



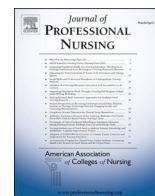
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What PhD competencies should guide the preparation of nurse scientists?

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ABSTRACT

PhD Summit attendees, as part of moderated roundtable discussions, responded to two questions: What PhD competencies should guide the preparation of PhD prepared nurses to function in current and emerging roles? and How has innovation in programs and curricula changed the landscape to prepare and support PhD students for success? The purpose of this report is to summarize Summit discussion around these issues and assess the current relevance of 2010 AACN competencies and whether they are adequate to meet the needs of emerging nurse scientists.

More than three decades ago, the Division of Nursing of the Department of Health and Human Services and the American Association of Colleges of Nursing (AACN) convened a consensus conference to assess the quality of PhD education for nursing (Jamann, 1985); two years later the AACN published its first Position Statement on Indicators of Quality in Doctoral Programs in Nursing (American Association of Colleges of Nursing, 1987). The latest update of the AACN position statement, The Research-Focused Doctoral Program in Nursing: Pathways to Excellence, published in 2010 (AACN, 2010), included both expected outcomes of PhD education and core curricular elements required to foster PhD student outcome achievement (Table 1). In 2012, the Council for the Advancement of Nursing Science (CANS) held an Idea Festival for Nursing Science Education to identify priority areas of science needed by PhD graduates to be successful in their future research careers (Henley et al., 2015). Among new priority areas identified by this group of nationally recognized nurse scientists were omics and the microbiome, big data, and health economics. During the same period, websites of PhD nursing programs were examined to identify PhD program curricular content; of 120 PhD program websites, only about half listed courses in nursing inquiry, fewer than one-fourth included informatics/information science, and biologic coursework such as genomics was noted less than 10% of the time (Wyman & Henly, 2015). This suggests that PhD curricula, and hence the competencies of nurse researchers, may not be keeping pace with changes in healthcare and science.

In October 2019, 77 nurse scientists representing deans and PhD program directors from 18 research-intensive universities in the United

States, leaders from professional nursing organizations and foundations who have invested in the education of nurse scientists, e.g., Robert Wood Johnson Foundation, and nurse leaders from the Latin American and Caribbean region attended an invitational Summit held at the University of Pennsylvania to examine research focused PhD programs in nursing at research intensive schools. Specifics regarding participating institutions and the overall charge of Summit attendees have been described by Fairman, Giordano, McCauley, and Villaruel (n.d.). A subgroup of approximately 20 Summit attendees, as part of moderated roundtable discussions, responded to two questions about competencies and recent PhD program curricular innovations: What PhD competencies should guide the preparation of PhD prepared nurses to function in current and emerging roles? and How has innovation in programs and curricula changed the landscape to prepare and support PhD students for success? The purpose of this paper is to briefly summarize Summit discussion around these issues and assess the current relevance of 2010 AACN competencies and whether they remain adequate to meet the needs of emerging nurse scientists.

PhD programs in nursing should provide a foundational preparation for future nurse scientists who, during the course of their careers, will generate new knowledge to advance nursing practice, improve health-care quality, shape health policy and improve population health (AACN, 2010). To achieve this goal, PhD curricula must remain relevant regarding required coursework, mentoring, and experiences to both prepare and acculturate PhD students to be successful in both traditional nurse scientist roles as well as those roles not currently envisioned. During roundtable discussions, Summit attendees noted that PhD

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prepared nurses needed competencies in health policy and innovation and global engagement to function in current and emerging roles. What was far less clear from the discussion was both when and how these competencies should be achieved and the expectation regarding level of competency achievement during predoctoral education.

The most frequent PhD curricular innovations reported by Summit attendees were new ways of learning (distance learning and BSN to PhD academic progression) and shorter timeframes for program completion. The landscape of PhD education has clearly changed over the past decade. This has been driven, in part, by the recommendation of the National Academy of Medicine's 2010 Future of Nursing report that the number of nurses with a doctorate double by 2020 ([The Future of Nursing: Leading Change, Advancing Health, 2011](#)) as well as a nurse faculty shortage that has exacerbated over the past decade ([American Association of Colleges of Nursing, 2019](#)). Foundation supported initiatives such as the Hillman Scholars in Nursing Innovation and the Robert Wood Johnson Future of Nursing Scholars programs have stimulated increased BSN to PhD student progression as well as efficiencies in PhD program delivery, leading to shorter duration PhD programs. However, the outcomes and benefit of these innovations, if any, remain unclear. In one sample of 84 PhD nursing graduates at the University of Wisconsin-Madison, few differences were found between BSN to PhD graduates compared to those with greater educational and/or work experience in terms of both research scholarship during doctoral education and post-graduation employment ([Nehls, Barber, & Rice, 2016](#)). Further research is needed to critically examine whether these curricular innovations are working.

Achieving beginning competency in teaching was also identified by some Summit attendees as being prerequisite for PhD graduates, particularly for those whose career focus will be in pedagogy. This was somewhat surprising as Summit attendees represented research-intensive universities whose goal is to prepare nurse scientists, not nurse educators. However, others have argued that formal preparation for the teaching role can and should be integrated within PhD curricula ([Fiedler, Degenhardt, & Engstrom, 2015](#)) as approximately 80% of graduates from PhD nursing programs nationwide will pursue faculty roles with emphasis in teaching ([Ketefian & Redman, 2015](#)). A recent integrative review ([Bullin, 2018](#)) synthesized findings of 139 peer-reviewed articles that described the dichotomy between the need for graduates who will pursue teaching roles to be equipped with pedagogical skills and the very limited extent to which PhD programs prepare graduates for this role either through curricular offerings or mentoring. In an environment where demand for knowledge is greater than ever before and shorter time to degree completion is becoming more prevalent, it is critical that PhD program curricula, particularly for programs where the majority of its graduates aspire to careers in teaching, be consistent with these career goals.

It is clear that formal education for nurse scientists who aspire to careers in research-intensive universities cannot end upon graduation from a PhD program ([Beckett, 2014](#)). Like many other professions, postdoctoral education has become key to build on knowledge gained as part of PhD curricula. As many PhD programs now provide opportunities for PhD students to develop their dissertations using the publication format ([Graves et al., 2018](#); [Smaldone, Heitkemper, Jackman, Joanne Woo, & Kelson, 2019](#)), postdoctoral trainees no longer require extensive time during postdoctoral training to convert a traditional formatted dissertation into manuscripts suitable for publication. The postdoctoral training period may be an ideal time to incorporate additional exposure and application of competencies such as informatics and information sciences, data science, genomics and implementation science to one's emerging area of scientific inquiry. Support for postdoctoral positions in nursing has been primarily through federally supported T32 training programs. However, the number and foci of these programs in nursing is limited and inadequate to support the number of current and future applicants. In recognition of this, Summit attendees confirmed that new areas of funding for postdoctoral opportunities from foundations and

other sources are needed.

Today, the expectation of PhD graduates is acquisition of a basic level of research competency as applied to a specific focus area. While core curricular elements, particularly in the areas of new scientific methods, advanced research designs and statistical methods, require ongoing assessment regarding relevancy to current and future PhD student needs, it is the opinion of the authors that the 2010 AACN competencies to develop the science, steward the discipline and educate the next generation remain highly relevant today. Post-doctoral education should begin to prepare nurses to be ongoing lifelong learners and members of a faculty which seeks to create a "learning organization".

In summary, while Summit participants did not develop specific recommendations, they concurred that current PhD curriculum needs to keep pace with rapidly changing and expanding areas of science while focusing less on specific content and more on building methodologic and thinking/problem solving skills to imbue students with a commitment to innovation and continuous, life-long learning. This will require more efficient and effective teaching methods such as simulation, field experience, and integration of interdisciplinary and team science experiences. Such methods have become even more important since the Summit because of the need to identify effective ways to use virtual and digital teaching options because of the COVID-19 pandemic ([Bearman & Davidson, 2020](#); [Bova, Perry, Kane, Morris, & Fain, 2018](#); [Burki, 2020](#)). A major challenge for nursing faculty will be how to effectively support PhD students to develop Socratic and other active methods for learning, including thoughtful reflection, discussion, questioning and interaction using online technology ([Armstrong, McCurry, & Dluhy, 2017](#); [Liu, 2019](#); [Seymour-Walsh & Weber, 2020](#)). To add to this challenge is the need to streamline programs to expeditiously get students into the workforce that is desperate for nurse scientists. This implies that the approach in general is not to add new courses but to incorporate more such experiences into 'core' curriculum and electives. Additionally, continuing education, refreshing and enhancing faculty teaching-learning expertise, and new sources of funding for formal post-doctoral training will be needed.

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None.

References

- AACN. (2010). The research-focused doctoral program in nursing: Pathways to excellence. https://www.uab.edu/nursing/home/images/AACN_doctoral_task_force_report.pdf.
- American Association of Colleges of Nursing. (1987). Indicators of quality in doctoral programs in nursing. *Journal of Professional Nursing*, 3, 72–74.
- American Association of Colleges of Nursing. (2019, April). Nursing faculty shortage. <https://www.aacnnursing.org/News-Information/Fact-Sheets/Nursing-Faculty-Shortage>.
- Armstrong, D. K., McCurry, M., & Dluhy, N. M. (2017). Facilitating the transition of nurse clinician to nurse scientist: Significance of entry PhD courses. *Journal of Professional Nursing*, 33(1), 74–80. <https://doi.org/10.1016/j.profnurs.2016.06.005>.
- Bearman, A., & Davidson, P. (2020). Service learning and COVID-19 – What the future might look like? *Journal of Clinical Nursing*. <https://doi.org/10.1111/jocn.15369>.
- Beckett, D. M. (2014). PhD preparation of nurse faculty and nurse scientists: Do they have to be the same? *Nursing Research*, 63(3), 156–157. <https://doi.org/10.1097/NNR.0000000000000042>.
- Bova, C., Perry, D. J., Kane, A. T., Morris, N. S., & Fain, J. (2018). Expanding horizons: Loneragan's philosophy as a guide to PhD program pedagogy. *Nursing Outlook*, 66(1), 77–83. <https://doi.org/10.1016/j.outlook.2017.07.003>.
- Bullin, C. (2018). To what extent has doctoral (PhD) education supported academic nurse educators in their teaching roles: An integrative review. *BMC Nursing*, 17(6). <https://doi.org/10.1186/s12912-018-0273-3>.
- Burki, T. K. (2020). COVID-19: Consequences for higher education. *Lancet Oncology*, 21, 758. [https://doi.org/10.1016/S1470-2045\(20\)30287-4](https://doi.org/10.1016/S1470-2045(20)30287-4).

- Fairman, J.A., Giordano, N.A., McCauley, K., & Villaruel, A., Invitational summit: Re-envisioning research focused PHD programs of the future. *Journal of Professional Nursing*, (under review).
- Fiedler, R., Degenhardt, M., & Engstrom, J. L. (2015). Systematic preparation for teaching in a nursing doctor of philosophy program. *Journal of Professional Nursing*, 31(4), 305–310. <https://doi.org/10.1016/j.profnurs.2015.02.009>.
- Graves, J. M., Postma, J., Katz, J. R., Kehoe, L., Swalling, E., & Barbosa-Leiker, C. (2018). A national survey examining manuscript dissertation formats among nursing PhD programs in the United States. *Journal Nursing Scholarship*, 50(3), 314–323. <https://doi.org/10.1111/jnu.12374>.
- Henley, S. J., McCarthy, D. O., Wyman, J. F., Heitkemper, M. M., Redeker, N. S., Titler, M. G., ... Dunbar-Jacob, J. (2015). Emerging areas of science: Recommendations for nursing science education from the council for the advancement of nursing science idea festival. *Nursing Outlook*, 63(4), 398–407. <https://doi.org/10.1016/j.outlook.2015.04.007>.
- Jamann, J. S. (1985). Proceedings of doctoral programs in nursing: Consensus for quality. *Journal of Professional Nursing*, 1, 90–121.
- Ketefian, S., & Redman, R. W. (2015). A critical examination of developments in nursing doctoral education in the United States. *Revista Latino-Americana de Enfermagem*, 23(3), 363–371. <https://doi.org/10.1590/0104-1169.0797.2566>.
- Liu, Y. (2019). Using reflections and questioning to engage and challenge online graduate learners in education. *Research and Practice in Technology Enhanced Learning*, 14(3). <https://doi.org/10.1186/s41039-019-0098-z>.
- Nehls, N., Barber, G., & Rice, E. (2016). Pathways to the PhD in nursing: An analysis of similarities and differences. *Journal of Professional Nursing*, 32(3), 163–172. <https://doi.org/10.1016/j.profnurs.2015.04.006>.
- Seymour-Walsh, A. E., & Weber, A. (2020). Practical approaches to pedagogically rich online tutorials in health professions education. *Rural and Remote Health*, 20, 6045. <https://doi.org/10.22605/RRH6045>.
- Smaldone, A., Heitkemper, E., Jackman, K., Joanne Woo, K., & Kelson, J. (2019). Dissemination of PhD dissertation research by dissertation format: A retrospective cohort study. *Journal of Nursing Scholarship*, 51(5), 599–607. <https://doi.org/10.1111/jnu.12504>.
- The Future of Nursing: Leading Change, Advancing health. (2011). Retrieved from Washington, D.C.: doi:10.17226/12956.
- Wyman, J. F., & Henly, S. J. (2015). PhD programs in nursing in the United States: Visibility of American Association of Colleges of nursing core curricular elements and emerging areas of science. *Nursing Outlook*, 63(4), 390–397. <https://doi.org/10.1016/j.outlook.2014.11.003>.