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The History and Development of Doctor of Health Science (DHSc) Programs in the United States - Past, Present, and Future PART I - Past

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The History and Development of Doctor of Health Science (DHSc) Programs in the United States - Past, Present, and Future PART I - Past

Abstract

Purpose: This three-part article series will elucidate how the Doctor of Health Science (DHSc) programs in the United States were envisioned and introduced. **Method:** Part I discusses relevant historical information about Higher Education and the traditional Doctor of Philosophy (PhD) degree to reach this goal. It describes the transition of PhD philosophies to professional doctorates by following the historical postgraduate program paths in education, nursing, and public health. Included is a brief discussion about the rapid growth of professional doctorates. Part I ends by identifying the origins of DHSc programs within the United States system of higher education. Part II of the series reviews the evolutionary stages of professional doctorates and DHSc programs. The article compares the DHSc degree to a PhD degree and examines the current state of DHSc programs. Part III presents current and future trends among DHSc programs in the United States. It focuses on workplace expectations of doctoral graduates, changing learner demographics and needs, essential curriculum designs for students, competency-based learning, assessment for future learners, design of culminating projects critical for prospective DHSc learners, and the importance of third-generation style DHSc programs. **Conclusion:** These are the first papers that record the origins, development, current state, and trends of DHSc programs in the United States.

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The History and Development of Doctor of Health Science (DHSc) Programs in the United States - Past, Present, and Future

Part I: The Past

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ABSTRACT

Purpose: This three-part article series will elucidate how the Doctor of Health Science (DHSc) programs in the United States were envisioned and introduced. **Method:** Part I discusses relevant historical information about Higher Education and the traditional Doctor of Philosophy (PhD) degree to reach this goal. It describes the transition of PhD philosophies to professional doctorates by following the historical postgraduate program paths in education, nursing, and public health. Included is a brief discussion about the rapid growth of professional doctorates. Part I ends by identifying the origins of DHSc programs within the United States system of higher education. Part II of the series reviews the evolutionary stages of professional doctorates and DHSc programs. The article compares the DHSc degree to a PhD degree and examines the current state of DHSc programs. Part III presents current and future trends among DHSc programs in the United States. It focuses on workplace expectations of doctoral graduates, changing learner demographics and needs, essential curriculum designs for students, competency-based learning, assessment for future learners, design of culminating projects critical for prospective DHSc learners, and the importance of third-generation style DHSc programs. **Conclusion:** These are the first papers that record the origins, development, current state, and trends of DHSc programs in the United States.

Keywords: professional doctorate, doctorate education, education trends

INTRODUCTION

The Doctor of Health Science degree (DHSc) is an interprofessional doctorate specific to healthcare. The DHSc degree differs from the research-based and topic-specific Doctor of Philosophy (PhD) degree. Unlike specific clinical doctorates, such as medical (MD, DO), or pharmacy doctorates (PharmD), a DHSc doctorate is a diversified degree that allows healthcare professionals from multiple healthcare backgrounds to obtain a doctorate-level terminal designation to use in various healthcare-related settings such as leadership roles in clinical practice, education, or administration. This three-part article series will review how the Doctor of Health Science (DHSc) programs in the United States were envisioned and initiated, the evolutionary stages of professional doctorates, and the future trends in professional doctorate degrees.

HISTORICAL PERSPECTIVE - HIGHER EDUCATION AND DOCTOR OF PHILOSOPHY (PhD)

A brief history of higher education and the Doctor of Philosophy (PhD) offers a perspective on the origins and development of DHSc programs. The University of Bologna, established around 1088, is accepted as the first university for formal learning.¹ Societies and cultures have used higher education to enlighten their significant decision-makers, such as politicians, judges, clergy, and the military.² Universities promoted teaching, learning, scholarship, and freedom of thought. Their formal start in Europe differentiated them between Church and State philosophies in many countries. For the most part, modern universities around the world have not strayed far from their origins of structure or purpose.²

Doctorate degrees originated in Medieval Europe and were a prerequisite for teaching rather than experience in research.³ The research-based PhD began at the University of Berlin, founded in 1810.⁴ Students attended seminars, submitted original and creative research theses, and graduated based on an oral exam.^{5,6} Through obtaining the PhD, students established themselves as experts in their field and in the eyes of their peers.³

Higher education structures and traditions came to North America in the mid sixteen hundreds. Harvard claims to be the oldest institution of higher learning in the United States. As it was initially known, Harvard College drew its academic foundations from the British educational system.⁷ PhD programs did not exist in the United States (U.S.) before the mid-1800s, therefore those seeking educational expertise went to Germany for their PhD. Upon their return to the U.S., these scholars formed the foundation for academic research at colleges and universities in America.⁸ In 1861, Yale was the first American University to adopt the Doctor of Philosophy. After three years, students received their degree if they attended classes, did original research, wrote a thesis, and passed an oral exam. They also required reading knowledge of one foreign language.⁹ Thus began the rapid U.S. expansion of PhD programs from the 1860s to the 1900s.³

In the late 19th and early 20th centuries, there was a strong push among higher education institutions in the U.S. towards teaching sciences and emphasizing specialization in one area. Chemistry, physics, and engineering programs proliferated to address U.S. industrialization.¹⁰ For example, the number of chemists grew sixfold from 1900 to 1940. In addition, society and industrial interest in biology, agriculture, and social sciences pushed higher education further into specialization in these and other fields. During these years, private industry and higher education moved in tandem.¹⁰ The concept of a PhD from a four-year institution fit with the societal needs of that era.

However, societal and workplace needs began to change. In 1995, the Institute of Medicine, National Academy of Sciences, and National Academy of Engineering, in their article, *Reshaping the Graduate Education of Scientists and Engineers*, suggested the time had come for PhD programs to change.¹¹ The Academies noted criticism from employers about the suitability of PhD graduates for the workplace. Employers believed that students were too specialized and that workplaces required varied skills. As a result, new graduates needed help adapting to their new work environment. With only one-third of doctoral graduates choosing academia, the Academies thought schools should better prepare the other two-thirds for their work environment.¹¹ They pointed out that most graduates sought professional employment in applied research, research development, and consulting. They advised doctorate programs to offer professors and students more versatility and career guidance and increase discussion and collaboration among stakeholders such as higher education institutions, governments, industry, and professional societies.

The conceptual framework for the DHSc degree is based on concepts as described by Taylor and Maxwell and Lee et al.^{12,13} In addition, Taylor and Maxwell cite the work of Gibbons et al. (as cited in Taylor and Maxwell) in discussing how the new "knowledge society" has produced effects on both universities and employers by displacing the production of knowledge from the traditional university setting into the workplace, thus looking at the production of knowledge in the "context of application" instead of in the research laboratory.¹²

Responding to the call for a more practically based doctoral program for the professional, Lee et al. hypothesized working professionals needed a curriculum with doctoral rigor that addressed real-world problems in the workplace.¹³ Traditionally, the PhD

curriculum prepared individuals to perform research to generate new knowledge. This knowledge was quite specialized and historically confined to the silo of that individual's subspecialty.¹⁴

While this type of research did produce new knowledge, it often did not address any specific real-world problem and usually, it remained in the realm of the academy rather than seeing application in the workplace. PhD programs have also been relied upon to produce new academic staff at universities. Recent research has documented many individuals who graduated with a PhD did not intend to enter academe.¹⁵ However, due to the specialization of the PhD program, many of these doctorally-prepared individuals did not have the skills needed to address issues of the modern workplace.

Lee et al cited the creation of the “professional doctorate” that allowed graduate students to combine academic theory and professional knowledge as it applied to the workplace.¹³ Figure 1 (modified from Lee et al depicts the relationship of the three spheres describing theory, the workplace, and the profession. The intersecting area of overlapping interest represents the target area for the professional doctorate.¹³

Figure 1. Three Spheres in Academia: Theory, Workplace, Profession



While still convinced the doctoral student needed a strong basis in academic theory, Lee et al. envisioned a doctoral practitioner who had less skill in pure research but could apply theory to address everyday problems in the workplace.¹³ This model did not devalue the contributions of classical PhD training but rather suggested the creation of a hybrid doctoral curriculum preparing individuals to address a different set of problems via “applied research” while adding value to the workplace.¹²

Maxwell refined this concept, describing the professional doctorate as “a vehicle which draws together the state of the art in professional practice”, and applies solutions to work-based problems; with a resulting change within the student's workplace.^{16(p288)} Maxwell described an interdisciplinary program, that could address problems in the workplace, which by its nature are multifaceted and complex. He recognized the professional doctorate as a vehicle drawing professional practice and relevant academic theory together to solve problems either in the workplace or in society.¹⁶ It was this concept that helped formulate the tenets of what a professional doctoral curriculum contained.

As the concept of the professional doctorate gained acceptance, it matured from the original concept described by Taylor and Maxwell, the so-called first generation which followed the coursework plus thesis model, which was still quite similar to the PhD in structure.¹² Today, the professional doctorate concept has evolved to a second generation.¹⁶ The second-generation doctorate is more focused on discipline and workplace realities.¹⁷

Health professions have seen startling growth in the number of second-generation professional doctorates.¹⁸ Some of the disciplines that have developed professional doctorates include audiology, nursing, physical therapy, athletic training, and occupational therapy as well as non-health related fields such as education and business. While there is divergence in the construct of the various programs, these types of professional doctorates share certain commonalities:

- They typically do not require original research¹⁸
- They typically include a clinical component¹⁸
- They promote “mode 2 knowledge,” defined as knowledge in context of application¹²
- They promote a tripartite collaboration between profession, workplace, and university spheres¹²
- They prepare stewards of practice¹⁹

The Doctor of Public Health (DrPH), Doctor of Education (EdD), and the Doctor of Nurse Practitioner (DNP) exemplify professional doctorates that have separated from their PhD predecessors. Their evolution shows how some areas of higher education were leaning towards a more pragmatic and work-friendly educational style. These professional doctorates highlight a similar historical and development pattern to the DHSc.

DOCTOR OF PUBLIC HEALTH (DrPH)

The Doctor of Public Health (DrPH) is an advanced professional practice degree that like the DHSc, depending on the University specific program, changes emphasis between a professional practice degree versus a research-based degree. The conceptualization of a doctorate in public health degree is apparent in the 1901 *Report of the Committee on Teaching of Hygiene and Granting of Diploma of Doctor of Public Health*.²⁰ The intent was to adopt the English model already in place, which restricted the degree to physicians. However, a year later, the lead Report author wrote, “...there has been no demand for the degree of Doctor of Public Health.”^{21(p171)} Instead, he suggested offering the degree to non-physicians. Sedgwick thought public health should include people from diversified backgrounds to promote better hygiene practices among health professionals, veterinarians, and the public.^{20,21}

However, it was not until the 1940’s that the Association of Schools of Public Health developed the Master of Public Health pathway into the DrPH for non-medical students.^{22,23} The Institute of Medicine in 1988 and others thought the DrPH was veering away from clinical practice and was too similar to PhD programs in structure and academic intent.^{24,25} Lee and others in 2009 stated the following about DrPH programs, “DrPH degree programs vary widely with regard to mission, admissions criteria (including prior degrees and prerequisite coursework), curriculum requirements, generalist vs. specialist orientation, program length, required fieldwork, culminating requirements such as dissertations and capstone projects, and competencies. There is not even consistency in the abbreviation for the degree,” with different SPHs (*Schools of Public Health*) using Dr.P.H., DrPH, and DPH abbreviations for their degrees.^{25(p177)}

In 2012, following the guidance of the Institute of Medicine, the Association of Schools of Public Health (ASPH) stated the core competencies needed for the DrPH and wanted students to use evidence-based knowledge and research skills to fill leadership roles in professional practice.^{23,26,27} The bifurcation between the research-based public health PhD and professional practice Doctor of Public Health remains.²⁸

The 2019 annual report from the Association of Schools and Programs of Public Health (ASPPH) pointed out that their programs are interdisciplinary, covering topics such as epidemiology, health informatics, public health practice, biomedical science, and health policy and management.²⁹ Like DHSc programs, DrPH programs are interprofessional and interdisciplinary; however, their focus is more closely aligned with one topic, public health.

DOCTOR OF EDUCATION (EdD)

Harvard's Doctor of Education encapsulates the ideological ambiguity in academia about professional doctorates and PhD doctorates. Harvard granted the first American EdD in 1921.³⁰ Yet, they ended this longstanding, respected program in 2012.³¹ Their reasoning was that Harvard's graduate program wanted others to realize their EdD degree was research-based rather than a professional degree. They thought that changing the designation from a Doctor of Education to a Doctor of Philosophy would meet their goal. They saw the EdD as a practice degree for those seeking administrative duties as practitioners.³¹

DOCTOR OF NURSE PRACTITIONER (DNP)

In 1860, Florence Nightingale, the founder of modern nursing, established the first nursing school globally.³² From this origin, nursing established a Bachelor of Nursing (BN), a Bachelor of Science in Nursing (BScN), and a Master of Nursing (MN). The 2010 *The Future of Nursing: Leading Change, Advancing Health* report by the Institute of Medicine recommended that nurses pursue Master and Doctorate training to rise within healthcare and education professions.³³

Regarding post-graduate degree demand, the American Association of Colleges of Nursing provided the following facts³⁴ Nursing is the nation's largest healthcare profession with over 3.8 million registered nurses (RNs). The employment of registered nurses will grow 15% from 2016 to 2026, much faster than the average for all occupations. As a result, the current demand for master's

and doctor-prepared nurses outstrips the supply. Besides the Doctor of Nurse Practitioner (DNP), nurses can obtain a PhD in nursing or a Doctor of Nurse Science (DNS/DNSc), the latter two are research-based. There are 135 Nursing PhD programs and only four DNS programs in the U.S.³⁵ By contrast, in 2020, there were 357 DNP, clinical doctorate programs with 60 more planned.³⁶ American Association of Colleges of Nursing (AACN) endorsed the transition to the Doctor of Nurse Practitioner (DNP) for advanced practice nurses more than a decade ago, with the complete transition to the doctorate planned for and completed in 2015.³⁶

From 2010 to 2020, the annual number of student graduates from nursing PhD programs grew from 532 to 759.³⁷ However, this growth is minimal compared to the growth of clinically oriented DNP graduates. In 2010, 1,282 graduated from DNP programs; by 2020, this number reached 9,158. These data suggest that nursing students prefer the professional clinically oriented doctorate designations.³⁷

WHY THE GROWTH OF POST-PROFESSIONAL DOCTORATES OR ADVANCED PRACTICE DOCTORATES?

There are numerous reasons for the growth of post-professional or advanced practice doctorates. Two examples include an increased workplace demand for health care professionals, as seen with nursing; and the reality that students with advanced degrees earn almost four times the wage of a high school dropout.³⁸ Zusman suggested that professional bodies responsible for "credentialism and gatekeeping" promoted an increase in post-professional doctorates to promote status, autonomy, and salaries of their members; and promote their professional profile of their field.¹⁸ Competitive institutional pressure to have highly educated faculty may also have added to the growth of post-professional doctorate degrees. Regardless of etiology, post-professional doctorate availability has emerged in the U.S., with healthcare leading the way. From 2000 to 2012, post-professional practice doctorate programs went from a few to 500.¹⁸

HISTORY: DOCTOR OF HEALTH SCIENCE

Nova Southeastern University: Doctor of Health Sciences

In 2002, Nova Southeastern University in Florida (NSU) under the leadership of Dr Richard Davis, a physician assistant with a EdD; and Dr. Guy Nehrenz, a respiratory therapist with a EdD, initiated the first regionally accredited online Doctor of Health Science program in the United States. The program was initially envisioned as a post-professional program for physician assistants, but before opening to the public the program was opened to all health practitioners with a master's degree. This allowed for a mix of professions to learn together. The original class of 14 was made up of one nurse with the rest of the cohort being Physician Assistants. However, the mix quickly began to include multiple professions. This was important because healthcare was shifting towards interprofessional collaboration for education and service delivery at the time. This program emphasized the interprofessional relationships and interaction needed in the areas of global health, research, healthcare systems, and healthcare education.

A.T. Still University: Doctor of Health Sciences

The second DHSc program in the United States started in 2008 at A.T. Still University (ATSU) by Dr. Randy Danielsen, a physician assistant with a PhD; Dr. Eric Sauers, an athletic trainer with a PhD; and Dr. Helen Ewing, a registered nurse, who obtained her DHSc from the first graduating class at NSU. ATSU established the Doctor of Health Sciences degree program as a post-professional degree. The DHSc program was developed to enhance the professional, academic, and applied research skills needed to provide competent leadership in the professional disciplines of the health sciences. The ATSU DHSc focuses on critical analysis and evaluation of complex issues and challenges arising in professional practice or affecting an area of professional practice, with the practical objective of resolving them optimally. This degree program has shown many positive outcomes for healthcare as well as serving to meet the health profession's education needs outlined by the Institute of Medicine (IOM) Health Professions Education Summit.²⁶ In response to the IOM call for health professions education reform, the DHSc is based on a set of five core competencies. These five core competencies include the ability to: 1) provide patient-centered care, 2) work in interdisciplinary teams, 3) provide evidence-based practice, 4) apply quality improvement, and 5) utilize health information technology. Training and graduating doctoral health care providers using these core competencies as a foundation should result in the enhancement of healthcare services across the country.

The backgrounds of these DHSc builders show interdisciplinary origins, which are the hallmark of DHSc programs. Collaboration is another essential foundational component of DHSc programs. Although the NSU and ATSU programs were competitors, they have shared faculty, administrative and scholarship ideas for many years.

Doctor of Health Sciences Degree Outcomes

The DHSc graduate demonstrates skills in developing and providing healthcare services emphasizing decision analysis and evidence-based practice, achieving optimal outcomes through sound technical and practical methods from the decision sciences

and informatics, while practicing patient-centered care. The DHSc enables the student to pursue research and scholarship to advance professional practice. Health practice requires health professionals to be more responsive to health system issues, to be more focused on the efficacy of clinical and public health interventions, and to be more flexible in the ways the choice of services is developed, and services provided. These emerging changes require leaders in the health professions to develop sophisticated intellectual and practical skills that have not, until recently, been taught as part of their entry-level professional degree programs. For example, health professionals must become skilled in the evaluation of professional practice and achievement of outcomes at individual and population levels, and in developing new ways of organizing the delivery of care to clients in organizations with diminishing resources. Graduates of the DHSc program pursue research and scholarship directed towards advanced professional practice. Graduates are also recognized as innovative leaders in education, policy development, and evidence-based practice. The DHSc was designed to provide specific professional development for experienced health professionals who wish to acquire the knowledge and skills required to assume leadership roles as health professional practitioners. It supports the development of high standards of relevant academic and clinical skills in health professionals. This occurs through an emphasis on systematic and scientific investigations to interpret theory and research, critique current methods and intervention, and translate these findings into a form, which can direct present and future practice.

Upon completion of the DHSc degree program, graduates achieve knowledge and skills in planning optimally allocated healthcare services, in day-to-day management and in the long-term administration through high quality decision-making, analysis, and assessment by emphasizing evidence-based practice, healthcare outcomes, and information technology, while practicing patient-centered care and promoting inter-professional values and teamwork. The professional doctorate is a path for professionals in health-related areas to further develop their expertise and increase their research capabilities by providing them with the skills and experiences that will permit them to achieve optimal outcomes with the constraints imposed by limited resources.

SUMMARY

DHSc programs were born during a time of a shifting from PhD degrees to post-professional terminal degrees. External forces promoted doctorate-level training to move away from the traditional new knowledge, research and siloed expertise to a model that embraces interprofessional collaboration, scholarship, and evidence-based knowledge as a pathway to useful employment and leadership. Professional bodies also play a role in recognizing and learning from the struggles in advancing professional practice doctorates and supporting the current educational needs of health professionals and the health system. This brief historical summary shows that societal needs and expectations of higher education graduates have changed.

REFERENCES

1. Ruegg, W., De Ridder-Symoens, H. (editors). *A history of the university in Europe*. Cambridge University Press;1992.
2. Perkin, H. *History of Universities*. Forest J.J.F., Altbach P.G. (eds). International Handbook of Higher Education. Springer International Handbooks of Education, 18. Springer; 2007. https://doi.org/10.1007/978-1-4020-4012-2_10
3. Simpson, R. *How the Ph.D. came to Britain: A century of struggle for postgraduate education*. Guildford: Society for Research into Higher Education; 1983. PMID: PMC1139601
4. Wyatt, J. "The lengthening shadow of one man": The public intellectual and the founding of universities. *Higher Education Review*.1998;30(2): 29-49. <https://www.proquest.com/openview/9f641294113e663947ca220ca4a75440/1?pg-origsite=gscholar&cbl=1820949>
5. Goodchild, L., Miller, M. The American doctorate and dissertation: Six developmental stages. *New Directions for Higher Education*. 2002; 25(3):17-32. <https://doi.org/10.1002/he.9902>
6. Park, C. New variant PhD: The changing nature of the doctorate in the U.K. *Journal of Higher Education Policy and Management*. 2005;27(2):189-207. <https://doi.org/10.1080/13600800500120068>
7. Morison, S. *Three centuries of Harvard 1636-1936*. Belknap Press with Harvard University Press;1986. ISBN-13: 978-0674888913
8. Schatte, C. E. The persisting European heritage of the American PhD. *Improving College and University Teaching*. 1977;25(2):75-88. <https://doi.org/10.1080/00193089.1977.9927425>
9. Buchanan, A. L., Herubel, J. V. M. *The Doctor of Philosophy degree: A selective, annotated bibliography*. Greenwood Press;1995.
10. Goldin C., & Katz L. The shaping of higher education: The formative years in the United States 1890-1940. *Journal of Economic Perspectives*.1999;13(1): 37-62. <https://www.aeaweb.org/articles?id=10.1257/jep.13.1.37>
11. Institute of Medicine. *Reshaping the graduate education of scientists and engineers*. The National Academies Press;1995. <https://nap.nationalacademies.org/catalog/4935/reshaping-the-graduate-education-of-scientists-and-engineers>

12. Taylor, N., Maxwell, T. Enhancing the relevance of a professional doctorate: the case of the Doctor of Education degree at the University of New England. *Asia-Pacific Journal of Cooperative Education*. 2004;5(1):60-69.
13. Lee, A., Green, B., Brennan, M. Organizational knowledge, professional practice and the professional doctorate at work. In, J. Garrick & C. Rhodes (Eds.), *Research and knowledge at work. Perspectives, case-studies and innovative strategies* (pp. 117-136). London: Routledge; 2000.
14. Carnegie Project on the Education Doctorate, Founding Literature; 2010. <http://cpedinitiative.org/founding-literature>
15. Costley, C., Lester, S. Work-based doctorates: professional extension at the highest levels. *Studies in Higher Education*. 2011;37(3):257-269. <https://doi.org/10.1080/03075079.2010.503344>
16. Maxwell, T. From first to second generation professional doctorate. *Studies in Higher Education*. 2003;28(3):279-291. Doi: [10.1080/03075070309292](https://doi.org/10.1080/03075070309292)
17. Maxwell, T., Kupczyk-Romanczuk, G. "Producing the professional doctorate: A portfolio as a legitimate alternative to the dissertation". *Innovations in Education and Teaching International*. 2009;46(2):135-45. <http://www.informaworld.com/openurl?genre=article&id=doi:10.1080/14703290902843760>
18. Zusman A. Degrees of change: How new kinds of professional doctorates are changing higher education institutions. *Research and Occasional Paper Series*. 2013;8(13):1-20. <https://files.eric.ed.gov/fulltext/ED545185.pdf>
19. Kumar, S., Dawson, K. Exploring the impact of a professional practice education doctorate in educational environments. *Studies in Continuing Education*. 2013;35(2):165-178. <https://doi.org/10.1080/0158037X.2012.736380>
20. Sedgwick, W.T., Abbott, A.C., Probst, C.O., Ravenel, M.P., Suiter, A.W., Burrage, S., Johnston, W. Report of Committee on Teaching of Hygiene and Granting of Diploma of Doctor of Public Health. *Public Health Pap Rep*. 1901;27:87-91. PMID: 19601030; PMCID: PMC2329385.
21. Sedgwick, W.T. Report of Committee on the Teaching of Hygiene and Granting a Diploma of Doctor of Public Health. *Public Health Pap Rep*. 1902; 28:170-171. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2329443/?page=2>
22. Shepard, W.P., et al. Institutions accredited by the American Public Health Association to give the degree of Doctor of Public Health for the academic year 1946-1947. *American Journal of Public Health*. 1946;36(9):1038-1039. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1625926/>
23. Canyon, D., Maddock, J., Lowery, T., Hayes, D., Rajan, R. Public health hotline. Developing a novel doctorate in global and Indigenous health leadership. *Hawaii Journal of Medicine & Public Health*. 2012;71(10):294-298 https://www.academia.edu/28284161/Developing_a_Novel_Doctorate_in_Global_and_Indigenous_Health_Leadership
24. Institute of Medicine. *The future of public health*. Washington, DC: National Academy Press; 1988. <https://www.ncbi.nlm.nih.gov/books/NBK218218/>
25. Lee, J.M., Furner, S.E., Yager, J., Hoffman, D. A review of the status of the Doctor of Public Health degree and identification of future issues. *Public Health Rep*. 2009;124(1):177-183. doi: [10.1177/003335490912400123](https://doi.org/10.1177/003335490912400123)
26. Institute of Medicine. *Who will keep the public healthy?* Washington, DC: National Academy Press; 2003. <https://www.ncbi.nlm.nih.gov/books/NBK221695/>
27. Calhoun J.G., McElligott, J.E., Weist, E.M., Raczynski, J.M. Core competencies for doctoral education in public health. *Am J Public Health*. 2012;102(1):22-29. doi: [10.2105/AJPH.2011.300469](https://doi.org/10.2105/AJPH.2011.300469)
28. 2U Inc. Explore Doctor of Public Health Programs (PhD & DPH); 2020. <https://www.publichealthdegrees.org/program/doctorate/drph/>
29. Association of Schools and Programs of Public Health. Annual report; 2019. <https://aspgh.org/about/annual-report-pages/annual-report-2019/>
30. Perry, J. What does history reveal about the education doctorate? Latta, Margaret (ed.). *Placing Practitioner Knowledge at the Center of Teacher Education. Educational Policy in Practice: Critical Cultural Studies*. Information Age Publishing; 2012. https://www.researchgate.net/publication/272148726_What_does_history_reveal_about_the_education_doctorate
31. Basu, K. Ending the first Ed.D. program; 2012. <https://www.insidehighered.com/news/2012/03/29/country%E2%80%99s-oldest-edd-program-will-close-down>
32. Karimi, H., Alavi, N. Florence Nightingale: The Mother of Nursing. *Nurs Midwifery Stud*. 2015;4(2):e29475. doi: [10.17795/nmsjournal29475](https://doi.org/10.17795/nmsjournal29475)
33. Institute of Medicine. *The future of nursing leading change and advancing health, report brief*, 2010. doi: [10.17226/12956](https://doi.org/10.17226/12956)
34. American Association of Colleges of Nursing. *Nursing fact sheet*; 2022. <https://www.aacnursing.org/news-data/fact-sheets/nursing-fact-sheet>
35. American Association of Colleges of Nursing. *Ph.D. in nursing*; 2021. <https://www.aacnursing.org/news-data/research-data-center/phd-data>
36. American Association of Colleges of Nursing. *DNP fact sheet*; 2020. <https://www.aacnursing.org/news-data/fact-sheets/dnp-fact-sheet>

37. Campaign for action, American Association of Colleges of Nursing, Enrollment, and Graduations in Baccalaureate and Graduate Programs in Nursing (series). *Number of people receiving nursing doctorate degrees annually; 2022.*
<https://campaignforaction.org/resource/number-people-receiving-nursing-doctoral-degrees-annually/>
 38. United States Census Bureau. *Number of people with master's and doctoral degrees doubles since 2000; 2019.*
[Number of People With Master's and Doctoral Degrees Doubles Since 2000 \(census.gov\)](https://www.census.gov/data/tables/2019/education/number-people-with-master-s-and-doctoral-degrees-doubles-since-2000.html)
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