

7 November 2009

A. Lorris Betz
Senior Vice President for Health Sciences
Bldg 550, 5th Floor
Campus

Dear Vice President Betz,

Enclosed is the proposal for a Ph.D. in Pharmacotherapy Outcomes Research and Health Policy which was approved by the Graduate Council on October 26, 2009. Included in this packet are the proposal and signature page.

Please forward this packet to the President's Office for his signature before being forwarded to the Academic Senate to be placed on the information calendar for the next meeting of the Senate.

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Sincerely,

David S. Chapman
Associate Vice President for Graduate Studies
Dean, The Graduate School

SECTION I: The Request

Pharmacotherapy outcomes are major issues for physicians, pharmacists, and other health professionals. Policy makers, insurance companies, managed care organizations, and patients make significant resource allocation decisions based on pharmacotherapy outcomes research. To prepare scholars capable of analyzing clinical and economic outcomes from pharmacotherapy requires substantial education and training beyond that necessary to practice as a clinician. The Department of Pharmacotherapy at the University of Utah has a rich history of training advanced practice pharmacists, through both the College of Pharmacy's Doctor of Pharmacy (PharmD) program and Master of Science in Pharmacotherapy program. However, the Department does not currently offer an academic doctoral program (Doctor of Philosophy, or PhD) that specifically trains individuals for research-based careers in outcomes-based pharmacotherapy research. The Department of Pharmacotherapy wishes to expand on the department's current Master of Science program to form a PhD program in Pharmacotherapy Outcomes Research and Health Policy.

Therefore, the University of Utah requests approval to offer a Doctor of Philosophy (PhD) in Pharmacotherapy Outcomes Research and Health Policy effective Fall 2010.

SECTION II: Program Description

The program in Pharmacotherapy Outcomes Research and Health Policy will train students so that they have a core competency in health economics, epidemiology, research design, and statistics and how these disciplines are applied to health policy decisions. In the first year, students will take required courses in health economics, biostatistics, research design, and epidemiology in preparation for qualifying examinations and development of a dissertation proposal. The goal of this coursework is to expose students to the tools necessary for conducting outcomes research in pharmacotherapy. Following coursework, students will take qualifying examinations and form a supervisory committee for advancement to the dissertation. Students who pass the qualifying examinations will create a dissertation proposal, develop and defend a dissertation that demonstrates their ability to conduct independent scholarship in pharmacotherapy outcomes research.

Program of Study

The doctoral program in Pharmacotherapy Outcomes Research and Health Policy requires a minimum of 66 credit hours. These required credit hours must be taken from five different areas (specific course offering within each area are listed in Appendix A):

1. Pharmacotherapy Core Courses: minimum 11 credit hours required
2. Health and Health Policy Emphasis Courses: 24 credit hours required
3. Research Seminar and Pharmacotherapy Outcomes Journal Club: 1 credit per semester; minimum 8 credit hours required (4 seminar, 4 JC)
4. Dissertation credits: 14 minimum credit hours required
5. Electives to suit the needs of the individual student: 9 credit hours minimum required

Supervisory Committee

Students in the doctoral program in Pharmacotherapy Outcomes Research and Health Policy will form a supervisory committee after successful completion of two semesters of coursework (minimum of 18 credit hours). The supervisory committee must consist of five members. Three

members must be from the Department of Pharmacotherapy at the University of Utah. One of the members will be designated the chair of the student's supervisory committee. The two additional committee members must be from outside the Department of Pharmacotherapy. The chair and majority membership must be regular faculty or have a justified exception approved by the Graduate School. The supervisory committee will have the responsibility for approving the student's academic program, approving and judging the qualifying examination, approving the dissertation subject and final dissertation, and administering and judging the dissertation defense.

Qualifying Examination

Ph.D. Candidates for Pharmacotherapy Outcomes Research and Health Policy will be required to take the qualifying examinations at the completion of a minimum of 3 semesters of course work (minimum 24 credit hours). The proposal topic for the qualifying examination must be approved by student's supervisory committee. The Qualifying Exam will consist of two parts: a written proposal covering the student's approved area of emphasis and an oral examination involving a defense of the student's written proposal. The student's supervisory committee will be responsible for evaluating and grading the written proposal and judging the accuracy of the oral defense. Students must pass the qualifying examination to advance to candidacy.

Dissertation

Students will be required to submit a dissertation with the results of the student's dissertation research. The dissertation will be judged and approved by the student's supervisory committee. Students will be required to perform an oral dissertation defense. At least three weeks before the dissertation defense, the student will submit a written draft of the dissertation to the chair of the supervisory committee who will distribute copies to the supervisory committee.

Institutional Readiness

The Department of Pharmacotherapy conducted its annual strategic planning retreat in December of 2008. The faculty considered the creation of a PhD program one of the main objectives of this retreat. The faculty believe that a PhD program will expand the Department's research agenda and commitment to outcomes research and health policy and increase the scholarly activity of our faculty.

The Department currently offers an M.S. in Pharmacotherapy; therefore, essential resources such as administrative and technical support are in place. The College of Pharmacy will be conducting a ground-breaking ceremony for a new building in August, 2009. The completion of this new building will allow the outcomes research facilities to meet the space demands of additional future graduate students.

The size of the faculty was a consideration in determining the readiness of the Department of Pharmacotherapy to offer a doctorate degree. The department currently has 7 tenure-track faculty members, 4 research track members and 13 clinical track faculty members who are actively engaged in an ongoing research agenda. The faculty members have established collaborative relationships with faculty members and research facilities in other departments, providing a diversity of opportunities for mentoring and access to research facilities. The Department of Pharmacotherapy faculty members are also in active collaboration with faculty from the Departments of Family and Preventative Medicine, Pediatrics, and Internal Medicine, and many of these collaborating faculty members have expressed interest in contributing to the training and

mentorship of our PhD students. The Department has also been proactive in addressing the faculty size issue and has received blanket exception from Dean Wight for three of our research track faculty members to serve as chairs and majority members of supervisory committees. The Department will also limit enrollment in the doctoral program to no more than 3 new students per year until faculty members can be added to the program.

Faculty

The faculty has a strong record of scholarship that has been steadily increasing over the past several years. The faculty's research has been extensively published in the peer-reviewed journals, such as *Journal of Managed Care Pharmacy*, *Annals of Epidemiology*, *International Journal of Clinical Practice*, *Journal of Antimicrobial Chemotherapy*, *American Journal of Health System Pharmacy*, *Health Services Research*, *Medical Care*, *Pediatrics*, and *Current Medical Research and Opinion*. Several members of the faculty have received institutional, regional, national and international awards for their research efforts. Our faculty represent senior leadership in numerous national and international professional societies including: the International Society for Pharmacoeconomics and Outcomes Research, Academy of Managed Care Pharmacy, American Society of Health System Pharmacists, Pharmacotherapy Specialty Council, Utah Society of Health System Pharmacists, American Association of Colleges of Pharmacy, American Society of Health-System Pharmacy and American College of Clinical Pharmacy. The demonstrated excellence in scholarship of the department insures that potential Ph.D. students will be immersed in a productive scholarly environment. The following faculty list includes regular, research and clinical faculty who will support the doctoral program:

- Regular Core Faculty
 - Diana I. Brixner, RPh, PhD
 - Michael J. Goodman, PhD
 - Arthur G. Lipman, PharmD, FASHP
 - Mark A. Munger, PharmD
 - Nancy A. Nickman, MS, PhD
 - Gary M. Oderda, PharmD, MPH
 - Joanne LaFleur, PharmD, MSPH
- Research Core Faculty
 - Frederick S. Albright, MS, PhD
 - Carl V. Asche, PhD, MBA
 - Joseph E. Biskupiak, PhD, MBA
 - Carrie McAdam-Marx, RPh, MS, PhD
- Clinical Core Faculty
 - Barbara Insley Crouch, PharmD, MSPH
 - Kamila Dell, PharmD, BCPS
 - Karen M. Gunning, PharmD
 - Brandon T. Jennings, PharmD
 - Sarah S. Feddema, PharmD, BCPS
 - Lynda H. Oderda, PharmD
 - Patricia L. Orlando, PharmD
 - William J. Rusho, MS
 - Laura Shane-McWhorter, PharmD
 - Morgan Sayler, PharmD

William J. Stilling, RPh, MS, JD
Linda S. Tyler, PharmD
David C. Young, PharmD

Staff

No additional professional staff would be needed to support the doctoral program in the department. Because of the limited number of students to be admitted to the program initially, the existing staff in the Department of Pharmacotherapy will be able to provide support to the program. Over time, our Department's consolidation in a new building in late 2011 will provide increased capacity of our staff to support the graduate program.

Library and Information Resources

Library resources required for a doctoral program include access to pharmaceutical and health outcome journals and other textbooks and reference material related to pharmacotherapy outcomes and health policy. The existing resources of the Eccles Health Science Library are adequate for support of this doctoral program.

Admission Requirements

Applicants for admission to the Program in Pharmacotherapy Outcomes and Health Policy must be admitted by the graduate school and the Department of Pharmacotherapy at the University of Utah. Applicants should have a strong interest in research and teaching. Applicants should also have a master's or clinical doctoral degree. Exceptional students with a bachelor's degree and compelling clinical research experience in health sciences will be considered.

The following information must be submitted to the graduate school:

1. Graduate admission application
2. Official transcripts of undergraduate and graduate course work
3. For international students, a Test of English as a Foreign Language (TOEFL) score.

The following information must be submitted to the Department of Pharmacotherapy.

1. A current *Curriculum Vitae*
2. Report of the Graduate Record Exam taken within the past five years
3. A written statement (less than 1000 words) of research experience and interest, and long-term career goals
4. 3-5 letters of recommendation from individuals with knowledge of the applicant's potential for success in a doctoral program

Admission to the doctoral Program in Pharmacotherapy Outcomes and Health Policy will require:

1. Acceptance to the graduate school at the University of Utah
2. A minimum grade point average of 3.0 in all college work and a record of the Graduate Record Exam
3. Availability of faculty mentor resources that match the student's research interests
4. TOEFL score of at least 550, if applicable.

Student Advisement

Upon admission into the doctoral program, each student will be matched with a faculty advisor. This faculty advisor will assist the student in developing a plan of study and will oversee the composition of a supervisory committee that will be identified after the student's first year. The

supervisory committee must be approved by the faculty advisor and will be responsible for providing additional advisement to the student throughout his or her course of study.

Justification for Graduation Standards and Number of Credits

The total number of credit hours required by the doctoral program in Pharmacotherapy Outcomes and Health Policy (minimum 66 credits), examination processes and dissertation evaluation are consistent with other Ph.D. programs at the University of Utah.

External Review and Accreditation

The PhD program in Pharmacotherapy Outcomes Research and Health Policy is not subject to external review and accreditation, except as required for the University of Utah’s Northwest Accreditation process. The department’s graduate programs abide by the University of Utah Graduate School periodic (6 year) review process that includes both campus and external university reviewers (see Section IV: Program and Student Assessment).

Projected Enrollment

We will admit a maximum of three students per year until faculty resources can be increased. Most of these students will be new students; however, some of our current MS students may be interested in applying for the new PhD program.

Year	Student Headcount	# of Faculty	Student-to-Faculty Ratio
2010	3	24	0.125
2011	3 + 3	24	0.25
2012	3 + 6	24	0.375
2013	3 + 9	24	.5
2014	3 + 12	24	.625

Expansion of Existing Program

Not applicable

SECTION III: Need

Institutional Need

The Department of Pharmacotherapy is one of four departments in the College of Pharmacy. The remaining three departments (Medicinal Chemistry, Pharmaceutics/Pharmaceutical Chemistry, and Pharmacology & Toxicology) have long-standing and distinguished PhD programs. As one of the premier research-intensive Colleges of Pharmacy in the US and the only state-supported College of Pharmacy in Utah, Department of Pharmacotherapy faculty wish to contribute to the research and training legacy of the College through development of a PhD program in Pharmacotherapy Outcomes Research and Health Policy. The Department currently offers a Master of Science (MS) in Pharmacotherapy (for consistency, the name of which will be petitioned to change to MS in Pharmacotherapy Outcomes Research and Health Policy when the PhD program proposal is approved) that admits 3-5 students per year. However, no other PhD level of training in Pharmacotherapy Outcomes and Health Policy or similar degree programs

exist in the Western US, except as noted under Similar Programs below (University of Washington and University of Arizona).

The three existing PhD programs in the College of Pharmacy, as the names imply, train PhD students in basic, laboratory-based pharmaceutical sciences. The PhD program in Pharmacotherapy Outcomes Research and Health Policy will train PhD students in the applied sciences of pharmacoeconomics (health economics as applied to medication use), pharmacoepidemiology (epidemiological principles as applied to medication use), and outcomes research (evidence-based use of medications) as relevant to health and medication use policy. At present, no PhD-level training in pharmacotherapy outcomes research exists within the University of Utah, although faculty in complementary departments and PhD programs in Economics, Biomedical Informatics, and Public Health participate in research projects and MS supervisory committees with Department of Pharmacotherapy faculty. Although these other PhD programs potentially provide focused areas of education for students who wish to attain additional education, none of those programs provide further education in evidence-based evaluation of medications and the impact of medication use policy on patient-centered and population-based care.

As described below relative to Labor Market Demand, the Department of Pharmacotherapy has been successful in hiring two new tenure-track outcomes research-focused faculty members this academic year. These hires were the result of two separate searches to fill open tenure track positions – one search was conducted for three years and the second search remained open for a third year. The existence of a PhD program in the Department of Pharmacotherapy will allow the department to recruit our best and brightest PharmD and MS students to continue PhD-level education, in addition to expanding recruitment of PhD students to other institutions for retention as faculty at the University of Utah (“grow your own faculty”). Finally, the College of Pharmacy supports dual-degree programming for Doctor of Pharmacy (PharmD) students, through a program that allows current PharmD students to simultaneously complete both a PharmD and PhD in one of the three existing basic pharmaceutical science PhD programs. At such time that the PhD in Pharmacotherapy Outcomes Research and Health Policy is able to satisfactorily mentor PharmD students in the dual-degree program, Department faculty would also be supportive and encouraging of student participation. The 2005 University of Utah Graduate Council Review of the MS program also recommended that the Department continue to plan for a PhD program.

Professional Need and Labor Market Demand

As outlined above, the Department of Pharmacotherapy conducted two separate tenure-track outcomes research faculty searches for a combined total of five years, while successfully recruiting two tenure-track PhD-level faculty members in that same time period. Numerous national pharmacy education reports on faculty workforce issues [*American Association of Colleges of Pharmacy (AACCP) 2006/2007 Council of Faculties/Council of Deans Joint Task Force on Faculty Workforce*, and *American Foundation for Pharmaceutical Education* reports and *Gateway to Research* programs] have noted that although pharmacy education faces the same issues as other disciplines related to a “graying of the faculty,” other market forces are expanding the labor market for PhD-trained pharmaceutical scientists at a time when PhD programs are already unable to keep up with demand from the pharmaceutical and healthcare

industries. This issue is particularly acute in pharmaceutical education, because schools and colleges of pharmacy have increased enrollments and new schools have developed in order to meet the shortage of practicing pharmacists available in the US. Compounding the faculty workforce issue are higher wages paid in the healthcare sector that encourage students to practice pharmacy rather than entertain additional educational opportunities, and shortages of scientists capable of working in industry.

Specifically related to pharmacotherapy outcomes research and the practice of evidence-based medicine, only Ohio State, Arizona, Texas-Austin, and Washington specifically focus on the production of pharmaceutical scientists trained in the methods and analysis of medication-related outcomes research. From 1990 to present, the number of PhDs broadly classified as trained in the “Social and Administrative Sciences” has hovered around 300 individuals [*Academic Pharmacy Now, May/June 2008*]. Although approximately 40 PhD students per year are produced by the 13 programs outlined below, perhaps 25% of these students (10/year nationally) are trained as pharmacotherapy outcomes researchers. Given recent reports from the Institute of Medicine (IOM) on health professions education (2003) and preventing medication errors (2007), outcomes research and the practice of evidence-based medicine are specifically mentioned as methods which the US health care system can use to improve healthcare and medication use safety. Finally, the National Institutes of Health (NIH) *Roadmap for Biomedical Research* also specifically mentions “outcomes researchers” as essential to the collaborative, translational science atmosphere inherent in present and future “bench to bedside” research programs. The Department of Pharmacotherapy is uniquely poised to embark on development of a PhD program in Pharmacotherapy Outcomes Research and Health Policy that is not only timely, it will be one of only a few growth areas in the biomedical sciences where the educational enterprise cannot keep up with demand for the product.

Student Demand

Although exact numbers of students who desire PhD-level training in pharmacotherapy outcomes research is difficult to tabulate, former and current departmental MS students who desire PhD-level training are currently referred to University of Utah PhD programs in Economics, Biomedical Informatics or Public Health. Faculty from the Department of Pharmacotherapy currently serve as committee members for both MS and PhD students in these local departments. Current and/or potential students with specific interests in pharmacotherapy outcomes research are referred to one of the PhD programs listed below. Similar national programs with which the proposed program would be competitive are those to which the faculty currently refer students: Arizona, Texas-Austin, and Washington.

Similar Programs

There are no similar programs within the USHE. The 13 programs below (some more productive with regard to graduates than others) are currently available, although only Arizona and Colorado would be considered to be within the Intermountain West. Department of pharmacotherapy faculty are recruited on a national and international basis; the expectation would also be to recruit from local pharmacy school graduates with additional interest in a national and international pool of applicants.

Institution	Program	Number of Credit Hrs	Administrating Department
The Ohio State University	MS & PhD Pharmaceutical Administration	135 quarter credits (core, elective, thesis)	Division of Pharmacy Practice and Administration
University of Arizona	MS & PhD Pharmaceutical Economics, Policy and Outcomes Track	80 semester credits (core, elective, thesis)	Pharmaceutical Sciences Graduate Program
University of Colorado	PhD Pharmaceutical Outcomes Research emphasis area	30 semester credits minimum; research rotations; seminars	Pharmaceutical Sciences Graduate Program
University of Florida	PhD Pharmacy Health Care Administration; emphasis in pharmacoepidemiology, pharmacoconomics, or patient safety and medication use	36 semester credits (core), in addition to emphasis courses and thesis	Department of Pharmacy Health Care Administration
University of Maryland	PhD Pharmaceutical Health Services Research	30 semester credit core, 12 credits in research emphasis area, thesis	Department of Pharmaceutical Health Services Research
University of Michigan	PhD Social and Administrative Sciences	36 semester credits (core), in addition to elective courses and thesis	Department of Social and Administrative Sciences
University of Minnesota	PhD Social and Administrative Pharmacy track	Minimum of 34 semester credits minimum(core), 12 credits minor/supporting program, 24 credits thesis	Graduate Program in Social, Administrative and Clinical Pharmacy
University of North Carolina-Chapel Hill	PhD Pharmaceutical Outcomes and Policy	46 semester credits (core), in addition to elective courses and thesis	Division of Pharmaceutical Outcomes and Policy
University of Rhode Island	PhD Pharmacoepidemiology and Pharmacoconomics	72 semester credits (core, elective, thesis)	Department of Pharmacy Practice
University of South Carolina	PhD Pharmaceutical Sciences Pharmacy Administration option	55 semester credits), in addition to 12 minor credits and thesis	Department of Pharmaceutical and Health Outcome Sciences

University of Texas-Austin	MS & PhD Pharmacy Administration	30 Semester Credits for PhD beyond Masters (does not include thesis credits)	Department of Pharmacy Administration
University of Washington	PhD Pharmaceutical Outcomes Research & Policy	126 quarter credits (core, elective, thesis)	Department of Pharmacy

Collaboration with and Impact on Other USHE Institutions

None. The University of Utah contains the only College of Pharmacy and Department of Pharmacotherapy among the institutions in the USHE.

Benefits

The current thesis-based MS in Pharmacotherapy program admits 3-5 well-qualified students per year, with a graduation rate of 2 students per year (program was updated and re-designed in 2005 to reflect outcomes research focus). One unusual aspect of the current MS program is a programmatic tie to advanced pharmacy practice administrative residencies at University Hospital Pharmacy Services and Intermountain Healthcare Pharmacy Services. These 2-year residency experiences are accredited by the American Society of Health-System Pharmacists (ASHP). Although managed separately through the Department of Pharmacotherapy and the University of Utah Graduate School, exceptional administrative residents are encouraged to complete a concurrent MS in Pharmacotherapy. This collegial arrangement with the two hospitals also provides a level of academic administrative training to administrative residents that is specific to their desired employment sphere: health systems pharmacy practice administration. Practicing pharmacists who completed the MS degree prior to 2005 also successfully work in managed care, pharmaceutical and healthcare industry, government, or academia. Department faculty would also assume that some of these students would be interested in completion of PhD-level studies in Pharmacotherapy Outcomes Research and Health Policy; thus, this program would also provide local pharmacists with options for graduate study that are not currently available beyond the MS-level of training.

Consistency with Institutional Mission

The mission of the PhD in Pharmacotherapy Outcomes Research and Health Policy program is consistent with the University of Utah Mission Statement: "...to serve the people of Utah and the world through the discovery, creation and application of knowledge..." The graduate program mission will also be consistent also with the University of Utah Health Sciences Center Mission ("To serve the public by improving health and quality of life" accomplished via a commitment to "excellence in education, research and clinical care."), and the College of Pharmacy Mission statement related to advancing "health care related to optimal medication outcomes through education and training." As described previously under Institutional Need, the College of Pharmacy has a rich and long-standing tradition of world leaders, both on the faculty, and as graduates of MS and PhD level training. The primary outcome goal of the PhD in Pharmacotherapy Outcomes Research and Health Policy would be to educate productive teachers, researchers and professional thought leaders.

SECTION IV: Program and Student Assessment

Program Assessment

This program is not subject to accreditation from any agency. As a graduate program at the University of Utah, the program will be subject to review from the Graduate Council. In addition, the College of Pharmacy will evaluate the program as it currently evaluates the programs in other departments within the college. This includes:

The faculty of the Department of Pharmacotherapy will use these assessment tools to conduct an internal review of the program on an annual basis. Until the program matures, this review will be conducted informally as a meeting of the core faculty in the PhD program.

Expected Standards of Performance

Graduates of the PhD program will have specific knowledge of one of the general areas of outcomes research: epidemiology or economics. These graduates will become researchers, scholars, teachers, thinkers, and planners in academia, government, and industry. The graduates will have the skills required to lead in Universities and other settings where pharmaceutical outcomes research is practiced and taught. Students will acquire these skills through the completion of the graduation requirements. These are:

1. Coursework: Students in the PhD program will be expected to complete coursework in health economics, biostatistics, epidemiology, and research design during their first year to develop the tools to conduct independent scholarship in pharmaceutical outcomes research.
2. Supervisory Committee: Students will form a supervisory committee after the successful completion of three semesters. This committee will approve electives, approve and judge the qualifying examination and approve dissertation subject, final written dissertation and judge the final oral examination.
3. Qualifying Examinations: At the end of the required coursework, students will take a qualifying examination that assesses their knowledge within their specific discipline and of the tools of outcomes research.
4. Dissertation: After successful completion of the Qualifying Examination and advancement to candidacy, students will develop a proposal for the dissertation, complete and defend the research.

Section V: Finance

Budget Comments

The costs associated with the PhD program would be those required for instruction of a second semester of pharmacotherapy outcomes research and stipends for doctoral students. The additional course will be taught by regular faculty within the Department of Pharmacotherapy. The Department has passed pre-proposal screening for \$5,000 from the Herbert & Elsa Michael Foundation. If awarded, the money will support startup of the program.

Students will be paid a stipend of \$25,000 per year. The students will be funded by 5000 funds, be Research Assistants and will be eligible for Student Tuition Benefit through the Graduate

School. The Department will pay any cost of health insurance and tuition not covered by the Student Tuition Benefit Subsidized Insurance Plan.

There will be no additional costs associated with mentoring PhD students. The time required for mentoring can be absorbed into existing faculty FTE. There are no additional costs for space or equipment as space has been requested in the new Pharmacy building design.

Funding Sources

Funding for the stipends will come from the Pharmacotherapy Outcomes Research Center budget.

Reallocation

Not Applicable

Impact on Existing Budgets

No impact on existing budgets is anticipated from this program.

Appendix A: Program Curriculum

Appendix B: Course Descriptions

Appendix C: Supporting Letters

Appendix D: Letter from Dean Wight

Appendix E: Faculty list

APPENDIX A: Program Curriculum

All Program Courses

A minimum of 66 credits past the baccalaureate degree will be required for completion of the PhD program in Pharmacotherapy Outcomes Research and Policy. All students will be required to complete a minimum number of 43 credits in the 4 areas below (Pharmacotherapy Outcomes, Economics, Public Health/Epidemiology, and Research Methods/Biostatistics). In addition, a minimum of 9 elective credits and 14 thesis research credits will be required.

Required Core Courses		
Course Prefix & Number	Title	Credit Hours
PCTH 7890*	Journal Club in Pharmacotherapy Outcomes	1 (4 semester minimum)
PCTH 7891*	Research Seminar	1 (4 semester minimum)
PCTH 7150*	Pharmacotherapy Outcomes Research I	3**
PCTH 7151*	Pharmacotherapy Outcomes Research II	3
PCTH 7XXX	Pharmacoepidemiology	3
PCTH 7436	Ethical Dilemmas in Pharmacotherapy and Pharmaceutical Sciences	2
ECON 6190	Health Economics	3
ECON 6630	Applied Microeconomics	3
FPMD 6300	Epidemiology I	3
FPMD 7300	Epidemiology II	3
FPMD 6401	Public Health Policy and Health Systems	3
FPMD 7310	Advanced Research Design	3
FPMD 6100	Biostatistics I/ Biostatistics I lab	3
FPMD 7100	Biostatistics II / Biostatistics II lab	3
	Subtotal Core Credits	43
PCTH 7970*	Thesis Research: Doctoral	14 minimum
	Subtotal Elective Credits	9 minimum
	Total Required for Graduation	66 minimum
*New course number and/or upgrade of existing course required for PhD students		
**Increase from 2 to 3 credits per semester effective Spring 2010		

Suggested Program Electives		
Course Prefix and	Title	Credit Hours

#		
Policy/Health Care Systems		
NURS 6772	Quality Improvement in Health Care	3
PADMN 6321	Health Policy	3
FPMD 6500	Intro to Public Health	3
Biostatistics Electives		
FPMD 7110	Methods of Clinical Trials	3
FPMD 7120	Linear and Logistic Regression Models	3
FPMD 7140	Applied Multivariate Data Analysis	3
FCS 5969	Survival Analysis	3
FPMD 6101	SAS Programming	3
Epidemiology Electives		
FPMD 6305	Advanced Methods of Epidemiologic Research	2
FPMD 6301	Occupational and Environmental Epidemiology	3
FPMD 6340	Infectious Disease Epidemiology	3
Economic Electives		
ECON 6610	Microeconomics	3
ECON 6630	Applied Econometrics	3
ECON 7590	Econometrics	3

New Courses to be Added in the Next Five Years

New Course Prefix & Number	Title	Credit Hours
PCTH 7151	Pharmacotherapy Outcomes Research II <i>Builds on concepts taught in Pharmacotherapy Outcomes Research I, and introduces new outcomes realms including humanistic/quality of life and other patient reported outcomes</i>	2
PCTH 7XXX	Pharmcoepidemiology <i>Statistical analysis of drug safety data</i>	3

APPENDIX B – Course Descriptions

New Courses

NEW COURSE: PCTH 7890 Journal Club in Pharmacotherapy Outcomes (1 credit): Faculty and student forum for presentation of current scientific literature.

NEW COURSE: PCTH 7891 Research Seminal (1 credit): Faculty and student forum for presentation of current research.

NEW COURSE: PCTH 7970 Thesis Research (1-9): Independent research project toward preparation of Ph.D. thesis meeting approval of the student's advisory committee.

NEW COURSE: PCTH 7151 Pharmacotherapy Outcomes Research II (2 credits): This course is build on the concepts taught in Pharmacotherapy Outcomes Research I and introduces new outcomes realms including humanistic/quality of life and other patient reported outcomes.

NEW COURSE: PCTH 7XXX Pharmacoepidemiology (3 credits): The statistical analysis of drug safety data.

Existing Required / Optional Courses

ECON 6190 Health Economics (3 credits): Economics of health care, health-care delivery systems, public and private health insurance, location of health facilities, and health-care inflation.

ECON 6610 Microeconomics for Master's Students (3 credits): Theoretical demand and supply issues with emphasis on application. Topics include intertemporal choice, uncertainty and insurance, risky assets, consumer surplus, household production theory, firm cost, production theory and duality, oligopoly firm theory, and general equilibrium and welfare economics.

ECON 6630 Applied Econometrics (3 credits): Application of multiple regression analysis to financial models, costs and production models, hedonic price models, labor demand, investment demand, and similar micro- and macro-economic models. The applications involve the use of data sources and computer software packages.

ECON 7590 Econometrics (3 credits): Ordinary least squares, maximum likelihood, constrained estimation, systems of equations, generalized least squares, and regression diagnostics. Application-oriented.

FCS 5969 Special Topics in Statistics (1 to 6 credits): Topics vary. Taught by members of the University Statistics Committee.

FPMD 6100 Biostatistics I (3 credits) Basic course in the use of statistical methods in the analysis of outcome studies and quality improvement.

FPMD 6101 Data Analysis using SAS (3 credits): This course will give the students skills in data preparation, management, processing, analysis and display using the SAS software system. It is focused on practical application and utilizes experiential learning.

FPMD 6300 Epidemiology I (3 credits): Basic principles of epidemiology, with emphasis on determining causation of chronic disease. Fundamentals of epidemiologic study design and data resources.

FPMD 6301 Occupational and Environmental Epidemiology (3): An introduction to principles, methods, and quantitative techniques building on basic concepts of epidemiology. Prepares students to perform research in and interpret published reports from these specialized areas of public health.

FPMD 6305 Advanced Methods Epidemiology Research (3 credits) Advanced approaches in theoretical and practical epidemiologic research methods. Student will work in a group with 2-3 other students. Each group will take research data and produce a paper suitable for submission to a medical journal.

FPMD 6340 Infectious Disease Epidemiology (3 credits): Course is designed to provide an overview of the foundations and epidemiologic methods used in assessing the phenomena of infectious disease from a public health perspective.

FPMD 6401 Public Health Policy and Health Systems (3 credits): Organization and financing of health-care delivery systems including integrated delivery systems and managed care such as HMOs and PPOs. Formation of health policy by federal and state government and its impact on private health care systems.

FPMD 6500 Introduction to Public Health (3 credits): An introduction to public health practice including prevention, disease screening, surveillance of communicable diseases.

FPMD 7100 Biostatistics II (3 credits): Course explores the use of statistical modeling of analysis of health and medical data. Expanding upon the foundation laid in Biostatistics I, this course focuses on the analysis of complex data using a variety of regression and analysis of variance techniques, including: linear regression, logistic regression, proportional hazards regression, Poisson regression, fixed effects analysis of variance, and repeated measures analysis of variance.

FPMD 7110 Methods of Clinical Trials (3 credits): This course is intended to provide students with the basic of designing, carrying out, and analyzing randomized clinical trials (RCTs). The focus will be on practical, common sense issues rather than technical mathematics whenever possible-the instructor's goal is to convey the concepts assuming

students have had at most calculus. There may occasionally be guest speakers with specialized experience in various aspects of designing and carrying out studies.

FPMD 7120 Linear and Logistic Regression Models (3 credits): Students will study multiple linear regression, logistic regression, ordinal and generalized least squares, multinomial and ordinal logistic regression, hypothesis testing, prediction, measure of goodness-of-fit, regression diagnostics, collinearity, model selection, ANOVA.

FPMD 7140 Applied Multivariate Data Analysis (3 credits): Students will study multivariate normal distribution, multivariate regression, MANOVA, principal components, classification, factor analysis, cluster analysis. This is more applies course focusing on applications in health science research.

FPMD 7300 Epidemiology II (3 credits): Intermediate and advanced principles in epidemiology, with emphasis on advanced designs (e.g. clinical trials, nested case-control, case-cohort, case-only, case-crossover), topics in statistical methods in epidemiology (e.g. survival analysis, categorical data analysis, multivariate models) and other topics.

FPMD 7310 Advanced Research Design (3 credits): This course is designed to teach you the rudiments of effective research. This course will combine lecture, seminar, and hands-on approaches. You will be responsible for choosing a topic for your thesis or dissertation, or some other research, and creating a proposal. You will also be responsible for obtaining and providing reviewer comments (i.e. student/peer comments) at different points throughout the semester. You will learn methods of public health and clinical investigation. You will gain experience in identifying a research topic, preparing a research proposal, and presenting and defending a research plan. You will also gain experience in acting as a research collaborator and reviewer.

INTMD 7560 Medical Ethics (1 credit): The course objectives are: 1) explore the complexities of ethical issues in the practice of medicine; 2) provide a foundation of philosophical and moral reasoning skills; 3) encourage reflection on personal and professional moral commitments in the practice of medicine and promote discussion between professionals; 4) and employ this knowledge and these skills in a clinical setting.

NURS 6772 Quality Improvement in Health Care (3 credits): Further role development for patient care services administrative practice and leadership. Focuses on theory, methods, and tools of quality improvement. Patient care services administrators are expected to support and facilitate quality improvement, reduction of waste, and lowering of costs. Students complete one defined process improvement as part of course work.

PADMN 6321 Health Policy (3 credits): Introduction to health policy issues in U.S.; needs and demands for public action; organization and nature of political support; process and problems of decision making in health policy areas.

PCTH 7150 Pharmacotherapy Outcomes Research (2 credits): After the completion of this course, the student should be able to describe how the following terms pertain to the pharmacotherapy outcomes movement. Outcomes research: the scientific design, data collection and analysis of the end results of therapy. Outcomes management: a systematic approach to measure and analyze patient outcomes with the goal of improving the effectiveness and quality of care for a specific patient population. Outcomes measurement: quantitative results of individual patient treatment as part of routine clinical practice in order to assess indicators of care.

PHIL 7570 Case Studies and Research Ethics (1 credit): An examination of research integrity and other ethical issues involved in scientific research. Topics may include scientific fraud, conflicts of interest, plagiarism and authorship designation, and the role of science in formulating social policy. This course is designed for graduate students, post-docs and regular faculty in the sciences.

APPENDIX C – Supporting Letters



The University of Utah
Department of Physical Therapy

September 17, 2009

Diana Brixner, RPh, PhD
Professor and Chair
Department of Pharmacotherapy
Executive Director Outcomes Research Center
LS Skaggs Pharmacy Building
30 S 2000 E, Room 201
CAMPUS

Dear Diana:

As Chair of the Department of Physical Therapy I express my enthusiastic support for your pursuit of a PhD program in Pharmacotherapy Outcomes Research and Health Policy. I endorse your proposal's clarity about, and drive toward, addressing the critical need for outcomes and policy related data in health care. Having recently established a PhD program in Rehabilitation Sciences that focuses both on the sciences of rehabilitation and clinical outcomes research in rehabilitation, I share your enthusiasm for producing scientists that address broad health care demands for information about the delivery and results of care.

Being a part of the College of Pharmacy, which has such a strong history of successful research coupled with clinical training, will serve your Department well as you establish this degree and serve your future graduate students. The infrastructure that is already present in the College of Pharmacy bodes well for this program to be a success. The direction of this program as outlined in your proposal demonstrates vision and leadership in health care delivery and assessment that is critical in many areas including pharmacotherapy.

I expect there will be opportunities for us in the Department of Physical Therapy to collaborate with students in your program as they seek to look at a variety of outcomes measures and policies that affect the functional and biomechanical outcomes of patients.

The program you are proposing is timely and your proposal is strong. I look forward to the potential of working with you on additional projects in the future.

Sincerely,

R. Scott Ward, PT, PhD
Professor and Chair
Department of Physical Therapy



The University of Utah

Department of Family & Preventive Medicine

September 24, 2009

Diana Brixner, RPh, PhD
Professor and Chair
Department of Pharmacotherapy
L.S. Skaggs Hall
30 South 2000 East, Room 258
Salt Lake City, UT 84112

Dear Dr. Brixner,

I am pleased to offer support for the establishment of a Doctor of Philosophy in Pharmacotherapy Outcomes Research and Health Policy through the Department of Pharmacotherapy. From my experience, doctoral training in this area is growing more important as the need to understand impacts of pharmacotherapy in the population and related health policy increase. I am also pleased to have doctoral students enroll in both required and elective statistical coursework through the Division of Public Health in the Department of Family and Preventive Medicine. I have appreciated the collaborations over time between the Departments of Pharmacotherapy and Family and Preventive Medicine, and see this as another opportunity to work together.

Please accept my best wishes on the successful establishment of this doctoral program. Please let me know if there are further ways in which the Division of Public Health can be supportive in this endeavor. I look forward to our continued collaboration.

Regards,

Stephen C. Alder, Ph.D.
Chief, Division of Public Health



9/30/09

To Whom it May Concern,

I am writing this letter with my support for the proposed pharmacotherapy outcomes and policy PhD program. As health care reform progresses, research methods focused on outcomes will continue to become more central to the process of gauging quality and cost effectiveness. This program can contribute productively in that regard. I can also assure that we will continue to offer the rigorous health economics course that is an integral part of this program on a regular basis.

Best,

Norman J Waitzman, PhD
Professor, Economics
Co-Director, Behavioral Science and
Health Program



The University of Utah

Department of Family & Preventive Medicine

September 25, 2009

Michael K. Magill, M.D.
*Hicken Professor and Chairman
Department of Family and Preventive Medicine*

*Executive Medical Director, Community Clinics
University Hospitals and Clinics*

Diana Brixner, RPh, PhD
Professor and Chair
Department of Pharmacotherapy
Executive Director Outcomes Research Center
258 Skaggs Hall
30 South 2000 East
Salt Lake City, UT 84112

Dear Diana,

I enthusiastically support your proposed PhD program in Pharmacotherapy. In the current national environment of healthcare reform, I believe it is a great time to offer this degree.

The Department of Pharmacotherapy is in an excellent position to offer this degree. The Department has a long history and good reputation for educating the PharmD students in the College of Pharmacy. Their new MS in Pharmacotherapy program is very successful. The Department has recently added several outstanding faculty members who add research and mentoring skills to the Pharmacotherapy Outcomes Research Center (PORC). In addition, PORC continues to gain international recognition for its healthcare outcomes research.

Our department has been successfully collaborating with the Department of Pharmacotherapy in many ways, including the education and support of their MS in Pharmacotherapy students. The MS program has thrived in part because of this collaborative atmosphere, and our current mutual projects would be conducive to an effective research environment for PhD students. Since student support is necessary for a productive program, I believe the Department of Pharmacotherapy's commitments to collaboration and outcomes research, along with its ability to provide funding make it very capable of producing first-class researchers. I would also look forward to facilitating work of the new PhD students to take advantage of the clinical practice-based resources of the University of Utah's Community Clinics, a 10-site, 300,000-patient visit per year network of medical practices linked with a robust electronic medical record to facilitate productive research.

In today's policy-changing climate, meaningful healthcare transformation will depend on trained researchers in healthcare outcomes. Demand for their services will become prevalent and the quality of their research will be paramount. The University of Utah's reputation for outstanding research could only be enhanced through programs such as the one proposed by the Department of Pharmacotherapy, and I fully support the program.

Sincerely,

Michael K. Magill, MD
Professor and Chairman



The University of Utah

College of Nursing

Diana Brixner RPh, PhD
Professor and Chair
Department of Pharmacotherapy
University of Utah College of Pharmacy

October 5, 2009

Dear Dr. Brixner:

I am pleased to write a letter of support for the application of the Department of Pharmacotherapy to offer a PhD in Pharmacotherapy Outcomes and Health Policy. This new offering is extremely timely as there is an increased demand for health professionals and health care delivery systems to be accountable for the outcomes of their care. This new degree will build on the strengths developed by the faculty of the Pharmacotherapy Outcomes Research Center and prepare scientists in this important area. The Institute of Medicine report (IOM) on health professions education (2003) and preventing medication errors (2007) identifies outcomes research and the practice of evidence-based medicine as methods needed by the US health care system to improve healthcare quality and safety.

I have had the opportunity to review the proposal and the proposed curriculum. The proposal leverages many existing resources on campus. These new PhD students would be welcome in College of Nursing electives including the one course named (NURS 6772) as well as electives that are offered to our PhD students each semester. Some of our students may also be interested in courses that will be offered as part of this new program.

College of Pharmacy faculty have served as members of Supervisory Committees for our PhD students in the College of Nursing for many years. We will welcome the opportunity to reciprocate and support their students by participating in Supervisory Committees when the student's area of interest matches with our faculty expertise.

We are pleased to endorse this proposal and commit to supporting its implementation.

Sincerely,

Susan L. Beck PhD APRN FAAN
Professor
Robert S. and Beth M. Carter Endowed Chair in Nursing
Director, PhD Program



The University of Utah
Department of Internal Medicine

October 1, 2009

Diana Brixner, RPh, PhD
Professor and Chair
Department of Pharmacotherapy
L.S. Skaggs Hall Rm. 258
30 South 2000 East
Salt Lake City, UT 84112

Re: PhD program in Pharmacotherapy Outcomes Research and Health Policy

Dear Dr. Brixner,

I am pleased to write this letter giving my full support to the College of Pharmacy in its request to create a PhD program in Pharmacotherapy Outcomes Research and Health Policy. As healthcare reform moves to the forefront of the national agenda, the demand for trained professionals who understand the importance of outcomes research will only become greater. The University of Utah's College of Pharmacy is in a unique position to provide those professionals in pharmacotherapy outcomes research for government, industry, and academic positions.

Many healthcare-related decisions are based on pharmacotherapy outcomes. Insurance companies, managed care organizations, policy decision makers, and perhaps most importantly, patients, make crucial decisions based on the intended outcomes of pharmacotherapy. Research on the actual outcomes that can be expected from these therapies and the economic impact of different therapies is critical, and to understand these issues takes much more training than can be expected from a practicing clinician. One must understand the intricate intertwining of health economics, biostatistics, research design, and epidemiology to analyze outcomes and provide reliable data to support decision making. The College of Pharmacy's proposed program offers a unique educational experience for grasping these significant issues.

Not many programs focusing on pharmacotherapy outcomes currently exist; any students desiring training in this field must be referred to a few universities with such programs. The University of Utah has a substantial history in training pharmacists, and adding this program is a logical and timely next step. Recently, the National Institutes of Health specifically identified outcomes researchers as a necessary part of bench-to-bedside research programs that will be an essential part of a collaborative scientific atmosphere. Pharmacotherapy outcomes research will continue to be an integral part of this growing field.

Because the University of Utah currently supports a Master's degree in Pharmacotherapy Outcomes Research, the basic structure of the program is in place. Expanding the current program to include a PhD degree will provide world-class researchers, teachers, and thought leaders who will advance understanding in this field. This program is in line with the University of Utah, Health Sciences Center, and College of Pharmacy missions, and it will enhance the nationwide research reputation of the University. I strongly support its creation.

Sincerely,

Matthew H. Samore, M.D.

Division of Epidemiology
295 Chipeta Way
Salt Lake City, Utah 84132
Phone (801) 585-6667
Fax (801) 581-3623



October 6, 2009

Richard J. Sperry, M.D., Ph.D.
Associate Vice President,
Health Sciences
Academic & Clinical Affairs
Governor Scott M. Matheson
Professor of Health
Policy & Management

Graduate Council
University of Utah
302 Park Building
201 South President's Circle
Salt Lake City, UT 84112

Dear Council Members:

I am pleased to offer my support for the creation of a Doctor of Philosophy (Ph.D.) program in Pharmacotherapy Outcomes Research in the College of Pharmacy at the University of Utah. I have observed and admired the work of the Pharmacotherapy Outcomes Research Center for many years and find this proposal to be a natural extension of the success enjoyed by the Center.

I have served as the Director of the Matheson Center for Health Care Studies at the University of Utah since 2002. The mission of the Matheson Center is to foster education and dialog on issues of health care economics and health policy. The Matheson Center does not have faculty members and a budget to perform its mission directly; rather, it serves as a facilitator of campus groups to enhance the goals of the Center. The Pharmacotherapy Outcomes Research degree program will provide additional research and training opportunities that will strengthen the Matheson Center and enhance campus-wide opportunities for collaboration.

In summary, I support the creation of a Doctor of Philosophy (Ph.D.) program in Pharmacotherapy Outcomes Research and believe that it will strengthen the existing programs that focus on health care economics and health policy.

Sincerely,

Richard J. Sperry (M.D., Ph.D.)
Governor Scott M. Matheson Presidential Endowed Chair
Health Policy and Management



The University of Utah

Department of Pharmacotherapy

July 17, 2009

Charles A. Wight, Ph.D.
Dean of the Graduate School
302 Park Building
Salt Lake City, UT 84112

Dear Dean Wight;

The Department of Pharmacotherapy is finalizing a proposal for a PhD program in Pharmacotherapy to complement our current MS program. This proposal will be sent to the Graduate School in early September. In preparation of submitting the proposal, and in light of the fact that we have fewer PhD-trained regular faculty than most Departments with a PhD program, I am requesting PhD supervisory committee blanket exception to serve as chairs and regular faculty majority for three of our qualifying research faculty. To have this exception to the regular faculty committee rule approved by the Graduate School in advance will strengthen our PhD program proposal by allowing our prospective PhD students to take greater advantage of the knowledge and expertise of these faculty members. This request was originally directed to Dean Chapman in early June. Dean Chapman answered our correspondence, and this modified request is in response to that letter.

Dean Chapman's letter stated that due to the small number of tenured faculty in our department, several factors would be considered for exception to the chair and majority membership committee rules. We currently have three PhD Research faculty members who meet all of the criteria for exception: (1) they all possess special expertise unique to the department; (2) funding for our PhD students (should the program be approved) will come, in whole or in part, directly from research grants and contracts generated by these faculty members; (3) all have a history of good mentoring; (4) tenured faculty approve and their documented approval is attached.

Therefore, we would like to request blanket approval to serve as chairs and count for the regular majority on any of our PhD committees for the following research faculty members:

Joseph Biskupiak, MBA, PhD, Research Associate Professor
Carl Asche, PhD, Research Associate Professor
Carrie McAdam Marx, PhD, Research Assistant Professor

We would then like to proceed with the understanding that chairs and majority membership for our PhD supervisory committees will come from tenured faculty and those PhD research faculty granted blanket exception, and if we feel that an additional exception should be considered, especially for our PharmDs, we will formally request that exception on a case by case basis.

Thank you for your guidance on this issue.

Sincerely,

Diana Brixner, R.Ph., Ph.D.
Professor and Chair
Department of Pharmacotherapy
(801) 581-3182

Approved.

7/17/09

Department of Pharmacotherapy All Faculty List

Faculty eligible to serve as PhD Committee chairs and majority members

Tenure Track	Academic Rank	Academic Training
Diana I. Brixner, R.Ph., Ph.D.	Professor and Chair	B.S. Pharmacy, University of Rhode Island 1982 Ph.D. Medicinal Chemistry, University of Utah 1987
Michael S. Goodman, Ph.D.	Assistant Professor	B.S. Political Science, Wisconsin-Oshkosh 1980 M.S., Political Science, Oregon 1983 Ph.D., Government, Texas, 1992
Joanne LaFleur, Pharm.D., M.S.P.H.	Assistant Professor	B.S., University of Utah Pharm.D., University of Utah 2003 M.S.P.H., University of Utah 2005 Fellowship, University of Utah 2003-2005.
Arthur G. Lipman, Pharm.D.	Professor	B.S. Pharmacy, University of Rhode Island 1967 Pharm.D., University of Michigan 1968
Mark A. Munger, Pharm.D.	Professor	B.S. Pharmacy, Oregon State University 1983 Pharm.D., University of Illinois 1986 Fellowship, Case Western Reserve University 1988
Nancy A. Nickman, Ph.D.	Professor and Presidential Teaching Scholar	B.S. Pharmacy, University of Montana 1982 M.S., University of Minnesota 1984 Residency, (Hospital Pharmacy) Ph.D., University of Minnesota 1987
Gary M. Oderda, Pharm.D., M.P.H.	Professor	Pharm.D., University of California-San Francisco 1972 Residency, University of CA at SF 1972-73 M.P.H., Johns Hopkins University 1982

Faculty approved to serve as Committee chair, majority membership (blanket exception, see Appendix D)

Carl V. Asche, Ph.D.	Research Associate Professor	B.A., Simon Fraser University 1987 M.B.A., City University 1988 M.S., Health Economics, University of York 1993 Ph.D., University of Surrey 2002
Joseph E. Biskupiak, M.B.A., Ph.D.	Research Associate Professor	B.S. Chemistry, University of Connecticut 1979 Ph.D. Medicinal Chemistry, University of Utah 1985 M.B.A., Seattle University 1995
Carrie McAdam-Marx, M.S., Ph.D.	Research Assistant Professor	B.S. Pharmacy, University of Kansas 1988 M.S., University of Minnesota 1991 Ph.D., University of Sciences Philadelphia 2009

Research Track	Academic Rank	Academic Training
Frederick S. Albright, M.S., Ph.D.	Research Assistant Professor	B.S. Chemistry, Guilford College 1978 M.S. Medical Informatics, University of Utah 1989 Ph.D. Medical Informatics, University of Utah 1996
Clinical Track	Academic Rank	Academic Training
Barbara I. Crouch, Pharm.D., MSPH	Professor (Clinical)	B.S. Pharmacy, Philadelphia College of Pharmacy and Science 1982 Pharm.D., University of Texas 1984 Fellowship, University of Maryland 1985 M.S.P.H., University of Utah 1994

APPENDIX E: Faculty List

Kamila Dell, Pharm.D., B.C.P.S.	Assistant Professor (Clinical)	B.S. University of Alberta 1995 Pharm.D., University of North Carolina 1997 Residency, University of Utah Hospitals 2001-2003
Sarah Feddema, Pharm.D, B.C.P.S.	Assistant Professor (Clinical)	Pharm.D., University of Wyoming 2001 Residency, University of Utah 2001-2003
Karen Gunning, Pharm.D., B.C.P.S.	Associate Professor (Clinical)	B.S., Oregon State University 1995 Pharm.D., University of Utah 1997 Residency, University of Washington 1997-1998
Brandon Jennings, Pharm.D.	Assistant Professor (Clinical)	Pharm.D., Virginia Commonwealth University 2006 Residency, Virginia Commonwealth University 2006-2007
Lynda Oderda, Pharm.D.	Assistant Professor (Clinical)	B.S., University of Maryland 1979 Pharm.D., University of Maryland 1981
Patricia Orlando, Pharm.D., F.C.C.P.	Associate Professor (Clinical)	B.S., University of Montana 1982 Pharm.D., University of Utah 1985 Residency, University of Utah 1983-1985 Residency, Veterans Affairs Medical Center 1985-1986 Fellow, University of California - LA 1986-1987
William Rusho, M.S.	Professor (Clinical)	B.S., University of Utah 1968 M.S., University of Utah 1989
Morgan Sayler, Pharm.D.	Assistant Professor (Clinical)	B.S., University of Kansas 2004 Pharm.D., University of Kansas, 2008 Residency, University of Iowa 2008-2009
Laura Shane-McWhorter, Pharm.D., B.C.P.S., F.A.S.C.P., D.D.E., B.C.- ADM	Professor (Clinical)	B.A.Psychology-Chemistry, University of Texas at Austin 1968 M.S.Biology-Chemistry, East Texas State University 1970 B.S. Pharmacy, University of Utah 1988 Residency (Geriatrics), Salt Lake VA 1989 Pharm.D., University of Utah 1988
William J. Stilling, J.D.	Associate Professor (Clinical)	B.S., University of Utah 1983 M.S., University of Utah 1989 J.D., University of Utah 1992
Linda S. Tyler, Pharm.D.	Professor (Clinical)	B.S. Pharmacy, University of Utah 1978 Residency (Hospital Pharmacy) University of Nebraska Medical Center Pharm.D., University of Utah 1981