care for older adult patients, coupled with projected growth in the number of nurse practitioners in the United States to

244,000 by 2025 (American Association of Nurse Practitioners, 2018), it is imperative that schools and colleges of nursing develop and implement strategies to prepare graduates with the knowledge and skills required to provide high quality care for this population. Over the past decade nursing leaders and organizations have made great strides toward answering the NAM challenge. The investments and work of leaders at the American Association of Colleges of Nursing (AACN), the National Council of State Boards of Nursing (NCSBN), the National Organization of Nurse Practitioner Faculties (NONPF), the Gerontological Advance Practice Nurses Association (GAPNA), and the Hartford Institute for Geriatric Nursing are creating a pathway for nursing to answer the NAM call. At the same time, lack of academic capacity, and specifically faculty with graduate-level preparation in gerontological nursing, has been cited as the single greatest barrier to improving geriatric care within the discipline (Bednash, Mezey, & Tagliareni, 2011; Pepper, 2014).

To address these challenges at the local and regional levels, in 2014

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faculty and administrators at the University of South Florida (USF) submitted an application for funding through the Health Resources and Services Administration (HRSA) Geriatric Workforce Enhancement Program (GWEP). In 2015, the USF College of Nursing was awarded $2.24 million in funding to support faculty development and geriatric-specific learning experiences for health professions students in three USF Colleges: Medicine, Pharmacy, and Nursing.

This article describes how faculty within the College of Nursing used GWEP funding and applied principles and concepts of curriculum mapping to enhance curricula in the two graduate primary care nurse practitioner tracks. This mapping was the first step toward increasing geriatric competencies among graduates of the Family Nurse Practitioner (FNP) and the Adult-gerontology Primary Care Nurse Practitioner (AGPCNP) tracks and advancement of the larger GWEP vision for integrating geriatrics in primary care. Information on our processes and results have been organized using the Standards for Quality Improvement Reporting Excellence 2.0 (2015) beginning with an overview of background information and contextual factors that impacted this work.

Background

In response to the NAM's 2008 challenge, in December 2014, HRSA combined the geriatrics health professions training programs in Titles VII and VIII of the Public Health Service Act to establish the GWEP. This program is now the only federal initiative designed to develop a health care workforce specifically trained to care for the complex health needs of older Americans. Proven results from activities under the GWEP and its predecessor programs include an important increase in the number of teaching faculty with geriatrics expertise in a variety of health care and related disciplines, plus thousands of health care providers and family caregivers better prepared to support older Americans with complex chronic conditions (Eldercare Workforce Alliance, 2014; Hyer, 2017).

In 2015, the USF College of Nursing received a $2.24 million GWEP award. In order to meet the overarching priorities defined by HRSA (2014), local GWEP project objectives focused on faculty development, interprofessional collaboration, and providing health professions students within the USF Colleges of Medicine, Pharmacy, and Nursing with the knowledge and skills needed to integrate geriatrics in primary care practice. Faculty and GWEP project leaders recognized that baseline assessment of existing curricula was the first step toward ensuring integration of appropriate and sufficient geriatric content, learning experiences, and learning assessments for students in each of the three colleges. Recognizing the GWEP Program focus on interprofessional team work, faculty and project leaders decided that the Partnership for Health in Aging's (PHA) *Multidisciplinary Competencies in the Care of Older Adults at the Completion of the Entry-level Health Professional Degree* (PHA, 2010) would be used as the primary framework in conjunction with discipline-specific competencies and/or curriculum standards for medicine, pharmacy, and nursing respectively.

Within the College of Nursing, GWEP funding was used, to examine and enhance curricula for the FNP and the AGPCNP tracks. Both tracks are offered within the Master's and the Doctor of Nursing Practice degree programs. Curricula for these tracks were targeted based on GWEP Program emphasis on integration of geriatrics in primary care. In addition to the PHA multidisciplinary competencies, faculty used current standards developed by NONPF and AACN to guide curriculum assessment and improvement work. Relevant background information on these standards is provided below.

Multidisciplinary competencies for care of older adults

In June 2008, the American Geriatrics Society convened a meeting of 21 organizations representing healthcare professionals who care for older adults to discuss strategies for meeting the NAM challenge and the

health care needs of the nation's older population (The Partnership for Health in Aging, 2010). This meeting leads to the establishment of a new coalition—The Partnership for Health in Aging. Members of this new coalition quickly established the development of a set of core competencies in the care of older adults relevant to all health professional disciplines as their top priority and commissioned a workgroup of healthcare professionals representing 10 health care disciplines to complete this important work. Their belief in the need for a set of competencies common to all health professions recognized that older adults often require the expertise of multiple health professionals and that care outcomes can be optimized when providers work together within the context of comprehensive and coordinated care planning (Partnership for Health in Aging Workgroup on Interdisciplinary Team Training in Geriatrics, 2014).

In 2010, the PHA published *Multidisciplinary Competencies in the Care of Older Adults at the Completion of the Entry-level Health Professional Degree*. This document outlines a set of 23 core competencies that broadly define the knowledge and skills that all health professional students should attain by the time they complete entry-to-practice degree requirements. The 23 competencies are organized in six domains as illustrated in Table 1: *Health Promotion and Safety*, *Evaluation and Assessment*, *Care Planning and Coordination Across the Care Spectrum*, *Interdisciplinary and Team Care*, *Caregiver Support*, and *Healthcare Systems and Benefits*.

Nurse practitioner competencies for care of older adults

Revised competencies for FNPs and AGPCNPs were published in 2013 and 2016 respectively (National Organization of Nurse Practitioner Faculties, 2013; National Organization of Nurse Practitioner Faculties and the American Association of Colleges of Nursing, 2016). These revisions evolved in the wake of adoption and advancement of the *Consensus Model for APRN Regulation*, *Licensure*, *Accreditation*, *Certification & Education* (APRN Consensus Work Group and the National Council of State Boards of Nursing APRN Advisory Committee, 2008). Under the APRN Consensus Model, competence at the specialty level is not assessed or regulated by boards of nursing but rather by professional organizations. While geriatric-specific didactic and clinical learning experiences for students in family or adult-gerontology focused tracks have been enhanced, an untoward consequence of model advancement has been the elimination of the Gerontological Nurse Practitioner and Gerontological Clinical Nurse Specialist certification exams. Both exams were retired in 2013 effectively extinguishing an already woefully insufficient pipeline of gerontological nurse practitioner and clinical nurse specialists qualified to teach in APRN programs (GAPNA, 2015)—currently a topic of ongoing discourse among nursing leaders at the national level.

Project aims

The aims of the curriculum mapping were to (a) assess baseline integration of gerontology-specific content, learning experiences, and learning assessments in the FNP and the AGPCNP tracks within the USF College of Nursing, (b) identify gerontology-specific curricular gaps, and (c) integrate new geriatric-specific content, learning experiences, and/or learning assessments to close identified gaps.

Methods

Setting

The University of South Florida College of Nursing operates one of the largest graduate nursing programs in the United States with approximately 850 students enrolled in the Master and DNP degree programs in 2017. Nearly 100% of graduate students are Florida residents and are therefore more likely to remain in Florida following graduation.

Table 1
PHA competencies: results of gap analysis.

Domain		Objective	Curriculum content sufficient?
Health promotion and safety	1	Advocate to older adults and their caregivers interventions and behaviors that promote physical and mental health, nutrition, function, safety, social interactions, independence, and quality of life.	No
	2	Identify and inform older adults and their caregivers about evidence-based approaches to screening, immunizations, health promotion, and disease prevention.	No
	3	Assess specific risks and barriers to older adult safety, including falls, elder mistreatment, and other risks in community, home, and care environments.	Yes
	4	Recognize the principles and practices of safe, appropriate, and effective medication use in older adults.	Yes
	5	Apply knowledge of the indications and contraindications for, risks of, and alternatives to the use of physical and pharmacological restraints with older adults.	Yes
Evaluation and assessment	6	Define the purpose and components of an interdisciplinary, comprehensive geriatric assessment and the roles individual disciplines play in conducting and interpreting a comprehensive geriatric assessment.	Yes
	7	Apply knowledge of the biological, physical, cognitive, psychological, and social changes commonly associated with aging.	Yes
	8	Choose, administer, and interpret a validated and reliable tool/instrument appropriate for use with a given older adult to assess: a) cognition, b) mood, c) physical function, d) nutrition, and e) pain.	No
	9	Demonstrate knowledge of the signs and symptoms of delirium and whom to notify if an older adult exhibits these signs and symptoms.	Yes
	10	Develop verbal and nonverbal communication strategies to overcome potential sensory, language, and cognitive limitations in older adults.	Yes
Care planning and coordination across the care spectrum (including end-of-life care)	11	Develop treatment plans based on best evidence and on person-centered and directed care goals.	Yes
	12	Evaluate clinical situations where standard treatment recommendations, based on best evidence, should be modified with regard to older adults' preferences and treatment/care goals, life expectancy, co-morbid conditions, and/or functional status.	No
	13	Develop advanced care plans based on older adults' preferences and treatment/care goals, and their physical, psychological, social, and spiritual needs.	No
	14	Recognize the need for continuity of treatment and communication across the spectrum of services and during transitions between care settings, utilizing information technology where appropriate and available.	No
Interdisciplinary and team care	15	Distinguish among, refer to, and/or consult with any of the multiple healthcare professionals who work with older adults, to achieve positive outcomes.	No
	16	Communicate and collaborate with older adults, their caregivers, healthcare professionals, and direct-care workers to incorporate discipline-specific information into overall team care planning and implementation.	Yes
Caregiver support	17	Assess caregiver knowledge and expectations of the impact of advanced age and disease on health needs, risks, and the unique manifestations and treatment of health conditions.	Yes
	18	Assist caregivers to identify, access, and utilize specialized products, professional services, and support groups that can assist with care-giving responsibilities and reduce caregiver burden.	No
	19	Know how to access and explain the availability and effectiveness of resources for older adults and caregivers that help them meet personal goals, maximize function, maintain independence, and live in their preferred and/or least restrictive environment.	No
	20	Evaluate the continued appropriateness of care plans and services based on older adults' and caregivers' changes in age, health status, and function; assist caregivers in altering plans and actions as needed.	Yes
Healthcare systems and benefits	21	Serve as an advocate for older adults and caregivers within various healthcare systems and settings.	No
	22	Know how to access and share with older adults and their caregivers information about the healthcare benefits of programs such as Medicare, Medicaid, Veterans' services, Social Security, and other public programs.	No
	23	Provide information to older adults and their caregivers about the continuum of long-term care services and supports – such as community resources, home care, assisted living facilities, hospitals, nursing facilities, sub-acute care facilities, and hospice care.	No

Partnership for Health in Aging (2010) Multidisciplinary Competencies in the Care of Older Adults at the Completion of the Entry-level Health Professional Degree available online at https://www.americangeriatrics.org/sites/default/files/inline-files/Multidisciplinary_Competencies_Partnership_HealthinAging_1.pdf

All clinical programs within the College of Nursing are accredited by the Commission on Collegiate Nursing Education. Nurse practitioner tracks also meet NONPF *Criteria for Evaluation of Nurse Practitioner Programs* (National Task Force on Quality Nurse Practitioner Education, 2016).

Within the College, four nurse practitioner tracks are available to students in the Master's Program and to post-baccalaureate students in the Doctor of Nursing Practice Program (i.e., BS-DNP students). In addition to the FNP and the AGPCNP tracks, Pediatric Primary Care and Adult-Gerontology Acute Care nurse practitioner tracks are also offered.

While the curriculum requirements specific to entry-level nurse practitioner preparation are identical for students in both degree programs, post-baccalaureate students in the DNP Program complete additional course work and learning experiences in order to also meet *The Essentials of Doctoral Education for Advanced Nursing Practice* (AACN, 2006).

Like many schools and colleges of nursing across the country, the USF College of Nursing has faced significant barriers in the recruitment of faculty with geriatric certification and/or the scope and depth of expertise needed to optimize geriatric-specific learning experiences for

Table 2
Geriatric content integration matrix: PHA domains 1 and 2.

Domain	Competency description	Adult-gerontology primary care nurse practitioner competencies	Course number(s)	Course title(s)	Title of content or curricular element(s)	Reference or source	Student Learning Outcome Assessment or Evaluation Strategies
Domain 1: health promotion and safety							
1	Advocate to older adults and their caregivers interventions and behaviors that promote physical and mental health, function, safety, social interactions, independence, and quality of life.	Promotes safety and risk reduction through the use of interventions such as devices to promote mobility and prevent falls, cognitive and sensory enhancements, restraint free care, reduced catheter use	NGR6002C	Advanced Health Assessment	Assistive Devices Presentation	https://www.pogoe.org/sites/default/files/AngelUploads/applications/astdevice/AstDevice.html	Completion of assistive devices presentation. Case study discussion board class presentation, evaluation of care in clinical site, and multiple choice exam
2	Identify and inform older adults and their caregivers about evidence based approaches to screening, immunizations, health promotion, and disease prevention.	Develops, implements, and evaluates age-appropriate health screening and health promotion programs.	NGR 6207C	Health Management of Adults and Older Adults I	Medicare Wellness Exam	https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/AWV_chart_ICN905706.pdf	Perform a mock wellness visit
			NGR6244C	Health Management of Adults and Older Adults II	Gerontology Case Study -Immunizations Clinical practicum with geriatric patients	Boltz, M., Capezuti, E., Fulmer, T.T. & Zwicker, D. (Eds.). (2016). Evidence- based geriatric nursing protocols for best practice (5th ed.). Springer, New York. Buttaro, T.M, Trybulski, J.,Polgar-Bailey, P., & Sandberg-Cook, J. (2016). Primary Care: A Collaborative Approach (5th ed). Elsevier/ Mosby, St. Louis, Missouri. https://pogoe.org/sites/default/files/Immunizations_1.pdf	Case study; Class presentation in class Evaluation of care in clinical site; multiple choice exam
			NGR6291C	Health Management of Adults and Older Adults III	Gerontology Case Study- Palliative Care Clinical practicum with geriatric patients	Buttaro, T.M, Trybulski, J.,Polgar-Bailey, P., & Sandberg-Cook, J. (2016). Primary Care: A Collaborative Approach (5th ed). Elsevier/ Mosby, St. Louis, Missouri. http://apps.nursing.uw.edu/grants/hrsa/palliative-care/index.html	Complete Palliative Care Case study in discussion board Case Study Class presentation Evaluation of care in clinical site multiple choice exam
3	Assess specific risks and barriers to older adult safety, including falls, elder mistreatment, and other risks in community, home, and care environments.	Assesses for syndromes and constellations of symptoms that may be manifestations of other common health problems (e.g., risk taking behaviors, self-injury, stress, incontinence, falls, delirium or depression	NGR6244C	Health Management of Adults and Older Adults II	Gerontology Case Study-Delirium and Dementia Clinical practicum with geriatric patients	Boltz, M., Capezuti, E., Fulmer, T.T. & Zwicker, D. (Eds.). (2016). Evidence- based geriatric nursing protocols for best practice (5th ed.). Springer, New York. Buttaro, T.M, Trybulski, J, Polgar-Bailey, P., & Sandberg-Cook, J. (2016). Primary Care: A Collaborative Approach (5th ed). Elsevier/ Mosby, St. Louis, Missouri. https://pogoe.org/sites/default/files/Azusa_Pacific_Care_of_Older_Adults_CaseStudy.pdf	Completion of Delirium and Dementia activity in Discussion Board Case Study Class presentation Evaluation of care in clinical site multiple choice exam
			NGR6291C	Health Management of Adults and Older Adults III	Gerontology Case Study Clinical practicum with geriatric patients	Buttaro, T.M, Trybulski, J.,Polgar-Bailey, P., & Sandberg-Cook, J. (2016). Primary Care: A Collaborative Approach (5th ed). Elsevier/ Mosby, St. Louis, Missouri.	Case Study Class presentation Evaluation of care in clinical site multiple choice exam

Table 2 (*continued*)

Domain	Competency description	Adult-gerontology primary care nurse practitioner competencies	Course number(s)	Course title(s)	Title of content or curricular element(s)	Reference or source	Student Learning Outcome Assessment or Evaluation Strategies
4	Recognize the principles and practices of safe, appropriate, and effective medication use in older adults.	Prescribes medications with particular attention to high potential for adverse drug outcomes and polypharmacy in vulnerable populations including…older adults.	NGR 6172	Pharmacology for Advance Nurse Practitioners	Modules presented across the lifespan considerations	Woo, T. & Robinson, M. (2015). Pharmacotherapeutics for advanced practice nurse prescribers. (4th ed). FA Davis, Philadelphia, PA.	Multiple choice exam
5	Apply knowledge of the indications and contraindications for risks of, and alternatives to the use of physical and pharmacological restraints with older adults.	Promotes safety and risk reduction through the use of interventions such as devices to promote mobility and prevent falls, cognitive and sensory enhancements, restraint free care, reduced catheter use	NGR6291C	Health Management of Adults and Older Adults III	Gerontology Case Study Clinical practicum with geriatric patients	Buttaro, T.M, Trybulski, J.,Polgar-Bailey, P., & Sandberg-Cook, J. (2016). Primary Care: A Collaborative Approach (5th ed). Elsevier/ Mosby, St. Louis, Missouri.	Case Study Class presentation Evaluation of care in clinical site multiple choice exam
Domain 2: evaluation and assessment							
1	Define the purpose and components of an interdisciplinary, comprehensive geriatric assessment and the roles individual disciplines play in conducting and interpreting a comprehensive geriatric assessment.	Assesses individuals with complex health issues and co-morbidities; Obtains information from collateral sources; synthesizes data from a variety of sources to inform clinical decision making; Provides leadership to facilitate planning and delivery of care by health care teams; Directs and collaborates with …caregivers and professional staff to achieve optimal care outcomes.	NGR6002C	Advanced Health Assessment Across the Lifespan	System examinations across the Lifespan Lab Problem Based Learning exercise Shadow Health Geriatric Case Module	Bickley, L. & Szilagyi, P.(2013). Bates' Guide to Physical Examination and History Taking. 11th ed. Wolters Kluwer: Lipincott Williams & Wilkins	Lab discussion and presentation OSCE Shadow Health Module- Abdominal Case Study
			NGR 6291C	Health Management of Adults and Older Adults III	Gerontology Case Study Clinical practicum with geriatric patients	Buttaro, TM; Trybulski, J; Bailey, PP, Sandbery-Cook, J (2014). Primary Care: A Collaborative Practice (4th ed), St. Louis: Elsevier.	Case Study Class presentation Evaluation of care in clinical site multiple choice exam
2	Apply knowledge of the biological, physical, cognitive, psychological, and social changes commonly associated with aging.	Differentiates between normal and abnormal changes associated with development and aging.	NGR 6207C	Health Management of Adults and Older Adults I	Gerontology Case Study Clinical practicum with geriatric patients	Buttaro, T.M, Trybulski, J.,Bailey, P-P, & Sandberg-Cook, J. (2013). Primary Care: A Collaborative Approach (4th ed). Elsevier/ Mosby, St. Louis, Missouri.	Case Study Class presentation Evaluation of care in clinical site multiple choice exam
			NGR 6244C	Health Management of Adults and Older Adults II	Gerontology Case Study Clinical practicum with geriatric patients	Boltz, M., Capezuti, E, Fulmer, T.T., Zwicker, D., & O'Meara, A. (Eds.). (2012). Evidence- based geriatric nursing protocols for best practice (4th ed.). Springer, New York. Buttaro, T.M, Trybulski, J.,Bailey, P-P, & Sandberg-Cook, J. (2013). Primary Care: A Collaborative Approach (4th ed). Elsevier/ Mosby, St. Louis, Missouri.	Case Study Class presentation Evaluation of care in clinical site multiple choice exam
			NGR 6291C	Health Management of Adults and Older Adults III	Gerontology Case Study Clinical practicum with geriatric patients	Buttaro, TM; Trybulski, J; Bailey, PP, Sandberg-Cook, J (2014). Primary Care: A Collaborative Practice (4th ed), St. Louis: Elsevier.	Case Study Class presentation Evaluation of care in clinical site multiple choice exam

Table 2 (*continued*)

Domain	Competency description	Adult-gerontology primary care nurse practitioner competencies	Course number(s)	Course title(s)	Title of content or curricular element(s)	Reference or source	Student Learning Outcome Assessment or Evaluation Strategies
3	Choose, administer, and interpret a validated and reliable tool/instrument appropriate for use with a given older adult to assess: a) cognition, b) mood, c) physical function, d) nutrition, and e) pain.	Assesses health promotion needs, social support and physical and mental status using age, gender, and culturally appropriate standardized assessment instruments or processes in relationship to…cognition, pain, nutrition, quality of life, …	MGR6002C	Health Assessment	Geriatric Case Study	GNRS AGS Slides on Assessment	Lab discussion and presentation OSCE Shadow Health Module- Abdominal Case Study
4	Demonstrate knowledge of the signs and symptoms of delirium and whom to notify if an older adult exhibits these signs and symptoms.	Assesses for syndromes and constellations of symptoms that may be manifestations of other common health problems (e.g., risk taking behaviors, self-injury, stress, incontinence, falls, delirium or depression	NGR 6244C	Health Management of Adults and Older Adults II	System examinations across the Lifespan Lab Problem Based Learning exercise Shadow Health Geriatric Case Module	Boltz, M., Capezuti, E., Fulmer, T.T., Zwicker, D., & O'Meara, A. (Eds.). (2012). Evidence- based geriatric nursing protocols for best practice (4th ed.). Springer, New York. Buttaro, T.M, Trybulski, J.,Bailey, P.P, & Sandberg-Cook, J. (2013). Primary Care: A Collaborative Approach (4th ed). Elsevier/ Mosby, St. Louis, Missouri.	Case Study Class presentation Evaluation of care in clinical site multiple choice exam
			NGR 6291C	Health Management of Adults and Older Adults III	Gerontology Case Study Clinical practicum with geriatric patients	Buttaro, TM; Trybulski, J; Bailey, PP, Sandbery-Cook, J (2014). Primary Care: A Collaborative Practice (4th ed), St. Louis: Elsevier.	Case Study Class presentation Evaluation of care in clinical site multiple choice exam
5	Develop verbal and nonverbal communication strategies to overcome potential sensory, language, and cognitive limitations in older adults.	Provides support through effective communication and therapeutic relationships with individuals, families, and caregivers facing complex physical and/or psychosocial challenges; Adapts teaching-learning approaches based on physiological and psychological changes, age, developmental stage, …environment, and resources.	NGR6002C	Advanced Health Assessment Across the Lifespan	System examinations across the Lifespan Lab Problem Based Learning exercise Shadow Health Geriatric Case Module	Bickley, L. & Szilagyi, P.(2013). Bates' Guide to Physical Examination and History Taking. 11th ed. Wolters Kluwer: Lippincott Williams & Wilkins	Lab discussion and presentation OSCE Shadow Health Module- Abdominal Case Study
			NGR 6291C	Health Management of Adults and Older Adults III	Gerontology Case Study Clinical practicum with geriatric patients	Buttaro, TM; Trybulski, J; Bailey, PP, Sandbery-Cook, J (2014). Primary Care: A Collaborative Practice (4th ed), St. Louis: Elsevier.	Case Study Class presentation Evaluation of care in clinical site multiple choice exam

nurse practitioner students. The GWEP Grant provided a unique opportunity for nurse practitioner faculty to collaborate with and to learn from nationally recognized faculty with geriatric expertise from the College of Medicine, the College of Pharmacy, and the School of Aging Studies. The GWEP Grant also-supported visiting faculty who provided USF faculty with development lectures, geriatric curriculum, and consultations across the USF residency and health professions programs. Materials from the American Geriatrics Society, including geriatric-specific teaching materials and slide presentations on numerous topics germane to the specialty of geriatrics, were also purchased as part of the GWEP program. Finally, faculty attended national geriatric meetings to enhance their knowledge and confidence in teaching geriatric content.

Procedures

The Plan-Do-Study-Act (PDSA) quality improvement model guided project development and implementation. The model represents a series of structured activities organized cyclically in four phases to conduct repetitive tests of change in rapid sequence. Within the context of the GWEP grant, the PDSA was specifically identified as the preferred model for program assessment and improvement (HRSA, 2014). Key tasks and project deliverables were organized around three phases: *planning*, *gap analysis*, and *curricular element integration to close gaps*. For the purpose of this discussion, the term *curricular element(s)* includes curriculum content, learning experiences, and learning assessment strategies.

Planning

During an initial project planning meeting we developed a performance improvement project charter document delineating project goals and objectives, scope of work, indicators of success, key steps or tasks, deliverables, team participants and roles and responsibilities. Project faculty identified *curriculum mapping* as the preferred strategy for assessing and improving curricula.

Rationale: curriculum mapping

Theoretical models that guide curriculum analysis and evaluation traditionally provide conceptualization of curricula in three dimensions: the *intended curriculum* reflects regulatory, institution, and program requirements, the *implemented curriculum* refers to the educational processes which occur within the institution, and the *learned* curriculum includes student learning outcomes attained as a result of the learning experiences provided. Periodic examination of the alignment among these three domains is essential to the success of academic programs. Curriculum mapping can be used to identify potential deficiencies in a curriculum, to guide integration of curricular content and learning experiences to close gaps, and to promote attainment of targeted learning outcomes (Jacobs & Johnson, 2009; Plaza, Draugalis, Slack, Skrepnek, & Sauer, 2007).

Curriculum mapping is a process that involves the creation of tables, flow charts, or textual information and provides a visual representation of the relationship among various elements (i.e., content, learning experiences, and learning assessments) of a curriculum (Ervin, Carter, & Robinson, 2013). The resulting products can be configured to provide tangible evidence of alignment between course-level curricular elements and the larger program or organizational goals (Jacobs & Johnson, 2009). For example, the Accreditation Council for Pharmacy Education (2016) requires Doctor of Pharmacy academic programs to provide evidence of curricular content and experiential education mapping for individual courses.

Gap analysis procedures

Six graduate-level courses were targeted for examination based on relevance to project objectives: Advanced Health Assessment, Advanced Diagnostics and Procedures, Pharmacology for Advanced Practice Nursing, and three clinical management courses required for FNP and AGPCNP students. A Microsoft® Excel® template was created and used to organize, document, and analyze the results of a curriculum gap analysis.

As illustrated in Table 2, within the Excel® template, information was organized using eight column headers on the horizontal axis: *PHA Domain, Competency Description, Adult-Gerontology Primary Care Competencies, Course Number, Course Title, Description of Course or Curricular Element, Reference or Source,* and *Student Learning Outcome Assessment or Evaluation Strategy*. Because of the significant overlap of the geriatric-specific nurse practitioner competencies for FNP and AGPCNP nurse practitioners, competency information was collapsed into a single category under the AGPC label. The six primary PHA competency domains were organized on the vertical axis to create section header rows. Competency statements for all items in each domain were then organized on individual rows immediately following the corresponding section header. This design allowed rapid and intuitive visual analysis and identification of gaps across all PHA domains and courses.

Gap analysis work was completed in two phases with collaboration from course faculty leads. First, we cross-walked and reconciled PHA and NONPF/AACN competencies to identify similarities and differences. Next, course syllabi and curricular elements were cross-walked and reconciled to examine alignment with PHA and corresponding NONPF/AACN competencies. The results are described Results section below.

Gap closure procedures

Following completion of the gap analysis, the Excel® template guided integration of geriatric curricular elements into individual courses, addressed identified gaps, and generated a comprehensive geriatric specific curriculum map for the FNP and AGPCNP programs. Ongoing collaboration and discussion ensued among academic and clinical experts facilitated by the GWEP and faculty course leads for each of the six courses targeted for assessment and improvement. Decisions regarding integration of specific curricular elements, and assessment or evaluation of corresponding student learning outcomes, to close identified gaps were negotiated but based on congruence with course objectives, student learning outcomes, and the topical outlines for individual courses as delineated in the respective course syllabi.

Early steps in the curricular element integration phase included identification of a collection of evidence-based low- or no-cost resources and references from which required readings, learning modules, videos, interactive case studies and images could be used. The rationale for this approach was based on considerations relevant to quality of integrated materials and workload mitigation for faculty involved in the geriatric curricular enhancement project. A summary of key resources is presented in Table 3. These include the Hartford Institute for Geriatric Nursing's *e-Learning Primary Care for Older Adults* clinical training modules (https://consultgeri.org/education-training/e-learning-resources/pcoa-pcp), *The Portal of Geriatrics Online Education* (POGOe; https://www.pogoe.org/), the *Geriatric Nursing Review Syllabus: A Core Curriculum in Advanced Practice Geriatric Nursing* (Resnick, 2016) and companion teaching slides (https://geriatricscareonline.org/ProductAbstract/gnrs-teaching-slides/S002/). When and where possible, curricular elements were selected and derived from existing course materials in order to contain costs for students and to minimize risk of content overload in individual courses.

Results

Gap analysis results

The organization of data on the Excel® template provided for accurate and rapid visual assessment of alignment between PHA

Table 3
Key resources.

Textbooks	
	Bickley, L. (2016). Bates' guide to physical examination and history taking (12th ed.). Philadelphia, PA: Wolters Kluwer.
	Boltz, M., Capezuti, E., Fulmer, T.T. & Zwicker, D. (Eds.). (2016). Evidence- based geriatric nursing protocols for best practice (5th ed.). Springer, New York.
	Buttaro, T.M, Trybulski, J,.Polgar-Bailey, P., & Sandberg-Cook, J. (2016). Primary Care: A Collaborative Approach (5th ed.). Elsevier/Mosby, St. Louis, Missouri.
	Shi, L. & Singh, D. A. (2015) Delivering healthcare in America: A systems approach (6th ed.). Burlington, MA: Jones& Bartlett.
	Resnick, B. (2016). Geriatric review Syllabus (5th ed.). New York, NY: American Geriatrics Society.
	Woo, T. & Robinson, M. (2015). Pharmacotherapeutics for advanced practice nurse prescribers. (4th ed) FA Davis, Philadelphia, PA.
Online resources	
Center for Medicare Services	https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/AWV_chart_ICN905706.pdf
Geriatrics Care Online	https://geriatricscareonline.org
Hartford Institute for Geriatric Nursing Consult Geri	https://consultgeri.org/education-training/e-learning-resources
Institute for Healthcare Improvement	http://www.ihi.org
POGOe	https://www.pogoe.org

competencies and NONPF/AACN older-adult competencies for FNPs and AGPCNPs. An illustrative example based on PHA Domains 1 and 2 is shown in Table 2. As gauged by College of Nursing faculty, the competencies as defined within the three sets of standards were highly congruent.

For the purpose of identifying curricular gaps, the term *gap* was applied to describe those instances in which curricular elements necessary for attainment of a specific PHA competency were gauged by faculty to be missing or insufficient. Gaps were identified in 12 of the 23 PHA competency areas as shown in Table 1. The largest number of gaps were identified in the *Care Planning and Coordination Across the Care Spectrum* and *Healthcare Systems and Benefits* domains with three of four competencies and three of three competencies respectively not sufficiently addressed in the curriculum as gauged by project and program faculty.

Gap closure results

Results of the gap analysis were used to close identified gaps. Curricular elements, including content, learning experiences, and assessment and evaluation strategies, were identified and successfully integrated across the six courses targeted for improvement. Table 2 provides an illustrative example for PHA Domains 1 and 2. An example of integration of geriatric-specific content within an individual course, *NGR 6207C Health Management of Adults and Older Adults I*, is provided in Table 4. The selection and integration of individual curricular elements was based on congruence with course objectives, student learning outcomes, and existing topical outlines documented in the respective course syllabi. The inclusion of *lifespan* and *age-related* language qualifiers associated with major course elements allowed for integration within the boundaries of existing course syllabi language and no modifications to existing course syllabi were required in order to address all PHA competency gaps. At the conclusion of this work, a geriatric content-specific curriculum map was effectively created for the FNP and AGPCNP programs—illustrating precisely how and where content, learning experiences, and learning assessments were situated within courses and within the larger curriculum.

Discussion

Given the key role that nurse practitioners will play in meeting the health care needs of the older adult population in the United States over the next four decades, and the recognized shortage of advanced practiced nurses with the geriatric expertise and certification, it is imperative that schools and colleges of nursing continue working to

identify local solutions to ensure that graduates of nurse practitioner programs are armed with the knowledge and skills required to care for older adults—including members of the often frail oldest-old population. In this paper, we describe how faculty at the USF College of Nursing applied a quality improvement model and principles and concepts of curriculum mapping to identify and address gaps in geriatric content in two graduate primary care nurse practitioner tracks. Attainment of these project goals are a requisite step toward increasing PHA and NONPF/AACN defined geriatric-specific competencies among program graduates.

Using the PDSA quality improvement model to guide our work, we developed an Excel® spreadsheet template which was used iteratively to complete project work in three phases beyond an initial planning phase. First, we mapped and examined PHA multidisciplinary competencies for congruence with NONPF/AACN competencies. Once congruence was confirmed, we mapped FNP and AGPCNP curricular and syllabi elements and used visual analysis to identify gaps in curriculum content, learning experiences, and learning assessments needed for attainment of PHA multidisciplinary competencies. Once gaps were clearly identified, we integrated high quality teaching materials available in the public domain, including POGOe and the Hartford Institute for Geriatric Nursing e-Learning Primary Care for Older Adults clinical training modules, to close gaps identified in 11 of the 23 PHA categories. This approach allowed us to horizontally and vertically thread content, learning activities, and learning assessment strategies across the entire curriculum and to close gaps identified during the curriculum assessment phase of our work.

Project team members identified two factors that were key to project success. First, several members of the faculty team had previous experience with curriculum mapping and, thus, knowledge of the basic process. Second, at project completion project team members reported that the opportunity for interdisciplinary collaboration with faculty from other USF Colleges and expert geriatricians engaged through the GWEP Project resulted in increased knowledge of geriatrics and geriatric-resources to support teaching within the College of Nursing.

Curriculum mapping is a systematic and highly effective method for examining and promoting alignment among the *intended*, *implemented*, and *learned* curricula; such examination is essential to the attainment of academic program goals and learning outcomes. Mapping also promotes efficiency in program development and delivery. It provides for identification of unintended redundancy or overlap of curricular elements across courses and creates time and space needed for other material and learning experiences. Despite these benefits, a limited number of published reports on the application of curriculum mapping in nursing suggest that it has not been widely adopted or leveraged

Table 4
Geriatric content integration: NGR 6207C health management of adults and older adults.

Competency description	Adult-gerontology primary care nurse practitioner competencies	Title of content or curricular element(s)	Reference or source (title of text, name of learning activity, Internet site, professional organization, etc.)	Student learning activities
Domain 1: health promotion and safety				
Identify and inform older adults and their caregivers about evidence-based approaches to screening, immunizations, health promotion, and disease prevention.	Develops, implements, and evaluates age-appropriate health screening and health promotion programs.	Medicare Wellness Exam	https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/AWV_chart_ICN905706.pdf	Perform a mock wellness visit Class presentation Evaluation of care in clinical site Multiple choice exam
Domain 2: evaluation and assessment				
Apply knowledge of the biological, physical, cognitive, psychological, and social changes commonly associated with aging.	Differentiates between normal and abnormal changes associated with development and aging.	Gerontology Case Study -Urinary Incontinence Clinical practicum with geriatric patients	Boltz, M., Capezuti, E., Fulmer, T.T. & Zwicker, D. (Eds.). (2016). Evidence- based geriatric nursing protocols for best practice (5th ed.). Springer, New York. Buttaro, T.M, Trybulski, J.,Polgar-Bailey, P., & Sandberg-Cook, J. (2016). Primary Care: A Collaborative Approach (5th ed). Elsevier/Mosby, St. Louis, Missouri. https://www.nia.nih.gov/health/urinary-incontinence-older-adults	Case Study-In class activity Class presentation Evaluation of care in clinical site Multiple choice exam
Domain 3: care planning and coordination across the care spectrum including end-of-life care				
Develop treatment plans based on best evidence and on person-centered and directed care goals.	Adapts intervention to meet the complex needs of individuals and families arising from aging, developmental/life transitions, multiple system problems, psychosocial, and financial issues.	Geriatric Class Presentation Clinical practicum with geriatric patients	Boltz, M., Capezuti, E., Fulmer, T.T. & Zwicker, D. (Eds.). (2016). Evidence- based geriatric nursing protocols for best practice (5th ed.). Springer, New York. Buttaro, T.M, Trybulski, J.,Polgar-Bailey, P., & Sandberg-Cook, J. (2016). Primary Care: A Collaborative Approach (5th ed). Elsevier/Mosby, St. Louis, Missouri.	Class presentation Evaluation of care in clinical site Multiple choice exam
Evaluate clinical situations where standard treatment recommendations, based on best evidence, should be modified with regard to older adults' preferences and treatment/care goals, life expectancy, co-morbid conditions, and/or functional status.	Adapts intervention to meet the complex needs of individuals and families arising from aging, developmental/life transitions, multiple system problems, psychosocial, and financial issues.	Gerontology Video Activity-The Space Between Clinical practicum with geriatric patients	Boltz, M., Capezuti, E., Fulmer, T.T. & Zwicker, D. (Eds.). (2016). Evidence- based geriatric nursing protocols for best practice (5th ed.). Springer, New York. Buttaro, T.M, Trybulski, J.,Bailey, P-P, & Sandberg-Cook, J. (2013). Primary Care: A Collaborative Approach (4th ed). Elsevier/Mosby, St. Louis, Missouri. http://thespacebetweendoc.com/	Discussion Board about video Class presentation Evaluation of care in clinical site Multiple choice exam
Domain 4: interdisciplinary and team care				
Distinguish among, refer to, and/or consult with any of the multiple healthcare professionals who work with older adults, to achieve positive outcomes.	Assesses individuals with complex health issues and co-morbidities; Obtains information from collateral sources; synthesizes data from a variety of sources to inform clinical decision making; Provides leadership to facilitate planning and delivery of care by health care teams; Directs and collaborates with ...caregivers and professional staff to achieve optimal care outcomes.	Clinical practicum with geriatric patients	Buttaro, T.M, Trybulski, J.,Polgar-Bailey, P., & Sandberg-Cook, J. (2016). Primary Care: A Collaborative Approach (5th ed). Elsevier/Mosby, St. Louis, Missouri.	SOAP note Evaluation by clinical site preceptor
Communicate and collaborate with older adults, their caregivers, healthcare professionals, and direct-care workers to incorporate discipline-specific information into overall team care planning and implementation.	Assesses individuals with complex health issues and co-morbidities; Obtains information from collateral sources; synthesizes data from a variety of sources to inform clinical decision making; Provides leadership to facilitate planning and delivery of care by health care teams; Directs and collaborates with ...caregivers and professional staff to achieve optimal care outcomes.	Clinical practicum with geriatric patients	Buttaro, T.M, Trybulski, J.,Polgar-Bailey, P., & Sandberg-Cook, J. (2016). Primary Care: A Collaborative Approach (5th ed). Elsevier/Mosby, St. Louis, Missouri.	SOAP note Evaluation by clinical site preceptor
Domain 5: caregiver support				

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Table 4 (*continued*)

Competency description	Adult-gerontology primary care nurse practitioner competencies	Title of content or curricular element(s)	Reference or source (title of text, name of learning activity, Internet site, professional organization, etc.)	Student learning activities
Assess caregiver knowledge and expectations of the impact of advanced age and disease on health needs, risks, and the unique manifestations and treatment of health conditions.	Collaborates with the individual, family, and caregivers in the development of appropriate intervention.	Case Study-Assessing and Counseling Older Drivers; Clinical practicum with geriatric patients	https://geriatricscareonline.org/ProductAbstract/clinician's-guide-to-assessing-and-counseling-older-drivers/B022	In class case study; Class presentation; Evaluation of care in clinical site; Multiple choice exam
Know how to access and explain the availability and effectiveness of resources for older adults and caregivers that help them meet personal goals, maximize function, maintain independence, and live in their preferred and/or least restrictive environment	Collaborates with the individual, family, and caregivers in the development of appropriate intervention; Assists individuals, their families, and caregivers to navigate transitions and negotiate care across healthcare delivery systems.	Case Study-An Extended Stay	http://www.ihi.org/education/IHIOpenSchool/resources/Pages/Activities/CaseStudyAnExtendedStay.aspx Boltz, M., Capezuti, E., Fulmer, T.T. & Zwicker, D. (Eds.). (2016). Evidence- based geriatric nursing protocols for best practice (5th ed.). Springer, New York. Buttaro, T.M, Trybulski, J.,Bailey, P-P, & Sandberg-Cook, J. (2013). Primary Care: A Collaborative Approach (4th ed.). Elsevier/Mosby, St. Louis, Missouri.	Discussion Board about video; Class presentation; Evaluation of care in clinical site; Multiple choice exam
Evaluate the continued appropriateness of care plans and services based on older adults' and caregivers' changes in age, health status, and function; assist caregivers in altering plans and actions as needed.	Modifies plan of care and treatment as needed based on evaluation.	Clinical practicum with geriatric patients	Buttaro, T.M, Trybulski, J.,Bailey, P-P, & Sandberg-Cook, J. (2013). Primary Care: A Collaborative Approach (4th ed.). Elsevier/Mosby, St. Louis, Missouri.	SOAP note; Evaluation by clinical site preceptor
Domain 6: healthcare systems and benefits				
Know how to access, and share with older adults and their caregivers, information about the healthcare benefits of programs such as Medicare, Medicaid, Veterans' services, Social Security, and other public programs.	Demonstrates knowledge of the services provided by type and level of care across health care settings; Applies knowledge of regulatory processes and principles of payer systems to the planning and delivery of health care services.	Clinical practicum with geriatric patients	Buttaro, T.M, Trybulski, J.,Bailey, P-P, & Sandberg-Cook, J. (2013). Primary Care: A Collaborative Approach (4th ed.). Elsevier/Mosby, St. Louis, Missouri.	SOAP note; Evaluation by clinical site preceptor
Provide information to older adults and their caregivers about the continuum of long-term care services and supports – such as community resources, home care, assisted living facilities, hospitals, nursing facilities, sub-acute care facilities, and hospice care.	Demonstrates knowledge of the services provided by type and level of care across health care settings.	Financial Challenges Facing Low-Wealth Older Adults	http://courses.cme.uab.edu/mod/lesson/view.php?id = 916 Boltz, M., Capezuti, E., Fulmer, T.T. & Zwicker, D. (Eds.). (2016). Evidence- based geriatric nursing protocols for best practice (5th ed.). Springer, New York. Buttaro, T.M, Trybulski, J.,Polgar-Bailey, P., & Sandberg-Cook, J. (2016). Primary Care: A Collaborative Approach (5th ed.). Elsevier/Mosby, St. Louis, Missouri.	Discussion Board about video; Class presentation; Evaluation of care in clinical site; Multiple choice exam

among colleges and schools of nursing. Key challenges include the amount of time associated with development of mapping templates, examination of existing course syllabi and curricular elements, and workload impacts for individual course instructors involved in course development and delivery. Work on the project described here was completed over the course of three semesters and supported with GWEP funding. Despite these challenges, we gauge the precision and accuracy of the results obtained through application of curriculum mapping concepts to be unparalleled as a technique for ensuring full integration of geriatric-specific content, learning experiences, and learning assessments in nurse practitioner curricula.

Through this process, we effectively created a *geriatric-content specific curriculum map* for the FNP and AGPCNP tracks within the USF College of Nursing. The strategies applied are transferrable and can be used to promote full horizontal and vertical integration of geriatric-specific curricular elements in nursing programs at the baccalaureate and graduate levels. We integrated geriatric-focused curricular content, learning experiences, and learning assessments into core nurse practitioner sequence courses taken by all nurse practitioner students, including the Advanced Health Assessment, Advanced Diagnostics and Procedures, and Pharmacology for Advanced Practice Nursing courses. As a result, students in all nurse practitioner tracks, including the Adult-gerontology Acute Care Nurse Practitioner track, will have increased opportunities to develop geriatric-specific knowledge and competencies during the first year of the program and prior to the start of clinical training. For program graduates, potential benefits beyond those associated with optimizing care for older adult patients include linking care processes to achieving quality standards including Health Effectiveness Data and Information Set and Centers for Medicare and Medicaid Services quality measures and associated payment incentives under the Medicare Access and CHIP Reauthorization Act of 2015 and similar pay-for-performance payer programs.

Attainment of project goals is also important to the local and regional health systems in Florida. The USF College of Nursing operates one of the largest graduate nursing programs in the nation with approximately 200 nurse practitioner graduates annually. Nearly 100% of nurse practitioner students reside in one of four regions within the extended Tampa Bay region and are likely to be employed in health systems within these catchment areas following graduation.

Limitations of this work include implementation in the FNP and AGPCNP tracks within one college of nursing at a single location. While the results of our work provide evidence of attainment of the short term goal of integrating curricular elements to close identified gaps in geriatric content, an evaluation of the impact of this work on student learning outcomes and competency attainment are still needed and are planned for the future. Evaluations of the impact of this work relative to attainment of targeted clinical and interprofessional competencies are essential within the context of current interest and movement toward competency-based education for health professionals.

The results of our work are consistent with previous reports of curriculum mapping work completed by other health professions, including pharmacy and medicine (Accreditation Council for Pharmacy Education, 2016; Plaza et al., 2007; Schwartz et al., 2014; Willett, 2008; Zelenitsky et al., 2014). While we suggest that the processes described here are transferrable and can be applied in other settings, additional studies focused on nursing- and geriatric-specific applications are needed. Additionally, while the focus of the work described here was on primary care, in keeping with GWEP program priorities, ensuring the sufficiency of geriatric learning experiences in acute care nurse practitioner programs is equally important in meeting the NAM challenge and quality standards in acute care settings, particularly those relative to care transitions and the prevention of avoidable hospital re-admissions.

Continued discourse among nursing leaders to find systems level solutions and clarify the gray area that currently exists between basic nurse practitioner preparation as envisioned under the APRN Consensus

Model and specialist level preparation as described by GAPNA. The results of our work suggest a high level of congruence between NONPF/AACN defined competencies for FNPs and AGPCNPs and PHA-defined multidisciplinary competencies for all health professional students. As gauged by USF College of Nursing faculty, the language used to define NONPF/AACN competencies for AGPCNPs is broader as necessary to encompass the care provided for patients across the entire *adult lifespan*. It is even broader for FNPs as necessary to encompass the *entire lifespan*. Conversely, the PHA competencies are more granular and precisely applicable to the older adult population and can be incorporated in curricula to augment NONPF/AACN defined competencies.

Conclusion

University of South Florida College of Nursing faculty successfully applied principles of curriculum mapping to address all 23 PHA geriatric competencies in the FNP and AGPCNP tracks. Curriculum mapping principles and concepts applied in this project have been successfully applied in other health professional training programs to advance student learning outcomes and improve the delivery of health across the care continuum. The project described here is the first to demonstrate the value of curriculum mapping as a strategy for horizontal and vertical integration of geriatric-specific content in nurse practitioner curricula and adds to the existing body of evidence in favor of curriculum mapping as an effective means for evaluating and improving curricula in health professional academic programs. While there is no substitute for faculty with geriatric expertise, this approach provides one additional alternative technique for improving curricula and, potentially, attainment of geriatric competencies within the context of current system constraints. Additional studies to examine the impact of curriculum mapping concepts in nursing and, specifically, on attainment of geriatric competencies among nurse practitioner students are critical to meeting the NAM challenge and the health care needs of the growing older adult population in the U.S.

Ethical considerations

IRB approval (IRB #00024533).

Declarations of interest

None.

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