SPECIAL ARTICLES

Pharmacy Residencies and Dual Degrees as Complementary or Competitive Advanced Training Opportunities

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The impact of pharmacy practice has been enhanced through additional graduate training opportunities, such as pharmacy residencies and dual-degree programs. This article compares and contrasts key aspects of pharmacy residencies and dual-degree programs, as well as examines the efforts of US colleges and schools of pharmacy in promoting these advanced training opportunities on their Web sites. Pharmacy residencies and dual-degree programs are complementary opportunities that allow student pharmacists to gain advanced knowledge and specialized skills beyond the traditional Doctor of Pharmacy (PharmD) degree. The combination of these credentials can be highly advantageous in a variety of practice settings. As pharmacists collaborate with healthcare providers and professionals from other disciplines, more support is needed to expand the availability and use of these cross-profession, advanced training opportunities to enhance the future of the pharmacy profession.

Keywords: dual degree, residency, graduate program, advanced educational training, leadership, master's degree

INTRODUCTION

As health care reform continues to be a central discussion topic in the United States, the potential impact on the pharmacy profession and its future outlook is constantly being assessed. With pharmacist-driven initiatives such as medication therapy management (MTM) services,[1] pharmacy immunization programs,[2] and other health and wellness programs, pharmacists have become more visible as health care providers. This transition from dispensers of medications to providers of clinical knowledge and preventive care services has been reflected in and encouraged by the American Association of Colleges of Pharmacy (AACP) 2004 Center for the Advancement of Pharmaceutical Education (CAPE) educational outcomes. Initiated to further develop the academic curriculum for training pharmacy practitioners, the CAPE outcomes state that future pharmacists must be competent in 3 major areas of practice: pharmaceutical care, system management, and public health.[3] Evidence that these goals are being accomplished is exemplified in the development of MTM services, which are an expansion of the pharmaceutical care foundation of pharmacy practice.[4] Additionally, pharmacists' roles have also expanded in systems management, with the development of pharmacy informatics and medication use systems, as well as in public health, through health education and disease prevention programs.[3]

With the increase in the number of colleges and schools of pharmacy and the easing of the national shortage of pharmacists, both practicing pharmacists and students may be concerned about what the future of pharmacy practice will entail. Because of the national shortage of pharmacists over the last 15 years, there has been expansive growth of pharmacy colleges and schools in the United States. In 2003, there were approximately 87 colleges and schools of pharmacy offering the PharmD degree, as well as other pharmacy-related graduate degrees.[5] As of January 2012, there are 127 PharmD programs with accreditation status in the United States (119 programs with full accreditation or candidate accreditation status, and 8 with pre-candidate accreditation status).[6] Consequently, the number of pharmacy graduates entering the job market each year has increased dramatically.

Data from the Pharmacy Workforce Center (formerly known as the Pharmacy Manpower Project) provides

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relevant information on the supply and demand for pharmacists and pharmacy services in the United States.[7] A study examining the change in pharmacist demand over a 10-year period from 1999-2010 using the aggregate demand index (ADI),[8] a monthly state-based survey of the unmet demand for pharmacists, revealed lower demand levels for pharmacists since late 2006, which parallels with the economic downturn in the United States.[9] The study also indicated a significant relationship between the ADI and US unemployment rates, suggesting that an improved economy could result in an increase in pharmacist demand. Despite the slowdown in pharmacist demand, the 2009 National Pharmacist Workforce Survey indicated more pharmacists practicing part-time and working past retirement age, as well as a shift in the pharmacy profession toward providing more patient care services.[10] As a result of the shifts in the demand for pharmacy services, many PharmD students are considering additional training opportunities to differentiate themselves among the increased number of pharmacists entering and remaining in the profession. They also want to contribute to the expanding role of the pharmacist in the dynamically changing health care environment.

As pharmacy transcends from a product-oriented to a patient-centered profession, there is an increased emphasis on clinical pharmacy and other skills important in health care. As a result, postgraduate pharmacy residencies and dual-degree programs have emerged as leading avenues for student pharmacists to consider for obtaining additional training. Graduates begin residency programs following completion of the PharmD program. Dual-degree programs allow students to work on 2 different and distinct degrees simultaneously at the same or different universities, usually completing both degrees in less time than it would normally take to complete them separately (sequentially).[11] When students complete a dual-degree program, they receive a distinct degree from each college or school involved in the program, either at the same time or at different times as the requirements for each degree are completed.

The importance of these 2 pharmacy training options (residency programs and dual-degree programs) has been recognized by AACP in its strategic plan, which states that the association should provide research and resources to assist colleges and schools to further expand these programs.[12] There are published studies on the individual influence of each of these postgraduate training opportunities on the evolution of pharmacy.[13-16] However, there has yet to be an assessment as to whether and how they impact one another. This article assesses whether there is a complementary or competitive relationship between residency and dual-degree programs by discussing factors affecting student pharmacists' selection of these opportunities, their potential impact on the future leadership of pharmacy, and support from academic institutions for these advanced training opportunities for PharmD graduates in the future.

PHARMACY RESIDENCY PROGRAMS

Pharmacy residencies have become a widely recognized postgraduate training option for pharmacy graduates. Because of the shift in educational focus from dispensing to providing cognitive services to other health care professionals and patients, residency programs have been highly encouraged by some professional pharmacy organizations, colleges and schools of pharmacy, and employers. There are American Society of Health-System Pharmacists (ASHP) accredited postgraduate year 1 (PGY1) and postgraduate year 2 (PGY2) pharmacy programs,[17] as well as some not currently accredited through ASHP. Within PGY1 residencies, there are programs focused on community practice[18] and managed care.[19] In 2006, the American College of Clinical Pharmacy stated that completion of a pharmacy residency should become an educational requirement for providing direct patient care in pharmacy practice by the year 2020.[20] The 2007 ASHP House of Delegates adopted a resolution that supported this position.[21] The reasoning behind these declarations stemmed from the 2004 CAPE educational outcomes, which described patient-centered care as an aspect of pharmaceutical care that all pharmacists must be able to provide in order to be competent practitioners.[22] ASHP-accredited PGY1 pharmacy residency programs are the focus of this article when discussing residencies as these are the most prevalent pharmacy residency opportunities at this time.

Residencies offer pharmacists additional clinical experiences under the supportive mentorship of more-experienced practitioners to further develop their health-care provider skills. This option to build upon their knowledge and past experiences has been cited as one of the main reasons new pharmacy practitioners pursue a residency.[23] Other notable reasons to consider a residency include the opportunity to increase confidence in clinical skills, the ability to obtain more training in a specialized area of patient care, and the need to fulfill a requirement (whether implicit or explicit) to attain a specific job. A questionnaire-based study that assessed the impact of postgraduate training on job and overall career satisfaction among pharmacists practicing in health systems found that pharmacists with postgraduate training scored the following areas significantly higher: practice autonomy, job responsibilities, level of supervision, skill use, and workload.[13]

A concern that has been debated for many years, and has been growing since the expansion of pharmacy colleges and schools, is whether residencies should become a mandatory component to enter certain aspects of pharmacy practice. There are issues to consider in requiring all PharmD graduates to have residency training. According to the AACP, 10,988 graduates received the PharmD as their first professional degree in 2008.[6] In comparison, in 2008 there were 1,762 ASHP-accredited PGY1 residency positions available,[24] which would only provide enough positions for 16% of graduates to pursue a PGY1 residency. The number of pharmacy school graduates is predicted to expand to approximately 12,000 graduates annually, which would require a minimum of 9,000 residency positions to be available for 75% of these graduates to pursue a residency.[25]

Though more residency programs and positions are being developed, the profession still would not be able to accommodate a mandate for all new pharmacists to pursue a residency. Although there were 1,967 PGY1 residency positions available in 2010, following the results of the 2010 ASHP Residency Matching Program, there were 948 applicants who did not match for a residency position.[26] Unfortunately, this gap increased to 1,104 unmatched applicants in 2011 (3,277 applicants for 2,173 positions[27]) and to 1,438 in 2012 (3,706 applicants for 2,268 positions[28]). The widening pharmacy residency disparity and the need to expand residency capacity was the impetus for the Pharmacy Residency Capacity Stakeholders Conference, which was held in February 2011. This conference brought together thought leaders and residency experts from various pharmacy organizations to identify methods to bring the supply of accredited pharmacy residency training programs in better balance with the demand.[29]

Another caveat to the pharmacy residency capacity dilemma is funding. The development of new residency programs requires a significant amount of financial support. However, because of the US economy, obtaining funds from federal and state resources is not as easy as in the past. In 2010, a survey among colleges and schools of pharmacy and community practice sites was conducted to assess perceptions of the value of community practice residency programs. Respondents were from both participating and nonparticipating partners in community practice residency programs. The major barriers to the growth and maintenance of residency programs were financial in nature, with concerns raised over the lack of revenue gained and the reimbursement cost for the residents.[30] General mechanisms for financing residencies include funds from Centers for Medicare and Medicaid Services as pass-through funds, local partnerships, and state pharmacy associations.[31] The National Association of Chain Drug Store Foundation Community Pharmacy Residency Expansion Project promotes collaboration of colleges and schools of pharmacy with community pharmacy organizations to develop community pharmacy residencies.[32] However, additional resources will need to be explored as residency programs continue to expand. Compounding this issue is the decreasing availability of full-time positions after completion of residencies in some practice areas, decreasing the incentive for some pharmacy graduates to apply.[22]

Despite the burdens of establishing and maintaining residencies, there are potential benefits for the hosting institution or organization. A retrospective cost-benefit analysis involving primary care and pharmacy practice residents at a Veterans Affairs (VA) hospital found that residents provided the VA with "in-house" methods for professional development through continuing education presentations, and an internal pool of qualified, trained candidates from which to select to fill clinical positions.[14] In addition to these benefits, pharmacy residencies can serve as tremendous avenues for recruitment and retention of pharmacy faculty members, and residents can be influential in the development of new innovative pharmacy services.[31]

DUAL DEGREE PROGRAMS

Though not as well publicized, enrolling in a parallel graduate-level degree program while attending pharmacy school is an opportunity that many PharmD students consider to further their education. Promoted by many US colleges and schools of pharmacy, dual-degree programs allow pharmacy students the unique opportunity to gain additional knowledge and achieve competences in another professional discipline besides pharmacy.[11] One of the primary incentives for students to enroll in dual-degree programs is the curricular structure, which enables students to graduate in less time than it would take if they opted to pursue each degree separately, resulting in decreased educational cost and time. Moreover, the additional skills developed in the dual program can be beneficial for students interested in nontraditional areas of pharmacy (Table 1).[33]

There are various dual-degree programs available including the master of science (MS) degree in various disciplines, master of business administration (MBA) degree, master of public health (MPH) degree, doctor of jurisprudence (JD) degree, and doctor of philosophy (PhD) degree. Each of these graduate degrees allows students to gain skills in another discipline that complements the knowledge achieved through the PharmD program, and provide methods to advance the profession on various social aspects (Table 1).[33] For example, a pharmacist with

Table 1. Potential Career Opportunities for Pharmacists With an Additional Graduate Degree

Graduate-Level Degree	Career Opportunities
Master of Business Administration (MBA)	Academia: pharmacy practice/management, pharmaceutical outcomes research, health outcomes/service research Industry: management, marketing, medical liaisons Managed Care: pharmacy benefits management, pharmacy consultant organizations, health maintenance organizations Association Management
Master of Public Health (MPH)	Academia: pharmacy practice, pharmaceutical research, health outcomes/service research, population health research Industry: environmental consultant organizations Government: health care policy development and consultation, legislative advocacy initiatives, policy analysis, regulatory affairs Health agency/ department: program planning, implementation, and evaluation Association Management
Juris Doctorate (JD)	Academia: pharmacy law and practice, pharmaceutical research, health outcomes/service research Government: regulatory affairs, health care policy development and consultation, policy analysis Industry: patent legality advisement
Doctor of Philosophy (PhD)	Academia: pharmacy administration, pharmaceutical research, health outcomes/service research Industry: clinical consultation, pharmaceutical research, health outcomes/service research, clinical research Association Management

Adapted from Brazeau et al.[33]

a JD degree gains specialized knowledge and competencies in legal and regulatory issues surrounding health care and its reform process. Similarly, a pharmacist with a PhD has the skills necessary to initiate and focus on research, and is more prepared for entry into academia.[11] The MPH degree may be a particularly advantageous choice for pharmacists, as the profession embraces its macro-level applications in preventive health services and impact on public health concerns.[11,15]

The most prevalent graduate degree associated with the PharmD as part of a dual-degree program in the United States is the MBA.[34] The MBA is highly recognized as having a broad range of applications, with PharmD/MBA graduates entering pharmacy practice areas such as the pharmaceutical industry, community pharmacies, hospitals, managed care, and academia. In 2008, a survey conducted among recent PharmD/MBA graduates by the South Carolina School of Pharmacy found that, in addition to having a high satisfaction rate with the dual-degree program, these graduates typically received more position interviews, as well as higher salaries and total compensation.[16] Furthermore, the dual-degree graduates were less likely to pursue residency options after completing the program. While these findings may not reflect the outcomes of all PharmD dual-degree programs, they do suggest that training in other academic disciplines may lead to career opportunities that otherwise might not be available for applicants with only the PharmD degree.

TRENDS IN PHARMACY RESIDENCY AND DUAL-DEGREE PROGRAMS

With the pursuit of continued formal education through dual-degree programs and residencies, PharmD students and graduates are able to develop additional professional competencies that can further strengthen their credentials as qualified practitioners. According to the ASHP accreditation standards for PGY1 pharmacy residencies, residents are provided the opportunity to accelerate their growth beyond the entry-level professional competence in patient-centered care and pharmacy operational services, as well as further develop leadership skills that can be applied in any position and in any practice setting.[35]

With residency experience and training, residents are held responsible and accountable for acquiring the following outcome competencies: managing and improving the medication-use process; providing evidence-based, patient-centered medication therapy management with interdisciplinary teams; exercising leadership and practice management; demonstrating project management skills; providing medication and practice-related

education/training; and using medical informatics.[35] Dual-degree competencies are specific to their designated area(s) of specialization. The majority of these degrees require the completion of 1 or more theses or research projects following completion of in-class requirements and demonstration of competence in the areas of statistics, research methods, and program evaluation. For example, a PharmD/MBA graduate would have the knowledge and skills to apply marketing, finance, human resource management, and communication principles, as well as appropriate research and statistical procedures in an organization's decision-making process. Additionally, these graduates would be able to use the ethical and legal knowledge frameworks learned in their MBA program. Graduates from pharmacy residency programs and dual-degree programs are trained to advance their knowledge, skills, and attitudes in specific area(s) in order to contribute to the improvement of patient care and health care in a health system, organization, or health care entity.

To examine the profession's progress in promoting and supporting the development of postgraduate pharmacy education and training experiences, an online assessment was conducted in February 2011 involving the 120 colleges and schools of pharmacy that had accreditation, including those with candidate and pre-candidate status at that time. The Web sites of all institutions were visited and searched for documentation regarding dual-degree programs and residency training programs available for PharmD students and graduates. A preliminary search was conducted of the home page of each pharmacy college/school Web site, looking for specific "tabs" to subsequent pages with information on residencies and dual-degree programs. In cases where documentation was not available at the home page, use of the active search feature was required to obtain the necessary search findings. Key terms used in the search process included: "pharmacy residency," "dual degree," "joint degree," and "combined degree."[11] Fifty-nine (49%) colleges and schools of pharmacy offered residency programs, 52 (43%) offered dual-degree programs, and 36 (30%) offered both.

The findings from the Web site study were compared to the 2010 AACP Profile of Pharmacy Students report, which showed only 50 colleges and schools had participated in a residency program[36] and only 41 matched those colleges and schools found in the online survey. Potential reasons for non-concordance between the 2 studies include colleges and schools not being able to fill their advertised residency positions and colleges or schools classifying an offered residency as a fellowship or other form of postgraduate pharmacy training in the AACP survey, as well as the study limitations, which are discussed later.

Findings from the Web site study were also compared with the 2011 AACP Pharmacy School Admission Requirements (PSAR) which projected that 61 colleges and schools of pharmacy would offer dual degree programs for the 2010-2011 academic year.[37,38] In comparison, only 52 colleges and schools were found in the online assessment and only 44 were found in both studies. One potential reason for non-concordance between the 2 sources was colleges and schools electing not to offer a dual-degree program in the 2010-2011 academic school year.

This study had several limitations. Differences among colleges and schools in Web site layout and design made it difficult to identify information regarding the available programs. Also, a variety of search terms were used to identify PharmD dual degree programs based on reported observations.[11] The lack of consistency in the definitions and terms used to describe programs that link an additional graduate degree to the PharmD could have led to inaccurate findings and exclusion of such programs from data collection. The same can be said for pharmacy residencies, which may have been classified as pharmacy fellowships or other postgraduate pharmacy educational or training opportunity. In addition, some Web sites were under construction at the time of this study, which may have reduced those institutions' ability to advertise their programs. Finally, some institutions did not provide detailed information for dual-degree programs and merely linked their Web page to the corresponding program's main page, which often was another academic institution. A more detailed investigation of the breadth and depth of postgraduate training opportunities provided by colleges and schools of pharmacy is needed. The strength of this investigation is that it describes the information that PharmD students may see when they are investigating potential postgraduate training programs and identifies areas for improvement in promoting postgraduate pharmacy education.

FUTURE LEADERSHIP OF THE PROFESSION

Along with the trend of PharmD students and pharmacy school graduates opting to pursue advanced postgraduate pharmacy training opportunities, the issue of how leadership of and within the pharmacy profession will be affected by this training is also a concern. Although the shortage of pharmacists decreased from 8.9% in 2000 to 5% in 2004, leadership positions, such as pharmacy directors and managers, experienced growth, with the percentage of vacant positions increasing from 27% in 2003 to 36% in 2004.[39] In A 2004 study by the ASHP Foundation found that although satisfied with their jobs, 60% to 80% of the current directors, managers, and pharmacists were planning to leave their positions by

2015.[40] Additionally, when pharmacists and pharmacy students were asked about their interest in pursuing a leadership or managerial role in the future, only 30% of pharmacists and 62% of students responded affirmatively. The reasoning behind their responses stemmed from the inherent additional stress of the positions, as well as the decreased opportunity for providing clinical services.

The potential for a prolonged exodus of pharmacy leaders throughout the next decade is important considering where the profession is focusing its education efforts. While the increased focus on clinical residencies will better prepare PharmD graduates to be the direct patient care clinicians that are needed to address the nation's health care concerns, it may have some adverse effects. The 2004 perceptions of students and pharmacists on leadership and management reported by the ASHP Foundation may be propagated to future practitioners, resulting in leadership gaps in some areas of the profession. Because of this, assessing the characteristics of residencies and dual-degree programs may provide insight into the leadership and management inclinations of pharmacy graduates from these programs. Activities germane to residencies and dual-degree programs include independent study, completion of a project(s), continuous communication with a broad spectrum of professionals/practitioners, working in a team-based environment, and demonstration of initiative and competence in the designed area(s) of the training program. Additional characteristics of residency and dual-degree programs are listed in Table 2. Both postgraduate pharmacy training avenues enhance the leadership and management skills of graduates, as well as their ability to think critically, innovate, investigate, implement, and evaluate in short-term and long-term perspectives. In the event of a widening leadership gap despite the growth of residencies, practitioners with dual-degrees could prove to be an equally valuable asset and well suited to help address this void.

THE ROLE OF COLLEGES AND SCHOOLS OF PHARMACY

Although not a standard required by the Accreditation Council for Pharmacy Education (ACPE), colleges and schools of pharmacy should demonstrate their commitment to postgraduate pharmacy training opportunities. ACPE guidelines do mention the role of colleges and schools with postgraduate training opportunities (Guidelines 16.1 and 21.1) and pharmacy residencies (Guidelines 1.6, 6.2, 25.1, and 25.9).[41] Colleges and schools of pharmacy have a variety of issues to consider for pharmacy residencies and dual-degree programs. Colleges and schools should continuously examine methods to improve clinical, managerial, and leadership competencies within their curricula, as well as through other available experiences for their students. Information and exposure to additional professional growth opportunities (ie, residency and dual-degree forums, postgraduate career fairs)

Table 2. General Characteristics of Residency Programs and Dual-Degree Graduate Programs

Characteristics	Residency Programs	Dual-Degree Programs
Financial support/ participant status	Paid position (learning as a practitioner)	Tuition payment (learning as a student)
Organizational format	Learning primarily via practice experiences with optional opportunities for an occasional didactic class	Didactic learning with the requirement for experiential/research components after demonstration of competence in didactic area(s)
Program duration	Primarily full-time training in one year	Full-time or longitudinal training over several years
Educational focus	Highly focused on clinical practice	Focused on cross- professional development
Level of patient care	Emphasis on patient-centered care at the micro-level	Emphasis on population-based interventions at the macro-level
Program initiation	Usually initiated immediately post-graduation	May be initiated during pharmacy school and usually completed after starting independent professional career
Type of curriculum	Specific or focused curriculum in which knowledge and skills are achieved through supervised practice experiences	General knowledge and skills are achieved through organized curriculum and research experiences
Target goals	Aims to initiate career to meet short-term goals	Aims to enhances professional practice skills to meet short-term and life-long goals

should be a part of students' experiences during PharmD training. Colleges and schools of pharmacy can also build components found in residency or dual-degree programs into their curricula. An example would be to have a capstone project or other required research component as a part of the classroom or experiential curriculum. Institutions with established residency and dual-degree programs could work with pharmacy faculty members to integrate student pharmacists' research projects within the research area(s) being pursued by postgraduate trainees. While not an easy process to initiate, the integration of the PharmD curricula with postgraduate training programs will result in a stronger learning experience, and potentially enhanced clinical, humanistic, and economic outcomes for patients.

Pharmacy institutions also should consider the initiation of a pharmacy residency program, expansion of their established pharmacy residency program(s), or collaboration with more established pharmacy residency programs to strengthen pharmacy residency training. Colleges and schools of pharmacy can develop and offer residency teaching certificate programs for residents to learn about the theories and scholarship of teaching, as well as effective teaching and learning strategies.[42] There are many Web sites available to assist in development and expansion of pharmacy residency programs. National pharmacy organizations are committed to growing the opportunities and resources for institutions to learn from one another as well as providing the necessary tools, resources, and services needed for pharmacy residency expansion. Likewise, colleges and schools of pharmacy should consider pursuing the establishment of dual degrees in their larger academic communities when possible. Strengthening interprofessional and institutional relationships along with the support of pharmacy and other health professional organizations could also increase student participation in these currently limited but valuable programs.

ACPE Guideline 1.6 states that a college or school of pharmacy's values should include a stated commitment to a culture that supports postgraduate professional education and training of pharmacists, such as accredited residencies, fellowships, and graduate programs, including combined degree options.[41] There is the opportunity for colleges and schools of pharmacy to use their expertise solely, or in collaboration with other schools or local programs to develop pharmacy residency training and dual degree programs simultaneously. Residency training while concurrently working on a second degree program is available at some health-system pharmacy practice administration residencies that offer residents the ability to earn a master of science degree over a 2-year period.[43] As the field of pharmacy continues to evolve in response to the ever-changing health care environment**,** colleges and schools of pharmacy are crucial centers of information for new practitioners. Not only are they responsible for ensuring that students receive the knowledge and skills necessary to practice pharmacy, they are often the impetus for establishing new and innovative methods to advance the profession and health care practice.

THE EVOLUTION OF THE PHARMACY PROFESSION

Leaders who have contributed to the evolution of the pharmacy profession have come from various backgrounds and training experiences. While pursuit of a dual degree and/or a residency is not the ideal path for all PharmD students, the continued advancement of pharmacy and its contribution to the health care system both nationally and internationally may greatly depend on pharmacists who have completed postgraduate pharmacy training. Advanced training allows PharmD students and graduates the opportunity to proceed with enhancing their skills, attitudes, and knowledge in a specific area of practice to effectively contribute to some aspect of patient care. If a practitioner desires a clinical pharmacy career, a pharmacy residency would be beneficial and should be highly considered. If a practitioner wants to develop a career with more emphasis on research, a PhD dual degree is an option for obtaining the necessary knowledge and experience in an academic or mentored environment. An individual interested in health policy and/or programming planning, implementation, and evaluation, may opt for the MPH as a dual degree; while students with an interest in legal and regulatory issues related to medication, pharmacy practice, and/or health care should consider earning the JD as a dual degree.

Pharmacy residencies and dual-degree programs are not directly competitive in that they focus on specific avenues of knowledge, skills, and application in the health care spectrum. In fact, pharmacy residencies and dual-degree programs may be complementary. Table 3 provides a parallel perspective on a common element of most pharmacy residency and dual-degree programs: a resident/graduate student-led project. Both programs develop a similar method of how to investigate, conduct, and evaluate a research question or theory to contribute to the health care and research literature, as well as the profession. The training opportunities presented use a type of project or outcome that would have to be conducted during the course of the experience. All of the components relate to developing a plan, using available tools/mechanisms/research to test the plan, analyzing the resulting data, and describing how the results affect the testing situation itself, as well as the surrounding environment. Although each training avenue may require that the

Table 3. A Comparison and Contrast of the Relationship between Additional Training Options for Pharmacists

Type of Additional Pharmacy Training	Type of Activities or Assessments	Components
Doctor of philosophy	Comprehension examination; research question and dissertation; manuscript preparation and submission	Develop research question Conduct literature review Construct a hypothesis Test hypothesis using a valid research methodology Analyze the research results Discuss conclusion(s) with research limitations and research's application to the literature
Master of public health	Needs assessment; program planning, implementation, and evaluation; capstone experience	Identify and investigate a health-related issue or need in the community or population Develop population-based programs or service policies and procedures to address the identified issue or problem Implement the designed or planned community or population-specific program or services Evaluate process, impact, and outcome for sustainability of the services provided, as well as its effectiveness and quality in the community or population
Master of business administration	Strengths, weaknesses, opportunities, threats (SWOT) analysis; business plan, implementation and evaluation; thesis	SWOT analysis provides specification of an objective of a business venture or project by identifying the internal and external factors that are favorable and unfavorable to achieve the objective. It can be used as a part of strategic planning, setting objective, developing new products/services/tools, and monitoring results. Strength: an internal and positive factor Weakness: an internal and negative factor Opportunities: an external and positive factor Threat: an external and negative factor
PGY1 residency training	Research project; program development, implementation, and evaluation; manuscript preparation and submission	Develop research question Conduct literature review Construct a hypothesis Test hypothesis using a valid research methodology Analyze the research results Discuss conclusion(s) with research limitations and research's application to the literature Program Development, Implementation, and Evaluation

student/resident use different approaches or techniques to arrive at a conclusion, they all aim to examine an area of interest and disseminate the results, regardless of the outcomes, to others working or affiliated in their area of interest for potential implementation, validation of procedures/processes, or exploration of additional investigations.

The exponential growth of colleges and schools of pharmacy is not correlating with the growth of available residency programs. Despite new programs being formed, there still are not enough residency programs to meet the needs of the profession. Therefore, it is not possible or reasonable to require residency training for entry into clinical pharmacy practice. Considering this, dual-degree programs provide another avenue for PharmD students to begin pursuing specialized training before they graduate. Pharmacists with dual degrees are not only trained in a discipline that complements their pharmacy expertise, but also afforded the opportunity for cross-professional training and to work with professionals outside of pharmacy. Pharmacists with dual degrees are highly versatile and more easily recognized in health care settings and by other professionals.

Figure 1 depicts the pharmacy profession as it relates to pharmacists' advanced training opportunities and the potential for future leadership roles. The base of the pyramid is the PharmD degree, which became the sole first-professional degree in pharmacy available in the United States in 2006.[41] This base also includes pharmacists who possess a BS in pharmacy as these practitioners consider future postgraduate opportunities. Having a PharmD and residency training or a PharmD and a second degree provides practitioners with specialized training in competencies that will allow them to build upon their pharmacy knowledge. The apex of the pyramid would be to complete residency training as well as earn a second degree, which is available through postgraduate training programs in healthcare administration. Although not possible for all practitioners, some individuals pursue dual degrees while completing residency training.

Practitioners who pursue residency training as well as a second-degree would potentially acquire the widest range of skill sets for their chosen practice or professional settings, with the residency program providing clinical and leadership training and the second degree program providing specialized training with interprofessional insights and collaborations, along with additional leadership experiences. There are a limited number of practitioners who have reached the apex of this pyramid. It is the responsibility of everyone within or associated with the pharmacy practice pyramid to become knowledgeable about the training and educational options for future practitioners in order to assist with the mentoring, advising, precepting, and managing of student pharmacists.

CONCLUSION

This article describes, compares, and contrasts 2 categories of postgraduate training opportunities for pharmacy graduates: dual-degree programs and residency training. The implications of these programs on the supportive roles of colleges and schools of pharmacy, as well as future leadership of the pharmacy profession, are also discussed. Both advanced training options provide a wealth of knowledge, skills and experiences that will influence pharmacy practitioners as they evolve into their ideal "professional" selves. Residency and dual-degree programs should not be viewed as competing options, but rather options that complement one another. Both experiences enrich practitioners, the health care environment in which they work, and the patients whom they serve, as well as provide leaders within the profession. These 2 opportunities need to continue to expand in depth and number of programs for the pharmacy profession to meet the needs of health care providers, other professionals, and most importantly, the patients within the health care system.

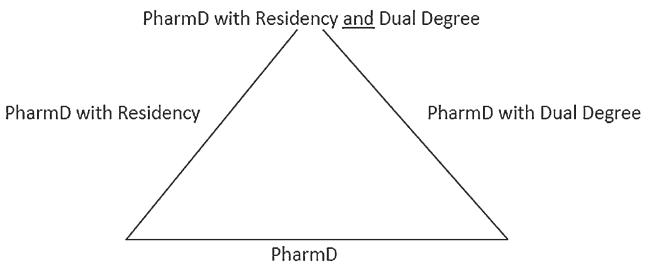

Figure 1. A pyramidal representation of the current routes PharmD practitioners can follow to obtain additional professional skills and leadership opportunities. The base is identified as the fundamental PharmD degree, while the apex is the ideal PharmD with Residency and Dual Degree training.

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