Transitions to Clinical Practice Doctorates: Audiology, Pharmacy, Physical Therapy & Nursing

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Overview

Over the past few decades in the United States, clinical doctorates (also referred to as professional practice doctorates) have been created in multiple fields. This brief outlines the transition to clinical doctorates in four health care fields: audiology, nursing (including midwifery), physical therapy, and pharmacy. We discuss the potential impacts of these transitions on key health care workforce objectives, as well as common trends across the four professions. Based on our literature review, we suggest that a transition to a single-entry clinical doctorate is expected to have a negative impact on supply, diversity, access to education, and cost, and a neutral impact on geographic distribution and retention.

Key takeaways

- There is little published evidence that clinical doctorates have led to better patient outcomes in the four professions. Even though some of these transitions occurred decades ago, little research has been conducted on their impact.

- Many professions hoped that transitioning to single-entry clinical doctorates would allow them to achieve similar status, recognition, and autonomy as physicians. Generally, this ambition has not been realized.
- Transitions to clinical doctorates have been challenging for some educational institutions, in some cases leading to a decrease in the number of available programs.
- There is little to no evidence on how these transitions impact workforce supply, but increased cost and time-to-degree suggest that they may negatively impact supply.

Problem

The number of clinical doctoral programs has grown from almost none in 2000 to hundreds today. Clinical doctorates typically focus on professional practice rather than original research and are usually shorter in duration than PhDs. Aside from these traits, there is a wide range of types of clinical doctorates.[1] The term 'single-entry doctorate' has been used to describe when a clinical doctorate is the only way to enter the profession—for example, in the United States, the only way to become a pharmacist is to earn a PharmD.

New clinical doctorates include:

- Acupuncture and Oriental Medicine (DAOM)
- Art Therapy (DrAT)
- Audiology (AuD)
- Marriage and Family Therapy (DMFT)
- Nursing Practice (including midwifery) (DNP)
- Occupational Therapy (OTD)
- Physical Therapy (DPT)
- Speech-Language Pathology (SLPD or CScD)
- Doctorate in Clinical Laboratory Science (DCLS)

Why it matters

At a time of significant health care workforce shortages and complex challenges in the health care system, policymakers and other stakeholders have an interest in why these types of degrees are increasing and how they affect the workforce and patient outcomes.

Workforce development goals

Any major change in the health care landscape has the potential to impact the stability and supply of the health care workforce. Ensuring an ample supply of health workers is just one critical goal of state health workforce policy. Additional California workforce goals[1] include:

1. Diversifying California's workforce so that it reflects the people it serves
2. Increasing the number of health workers in medically underserved areas, especially rural areas; and
3. Increasing the number of health workers serving Medi-Cal (California's state Medicaid program) members

Achieving these goals requires improved access to education, reduced cost and time to enter practice, and better retention[2]. The ultimate goal of health workforce development is better access, experience, and health outcomes for all patients, and improved job opportunities for health care workers.

[1]These goals are drawn from the Workforce for a Healthy California for All; Guiding Principles and Strategic Priorities - California Health and Human Services, and Elevating Equity through California's Health Workforce Funding Processes: Final Recommendations for HCAI.

[2] See above.

Below are the criteria related to these overall goals that we used to contextualize our review of clinical doctorate programs[3].

Access to education / acceptance rates. The accessibility of health profession education programs is impacted by a variety of factors, including but not limited to public awareness of the programs, exams, other application requirements, loan and grant eligibility, location of programs, admissions criteria and processes, and program acceptance rates.

Cost of education. The cost to the student is impacted by the tuition and fees charged by a school, the cost of living in the area, and whether students can hold a job while in their program. Cost to the institution is also a factor, with variable factors impacting the tuition charged.

Diversity of workforce. The diversity of the health care workforce is an important component of achieving health equity for patients. The diversity of the workforce is impacted by the demographics of students entering educational programs, as well as graduation and licensure rates, retention, and advancement in employment.

Appropriate supply. The overall supply of qualified health professionals in California should meet the demand and need for these providers. This goal is impacted by the number of students who graduate from schools each year, licensing exam pass rates, and the number of graduates seeking jobs in those professions in California.

Geography. Patients' access to care is directly related to the supply of health professionals in their area. A lower supply of health professionals in low-income and rural areas is an ongoing challenge in California. Programs can address this by locating in medically underserved areas, hosting classes online, recruiting students who commit to serving in rural

[3] Peterson K, Mertz E, Chapman, S. Accelerated Health Professions Education Programs in California. Policy at Healthforce Center at UCSF; June 2025. https://healthforce.ucsf.edu/publications/accelerated-health-professions-education-programscalifornia

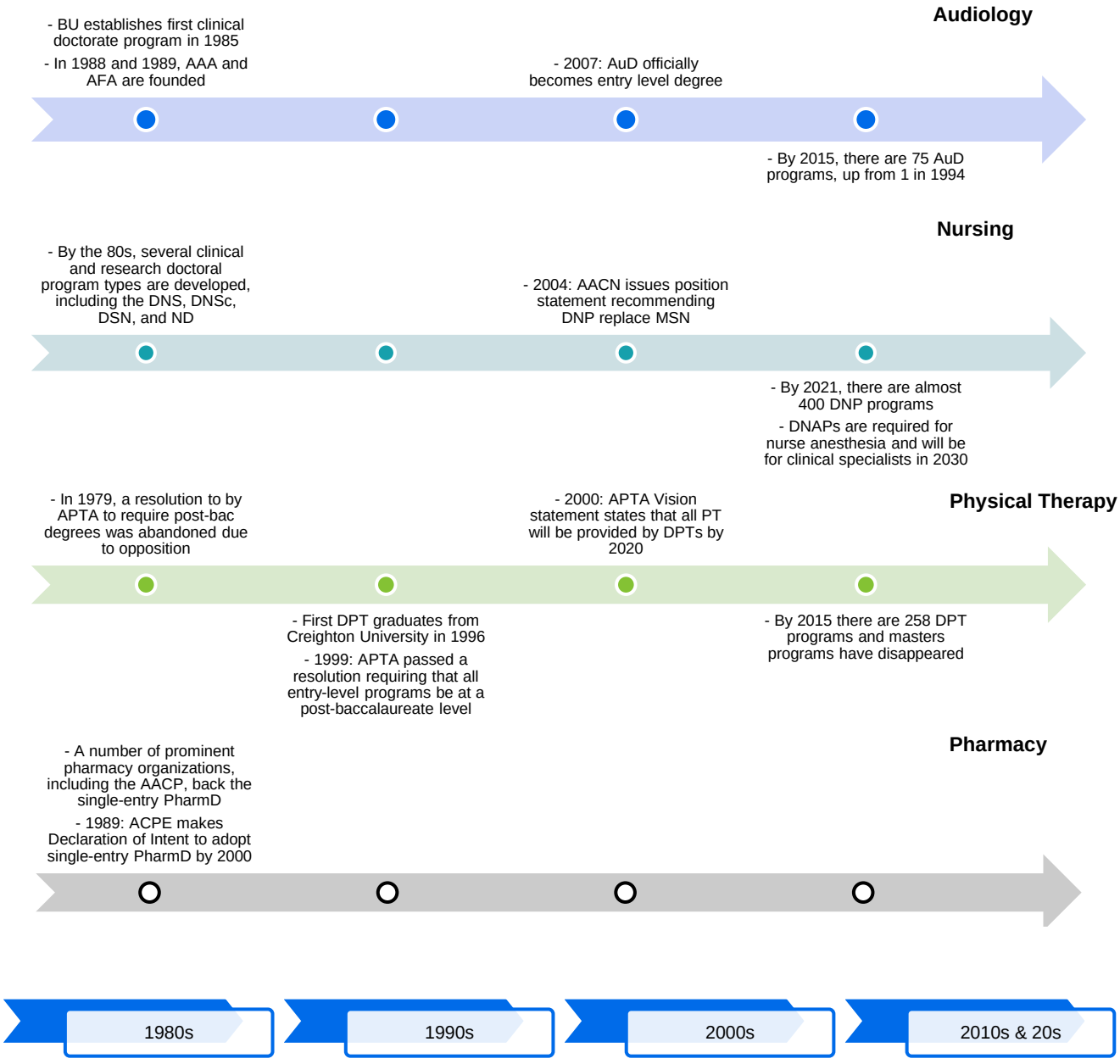
or low-income areas, developing partnerships with clinical sites, and pairing students with mentors from these communities.

Retention. Workforce retention refers to whether health care professionals continue working in the profession in which they were trained. It also refers to whether they continue working in certain desired specialties (e.g., primary care, psychiatry), areas (e.g., rural, low-income and location types (e.g., primary care clinic, safety-net hospital).

The impact of a transition to a single-entry clinical doctorate on these workforce goals varies by profession. Single-entry clinical doctorate refers to when doctorate is the only pathway to enter the profession—for example, the only way to become a physical therapist in the United States is to earn a Doctorate in Physical Therapy (DPT). The next sections explore what we know about transitions to clinical doctorates for audiology, nursing, physical therapy, and pharmacy. These fields were chosen because they represent variation in transitions in terms of timing, workforce dynamics, challenges, and outcomes. Our search encompassed both academic literature (articles published in research journals) and grey literature (materials published outside of journals, such as reports, op-eds, and data collected by professional associations).

Figure 1 presents a brief condensed timeline of the clinical doctorate transitions in these four fields. Important events will be discussed in more detail in each section.

Figure 1: National Timeline of Clinical Doctorate Transitions in Audiology, Nursing (including Nurse Practitioners and Certified Nurse Midwives), Pharmacy & Physical Therapy, 1990s to Present



Notes: BU = Boston University, AAA = American Academy of Audiology, AFA = Audiology Foundation of America, AuD = Doctor of Audiology, DNS or DNSc = Doctor of Nursing Science, DSN = Doctor of Science in Nursing, ND = Nursing Doctorate, AACN = American Association of Colleges of Nursing, DNP = Doctor of Nursing Practice, MSN = Masters of Science in Nursing, APTA = American Physical Therapy Association, DPT = Doctor of Physical Therapy, AACP = American Association of Colleges of Pharmacy, ACPE = Accreditation Council for Pharmacy Education. Sources for number of programs: Audiology (Zusman, 2017); Nursing (Dunbar-Jacob, 2023); Physical Therapy (Zusman, 2017).

Table 1 presents a summary of the impact and details of each clinical doctorate transition for each of the four professions. Data and literature on changing costs and degree length nationally is very limited. More details will be discussed in the subsequent sections.

Table 1: Impact of Clinical Doctorate Transitions in Audiology, Nursing (including Nurse Practitioners and Certified Nurse Midwives), Pharmacy & Physical Therapy

Profession	Educ Requirement in 2000	Educ Requirement in 2025	Change in average degree cost	Additional time required	Benefits to patients	Benefit to professional
NPs	MSN	MSN (DNP recommended)	Unknown	Unknown	DNPs may have more interest in serving Medicaid patients[2]	Greater autonomy in clinical roles[3]
Audiology	Masters	AUD	Unknown	Unknown	None documented	None documented
Pharmacy	PharmD	PharmD	Unknown	Unknown	None documented	None documented
Physical Therapy	Masters	DPT	In public institutions, median tuition and fees for DPT programs were 63% higher than for master's degree programs[1]	1 Semester[1]	None documented	None documented

Audiology

Transition to Clinical Doctorate

History and Context

The audiology profession underwent a significant shift in its business model around 1978. At that time, the American Speech-Language-Hearing Association (ASHA) eliminated an ethical rule that had previously prohibited audiologists from selling hearing aids. This change led to

the rise of the dispensing audiologist model, which relies heavily on hearing aid sales for revenue generation in private practice.[4]

Boston University initiated the first clinical doctoral program in audiology in 1985. Shortly thereafter, the American Academy of Audiology (AAA) was founded in 1988 to spearhead change and take control of the profession's direction. AAA advocated for the implementation of the Doctor of Audiology (AuD) degree, and in 1989, the Audiology Foundation of America (AFA) was established to further this effort. The AFA held the "Standards and Equivalency Conference" in 1995 to develop standards for the AuD.[5]

Unlike clinical doctorate transitions in other professions, which were often led by organizational leadership, the push for the AuD degree stemmed largely from practitioners themselves. This grassroots effort faced considerable opposition from traditionally trained audiologists and PhD holders. Although some support came from leaders within ASHA, advocating for this change was challenging.[5] In 1998, a survey of practicing audiologists revealed mixed views on the doctoral transition, prompting some faculty members to advocate for maintaining the master's degree as an entry-level qualification for private practice. Despite initial reluctance from faculty and opposition to the transition, many academic leaders began to see the merits of AuD programs as they witnessed their success.[6]

Arguments in favor

- Improve the training and technical skills of audiologists in response to the increasing complexity of the field.
- Elevate the profession, granting audiologists the same status and autonomy as other health professions, such as dentists and optometrists.[6]

Arguments against

- Uncertainty regarding how the AuD would be implemented as the required entry-level degree.
- Potential limitations in employment opportunities
- Employer reluctance to pay higher salaries for AuD graduates

- Ambiguity regarding the supervision of audiologists.[5]

Results

In 2002, the Accreditation Council for Audiology Education (ACAE) was established to provide accreditation for AuD programs. By January 1, 2007, the AuD officially became the entry-level degree for clinical practice in audiology. ASHA further stipulated that all audiologists seeking certification after January 1, 2012 must possess a doctoral degree.[5]

The transition significantly reshaped audiology education; the number of programs offering the AuD increased from one in 1994 to 75 by 2015. Between 2013 and 2014, these programs enrolled 2,573 students and awarded 568 degrees. Meanwhile, audiology master's programs declined rapidly, falling from 102 in 2001 to zero by 2007.[1]

The transition to the AuD drove a transformation of the workforce. In 2000, fewer than three percent of audiologists held an AuD degree. By the end of 2004, this figure rose to nearly 15%, and by 2008, approximately one-third of audiologists were expected to hold the degree. Additionally, the U.S. Department of Labor recognized audiology as a distinct profession, projecting faster-than-average job growth due to increased demand for services among aging baby boomers.[6]

Impact of Transition

Professional Image

The transition to the AuD did not necessarily have the desired impact on the professional image of audiologists, particularly in terms of public perception. Many audiologists report frustration at being seen as "hearing aid dispensers." Participants in one study suggested that the profession's emphasis on the dispensing audiologist model and hearing aid sales contributed to this confusion.[7]

Workplace Supply

One significant cost of the transition was the closure of many audiology programs that could not meet the new resource requirements for AuD programs or lacked the authority to offer doctoral degrees. This reduction in educational opportunities contributed to fewer individuals entering professional practice. Between 2000 and 2014, the number of entry-level clinical audiology degrees awarded annually declined by one-third, from 856 to 568.

This decline raised concerns about future shortages in the profession. Unless the number of eligible audiologists increases to approximately 700 per year, the U.S. Bureau of Labor Statistics projects a shortage of audiologists in the coming decade.[1] In 2024, the U.S. Bureau of Labor Statistics estimated that there were 15,800 audiologist jobs in the United States and that employment of audiologists is projected to grow over nine percent in the next decade—a much faster rate than the average for other occupations.

The quality of AuD programs also became a point of concern. James Jerger, founder and first president of the American Academy of Audiology (AAA), expressed disappointment that many programs were simply rebranded master's programs rather than adopting a broader training philosophy. He had hoped that universities with medical schools and hospitals would launch a smaller number of high-quality programs, but instead many institutions rushed to transition their master's programs to doctoral programs while making only minor changes to the curriculum.[6]

Student debt has also emerged as a major issue associated with the transition to the AuD degree. In a qualitative study consisting of semi-structured interviews of 30 audiologists, debt was frequently cited as a reason participants would not recommend audiology as a career choice or, for those who would recommend it, why prospective students must be fully informed about the financial realities of the profession. Participants described the significant personal toll of student debt, which they anticipated repaying over decades. The debt-to-income ratio (DTI) for audiologists is higher than many other professions with similar degree requirements, contributing to dissatisfaction with salaries and overall job satisfaction among practitioners.[7] In 2024, the U.S. Bureau of Labor Statistics estimated that the median annual

wage of audiologists was $92,120—almost $10,000 lower than estimates for other health care diagnosing or treating practitioners.

Nursing

Transition to Clinical Doctorate

History and Context

Advanced practice nursing encompasses several fields, including nurse practitioners (NPs), clinical nurse specialists, nurse anesthetists, and nurse midwives. Like several other health care fields, nurse practitioner education began with certificate programs, not degree programs. However, by the 1980s, most of the NP programs had transitioned to being masters' programs.[8] During that same period, several clinical and research doctoral program types were developed, including the Doctor of Nursing Science (DNS, DNSc), Doctor of Science in Nursing (DSN), and the Nursing Doctorate (ND). Throughout the 1990s and 2000s, there was significant disagreement within the literature and the community over the most beneficial model for a nursing practice doctorate degree.[9] The first Doctor of Nursing Practice (DNP) program was opened in 2001 by the University of Kentucky, though the ND program opened by Case Western Reserve University in 1979 is often seen as a precursor to the modern DNP.[8,9]

The discussion shifted in 2004, when the American Association of Colleges of Nursing (AACN) issued a position statement that the DNP replace the master's degree as preparation for advanced practice nurses.[9] This statement occurred within the context of several influential national reports and recommendations that focused on the nursing shortage, the crisis in the health care system, and proposed strategies for addressing these critical issues, including creating additional competencies in health professions education and the development nursing clinical doctorate. Namely, these included the Institute of Medicine's (IOM) *Crossing the Quality Chasm* (2001), the IOM Committee on the Health Professions Education report *Health Professions Education: A Bridge to Quality* (2003), the Institute of

Medicine's 2002 recommendations, and the National Research Council's 2005 recommendations.[8,10,11]

Arguments in favor

A variety of arguments were advanced to support this change, including:

- Nursing as a field **must respond to the changing health care landscape**. In 2006, faculty and administrators from an "early adopter" DNP program, the University of Tennessee, argued that: "If nurses fail to respond to the needs of consumers (e.g., potential students and patients), then others will respond to these needs, and their solutions will not likely be favorable to nursing."[12] The DNP was positioned as a natural response to the changing conditions of the "marketplace" of health care, mirroring the earlier transition from certificate programs to masters' programs.
- The **increasing complexity of health care field and patient care** requires a higher standard of preparation for nurse practitioners.[9,11,13,14]
- There is a need for **an increased number of nurse educators**, which requires an increase in doctoral-prepared nurses.[9,11,13]
- Similarly, there is a need for more nurses who can take leadership roles, and a DNP could provide additional training to meet this need.[11]
- **Other health care fields have already transitioned to single-entry clinical doctorates** to address needs for increased knowledge and skills, including pharmacy, audiology, and physiotherapy.[11,15,16]
- A doctoral degree may allow nurse practitioners to achieve **parity with medicine** in terms of autonomy, access to patients, and scope of practice.[15]
- Finally, the coursework of most APRN masters' programs is **already on the level of a clinical doctoral degree**, as evidenced by a comparison to clinical doctoral programs in other fields. Many APRN programs exceeded 60 credits, with an increased number of didactic and supervised clinical practice hours being added by schools of nursing, state boards of nursing, or accreditation agencies.[10,16]

Arguments against

Several arguments were made by opponents of the transition, including:

- The transition could **negatively affect the supply** of practicing nurse practitioners. Not only would the DNP lengthen the time-to-entry into the workforce for NPs, but if schools that currently offer MSN programs cannot or do not want to make the transition to DNP programs, the overall number of NP programs could decrease.[5,9,10,15] This would be most likely to adversely affect geographic areas with the greatest patient need for access to APRN care.[10]
- There was, and continues to be, **a lack of evidence** that doctoral-prepared NPs lead to better patient outcomes than master's-prepared NPs.[15,17]
- A new degree might cause confusion among other health care professionals and the general public.[9,15]
- There might be **confusion and conflict over the roles of PhDs and DNPs**. A practice doctorate might increase the divide between nursing practice and nursing research.[9] The field of nursing might be undermined if DNPs are doctoral-level clinicians but have less rigorous research preparation than PhD-prepared nurses and are less grounded in nursing theory. Some questioned whether such a doctorate will give the impression that nursing is an applied science.[15]
- The transition may "devalue" the MSN, and NPs currently practicing with MSNs or certificates may feel that they have been disenfranchised by the profession.[15]
- There are **benefits to entering doctoral training with prior APRN training and experience** and to be able to work while earning a DNP. Students who are already working APRNs can bring their practical and systems knowledge and experience to their coursework, naturally enhancing their experience. They will also be better equipped to pursue their independent project work.[10]
- There are potentially significant costs to students, educational institutions, and the public.
    - Schools:
        - The costs of establishing DNP programs for schools may lead to **adverse impacts on their other educational programs**, such as BSN

programs, as administrators make trade-offs. This would be detrimental to the goal of increasing the number of BSN prepared nurses.[18]

- DNP curricula typically require a capstone or final project, and supporting students through these projects will be an added cost for programs. Some programs may lack the faculty time and expertise to support these projects.[18]

- Students:
  - Students will not only have increased direct educational costs (such as tuition, books, and fees), but face potential lost earnings if a DNP is required prior to certification to practice.[10,18] According to the BLS, the median annual wage for nurse anesthetists, nurse midwives, and nurse practitioners was $132,050 in May 2024. DNP programs are on average one year longer than corresponding master's programs, and we can therefore estimate that NPs may lose out on $132,050 in potential earnings.
- Public
  - Many states have significant public dollars invested in higher education. If states desire to produce more APRNs, they will be forced to shoulder increased costs to convert MSN programs to DNP programs.[10]

Results

Despite concerns and rigorous debate, the number of DNP programs has grown dramatically over the past two decades. In 2010, there were 156 DNP programs, which had risen by 152% to 394 by 2021. The number of enrolled students has increased by 519%, from 6,599 students in 2010 to 40,834 in 2021.[19]

However, these numbers do not show the full picture. An analysis of 553 DNP programs established between 2008 and 2018 found that 15% (n = 83) were clinical and 85% (n = 470) were nonclinical.[20] This finding is not necessarily surprising, given that post-MSN nonclinical DNP programs are significantly easier to establish—they do not require investment in clinical sites and can be delivered online. These programs are typically designed for nurse executives or practicing APRNs and are intended to develop leadership capacity rather than

clinical skills.[18] This trend toward nonclinical DNP programs deviates from the original vision of an additional, clinically focused year.

Due to the size of the workforce, the overall proportion of NPs holding DNPs remains low. The American Association of Nurse Practitioners reports 79.8% of APRNs hold a master's as their highest degree, while only14% hold a DNP.[18] In California, a 2023 survey of NPs found that only 10.1% indicated holding a DNP as their highest degree, while 64.2% had a master's degree.. However, an increasing number of professional associations are endorsing or requiring the DNP. Currently, nurse anesthesia requires a DNAP, clinical specialists will require a DNP by 2030, nurse practitioners are recommended to have a DNP by 2025, and midwives will accept but do not require the DNP.[8,14]

However, a lack of consensus over the DNP persists, even among DNPs themselves. In a survey of 1,308 DNPs in 2019, the overall mean rating of the need for every APRN to obtain a DNP was 6.7 on a 10 point scale, where 1 was "not at all" and 10 was "a necessity".[21] A national survey of 172 DNP students and graduates found that some students had experiences where people, including authority figures, questioned the value of the DNP. For example, one student recalled, "On more than 1 occasion I was told by my [former supervisor] that the DNP was a waste of time—not a real degree."[22] In addition, the two largest accreditation organizations in nursing education in the country, the Commission on Collegiate Nursing Education and the Accreditation Commission for Education in Nursing have still not weighed in on this issue. Without policy changes in licensing and credentialing, it is unlikely that nursing will fully transition to the DNP while other options are available.[18]

Impact of Transition

Workforce Supply

One of the stated potential benefits of the DNP was its contribution to education, leadership, and clinical workforces. Evidence suggests that currently, the first two have been achieved more than the last. AACN data revealed that **out of the 7,039 DNP graduates in 2018, 4,232 (60%) had full-time positions in nursing schools rather than bedside or clinical positions.** Given that there are almost five DNP graduates per year for every nursing PhD

graduate, the DNP offers a quick way for schools to increase their doctorate-prepared faculty.[18] This trend has persisted. An AACN survey of 875 DNP graduates in 2023 found that the largest group were faculty members (23%) and "other" positions (20%), which included pharmaceutical and equipment sales or education, quality assurance, utilization management, and case management roles.[8]

Patient outcomes

While some evidence has suggested there are differences in the roles, autonomy, and perceived impact of DNPs when compared to MSNs, as of **today there is little to no evidence that patients of DNPs have better outcomes than patients of MSNs.** Only a small number of studies have been conducted. In the largest study to date, of over 1,000 primary care NPs in 6 states linked to Medicare claims data, the authors found that patient outcomes were not statistically different between patients attributed to MSN- and DNP-prepared primary care NPs.[17]

Autonomy

Evidence suggests that DNPs who are in clinical roles have greater autonomy than those with an MSN. In a nationally representative sample of 278,806 NPs, the authors found that **doctoral education was associated with higher levels of autonomy** and that the impact was greater than, and independent of, the impact of post-graduate training programs, RN experience, NP experience, and scope of practice. Compared to NPs without a doctorate, those who earned their doctorate concurrently with their NP degree had 62% higher odds of self-employment, 57% higher odds of billing using their own National Provider Identifier (NPI) number, and 49% higher odds of having their own Drug Enforcement Administration (DEA) number.[3]

Roles

To date, with the exception of CRNAs, there is little or no differentiation in the practice authority of those who have doctorates.[8] There was also a reported lack of differentiation in roles. In a 2019, survey, 59% of DNP-prepared respondents from key professional nursing

organizations (e.g., the American Academy of Nurse Practitioners, the American Organization of Nurse Executives, and the American Association of Nurse Anesthetists) **reported that the DNP was neither required nor preferred by their current employers**.[18]

Organizations struggle to use DNPs to their full potential. A survey of 87 organizational nursing leaders found that even though more than half reported that scholarship competencies were integrated into DNP-prepared nurses' job descriptions, almost half reported no time allotment for scholarship activities.[23] In another study of 130 DNP program directors and 23 employers, the authors found that **the role of the DNP-prepared nurse in nonacademic settings remains unclear**.[24]

Confidence

While there is no evidence that DNPs are associated with improved clinical outcomes, a small number of studies suggest that DNPs are more confident in their own skills. A study found that in rural practice, DNP-prepared nurse practitioners felt more prepared for practice than MSN nurse practitioners.[8] In a 2024 study of 128 NPs, DNPs were more likely than MSNs to self-report that they improved organizational outcomes positively, such as precepting NP students, improving patient satisfaction scores, and being a committee member.[25]

Earnings

There is scant evidence that the DNP is associated with increased compensation. A study in 2019 found that the average 2014 salary for DNP-educated certified nurse midwives (CNMs) was $105,968 while the average 2014 salary for master's-prepared CNMs was $102,576. Considering the cost, time, and effort associated with doctoral education, this salary differential of $3,392 is small.[18] In a nationally representative sample of 278,806 NPs, the authors found that hourly wages were not associated with degree type or timing. However, they were associated with level of care, clinical specialty, and sex.[3]

Perspectives from Nursing Faculty and Students

Recent publications have summarized the research on DNP programs with interviews and surveys of faculty and student graduates.[24,26,27] The feedback from students has been mixed, with students reporting more success in areas such as leadership, management, education, and prestige.[26] A common theme in the papers was the need for research comparing clinical outcomes from master's-prepared and doctorate-prepared NPs.. However, data are sparse to suggest that DNP graduates are more clinically proficient and there is a need for future research in that area.[27] The issue of "Return on Investment" was raised in all three papers above, raising the issues of extra cost of education and gains in salary.

The perspective of NP leaders summarized the need for further evidence on DNP practice and programs, "Barriers to acceptance of the DNP degree in practice include a lack of degree standardization, a need for DNP outcomes data, and a desire for a clearer return on investment for DNP degree among graduates and employers".[27] Differing perspectives, more data, and ongoing discussion about these issues will continue in nursing education, practice, and in leadership organizations.

A recent paper highlighted the potential interest of PhD and DNP nurses in California in serving MediCal patients.[2] This may be an opportunity to address a primary care supply issue in MediCal in California with an increase in DNP prepared nurse practitioners. The authors discuss whether or not the pursuit of a DNP increases interest in independent primary care practice or reflects a pre-existing interest.

Physical Therapy

Transition to Clinical Doctorate

History and Context

The educational requirements for physical therapists have evolved significantly over the past century. From 1900 to the 1930s, physical therapy education consisted of certificate

programs. During the 1930s to 1950s, these programs transitioned to baccalaureate degrees (BA), which became the standard from the 1950s to the 1980s. Since the 1980s, there has been a shift toward post-baccalaureate education—from the BA to the Master's degree, and then from the Master's degree to the Doctor of Physical Therapy (DPT) degree as the entry-level requirement.[28] Proponents in favor of transitioning to graduate education argued that the BA model required unrealistic course loads for students and placed undue responsibility on employers to train new graduates. They argued that the depth and breadth requirements of the BA in Physical Therapy placed it at the graduate level, regardless of the actual degree awarded.[29]

Despite this progression, initial efforts to elevate entry-level requirements to a master's degree met considerable resistance. The 1979 resolution by the American Physical Therapy Association House of Delegates (APTA-HOD) to require post-baccalaureate degrees by 1990 was abandoned in 1988 due to strong opposition and lack of consensus.[28] It was revived again in 1999, when the APTA-HOD passed a resolution requiring that all entry-level programs be at a post-baccalaureate level. The first DPT program in the U.S. was launched by Creighton University in Nebraska, with its first graduates in 1996, although models of the program were being developed as early as the 1980s.[30]

In the 1990s, challenges such as insurance industry-imposed limits, increased utilization of physical therapist assistants, and reliance on foreign-trained physical therapists led to a surplus of physical therapists for the first time in the field's history. The APTA Workforce Study predicted a 20–30% surplus between 2005 and 2007.[28] This surplus may have also created pressure to reform and adapt physical therapy education and transform the practice of physical therapy.

Arguments in favor

The path to adopting doctoral education was marked by significant controversy. The process was described by some leaders in the field as chaotic and counterproductive.[29] Pro arguments for transitioning to the DPT as the single entry to practice were as follows:

- The DPT would be more consistent than the MS entry-level degree, which had a variety of models, including the 3 + 2.5, Post bac + 2.5, etc.[31]
- Having the title of “doctor” would solidify the status of the profession in the eyes of both the public and the health care industry—it was believed that the transition to DPT would lead insurance carriers to allow physical therapists to receive direct reimbursement.[31]
- Because of the growing complexity of health care, a higher level of knowledge and skill is needed to deliver improved care to patients. This includes knowledge of pharmacology, genomics, diagnostic imaging, differential diagnosis, reimbursement, legal and ethical issues). A doctoral program could offer a greater number of clinical hours as well.[30,32]
- The existing physical therapy curriculum already possessed the academic rigor expected of a clinical doctorate degree and transforming it into a doctoral program would therefore be the logical next step.[30]
- Students may be more attracted to a doctoral degree program than a master’s degree program.[30]

Arguments against

- Increased educational costs might discourage students from entering the field, exacerbate workforce shortages, and fail to improve patient outcomes.[5,32]
- A new degree could cause confusion by the public and health care system, especially considering existing confusion around the physical therapists role.[28]
- There was a lack of evidence that the DPT would lead to improved patient outcomes.[5]

Results of the Transition

The transition to DPT programs occurred rapidly. The APTA’s Vision Statement in 2000 emphasized that physical therapy services would be provided exclusively by DPT-qualified practitioners by 2020.[28] By 2002, the APTA reported significant growth in accredited DPT programs and those in development or planning stages. Between 2000 and 2015, the number of entry-level DPT programs increased by over 1,250%, growing from 19 to 258, while master’s degree programs decreased from 184 to zero. However, despite the transition,

DPT programs showed only modest changes in curriculum, length of program, and admissions standards compared to master's programs. On average, DPT programs were one semester longer, primarily due to increased clinical experience—the rest of the increase came from coursework. Admission standards and student-to-faculty ratios remained similar between the two-degree types.[1]

Impact of Transition

Despite concerns about the transition, research and data on the impact are limited.[32] While the DPT curriculum and requirements are similar to those of a master's degree, an analysis from 2010 found that in public institutions, median tuition and fees for DPT programs were 63% higher than for master's degree programs. Data from APTA in 2013 indicated that DPT practitioners did not consistently secure better jobs or higher salaries compared with those holding master's or baccalaureate degrees. Finally, efforts to achieve "physician status" reimbursements have faced resistance from physicians and legislators.[1] We conducted an interview with a Physical Therapy faculty member at UCSF and learned that there is limited research on whether clinical outcomes can be associated with the DPT as clinical outcomes in physical therapy can be difficult to measure.[33]

Research on how the transition impacted the workforce supply is very limited. A qualitative study in 2010 found that there was little evidence that the transition has had limited effects on the supply or quality of physical therapy in rural areas. Respondents noted that experience, rather than degree level, was the primary factor influencing care quality. However, several respondents had concerns that the DPT would impact the supply and quality of rural physical therapy in the future.[32] In 2024, the U.S. Bureau of Labor Statistics estimated that the median annual wage of physical therapists is $101,370—very similar to other health care diagnosing or treating practitioners. They also projected that employment of physical therapists will grow eleven percent in the next decade—much faster than the average for all occupations.

Pharmacy

Transition to Clinical Doctorate

History and Context

The process of transitioning to a single-entry PharmD took place over many decades and began in the 1960s and 70s. Previously, there were a variety of educational pathways to becoming a pharmacist, including Bachelor of Pharmacy (BS) degrees, PharmD degrees, and/or transition programs for BS graduates that, upon completion, provided PharmD credentials. However, some argued that the variety of educational pathways contributed to confusion about the role of pharmacists, not only among the public, but also other health care professionals.[34] In addition, the trend of employers favoring PharmD degrees over other pharmacy degrees led to concern that pharmacy was developing a "caste" system, where those with non-PharmD degrees could not access all jobs and opportunities.[35]

Arguments in favor

Several professional associations, including the American Society of Health-System Pharmacists, American Pharmacists' Association, National Association of Retail Druggists, American Association of Colleges of Pharmacy (AACP), and National Associations of Boards of Pharmacy, backed a transition to a single-entry PharmD in the late 1980s and 90s. In statements, they predicted that the transition would lead to:

- Allowing pharmacists to devote full attention to serving patients' pharmaceutical care needs
- Preventing a degree "caste system" between those with doctorates and those with bachelor's degrees
- Effectively managing drug therapy using problem-solving skills
- Enhancing the dignity and status of the pharmacy profession
- Achieving more comparable standards with physicians.[34]

Arguments Against

However, there was little empirical evidence to support these conclusions, and the debate was contentious. Some in the field felt that academia played an outsize role in driving the transition and that the discussion was dominated by a few prominent voices. In this view, academia was driving educational change in order to transform the nature of pharmacy practice, when it should be the reverse. A 1990 Gallup survey of 1000 pharmacy faculty reported that 60% favored continuing the 5-year baccalaureate degree.[36] The AACP adopted the position that the baccalaureate degree should be maintained as an entry-level degree and used as a prerequisite for admission to a PharmD program. In addition, a survey of American College of Clinical Pharmacy (ACCP) members showed 79% opposition to the transition. The National Association of Chain Drug Stores (NACDS) also voiced their opposition to this transition.

Overall, the criticisms by ACCP and NACDS were summarized as:

- Increased educational costs
- Increased cost to consumers
- Lack of clinical faculty and facilities to train all students at the PharmD level
- Exacerbated shortages
- Underutilization of pharmacist skills
- Stagnation of pharmacists involved in technical dispensing functions
- Threatened convenient access to pharmacy services, such as patient counseling.[34]

Results

However, after decades of debate, in 1989 the American Council on Pharmacy Education (ACPE) made a Declaration of Intent to adopt the PharmD as the universal standard for pharmacy education by 2000.[34,37] The United States was the first country to make this transition, but many others have followed in recent years, including Canada, Hungary, Italy, Japan, South Korea, Pakistan, Saudi Arabia, Thailand, Benin, Cameroon, Republic of Congo, and Senegal.[38]

Impact of Transition

Mixed Results

The ACPE considers the transition to the single-entry PharmD to be a success.[39] However, some argue that the predicted benefits of the transition have not been realized. One of the predicted benefits was to "allow pharmacists to devote full attention to serving patients' pharmaceutical care needs".[34] However, many practicing pharmacists and students have expressed frustration that they are over-trained for certain positions, and that they cannot or do not end up using the full extent of the training they received in the PharmD program. This is often true in community practice sites where the skills of product verification and drug utilization review are emphasized while clinical skills, such as assessment, recommendation, and medication optimization, are underutilized.[34,40] Romanelli and Malcolm state that "a common refrain from some students is that they cannot and/or do not envision themselves applying much of the education and training they are being provided."[40] In 2015, Romanelli and Tracy warned that the number of overqualified pharmacists currently practicing in predominantly dispensing roles would cause a crisis in the field.[36] Alternatively, the pharmacy profession has seen an increase in specialty pharmacy certifications which may have been enabled through the transition to the single-entry doctorate.[41]

Another predicted benefit was the solidification of the professional status and identity of pharmacists. Anecdotally, the profession continues to struggle with these issues. Moore et al in 2022 expressed their frustration that pharmacists are classified by many, including the Drug Enforcement Administration (DEA) as "mid-level" providers.[42] This separation is also reinforced by the trend of having prescribing providers, such as Advanced Registered Nurse Practitioners (APRNs) at community pharmacies to provide basic primary care services. This contributes to a continued lack of understanding by the public on the role of pharmacists.[40]

Workforce Supply & Patient Outcomes

Little research has been conducted about how the transition to single-entry PharmD impacted workplace supply and patient outcomes. A Bureau of Health Professions report submitted to Congress in 2000 concluded that "the PharmD had lengthened the educational program,

required additional faculty and resources, reduced the number of graduates throughout the transition, and was associated with a decrease in applicants to pharmaceutical programs". No research has directly linked the PharmD to improved patient outcomes.[5] Limited research comparing PharmD and Bachelor of Science in Pharmacy graduates has found job activities and professional satisfaction between the two groups were not significantly different. However, the studies were limited by low response rates and nonrepresentative samples.[38] In 2024, the U.S. Bureau of Labor Statistics estimated that the median annual wage of pharmacists is $137,480—higher than other health care diagnosing or treating practitioners. They also projected that employment of pharmacists will grow five percent in the next decade—faster than the average for all occupations, but slower than other health care diagnosing and treating professions.

Solutions

Some have proposed that the solution to these challenges would be to return to a multi-degree model. After warning of the issues with so many overqualified pharmacists practicing in predominantly dispensing roles, Romanelli and Tracy suggested in 2015 that the field should create a two-tier practice system, where pharmacists practice in either dispensing or non-dispensing roles.[36,43] In their words:

> "Dispensing pharmacists would supervise a core of pharmacy technicians that provide high-volume, product-focused services. As pharmacy technician credentialing continues to increase, these "super technicians," combined with robotic systems, might even replace the functions of the dispensing pharmacist. Non-dispensing, clinically proficient pharmacists, many with residency training and appropriate credentials, would focus on clinical implications of drug therapy, health care outcomes, and other direct patient care-related activities. These clinicians might also meet current primary care gaps within the United States by managing basic and chronic care of patient populations. The substantial patient assessment and care management training occurring at many pharmacy schools prepares pharmacists to assume this more significant patient care role."[43]

Bloom et al argued in 2025 that “by expanding technicians’ roles or increasing degree and training options for tiered pharmacist licensure, we could create the means to clarify responsibilities, create advancement opportunities, and acknowledge the roles available with each degree.”[34] Romanelli and Malcolm argued similarly in 2023 and used nursing as an example of a field that links progressive levels of education to increasing clinical privileges.[40] Another argument in favor of this system is increasing specialization of pharmacists.

Trends Across Clinical Doctorates

Despite the diversity of circumstances, history, and clinical needs, there are common trends in all four clinical doctorate transitions. Transitions are typically led by professional associations and academics and are motivated by a desire for professional legitimacy and power in an increasingly complex and demanding health care landscape. There is little or no evidence that single-entry clinical doctorates led to better patient outcomes or improved health care system functioning, but they are often more expensive than the corresponding master’s degrees.

Roles of Organizations

Except for audiology, where the push was initially led by the individual practitioners in the community who were unaffiliated with professional organizations, these transitions were typically led by those in academia and professional associations. Statements and recommendations by these organizations were typically major forces in achieving the change, such as the 2004 AACN position statement, the 2000 APTA Vision Statement, and the 1989 ACPE Declaration of Intent. Policy changes by accrediting and credentialing bodies are often the final step to achieve full transformation, after such statements from professional organizations create momentum and the perceived consensus around the decision. In a 2020 article on the DNP transition, Deans from top-ranked nursing schools who are advocates for the DNP acknowledged that the fact that neither of the largest accreditation bodies in nursing education had weighed in was a significant obstacle. They wrote that “as long as certification boards continue to allow graduates with either an MSN or a DNP to sit for the same certification exam, schools will not rush to end their MSN programs”.[18]

Concerns about academia's predominance in driving these transitions have been raised as far back as the 1990s. In pharmacy, Bussey asked "could it be that individuals who think that a change in education will bring about a change in practice have placed the cart before the horse?"[36] In a 2020 article, many decades after pharmacy had achieved its transition, Brown argued that:

> "The all Pharm.D. movement is a fitting example of academia embarking on a course of educational change in order to transform the nature of pharmacy practice. Many practitioners believe the process should be reversed, with those in practice charting a vision for the future, and academia responding to, rather than trying to shape, the practice needs of the profession".[36]

The tension between the statements by organizations and the beliefs of the general practitioners which they serve can be seen in multiple fields. For example, a 1998 survey of practicing audiologists found that they had mixed feelings on the transition to a doctoral degree, but the transition still went through less than 10 years later.[6] In a survey of 1,308 DNPs in 2019, the overall mean rating of the need for every ARPN to obtain a DNP was 6.7 on a 10 point scale, where 1 was "not at all" and 10 was "a necessity"—suggesting that not even all DNPs agree with the need for a DNP.[21] Finally, in pharmacy, a 1990 Gallup survey of 1000 pharmacy faculty reported that 60% favored continuing the 5-year baccalaureate degree, and a survey of American College of Clinical Pharmacy (ACCP) members showed 79% opposition to the transition.[34,36]

Driving Forces of Transitions

What drives these transitions in the face of practitioner skepticism and fierce debate is an open question. Across all four fields reviewed, a desire to attain status and legitimacy equal to physicians was a common theme—for example, in physical therapy, it was believed that the transition to DPT would lead insurance carriers to allow physical therapists to receive direct reimbursement.[31] In another example in pharmacy, both "enhance the dignity and

status of the pharmacy profession" and "achieve more comparable standards with physicians" were cited as reasons.[36] Proponents often also cited the need to compete in an increasingly complex and demanding health care system. For example, early adopters of the DNP in 2006 argued that "just as master's degree programs enabled early NPs to move competently upmarket from certificate programs, DNP degree programs enable nurses to move competently upmarket in today's complex practice environment".[12] The need to compete is especially salient given the fact that other fields are transitioning to doctorates, and previous transitions were often cited by proponents. Both the desire for professional legitimacy and power in the face of hierarchy were powerful driving reasons for these transitions.[1]

Impact of Transitions

In most cases, the predicted benefits of the single-entry doctorate transition have not yet been realized. Despite frequently cited motivations in all four fields, there is little or no evidence that single-entry clinical doctorates led to better patient outcomes or improved health care system functioning. In audiology, pharmacy, and physical therapy, we found no studies that examined the relationship between doctorates and patient or system outcomes. In nursing, there are a small number of studies investigating these relationships. In the largest study to date, of over 1,000 primary care NPs in 6 states linked to Medicare claims data, the authors found that that patient outcomes were not statistically different between patients attributed to MSN- and DNP-prepared primary care NPs.[17]

There is also limited evidence that clinical doctorates are linked to higher wages. A study in 2019 found that the average 2014 salary differential between DNP-educated certified nurse midwives and master's-prepared CNMs was $3,392—a small amount considering the time, money, and effort needed to be invested in doctoral education.[18] In a nationally representative sample of 278,806 NPs, the authors found that hourly wages were not associated with degree type or timing.[3] In 2013, the APTA acknowledged that "[t]here are no data to suggest that, as a matter of course, a [physical therapist] with a DPT will be paid more than one who possesses a master's or baccalaureate degree".[1] More recent data on salary gains or differentials comparing individuals with a clinical doctorate and those without, in the same positions, are needed.

Some schools have been unable to transition from master's to doctoral programs or have done so in superficial ways—bringing into question the quality and legitimacy of the doctoral education. In audiology, many programs could not meet the new resource requirements for AuD degrees or lacked the authority to offer doctoral degrees and subsequently[1] closed. This reduction in educational opportunities contributed to fewer individuals entering professional practice. Between 2000 and 2014, the number of entry-level clinical audiology degrees awarded annually declined by one-third, from 856 to 568. In addition, some audiology programs that did transition only made minor changes.[1] James Jerger, the first president of the AAA, stated that almost every program with a master's program "closed it up, renamed it, and jumped on the AuD bandwagon" [6]. Similar issues can be found in physical therapy, where Zusman points out that recent DPT programs are on average only one semester longer, and that most programs added clinical experience and coursework, not capstone projects. The average student-to-faculty ratios are also similar between DPT and master's programs.[1]

Clinical doctorate programs are often more expensive than clinical master's programs. Zusman found that "in public institutions, median tuition and fees for DPT programs were 63% higher than for master's degree programs in 2010".[1] Higher costs have led to concerns about increasing student debt. This has especially been a challenge in audiology, where the ratio between student debt and average compensation is higher than nursing, physical therapy, and pharmacy. In a qualitative study of interviews with 30 audiologists, Emanuela states that

> "Perspectives on student debt were strongly linked to negative perceptions of the future, such that debt was often provided as the reason participants would not recommend the profession or, for those who would recommend the profession, the reason why students must be fully informed about the nature of the profession."[7]

Impact of Transitions on Workforce Goals

Based on our literature review, in Table 2 we hypothesize the impact of the transitions on the essential health care workforce goals outlined in the earlier section. A transition to a single-entry clinical doctorate is expected to have a negative impact on supply, diversity, access to education, and cost, and a neutral impact on geography and retention.

Table 2: Hypothesized Impact of Clinical Doctorate Changes on Health care Workforce Goals

Strategies	Supply	Diversity[1]	Access to education	Geography	Cost	Retention[1]
Additional terms, Additional clinical time, Additional required courses	Increases time to graduation	Underrepresented students may have less flexibility around taking more time out of the workforce	Admissions standards may differ; students may perceive doctoral level education to be more of a challenge and choose not to apply.	Neutral	Increased cost due to additional terms – depends on cost structure	Neutral

Grey = Hypothesized neutral impact on workforce goals
Pink = Hypothesized negative impact on workforce goals

Conclusion

1. There are common trends in the transitions to clinical doctorates in audiology, nursing, pharmacy and physical therapy in the driving forces, roles of organizations, and challenges post-transition.
    - The need to respond to an increasingly complex health care landscape and better serve patient needs is the most commonly given reason. However, little or no research to date has linked clinical doctorates to improved patient outcomes in these professions.
    - Many professions hoped that transitioning to single-entry clinical doctorates would allow them to achieve similar status, recognition, and autonomy as physicians. Generally, this ambition has not been realized.

2. Transitions to clinical doctorates have brought successes but also challenges, including:
    - Some schools have not been able to transition from master's to doctorate, leading to a decrease in the number of available programs in some cases.

Other programs only made small changes, leading to concerns about the quality of their doctoral programs.
    - Increased costs due to longer program length, leading to increasing concerns about student debt, especially in audiology due to the high student debt to average compensation ratio.
    - Despite hopes, there is limited evidence that the transition has led to higher compensation for practitioners.

3. Given the impacts of these transitions, we hypothesize that transitions to single-entry clinical doctorate programs may negatively affect our health care workforce goals in certain ways.
    - Increased program length may reduce the number of practitioners entering the workforce, adversely impacting supply.
    - Increased program length increases the time for entry into practice, limiting ability to address critical workforce shortages.
    - Increased program length, increased program cost, and program name change may lead to decreased numbers of students from underrepresented backgrounds, adversely impacting the diversity of the workforce.
    - Institutions in rural or other under-resourced areas may have more difficulty transitioning to a doctoral format and sustaining the resources needed, leading to fewer programs in rural and other under-resourced areas. This would adversely impact geographic diversity.

4. Further research is needed to understand the full impact of single-entry clinical doctorate transitions on the workforce dynamics and patient outcomes, and to inform policy changes.

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References

1. Zusman A. Changing Degrees: Creation and Growth of New Kinds of Professional Doctorates. *The Journal of Higher Education*. 2017;88(1):33-61. doi:10.1080/00221546.2016.1243941

2. Muench U, Quan A, de Lisser R, Bates T, Spetz J. Nurse practitioner race and ethnicity and interest in independent primary care practice and serving Medicaid enrollees. *Health Aff Sch*. 2024;2(12):qxae153. doi:10.1093/haschl/qxae153

3. Hoyt A, Lucey J, Kelly-Weeder S, O'Reilly-Jacob M. Nurse practitioners' degrees and associations with time use, functional autonomy, and job outcomes. *Nursing Outlook*. 2024;72(4):102193. doi:10.1016/j.outlook.2024.102193

4. Emanuel DC. The Lived Experience of the Audiologist: Connections Between Past, Present, and Future. *American Journal of Audiology*. 2021;30(4):994-1009. doi:10.1044/2021_AJA-20-00185

5. Reyes J. TRANSITIONING TO THE DOCTORATE OF NURSING PRACTICE.

6. Pallarito K. AuD is transforming audiology, but growing pains persist. *The Hearing Journal*. 2005;58(5):21. doi:10.1097/01.HJ.0000287172.79844.9c

7. Emanuela DC. The Lived Experience of the Audiologist: Connections Between Past, Present, and Future. *American Journal of Audiology*. 2021;30:994-1009. doi:10.1044/2021_AJA-20-00185

8. Dunbar-Jacob J, Schlenk EA, Tuite P. The Doctor of Nursing Practice: A Narrative Review of the History and Current Status. *Medical Research Archives*. 2023;11(7.1). doi:10.18103/mra.v11i7.1.4037

9. Armstrong GE, Lindell D. *The History and Future of the DNP in Nursing*. Springer Publishing Company; 2025. Accessed July 23, 2025. https://connect.springerpub.com/content/book/978-0-8261-8863-2/part/part01/chapter/ch01

10. Cronenwett L, Dracup K, Grey M, McCauley L, Meleis A, Salmon M. The Doctor of Nursing Practice: A national workforce perspective. *Nursing Outlook*. 2011;59(1):9-17. doi:10.1016/j.outlook.2010.11.003

11. DNP Roadmap Task Force Report. Published online October 20, 2006.

12. Chase SK, Pruitt RH. The practice doctorate: innovation or disruption? *J Nurs Educ*. 2006;45(5):155-161. doi:10.3928/01484834-20060501-04

13. Anderson CA. Current strengths and limitations of doctoral education in nursing: Are we prepared for the future. doi:https://doi.org/10.1053/jpnu.2000.7830

14. National Association of Clinical Nurse Specialists. Position-Statement-on-the-Doctor-of-Nursing-Practice-FInal.pdf. Accessed July 23, 2025. https://nacns.org/wp-content/uploads/2021/12/Position-Statement-on-the-Doctor-of-Nursing-Practice-FInal.pdf

15. Brar K, Boschma G, McCuaig F. The development of nurse practitioner preparation beyond the master's level: what is the debate about? *Int J Nurs Educ Scholarsh*. 2010;7:Article9. doi:10.2202/1548-923X.1928

16. Discussion Paper: Doctor of Nursing Practice. Published online 2005.

17. Martsolf G, Turi E, Liu J, Chen J, Poghosyan L. DNP preparation of primary care nurse practitioners and clinical outcomes for patients with chronic conditions. *Nursing Outlook*. 2023;71(3):101951. doi:10.1016/j.outlook.2023.101951

18. McCauley LA, Broome ME, Frazier L, et al. Doctor of nursing practice (DNP) degree in the United States: Reflecting, readjusting, and getting back on track. *Nursing Outlook*. 2020;68(4):494-503. doi:10.1016/j.outlook.2020.03.008

19. American Association of Colleges of Nursing. *The State of Doctor of Nursing Practice Education in 2022*. 2022. Accessed January 20, 2026. https://www.aacnnursing.org/Portals/42/News/Surveys-Data/State-of-the-DNP-Summary-Report-June-2022.pdf

20. Mundinger MO, Carter MA. Potential Crisis in Nurse Practitioner Preparation in the United States. *Policy, Politics, & Nursing Practice*. 2019;20(2):57-63. doi:10.1177/1527154419838630

21. Minnick AF, Kleinpell R, Allison TL. DNPs' labor participation, activities, and reports of degree contributions. *Nursing Outlook*. 2019;67(1):89-100. doi:10.1016/j.outlook.2018.10.008

22. Hlabse ML, Dowling DA, Lindell D, Underwood P, Barsman SG. Supports and Barriers to Successful Progression in a DNP Program: Students' and Graduates' Perspectives. *Nurse Educator*. 2016;41(5):256. doi:10.1097/NNE.0000000000000251

23. Moran K, Beebe SL, Corrigan C, Manderscheid A, Conrad D, Kesten KS. Exploring the Scholarly Value and Impact of DNP-Prepared Nurses Through the Lens of Nursing Leaders. *JONA: The Journal of Nursing Administration*. 2025;55(2):104. doi:10.1097/NNA.0000000000001537

24. Beeber AS, Palmer C, Waldrop J, Lynn MR, Jones CB. The role of Doctor of Nursing Practice-prepared nurses in practice settings. *Nursing Outlook*. 2019;67(4):354-364. doi:10.1016/j.outlook.2019.02.006

25. Hampton D, Melander S, Rayens MK. Differences in Nurse Practitioner Work Effectiveness by Level of Education and Work Experience. *J Nurs Adm*. 2024;54(10):561-567. doi:10.1097/NNA.0000000000001489

26. Melander S etal. Celebrating over 20 years: Outcomes from the first doctor of nursing program. *Journal of Professional Nursing*. 2023;48:186-193.

27. Pappas S et al. Nursing practice leaders' perspectives on continuing challenges related to the Doctor of Nursing Practice Degree. *Nursing Outlook*. 2023;71:102002.

28. Plack M. The Evolution of the Doctorate of Physical Therapy: Moving beyond the controversy.

29. Rothstein JM. Education at the Crossroads: For Today's Practice, the DPT. *Physical Therapy*. 1998;78(4):358-360. doi:10.1093/ptj/78.4.358

30. Mathur S. Doctorate in Physical Therapy: Is It Time for a Conversation? *Physiother Can*. 2011;63(2):140-142. doi:10.3138/physio.63.2.140

31. Hasson S. Doctorate in Physical Therapy (DPT): What is the DPT and why is it becoming the entry-level degree in the United States? *Physiotherapy Theory & Practice*. 2003;19(3):121. doi:10.1080/09593980307963

32. King J, Freburger JK, Slifkin RT. What does the clinical doctorate in physical therapy mean for rural communities? *Physiotherapy Research International*. 2010;15(1):24-34. doi:10.1002/pri.455

33. Peterson K, Chapman S. Interview with UCSF Physical Therapy Faculty Member. Published online September 4, 2025.

34. Bloom TJ, Kebodeaux C, Munger M, Smith MD, Stutz M, Wagner J. A Narrative Review of Pharmacy Identity and the PharmD Experiment. *American Journal of Pharmaceutical Education*. 2025;89(2). doi:10.1016/j.ajpe.2024.101351

35. Martin S. Uniting for One Pharmacy Degree. *American Pharmacy*. 1992;32(1):52-55. doi:10.1016/s0160-3450(15)31245-9

36. Brown DL. Years of Rampant Expansion Have Imposed Darwinian Survival-of-the-Fittest Conditions on US Pharmacy Schools. *American Journal of Pharmaceutical Education*. 2020;84(10):ajpe8136. doi:10.5688/ajpe8136

37. Urick BY, Meggs EV. Towards a Greater Professional Standing: Evolution of Pharmacy Practice and Education, 1920–2020. *Pharmacy (Basel)*. 2019;7(3):98. doi:10.3390/pharmacy7030098

38. Supapaan T, Low BY, Wongpoowarak P, Moolasarn S, Anderson C. A transition from the BPharm to the PharmD degree in five selected countries. *Pharm Pract (Granada)*. 2019;17(3):1611. doi:10.18549/pharmpract.2019.3.1611

39. Vlasses PH. Reflections on a Decade of Progress in Pharmacy Education: Reasons for Celebration. *Am J Pharm Educ*. 2010;74(9):174. doi:10.5688/aj7409174

40. Romanelli F, Malcom D. Re-examining the Entry-to-Practice PharmD Experiment. *American Journal of Pharmaceutical Education*. 2023;87(5). doi:10.1016/j.ajpe.2022.08.001

41. Ignoffo RJ, Knapp K, Ellis W. Board-certified pharmacy specialties: Growth from 2008 to 2020 and projections to 2025. *Am J Health Syst Pharm*. 2022;79(23):2134-2140. doi:10.1093/ajhp/zxac243

42. Moore GD, Bradley-Baker LR, Gandhi N, et al. Pharmacists Are Not Mid-Level Providers. *American Journal of Pharmaceutical Education*. 2022;86(3):8556. doi:10.5688/ajpe8556

43. Romanelli F, Tracy TS. A Coming Disruption in Pharmacy? *Am J Pharm Educ*. 2015;79(1):01. doi:10.5688/ajpe79101

