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## Strategies to promote and sustain baccalaureate students' interest in pursuing a PhD degree in nursing

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### Abstract

PhD-prepared nurses are integral to the delivery of cost-effective, safe, and high-quality care to the increasingly diverse population in the U.S. Nurses with a PhD are needed to develop knowledge that informs and directs nursing care, promote positive health outcomes, and train the next generation of nurses and nurse scientists. Unfortunately, less than 1% of nurses have their PhD in nursing and there is an ongoing shortage of nurses in the U.S. that has not been effectively addressed. The PhD in nursing pipeline needs to be bolstered to address the escalating nursing shortage. This is especially important considering the importance of having an adequate number of well-prepared nurses to address the increasing complexities of health conditions and patient populations in the U.S. This paper presents strategies to promote and sustain interest in PhD in nursing among baccalaureate nursing students and discusses the importance of meaningful engagement in research and engaged faculty mentorship. It is important to incorporate research into undergraduate experiences, promote engaged mentorship during undergraduate level and beyond, and provide a conducive environment for undergraduate students to address their fears, misconceptions, and myths about PhD in nursing.

### Keywords

PhD pipeline; Nursing; Graduate education; PhD in nursing; Nursing shortage

### Introduction

Nurses operate as leaders in various collaborative and interprofessional settings, delivering high-quality care in the growing, culturally diverse populations in the U.S. According to the American Association of Colleges of Nursing (AACN) the research-focused doctoral

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education (PhD) in nursing program is to prepare future leaders in nursing (AACN, 2010). Nurses with PhD are needed to contribute to the science of nursing and generate new knowledge that inform effective strategies to improve patient care and outcomes and to inform future policies (AACN, 2010; Joseph et al., 2021). In addition to pioneering research, these nurse scientists are also to critique traditional approaches to inquiry or trends in nursing practice and develop policy as the stewards of the discipline (AACN, 2010; Morris et al., 2021). While the National Academy of Medicine (NAM) and Robert Wood Johnson Foundation (RWJF) recommendation to double the number of nurses with doctoral level of education was achieved in 2017 due to an increase in nurses completing their Doctor in Nursing Practice (DNP), the number of PhD-prepared nurses has remained constant (American Association of Colleges of Nursing [AACN], 2020a; IOM, 2011; National League for Nursing (NLN), 2010; Smiley et al., 2018). PhD-prepared nurses comprise less than 1% of the nursing workforce (Smiley et al., 2018) and this number is expected to decline as PhD nurse faculty retire (AACN, 2020b; Fang & Kesten, 2017). Many of the nurses with PhDs are older and are now retiring while the younger faculty who are likely to replace the retiring faculty possess fewer doctoral degrees and have more limited ability for graduate level teaching (Fang & Kesten, 2017). It is essential to sustain the pipeline of PhD in nursing as the PhD programs supply the future faculty, researchers, and leaders in nursing (AACN, 2019).

In the past year, over 80,000 qualified Bachelor of Science in Nursing (BSN) and graduate nursing applicants were turned away from nursing programs for various reasons including a shortage of PhD-prepared nursing faculty (AACN, 2020c). As the COVID-19 pandemic has freshly illuminated, there is a critical need for well-prepared, professional nurses to care for the increasingly complex and diverse health needs of the U.S. population. A PhD in nursing pipeline needs to be sustained to instruct the next generation of nurses, address the escalating nursing shortage, and to ensure the continued development of young, innovative, and diverse nurse scientists (AACN, 2020d). According to a study conducted in 2018, there has been ongoing decrease in graduation rate and increased attrition rate among PhD in Nursing students in the U.S. (Fang & Zang, 2021). Thus, we need to continue to direct significant efforts towards expanding enrollment and successful completion of the PhD in nursing to sustain the pipeline for future nurse scientists.

Strategies to increase enrollment in PhD programs have focused on attracting students to PhD programs earlier in their careers to increase the amount of time that individuals have to contribute to the nursing body of science (Ellenbecker & Kazmi, 2014; Nehls et al., 2016; Nehls & Barber, 2012). In addition, mentorship and encouragement by PhD-prepared faculty have been identified as key components of encouraging students to pursue PhD studies (Ayoola et al., 2017; Joseph et al., 2021; Neuberger, 2016; Stanfill et al., 2019; Vance et al., 2020). Finally, meaningful undergraduate research experiences can lead to increased interest in pursuing a PhD (Mitchell et al., 2020; Nehls et al., 2016) to ultimately sustain the PhD pipeline.

According to a recent review (Granner & Ayoola, 2021; in press) there are many significant barriers for BSN students to pursue their PhD which must be addressed in order for efforts to increase the BSN-PhD pipeline to succeed. These include students' lack of awareness

of PhD education (Smith et al., 2016), as well as limited time, energy, or futuristic plans (Ellenbecker & Kazmi, 2014; Squires et al., 2014). Competing demands related to family, work, or the desire or perceived need to engage in clinical practice also make the pursuit of a PhD more difficult (Smith et al., 2016; Squires et al., 2014). In addition, many students have negative beliefs about life as a PhD student or about research itself (Ellenbecker & Kazmi, 2014; Smith et al., 2016). Research-track positions have salaries that are not competitive with those of clinical-track positions (Neuberger, 2016), which likely encourages students to pursue a DNP over a PhD. Another barrier is insufficient mentorship during BSN programs and insufficient graduate mentors available to advise PhD students (Ellenbecker & Kazmi, 2014). Finally, lack of funding for PhD education and financial insecurity can be enormous barriers which hugely impact students career decision-making (Nehls et al., 2016).

To increase the number of PhD-prepared nurses, schools of nursing must share best practices to promote future PhD studies among students and address barriers. The purpose of this paper is to present five strategies that have been effective in promoting and sustaining interest in PhD in Nursing and remove barriers to BSN students' pursuit of PhD education. As an exemplar, this paper incorporates a programmatic description and personal/collective reflections from faculty members and former undergraduate students from Calvin University Department of Nursing (CUDON).

### **Exemplar: Calvin University**

Calvin University is a liberal arts prelicensure undergraduate institution with a strong commitment to promoting undergraduate research and actively involving students in the dissemination of research. The university also has a long and rich history of service learning and community engagement. Calvin University graduated its first nursing class in 1984. Today the prelicensure nursing program graduates 80 students a year and over 50% of the nursing educators have a PhD in nursing. The Calvin nursing program provides opportunities for students to participate in research in three different ways: 1) during their community-focused nursing clinical rotations in the first and last semester of the program, 2) paid research assistant opportunities through faculty-led funded projects, and 3) a research honors program.

The five CUDON graduates (KK, YJA, JRG, LD and HL), who are co-authors in this paper, graduated with a Bachelor of Science in Nursing (BSN) from Calvin University within the past 8 years and enrolled in PhD programs either immediately or within three years of completing their undergraduate education. The graduates were asked to write about their experiences as an undergraduate student at CUDON and the factors that facilitated their decisions to pursue graduate school. They were asked to think about the structure of the institution, the faculty members and all programmatic factors that facilitated their learning experiences. The faculty members were asked to write on the programmatic and other factors among faculty members that facilitated the program graduates' desire to pursue PhD. The faculty members and the five graduate students answered these questions from their personal perspectives. The first author reviewed and identified themes from the submitted writings, reflections, and reviews. These themes aligned with five specific strategies to promote and sustain BSN students' interest in pursuing a PhD, as outlined below.

### Strategy #1: curriculum with a focus on community engagement

In 2002, the Calvin University Department of Nursing (CUDON) launched a *community-based curriculum* that flowed from the mission of the university and its historical commitments. The curriculum was designed to create meaningful learning experiences for students that served the community (Zandee et al., 2015). It was also designed to engage students in undergraduate research during their two years in the nursing major (Doornbos et al., 2015). To achieve this vision, CUDON created *service-learning community* campus partnerships with four culturally diverse, low income, underserved urban neighborhoods. (Community A: predominantly Hispanic /Latino Spanish speaking, Community B: predominantly Black /African American community; Community C: predominantly White /Caucasian community; and Community D: predominantly a homeless population). These partnerships were built on the foundation of Community Based Participatory Research (CBPR). CBPR emphasizes shared power, building community capacity, and joint research with the goal of action, improving the health of the community (Minkler & Wallerstein, 2008).

The CUDON made a commitment to emphasize service and learning equally so the research and learning activities in the neighborhoods would be driven by the voice of the community with the goal of improved community health. To integrate CBPR into the nursing program, faculty, nursing students, and the community are actively involved in a collaborative needs assessment research study every seven years. Residents of the partnering neighborhoods participated in each step of the research process with the goal of improving the health of the community. Residents help define the research questions, assist with data collection, explain research results in their cultural context, design solutions to health concerns and assist in evaluation. As part of their nursing curriculum, students participate in each step of the research process, working alongside community residents during their practicum courses.

The CBPR practicum is incorporated into clinical time for every baccalaureate nursing student at CUDON (Zandee et al., 2015). Students spend the first semester in a neighborhood practicing community-based nursing and return to the same neighborhood the last semester of their senior year to practice community focused /public health nursing. This extended time working with vulnerable populations builds compassion for vulnerable groups and encourages the development of creative strategies to address the unique health concerns and barriers these populations experience. Activities completed by the students during the last semester of the nursing program include assessing the health of the neighborhoods and/or researching resident driven solutions to resident identified health concerns.

### Community focused nursing (CFN) and CBPR practicum

In their practicum, CUDON students work with faculty and neighborhood residents conducting community assessments which include both qualitative and quantitative study components. These assessments are completed in one neighborhood at a time and repeated every 7 years. So, every 4 out of the 7-year time frame there is opportunity for nursing students to participate in community assessment research. During the first week of practicum, students experience the institutional review board (IRB) process as they learn how IRB approval is needed to complete the community assessment research. Since they

will be researchers, students are required to complete the Collaborative Institutional Training Initiative (CITI Program) training on how to protect the rights of human subjects in research. During the community assessments, students participate in neighborhood focus groups and door to door surveys. In the qualitative study, nursing students serve as note-takers, help transcribe the focus group discussions, and learn how to code focus group discussions. In the quantitative study, students conduct door to door surveys and attend meetings where the research results are presented back to the community. They learn the importance of disseminating research results and listening to resident voices throughout the research process. During the senior practicum, students supervised by faculty and assisted by a community health worker (CHW), have the opportunity to deliver a nursing research intervention as a part of their practicum experience.

The CBPR practicum is incorporated into clinical time for every baccalaureate nursing student at CUDON (Zandee et al., 2015). Involving students in CBPR promotes an environment where students need to work through clinical puzzles and are pushed to develop skills of inquiry. During practicum, they observe first-hand how research drives their own practice and promotes the health of the population they are caring for (Zandee et al., 2013). Students' enthusiasm for research increases when research is taught as a form of advocacy. Benner et al. (2010) also talks about the value of using pedagogies for advocacy. In the CUDON, students spend clinical time in an underserved neighborhood in Grand Rapids and research is used to advocate for populations they know and serve.

### **Strategy #2: faculty programs of research as opportunities for student mentorship**

The CUDON also promotes *individual faculty research programs* with the intention to involve undergraduate students in real-life research. In addition to the CBPR approach used to involve students in research across the curriculum, individual faculty members used CBPR to design nursing interventions implemented by all nursing students while in the nursing program. These programs include the women's health promotion project which focused on preconception reproductive knowledge promotion (PREKNOP), women supporting women (WSW) which is a program to promote women's mental health, and the community health worker (CHW) program (Ayoola et al., 2017; Doornbos et al., 2015; Jansen et al., 2015; Zandee et al., 2013). These projects involved nursing students throughout the research process. Many of these research assistants were inspired to pursue their PhD in nursing (Ayoola et al., 2017). Five of the co-authors in this paper (KK, YJA, JRG, LD, HL) were involved in these projects as research assistants as undergraduate students and part of their stories are also shared later in this paper.

### **Faculty-led research programs**

CUDON CBPR practicum as well as *faculty-led research programs* provide learning opportunities that are transformational for the students. Nursing students can participate as paid research assistants in faculty-led research programs such as PREKNOP and WSW. These experiences increase the students' engagement in research. Nursing students participate in research program conception, study design, recruitment and data collection, data analysis, research presentations at local, regional, national and international levels, and writing of manuscripts for publication (Ayoola et al., 2017; Doornbos et al., 2015). Nursing

students were hired as research assistants to have a deeper involvement in the process and continue with program implementation and evaluation outside of practicum times. The research assistants participate in team research meetings and are involved in brainstorming sessions to review research designs and develop study implementation plans. Most research teams meet regularly, discuss all steps of the research process as the study unfolds, make decisions collaboratively, allow involved undergraduates to get a realistic perspective on the research process, and experience the excitement of the project. WSW usually meets 1–2 h per week and the PREKNOP team meets about 2 h per week or every other week depending on the stage of the project. One student reflected on the research teams stating:

“Dr. ABA provided us with the freedom and voice to contribute to the research team. We were not merely performing tasks, but she listened to us and allowed us to voice our opinions”.

Providing hands-on research experience is one of the first steps in promoting interest in research and PhD studies (Ayoola et al., 2017; Neuberger, 2016; Salerno et al., 2017). For example, 16 out of 32 (50%) of the research assistants who participated in PREKNOP from 2013 to 2019 decided to pursue graduate studies. Many students who take on paid research assistant opportunities present or publish with the faculty member (Neuberger, 2016; Vance et al., 2020).

Being involved in real-life implementation of nursing research demystifies and addresses concerns, assumptions and misconceptions associated with research. This concern was expressed by one of the CUDON graduates, now a postdoctoral fellow at a renowned research university, (co-author KK), “when I started my undergraduate education, I said that I never wanted to do research. Researchers are boring. They sit in a closet and don’t talk to people.”

*Real-life exposure to research* helps students to confront their misconceptions and concerns about PhD in nursing being mostly about research that could be “boring.” One of the research assistants on the PREKNOP project and also a co-author of this paper (KK) stated that:

“Some of us also, along with a community health worker (CHW), helped deliver the intervention. We went into women’s houses and taught them about healthy living and about reproductive health, if they were in the intervention group. It was through this experience that I caught the passion for research. I realized how unique it was that we were able to go into women’s houses for several months in a row to provide education. And, I realized that researchers do interact with patients!”

Another graduate co-author (LD) stated that:

“As an undergraduate nursing student, my passion for research was sparked by an opportunity to work on a randomized controlled trial with one of my nursing professors at Calvin University... At the time, I didn’t even know that nurses did research or that they could pursue a PhD to become a nurse scientist. Several components of this experience contributed to my future decision to pursue a PhD.”

Providing undergraduate research opportunities can benefit students significantly. Students can develop critical thinking, time management, and organization skills. Students may also improve communication skills through networking, presenting and scholarly writing. Each of these can improve the confidence of students, increase satisfaction with educational experiences, and help with preparation for graduate school (Coyne et al., 2018; Greenwald, 2010; Schaefer, 2013; Seymour et al., 2004). Seeing the direct impact research has on the vulnerable populations that they work with in the CUDON partnering neighborhoods and how it promotes health and social change for people they know and care about motivates students to be involved in this important work. It can also plant a seed for a focus area for doctoral studies. For instance, another CUDON graduate who previously worked on PREKNOP (YJA) specialized as a maternal/newborn nurse and conducts research on maternal health. Showing students how research can be a means to advocate for the underserved population and promote social good can build a desire to expand on that work.

### **Strategy #3: special courses and seminars**

CUDON offers their students an advanced nursing role course to discuss the different graduate school options and assist students in completing their graduate school applications. Prior to the creation of this course (written in 2011 for implementation in 2012), we had no “place” to gather students collectively for conversations about terminal degrees in nursing. Most BSN students indicated that they didn’t know about the PhD option and what it entailed, which is a common barrier to the pursuit of a PhD in nursing across the U.S (Nehls & Rice, 2014; Smith et al., 2016). Of course, this seminar introduces the DNP as well but for some, it is the first real seminar and formal institutional exposure or conversation about the PhD pathway and terminal degrees in nursing. Students in the CUDON also have the option of participating in an honors program which involves working alongside a nursing faculty mentor to complete an honors thesis.

### **Honors program**

The Calvin Honors Program enables nursing students to take courses for honors credit. Students take 6 honors courses (4 general + 2 nursing or 3 general + 3 nursing). Taking a nursing course for honors credit involves working with the faculty member to establish a research project, typically a literature review. The honors program culminates in a thesis project in which students work with a nursing faculty to address a clinical research question. Previous nursing honors students have focused on topics such as: Nutrition, depression, and adequacy of pre-natal care. In the United States, *honors programs in nursing* have existed since 1961, although the exact number of existing programs is unknown (Lim et al., 2016). Since the 1960s, studies have highlighted the importance of involving nursing students in research and dissemination (Lim et al., 2016). Honors programs in nursing have the potential to increase the number of undergraduate students who pursue graduate education in nursing and a nursing research career. Research on nursing honors programs indicate that honors programs are used to socialize high achieving students in research and to help prepare them as future leaders of nursing (Lim et al., 2016; Mahmoud et al., 2017; Reutter et al., 2010).

Honors programs provide undergraduate students with significant and meaningful research experience. Students experience the world of research including conducting research studies,

presenting findings, and publishing manuscripts (Stanford & Shattell, 2010). Opportunities to participate in real-life research experiences as part of honors programs makes students appreciate evidence-based practice and the impact of research on patient care (Mahmoud et al., 2017). One of the goals of honors programs in nursing is to promote early entry into graduate school (Reutter et al., 2010). Graduates of honors programs are more likely to pursue graduate education than graduates who did not participate in honors programs (Jukkala et al., 2016; Lim et al., 2016). An alumnus of the Calvin BSN program, now faculty at a renowned research university, and a co-author of this paper (YJA), details the impact of participating in honors research while at Calvin University:

“I had the opportunity to conduct honors research during my undergraduate program. I was one of the two students from my school who presented research posters at the 2012 Annual Midwest Nursing Research Society Conference (MNRS) student poster competition. I also presented a research poster at the 2012 Sigma Theta Tau International Kappa Epsilon research event. My undergraduate research experiences promoted and sustained an interest in conducting research and prepared me for graduate school research.”

#### **Strategy #4: sustaining interest in pursuing PhD Program in Nursing**

It is not sufficient to promote undergraduate nursing students' interest in pursuing a PhD Program in Nursing, it is also essential to sustain these interests. This becomes important when students are undecided about pursuing a graduate program or their ability to survive or even thrive in a PhD program. Nursing programs can support their students by creating seminar/educative sessions and/or elective courses to discuss graduate school options as well as assist the students in writing their graduate school applications. Availability of institutional support to write successful graduate school applications will reduce students' anxieties, fears of failure and feelings of unpreparedness for graduate education.

The graduate school preparatory elective course offered by CUDON discussed in the earlier part of this paper provided a much-needed support for the graduates of the program. This was expressed in the reflection by (co-author LD) as follows:

“I took a course on Graduate School options in Nursing taught by Dr. MMD at Calvin University. This course gave me time, support, and guidance to explore the differences between DNP and PhD and begin considering the possibility of pursuing an advanced degree. Although the DNP seemed like a better fit for me on paper, I was drawn to the PhD. We had the opportunity to write graduate school essays and prepare a portfolio which I used in the future to apply for my programs”.

#### **Strategy #5: extensive individualized mentorship, encouragement, and role modeling**

Engaged mentorship is important to promote and sustain interest in pursuing a PhD in nursing. An *engaged mentor* is a compassionate and encouraging role model who is available to interact and collaborate with the mentee at every stage of career development to foster productivity for the mentee and the mentor. These mentors provide guidance to help students pursue and succeed in their academic and career pursuits.



### Available, knowledgeable and inspiring mentors

It is essential to have mentors who are passionate about their work as nurses and nurse scientists, actively involved in research and available to answer students' questions about real-life nursing research and address some of the myths and misconceptions about PhD programs in nursing. A CUDON alumni (co-author LD) concisely expressed the positive effect of engaged mentors in her reflections:

“One of my professors foreshadowed my future decision to do the PhD, saying, ‘After several years of clinical practice, you will get restless and frustrated by problems that don’t have solutions. This will inspire you to go back to get a PhD to find those solutions and implement them to create system level change.’ Another professor said, ‘Your brain works like a PhD brain. You see the bigger picture, how things interact, the system level problems and potential solutions. That’s how scientists think.’ All of these faculty members were PhD prepared nurses with a deep passion for their topic areas who remained involved in clinical practice”.

There are several ways mentoring can impact undergraduate students' experiences and their graduate school decisions. The type of information provided to address students' concerns in a mentoring relationship could be a facilitator or a barrier to the desire to pursue a PhD in nursing. There are situations where undergraduate students may desire to pursue a PhD but have misconceptions that they would not be able to practice nursing if they are nurse scientists or researchers. Modeling how research contributes to clinical practice or patient care is a strong factor that could positively inspire students to pursue their PhD in nursing. One of the co-authors' (LD) reflection on her undergraduate experience further shows that it is important for faculty mentors to address these concerns. LD stated that:

“Dr. ABA would remind us that having a PhD gives you a seat at the table to advocate for the patients you care deeply for and have taken care of as a bedside nurse. I was afraid that becoming a researcher meant I had to completely abandon my clinical practice, something which I was unwilling to do. I thrive at the bedside and had been looking forward to becoming a nurse for so long that I didn’t want to go do a PhD right away.”

It is essential to let undergraduate nursing students know that having a PhD in nursing can strengthen your ability to advocate for your patients and make impact on policies as a nurse scientist. Graduate education is extremely individualized and tailored to each students' own career goals and priorities. Thus, clinical practice and PhD education are far from mutually exclusive, and many students maintain clinical practice during their PhD program. Indeed, innovative PhD programs are beginning to offer clinical practice fellowships for direct admit BSN-PhD students to address this perceived barrier (Greene et al., 2017). Some faculty mentors believe that lack of clinical experience will prevent new nurse investigators or researchers from asking clinically important research questions (Greene et al., 2017), and thus encourage their students to gain as much clinical experience as much as possible before entering graduate studies (Vance et al., 2020). However, there is emerging evidence that direct admit BSN-PhD students who never practiced clinically are just as successful in terms of research productivity and postgraduate employment as both PhD students who have clinical experience and those who have masters' degrees (Nehls et al., 2016). Mentors

should advise students that while pursuing PhD education will not prevent them from practicing clinically if they wish, they can be just as successful without any clinical practice experience.

### **Mentoring to promote professional development and career goals**

Mentoring can positively influence students' career goals. A study on mentored research experiences found a strong correlation ( $r = 0.31$ ;  $p < 0.01$ ) between culturally relevant mentoring and refinement of students' academic and career goals (Haeger & Fresquez, 2016). Having a bond with faculty mentors facilitates future research collaborations between the mentor and the mentee (Mahmoud et al., 2017). Mentoring promotes professional development/career goals and influences decisions to apply to graduate school. Faculty mentors can help their students' network with other researchers by helping connect them with prominent nursing scientists or introducing them to colleagues during professional conferences (Mahmoud et al., 2017; Shanahan et al., 2015). Faculty mentors who go to conferences with students should introduce their students to colleagues and invite them to dinners with colleagues and other informal gatherings.

One of the co-authors of this paper (YJA), details the impact of mentoring while at Calvin University:

“My mentor took the time to know me and learn about my passion and future goals. My final year at Calvin University was when I started thinking about next steps after graduation. My undergraduate advisor, (co-author, AA), recommended that I apply for a BSN-PhD program. She had no doubts about my ability to succeed in a PhD program. Although I told her I did not think I wanted to pursue a PhD, she was so convinced that she kept on encouraging me to apply for a PhD program. Yet, I went to her office multiple times with applications to nurse practitioner programs. My reasoning was that I wanted to interact with patients and make good use of the compassionate and caring attributes people saw in me. Although I was convinced that I wanted to pursue graduate education, I thought becoming a nurse practitioner was the only way for me to impact women's lives and improve maternal health outcomes. Looking back, I know I reasoned that way because at the time, I did not know of the numerous opportunities a PhD in nursing will provide me to fulfill my passion and calling. It was a long journey to the PhD, but my mentor did not give up. She provided any information and resources I needed in my decision-making process and served as a reference on all my graduate school applications. Although I applied to and got accepted into master's programs, I eventually made a last-minute decision to pursue a PhD in Nursing and have never looked back. The complete story is available in my blog post ‘*my unexpected journey to the PhD in nursing*’”.

(Adams, 2015)

Faculty mentors can help with the research productivity of students. Mentors need to encourage students to disseminate their research and provide guidance on appropriate dissemination options such as conference presentations, journal articles, and research reports (Shanahan et al., 2015). Dissemination of research results and attendance at regional

conferences have positive impacts on students (Shanahan et al., 2015). One study has indicated that undergraduates who see their peers presenting research findings may be motivated to become involved in research themselves (Stanford & Shattell, 2010). This could possibly assist in preparing for graduate schools. Also, being co-authors with faculty mentors based on undergraduate research will help such students to have stronger PhD applications.

Participation in nursing conferences can provide networking opportunities for students to interact with renowned nursing experts they had possibly read about in their courses. The positive effect of attending nursing regional conferences was expressed by one of the CUDON alumni (co-author LD):

“We had the opportunity to attend Midwest Nursing Research Society (MNRS) conference, my first conference, and several of the students from my institution won awards. When I won the Research Scholar Award at MNRS in 2014, I felt incredibly affirmed in my potential to develop as a nurse scientist. A PhD program director contacted me following that conference to meet and discuss the PhD program at their university, which was also very affirming and prompted me to apply for their program several years later.”

To make these benefits possible, faculty mentors need institutional support and adequate funding to take undergraduate students to nursing conferences.

### **Promoting mentoring by diverse faculty**

Furthermore, having diverse faculty members from different backgrounds and social identities as engaged mentors are crucial to producing diverse PhD prepared nurses to serve the ever-more-diverse population of the United States. It is well established that while racial and ethnic minority populations are predicted to grow, diversity of the nursing profession does not reflect the nation's change in demographics (Phillips & Malone, 2014). The National Institutes of Nursing Research (NINR) recognizes the strong relationship between a diverse nursing research workforce and the research that includes a diverse study population and informs culturally competent health care with the goal of improving health outcomes and quality of life for all patients. To increase the number of future researchers that come from diverse backgrounds, the institutions also need to commit to recruiting, retaining, and equipping mentors of diverse backgrounds.

Research shows that minority students do not receive equal amounts of exposure to academic and mentorship opportunities that are foundational in underpinning further opportunities (Phillips & Malone, 2014). Studies have shown that having a mentor who has been through similar experiences based on a shared identity greatly benefits mentees in terms of identification, building trust, and setting expectations (National Academies of Sciences, Engineering, and Medicine, et al., 2020). Minority students in research training programs mentioned the value of seeing others like themselves (i.e., in race and gender) as a motivating factor in pursuing advanced degrees (Hurtado et al., 2009). An alumnus of the Calvin BSN program, now a PhD candidate at renowned research university, and a co-author of this paper (HL), stated:

“As an international student, I never would have thought to pursue a PhD if I didn’t have a role model that I could identify with. Being able to work closely with a professor (co-author AA) that also came to the United States as an international student, received her PhD, and was doing research that had real-life impact in the community showed me that I can also pursue a PhD and conduct meaningful research in wide range of contexts. Through her, I learned that research can go beyond my immediate community and residing country. Currently, my research is focused on the sub-Saharan African region.”

Offering research opportunities that address health disparities may be another promising approach to engage minority nursing students in research early on (Salerno et al., 2017). Mentoring students to personally experience the role they can play in addressing health disparities in vulnerable communities through research can make their research experiences especially meaningful (Salerno et al., 2017).

### Ongoing mentoring beyond undergraduate level

There is a need for ongoing support for baccalaureate students’ post-graduation and while in graduate programs. For instance, there are situations when undergraduate nursing students might not be sure of their graduate school plans at the time of graduation. To effectively support such new graduates, nursing programs should have a system in place to maintain contact with all their graduates and follow up with the students who expressed interest in pursuing a terminal degree in nursing. Nursing mentors would also be a great resource for their graduates who are thinking about applying to a graduate program in nursing. Ongoing support from CUDON faculty mentors was effective in encouraging recent graduates to pursue their PhD in nursing. According to one of the graduate co-authors (LD) the continued presence and tangible support from faculty throughout her undergraduate, clinical, and graduate careers was very helpful. A quote from (LD) states that:

“...faculty members met with me individually to talk about the possibility of the PhD even after I graduated and was working clinically. They were responsive and accessible, providing letters of recommendation and guidance on writing my admission essays. They helped me develop my research ideas and communicate them effectively in my applications”.

Graduation rate for PhD in nursing programs is not 100%, the average attrition rates are 30% (Fang et al., 2020). To sustain interest in the PhD in nursing program, it is essential for faculty mentors to continue to interact and fully engage with any of their graduates with potential interest in pursuing a PhD program in nursing. There are also times during the PhD programs when things get difficult, support from mentors can be helpful. For a successful completion of a PhD program, potential candidates will need different types of mentors and cheer-leaders depending on their stage in the program. A reflection from one of the graduate co-authors (LD) effectively summarizes the positive impact of ongoing support post-graduation:

“... After my first semester of the PhD, I met with all three of them [undergraduate faculty mentors] when I returned home for Christmas break and was feeling discouraged and lost. They provided perspective, encouragement, and support,

reminding me of why I was capable and that they were continuing to support me and were available to talk anytime”.

To realize the true impact of mentoring on promoting and sustaining interest in PhD programs, faculty time release is needed to enable faculty mentors to provide dedicated time to mentor the next generation of nurse scientists.

## Conclusions

The main strategies identified to be effective in promoting and sustaining interest in pursuing a PhD degree in nursing include the design of an undergraduate curriculum that promotes students' involvement in real-life research projects early during the nursing program from conceptualization to dissemination of findings. It is essential to discuss the benefits of a PhD education and its impact on the science of nursing and the future of the nursing profession early in the undergraduate nursing program. It is also essential for mentors to be passionate about their specialty of research, and to be fully engaged in mentoring undergraduate students. Another effective approach is to create both formal courses/seminars and informal talks to explain graduate school options including PhD applications and review process. Finally, there is a need for ongoing post-graduation support.

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