

**University of Kansas Medical Center
2012-13 Program Review Report**

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Institutional Overview

The University of Kansas Medical Center is an integral and unique component of the University of Kansas, composed of the Schools of Medicine, Nursing, Health Professions, and the Office of Graduate Studies. The academic units operate alongside The University of Kansas Hospital, which provides students an exceptional, highly-ranked clinical arena from which to train and learn. The KU Medical Center is a multi-faceted institution whose basic functions include education, research, patient care, and community engagement.

Mission Statement

The KU Medical Center trains professionals to meet a wide range of health needs in Kansas, from the critical need for primary care and prevention to the urgent need for highly innovative and specialized clinical care. Further, the Medical Center produces medical scientists who are essential for basic and translational research, supplying the state's bioscience and biotech workforce and creating economic development. The Medical Center serves people throughout the state of Kansas and the region, in rural as well as urban areas. The programs are comprehensive and maintain the high scholarship and academic excellence upon which the University's reputation is based. The University of Kansas Medical Center's mission is to create an environment for:

Education. The KU Medical Center educates health care professionals to primarily serve the needs of Kansas as well as the region and the nation. The Medical Center offers high-quality educational experiences to a diverse student population through a full range of undergraduate, graduate, professional, postdoctoral, and continuing education programs.

Research. The KU Medical Center strives to advance the health sciences through internationally recognized research programs in strong basic, clinical, and translational sciences, as well as drug discovery, health services research, and public health.

Patient Care. The KU Medical Center provides exceptional patient care with a focus on quality care and outcomes through hands-on student training, residency programs, affiliations with hospitals and clinics throughout the state, Telemedicine and Telehealth consultations, and student- and faculty-operated clinics to care for the underserved and uninsured.

Service. The KU Medical Center serves the citizens of Kansas, the region and the nation by developing, implementing and promoting model health care programs, and through numerous charitable, philanthropic and mission-oriented endeavors.

To realize this mission, the Medical Center must have strong and viable programs. To ensure their quality and viability, the Medical Center is committed to periodic review of academic programs, both internally at the department level and externally by appropriate accrediting agencies and the Kansas Board of Regents.

Periodic Review

Periodic review offers the opportunity to assess the strengths and concerns of Medical Center programs. To accomplish this, the following goals have been established:

1. Assess existing program strengths and concerns to enhance the quality and accessibility of academic and professional programs.
2. Identify and articulate academic program needs and campus priorities to augment institutional self-management.
3. Identify needs to reorganize academic programs, including modification, merger and discontinuance.

Due to the inherent professional nature of many of the programs at the Medical Center, such programs are reviewed and evaluated by an appropriate discipline-specific accrediting agency with site visits occurring on a schedule determined by the accreditation body. These reviews are rigorous and measure progress toward the program's stated mission, identify its strengths and weaknesses, and, if appropriate, state improvements necessary to meet national standards. Many accrediting bodies now require annual updates on benchmark data related to outcome minima.

Program Review Process

All degree programs at the University of Kansas Medical Center are accredited under the general umbrella of the Higher Learning Commission (HLC) of the North Central Association. As mentioned above, most of our professional programs are accredited by a discipline-specific agency, viewed as a critical component for having a valid program in the eyes of students and employers. To take advantage of the activities associated with this type of accreditation, the Medical Center makes efforts to coordinate the Program Review year with site visits from the accrediting body.

Leading up to the Program Review year, programs are provided minima tables from KHEDS data, instructions related to the PR process, and the six Board of Regents criteria required to be incorporated into the narratives. These criteria are to address:

- Centrality of the program to fulfilling the mission and role of the institution.
- The quality of the program as assessed by the strengths, productivity and qualifications of the faculty.
- The quality of the program as assessed by its curriculum and impact on students.
- Demonstrated student need and employer demand for the program.
- The service the program provides to the discipline, the university, and beyond.
- The program's cost-effectiveness.

The department may use information compiled during internal self-review, annual updates required by the accrediting body, and/or a self-study report produced for an accreditation site visit team. Data comes from centralized sources involving student, HR, research, and financial systems, as well as internal department record keeping. Departments may use course evaluation and program evaluation data from students and other stakeholders to make necessary modifications, or to further enrich their programs. Many departments run exit surveys on student satisfaction as well as surveys on recent graduates regarding employment.

For programs that do not have additional accreditation outside of the HLC, the Office of Academic Affairs institutes a process of internal self-review based upon a set of standard criteria. An example of this process is given at the end of this overview. The results are sent to a committee of peers, who make a recommendation to Academic Affairs regarding the program (e.g. enhancement, continuation, deletion). For professional programs with specific accreditation, the University understands the rigors undertaken to maintain accreditation and to prepare for site visits or annual updates. In these cases, Academic Affairs does not mandate additional internal review in preparation for Program Review. The final recommendation by Academic Affairs is made based on these inputs in conjunction with strategic planning and external forces (e.g. financial support, research landscape, state health-professional needs). The Office of Enterprise Analytics compiles the Program Review report prior to final approval from Academic Affairs.

Review of Basic Science Graduate Programs

- Each department is asked to review their programs from a student, curriculum, and faculty perspective.
- A report is written which provides five-year details about: the graduate faculty in the program; the graduate students of each faculty member; and the degrees conferred and titles of theses or dissertations. Full description of the current curriculum is required.
- The department must prepare a two-page summary narrative in line with Board of Regents Program Review requirements.
- The report is distributed to a select tenured faculty committee for review. To help remove bias, the faculty chosen are from outside the reviewed department.
- The review committee meets with program administrators for questions and feedback.
- The committee prepares its own report based upon review, and makes a recommendation to Academic Affairs regarding the program.

List of Reviewed Programs

The Program Review (PR) submitted to the Kansas Board of Regents in February 2014 consists of programs at the University of Kansas Medical Center reviewed during the July 1, 2012 - June 30, 2013 Academic Year. Five programs were reviewed during the academic year. The program name is followed by the housing department and school. The awards offered within each program are listed for reference.

- Cell Biology and Anatomy Program (Anatomy and Cell Biology, School of Medicine)
Master of Arts in Cell Biology and Anatomy (MA)
Doctor of Philosophy in Cell Biology and Anatomy (PHD)
- Microbiology Program (Microbiology, Mol. Genetics & Immunology, School of Medicine)
Master of Arts in Microbiology (MA)
Doctor of Philosophy in Microbiology (PHD)
- Pharmacology Program (Pharmacology, Toxicology & Therapeutics, School of Medicine)
Master of Science in Pharmacology (MS)
Doctor of Philosophy in Pharmacology (PHD)
- Toxicology Program (Pharmacology, Toxicology & Therapeutics, School of Medicine)
Master of Science in Toxicology (MS)
Doctor of Philosophy in Toxicology (PHD)
- M.D. Program (School of Medicine)
Doctor of Medicine (MD)

Statistical Data

The information in the following table is taken primarily from KBOR data collections over the most recent five-year period; that is, from AY 2008-09 to AY 2012-13. Both declared majors and degrees conferred are generated from the Kansas Postsecondary Database (KSPSD). Departmental faculty counts are part of Program Review data collections, as are ACT scores for undergraduate majors. Only tenured or tenure-track faculty with terminal degrees are submitted for the purposes of Program Review (PR); as such, these do not typically reflect the scope of faculty instruction at KUMC. The Medical Center has several main types of faculty appointments: tenure-track/tenured, clinical scholar, clinical-titled, research-titled, and affiliate (volunteer faculty). All are important for maintaining the educational, research, and clinical missions of the Medical Center. Neither clinical or research faculty are tenurable and thus do not get reported within PR minima data. Of the clinical faculty, those in the clinical scholar track serve a vital role in education of students at KUMC.

Minima Data for Reviewed Programs

Program	Award	Program Review Minima Data (5 Year Averages)				Institutional Data
		Declared Majors	ACT Scores (UG only)	Degrees Conferred	Departmental Faculty ^{1,4}	Program Core Faculty ²
		(Fall 08-12)	(Fall 08-12)	(AY 09-13)	(Fall 08-12)	Fall 2012
Cell Biology and Anatomy	MA	< 1		< 1	17	31
	PhD	18		3		
Microbiology	MA ³	< 1		< 1	11	14
	PhD	13		2		
Pharmacology	MS	< 1		< 1	16	25
	PhD	12		2		
Toxicology	MS	0		0	16	25
	PhD	16		3		
Medicine (M.D.)	MD	735		164	129	

¹ Faculty in the program's parent department who are tenured or on tenure-track and hold the appropriate terminal degree for the field.

² Faculty who teach full- or part-time in departmental program(s), or who may serve key roles in research mentoring of students. Faculty may be traditional tenure-track, research-track, clinical-track, or affiliate-track.

³ Degree is erroneously listed as MS in the Program Inventory.

⁴ The M.D. Program is not housed in a traditional department; rather it is administered by the Office of Medical Education. Faculty who instruct in the program have appointments in either a basic science or clinical department within the School of Medicine. KHEDS data reflects all tenured or tenure-track faculty within the School.

Institutional Recommendations and Program Assessments

Program Review stipulates that institutions make a recommendation about each program reviewed during the academic year using one of the following: continue, additional review, enhance, or discontinue. These recommendations are listed in the Program Review Summary Table. Further, for each program reviewed, a summary assessment and the institutional recommendation is presented in the form of a narrative. This “program narrative” is to include all degrees within a program.

Due to the nature of some Medical Center’s programs and the nuances in classifying such programs in Program Inventory, some flexibility is necessary to accurately assess and summarize departmental programs. For example, the Department of Pharmacology, Toxicology and Therapeutics offers degrees in either Pharmacology or Toxicology. The tables reflect the minima data for each degree program group (CIP code) and are reported separately. From a review and narrative standpoint however, it was best to group these two programs together.

To better understand the nature and assessment of our biomedical science programs, further context is given here. The first-year core curriculum for graduate students interested in becoming biomedical researchers is provided by The Interdisciplinary Graduate Program in Biomedical Sciences (IGPBS). Students are admitted to this program at the doctoral level. The IGPBS has strong additional support from the Stowers Institute for Medical Research, located in Kansas City, MO. Many of the Stowers’ researchers have appointments to the graduate faculty at KUMC. Currently, around 15-18 students are admitted into the IGPBS each year.

During the IGPBS year, students meet faculty from the various departments and become acquainted with the types of research being conducted in their laboratories. Each student selects three laboratories for research rotations, which helps facilitate their choice of a research and thesis advisor. Students may choose among one of eight PhD programs (Cell Biology & Anatomy, Biochemistry, Microbiology, Neuroscience, Pathology, Pharmacology, Physiology, and Toxicology). The choice of advisor determines the doctoral degree which the student pursues and the department providing support. Occasionally, a student may not be able to complete all the requirements for the PhD. Currently, all biomedical sciences programs offer master’s degrees to reward students that have completed minimal requirements at that level. As such, the Medical Center addresses the Board minima requirements for these programs at the doctoral level only.

Cell Biology and Anatomy Program

The University of Kansas Medical Center recommends continuation of the Cell Biology and Anatomy Program (MA/PhD), based upon institutional review during the 2012-13 academic year. The program exceeded Board of Regents minima in all areas. The graduate programs are offered by the Department of Anatomy and Cell Biology within the School of Medicine. The primary goals of the Department are to: provide an outstanding training environment for graduate students and postdoctoral scientists; develop and sustain prominent research programs in cell biology, developmental biology, and neurobiology; and, deliver a superb educational program for medical students and other healthcare professionals. Supporting these goals are twenty primary faculty (16 tenure-track; 3 research-track), four secondary appointees, and seven affiliate faculty who are investigators at the Stowers Institute for Medical Research.

Students typically enter the program having completed their first year at KUMC through the IGPBS, although students may apply to be directly admitted. In addition to in-depth study on biochemistry, molecular genetics and cell biology, these core courses include introductions to research ethics and biomedical research. After the first-year core, program students are required to take a Graduate Histology course; and, depending upon their research interests, advanced departmental or inter-departmental courses. Each semester, students must also enroll in an Analysis of Scientific Papers course and a departmental seminar course.

Although there are a variety of didactic courses offered, the bulk of the graduate training program takes place in a research laboratory under the guidance of primary graduate faculty mentor, with regular evaluation and input from a graduate research committee. No later than the end of the fall semester of their third year, students must have passed a comprehensive examination. This exam consists of the preparation of a written research proposal on the student's area of interest that strictly follows the NIH R01 grant application format, oral defense of that proposal; and verbal response to questions from the student's graduate committee on topics broadly related to the research proposal. After passage of the Comprehensive Exam, the student conducts laboratory dissertation research, which culminates in the preparation of a written doctoral dissertation. Most students complete their PhD dissertation research in 3-5 years after entering labs in Anatomy and Cell Biology. In relatively rare instances, graduate students will terminate their training before completing the doctoral dissertation, and, depending upon the circumstances, will receive the MA degree. Currently, there are 22 students enrolled in the PhD program, half of whom are in the research phase of their education. Program graduates have gone on to postdoctoral fellowships at some of the continent's most prominent educational institutions, including Harvard Medical School, the Mayo Clinic, University of Toronto, and University of Washington, and to lucrative positions in the private sector.

In addition to teaching graduate students within the program and in the IGPBS curriculum, a major academic focus of the Department involves medical education. Faculty members serve as module directors for two of the eight first-year courses taken by medical students. Anatomy and Cell Biology faculty have teaching responsibilities throughout the Phase I medical curriculum (first and second year). Faculty have been honored with numerous Student Voice Awards (voted on by medical students) as well as the Ruth Bohan Teaching Professorship.

Graduate students in the program benefit from experienced faculty with a wide range of research interests and stable NIH funding. Some examples of these interests include normal and abnormal heart and kidney development, cell-matrix interactions during organogenesis, diabetic neuropathy, pelvic pain, migraine, cystic fibrosis, and maternal-fetal immunology. In 2012, the Department ranked 7th among the 83 public U.S. Medical Schools in total NIH funding awarded

to departments of anatomy/cell biology. In FY 2013, primary faculty received over \$7.5 million in externally-sponsored awards. The research funds garnered by departmental faculty are used in part to supplement faculty salaries, support graduate student stipends and hire technical staff, which therefore helps contribute positively to the area's economy.

In particular, students, post-doctoral trainees, and faculty benefit from two influential NIH National Institute of General Medical Sciences awards. The Institutional Development Award (IDeA) funds the Kansas IdeA Network of Biomedical Research Excellence (K-INBRE) which is based in the Anatomy and Cell Biology Department at KUMC. The K-INBRE helps fund undergraduate and graduate students at four-year universities across Kansas and assists with faculty recruitment statewide. The Center for Biomedical Research Excellence (COBRE) grant provides funds to recruit and mentor new and early-stage investigators in several departments at KUMC and to support core research facilities at the Medical Center. Among these research cores, two are headquartered in the Department: the Electron Microscope Research Laboratory (EMRL) and the Confocal Imaging Facility. These two core facilities are widely subscribed by faculty in multiple departments at KUMC, and the EMRL does contract work for private sector companies as well. Together with Department resources, the COBRE grant also helps sponsor a weekly seminar program where locally, nationally, and internationally distinguished speakers present their research.

Several departmental faculty members hold memberships on editorial boards of professional journals, elected offices in prestigious scientific societies, and appointments to peer review committees of the NIH and other national funding agencies. Additionally, many are active in important university committees, such as the Institutional Animal Care and Use Committee, Promotion and Tenure, and the Research Committee. Departmental faculty currently hold the following leadership positions: Vice Chancellor for Academic Affairs and Dean of Graduate Studies, Associate Dean for Graduate Studies and Director of the Interdisciplinary Graduate Program in Biomedical Sciences (IGPBS), and Associate Director of the MD/PhD Program.

The Department of Anatomy and Cell Biology is a vibrant, research intensive department with a highly productive faculty, educating the next-generation of cell biologists, developmental biologist, neuroscientists, and physicians. The program is cost-effective due to the shared IGPBS curriculum and strong NIH funding, allowing the graduate training program to be highly competitive nationally and supporting its firm foundation at the Medical Center for years to come.

Microbiology Program

The University of Kansas Medical Center recommends continuation of the Microbiology Program (MA/PhD), based upon institutional review during the 2012-13 academic year. The program exceeded Board of Regents minima in all areas. The graduate degrees are offered by the Department of Microbiology, Molecular Genetics and Immunology within the School of Medicine. Supporting the mission of the Department are eleven primary faculty (9 tenure-track; 2 research-track) and three faculty holding joint appointments in Microbiology. This mission is to conduct high impact research relevant to human health and to train the next generation of biomedical scientists and physicians who will advance our understanding of infection and immunity in ways that benefit humankind.

Students typically enter the program having completed their first year at KUMC through the IGPBS, although students may apply to be directly admitted. Following completion of the first-year, microbiology students take a series of three one credit-hour courses that cover the essence of the three disciplines represented by departmental faculty: bacteriology, virology, and immunology. Students are then required to take two advanced courses in the discipline. Following the second year, the student takes the PhD qualifying exam, which involves the oral defense of a written research proposal outside the student's immediate research area. In addition to the formal classes, graduate students perform laboratory research that will ultimately lead to publications and their dissertation. The required research involves designing and implementing cutting-edge scientific theory and applications. The curriculum, including the first-year core, dissertation and defense, normally takes 5 years to complete.

As scientific research becomes less defined by conventional disciplines, other students often request to participate in Departmental courses, including medical fellows and students at neighboring institutions. For example, Rheumatology fellows often use the Advanced Immunology course to fulfill a curricular requirement. Due to the various backgrounds of the students, the needs can vary widely each time a course is taught. For this reason, it is essential that the courses are designed with sufficient flexibility. The clearest teaching methodology to build this flexibility is through active learning, in which students design their own learning objectives and fulfill the objectives.

Graduates of the Microbiology Program and post-doctoral fellows trained in the Department have obtained faculty positions at KUMC and other universities around the United States and the world. Recent PhD graduates have obtained research employment at prestigious institutions, such as Washington University, Harvard University, and the La Jolla Institute for Allergy and Immunology.

In addition to teaching graduate students within the program and in the IGPBS curriculum, a major academic focus of the Department involves medical education. Faculty members serve as module directors for two medical school courses, Inflammation and Immunity (I2) and Infectious Diseases (ID). As in the graduate curriculum, these modules employ active learning, an essential element outlined by the Liaison Committee on Medical Education (LCME) accreditation. This sharing of teaching techniques between graduate and medical education enhances the overall experience for both sets of students. The directors of I2 and ID have been highly innovative in their education techniques. The former director of the I2 module is a member of the Academy of Medical Educators, a distinguished position that recognizes excellence in education. In addition, the director of the ID module currently serves as the Chair of the Education Council, the faculty governance committee responsible for the medical education curriculum.

Not only do graduate students in microbiology at KUMC benefit from excellent academic

instruction and methodology, but they are exposed to a wide variety of high-quality and well-funded research efforts. In 2012, the Department was ranked in the top 25 Microbiology departments among U.S. public medical schools in annual NIH funding. For FY 2013, primary faculty were awarded over five million dollars in research grants. Some of the direct costs from these awards provide funding for graduate students in the program as well as the necessary materials and equipment needed to do cutting-edge research, and to recruit staff from around the world to the Kansas City area, enhancing the diversity of the state. Current research can be divided into three areas: bacteriology, virology, and immunology. Bacteriology and virology are part of the broader subject of infectious diseases. Faculty and students investigate novel therapeutic approaches to fight the causative agents of Lyme disease, flesh-eating bacteria, HIV, endocarditis, and hepatitis. Research covered by the immunologists includes aspects of innate and adaptive immunity, the two primary branches of the immune system. This immunology research includes studies that will fill gaps in our understanding of basic immunologic mechanisms and often involves clinical applications, including immuno-therapy for cancer and transplantation.

Students and faculty receive additional benefits from the NIH/NIGMS Center of Biomedical Research Excellence Program (COBRE). The COBRE grant helps supports the Flow Cytometry Core Laboratory (FCCL), which houses seven major instruments (valued at ~\$1.5 million). The scientific director of the FCCL is a faculty member of the Department. The Flow Core serves all basic science departments at KUMC, some clinical departments, and investigators at nearby universities, hospitals, and companies. For outside institutions, the FCCL provides a service that facilitates their operations and provides a revenue stream for KUMC. Further, the COBRE grant provides support for a seminar program, in which nationally and internationally recognized speakers present their research to our faculty and trainees, and for a writing center, which provides technical writing and editing assistance, as well as seminars on writing techniques.

Microbiology faculty serve as Chair of the School of Medicine Research Committee and as members of the Research Advisory Committee, two committees in the faculty governance structure that advise KUMC administration on matters related to research infrastructure and funding. Additionally, faculty represent KUMC on regional, national, and international committees related to their research; for example, as reviewers for the National Institutes of Health and the Italian Ministry of Health, as well as for numerous scientific journals. Primary faculty have been honored for their efforts in research and education. Microbiology's University Distinguished Professor won the 2013 Louisa Gross Horwitz Prize for Biology or Biochemistry, which is often considered a precursor for the Nobel Prize. Two faculty are members of the Faculty of 1000, including one who is Section Chief. Educationally, program faculty have won numerous Student Voice Awards (voted on by medical students) as well as the Ruth Bohan Teaching Professorship.

The Department of Microbiology, Molecular Genetics, and Immunology is an excellent resource for the University of Kansas Medical Center and the State of Kansas, educating the next generation of bacteriologists, virologists, immunologists, and physicians. The graduate program is cost-effective due to the shared IGPBS curriculum and the number of funded awards supporting the students. Faculty and students perform life-saving research and, in the process of this work, provide an important element of the economic resource that is the University of Kansas Medical Center.

Pharmacology and Toxicology Programs

The University of Kansas Medical Center recommends continuation of the Pharmacology Program (MS/PhD) and Toxicology Program (MS/PhD), based upon institutional review during the 2012-13 academic year. Both programs exceed Board of Regents minima in all areas. The graduate degrees are offered by the Department of Pharmacology, Toxicology and Therapeutics within the School of Medicine. The mission of the Department is to conduct high impact research that is relevant to human health and to prepare Pharmacology students for careers in the pharmacological sciences and Toxicology students for careers in toxicology and environmental sciences. Supporting this mission are nineteen primary faculty (17 tenure-track; 2 research-track) and six secondary appointees.

Students typically enter the program having completed their first year at KUMC through the IGPBS, although students may apply to be directly admitted. After the first-year core, graduate students take a one credit-hour introductory course, *Principles of Pharmacology*. Students proceed to take the two 4 credit-hours courses, *Essentials of Pharmacology* and *Toxicology*, as well as the two credit-hour course *Disposition of Xenobiotics*. The programs also require elective courses; ideally these are chosen to supplement the research projects that the trainees are working on. In addition to formal classes, graduate students are required to give an annual seminar and to perform research that will ultimately lead to publications and their dissertation or thesis. The required research involves formulating hypotheses and designing and implementing cutting edge scientific experiments to test them.

Other students often request to participate in Departmental courses, including medical fellows and students at neighboring institutions. Due to the various backgrounds of the students, the needs can vary widely each time a course is taught. For this reason, it is essential that the courses are designed with sufficient flexibility. The clearest teaching methodology to build this flexibility is through active learning, in which students design their own learning objectives and fulfill the objectives. The research opportunities in the Department extend beyond PhD and MD/PhD students. The Department funds undergraduate students through our Zannoni Summer Undergraduate Research Fellowship (SURF) program and mentors non-traditional students interested in pursuing research as a career.

Graduates from the Department have been highly successful as post-doctoral fellows and then faculty members at universities around the nation. Former trainees represent the State of Kansas and KUMC through their appointments at major academic research institutions including Harvard University, Oregon University Health and Science University, Michigan State University, M.D. Anderson Cancer Center, the University of Minnesota, the University of Colorado, Mayo Clinic, and Vanderbilt University.

In addition to teaching graduate students within the program and in the IGPBS curriculum, a major academic focus of the Department involves medical education. One faculty member is the module director for the Integration and Consolidation module of the medical school curriculum taken by students in the second year. As in the graduate curriculum, these modules employ active learning, an essential element outlined by the Liaison Committee on Medical Education (LCME) accreditation. Faculty also participate in the post-graduate curriculum offered by the Children's Mercy Hospital. Faculty have been honored for their efforts in education through numerous Student Voice awards (voted on by medical students), the Kemper Teaching Award, the Ruth Bohan Teaching Award, as well as by a Chancellors Club teaching professorship.

Graduate students in the program benefit from experienced faculty with a wide range of research interests and stable NIH funding. In 2012, the Department was ranked in the top 25

Microbiology departments among U.S. public medical schools in annual NIH funding. For FY 2013, primary faculty were awarded nearly five million dollars in research grants. Some of the direct costs from these awards provide funding for graduate students in the program as well as the necessary materials and equipment needed to do cutting-edge research, and to recruit staff from around the world to the Kansas City area, enhancing the diversity of the state. Research opportunities are available for graduate students in pharmacology, toxicology and therapeutics. In pharmacology, our faculty's research interests are in molecular and cellular neuropharmacology, neurotrauma, and the role of hormones and diet constituents on brain function. In addition, faculty study pharmacokinetics of drugs (absorption, distribution, biotransformation and excretion) as well as the biology and functional significance of drug transporters. Our faculty's research interests in toxicology include estrogen-induced carcinogenicity, toxicity of dioxin and other environmental chemicals, mechanisms of drug- and chemical-induced hepatotoxicity and liver regeneration, pathogenesis of hepatocellular carcinoma, alcoholic hepatitis, steatohepatitis and cholestatic liver disease and the role of nuclear receptors in these disease processes. Furthermore, in therapeutics, faculty are involved in determining whether herbal medicines cause drug interactions with prescribed drugs using metabolomics approaches. In addition, studies are being performed to understand which drugs enter the liver by specific transporters, and how genetics determines why the response to drugs can vary among different patients (pharmacogenomics).

Students and faculty receive additional benefits from the NIH/NIGMS Center of Biomedical Research Excellence Program (COBRE). The COBRE grant supports junior faculty members and core laboratories with the long-term goal of establishing a liver center to study liver functions in health and disease. The three cores supported are: the Cell Isolation core that provides isolated hepatocytes from human liver, technical support and experimental design for research investigators at KUMC and other KU campuses for a minimal cost; the Histopathology Core provides a full fee-based histology service; and the Analytical Core supports the investigators of the COBRE projects by providing state of the art analytical instrumentation and expertise in its application to research problems. In addition to funding these cores, the COBRE grant provides support for a seminar program, in which nationally and internationally recognized speakers present their research to our faculty and trainees. During the last 8 years, the Department has undergone a marked expansion with the addition of several tenure-track and research-track faculty with a major focus in liver pathobiology and toxicology. This was facilitated in part by the COBRE grant. In addition to supporting the research efforts of KUMC and the Department through the COBRE cores, faculty also support the larger research mission of KUMC through other roles. The Department includes the Scientific Director of the Disease Model and Assessment Services component of the KUMC IDDRC, which includes the KUMC Rodent Behavior Facility that serves numerous investigators at KUMC and in the local research community.

Faculty members have chaired the Committee on Toxicology of the National Research Council of the National Academy of Sciences, served on the scientific advisory panels of the Environmental Protection Agency (EPA), the National Institute of Occupational Safety and Health, National Center for Advancing Translational Sciences Advisory Council and the Cures Acceleration Network Review Board of the National Institutes of Health. Several Faculty members serve in positions with relevant professional societies including the American Society for Pharmacology and Experimental Therapeutics, the Society of Toxicology, the American Physiological Society, the International Society for the Study of Xenobiotics, the Society for Neuroscience, and American Association for the Study of Liver Diseases. In addition, previous

students as well as current faculty represent KUMC and the state of Kansas on national and international agencies or committees. For example, faculty members serve as reviewers for grant programs sponsored by state, regional, national, and international organizations, including the EPA, National Institutes of Health and National Science Foundation and funding programs from Italy, France, Switzerland, the Netherlands, the United Kingdom and Germany. Faculty members also serve on editorial boards and as reviewers for numerous scientific journals. Faculty members in the Department have been honored for their efforts in research through such awards as the Mildred S. Christian Career Achievement Award (the top award from the Academy of Toxicological Sciences, recognizing extraordinary scientific achievement through publications, professional activities and/or leadership), and the Chancellors Club Research Award.

In summary, the Department of Pharmacology, Toxicology and Therapeutics is an excellent resource for the University of Kansas Medical Center, the regional research community and the State of Kansas. Through ground-breaking research relevant to human health and disease, our efforts will contribute to the development of new medicines and therapies for the people of Kansas. In this process, the Department will also enhance the economic resources of the State of Kansas, and educate the next generation of physicians and scientists.

Doctor of Medicine

The University of Kansas Medical Center recommends continuation of the Doctor of Medicine (M.D.) Program, based upon institutional review during the 2012-13 academic year. The program exceeded Board of Regents minima in all areas. Undergraduate medical education leading to the M.D. degree is the core program of the University of Kansas School of Medicine. As such, it is absolutely central to the University's ability to meet its mission of preparing the next generation of physicians for the state, including primary-care doctors to meet the needs of underserved areas in Kansas.

The Doctor of Medicine Program requires four years to complete. The first two years consist of the Phase I curriculum, where students acquire integrated knowledge of core basic science disciplines along with basic clinical skills, ethics, preventive medicine, and behavioral sciences. The last two years are spent in clerkships (Phase II), which take place in hospital and clinic settings. These clerkships include rotation through core clinical disciplines (e.g. family medicine, internal medicine, neurology, pediatrics). Students may pursue the degree at one of three campuses: Kansas City, Wichita, and Salina. In Kansas City, students train at a large, urban academic medical center. Wichita provides a community-based medical education environment. The Salina program, which began in 2011, is specifically focused on rural medicine. The entering class is split at 175 / 28 / 8 at the three campuses, respectively. After two years, about 30% of the Kansas City students continue their training in Wichita, joining the 3rd year students who began their education at Wichita. The use of multiple campuses with individualized focus is fairly unique to academic medical centers in the United States. The School of Medicine has become a national leader in the number of medical students choosing family medicine and the Salina program has received national recognition for its efforts.

The M.D. Program is the only source of "home grown" physicians in the Regents' system and in the state of Kansas. In terms of the physician workforce, 37% of physicians practicing in Kansas are graduates of the School of Medicine and on average 41% of Kansas graduates will practice in the state after completing their residencies. Taking into account population growth and attrition rate from the physician workforce, the state must produce or recruit over 200 physicians per year to maintain the current ratio of 213 physicians per 100,000. Over the past five years, the program has averaged 164 graduates per year. After receiving the M.D., students must then generally spend an additional 3-6 years in graduate medical education training, referred to as residency, prior to becoming certified to practice medicine. Some specialties require additional fellowships that typically last 1-3 years. Even with the proposed expansion of the entering class to 250 as requested by Governor Brownback, the School of Medicine can meet only 30-40% of the anticipated annual demand. In light of these anticipated increases in demand for access to physician services, particularly in the area of primary care, it is the institutional recommendation that the University and Board of Regents assure that the School of Medicine continues to receive resources sufficient to recruit and retain faculty, to remodel and build educational facilities, and to preserve and expand the medical school class size on each of the three medical school campuses.

The principal indicator of the quality of an undergraduate medical education program is its accreditation status as determined by the Liaison Committee on Medical Education (LCME). Following its most recent LCME survey in October 2013, the school received "continued accreditation" for the maximum eight-year term through 2021-22. Attaining this status at the full-length of accreditation represents a "non-severe action decision" in the LCME vernacular. Of the 143 schools which underwent full accreditation visits between October 2004 and June

2012, 103 (72.7%) received “non-severe” decisions and 40 (27.3%) received “severe” actions including shortened terms of accreditation, requirements for limited accreditation visits, proposed probation, or loss of accreditation. The School of Medicine received “noncompliance” citations for only two of the 132 LCME standards, whereas the mean number of citations for noncompliance for other schools receiving non-severe decisions was five.

A second strength of the school identified during the most recent LCME review was the innovative educational program to address the state’s needs for rural physicians. The four-year curriculum is organized in a modern, interdisciplinary, systems-based structure. Delivery of the curriculum is increasingly focused on active, team-based learning rather than the traditional didactic format. Delivery is supported by a comprehensive system of technology including web-based content delivery, simulation, electronic testing and feedback, and tracking of student experiences and competency. The primary external indicator of the quality of the curriculum and its impact on students is student performance on the required licensure examinations – USMLE 1, USMLE 2CK, and USMLE 2CS. While student performance on these examinations varies slightly from year to year, on average, student performance falls within less than one standard deviation from the national means for exam score and first time pass rates. For the most recent graduating class, 80% completed their degrees in four years.

Admission to the School of Medicine remains highly sought after and competitive. The school receives over 3000 applications each year, over 500 from Kansas residents, alone. In a typical year, the school turns away about one qualified Kansas applicant for each of the students admitted. Kansas residents make up approximately 90% of each class. Over 98% of graduates secure first year postgraduate (PGY-1) residency positions. Roughly two-thirds of graduates leave the state for their initial post-graduate positions, many going to top-tier academic medical centers. Ultimately, a number of these “expatriate” Kansans return to practice in their home state.

Professional, academic and research service to our local communities, state, region and nation are core missions of the School of Medicine. All faculty members are active in clinical practice, research and/or teaching. A significant portion of the clinical work of the faculty is provided to uninsured or underinsured individuals. Service education is a core feature of the educational program with students organizing health clinics, community service projects, and international medical outreach programs. Faculty and students are well represented on the committees and boards of their representative professional and community service organizations. It is estimated that the faculty, in aggregate, spend 10-15% of their work weeks (many of which routinely exceed 50 hours) in purely service related activities.

The cost of attendance for the most recent graduating class was \$216,469 for in-state and \$300,509 for out-of-state students, placing the school at the 35th and 65th percentiles of all medical schools, respectively. The average debt for graduates carrying educational debt was \$134,999, favorably placing the school at the 35th percentile of all schools. Thus, the School of Medicine provides a comparably affordable program for both in-state and out-of-state students wishing to pursue the M.D. degree. As the only medical school in the state, keeping the cost of attendance at a reasonable level for Kansas residents remains a high priority of the University and the School.

Fiscal Implications of Program Changes (FY 2009 – FY 2013)

The University of Kansas Medical Center has not had any recommended programs changes during the last five fiscal years.