

LAYING THE FOUNDATION FOR THE NEW DOCTOR OF PHARMACY DEGREE IN THE UNITED STATES

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In order to understand better the development of the six-year professional doctorate degree in pharmacy, a brief summary of the history of pharmacy education in the United States will be provided. In the early 1900's, a two-year diploma from a recognized school of pharmacy was recommended before a candidate could stand for licensure to practice pharmacy in an individual state. Each state regulates the practice of pharmacy and a state board of pharmacy is responsible for granting a pharmacist the right to practice pharmacy. The board of pharmacy requires a candidate to demonstrate his/her proficiency in pharmacy practice by passing a comprehensive examination in all areas of pharmacy, including the basic pharmaceutical sciences and clinical pharmacy practice. In addition, the candidate must have a degree in pharmacy from an accredited college of pharmacy. Most states have reciprocal agreements whereby a pharmacist licensed to practice in one state will be allowed to practice in another state by showing knowledge of state pharmacy laws in the state to which he/she will be relocating.

By the 1930's, a four year bachelor of science (B.S.) degree was adopted by many states as a minimal standard for licensure. Educational standards in pharmacy continued to increase so that by the 1950's-1980's, a five year B.S. degree became the principal path for licensure.

During the same period of time for the development of the B.S. degree in pharmacy, a few states were experimenting with an advanced pharmacy program for pharmacists with a B. S. degree - the post-B.S. Doctor of Pharmacy (Pharm.D.). In the early 1980's, there were many colleges of pharmacy which offered a two to three year program after the five year B.S. program to a select group of pharmacists who wanted advanced training in clinical pharmacy. Many of these graduates specialized in pharmacotherapeutics (e.g., pediatrics, acute care, oncology, transplant, etc.) and became professors of clinical pharmacy in colleges of pharmacy.

A new phenomenon in pharmacy education became prevalent in the 1980-1990's: the development of a Pharm.D. degree which did not require the acquisition of a B.S. degree to become an advanced pharmacy practitioner. This new entry-level Pharm.D. degree has essentially replaced the B.S. and post-B.S. Pharm.D. degrees as the sole degree needed for licensure. Thus, the entry level Pharm.D. program allows a student to enter college after high school and theoretically (if not practically) receive two years of pre-pharmacy coursework, followed by four years of professional pharmacy coursework. A description of a six-year entry level Pharm.D. program will be given in the following pages.

What are some of the reasons for the development of a sole, entry level Pharm.D. degree in the United States? In 1900, there were 38,000 «drugstores» which served a population of 76 million people. Few «druggists» worked in drugstores devoted exclusively to professional services. Thus, during the 1900's there was the evolution of the druggist to a pharmacist to a pharmacy practitioner. In the latter half of the century there was a proliferation of new drugs which the public needed expert advice on their therapeutics and toxicity. This explosion of new

drug developments led to the concept of pharmaceutical care: there was a shift from a focus on "product distribution" to an emphasis on «patient care».

Before I describe the concept of pharmaceutical care in more detail, let me discuss the evolution of advances in pharmacology and therapeutics in the 1900's. The synthesis and isolation of active drug products from natural sources in the laboratory evolved to the synthesis of new drugs based on structure activity relationships - 195 of the 200 most-prescribed drugs in 1982 were unknown prior to the 20th century, and 150 of the 200 drugs were available only since 1950. In addition, over the last 50 years, the average lifespan of Americans has increased by 10 years. There is a vast improvement in the quality of life.

A major advance has occurred in the areas of molecular biology and biotechnology in drug development. Examples include new developments in such hormones as human insulin, growth hormone, erythropoietin, and alpha interferon. Other new advances involve interleukins, growth factors, recombinant vaccines, and monoclonal antibodies for targeting specific sites in the body with highly toxic compounds. Thus, pharmacists must have a thorough background in molecular biology, pharmacology, toxicology, and therapeutics. This foundation in the basic sciences allows the pharmacist to provide expert information on drug therapy to the patient.

A pharmacist with a Pharm.D. degree is then the health professional who is the ultimate provider of pharmaceutical care, which is defined as the «responsible provision of drug therapy for the purpose of achieving definite outcomes to improve a patient's quality of life.» In the provision of pharmaceutical care, there are several desirable outcomes which are recommended:

- Cure of a disease
- Elimination or reduction of a patient's symptomatology
- Arrest or slowing of a disease process
- Prevention of a disease

In order for pharmaceutical care to be successful, it must involve a partnership between the patient and pharmacist. There has been a shift in professional responsibilities from the product-distribution process (dispensing function) to patient-center care (consultative function). The pharmacist must respond to all of the patient's drug-related needs. The entry-level Pharm.D. degree is believed to provide the education foundation for a pharmacist to offer proper and comprehensive pharmaceutical care. As Francis W. Peabody once said: «One of the essential qualities of the clinician is interest in humanity, for the secret in the care of the patient is in caring for the patient.»

Because of this new development in comprehensive pharmaceutical care, the impetus in the educational needs of pharmacists came from pharmacy educators (i.e., colleges of pharmacy). In 1989, a letter of intent to develop a 6-year entry level Pharm.D. program was initiated by the American Council on Pharmaceutical Education (ACPE), the agency responsible for the accreditation of colleges of pharmacy in the United States. Later in 1992, the American Association of Colleges of Pharmacy (AACP) voted to urge that all colleges initiate curricular

«re-vision» to adopt the entry level Pharm.D. degree. By 1997, ACPE had developed new accreditation standards for colleges of pharmacy: all colleges must phase out the B.S. in Pharmacy by 2001-2002 and accreditation of the entry-level Pharm.D. program will be the only degree evaluated by ACPE. All colleges should start their Pharm.D. programs by 2000-2001. A majority of the colleges in the U. S. had already started their Pharm.D. programs in the mid-1 990's.

Major features in an entry-level Pharm.D. Program (University of Cincinnati model):

- Two years of pre-pharmacy coursework (e.g., chemistry, biology, mathematics, physics, microbiology, biochemistry, statistics, physiology, economics, and other requirements).
- Four years of professional pharmacy coursework.

The first professional year has the following courses:

- Advanced courses in biochemistry and physiology
- Molecular biology
- Principles of medicinal chemistry and pharmacology
- Introduction to U. S. health care systems
- Pharmacy communications
- Pharmacy jurisprudence
- Principles of physical pharmacy and drug delivery systems
- Integrated course in pharmacology, chemistry, and therapeutics of drugs used in inflammation, GI disorders, and respiratory diseases
- Introduction to pharmacy practice
- Experiential patient care
- Practice skills laboratory

The second professional year is the following:

- Continuation of course in drug delivery and biopharmaceutics
- Integrated course in pharmacology, chemistry, and the therapeutics of drug used in cardiovascular diseases
- Clinical pharmacokinetics
- Integrated course in pharmacology, chemistry, and the therapeutics of drugs used in renal and electrolyte disorders
- Pharmacy management
- Practice skills laboratory
- Integrated course in hematology disorders and cancer
- Integrated course in infectious diseases
- Integrated course in endocrine disorders

The third professional year has the following curriculum:

- Health systems

- Pharmacoeconomics
- Integrated course in neurological disorders
- Integrated course in skin and mucous membrane diseases
- Practice skills laboratory
- Professional experience in various pharmacy settings

The fourth year is the following:

- Year-long advanced clinical clerkships in a variety of pharmacy settings
- Review of therapeutics
- Seminar

Thus, a new era in pharmacy education in the United States has begun in the new millennium. The entry-level Pharm.D. program prepares the student to be an effective deliverer of pharmaceutical care because of a strong foundation in pharmacology and therapeutics.

Key References:

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