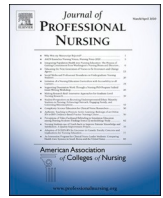


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## An innovative DNP post-doctorate program to improve quality improvement and implementation science skills

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## ABSTRACT

**Background:** Doctor of Nursing Practice programs prepare nurse leaders for unique roles to address healthcare needs across the quality spectrum. However, additional mentoring and training in implementation science and analytical skills is needed to effectively lead system-wide quality initiatives.

**Purpose:** The purpose of this article is to describe the planning, implementation, and evaluation of an innovative post-doctoral DNP Quality Implementation Scholars Program developed through an academic-practice partnership to address this need.

**Project method:** Throughout the one year post-doctoral program, we evaluated student experiences qualitatively using focus groups and quantitatively using standardized course and instructor surveys to assess overall programmatic goals. Program outcomes were evaluated from the perspective of the academic-practice partnership planning committee through a Qualtrics® survey.

**Findings:** Strengths of the program included the in-depth mentoring by faculty and relationships built across the larger health system. Both scholars and the planning team noted that the system-wide project implemented by the scholars was relevant, timely, and quality-focused.

**Conclusions:** This innovative DNP post-doctoral program leveraged the skill-sets of DNP-prepared nurse leaders to lead system-wide quality improvement initiatives tailored specifically to healthcare organizations.

## Introduction

Academic healthcare systems seek to provide safe, high quality care based on the best evidence. Numerous national organizations and accrediting bodies, such as The Joint Commission, Center for Medicaid and Medicare Services (CMS), and Magnet® demand healthcare systems maintain high standards for quality care ([American Nurses Credentialing Center, 2020](#); [Centers for Medicare & Medicaid Services, 2020](#); [The Joint Commission, 2020](#)). These high standards have led to a variety of quality and safety initiatives within healthcare systems, many of which are amenable to nursing interventions. Often these initiatives are led by nurses who possess deep clinical and operational knowledge of a problem, yet lack skills around data analytics and implementation science.

The Doctor of Nursing Practice (DNP) is well established as the terminal nursing practice degree and produces graduates that act as change

agents and leaders in a variety of roles that make important contributions. As such, with their clinical expertise and deep knowledge of health systems, combined with their knowledge of evidence-based practice translation, DNP-prepared nurses are well positioned to effectively lead quality and safety initiatives ([American Association of Colleges of Nursing, 2015](#); [Trautman et al., 2018](#)). However, DNP programs – even the best – have curricular limitations that may restrict DNP graduates from leading quality initiatives at a health system level ([Beeber et al., 2019](#)). In the context of the current data-rich health care environment, DNP-prepared nurses, require an additional period of mentoring and a deeper understanding of implementation science methods and analytical skills to successfully lead multidisciplinary teams in implementing and evaluating system-wide quality interventions. Formal post-doctoral programs provide opportunities for nurses to receive close mentoring and gain knowledge in analytic skills and implementation science

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methods (Beeber et al., 2019; Cashin, 2018; Joseph & Huber, 2015).

To address the need for DNP-prepared nurses to lead and co-lead quality improvement (QI) initiatives at a system level, and leverage the resources of a highly regarded academic health center that includes a top 10 school of nursing, an innovative, one-year DNP post-doctoral Quality Implementation Scholars Program was developed through an existing academic-practice partnership. This program provided advanced data analytic and implementation science skills to support a new generation of DNP-prepared nurses who will positively impact the quality and safety outcomes at all levels of a complex health care system. The purpose of this article is to describe the planning, implementation, and evaluation of an innovative post-doctoral DNP Quality Implementation Scholars Program developed through an academic-practice partnership.

*DNP quality implementation scholars program overview*

With the ever increasing demand for quality-focused patient outcomes, there was a need identified within our academic health system to increase the capabilities of clinicians to lead robust QI initiatives. DNP-prepared nurses, of which the health system employees many in operational and leadership roles, were trained in basic QI concepts through their DNP program. However, these DNP leaders were not utilized as QI leaders and had not developed the skill set to lead system-wide QI initiatives. Faculty with expertise in QI, implementation science, and data analytics were identified to facilitate development course-based experiential programming for health system based DNP leaders. A needs assessment was conducted by the academic-practice partnership members, and a DNP post-doctoral program was developed to meet the identified needs of the health system with the support of school of nursing resources.

Beginning in 2018, nursing leadership from the school of nursing and health system met to discuss program goals and outcomes. This planning team consisted of a core group of seven leaders including the school of nursing dean and faculty, the health system chief nurse executive, as well as other health system nursing leaders. The planning phase addressed an opportunity to provide the health system’s DNP-prepared nurses with value-added knowledge and skills to (1) identify quality and safety needs within the health system, (2) utilize and interpret data to identify trends, (3) develop interventions that directly address data trends, and (4) implement and sustain practice changes. Overall program objectives were developed based on health system needs (Table 1). During the program, the DNP-prepared nurses would have an opportunity to apply their new skill-set to improve a strategically aligned quality metric at the health system level. Upon program completion, scholars would receive a post-doctoral academic certificate as a Quality Implementation Scholar. The awarded certificate was approved from the University’s Registrar Office, as well as the school of nursing DNP program committee.

*Financial considerations*

The DNP postdoctoral program was funded with investment shared

**Table 1**  
DNP quality implementation scholars program objectives.

<ul style="list-style-type: none"> <li>• Demonstrate use of common methods used to assess health system generated data and measure QI initiatives.</li> <li>• Analyze clinical or healthcare data to generate meaningful evidence for nursing practice that can be used to support decision-making and critical thinking at both the point of care and at executive levels.</li> <li>• Utilize implementation science methodologies and evidence-based strategies in the development and implementation of a team-based QI initiative.</li> <li>• Relate advanced topics and principles of health care leadership to a team-based QI initiative</li> <li>• Design, implement, and plan evaluation and dissemination of a team-based QI initiative through application of methods and experiential learning.</li> </ul>
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between the school and health system equally. Costs were contributed in kind by both the health system (tuition, books, and fees, 0.3 FTE program manager) and the School of Nursing (program mentors, 0.2 FTE program coordinator). Scholars who enrolled in the program agreed to remain at the health system for a minimum of two years after completion. As this was a newly developed and tailored program, the planning team worked closely with the school’s admissions department to streamline scholar enrollment and funds flow between the organizations.

*Scholar selection considerations*

Four DNP-prepared nurses within the health system, with diverse backgrounds, were selected to participate in the inaugural cohort of the DNP Scholars Quality Implementation Program from May 2019 to May 2020. Requirements for the cohort included: (1) at least two years’ experience as an employee of the health system, (2) work in a position, or be working toward a position, where they could broadly influence quality, (3) possess a diverse work experience, (4) one scholar from four of the six entities, and (5) one scholar was required to be in a health system role. Scholars varied in leadership positions, including a health system Associate Vice President, Associate Chief Nursing Officer, Nursing Quality & Magnet®, Clinical Operations Director, and a Manager of Operations. Further, the scholars had existing relationships with staff and leadership, and understood the clinical culture – all key factors that aid in successful implementation (Rycroft-Malone et al., 2013).

*Didactic considerations*

During the one year, three-semester program (summer, fall, spring), scholars completed a total of 12 credit hours. Courses included advanced topics in data science and informatics, QI, implementation science, and leadership (Table 2). These courses were taught by school of nursing faculty with expertise in these topics. Two of the didactic courses (Healthcare Quality Improvement Methods and Advanced Topics in Health Services Leadership) were existing elective courses within the

**Table 2**  
DNP quality implementation scholars program courses and descriptions.

Course (credit hours)	Description
Data science and informatics for quality improvement (3)	<ul style="list-style-type: none"> <li>• Leveraging information systems and data structures to address health care questions</li> <li>• Selection of data and quality metrics to evaluate interventions to improve quality of care</li> <li>• Query, prepare data, and use analytics techniques</li> <li>• Explore data science methods and informatics tools in the context of QI</li> </ul>
Healthcare quality improvement methods (3)	<ul style="list-style-type: none"> <li>• Describe QI models and tools and steps in the QI process</li> <li>• Use of QI outcome measurement tools (i.e., run and control charts, benchmarking, and scorecards)</li> <li>• Application of methods of disseminating results and planning for continuous improvement</li> </ul>
Advanced topics in health services leadership (3)	<ul style="list-style-type: none"> <li>• Describe complex issues facing contemporary corporate leaders</li> <li>• Understanding strategic communication, executive presence, and interdisciplinary collaborations</li> <li>• Application of principles of executive leadership and problem solving</li> </ul>
Team based quality improvement science initiative practicum (1)	<ul style="list-style-type: none"> <li>• Understand capacity and cost analysis, collaborative partnerships, sustainability</li> <li>• Engagement with leaders and quality departments throughout the system</li> <li>• Development, implementation, and evaluation of a system-wide QI initiative</li> </ul>

DNP program; as such, other DNP students were enrolled. The DNP post-doctoral scholars were thus integrated into existing faculty workload for these courses. The Data Science and Informatics for Quality Improvement didactic course was newly developed by two faculty experts in informatics specifically for the DNP post-doctoral program. This course has been taught with the four DNP scholars; however, plans are in development to offer this course as an elective to other DNP students in the future. During each semester, scholars completed a one-credit hour QI practicum focused on implementing the QI project, with a bi-weekly seminar for active mentorship of the project design, methodology and analytics (Table 2). This multi-semester practicum course was designed to provide scholars with unique experiential learning activities to apply the knowledge, skills, and attributes needed to develop, lead, and evaluate quality initiatives. Scholars were charged by the health system to implement a system-wide QI project to improve performance on a nationally reported quality metric. The project topic was identified by health system leaders based on health system identified quality improvement priorities. The project for this first cohort focused on the reduction of non-ICU central line associated bloodstream infections (CLABSIs) through implementing chlorhexidine gluconate (CHG) bathing for patients with a central line.

Indeed, an innovative feature of this program was the robust mentoring provided to the scholars. Scholars received mentorship by both school of nursing and health system leaders throughout the program. The scholars met with school of nursing faculty mentors every other week for 2 to 4 h to review course content and receive guidance on their project. Health system mentors included the Director of Nursing Research and Evidence-Based Practice, Director of Nursing Practice, Assistant Vice President of Clinical Education, and Infection Prevention leaders. Due to their busy schedules, health system mentors met with the scholars one to two times per semester to provide guidance, in addition to email communication. To design and implement the QI project, the scholars collaborated on an ad hoc basis with multiple departments and disciplines across the health system, including clinical education, informaticists, procurement, supply chain, patient safety, data and analytics, and nursing leaders. The team utilized data from existing infection prevention databases and the electronic health record to evaluate the effectiveness of the practice change on quality, safety, cost, and patient outcomes across settings.

During the scholars' bi-weekly meetings, they met and engaged with health system leadership and quality departments. This not only exposed the scholars to valuable resources available within the health system, but also exposed health system leaders to the scholars. Leaders included the hospital's three Chief Nursing Officers, Chief Nursing Executive, Chief Quality Officer, Chief Medical Officer for Quality, Performance Services, Care Redesign, Center for Health Data Science, and health technology leaders, among others. The scholars also participated in a TeamSTEPPS® Master Trainer course to build their capacity with communication and teamwork skills. Launched in 2006, TeamSTEPPS® is an evidence-based team training system developed by the Agency for Healthcare Research and Quality (AHRQ) and the Department of Defense and includes several tools to improve collaboration and communication in the healthcare system. The TeamSTEPPS® curricular materials are freely accessible at <https://www.ahrq.gov/teamstepps/curriculum-materials.html> (Agency for Healthcare Research and Quality, 2019).

## Evaluation

The planning team intentionally executed both quantitative and qualitative methods for the program evaluation process to assess the program's success in meeting stated goals. Standardized course and instructor evaluations were completed by students at the conclusion of each semester. Evaluation questions were rated on a 4-point Likert scale (1 = Strongly Disagree to 4 = Strongly Agree). Items focused on the course's organization, structure, and assignments, as well as the

instructor's presentation of concepts. Scholars were also able to provide open ended feedback on the course and instructor evaluations.

We evaluated the scholars' experiences with the program qualitatively using focus groups that were conducted at the end of each semester. A focus group protocol was developed and sessions were facilitated by the school's Associate Dean of Academic Affairs. Each focus group included questions on the didactic courses completed guided by course objectives. The protocol also included items regarding (1) progression of the QI project, (2) strengths and weaknesses of the program, (3) most important skill or lesson they learned, and (4) how they have applied the knowledge gained through the program to their current role. Following the final semester, the focus group also included questions that evaluated the overall program objectives.

The program was further evaluated through an eight-item Qualtrics™ survey sent to the planning team upon program completion, including both school of nursing and health system individuals. Responses were rated on a four-point Likert scale (one = Strongly Disagree to four = Strongly Agree). Items asked the planning committee to rate their perspectives regarding aspects of the program. The survey also allowed free-text entry to provide feedback on the strengths, weaknesses, and opportunities of the program.

The scholars will evaluate the impact of the CHG bathing project at nine months post-implementation and quarterly for two years to ensure sustainability. To evaluate the implementation of the project, an eight-item Qualtrics™ survey was also sent to unit-based nursing leaders on the 36 units where the project was implemented. Leaders were asked to rate their satisfaction on various aspects of the project implementation on a five-point Likert scale (one = Extremely Dissatisfied to five = Extremely Satisfied).

## Findings

### *Scholar feedback: course and faculty evaluations*

Scholars completed course and faculty evaluations each semester. Course and instructor evaluations exceeded the school of nursing's benchmark of 3.0 and the mean for all semesters. Within the practicum course evaluations, scholars stated they appreciated the time spent with faculty experts, understanding the local health system processes, meeting with quality departments, and relationship building with peers.

### *Scholar feedback: focus groups*

The scholars completed a total of three focus group evaluations. Upon completion, the school's Associate Dean of Academic Affairs developed a robust summary and shared this information with the health system leadership team, as well as the school of nursing faculty and mentors. Information from these evaluations helped inform subsequent semesters and changes to the overall program.

One clear strength of the program was the high quality of mentorship the scholars received. They valued the support, expertise, and responsiveness of the faculty mentors, as well as their varied skill sets. Further, scholars appreciated the bi-weekly meetings which provided time to engage with one another, receive mentorship, build relationships, and networking across the system.

Within the practicum, the scholars expressed appreciation that the project focus (reduction in CLABSIs) was relevant and timely, given the newly structured Quality Management System. They commented that the project focus was beneficial not only for the health system, but also to improve their understanding of how to implement system-wide projects. Often in health systems, it is easy to complete work in silos; however, scholars had the opportunity to collaborate with diverse departments and teams within the health system that they previously had not worked with closely. Lastly, during all focus groups, the scholars mentioned the benefits of attending the TeamSTEPPS® Master Training class and how this has helped them in their daily careers.

Scholars also offered suggestions for improvement for the program, which were implemented in future semesters, as able. For example, during the first practicum semester, the health system program coordinator scheduled the scholars to spend 2 to 4 h in clinical rotations with health system quality departments; however, this became logistically challenging. Based on feedback, representatives from these departments were asked to attend the already established bi-weekly scholar meetings for a 30–60 minute presentation and discussion.

The scholars' lack of available time was a noted barrier. As all scholars were in prominent leadership positions, the additional 5–10 h per week required to complete the academic certificate was challenging. However, the scholars recognized that the program was valuable for their learning. Additionally, the scholars completed their final semester in spring 2020 in the midst of the COVID-19 pandemic. Since the scholars were under much stress and experienced further time constraints due to the pandemic, program faculty worked with each scholar to personalize their experience to support their successful completion of the program.

#### *Planning team evaluation*

To evaluate the program from the perspective of the planning team, a short Qualtrics© survey was provided. A total of nine individuals completed the survey. The overall program satisfaction mean was 3.56. Similar to findings from the scholars' focus groups, strengths of the program included the mentoring by school of nursing faculty and the strategic selection of a relevant QI project topic. Perceived weaknesses and opportunities for improvement included considerations for offering future scholars with workload reduction to participate in coursework, and embedding a strengthened sustainability plan during project implementation.

#### *Project implementation evaluation*

Nine months after implementing CHG bathing, there has been a 21% decrease in CLABSI rates within the health system. Outcomes will continue to be measured and monitored to assess sustainability, with scholars serving as staff mentors to maintain the improvements made. Unit-based nursing leadership received Qualtrics© surveys to evaluate the implementation of the CHG bathing project. Overall, the leaders were satisfied (mean 3.62). Strengths of the project included consistent communication from the scholars and the educational materials provided that described the "why" behind the practice change. To promote scholarship, faculty mentors worked with the scholars to develop a poster for a local quality and safety conference for which they were accepted. Further, a manuscript of the CHG bathing project has been submitted for publication by the scholars and faculty mentors.

#### **Discussion**

This article describes the planning, implementation, and evaluation of a robust, innovative post-doctoral certificate program for DNP-prepared nurse leaders. Whereas DNP programs produce practice-focused experts in advanced nursing and evidence-based practice, graduates that will lead system-wide QI initiatives require further training and mentoring in implementation science and analytical skills. Other programs have sought to build staff capability and organizational capacity through building QI training in the clinical setting to all levels of staff members (Harbman et al., 2017; Reisinger et al., 2017; Sarff & O'Brien, 2020). Baccalaureate and graduate nursing programs have also sought to integrate QI into their curriculum through QSEN competencies and information from the Institute for Healthcare Improvement (Cusson et al., 2020; Hulett & Davis, 2020).

However, to our knowledge, this program is the first of its kind that specifically targets DNP-prepared nurses to provide a formal, structured post-doctoral academic certificate to didactically and experientially

increase QI, implementation science, and data analytic capabilities. A unique and key component of this post-doctoral program was the in-depth mentoring provided by faculty with expertise in QI and implementation science. Not only were the scholars provided didactic training, they also had an opportunity to directly apply their new QI skills and knowledge through implementing a large, system-wide project. Integration of this type of experiential learning is an important aspect to properly build QI capability (Mery et al., 2017). Further, as strongly advocated for in the literature, mentors should assist with QI projects during training (McGrath & Blike, 2015; Mery et al., 2017). The faculty mentors worked side-by-side with the scholars to implement their system-wide project throughout the program; this was a strength noted by the scholars.

If other institutions are interested in developing this type of DNP post-doctoral program, it is imperative to have strong leadership support and investment in the program from both the health system and school of nursing. Indeed, one facilitator of this program was the careful planning and execution by the team of nursing leaders from the health system and school of nursing, which was accomplished through deliberate communication via email and meetings to monitor progress and focus group results. As previously noted, a major challenge of the program was the time constraints for the DNP scholars who were enrolled in the program while functioning in their full-time health system positions. However, the pragmatic focus on CLABSI prevention, a quality indicator that the DNP scholars had already prioritized in their leadership roles, helped to make the program relevant to their daily work and allow them to apply newly developed skills. As such, other institutions should align the program's project focus with key quality indicators that are relevant and timely.

Through a strong academic-practice partnership and the innovative post-DNP program, the health system now has a pipeline of nurse leaders capable of leading and mentoring other nursing staff to develop and implement solutions to significant QI issues. To sustain the gains made with the system-wide QI project and to leverage the newly formed capability of their DNP-prepared nurse leaders, the health system has begun a program where the scholars will serve as mentors and role models for nurse-led QI projects. Ultimately, the health system plans to utilize the scholars' expertise to its fullest, leveraging their new-found skill set to lead system-wide efforts to improve patient quality and safety outcomes. As a part of the pilot, two other cohorts, each with four DNP-prepared nurse leaders, will be enrolled in the certificate program. The second cohort began the program in Fall 2020. With strong leadership support from both the health system and school of nursing, it is anticipated that this program will continue and be adapted to the needs of the health system. This program also benefits the school by providing highly skilled doctorally-prepared nurse leaders who can serve as members of DNP student project committees.

As these DNP-prepared nurses continue in their roles within the health system following successful completion of the post-DNP program, the health system has expanded their resource base of confident and experienced nurse leaders to effectively lead and co-lead challenging and important quality initiatives. These nurse leaders are equipped to effectively identify opportunities, analyze data, and implement and sustain evidence-based changes and interventions throughout the health system. Leveraging a strong academic-practice partnership as a foundation to implement a unique and tailored post-doctoral experience for DNP-prepared nurses can improve the capability for leading system-wide quality initiatives.

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