PROFESSIONAL PHARMACY

Pharm.D. graduates are presented with opportunity and challenge: the opportunity to participate in the exciting field of health care and the challenge of expanding the role of the pharmacy professional within this changing system. Pharmacists are important members of the comprehensive health care team; the expertise of pharmacists is vital to the success of the health care team as it designs, implements, and monitors drug therapy for the benefit of patients. Pharmacists use their expertise to keep pace with the rapid changes taking place in the health care system and the growing complexities of providing optimal pharmaceutical care to patients. This care requires that pharmacists be effective health educators. The ultimate success of drug therapy can depend upon how well patients understand and follow their drug regimens. Therefore, opportunities for the development and improvement of communication skills, both written and oral, are essential components of the Pharm.D. professional curriculum; required and elective courses throughout the curriculum provide valuable practical experience in effective interaction with patients and other health practitioners.

Pharmacy offers many career opportunities. Graduates traditionally have pursued careers in community, hospital, and long-term care pharmacy, the pharmaceutical industry, pharmacy education, and government agencies. Pharmacists serve also in other roles, including managed care, home care, and primary care, to increase the availability and quality of pharmaceutical care.

Community pharmacy. Many pharmacists are employed in community pharmacies; these can be independent pharmacies, chain store pharmacies, or health maintenance organization (HMO) pharmacies. Community pharmacy practice usually is general in nature and involves a large ambulatory patient population. Community pharmacists are the most accessible health professionals. They prepare and dispense prescriptions, develop pharmaceutical care plans, counsel patients on the appropriate use of prescription and nonprescription drugs, and maintain patient medication records and profiles. In addition, community pharmacists consult with other members of the health care team and serve as important sources of information for the public. Other opportunities include involvement in business management, marketing strategies, inventory control, and personnel. Pharmacists supervise the activities of pharmacy technicians.

Hospital pharmacy practice includes active involvement with inpatient care in hospitals and outpatient care in ambulatory clinics. Hospital pharmacists participate with other health care professionals in the care of patients, obtain medication histories from newly admitted patients, develop pharmaceutical care plans, perform pharmacokinetic drug consultations, monitor drug therapies, educate patients about their drug therapy, administer medications, operate medication distribution systems, and prepare intravenous solutions and other dosage forms.

Hospital pharmacists supervise the activities of pharmacy technicians in purchasing, storing, and distributing drugs to patients. Hospital pharmacists also carry out clinical research and practice in specialized areas of pharmacy, such as nuclear pharmacy, the provision of drug and poison information to other members of the health care team and to the public, infusion therapy, oncological pharmacy, pediatric pharmacy, and psychiatric pharmacy.

Home care, assisted-living, extended care, and long-term care pharmacy. Residents in assisted-living, extended care, or long-term care facilities may require pharmaceutical care similar to that found in acute care hospitals, while patients residing at home may require a wide range of pharmaceutical care services.

Other career opportunities. Pharmacists are prepared to assume positions in the pharmaceutical industry, in areas such as research and discovery, clinical investigation, product formulation, quality control, marketing, and sales. Some pharmacists practice in government agencies, such as the U. S. Public Health Service, the Veterans Administration, the Armed Forces, and the Food and Drug Administration, and in other federal and state agencies. Opportunities for research and teaching are available at many colleges and universities, in the pharmaceutical industry, and in some government agencies. Pharmacists with graduate or advanced professional education teach in schools of
pharmacy. Specialization in nuclear pharmacy, veterinary pharmacy, technical writing for scientific and professional journals, or administration of state and national professional pharmacy organizations are additional areas that graduates may consider.

Graduate study. Well-qualified graduates who wish to prepare themselves for a variety of careers, including university teaching and research, industrial research, and pharmacy administration, will find outstanding opportunities for specialized study and research. The University of Wisconsin–Madison School of Pharmacy provides extensive research facilities and graduate courses in a wide variety of pharmacy-related areas. The M.S. and Ph.D. degrees are conferred upon candidates who have met the requirements of their respective fields of study. Postdoctoral training is available with faculty for those holding the Ph.D. degree, and in the form of residencies and fellowships for those holding the Pharm.D. degree.

REGISTRATION AS A PHARMACIST

The practice of pharmacy, recognized as a public health profession, is regulated by law. In Wisconsin, as in all states, pharmacy practice is limited to those who are professionally competent and are licensed by the state.

Educational requirements. To be eligible for licensure in Wisconsin, a candidate must be a graduate of an accredited school of pharmacy in the United States, or must meet the requirements established by the Wisconsin Pharmacy Examining Board for graduates of pharmacy schools in other countries.

Internship. Wisconsin requires the completion of 1,740 hours of internship to qualify for licensure. With proper planning, the Pharm.D. degree at the University of Wisconsin–Madison School of Pharmacy, completed with required clerkships under the supervision of qualified preceptors, can fulfill the internship requirement.

Internship requirements vary from state to state, although credit for internship generally is transferable. A person who plans to intern and/or become licensed in another state should contact the pharmacy examining board of that prospective state for information about the internship and/or licensure requirements of that state.

Licensing examination. Following completion of the internship requirement, prospective pharmacists must pass the national examinations (NAPLEX, MPJE) and an examination administered by the Wisconsin Pharmacy Examining Board. The board then issues a registration certificate entitling the holder to practice pharmacy in Wisconsin.

ACCREDITATION

The Accreditation Council for Pharmaceutical Education (ACPE) (http://www.acpe-accredit.org) accredits professional pharmacy degree programs; ACPE membership comes from the American Pharmacists Association (APhA) (http://www.pharmacist.com), the National Association of Boards of Pharmacy (NABP) (http://www.nabp.net), and the American Association of Colleges of Pharmacy (AACP) (http://www.aacp.org/Pages/Default.aspx). The purposes of ACPE are to advance the standard of pharmaceutical education and to accredit schools and colleges of pharmacy.

The School of Pharmacy Pharm.D. program is accredited by:

ACPE (http://www.acpe-accredit.org)
20 North Clark Street, Suite 2500

Chicago, IL 60602
312-664-3575; fax 312-664-4652
info@acpe-accredit.org (info@acpe-accredit.org)

PHARMACOLOGY AND TOXICOLOGY

The bachelor of science degree in Pharmacology and Toxicology ("PharmTox") focuses on the biomedical sciences. Pharmacology is concerned with the properties, effects, and mechanisms of action of drugs, and with the interactions between chemical agents and biological systems. Toxicology, the science of poisons, combines the elements of biology and chemistry with those of many other disciplines to help us understand the harmful effects of chemicals on living organisms.

A major challenge for the pharmacologist is to determine how drugs act. This can be carried out at the subcellular and molecular level, the cellular level, the tissue level, the organ level, or the whole-animal level. Pharmacologists also are concerned with the development of new drugs that produce fewer side effects while curing disease, and provide more effective and/or more rapid treatment of disease in humans or animals.

Some pharmacologists are concerned with screening newly discovered drugs or synthesized compounds for potentially useful therapeutic activity, then characterizing that activity. Others conduct research by using drugs (as tools) to probe biological systems. The challenges of this research are to achieve a better understanding of normal bodily functions and to better understand the biological basis of disease.

Toxicologists find scientifically sound answers to questions about chemicals that may potentially threaten our health, about pesticides in the food we eat, pollutants in the air we breathe, chemicals in the water we drink, and toxic waste sites near our homes. Some toxicologists are concerned with determining the cellular mechanisms by which drugs and chemicals produce toxic effects. Many are involved in subspecialty areas in toxicology research, such as reproductive and developmental toxicology, neurotoxicology, immunotoxicology, and inhalation toxicology. Researchers in these areas utilize both laboratory animals and in vitro systems to examine the cellular, biochemical, and molecular processes underlying toxic responses.

Other researchers are involved in research to define safe exposure limits for new chemicals before they reach the market, or to identify and determine the relative risks to humans of occupational and/or environmental exposure to chemicals. For example, toxicologists in this area are concerned with the adverse effects on humans and animals of long-term exposure to air and water pollutants, food additives, drugs, and agricultural and industrial chemicals. The development of new poisons that are more selective and effective against insects and pests is yet another challenge for the toxicologist; so, too, is the development of new antidotes for the more rapid and effective treatment of poisons by drugs and chemicals.

DEGREES/MAJORS/CERTIFICATES

- Pharmaceutical Sciences, B.S. (http://guide.wisc.edu/undergraduate/pharmacy/pharmacy/pharmaceutical-sciences-bs)
- Pharmacology and Toxicology, B.S. (http://guide.wisc.edu/undergraduate/pharmacy/pharmacy/pharmacology-toxicology-bs)
ENTERING THE SCHOOL

ADMISSION POLICIES
Pharm.D. and B.S.-Pharmacology and Toxicology Admission
Admission to both programs is selective and competitive, and requires specific prerequisite coursework as well as a complete admissions application. For detailed information on prerequisites and the application for the Pharmacology and Toxicology major/degree, see the major’s "How to Get In" tab in the [Guide](https://pharmacy.wisc.edu/pharmacology-toxicology-bs/#howtobegin). Information about the required elements of the application and prerequisites for the Pharm.D. (Doctor of Pharmacy) program can be found on the School of Pharmacy website ([https://pharmacy.wisc.edu/programs/pharmd/admissions](https://pharmacy.wisc.edu/programs/pharmd/admissions)). Completion of the required School of Pharmacy course prerequisites does not guarantee admission. Each applicant’s admission credentials are considered not only on their own merit, but also in comparison with the credentials of other applicants.

GRADUATION AWARDS
Annual awards to students graduating from the School of Pharmacy recognize scholastic achievement, leadership qualities, involvement in student organizations, professional potential, and general achievements. The awards program is supported by professional organizations, School of Pharmacy alumni, and the pharmaceutical industry. Some awards carry financial remuneration. Awards are presented at the Hooding Ceremony (Pharm.D. graduates) and at the graduation reception (B.S.–Pharmacology and Toxicology graduates) each May.

MINORITY AFFAIRS
The primary goals of the Multicultural Affairs Program in Pharmacy (MAPP) are to identify, recruit, admit, retain, and graduate students of color who are interested in the pharmaceutical professions, and to encourage the full participation of students of color in pre-professional and professional life.

MAPP focuses on the early identification and continuous development of School of Pharmacy and School of Pharmacy students. To accomplish these goals, MAPP and the diversity coordinator collaborate to serve as the bridge between pre–School of Pharmacy and School of Pharmacy admission and retention activities, by providing and disseminating information, by promoting activities that are designed to enlighten students about university resources, and by encouraging leadership development and academic success. Advanced Opportunity Program (AOP) scholarships, based upon need, are available to students in the School of Pharmacy.

The School of Pharmacy is committed to admitting a diverse student body, to help students prepare to become productive and involved members of an increasingly complex and diverse society. Applicants are encouraged to share information about their own unique backgrounds and experiences with the admissions committee (e.g. gender, racial/ethnic/cultural heritage, socioeconomic class, age, first-generation college student, geography, historical underrepresentation, multicultural and/or international experience, sexual identity/orientation).

STUDENT ORGANIZATIONS
Pharmacy students will find many organizations open to them, both in the school and across the UW–Madison campus. For more information about Pharmacy student groups, see this link ([https://pharmacy.wisc.edu/student-organizations](https://pharmacy.wisc.edu/student-organizations)).

FACILITIES
The School of Pharmacy is located in Rennebohm Hall, the state-of-the-art pharmacy building. Rennebohm Hall is located on the west side of campus, near University Hospital and Clinics and Health Sciences Learning Center. The School of Pharmacy provides students and faculty with the finest possible physical environment for professional pharmacy and for research in pharmaceutical fields of study.

The combination of small-enrollment courses and the availability of modern apparatus, equipment, computers, and laboratories creates optimal educational opportunities. School of Pharmacy students may

FINANCIAL AID
Students who seek financial assistance should contact the UW–Madison Office of Student Financial Aid ([https://financialaid.wisc.edu](https://financialaid.wisc.edu)) for financial aid applications and information about scholarships, loans, grants (not available to Pharm.D. students), work-study programs, and student employment.

RESOURCES

POLICIES AND REGULATIONS
BACHELOR OF SCIENCE - PHARMACOLOGY AND TOXICOLOGY POLICIES
For a list of Pharmacology and Toxicology (PharmTox) undergraduate policies, including academic standing and probation policies, please visit the PharmTox Policy Handbook ([https://students.pharmacy.wisc.edu/pharm-tox-handbook](https://students.pharmacy.wisc.edu/pharm-tox-handbook)).

SCHOOL OF PHARMACY SCHOLARSHIPS
About 120 School of Pharmacy students are awarded scholarships each year, in varying amounts. Only students who have been admitted to the Pharm.D. program or the B.S.–Pharmacology and Toxicology program may apply for scholarships. Applications are available from the School of Pharmacy Student Services Office during the spring semester, and must be submitted by a specified date. The School of Pharmacy Scholarships Committee evaluates scholarship applicants on the bases of academic achievements, personal and professional accomplishments, and a written essay. Applicants are notified of the committee’s decisions during the summer, and scholarships are presented at the annual Scholarships and Awards Ceremony each September.
take advantage of the resources not only of the school, but also of other schools and colleges on campus.

For Pharm.D. students, community and hospital pharmacies serve as clinical sites for the required and elective clerkships in the professional curriculum. Through these experiences, students become acquainted with actual pharmacy practice as they work under the supervision of registered pharmacists, who serve as preceptors. Throughout the Pharm.D. curriculum, students participate in an active program that is focused on the patient and the development of pharmacist-patient communication.

LIBRARIES

The Ebling Library (http://ebling.library.wisc.edu) is located in Health Sciences Learning Center (HSLC), 750 Highland Avenue, directly across the street from Rennebohm Hall. A skywalk connects Rennebohm Hall to the HSLC. Ebling Library opened in June 2004 and combines the collections of the three former Health Sciences Libraries on the UW–Madison campus: the former F. B. Power Pharmaceutical Library; the former F. L. Weston Clinical Sciences Center Library; and the former William S. Middleton Health Sciences Library. The library's collection includes journals, books, and other materials related to pharmacy (including pharmacy, pharmacology, toxicology, herbas, and the history of pharmacy), nursing, medicine and allied health. Many journals and books of interest to pharmacy students are available full-text online through the campus computer network. Most materials in the library can be checked out with a valid UW–Madison student identification card.

Library staff members are available to help students locate information, assist with the development of research strategies, provide instruction for database searching, and help with the evaluation of materials. Through electronic reserves, library staff post course exams, lecture notes and handouts, journal articles, book chapters, and audio files, as requested by instructors.

The Ebling Library maintains a selection of brochures and handouts pertaining to residency and career opportunities. The library's website (http://ebling.library.wisc.edu/pharmacy) includes links to job openings, sample resumes and cover letters, and educational opportunities.

RESEARCH FACILITIES AND EQUIPMENT

The School of Pharmacy provides graduate students and other students enrolled in independent study projects laboratory space, instruments, and supplies necessary to conduct scientific research. Among the instruments available to students are two nuclear magnetic resonance spectrometers, recording ultraviolet and infrared spectrophotometers, spectropho-fluorometers, several modern mass spectrometers, gas chromatographs and high-pressure liquid chromatographs, liquid scintillation spectrometers, gamma counters, a scanning laser densitometer, ultracentrifuges, and microscopes. Also available are a peptide synthesizer, an oligonucleotide synthesizer, equipment for small-scale fermentation, numerous tissue culture laboratories, and other pieces of specialized equipment necessary to conduct research. Animal care facilities are available for a variety of terrestrial and aquatic species. Additional facilities and resources within the School of Pharmacy include cold rooms, an electronics shop, and a well-provisioned stockroom. Computer specialists are available to offer individualized tutoring and group classes. Other campus resources, such as the Biotron, a system of controlled environmental facilities, and core instrumentation, microscopic, and biotechnology facilities, also are available to students.