

UNIVERSITY OF KANSAS MEDICAL CENTER



**NEW ACADEMIC PROGRAM
PROPOSAL**

**DOCTOR OF PHILOSOPHY IN
MEDICAL NUTRITION SCIENCES**

PREPARED BY DIETETICS AND NUTRITION DOCTOR OF PHILOSOPHY

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PROPOSED PHD PROGRAM IN NUTRITIONAL SCIENCES

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**Ph.D. Program in Nutritional Sciences
School of Allied Health**

Submitted October 2008

Proposed Implementation Date: Fall 2009

BASIC PROGRAM INFORMATION

Proposing Institution

The University of Kansas Medical Center, Department of Dietetics and Nutrition

Title of the Proposed Program

Doctor of Philosophy (Ph.D.) in Nutritional Sciences

Degree Offered

Ph.D.

Anticipated Date of Implementation

Fall Semester 2009

Responsible Department

Department of Dietetics and Nutrition

Center for Education Statistics CIP Code 2000

30.1901

Nutrition Sciences: A scientific program that focuses on the utilization of food for human growth and metabolism, in both normal and dysfunctional states, from the interdisciplinary perspective of the agricultural, human, biological, and biomedical sciences. Includes instruction in food science, biochemistry, physiology, dietetics, food and nutrition studies, biotechnology, biophysics, and the clinical sciences. (Moved from 26.0609)

PROGRAM PROPOSAL NARRATIVE

Introduction and Justification for Program

The Department of Dietetics and Nutrition currently offers a Dietetics Internship Graduate Certificate and a Master of Science in Dietetics and Nutrition. The Department proposes to retain these programs while adding an interdisciplinary Doctor of Philosophy in Nutritional Sciences effective Fall 2009. A Doctoral degree in Nutritional Sciences at the University of Kansas Medical Center would support the University of Kansas Medical Center's 10-Year Life Sciences Strategy for established disease and organ-based research programs and emerging translational research programs. The 10-Year Life Sciences Strategy, the recent addition of a General Clinical Research Center and our new KUMC Biostatistics Department are key resources that supply the synergism needed for a new doctoral degree in Nutritional Sciences. Ongoing research in the Department of Dietetics and Nutrition is already aligned with the 10-Year Life Sciences Strategy.

The University of Kansas is well-placed to institute a Doctoral program in Nutritional Sciences at this time. In 1999, the Department of Dietetics and Nutrition in the School of Allied Health at KUMC became independent of the KU Hospital Dietetics and Nutrition Department. The KUMC Department of Dietetics and Nutrition focused on its teaching and research missions. We increased enrollment in the Dietetic Internship and Master of Science Degree program and departmental faculty developed extramurally funded research programs capable of supporting doctoral trainees. Yearly extramural direct payments grew from \$110,000 in 2000 to \$1.3 million in 2007. Funds from grants held by faculty as the Principal Investigator as well as funds from grants on which faculty are key personnel will support graduate assistantships for doctoral training in the Nutritional Sciences.

Nutrition is the process by which an animal or plant takes in and utilizes nutrients. The discipline branched from biochemistry. Biochemistry and other biological sciences (e.g., molecular biology, immunology and genetics) as well as newer approaches made possible by advances in genetics and bioinformatics (metabolomics, the integrated study of the many small molecules produced by metabolism and nutrigenomics, the study of the bidirectional interactions between genes and diet] (Zeisel SH, Am J Clin Nutr 2007; 86:542-8) will be core knowledge for the new generation of doctoral trained nutritional scientists who do research related to human nutrition whether directly or in animal models that is translated to human clinical research. Interdisciplinary research conducted by nutritional scientists ranges from basic research on metabolism of nutrients to the role of culture or lifestyles on diet in promoting better health or disease risk.

A key component of the KUMC 10-year Life Sciences Strategy is a focus on advancing the translational research capabilities across many disciplines. Nutrition is a key aspect in health and has a role in the etiology of many diseases. More nutritional scientists are needed to conduct research related to disease and organ systems. The faculty in the Department of Dietetics and Nutrition have successful funded research programs in several of the established disease and organ-based research programs at KUMC including cancer, neuroscience and brain health, and maternal/fetal and child health. Departmental faculty currently have extramural funding as the principal investigator (Carlson, neuroscience/brain health; Carlson and Sullivan, maternal/fetal and child health) or co-investigator (Sullivan, cancer, maternal/fetal and child health; Carlson, maternal and child health) in several of these areas. The 10-year strategy lists emerging programs in bone,

diabetes, heart, integrative medicine, immunology/virology, obesity, personalized medicine and public health; and increased clinical and translational research as goals. Again, KUMC nutrition faculty have research programs on bone (Garimella), diabetes and obesity (Donnelly, Sullivan, Smith, Leidy, Goetz, Gibson, Barkley), immunology (Smith), public health (Donnelly, Sullivan, Gibson, Goetz) and integrative medicine (Drisko, Markley). The majority of these programs are clinical and translational in nature, but some employ animal or cell models to answer questions necessary to begin human research. The department faculty members are committed to taking our newest research programs in bone to a clinical/translational stage.

The Kansas City metro area has a large free-living population and academic physicians at the University of Kansas Medical Center care for clinical populations with all common diseases. KUMC also has a General Clinical Research Center and a new Department of Biostatistics and has committed money, space, training and personnel to increasing the number of clinical trials. KUMC is accredited by the Association for the Accreditation of Human Research Protection Programs, Inc (AAHRPP). While the State of Kansas has a Human Nutrition Department at Kansas State University that offers doctoral training in nutrition, the KUMC Doctoral program in Nutritional Sciences would be unique in the State of Kansas in that students in the program would be able to readily conduct clinical and translational research in nutrition on many diseases and organ systems. Few US academic institutions that offer doctoral training in the Nutritional Sciences have both academic physicians and large, diverse, urban, free-living and clinical populations. Funding agencies recognize that the resulting synergism increases the likelihood of research progress.

The Department of Dietetics and Nutrition core faculty are affiliated with numerous Research Centers at KUMC including the Smith Intellectual and Developmental Disabilities Research Center and Center for Neurological Disorders (Carlson), KU/CMH Center for Nutrition, Physical Activity and Weight Management (Sullivan, Smith) and the General Clinical Research Center (Sullivan). Formal research Collaborations with the University of Kansas Cancer Center (Fabian, Reed) and the Hoglund Brain Imaging Center (Gustafson, In Young Choi, Savage) exist. There are many opportunities to enhance collaborative efforts between our department and other KUMC Research Centers as well as those mentioned above.

Individual clinical populations studied by department faculty and our departmental partnership with the Integrative Medicine group (Drisko, Markley) will create opportunities for research in nutrigenomics and metabolomics, key components of individualized medicine. Our doctoral program will encourage students to include these new technologies in research. Nutrition is an important modifier of gene expression (epigenetic) and individual differences in biosynthesis of nutrients (related to different genetic alleles) influence nutrient requirement. Both epigenetic and genetic differences are relevant to personalized medicine; and we are on the verge of an explosion in knowledge as these technologies are employed. Several world centers already have a focus in nutrigenomics including the Nutrition and Genomics Laboratory at the USDA Human Nutrition Center on Aging at Tufts University, Nutrigenomics New Zealand and the National Center for Minority Health and Health Disparities Center of Excellence for Nutritional Genomics at the University of California, Davis. The influence of individual single nucleotide polymorphisms (SNPs) on nutritional requirements is an important new arena for doctoral research both directly and as a modifier of health outcomes.

Doctoral trained nutritional scientists are needed to advance local and State of Kansas agendas in

two ways a) by maintaining their own funded research programs related to human health and b) by supporting others funded research programs related to human health. Dietetics and Nutrition faculty are currently principal investigators in several existing and proposed areas of research included in the KUMC 10-Year Life Sciences Strategy. As well, Dietetics and Nutrition faculty serve as co-investigators on more than 13 additional grants¹ funded by the National Institutes of Health. A doctoral program in Nutritional Sciences would a) enhance discovery within established and proposed research programs of other KUMC faculty as our doctoral students would work in these areas of investigation under the tutelage of an interdisciplinary faculty and b) provide a workforce for these programs at KUMC, in the State of Kansas and nationally. As noted previously, KUMC is one of only a few university medical centers with a Department of Nutrition that includes PhD-trained research faculty to collaborate with clinical research faculty.

An additional benefit of a Doctoral Program in Nutritional Sciences would be the enhanced opportunities to support additional KUMC researchers through the interdisciplinary supervision of students working directly with other funded investigators. There are numerous untapped opportunities within KUMC for competitive collaborative research in nutrition within disciplines of neurology, pediatrics, cardiology, cancer, gastroenterology, integrative medicine and bone metabolism. Departmental faculty anticipates an expanded role in the support of academic scientists in these areas in the process of mentoring PhD students' dissertation research in Nutritional Sciences.

The American Society for Nutrition (ASN) Graduate Nutrition Education Committee has identified three major challenges that face the nutrition profession: (a) the need to train more doctoral students to be full and active participants in the interdisciplinary research and discovery, (b) the need to maintain nutrition as a unique academic discipline, and (c) the need to foster a cohesive academic community. Unprecedented opportunities for research and discoveries in the nutritional sciences have been created by advancements in the social and biological sciences, primarily genetics, genomic technologies, computational statistics and behavioral sciences. Other biological and biomedical disciplines have restructured their graduate programs due to opportunities afforded by integrative and interdisciplinary research, with emphasis on programs that interface the biological, mathematical and computational disciplines. While US graduate programs in the nutritional sciences are responding to these emerging opportunities as well, doctoral training in the nutritional sciences has been interdisciplinary throughout its history.

Courses in nutrition and a course in nutrigenomics developed for our doctoral program will be available to physicians and doctoral student in the biological sciences. The recognition and elucidation of the roles that the various single nucleotide polymorphisms (SNPs) play in the functionality of metabolic pathways will be aided by an understanding of nutrition, which is known to be an important modifier and, therefore, key knowledge to achieve the goal of "individualized medicine" in the future.

¹Sullivan , Carlson and Smith are collaborators on NIH funded research of animal models for basic studies of brain development and postpartum depression (Levant, Pharmacology) and diabetes (Hao, Clinical Laboratory Sciences); support of the General Clinical Research Center (KU GCRC) and clinical studies of breast cancer biomarkers (Fabian, KUMC Medicine), prevention and management of obesity (Donnelly, KU Lifespan Institute), psychiatric rehabilitation to weight loss (Hamera, KUMC SON), protein supplementation with resistance training (Washburn, KU Lifespan), fetal autonomic nervous system development (Gustafson, Hoglund Brain Imaging Center), maternal mood disorders (Keenan, Univ. of Chicago, Psychiatry), and community nutrition (Gibson, KUMC Medicine).

Program Need and Students' Characteristics

1. Centrality to the KU Mission Statement

The proposed degree program reflects the mission statement of KU and its commitment “to offering the highest quality undergraduate, professional, and graduate programs.” The University of Kansas (KU) is a major comprehensive research and teaching university that serves as a center for learning, scholarship, and creative endeavor. Kansas University is committed to excellence and fosters an environment where intellectual diversity, integrity and disciplined inquiry. An integral and unique component of KU and the Kansas Board of Regents system is The University of Kansas Medical Center (KUMC) composed of the School of Medicine, the School of Nursing, the School of Allied Health, the School of Graduate Studies, and the University of Kansas Hospital in Kansas City. The KU Medical Center is a complex institution whose mission is to create an environment for instruction, research, and service and provides these services incorporating multiple constituencies at state and national levels. The KU Medical Center is able to meet the mission of the Kansas Board of Regents, “to advance quality of life, promote economic vitality, create and preserve knowledge, foster respect for diversity and enrich the culture of Kansas by delivering superior educational opportunities for all citizens, so they may reach their greatest potential.”

In keeping with the educational mission of the academic medical center, the recommendations of the Blue Ribbon Task Force, and the 10-year Life Sciences Strategy for KUMC, it is important to increase the Department of Dietetics and Nutrition programs to include a Doctoral program. PhD students and post-doctoral personnel are essential contributors to any research environment as stated in the Blue Ribbon Report. A major strength of our proposed Doctoral program in Nutritional Sciences is that it offers the opportunity for clinical and translational research but at the same time would be built upon a solid foundation of the modern biological sciences. Our proposed Doctoral program in Nutritional Sciences would emphasize training in the core science of nutrition with training in biochemistry, biostatistics and research methods. This core knowledge is consistent with all Doctoral Programs in Nutritional Sciences in the US.. Our program differs in the research development of our students in clinical and translational research permitted by our presence within the University of Kansas Medical Center.

The Department of Dietetic and Nutrition's Mission Statement is to conduct research in nutritional sciences and to produce exemplary graduates with core knowledge of nutrition science capable of objectively evaluating scientific evidence and using that evidence to guide clinical practice, education, research and service.

We propose this degree in response to overwhelming interest and incorporation of the nutritional sciences in most areas of biological research. The mechanisms to support this proposal are highlighted by the expanding biosciences community in the Kansas City and regional area and the Bioscience's Initiative. The scientific study of the nutritional science requires the integration and application of principles derived from the other sciences including biochemistry, physiology, and behavioral and social sciences. The American Dietetic Association has documented the decline in active research among its members. This influential organization within the nutrition field has identified the need for increased research and has set areas of priority that align with the expertise of our faculty.

2. Student Demand for the Program

The proposed degree targets nutrition and biological science Bachelor's or Master's degree holders who aim to advance their knowledge in research and nutrition. The proposed program has significant advantages over other Board of Regents universities. Linkage to the KU School of Medicine and access to the KUMC facilities and patient population allows the future nutrition researcher to pursue research ranging from the basic nutritional sciences to the applied nutritional sciences. Student interest in this program has been substantial. Since we have a Master of Science program in dietetics, about 90% of our students remain at KUMC to complete the MS degree. Each year we have outstanding students interested in a Doctoral program in Nutritional Sciences. A number of our MS graduates have transferred to other university doctoral programs because of the lack of a program at the KUMC campus. Almost daily we are contacted by potential students seeking to further their graduate training in the nutritional sciences.

Survey study and focus groups. In spring 2008, Dr. Cheryl Gibson conducted focus groups with our Dietetic Interns and Master of Science students to gauge their interest in doctoral training and to determine what would be required for them to consider doctoral training. Although an MS is not required to practice as an RD, most were obtaining or planning to obtain the Master of Science before leaving our program. Most students planned to enter the workforce with an MS, RD. Several students were considering doctoral training and they had many questions about doctoral training including courses, mentoring, and financial concerns. They indicated that they would need financial support to enter doctoral training. These focus groups encouraged a number of students to later identify themselves to faculty as having an interest in obtaining a PhD. Based on what we learned from the focus groups, we have begun regular discussions with our students in order to ensure they are aware of the roles that doctoral-trained nutrition scientists fulfill in academia, government and industry. We are particularly interested in helping them understand the potential for nutrition scientists to develop a research program in areas identified in the 10-Year Life Sciences Strategy for KUMC.

Informal poll of our current and 2008 graduating Master of Science students. In the past few years, at least 10% of our MS students have expressed an interest in pursuing a doctoral program; and many who were able to move pursued doctoral training at another institution. Dr. Linda Griffith took over our MS program in 2005. She has increased the number and quality of MS applicants in our program; and a higher proportion are interested in Doctoral training. Three of our students who have recently completed the MS degree or will complete it this year plan to continue on for a PhD. A fourth graduate of our program plans to go on for a PhD at KUMC or elsewhere. Two other MS, RD graduates of our program are working as research associates at KUMC and are seriously considering Doctoral training at KUMC. Based upon our recent experience, we believe that we could reach our goal of 2 to 3 students per year easily from our own MS students. We also believe our program would be attractive to BS and MS graduates of nutrition programs from surrounding institutions such as Iowa State University, University of Missouri, University of Nebraska, Oklahoma State and Kansas State University who desire research training in clinical or translational nutrition. Each of these institutions have large and strong undergraduate programs in nutrition and each has a Doctoral program in Nutritional Sciences, however, institutions encourage students who obtain the undergraduate degree to move to another institution for graduate work.

Past MS students who obtained doctoral training at another institution. As noted above, a number of the MS student graduates of our program did not want to terminate their training with an MS, but KUMC could not offer them a Doctoral program in Nutritional Sciences. Two of our current faculty members enrolled in the doctoral program (one completed in 2008) offered in Therapeutic Sciences by KUMC Occupational Therapy Education. Three recent MS students entered PhD programs in Nutritional Sciences (2) or genetics (1) at other institutions. In the past 9 years, we have had four students enter medical or DO school after completing the Master of Science in Clinical Nutrition. Another student went to Pharmacy school. Nine former MS students in the program obtained a doctoral degree in nutrition elsewhere and now hold positions of authority in academia and government.

Unsolicited requests for information concerning post-professional graduate programs in the department. Dr. Linda Griffith handles contacts from persons interested in a post-professional program in the Department of Dietetics and Nutrition. In her first year, she recorded 54 contacts in a 9-month period with 12 of these being from Kansans. She receives between 2 and 3 contacts/weeks with at least one of them from the Kansas City metropolitan area.

3. Demand for Graduates of the Program

Severe nationwide shortage of doctoral-trained nutritionists. Since 1996, approximately 150 new doctoral-trained nutrition scientists have completed training in the US each year (<http://www.norc.org/SED/SED+Tables.htm>Table B-1). Our conversations with nutrition faculty from well-established academic departments and nutrition centers confirm our experience that the pool of doctoral-trained nutrition scientists does not meet current demand. Many faculties are hiring persons from related disciplines whose research is related to a nutrition problem. The need for nutrition scientists who can do research in obesity, cancer and nutrigenomics or metabolomics is particularly acute. Among doctoral-trained scientists in nutrition, the shortage of PhD, RDs is even greater as RDs have traditionally entered the workforce immediately after completing their training. The PhD, RD is particularly effective as an independent scientist or collaborator in an academic medical center because of their clinical orientation and skills with both clients/subjects and experience working with teams that include other disciplines. Finally, the Nutrition Sciences, like other Allied Health professions, face a serious shortage in workforce due to the aging of faculties. The academic workforce shortage is particularly acute in Nutritional Sciences because unlike our colleagues in other Allied Health disciplines, we train fewer PhDs and our graduates are in high demand by government and industry. The situation does create an opportunity to partner with industry and government (through grants and training programs) to fund more doctoral students once our program is established.

Need for doctoral-trained nutritionists highlighted by the American Society for Nutrition. As noted above, the need for more doctoral-trained nutritionists has been highlighted by the American Society for Nutrition, which is the major US society for our discipline (it joined with the American Society for Clinical Nutrition in 2006).

Advertisements and job opportunities. The need for doctoral-trained nutritional scientists is clear from the number of doctoral position announcements in the American Journal of Clinical Nutrition and the Journal of Nutrition in the past year and those sent directly to our department, more than 32 positions in academia the past 6 months. Among the positions announced since

the beginning of 2008, the expertise in nutritional sciences sought ranged from extension nutritionist to bioactive food substances to metabolomics.

Government and industry employ a large pool of doctoral trained nutritional scientists, which differs from most of the Allied Health professions. Twenty-three doctoral position openings were listed on the American Society for Nutrition website on August 12, 2008 (<http://www.nutrition.org/jobs/>). Of these, 9 were with an institute or industry; 5 were for government positions and 9 were for academic positions. Seven of the 9 academic positions were for clinical or community nutrition.

Paucity of doctoral programs in nutritional sciences in academic medical centers.

According to the American Society for Nutrition, there are approximately 200 programs offering advanced degrees in nutrition; however, only 44 programs across the United States have a Doctoral program (<http://graduateschools.phds.org/find/programs/nutrition>) in the Nutritional Sciences. With few exceptions, these programs are located at land grant institutions, which are not ideally prepared to train the nutrition scientists needed for studies of the influence of nutrition on health and diseases of humans. As well, many of the land grant institutions have reduced their commitment to train Nutritional Scientists and are currently training doctoral students more aligned with food technology than with health and disease. The current situation is in accordance with their agricultural mission and a way to add value to agricultural products. For example, the Department of Food Science and Human Nutrition at Iowa State University identified research of 8 faculty members in their summer 2008 newsletter, and only one research program was directly related to health and disease.

Nutrition departments with doctoral training programs in the Nutritional Sciences were traditionally located at the land grant institutions, institutions of higher education in the US designated to receive the benefits of the Morrill Acts of 1862 and 1890. [Of note: Kansas State University in Manhattan was established in 1863 as the first land-grant university created under the Morrill Act of 1862.] The traditional location of nutrition departments in these institutions was based mainly on the link of food and nutrition to agriculture. Excellent basic training and research into essential nutrients is the hallmark of these institutions. However, most of the research conducted by nutrition scientists employed animal (and more recently, cellular) models. While these models are valuable tools for establishing proof-of-principle and for research training, it has been noted that they often fail as models for studying human disease. It is our contention that an academic medical center is the optimal location for the conduct of nutritional research directly involving humans.

Clinical nutrition research was generally conducted in medical school departments by physicians, who mentored their successors through fellowships within their discipline but did not have programs to produce the doctoral-training nutrition scientists who are most competitive for research funding at this time. Several well-known physician-scientists at the University of Kansas Medical Center (Cook, Lukert, Schloerb) are members of the American Society for Nutrition and study or have studied nutritional problems. They have advised the Department of Dietetics and Nutrition on this doctoral proposal and will continue to be advisors to our PhD Program.

In our region, Kansas, Colorado, Iowa, Missouri, and Oklahoma each have a doctoral program in nutrition and each is located in the State land grant university. Many traditional nutrition programs have changed their focus to food technology, which fits well with their agricultural

mission. There is a need for nutritional sciences training focused to clinical populations, however, most land grant universities are located away from major population centers and have limited clinical populations for nutritionists to conduct clinical research. Few have an associated medical school or the availability of academic physicians as collaborators. It is important to have these collaborations as the academic physician's own research and understanding of disease can inform their clinical research endeavors and enable them to develop a competitive disease or organ-based research program.

Department of Dietetics and Nutrition research is funded by the National Institutes of Health whereas that of the Department of Human Nutrition at Kansas State University is funded mainly by the US Department of Agriculture. The research funding between the two departments clearly delineates the differences in research focus. The University of Kansas Medical Center Department of Dietetics and Nutrition is positioned to train nutrition scientists capable of research directly related to human health and disease. The model for training Nutritional Scientists ideally trained for translational research in human nutrition or for working in government or industry to monitor this type of research has been very successful in several metropolitan areas that have academic medical centers; e.g., the University of Arkansas, University of Alabama Birmingham, and University of North Carolina.

Local and state need for doctoral-trained nutritionists. As noted above, there is an unmet need for doctoral-trained nutrition scientists to collaborate with physician and basic scientists at KUMC. Two faculty members with independent research programs are already heavily committed as research collaborators and mentors for other KUMC clinical and basic scientists. For physician scientists, collaboration with a nutrition scientist has the potential to enhance their clinical research programs by adding expertise in an area for which they typically do not receive formal training. For basic scientists, collaboration with a nutrition scientist has the potential to add a translational aspect to excellent basic work to the advantage of both disciplines.

The Kansas City Area Life Sciences Institute (KCALSI) has created a focus for research in the biological sciences with various stakeholders. For example, Kansas State' Olathe Innovation Campus, which will serve as a bridge between the Manhattan campus and industrial resources in the greater Kansas City, will be focused in the area of animal health and food safety. Doctoral-trained Nutritional Scientists from our program would have the skills required to contribute to work at this facility and many other regional and State endeavors.

To summarize, the current need for Doctoral-trained Nutritional Scientists falls short of the number being trained to replace the current workforce needs of academia, government and industry. Unlike KUMC Department of Dietetics and Nutrition, most academic nutrition departments are located in land grant institutions that have few resources or physician scientists for clinical nutrition training. In addition, individualized medicine is on the horizon and it will require more Doctoral-trained Nutritional Scientists with the training in the newer technologies available to all biological scientists.

4. Location and Comparative Advantages of the Program

As noted above, the Kansas City metropolitan area has nearly 2 million people for studies of nutrition in health and disease. The population is diverse and includes large numbers of both white and non-white persons. The metropolitan area is the home of two medical schools and one

osteopathic school, and a number of large hospitals, many of which have a history of inter-institutional collaboration. The location of Cerner Corporation in Kansas City, MO has meant that hospital administrations are proactive in their health care management. Research institutes such as Stowers' Institute for Medical Research and the Midwest Research Institute have encouraged clinical research and helped create a core group of scientists in the metropolitan area around the most common diseases/organ systems. The 10-year Life Sciences Strategy at KUMC is also encouraging the creation of a number of research focused centers at KUMC and joint centers with KU and UMKC. These centers encourage interdisciplinary research collaboration around disease and organ systems.

5. Characteristics of the Students

Pool from which students will be drawn. Students may enter the PhD program in Nutritional Sciences with a Master of Science degree or with a Bachelor of Science in Nutrition or another biological science. Outstanding students who complete the dietetic internship and a Master of Science degree in our existing program would be expected to contribute the majority of students to the doctoral program at least initially. Outstanding students with a Bachelor of Science in Nutrition or related biological sciences from a large regional and national pool may enter directly into the Doctoral program, but will be expected to take DN courses considered prerequisites for the advanced nutrition courses required for the PhD in Nutritional Sciences.

Since 1988, the department has conferred 167 MS degrees in Clinical Nutrition. A number of these students desired a doctoral degree in Nutrition. Nine moved to another university to obtain a doctoral degree in nutritional sciences. One student, now a member of our faculty (Dr. Jeannine Goetz), chose to obtain her PhD in Therapeutic Sciences at KUMC and her dissertation was related to nutritional science. A Doctoral program in Nutritional Sciences would provide an option for the current students of the MS Program in Clinical Nutrition to obtain a PhD at KUMC and for persons with a Bachelor of Science degree in nutrition or a related biological science to obtain a Doctoral degree in Nutritional Sciences.

Many of our MS students received their undergraduate degree in nutrition from schools with very strong undergraduate training in nutrition and related sciences. Exceptional students among these are motivated to seek a Doctoral degree in Nutritional Sciences. Initially, we would plan to recruit doctoral students from among our interested and most capable MS students. These students currently include both RDs and others entering with a BS or MS in another biological science.

Nationally, thousands of students graduate with a Bachelor of Science from Nutrition departments intending to enter a Master of Science or Doctoral degree program in Nutritional Sciences or another health-related field. The few Doctoral programs and the fact that even fewer programs permit them to do translational research are factors that limit entry of this pool of students into currently available Doctoral programs in Nutritional Sciences. We believe these conditions favor our ability to recruit the very best of this pool of students to our doctoral program even as the program becomes established. We currently have excellent recruiting relationships with a number of Midwest schools that contribute students to our Dietetic Internship and Master of Science program in Dietetics and Nutrition. To summarize, our program will offer the opportunity to obtain research experience in nutrition related to disease and organ systems for the most motivated and advanced Bachelor of Science students of nutrition and dietetics in the State of Kansas, the

region and the nation by permitting them to enter the Doctoral program directly after receiving their Bachelor of Science degree.

Specific procedures and criteria for admission into this program. Admission to the PhD program in Nutritional Sciences is recommended by the Admissions Committee of the Department of Dietetics and Nutrition with the concurrence of the faculty and approved by the KUMC Office of Graduate Studies. Qualified students are admitted without regard to race, color, national or ethnic origin, gender, age or disability.

Application for admission to the PhD program is made through the Department of Dietetics and Nutrition. The following materials are required for admission:

1. Completed graduate application form
2. One official transcript from each academic institution attended. Degree awarding university transcripts must indicate bachelors or masters degree conferred.
3. Three (3) letters of recommendation from advisors, faculty or supervisors
4. Official Graduate Record Examination (GRE) scores sent directly to KUMC (Institution code: 6895 and Department Code: 0214).
5. Official TOEFL exam scores for international applicants sent directly to KUMC. (Institution code: 6875) Minimum English proficiency requirements are set by the KUMC Office of Graduate Studies and are posted online at http://www.kumc.edu/international/esl_req.html.

Application materials should be submitted directly to: Department of Dietetics and Nutrition, MS 4013; University of Kansas Medical Center,; 3901 Rainbow Blvd., Kansas City, KS 66160, Attn: PhD Admissions.

Minimum GPA requirements: To pursue the PhD program, the applicant must meet the general KU requirements for admission as a graduate student. The minimum GPA requirements for admission to the PhD program are:

1. An undergraduate cumulative GPA of 3.0 or better is required for regular admission status. An applicant may be admitted under probationary status when his or her undergraduate cumulative GPA is at least 2.75 but does not meet the minimum required 3.0 for regular admission. Applicants having with previous graduate coursework must have a cumulative graduate GPA of 3.0 or better for admission.
2. Evidence of successful completion (equivalent grade of B or higher) of undergraduate coursework in nutrition, biochemistry, genetics, or other biological science.

Within the guidelines established by the Graduate Studies, no credit is actually transferred toward the doctorate, however, relevant prior graduate work will be taken into consideration in setting up individual programs of study leading to the PhD.

Specific opportunities for student interaction. In addition to the usual possibilities to become involved with other students at KUMC through committees and social activities, students will have many opportunities to interact with other doctoral students in the program. They will take classes with those entering the Doctoral program in their year of matriculation and will take seminar with all PhD students in the program. They will be involved with other Doctoral and Master of Science students in Nutritional Sciences and affiliated programs involved in their area of research.

Curriculum of the Proposed Program

1. Academic Objectives of the Proposed Program

The objective of the PhD program in Nutritional Sciences program will be to produce persons recognizable as nutritionists to all in the discipline and thus be prepared for one of the roles served by nutritionists with doctoral training in academia, government and industry. Course work, seminars, teaching and collaborative research experiences are designed with this purpose in mind. The common knowledge base required for recognition as a Nutritional Scientist will be achieved through core coursework required of all students who complete the PhD. The range of skills will include a) the ability to conduct advanced research related to some aspect of nutrition obtained through the process of conducting research for the dissertation, b) interaction with a biostatistician in the analysis of research, c) the ability to compete for extramural funding through expertise in a given research area and skills in grant writing sharpened by reading the literature, courses designed to develop skills in grant writing and seminars; and d) sophisticated communication and interpersonal skills perfected through writing, speaking and working as a member of a research team.

Persons obtaining the Doctoral degree in Nutritional Sciences from the Department of Dietetics and Nutrition at KUMC would be competitive for independent and collaborative research in nutrition related to disease or organ systems because of the existing clinical research programs of our faculty, the availability of various clinical populations at KUMC and the ability to focus their research and career goals to a particular disease of organ system while obtaining the Doctoral degree.

Accordingly, students in Nutritional Sciences at the University of Kansas Medical Center will a) receive advanced coursework in the Nutritional Sciences and the basic knowledge in biological sciences and technical skills to conduct research in the nutritional sciences that contributes to our understanding of the role of nutrition in human health or advanced clinical practice; b) hone written and verbal skills in communication required to work and collaborate with colleagues in other health-related discipline, teach, obtain support for research or other efforts, and to share or synthesize new information from nutrition research; c) integrate science-based theories with human health to provide leadership in the health care systems and in the development of health care policy; d) be prepared to synthesize, interpret, and apply knowledge to promote and sustain evidence-based advanced clinical practice (for the PhD, RD); e) be capable of applying research utilization skills in various health care delivery systems (for the PhD, RD); and f) demonstrate professional and ethical values as expected for persons undertaking a career that involves research or its application to humans.

2. Course Work Required

The course work required would depend upon whether the student was entering with a Bachelor's degree or a Master of Science degree as well as on the area of study of these degrees. For students entering with a Bachelor's degree, the Doctoral program in Nutritional Sciences would typically require 60 semester hours of graduate course work (700 level and 800-level courses) beyond the Bachelor of Science degree or 30 hours beyond the Master of Science degree.

Students entering after successful completion of our Master of Science program in Nutrition

would typically enroll for an additional 30 semester hours of study. Prior coursework and the student's research interests will be considered in designing the course of study. Students will earn a Ph.D. in Nutritional Sciences.

Beyond the Master of Science degree, core courses in Macronutrients, Micronutrients and Integrated Metabolism (7 credits), Biostatistics (3), Grant Writing (3), and the IGPBS module on the Molecular and Physiological Basis for Disease (3) will be required. Students will be required to meet the FLORS requirement for KU's Graduate Studies. The FLORS requirement must be met before the student can take the qualifying exam. Dissertation research will typically be 9 or 10 credit hours but only the final semester graded in accordance with institutional policy. Elective course work in nutrition and other disciplines to support the chosen research direction in nutritional sciences will provide the remaining semester credit hours. Elective course work will vary based upon the interest and research and career goals of the student.

All graduates will be expected to demonstrate core values of ethics and respect for other persons; and will be mentored to develop the technical, communication and interpersonal skills required to develop an independent research program, to collaborate with other scientists and to teach. These concepts will be emphasized formally during coursework and research mentoring and informally by example of the faculty. The curriculum outline for the Doctoral Degree in Nutritional Sciences and sample tracks are in **Appendix I**. Dietetics and Nutrition course descriptions, including new courses that would be developed are listed in **Appendix II**.

3. Internships and Practica

Students in the program will be required to teach at least one one-semester course in nutrition for our Master of Science students or to undergraduates (through our affiliation with UMKC or KU). They will not have to develop the course. Those with the RD, will have already completed the dietetic internship or equivalent.

Program Faculty

1. Quality of Faculty

The Department of Dietetics and Nutrition currently has 7 PhD-prepared faculty who will serve as academic and research advisors to doctoral students in the program (the requirement for staffing is 5 PhDs within three years after inception of a doctoral program). Thus no new faculty will be required to offer a PhD in Nutritional Sciences. Significant research support is required to guarantee financial support to doctoral degree candidates so that we may retain our best students and compete nationally with other programs for their best doctoral students. Currently, two faculty members have strong extramural funding (Sullivan, Carlson) to support doctoral students. Three junior faculty members (Leidy, Garimella, Goetz) have already submitted or are preparing to submit NIH grants (Leidy has just received BIRWCH support allowing her 75% time for research) and their areas of research endeavor fit with the 10-Year Life Science Strategy at KUMC. It is expected that they will soon have support as the program grows. We expect these junior faculty members to obtain funding; however, we are not relying totally on them as other graduate faculty in the School of Medicine already collaborate with our Department and would be a source of funding for research.

The extramural research funding in the Department of Dietetics and Nutrition increased dramatically beginning with yearly direct costs of zero in 1999 rising progressively between 2000 and 2007 to over \$1.3 million. Direct costs in 2008 are \$1.2 million. Each of the three NIH-funded faculty members in our department (Carlson, Sullivan, Smith) have clinical research programs that relate to the 10-Year Life Sciences Strategy at KUMC. Extramural research support is an indication of quality and evidence that the proposed program will be of high quality and appropriate to the institution's mission, role and aspirations.

Our Department of Dietetics and Nutrition has an additional advantage in that it is located within an academic medical center, which offers potential for research opportunities and funding for our students by funded clinical investigators who study nutrition-related problems within diseases and organ systems. Many faculty members in clinical departments do not have access to graduate students who can help advance their research. As the program develops, the Department of Dietetics and Nutrition can seek additional funding for doctoral work through training grants in areas of strength (obesity, maternal and infant development, child nutrition) and by partnering with industry. Department faculty affiliations with a number of Centers at KUMC are another potential area of support for doctoral students as many already have training grants that students could compete to receive. A brief description of each faculty member of the Department of Dietetics and Nutrition follows with full curriculum vitae found in **Appendix V (separate file attachment)**.

a. Core Faculty Members

Debra K. Sullivan, PhD, RD, LD has been a member of the faculty of the Department of Dietetics and Nutrition since 1997. She was promoted to Associate Professor in 2003 and since 2005 has been the Chair of the Department. She is also an Adjunct Assistant Professor in the Department of Health, Sport and Exercise Sciences at KU and a Nutrition Consultant to the KU Weight Management Program in Lawrence, KS and in the Kansas City Metropolitan area. Dr. Sullivan has had consistent extramural support for her research since shortly after joining the Department of Dietetics and Nutrition. She is currently the PI on a National Institutes of Health (HL) study to evaluate "Dairy Foods and Blood Pressure in Multi-Ethnic Children" (RO1 HL080967-01A2 1/1/07-12/31/09). She is also a co-investigator on 9 additional funded R01 or R21 grants and a mentor on K12 and K23 grants held by faculty in the School of Medicine. Her research interests include child health and obesity. She has directed Master of Science theses of 15 students in the Department and supervised another 33 non-thesis projects. Dr. Sullivan currently teaches our Master of Science students in DN 885 (Biochemistry, Physiology and Genetics of Nutrition). She has also developed DN 810 (Nutritional Assessment), DN 876 (Interventions to Prevention and Treatment of Obesity) and DN 865 (Nutrition in Sports and Exercise), which are taught on a periodic basis as electives.

Susan E. Carlson, PhD has been a Professor in the Department of Dietetics and Nutrition since November 1999. Until Spring 2008, she held an Endowed Professorship to teach nutrition to medical students. She was named the AJ Rice Professor of Nutrition and while she will continue to teach medical students, her primary teaching role moves to the Department of Dietetics and Nutrition. She currently holds appointments in the SON and in the Department of Pediatrics in the SOM at KUMC and is appointed Professor of Obstetrics and Gynecology at the University of Missouri- Kansas City in Kansas City, MO. She has had consistent extramural funding for her research since 1975 from both the National Institutes of Health (NIHLB, NEI,

and NICHD) and from the infant formula industry. Her research focus is on the role of early nutrition in infant/child development and she has done clinical trials with docosahexaenoic acid (DHA) supplementation in preterm and term born infants. Since 1998, she has been interested in the role that maternal DHA status plays in infant and child development and is currently the PI on an NICHD Phase III clinical trial to evaluate the effect of DHA supplementation during pregnancy on infant/toddler development. Children aging out of that study at 18 months will be followed until 6 years of age to evaluate the effects of early DHA exposure on cognitive function in preschool and school-age children. She will collaborate on two R21 proposals designed to evaluate the effects of maternal DHA supplementation on fetal heart rate (PI Kathleen Gustafson at KUMC, 0.4%ile, October 2008) and maternal mood (PI Dr. Kathryn Keenan in the Univ. of Illinois, Dept. of Psychiatry, 0.7%ile, October 2008). In 2007, she was one of 22 KUMC researchers with direct extramural funding exceeding \$1 million. Dr. Carlson will develop the Macronutrient and Micronutrient courses that will be required core courses for the Doctoral degree in Nutritional Sciences. She will also develop an elective course in Nutrigenomics (DN 902). Dr. Carlson has been a member of a Pediatrics faculty since 1979 and of an Obstetrics and Gynecology faculty since 1986. She has directed numerous Master of Science students in nutrition at the University of Memphis and at the University of Kansas Medical Center. Her research has been clinical and interdisciplinary. With Dr. Sullivan, she will encourage and support doctoral research in nutrition in collaboration with faculty in the various disease and organ-focused institutes at KUMC.

Linda D. Griffith, PhD, RD, CNSD is a Clinical Assistant Professor and Director of the Graduate Program for Dietetics & Nutrition, joined the faculty in the Department in fall 2005. Her job responsibilities include graduate program administration and the academic advisement of the Dietetics and Nutrition graduate students. She developed and teaches online courses in dietetics and nutrition (DN 862: Maternal and Child Nutrition and DN 875: Pediatric Clinical Nutrition). Her online nutrition courses will be particularly useful for students prior to and after entering our doctoral program without a degree in nutrition. She has developed a course on Micronutrients (DN 835) to be offered on-line Spring 2010 for a Master of Science degree in nutrition as part of the consortium of universities participating in the Great Plains Ideal. The course will be the basis for a course in Micronutrients required of PhD students. She mentors students and serves on student graduate research committees for their thesis and non-thesis projects. Dr. Griffith was awarded a BS in Food Technology (1972) and a MS in Foods & Nutrition (1978) from Texas Tech University. She completed a dietetic internship at University Hospital in Jacksonville, FL and qualified for the credentials of Registered Dietitian (1976). She practiced for numerous years in the field of clinical dietetics as a nutrition support specialist prior to completing her PhD in Food Science at Alabama A&M University. She continues to maintain credentials as Certified Nutrition Support Dietitian. Dr. Griffith's research interests focus on the use of current computer technology to improve dietary recall and motivate dietary change. She also conducted research as a participant of the USAID grant "Development of Appropriate Technology for New & Improved Weaning Foods & Detoxification of Peanuts" prior to joining the faculty at KUMC. She has published peer-reviewed papers from her work in nutrition and cereal chemistry.

Heather Leidy, PhD joined the faculty in the Department of Dietetics and Nutrition in Fall 2007. She is an Assistant Professor in the Department of Dietetics and Nutrition, is responsible for teaching the Dietetics and Nutrition Seminar course, co-teaching the Nutrition for Sports and Exercise course, and developing the future integrative obesity course. Dr. Leidy received her

BS in Biology (with Teaching Certification in Biology & General Science) from Shippensburg University (1996) and taught junior-high biology in the PA public school system for several years. Dr. Leidy then went on to complete her MS (2000) and PhD (2004) work in the Inter-departmental Physiology Program at Penn State University. During her time at Penn State, Dr. Leidy taught several physiology courses, receiving the Pennsylvania State University Graduate Assistant Outstanding Teaching Award. Dr. Leidy went on to complete a Post-doctoral Fellowship (2007) in the Ingestive Behavior Research Center within the Department of Foods and Nutrition at Purdue University. Dr. Leidy's research focuses on the metabolic, hormonal, and neural regulation of appetite, food intake, and body weight in overweight and obese men and women across the lifespan. She has over 10 peer-reviewed, original research publications in obesity-focused research, has given over 20 presentations at various scientific conferences including Endocrinology, Experimental Biology, The Obesity Society, and American College of Sports Medicine, and has received/been involved with 9 internal and external (NIH and industry) grants. Dr. Leidy has also mentored and directed the research projects of over 10 undergraduate honors' and medical students, kinesiology interns, and MS and PhD graduate students.

Rama Garimella, MSc, MSc, PhD is a Research Assistant Professor in the Department of Dietetics and Nutrition (D&N). She is responsible for building a strong basic science research program and mentoring graduate student research towards the MS or PhD degree in the Department of D&N. She will be teaching Nutritional Biochemistry to our entry-level graduate students. She received her B.Sc. (Honors) in Botany from the University of Delhi, Delhi, India and M.Sc. in Plant Nematology from the Indian Agricultural Research Institute, New Delhi, India. She received her MS in Biochemistry from the University of Nebraska-Lincoln, Lincoln, Nebraska and PhD in Pathology and Laboratory Medicine from the University of Kansas Medical Center, Kansas City, Kansas. She completed her post-doctoral research training in the Departments of Orthopedic Surgery and Pathology before joining as a faculty in the Department of Dietetics and Nutrition. She is also an Adjunct Research Assistant Professor in the Department of Orthopedic Surgery. Dr. Garimella's research focuses on bone and cartilage biology, mineralization and skeletal repair. In addition, she is also interested in investigating the role of bioactive dietary factors and vitamins (vitamin D and C) in modulating osteosarcoma. Dr. Garimella is the author of twelve peer reviewed research papers. She also has over ten published abstracts and has presented her research at national and international scientific meetings. Dr. Garimella will be responsible for teaching DN 885 (Nutritional Biochemistry). She will also develop with Dr. Leidy a new course on Laboratory Techniques in Nutrition Research (DN 912), which will be taught by Dietetics and Nutrition faculty.

Jeannine Goetz, PhD, RD, LD is a Research Assistant Professor in the Dietetics and Nutrition Department and the Bionutrition Manager for the General Clinical Research Center at KUMC. She received her BS and MS in Dietetics from the University of Central Missouri and the University of Kansas Medical Center, respectively. In 2008, she received her PhD in Therapeutic Science from the University of Kansas Medical Center. Before receiving her PhD, Dr. Goetz developed a strong research background serving as project or nutrition coordinator for 10 research grants and providing nutrient analysis for numerous others. Her primary research interests lie in weight management and food security, in particular within the serious mental illness population. She has two peer reviewed research publications and 23 published abstracts. Dr. Goetz has extensive background with conducting advanced dietary analyses and is certified in using Nutrition Data Systems for Research (NDSR). She has trained and

mentored M.S. degree students in standardized interviewing methodology and data entry procedures. Dr. Goetz will be responsible for teaching DN 810 (Nutritional Assessment) and DN 876 (Intervention for the Prevention and Management of Obesity).

Bryan Smith, PhD received Bachelor of Science degree in exercise science, a Master of Science degree in biomechanics, and a PhD in exercise physiology from the University of Missouri-Columbia. He completed a post-doctoral fellowship at the Energy Balance Lab at the University of Kansas. He was promoted to Assistant Research Professor in 2004 and became the Assistant Director of the Energy Balance Lab in 2007. Dr. Smith's dissertation work involved the role of exercise in lipid metabolism, specifically the role of omega-3 fatty acids and exercise in the reduction of postprandial lipidemia. His current research interests include the mechanisms of weight change in women receiving chemotherapy for breast cancer and alternative delivery methods of weight management programs for individuals in high risk populations (i.e. pre-diabetics living in rural areas). In addition, Dr. Smith is responsible for the operation of the Energy Balance Lab's whole room in-direct calorimeter which is used to measure 24hr energy expenditure and substrate oxidation.

b. Further Development of the Core Faculty

The Department of Dietetics and Nutrition Core faculty includes three junior faculty members hired since 2007. Junior members of the research faculty are mentored by senior faculty both formally (regular monthly meetings) and through observation of their performance in trial processes such as directing research of Master of Science students. Although it will not be required, it is an expectation that an extramurally funded research program will be in place before any Core faculty member will be the primary mentor for a doctoral student. Our three junior faculty members have submitted one or more proposals each for extramural funding; and we expect them to obtain extramural funding. In the meantime, other core members of the doctoral faculty have funding to support the doctoral students expected to enter the program in Fall 2009.

c. Instructional Faculty from the Department

Five other faculty members in the Department of Dietetics and Nutrition will be involved in the PhD program. All have research experience and possess advanced clinical skills, and several have extensive teaching experience. Ms. Barkely, Ms. Baxter and Mr. Beyer are all strongly involved in the didactic missions of the Department of Dietetics and Nutrition would teach students entering the Doctoral program with a Bachelor of Science degree in one of the biological sciences. They may also serve on doctoral committees, but will not provide research mentoring for the PhD students. Ms. Rachel Barkley is expected to transition to Core Faculty role after she completes her PhD in Therapeutic Science in 2010.

Rachel Barkley, MS, RD, LD (will transition to Core Faculty when she completes her PhD in 2010) received a Bachelor of Science degree in Medical Dietetics, Coordinated Program, from the College of Home Economics at the University of Missouri, Columbia, and certification as a Registered Dietitian in 1976. She continued graduate studies in Human Nutrition at the University of Missouri, Columbia, and her thesis was "Diet, Diuretics, Hypertension and Serum Lipids in Male Humans". The Master of Science degree was awarded in 1979. Currently Mrs. Barkley is pursuing a doctorate degree in Therapeutic Sciences at the Kansas University

Medical Center, Department of Occupational Therapy Education. She is conducting a qualitative study of children's perception of dairy foods and is a member of the research team for the KIDS study, a controlled randomized study of elementary school age children investigating the effects of dairy snacks on blood pressure and other outcomes such as body mass index and blood lipids. Mrs. Barkley has worked with dietetics and nutrition students for more than 20 years in the role of program director for a Coordinated Program in Dietetics, a Didactic Program in Dietetics, and as a Dietetic Internship Program Director at the University of Oklahoma Health Sciences Center, Oklahoma City, OK, and the University of Kansas Medical Center, Kansas City, KS. She has taught the following courses at these two universities: Public Health Nutrition (US and World, web-based), Seminar (web-based), Practicum, Nutrition during the Life Cycle, Community Nutrition, Nutrition Counseling, Introductory Nutrition, and others. At the 2000 Summit on Best Practices in Dietetics Education, an international nutrition experience that she planned and coordinated was selected as one of three presentations for the 2000 Summit that was held at the American Dietetic Association Annual Conference. In May 2008, Mrs. Barkley was honored by the KU School of Allied Health with the Stata Norton Distinguished Teaching Award. In addition to working in higher education, Mrs. Barkley has had professional positions working as a Public Health Nutritionist for the Missouri Division of Health with the Special Supplemental Feeding Program for Women, Infants and Children (WIC) throughout the state of Missouri (covered 77 counties) and as a Clinical Dietitian and Chief Clinical Dietitian at Cox Medical Center in Springfield, MO. Mrs. Barkley was recognized as Outstanding Dietetics Educator (Oklahoma, 1995), Outstanding Dietitian of the Year (Oklahoma, 1991) and Recognized Young Dietitian of the Year (Missouri, 1982) by the American Dietetic Association.

Pete Beyer, MS, RD, LD is an Associate Professor, Dietetics and Nutrition, University of Kansas Medical Center, Kansas City, Kansas, Master of Science, Nutrition and Dietetics, University of Missouri 1974. Dietetic internship, VA Center West Los Angeles, Calif 1968. 40 years experience in clinical dietetics, 25 years as clinical nutrition manager, 35 years experience in education and research. Mr. Beyer's primary research interests include the role of diet and nutrition in gastrointestinal disorders and applied clinical nutrition in general. He has published ~35 refereed manuscripts, and 18 chapters in 7 different nutrition textbooks. He has also been invited to make over 200 presentations at national and regional nutrition and medical conferences and presented approximately 50 abstracts and posters at national meetings. Mr. Beyer has received numerous awards from national and regional professional associations and universities including: 1972 American Dietetic Association, Recognized Young Dietitian of the Year; 1986 Distinguished Teaching Award, SAH, University of Kansas Medical Center; 1988 Excellence in the Practice of Clinical Nutrition, American Dietetic Association; 1990 Outstanding dietitian of the year Kansas City Dietetic Association; 1996 American Dietetic Association Outstanding Dietetics Educator Award; 1998; Alumni of the Year award, Central Missouri State University; 2001 Medallion Award, American Dietetic Association; 2003 Honorary Alumnus Award School of Allied Health, University of Kansas Medical Center; 2005 University of Kansas, "Graduate Teaching Award", Center for Teaching Excellence. Throughout his career he has been involved in many professional committees at the national, regional and local level including former Chair of Quality Assurance committee, American Dietetic Association, Chair, Commission on Dietetic Registration, State Delegate to the American Dietetic Association --2, 3-year terms, Research delegate ADA 1 term. Standards of Professional Practice Task force, ADA Ethics Committee, ADA Specialization committee, ADA Ethics committee, Editorial board, American Dietetic Association, Editorial board, Nutrition in Clinical Practice, ADA Fellow

assessment committee, Chair, ADA Nomination Committee, Original member Nutrition Care Process Committee, ADA. Mr. Beyer teaches DN 838 and DN 839 (Advanced Clinical Dietetics and Clinical Aspects of Nutritional Support).

Adrienne Baxter, MS, RD, LD earned a B.S. in Dietetics and Institutional Management from Kansas State University in 1974. She completed the Indiana University Medical Center dietetics internship with Indiana University Purdue University at Indianapolis in 1975. Her M.S in Education was granted by Kansas State University in 1995. She is a Clinical Instructor in the Department of Dietetics and Nutrition who coaches dietetic interns through the food service and management section of the registration examination for dietitians. Ms. Baxter has 33 years experience in clinical dietetics, health care administration and community practice. Her work history includes certification as a diabetes educator, funding and staffing KU Medical Center's Nutrition Information Service for over a decade and employment as a hospital food service assistant director. She leads an interdisciplinary group of students studying dietary and herbal supplements in professional practice during summer semesters. Ms. Baxter is a KU Health Partners, Inc. allied health specialist with Medicare and other insurance provider numbers. Under her direction, graduate nutrition students recruit clients who receive medical nutrition therapy through services like the TeleHealth Nutrition Clinic as part of their outcomes based study population. Ms. Baxter participates in the American Dietetic Association Dietetics Practice Based Research Network with nutrition quality of life studies. She has a contract with Kansas University GI Motility Clinic facilitating weight loss support for study participants with gastric pacemaker devices. Ms. Baxter currently mentors a graduate nutrition student measuring cognitive restraint, emotional and uncontrolled eating in obese patients during nerve stimulation for weight reduction. Teacher Baxter chairs the Healthy Lifestyles Team for De LaSalle Education Center, Kansas City, MO. Through a contractual agreement, KU dietetics interns and the instructor teach culinary, health, fitness and nutrition curriculum for high school students and monitor impact on parameters of student wellness. She also teaches DN 822 (Nutritional Care management) and 851 (Administration of Nutrition Care Delivery Systems and Practicum) and DN 880 (Dietary and Herbal Supplements). She was recognized for outstanding achievement as a dietetics educator by the American Dietetic Association in 2004.

Catherine Mangiaracina, MS, RD, LD received her Bachelor of Science in Clinical and Community Dietetics at the University of Florida in Gainesville in 1977. During her first years of employment, she was employed by a consulting company in long term care facilities. One of her facilities was designated an ICFMR facility. This facility took care of the state's most disabled citizens on one side of the facility, and a geriatric facility on the other. After consulting for several years, Ms. Mangiaracina decided to work full time at the ICFMR facility. This was her first exposure to person's with physical and intellectual disabilities. This position then led her to Nemour's Children's Hospital in Jacksonville, Florida. Ms. Mangiaracina moved to Kansas and began working in WIC Program and was responsible for six counties. A grant was awarded to the Center for Child Health and Development at the University of Kansas Medical Center to work with clients to increase breastfeeding in the WIC population. Ms. Mangiaracina was very interested in breastfeeding and became one of the Breastfeeding Coordinators with the WIC program through this grant. Shortly thereafter in February 1992, she began to work at the Center for Child Health and Development and was coordinator of the grant at the University level. After arriving at KU, Ms. Mangiaracina decided to get her Master's degree and graduated in 1999. She was awarded the Ruth Gordon award for excellence in dietetics. Since, she has been on staff at the Center for Child Health and Development. Over the years, Ms.

Mangiaracina has worked with children with developmental disabilities' and chronic illness. She began working with children with Cystic Fibrosis and is very involved in the care of not only children, but is now working with the Adult Cystic Fibrosis Program at the University Medical Center. In addition to her interests in Cystic Fibrosis, she has taken care of metabolic patients, specifically PKU. Over the years, she has seen many females with PKU become adults and have infants of their own. Since being at the center, Ms. Mangiaracina has served in a clinical capacity, but is very interested in research and hopes to pursue those interests over the next several years. She is adjunct professor with the Department of Dietetics and Nutrition and is currently a professor at UMKC and is teaching nutrition to dental hygienist students. She has been a member of the American Dietetic Association and the Pediatric Nutrition Group for over thirty years, and the Kansas City Dietetic Association for the last 17 years.

Lisa Markley, MS, RD, LD received a Bachelor of Science in Health Education from Northern Arizona University in Flagstaff, Arizona in 2001. She went on to obtain a Master of Science in Nutrition from Bastyr University in Kenmore, Washington in 2004. Subsequently, she completed the Dietetic Internship Program at the University of Kansas Medical Center and became a Registered Dietitian in 2005. In May 2005, she was honored by the Department of Dietetics with the Ruth Gordon Award. Mrs. Markley formerly worked as a Research Associate with Dietetics and Nutrition in Dr. Susan Carlson's Maternal and Child Nutrition and Development Laboratory. She provided coordination and management of an NIH funded Phase III Clinical Trial assessing effects of prenatal intake of docosahexaenoic acid (DHA) on infant vision and cognitive development. Mrs. Markley is currently the Nutrition Educator and Outpatient Dietitian for the Program in Integrative Medicine at the University of Kansas Medical Center. She combines her knowledge of nutrition and health with her passion for food and cooking to provide personalized outpatient counseling that incorporates a whole foods philosophy. She also manages all aspects of the clinic's unique teaching kitchen where interactive cooking demonstrations are taught to patients, students, and employees of KU Medical Center.

d. Program Faculty Cross-Appointed in Other Departments

In addition to the primary faculty members listed above, the following cross-appointed faculty members of other departments will be involved in teaching and mentoring students in the proposed program.

Joseph Donnelly, EdD, Professor, School of Education, Director of the Center for Physical Activity and Weight Management, KU-Lawrence and Director of the Center for Physical Activity, Nutrition and Weight Management, KU-Children's Mercy Hospital Schiefelbusch Institute for Life Span Studies, Kansas City, MO

Jeanne Drisko, MD, Riordan Endowed Professor of Orthomolecular Medicine, Department of Obstetrics and Gynecology and Director of the Program in Integrative Medicine

Cheryl Gibson, PhD, Associate Professor, Department of Internal Medicine
Ann Davis, PhD, Associate Professor, Department of Pediatrics

e. Physician Members of the American Society for Nutrition Advising the Program

Senior faculty from medical departments who are members of the American Society of Nutrition and have distinguished scientific careers in nutritional sciences related to some aspect of human health or disease serve as advisor to the program. All are still active at the University of Kansas Medical Center. They will also serve in a special advisory role to the PhD program.

James Cook, MD, Professor Emeritus, Department of Medicine - Hematology

Barbara Lukert, MD, Professor, Department of Medicine – Metabolism, Endocrinology and Genetics

Paul Schloerb, MD, Professor, Department of Surgery

f. Need for Additional Faculty

No new faculty are needed as we have recently hired 3 new PhD-trained faculty (Leidy, Garimella, Goetz) and one member of the faculty holding an endowed professorship has been made available to take on additional responsibilities teaching in Departmental programs (Carlson). Our current faculty size, which consists of 7.4 FTE full-time and part-time faculty positions is more than sufficient for starting and maintain the doctoral degree in Nutritional Sciences.

Ms. Rachel Barkley will transition to Core Faculty when she completes her PhD in 2010, which would bring our number of doctoral-trained Core Faculty to 8. We expect the number in the doctoral program to grow from an initial number of 2 - 3 students during the 2009/2010 academic year to as many as 8 – 12 students during the 2012/2013 academic year. The time required to complete the degree should be 4 years, however, students who have already completed a Master of Science degree might be able to complete the program in 3 years with proper timing of advanced nutrition courses. We anticipate that the first PhD students enrolled will do their dissertation research in areas of expertise currently funded in the Department (maternal and child nutrition and child obesity). However, the Department of Dietetics and Nutrition faculty have the expertise to mentor students in nutrition research related to various diseases and organ systems as additional funding becomes available within and outside the Department of Dietetics and Nutrition at the University of Kansas Medical Center. Doctoral trained Dietetics and Nutrition faculty will be the required primary mentors for doctoral students in Nutritional Sciences, however, faculty members cross-appointed from other departments may also serve as research mentors.

2. Graduate Assistants

We anticipate that all doctoral students will require a Graduate Assistantship in order to matriculate in the doctoral program in Nutritional Sciences. Initially, we expect to achieve this support on research grants awarded to faculty members in the Department. As the number of doctoral candidates in the program increases, we will meet the continued need through applications for predoctoral research funds (available to doctoral programs) and through collaborative arrangements with KUMC scientists funded to work on nutrition-related projects. Most doctoral programs in Nutritional Sciences (like that at Kansas State University) have

access to federal funding for doctoral training of students. *KUMC is not a land grant institution so these funds are not available to our program, however, opportunities for extramural funding of nutrition research are enhanced at an academic medical center.* We have an excellent track record of R01 funding of core faculty (which is expected to grow as three new core faculty members become established) and a number of faculty members at KUMC in the SOM and SON are engaged in research that is related to nutrition, another potential pool for funding doctoral research.

Doctoral degree students will be required to teach one undergraduate level course in one of our affiliated programs or a graduate level course for Master of Sciences students in the Dietetics and Nutrition Department while in the doctoral program, most likely during their 3rd or 4th year in the program. In the semester they teach, they will require salary support and we have requested funding for 2 or 3 semesters per year for teaching assistantships beginning in year 3 of the Doctoral program.

Academic Support Services

1. Academic Support Services for This Program

Archie Dykes Library of Health Sciences, located on the University of Kansas Medical Center campus in Kansas City, Kansas, is one of the most advanced medical libraries in the Midwest. The Dykes Library at KUMC contains a comprehensive information resource base of approximately 62,000 book titles and a subscription to Access Medicine and the Springer e-Book Collection which is an online scientific book collection of over 25,000 eBooks and more than 3,500 new eBooks and eReference works provided each year.

The library holdings also include 578 active print journal subscriptions, approximately 13,000 online journals, and 72 reference databases. Dykes library maintains cooperative arrangements for interlibrary loan and for cooperative purchasing of some of the packaged or grouped resources with the remaining Kansas regent schools. Within the specific areas of dietetics and nutrition, Dykes library hold 767 texts with varied publication dates, 114 online journals and 51 print journals.

KUMC is a recognized leader in using technology to enrich and transform the teaching and learning experience. Students have access to a large variety of scientific software ranging from clinical simulations, interactive anatomy, statistical analysis, and a range of multimedia and office products. Teaching and Learning Technology works provide the technical and pedagogical support to explore, evaluate and integrate new educational tools resulting in the most advanced teaching and learning methods.

Dykes Library is staffed by professional reference personnel. The library also offers tutorial and training courses on literature search, Internet reference, basic software applications, and HTML publishing in addition to providing services such as photocopying, reference orientation, and inter-library loan.

Students also have access to the Instructional Technology Center where over 120 networked computers are housed and supported by a technical team. Twenty-six of these computers are accessible 24 hours a day. Modern equipment is available for printing, scanning, CD

production and PDA networking. This facility permits access to web-based courses thru Angel Learning course management system, video or TV viewing, slide viewing, educational modeling, and other audiovisual activities.

2. Interdisciplinary Courses

The doctoral program in nutritional sciences will require interdisciplinary coursework, particularly in biological sciences, biostatistics, and grant writing. The core interdisciplinary coursework supporting training in the nutritional sciences is available at the University of Kansas Medical Center. We currently utilize courses offered by other departments at KUMC for our Master of Science students. The IGPBS modules on metabolism, molecular biology and genetics or equivalent will be required for all students in the doctoral program and available to our students (see Werle letter in Appendix V). In the event that reorganization of the IGPBS modules spreads the required material greatly, we have confirmation that it can be offered as a single 3-credit course on the KU Edwards campus (see Pendergrass letter in Appendix V).

Special Seminars, Conferences and Colloquia

3. Special Seminars and Colloquia

KU clinical nutrition seminar themes and conference sponsorships. This seminar is held yearly to a) connect with researchers in the Kansas City Research Corridor and across the United States who are interested in foods, nutrition, health, genomics, and obesity; b) develop strategic partnerships interested in seminar sponsorship or other mutually beneficial relationships, c) enhance visibility of the KU Department of Dietetics and Nutrition among Schools of Allied Health and Land Grant Institutions of Higher Learning; d) recruit new students to the Department of Dietetics and Nutrition in the School of Allied Health by attracting student attendance at seminar open house activities. Dietetics and nutrition students from a nine state mid-central region of the United States are invited and attendance is typically 120-200 persons.

Past topics and sponsors include: 2008 Nutritional Genomics: Working Molecular Biology Research into Your Practice – Kansas Dietetic Association Foundation and Genova Diagnostics, Inc.; 2007 Evidence Based Diabetes Care: Avoiding Pitfalls for the Patient and the Health Care Team – Blue Cross and Blue Shield of Kansas City and the Kansas City Wellness Network; 2006 Cardiovascular Dietary Guidance: An Interactive Half-Day Packed with the Latest Nutritional Strategies – Enova oil, Good Natured Family Farms, Hen House Markets, Missouri Pecan Growers, Wild Oats Natural Marketplace; 2005 Docosahexaenoic Acid: A Nutrient for Optimal Development of Retina and Brain – Mead Johnson Nutritionals and Ther-Rx Corporation; 2004 Optimal Nutrition for Breast Cancer Survival – Kansas Masonic Cancer Research Institute & Wyeth Pharmaceuticals, Inc.; 2003 Calcium and Vitamin D Beyond Bones: Roles in Blood Pressure, Cancer, Weight Management – Mid West Dairy Association; 2002 The Challenge of Nutrition's 2nd Century: Long Latency Period Deficiency Disorders – Lt. Elizabeth S. Carloss Nutrition Education Fund; 2001 Dietary Supplements & Evidence Based Nutrition Practice – Kansas University Medical Center Damon Perry Lecture Fund & John W. & Effie E. Speas Memorial Trust.

Univ. of Kansas annual conference on the prevention and treatment of overweight and obese individuals. The obesity conference is designed for all health care professionals and agencies that have contact with and influence on at-risk populations, including physicians,

physician assistants, public health professionals, nurses, nurse practitioners, community health specialists, dietitians, nutritionists, health educators, exercise science and fitness professionals, emergency medical care providers, occupational therapists, youth leaders, physical therapists, teachers, parents and pharmacists. It has been held annually since 1999 in the Kansas City metropolitan area. Approximately 350 to 400 persons attend each year from across the US.

University of Kansas Medical Center student research forum. Dietetics and Nutrition students and medical students working with Dietetics and Nutrition faculty participate in this yearly springtime forum that includes presentation of research conducted during the past year by students from the Schools of Allied Health, Nursing, and Medicine and Graduate Studies. In the past few years, our students have twice won the top award for a student from the School of Allied Health and once the top award to medical students.

Pediatrics conference at CMH. Dietetics and Nutrition interns participate in a yearly conference on pediatric nutrition held at Children's Mercy Hospital in Kansas City, MO. These conferences add depth to our teaching in pediatric nutrition.

4. New Library Materials and Other Forms of Academic Support Required

No new library or other forms of academic support are required as these are sufficient for the research being conducted by PhD faculty in the Department of Dietetics and Nutrition.

5. Support Staff Requirements and Budgeted Salaries

The department currently has one full time staff supporting our Master of Science program. The addition of a doctoral program is not expected to result in any further staff requirement as admissions will be handled by core faculty in the program.

Facilities and Equipment

1. Anticipated Facilities Requirements

No new space or renovation of space is required. The Department has fully operational laboratories to support all ongoing research (see 3 this section). Courses will be scheduled and taught in classrooms already existing on the Medical Center campus. Depending upon growth, dedicated space for research assistants may be needed at some point in the future.

2. New Equipment Required

No new equipment is required. Departmental faculty members have collaborations and affiliations with all special equipment needed to conduct a broad array of nutritional projects. Excluding standard equipment common to all laboratories (e.g., refrigerated centrifuges, ultra-low freezers, refrigerators, spectrophotometers, pipettes), the equipment available in each laboratory is unique to the ongoing research of faculty (cell culture, gas liquid chromatography, metabolic chamber, bone mineral density scanning, video recording, computers and programs for analyzing duration of moment to moment behavior, etc.). Individual research funds, set up funds provided to new faculty and indirect funds coming back to the departmental from faculty grants were used to purchase equipment, which is less than 2 years old. Shared equipment is

also available for doing genetic analyses (thermocyclers, real time RT-PCR system). Any need for new equipment in future will be purchased with grant dollars or utilized from that available on campus through sharing.

3. Departmental Laboratory Facilities

Nutritional Sciences Analytical Laboratory. The laboratory is located in G007 and G009 Wescoe with office located in G008 and in an annex to G009. It is shared by Dietetics and Nutrition Department faculty. The laboratory supports Dr. Carlson's clinical trials conducted in the Maternal and Child Nutrition and Development Laboratory and her research using animal models to study nutritional requirements during development. Dr. Leidy and her students analyze human blood samples for hormones related to food consumption and satiety in subjects in her clinical studies conducted in the KUMC GCRC. Dr. Sullivan and her students also batch blood samples from her human trials for analysis.

Maternal and Child Nutrition and Development Laboratory. The 3300 sq ft laboratory is located in Smith West and the Child Development Unit ground floor and includes 7 large areas for testing infant development, 8 staff and student offices, storage areas for study records and supplies, rooms for assessing visual electrophysiology and evoked response potentials, a room for anthropometric and physiological assessment, conference and family rooms, and several interview rooms. The Nutritional Sciences Analytical Lab located in Wescoe supports the laboratory's need for measurement of biomarkers for nutritional status.

The Maternal and Child Nutrition and Development Laboratory is the center for research regarding docosahexaenoic acid (DHA) intake during pregnancy and infancy and its effect on infant/child development including cognitive and visual acuity development and autonomic nervous system development. The majority of the research done in the laboratory is through a highly interdisciplinary collaboration with Dr. John Colombo and Dr. Kathleen Gustafson, who also have independent laboratories.

Bone Research Laboratory. The Bone Research Laboratory is equipped adequately with the major equipment needed for studying biochemistry, cell and molecular biology, and light and electron microscopy of skeletal cells. The laboratory is ~1000 square feet including a separate room for cell culture. The research studies in the laboratory relate to bone and cartilage biology, mineralization and skeletal repair. Other projects relate to bone morphogenetic proteins (BMPs) in skeletal cell differentiation; pathophysiology of osteoarthritis, osteoporosis and other bone remodeling disorders; and the role of bioactive dietary factors and vitamins in modulating osteosarcoma as well as other cancers showing osteotropism.

Georgia Holland Metabolic, Strength, and Energy Lab. This lab, which encompasses approximately 4000 square feet on the ground floor of the new Kansas Life Science Innovation Center (opened March 2007) is shared by Department of Dietetics and Nutrition and Physical Therapy faculty. The lab includes a large waiting area, receptionist desk, faculty and research associate offices, a conference room, and three labs designed to assess: 1) body composition, 2) muscle strength and endurance, and 3) aerobic fitness and 4) dietary intake assessment. Dr. Sullivan has nine licensed copies of the Nutrition Data System for Research, the state-of-the-art nutrient composition software. Additionally, there is a large exercise intervention room that is newly furnished with LifeFitness aerobic equipment and a resistance training circuit.

4. Other Research Laboratories and Facilities Utilized for Departmental Research

KUMC General Clinical Research Center (GCRC). The GCRC is a multi-disciplinary research unit which facilitates investigator-initiated clinical research studies funded by a grant from the National Center for Research Resources of the National Institutes of Health. The GCRC receives additional funding from KUMC. The GCRC occupies ~ 7000 square feet on the ground floor of the Delp building. The GCRC provides a clinical research infrastructure to KUMC faculty members who wish to conduct clinical research and who receive funding from federal agencies, private foundations, and other peer-reviewed sources. Also included are investigator-initiated unfunded pilot studies that may lead to future NIH support. The GCRC may be used for a limited number of industry-sponsored studies.

The overall goal of the KUMC General Clinical Research Center is to provide investigators with the optimal facilities and resources to conduct clinical research, to foster interdisciplinary collaboration, to train health care professionals in clinical research, and to advance the quality of patient care. Dr. Sullivan is the Bionutrition Director to the Center and Dr. Goetz is the Assistant Director. Currently, Drs. Sullivan and Leidy have protocols that use the GCRC support services

Energy Balance Laboratory (EBL), KU and KU-Childrens' Mercy Hospital site). The Energy Balance Laboratory (EBL) is a major component of The Center for Physical Activity and Weight Management, at The Shiefelbusch Institute for Life Span Studies, at The University of Kansas. The EBL is a 2 million dollar facility completed in 2000. This state-of-the-art, dedicated research facility occupies approximately 10,000 square feet. It is designed to measure both energy intake and energy expenditure for both in-patient and out-patient investigations. The first floor contains a large reception area for subject registration and intake procedures. The EBL Director has a 230 square foot office located behind the reception area. A 1,600 square foot exercise area is dedicated to research investigations and has extensive audio and video entertainment packages to aid subject compliance. The exercise facility contains treadmills, steppers, stationary bicycles, and resistance exercise. Located adjacent to the reception and exercise areas are handicap accessible lockers and showers for men and women. Five exam rooms of ~120 square feet are available for medical exams and other procedures such as DEXA, resting metabolism, exercise testing, anthropometry, interviews, etc. All exam rooms contain a sink and cabinets for storage and can be modified to accommodate a variety of studies. A 340 square foot biochemistry laboratory is located adjacent to the exam rooms and is equipped for blood and muscle chemistry.

The second floor contains 6 offices for faculty and staff that are ~160 square feet and a large office of 247 square feet for doctoral students, post-doctoral fellows, visiting scholars, etc. All offices have PC desk top computers described below. Also on the second floor is a modern 425 square feet conference room that has telephone and video conference capacity. The conference room also contains a dedicated power point projector and computer for presentations. A whole-room indirect calorimeter occupies 450 square feet with all necessary support instruments. It is completely automated and interfaced with 2 computers for real-time data collection. Adjacent to the calorimeter is a dormitory equipped with a sink, toilet, shower, and entertainment center for overnight stays. A metabolic kitchen occupies 800 square feet and is used for feeding studies and to provide diets for subjects using the calorimeter. The kitchen contains multiple stove top/oven units and microwave units for food preparation and

refrigerators and freezers for food storage. A separately keyed, dedicated, 250 square feet room contains the 2 EBL servers and 6 dedicated desk top computers for data storage, data processing, report writing, and creating data presentations. All hard copy data are archived in this room. Approximately 800 square feet are available for storage of supplies at various sites throughout the EBL.

A new 14,000 ft sq facility has been completed at Children's Mercy Hospital (CMH) in Kansas City, Missouri and has all the features of the KU facility described above and has access to additional capacities such as classroom instruction, medical clinics, molecular biology, genetics, surgery, etc. This facility is located in the urban core of Kansas City and this facilitates recruitment of minorities and economically disadvantaged individuals. This is a joint venture of KU and CMH and Dr. Donnelly serves as Director.

The EBL occupies approximately 300 square feet in 2 KU cafeterias (Ekdalh Dinning Commons and Oliver Hall) for controlled feeding trials. Dietary intake is measured using digital camera plate waste methodology and recalls. All necessary support items are stored on-site (ie. food models, serving utensils, computers, etc.). Several lap top computers are used for data entry and are interfaced with the EBL servers. Digital cameras are used to obtain permanent records of food intake and these pictures are sent electronically to the EBL for future analysis by the Nutritional Data System for Research which has multiple licenses on the EBL server.

The EBL also has access to a 53 foot mobile clinic that is equipped as necessary to carry out field studies. Currently it contains an exam room, blood chemistry instruments, treadmill, scales, stadiometer, skinfold calipers, circumference tapes, and other miscellaneous items. This mobile clinic is used to support large community interventions.

The EBL has treadmills (16), steppers (4), stationary bicycles (4), weight machines (12), DEXA (1), ventilated hoods for resting metabolism (3), automated exercise tolerance testing with ECG and indirect calorimetry (4), portable indirect calorimeter system (1), ECG's (6), portable ECG's (3), anthropometry by calipers (8), physical activity monitors (50), whole-room indirect calorimeter (1), blood gas/electrolyte analyzer (1), projection microscope (1), cryostat (1), digitizing pad/pencil (1), glucose/lactate analyzer (2), flourometer (1), minus 70 freezers (2), water baths (2), autoclave (1), spectrophotometer (1), rapid nitrogen analyzer (2), biopsy cannulas (8), pH meter (1), precision scales (2), microcentrifuge (1), refrigerated centrifuge (1), associated glassware and pipettes. The new KU/Children's Mercy Hospital site more than doubles the major equipment and provided access to a new wet lab, genetics lab, and others.

Weight Control Research Project (WCRP) Clinics (locations at KU, KUMC, and Children's Mercy Hospital). WCRP is an ongoing clinical research program that provides service to overweight and obese individuals and explores new paradigms for weight loss and maintenance. The WCRP maintains 4 clinics. The Lawrence facility has ~5,000 square feet with a large reception area, 5 offices, 3 exam rooms, 3 meeting rooms for group sessions, and several storage rooms. Currently WCRP has 2 additional facilities in Kansas City. The site at The University of Kansas Medical Center is located in the urban core and facilitates recruitment of minorities. An off site facility is conveniently located on the beltway that surrounds Kansas City and provides easy access for commuters and those living in the suburbs. Each site has an office for administrative duties and numerous exam rooms for procedures such as physical

exams, anthropometry, blood draws, ECG, interviews, etc. Conference rooms and large waiting areas are used for group clinics. Laboratory procedures (when indicated by protocol) such as metabolic measurement, DEXA, treadmill testing, etc. may be done at the Energy Balance Laboratory in Lawrence located ~30 miles from the Kansas City Clinics, the GCRC located at the University of Kansas Medical Center, or at the new KU/Children's Mercy Hospital site.

The Energy Balance Laboratory, WCRP clinics, and KU/Children's Mercy Hospital sites maintain their own computer network. The server currently has two hard drives including a 20 gigabyte SCSI drive and a 80gigabyte IDE hard drive. The server has a Pentium IV processor running at 1.4 gigahertz, with 1024 megabyte of SDRAM and local computers connecting at 100mbps. The server also functions as a file/printer and DHCP web server. The server and all computers maintain up-to-date security patches and virus protection through daily automatic updates. Each night, selected folders are backed-up with incremental tape backups. All offices have PC desktop computers with at least Pentium IV processors, 512 meg RAM, 80 gig hard drive and 17" monitors and are networked to the server, black/white laser printers(6), and color laser printer (1).

All offices have adequate storage, filing, phone, etc. Photocopy support, telephone, internet access, email, and fax services are provided at the Energy Balance Laboratory and WCRP clinic sites. All offices have desk top computers as described above. WCRP Clinic Sites have ECG's (3), sphygmomanometers (5), scales (5), anthropometry (5), storage for materials and diet related items (5), LCD projectors (2).

Integrative Medicine Clinical Laboratory. The Integrative Medicine Clinical Laboratory is a 4600 square foot lab located in 2012 Sudler directed by Jeanne Drisko, MD. It is utilized by the Program in Integrative Medicine's multidisciplinary staff, which includes medical doctors, a naturopathic doctor, nurse practitioner, infusion nurse, fellow, acupuncturist, registered dietitian, massage therapist, meditation therapist, and patient services coordinator. The main goal of this unique lab is to conduct research studies that evaluate several complementary and alternative medicine modalities used in conjunction with traditional allopathic practices. The lab contains two consultation rooms, three exam rooms, a 10 chair IV Infusion clinic, a demonstration kitchen, medical library, conference room, and waiting room. The lab has equipment for conducting anthropometric and physiological assessments. There is also a room for IV preparation and storage, as well as additional storage areas for lab kits and supplies. Shared classroom space with Rehabilitation Medicine is also able to be utilized. The lab's demonstration kitchen is a place where patients, staff, and students attend cooking demonstrations to learn hands-on about how to prepare health supporting foods. The kitchen contains modern appliances including a cook top, convection oven/microwave, oven, warming drawers, refrigerator, and dishwasher. It is also fully equipped with cookware, dishware, silverware, and a preparation sink and dishwashing sink. Lisa Markley, MS, RD supervises all aspects of the clinic's demonstration kitchen.

This clinical lab currently supports several research studies, including evaluation of intravenous vitamin C as a chemotherapeutic agent, bio-identical hormones for menopausal women, intravenous vitamin C for hepatitis C, yoga therapy for atrial fibrillation, among others.

Program Review

1. Program Review Process

The program will be reviewed in accordance with KU Graduate Studies requirements. Courses will have student reviews performed at the end of each semester, which will be reviewed by the Departmental Promotion and Tenure committee and utilized in the annual review of faculty. Assessment of the program will be overseen by a Committee selected from Core faculty, with one member appointed by the Chair of the Department of Dietetics and Nutrition to serve as Graduate Program Director and Graduate Program Senior Coordinator.

2. Student Learning Outcomes

On entry into the Doctoral program in Nutritional Sciences, students will be assigned an academic advisor in the Department of Dietetics and Nutrition and put together an advisory committee consisting of 4 or 5 faculty members. When the student is ready to develop his/her dissertation research proposal, the academic advisory committee will be replaced by a dissertation committee. The faculty member from the Department responsible for mentoring the student through their research may change or remain the same as for the academic advisory committee depending upon the student's research direction for the dissertation. The academic advisory and dissertation committees will be required to have at least one senior faculty member (Associate Professor or Professor) from the Department of Dietetics and Nutrition and at least one member of the KUMC graduate faculty outside the Department to complete the proposal. To continue in the program, students must remain in good standing and maintain a 3.0 GPA with a grade of B or better in all required courses.

Student progress will be evaluated annually by their academic advisory or dissertation committee and the Departmental PhD faculty. Both will provide feedback regarding the student's progress in meeting program requirements, classroom performance and research performance. Students must pass a qualifying written exam after they have completed the Advanced Macronutrient and Micronutrient courses (DN 895, 896). The qualifying examination will serve the purpose of assessing the student's strengths and weaknesses in nutritional sciences and research design to determine if they should continue in the PhD program. Once the qualifying exam is passed, a student may apply to take the oral comprehensive exam required for doctoral programs at KUMC. The qualifying exam will be written by members of the graduate faculty in the Department of Dietetics and Nutrition. Once a student successfully completes the qualifying written and comprehensive oral exam and has satisfied any other departmental requirements, he/she may apply for admission to Candidacy for the PhD. The committee for the oral comprehensive and dissertation defense will be the student's dissertation committee and must include a 5th (or 6th) member from outside the department who is a graduate faculty and represents Graduate Studies.

It is expected that most students will work as a graduate research assistant in the service of a faculty member's funded proposal until they are ready to begin their dissertation research.

A final oral examination will be coordinated through the Chair of the Graduate Program Committee. The student will make a public presentation of their research followed by questions.

The final oral examination will be a comprehensive exam and conducted by the student's Dissertation Committee.

3. Student Accomplishments.

There is an expectation that students will contribute to the writing of publications with faculty in areas other than their dissertation research and present at regional and national meetings. We will track their progress to postdoctoral training and job placement and continue to obtain feedback from our doctoral trainees as to ways to improve the Doctoral program for future students.

4. Institutional Program

No specialized accreditation is required for the Doctoral degree in Nutritional Sciences.

This program is in accordance with KU Graduate Studies requirements. The program fits under the current administrative structure for all programs within the School of Allied Health. Admission and progression of the students through the program will be managed by the Associate Dean of Student Affairs. The Associate Dean of Academic Affairs will provide the direction and oversight for the academic structure, quality and integrity of the program. The Associate Dean of Academic Affairs will work with the faculty to provide guidance for faculty and students within the program.

Appendix I: Curriculum Outline and Sample Tracks

APPENDIX I-A

Sample Track: Persons Entering from the MS Degree in Dietetics & Nutrition Program

Courses Required (**BOLD** listings required for completion of the MS degree)

	COURSE NAME & NUMBER	CREDITS
CORE	DN 817 Seminar in Dietetics & Nutrition (1 cr hour x 3 semesters)	3
	DN 834 Methods of Research in Nutrition	3
	DN 836 Biochemical, Physiological & Genetic Aspects of Clinical Nutrition	3
	DN 885 Nutritional Biochemistry or BCHM 702 Biochemical Principles	3
	One (1) selection from below for minimum of 3 credit hours	3
	• DN 854 Special Problems in Dietetics & Nutrition / (Non-Thesis Research)	
	• DN 899 Thesis Research	
	One (1) course selection from below:	3
	• HP&M 874: Health Care Statistics	
	• PRVM 804 Principles of Statistics in Public Health	
	• PRE 710 Introduction to Statistical Analysis	
	DN 895 Advanced Macronutrients and Integrated Metabolism (NEW)	4
	DN 896 Advanced Micronutrients (NEW)	4
	DN 901 Doctoral Graduate Seminar (NEW) (1 cr hr x 2 semesters)	2
	NRSG 801 Analysis of Variance	3
	PRVM 872 Grant Writing	3
	IGPBS 892 Cell Metabolism (*Interdisciplinary Program in Biomedical Sciences)	1
	IGPBS 895 Molecular & Physiological Basis for Disease	3
IGPBS 901 Research Ethics	1	
TOTAL CORE HOURS	39	
ELECTIVES	Suggested Electives for PHD in Nutritional Sciences – more electives available (Students MS in Dietetics & Nutrition – 12 to 15 hours of electives)	
	DN 810 Nutritional Assessment	3
	DN 826 Applied Clinical Nutrition	3
	DN 829 Nutrition and Aging	2
	DN 838 Advanced Medical Nutrition Therapy	3
	DN 840 Advanced Topics in Nutrition	2
	DN 841 Public Health Nutrition	3
	DN 862 Maternal & Child Nutrition	3
	DN 865 Nutrition in Sports & Exercise	3
	DN 870 Health Behavior Counseling	3
	DN 875 Pediatric Clinical Nutrition	3
	DN 876 Intervention for the Prevention & Management of Obesity	3
	DN 880 Dietary & Herbal Supplements	2
	DN 902 Nutritional Genomics (NEW)	3
	DN 912 Laboratory Techniques in Nutritional Sciences Research (NEW)	2

	PRE 711 Introduction to Statistical Analysis Lab (Required with PRE 710)	1
	IGPBS 893 Molecular Biology	4
	IGPBS 894 Cell and Developmental Biology	5
	NRSG 806 Advanced Physiology	4
	OTMS 835 Interpreting Research for Applied Sciences	3
	HP&M 810 Research Inquiry to Support Evidence –Based Practice	3
	PRVM 814 Fundamentals of Biostatistics I (calculus required)	3
	PRVM 817 Fundamentals of Biostatistics II (calculus required)	3
	PRVM 886 Applied Linear Regression	3
	BIOL 811 Advanced Molecular & Cell Immunology	2
	MICR 808 Immunology	3
	MICR 840 Comparative Genomics	3
	BCHM 922 Advanced Molecular Genetics	3
	CLS 710 Molecular Techniques I (Lecture – 2 cr) & CLS 711 (Lab I – 2 cr)	4
	PTRS 825 Exercise Physiology	3
	TOTAL ELECTIVE HOURS	11
RESEARCH	DN 899: Dissertation Research (NEW)	10 min
	TOTAL HOURS TOWARD PHD	60

APPENDIX I- B

Sample Track: Persons Entering Program with BS Degree in Nutrition & Dietetics

	COURSE NAME & NUMBER	CREDIT HRS
CORE	DN 817 Seminar in Dietetics & Nutrition (1 cr hour x 3 semesters)	3
	DN 834 Methods of Research in Nutrition	3
	DN 836 Biochemical, Physiological & Genetic Aspects of Clinical Nutrition	3
	DN 885 Nutritional Biochemistry	3
	One (1) course selection from below:	3
	• HP&M 874: Health Care Statistics	
	• PRVM 804 Principles of Statistics in Public Health	
	• PRE 710 Introduction to Statistical Analysis	
	DN 895 Advanced Macronutrients and Integrated Metabolism (NEW)	4
	DN 896 Advanced Micronutrients (NEW)	4
	DN 901 Doctoral Graduate Seminar (NEW)	2
	NRSG 801 Analysis of Variance	3
	PRVM 872 Grant Writing	3
	IGPBS 892 Cell Metabolism (Interdisciplinary Program in Biomedical Sciences)	1
	IGPBS 895 Molecular & Physiological Basis for Disease	3
	IGPBS 901 Research Ethics	1
	TOTAL CORE HOURS	36
	ELECTIVES	Suggested Electives for PHD in Nutritional Sciences - additional electives available
DN 810 Nutritional Assessment		3
DN 826 Applied Clinical Nutrition		3
DN 829 Nutrition and Aging		2
DN 838 Advanced Medical Nutrition Therapy		3
DN 840 Advanced Topics in Nutrition		2
DN 841 Public Health Nutrition		3
DN 862 Maternal & Child Nutrition		3
DN 865 Nutrition in Sports & Exercise		3
DN 870 Health Behavior Counseling		3
DN 875 Pediatric Clinical Nutrition		3
DN 876 Intervention for the Prevention & Management of Obesity		3
DN 880 Dietary & Herbal Supplements		2
DN 902 Nutritional Genomics (NEW)		3
DN 912 Laboratory Techniques in Nutritional Sciences Research (NEW)		2
PRE 711 Introduction to Statistical Analysis Lab (Required with PRE 710)		1
IGPBS 893 Molecular Biology		4
IGPBS 894 Cell and Developmental Biology		5
NRSG 806 Advanced Physiology		4
OTMS 835 Interpreting Research for Applied Sciences		3
HP&M 810 Research Inquiry to Support Evidence –Based Practice		3
PRVM 814 Fundamentals of Biostatistics I (calculus required)		3
		36

	PRVM 817 Fundamentals of Biostatistics II (calculus required)	3
	PRVM 886 Applied Linear Regression	3
	BIOL 811 Advanced Molecular & Cell Immunology	2
	MICR 808 Immunology	3
	MICR 840 Comparative Genomics	3
	BCHM 922 Advanced Molecular Genetics	3
	CLS 710 Molecular Techniques I (Lecture- 2 cr) & CLS 711 (Lab I – 2 cr)	4
	PTRS 825 Exercise Physiology	3
	TOTAL ELECTIVE HOURS	14
RESEARCH	DN 899: Dissertation Research (NEW)	10 min
	TOTAL HOURS TOWARD PHD	60

Appendix I-C:

Sample Track: Persons Entering with a BS Degree from another Major

	COURSE NAME & NUMBER	CREDIT HRS
CORE	DN 817 Seminar in Dietetics & Nutrition (1 cr hour x 3 semesters)	3
	DN 834 Methods of Research in Nutrition	3
	DN 836 Biochemical, Physiological & Genetic Aspects of Clinical Nutrition	3
	DN 885 Nutritional Biochemistry	3
	One (1) course selection from below:	3
	• HP & M 874: Health Care Statistics	
	• PRVM 804 Principles of Statistics in Public Health	
	• PRE 710 Introduction to Statistical Analysis	
	DN 895 Advanced Macronutrients and Integrated Metabolism (NEW)	4
	DN 896 Advanced Micronutrients (NEW)	4
	DN 901 Doctoral Graduate Seminar (NEW)	2
	NRSG 801 Analysis of Variance	3
	PRVM 872 Grant Writing	3
	IGPBS 892 Cell Metabolism (Interdisciplinary Program in Biomedical Sciences)	1
	IGPBS 895 Molecular & Physiological Basis for Disease	3
	IGPBS 901 Research Ethics	1
	TOTAL CORE HOURS	36
ELECTIVES	Suggested Electives for PHD in Nutritional Sciences – additional electives available	
	DN 810 Nutritional Assessment	3
	DN 826 Applied Clinical Nutrition	3
	DN 829 Nutrition and Aging	2
	DN 838 Advanced Medical Nutrition Therapy	3
	DN 841 Public Health Nutrition	3
	DN 862 Maternal & Child Nutrition	3
	DN 865 Nutrition in Sports & Exercise	3
	DN 870 Health Behavior Counseling	3
	DN 875 Pediatric Clinical Nutrition	3
	DN 876 Intervention for the Prevention & Management of Obesity	3
	DN 880 Dietary & Herbal Supplements	2
	DN 902 Nutritional Genomics (NEW)	3
	DN 912 Laboratory Techniques in Nutritional Sciences Research (NEW)	2
	PRE 711 Introduction to Statistical Analysis Lab (Required with PRE 710)	1
	IGPBS 893 Molecular Biology	4
	IGPBS 894 Cell and Developmental Biology	5
	NRSG 806 Advanced Physiology	4
	OTMS 835 Interpreting Research for Applied Sciences	3
	HP&M 810 Research Inquiry to Support Evidence –Based Practice	3
	PRVM 814 Fundamentals of Biostatistics I (calculus required)	3
	PRVM 817 Fundamentals of Biostatistics II (calculus required)	3
	PRVM 886 Applied Linear Regression	3
	BIOL 811 Advanced Molecular & Cell Immunology	2
		38

	MICR 808 Immunology	3
	MICR 840 Comparative Genomics	3
	BCHM 922 Advanced Molecular Genetics	3
	CLS 710 Molecular Techniques I (Lecture – 2 cr) & CLS 711 (Lab I – 2 cr)	4
	PTRS 825 Exercise Physiology	3
	TOTAL ELECTIVE HOURS	14
RESEARCH	DN 899: Dissertation Research (NEW)	10
	TOTAL HOURS TOWARD PHD	60

Appendix II: Dietetics and Nutrition Existing and Anticipated Courses

DN 800 Selected Topics in Clinical Dietetics (1-6). A learner-centered, self paced study of topics in applied clinical dietetics. Independent modules are offered to address the science and art of nutritional care relating to specific issues in clinical dietetics. Topics will be grouped in various combinations to provide flexibility of choice. Students may enroll in one or more topics for a total of six credit hours.

DN 810 Nutritional Assessment (3). Methods and tools used in screening and assessment of nutritional status of individuals and population groups are studied. Assessment methodology includes dietary surveys, computerized dietary intake analysis, anthropometric measures, biochemical measures and clinical evaluations. Laboratory experiences are provided to allow students practice time for learning and applying assessment techniques.

DN 817 Seminar in Dietetics and Nutrition (1). Seminar designed to promote effectiveness of professional written and oral communication, increase knowledge of research, and review content information in selected topics in dietetics.

DN 820 Nutrition Education Skills for School Teachers (3). This graduate level course will expand understanding of nutrition and healthy eating for classroom teachers and other professionals who work with children. The course has a special emphasis on child and adolescent nutrition and how to translate nutrition facts into classroom applications and school-based interventions. Course topics will include healthy food choices, nutrition guidelines, nutrients, energy balance and weight, child and adolescent nutrition, and nutrition education in the classroom, school-based nutrition interventions, and measuring outcomes of nutrition interventions. Students must be classroom teachers or consent of instructor.

DN 822 Nutrition Care Management (1-2). An intermediate level course in which students develop skills involving communication, education, and management related to dietetics and nutrition practice. Students may typically be enrolled in DN 827 Practicum associated with the Dietetic Internship. Consent of instructor is recommended without concurrent enrollment in DN827. Prerequisites are undergraduate coursework in food service systems, management theory, or commensurate practical experience. Lectures, management experience simulations, student presentations, and tours of food service operations are educational methods used in this course.

DN 826 Applied Clinical Dietetics (3). An intermediate level graduate course in which students learn the appropriate processes in the provision of nutrition care for patients in health care settings. Course content includes current nutrition theory and evidence based practice in prevention and treatment of common health problems, e.g. obesity, heart disease, diabetes, cancer, renal disease, gastrointestinal disease and hypertension. Elements of pathology and biochemistry of the nutrition related problems are integrated into course topics. This course is designed for students enrolled in the clinical nutrition component of DN 827 (applied practicum) associated with the dietetic internship. Students from other departments may enroll with

consent of instructor. Prerequisite: Undergraduate coursework in nutrition, diet therapy, foods, biochemistry and physiology.

DN 828 Clinical Education in Dietetics (2-3). A study of teaching methods appropriate for use in a clinical setting. Emphasis on development of instructional objectives, learning situations, and methods of evaluations to be used in clinical teaching in dietetics. Consent of instructor required.

DN 829 Nutrition and Ageing (2). An overview of nutrition and the aging process. Physiological, psychological, and sociological aspects of aging, theories of aging, internal and external factors related to nutrient intake, and nutrient needs will be considered.

DN 830 Food Technology (2-3). Consideration of current food processing methods and the factors affecting the palatability and nutritive value of human foods. Course includes pertinent information regarding the protection of the food supply.

DN 834 Methods of Research in Nutrition (3). A study of basic research terminology and designs commonly used in nutrition research. Topics include: research on animals, tissue culture and human subjects; qualitative, quantitative and outcomes research; ethical issues in research; dissemination of research findings; and appropriate use of research findings. Prerequisite: Consent of instructor.

DN 835 Micronutrients in Human Nutrition (3) - This is a lecture course with the option of online delivery of course content. The topics covered will deal with the interrelationships of micronutrients in terms of biochemistry, physiology, genetics and nutrition. Emphasis will be placed on developing an understanding of how the coordination of structure and function is related to the metabolic needs of the cell and its response to the environment. This integrated approach will form the basis for evaluating the micronutrient needs of humans in both normal and altered metabolic states.

DN 836 Biochemical, Physiological and Genetic Aspects of Human Nutrition (3). The topics covered will deal with the interrelationships of biochemistry, physiology, genetics, and nutrition. Emphasis will be placed on developing an understanding of how the coordination of structure and function is related to the metabolic needs of the cell and its response to the environment. This integrated approach will form a basis for evaluating nutritional needs of humans. Prerequisite: consent of instructor.

DN 838 Advanced Medical Nutrition Therapy (3) - This course provides an in-depth study of the pathophysiology of nutritional disease. Those functional disorders which result in nutritional disease or those nutritional diseases which affect physiological function will be explored. The emphasis will be in the following areas: endocrinology, metabolism, and gastroenterology. Those pathological disorders which result in nutritional disease or those nutrition diseases which affect physiological function will be explored.

DN 840 Advanced Topics in Nutrition (1-2). Reading and preparation of a paper and/or oral presentation on a selected subject in nutrition. Prerequisite: consent of instructor.

DN 841 Public Health Nutrition (1-3). Introduction to public health nutrition concerns, assessment of nutritional status of populations, nutrition education and counseling of individuals and groups, and nutrition services in the community. Discussion of the roles of dietitians, nutritionists, and others in providing community nutrition services. Prerequisite: Consent of instructor.

DN 857 Motivational Interviewing in Public Health Settings (1) – This course is designed to introduce participants to Motivational Interviewing, its concepts, and to the subsequent skills required for helping people to change.

DN 862 Maternal and Child Nutrition (3). This course is a critical examination of behavioral, physiological, and public health issues impacting dietary and nutritional factors that support normal growth and development. The course content focuses on the early stages of the life cycle: gestation, lactation, infancy, preschool, school age and adolescence. Topics include the fetal programming hypothesis, growth and nutritional requirements, breast and formula feeding of infants, infant weaning, and eating behaviors that lead to normal growth, growth faltering, and pediatric obesity.

DN 865 Nutrition in Sports and Exercise (3). Exercise physiology and nutrient requirements in sports and exercise: macronutrient, micronutrient and fluid needs of athletes engaged in specific sports, pre/post exercise meals, gender specific requirements, role of ergogenic aids, eating disorders, and role of exercise in weight management and chronic disease. Prerequisites: Biochemistry and /or exercise physiology class or permission of instructor.

DN 870 Health Behavior Counseling (3). Theoretical and applied issues in health behavior counseling. Students will learn the theories of behavior change and how to apply these to health care issues. Specific health behaviors (i.e., dietary changes, smoking cessation, exercise adherence) will be discussed in the context of chronic disease for children, adults and the elderly. Effective methods of counseling patients and promoting changes on an individual and small group basis will be presented.

DN 875 Pediatric Clinical Nutrition (3). This course examines the physiological, biochemical and nutritional aspects of disease processes relevant to infants and children up to 18 years of age. Medical nutrition therapy for a variety of medical conditions found in this population will be discussed including inborn errors of metabolism, food hypersensitivity, obesity, and diseases of the major organ systems. Prerequisite Applied Clinical Nutrition or equivalent or consent of instructor.

DN 876 Interventions for the Prevention and Management of Obesity (3). This course emphasizes obesity in a population group ranging from childhood to the adult. Course materials will examine the impact of obese conditions on disease development throughout the life cycle. The course will critically analyze current evidence focused on interventions used in the behavioral and clinical management of overweight and obese individuals in community and clinical settings. Prerequisites: Consent of instructor

DN 880 Dietary and Herbal Supplements (1-2). Designed to develop the health professional's skills in partnering with patients to make dietary supplement decisions. Students will investigate the use of botanicals and dietary supplements in nutritional support of aging, maternal health

and wellness. Discussion on supplementation in the prevention and treatment of chronic disease will include: arthritis, cancer, cardiovascular, diabetes, digestive, liver and renal disorders, memory deficits, and ophthalmic dysfunctions. Prerequisite is an undergraduate degree completion of a course in human physiology is advisable. Lectures, journal readings, web-enhanced coursework and self-study of recommended resources on dietary and herbal supplements are educational methods used in this course. To be eligible for 2 hours credit the student will complete an investigation of a dietary or herbal supplement and present their findings to classmates on-line or in person.

DN 885 Nutritional Biochemistry (3). The course is designed to facilitate the understanding of biochemical principles and concepts to human nutrition. The course content will include structure and functions of biological nutrients-Water, Proteins & Enzymes, Carbohydrates, Lipids and Minerals. Topics like bioenergetics; intermediary metabolism, metabolism of carbohydrates, lipids, proteins and amino acids; regulation of metabolism of macromolecules will be included. Biochemistry of cellular signaling including membrane structure and function, hormones, and signal transduction will be also included. Topics like nucleic acids, gene expression and regulation will be covered.

DN 890 Graduate Research (1-4). Individual investigation of special problems in dietetics and nutrition or hospital dietary administration approved by the student's adviser or advisory committee. Investigation involves original research.

DN 895 Advanced Macronutrients and Integrated Metabolism (4). A study of macronutrient metabolism and implications on physiology, pathophysiology, and genetic aspects in human nutrition. The structural roles of these compounds in organs and tissues will be emphasized, especially with regard to the diverse functional roles of complex lipids and carbohydrates and their impact on health and disease. (NEW)

DN 896 Advanced Micronutrients and Integrated Metabolism (4). A study of micronutrients in terms of metabolism, physiology, pathophysiology, genetics and nutrition. Emphasis will be placed on developing an understanding of how the coordination of structure and function is related to the metabolic needs of the cell and its response to its environment. This integrated approach will form the basis for evaluating the micronutrient needs of humans in both normal and altered states. (NEW)

DN 899 Thesis (1-6). Scholarly essay based on research, written under the guidance of the student's adviser. Credit given upon meeting thesis requirements for the master's degree. Prerequisite: Consent of instructor.

DN 901 Doctoral Graduate Seminar (1). Review and analysis of recent scientific literature focused on a specific topic. Students will present a 45-50 oral seminar with appropriate visual aids. (NEW)

DN 902 Nutritional Genomics (3). The course will introduce the student of nutritional sciences to techniques for determining individual single nucleotide polymorphisms (SNPs) and examples of SNPs known to influence nutritional requirements or metabolism of nutrients, with emphasis on those where alterations in nutrient intake favorably modify disease or risk factors for disease. (NEW)

DN 912 Laboratory Techniques in Nutritional Sciences Research (2). Analytical techniques utilized in nutrition research including cell culture, lipid separation techniques (thin layer and gas liquid chromatography), high performance liquid chromatography, real time RTPCR, RIAs and basic food analysis. Prerequisite: Consent of instructor. (NEW)

DN 999 – Dissertation Research (1-3). Doctoral students may enroll for up to 3 credit hours of dissertation research per semester. (NEW)

Appendix III: Budget

IMPLEMENTATION YEAR: FY 2009
Fiscal Summary for Proposed Academic Programs
Institution: ___KUMC___
Proposed Program: PhD in Nutritional Sciences

Part I. Anticipated Enrollment	Implementation Year		Year 2		Year 3	
	Full-Time	Part-Time	Full-Time	Part-Time	Full-Time	Part-Time
A. Full-time, Part-time Headcount:	2 - 3	0	4 - 6	0	6 - 9	0
B. Total SCH taken by all students in program	48 - 72		96 - 144		144 - 216	
Part II. Program Cost Projection						
A. In <u>implementation</u> year one, list all identifiable General Use costs to the academic unit(s) and how they will be funded. In subsequent years, please include only the additional amount budgeted.						
	Implementation Year	Year 2		Year 3		
Base Budget Salaries	-----	-----		\$22,134-\$33,196 from internal reallocation		
OOE	-----	-----		-----		
Total	-----	-----		-----		

Indicate source and amount of funds if other than internal reallocation: We envision that this could be handled by reallocation of funds from reduced faculty time, for example Mr. Beyer is in phased retirement. Teaching for the Dietetic Internship could be one of the options for our students to obtain their required teaching experience. Of course all of this is negotiable between the Department of Dietetics and Nutrition Chair and our Dean. Although there are a number of new courses proposed, we have 3 new PhD faculty (Garimella, Leidy, Goetz) and 1 faculty whose professorship will permit more time to teach in our DN programs (Carlson).

Revised: September, 2003

Approved: _____

Appendix IV: Letters of Support



November 10, 2008

Susan E. Carlson, PhD
AJ Rice Professor of Nutrition
Chair, DN PhD Proposal Committee
Department of Dietetics and Nutrition, MS 4013
3901 Rainbow Blvd
Kansas City, KS 66160

Dear Dr. Carlson:

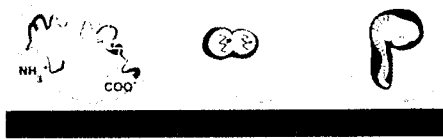
As you know, Dr. Sullivan and I have worked hard to enhance the faculty in the Department of Dietetics and Nutrition in recent years, and Departmental faculty members have been successful in creating a strong research base. As Dean of the School of Allied Health, it is clear that the Department is ready to move forward with a new program to train PhDs in the Nutritional Sciences.

I fully support your committee's proposal for a PhD in Nutritional Sciences in the Department of Dietetics and Nutrition, and I am particularly pleased to see that Departmental research programs and plans for training link so closely to the 10-Year Life Sciences Strategy. We all recognize that nutrition plays a role in both the prevention and treatment of chronic diseases. A PhD program in Nutritional Sciences at KUMC would offer a unique opportunity in the Midwest to train scientists who can work independently and in interdisciplinary collaborations with other basic and clinical scientists to better understand and treat those diseases.

Sincerely yours,

A handwritten signature in black ink that reads "Karen L. Miller". The signature is fluid and cursive.

Karen L. Miller, PhD
Senior Vice Chancellor and Dean
KU School of Allied Health



INTERDISCIPLINARY GRADUATE PROGRAM IN BIOMEDICAL SCIENCES
UNIVERSITY OF KANSAS MEDICAL CENTER

November 8, 2008

Susan Carlson, Ph.D.
Professor and Midwest Dairy Association Professor of Nutrition
Department of Dietetics and Nutrition
University of Kansas Medical Center
Kansas City, KS 66160

RE: Doctor of Philosophy in Nutritional Sciences

Dear Susan:

The IGPBS Advisory Board met on Friday, November 7, 2008. At this meeting we discussed the inclusion of the graduate students in nutritional sciences taking all or part of the courses offered by departments in the IGPBS. The committee unanimously and strongly supported the inclusion of your students. We agree that your degree programs are important components of a strong and cooperative graduate school at the University of Kansas.

Thank you for attending our meeting on Friday, and describing your program to us. This was very helpful. We strongly support the creation of this program. We also are very encouraged by your offer to allow students from other departments to take your specialized advanced courses. The inclusion of students from different schools and programs will continue our quest to improve the overall strength of the graduate school at the Medical Center, and make it a highly ranked national program. The fact that you have strong interactions with many basic science researchers is further evidence that the interaction between programs is both important and productive.

Sincerely yours,

Michael J. Werle, Ph.D.
Director, IGPBS and
Associate Professor, Anatomy & Cell
Biology



October 31, 2008

Susan E. Carlson, PhD
AJ Rice Professor of Nutrition
Chair, DN PhD Proposal Committee
Department of Dietetics and Nutrition, MS 4013
3901 Rainbow Blvd
Kansas City, KS 66160

Dear Susan:

I am happy to see that you are proposing a doctoral training program in nutrition. There is a definite need for more doctorally-trained nutrition scientists for roles in academia, industry and government. The proposal from the Department of Dietetics and Nutrition at the University of Kansas Medical Center for a PhD in Nutritional Sciences would offer a unique program that is not available elsewhere in the Midwest. In your program, students could work closely with academic physicians to study problems of human nutrition in health and disease while under the guidance of faculty in your Department of Dietetics and Nutrition.

I am the director of the UNC Nutrition Research Institute, and the director of UNC's NIH-funded Clinical Nutrition Research Center. I am actively recruiting new faculty members (18 over the next two years), and there is definitely a shortage of solidly trained individuals with expertise in human nutrition and metabolism. The new sciences of nutrigenomics and metabolomics require rigorous understanding of nutrition and metabolism, but are currently being staffed by individuals who have genetics or chemistry training but little nutrition background. It would be very desirable to see more students from programs like yours.

Best Regards.

Sincerely yours,

A handwritten signature in black ink that reads "Steve H. Zeisel". The signature is written in a cursive, flowing style.

Nov. 3, 2008

RE: PhD Proposal in Nutritional Sciences

To Whom It May Concern,

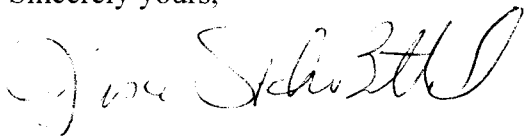
I wish to express my strong support of the proposal for a PhD in Nutritional Sciences. I have thoroughly reviewed the proposal and note that this strong department is in an excellent position to award doctoral degrees. The department is highly regarded with several funded researchers that have dramatically enhanced the body of knowledge in the field of nutrition. Their contributions to advancing our understanding of areas such as obesity and infant nutrition are impressive. These established and emerging faculty are in a perfect position to train new researchers to fill the current shortage of faculty candidates.

I was Interim Chair of the Department of Physical Therapy when we applied for our PhD program in Rehabilitation Science. I am well aware of the planning that went into the current proposal. I believe that this is a well-conceived plan that will result in successful graduates who will have no difficulties finding permanent academic or industry positions. Our own PhD program has graduated over 10 PhDs in the past 5 years, and 4 of them remained in Kansas to take faculty and post-doctoral positions. Thus, while other states have suffered from severe faculty shortages in physical therapy, Kansas institutions have a greater pool of applicants to choose from. The same effect will likely occur with the new PhD in Nutritional Sciences.

I also serve at the Scientific Director for the Great Plains Coalition for Diabetes, a multi-institutional initiative to coordinate clinical services and research in the area of diabetes. Central to the KU arm of the Great Plains Coalition, are the faculty of the Department of Dietetics and Nutrition. The important translational research that they direct in fields of childhood and adult obesity has a direct impact on the lives of Kansans.

The proposal before you for a new PhD program in Nutritional Sciences should be overwhelmingly approved for several reasons including, 1) there is a great need for graduates at this level, 2) the program would be housed in a research-strong department, 3) the outlined curriculum will benefit students and ensure their success. I enthusiastically look forward to working with the PhD candidates in Nutritional Sciences. If you have any questions or comments, please do not hesitate to contact me directly.

Sincerely yours,



Lisa Stehno-Bittel, PhD

THE UNIVERSITY OF KANSAS MEDICAL CENTER

HAO ZHU, PH.D.

ASSISTANT PROFESSOR

SCHOOL OF ALLIED HEALTH

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Susan E. Carlson, PhD

Chair, the PhD Program Proposal Committee

Department of Dietetics and Nutrition

University of Kansas Medical Center

3901 Rainbow Blvd., MSN 4013

Kansas City, Kansas 66160

Phone: (913) 588- 5359

FAX: (913) 588- 8946

E-mail: scarlson@kumc.edu

November 3rd, 2008

Dear Susan:

I am very glad to write you this letter in support of Department of Dietetics and Nutrition starting a PhD program in Nutritional Sciences. I have first-hand knowledge of two of your graduate students, Susan Kary and Lindsey Thompson, who wish to pursue a PhD degree at your department.

Both Susan and Lindsey are currently enrolled in CLS 710/711 "Molecular Biotech", a graduate lecture / laboratory course that I am teaching this semester. It is the third year that I am in charge of this course. Students are expected to grasp fundamental skills and knowledge in molecular biology, including recombinant DNA, RNA interference and RNA analysis, protein analysis, cell culture and transfection. Each student needs to present two seminars on selected topics within this scope under my guidance. In addition, all students are expected to execute relevant experiments by following established protocol and by trouble-shooting both as a team and independently. I am very pleased with the performance of Susan Kary and Lindsey Thompson. Both of them scored in the top of their class for our Quiz #1. More importantly, they demonstrated their intelligence, curiosity, and pursuit of knowledge through presenting excellent seminars and asking many good questions during and after the class. Both did very well in performing brand-new experiments, such as gene amplification through polymerase chain reaction and molecular cloning. In short, I can envision that the full potential of Susan and Lindsey as experimental scientists could be fully realized after they complete their PhD studies.

I am currently training three PhD students in my research laboratory at KUMC. I have also served as an ad-hoc reviewer of oversea applications for the IGPBS (PhD) program at KUMC. From my own experience with student selection, I am confident to say that both Susan Kary and Lindsey Thompson would be excellent PhD candidates. Therefore, I am very glad to learn that your department is developing a PhD program to satisfy the need of these talented students and to fully utilize the strength of your faculty.

All the best luck with your endeavor in achieving this goal.

Sincerely,



Hao Zhu

E-mail from: Penny M. Kris-Etherton, Ph.D., R.D.
Distinguished Professor of Nutrition
Department of Nutritional Sciences
319 Chandlee Lab
Penn State University
University Park, PA 16802 USA

To: Susan Carlson, KUMC

Dear Susan,

In response to your request to provide my perspective about the need for more Ph.D. programs in Nutrition, particularly programs that prepare individuals with a Ph.D. degree in medical nutrition sciences, I offer the following two comments.

1. As Chair of several search committees for nutrition faculty positions in the area of applied nutrition sciences, we have had fewer than 10 applicants for each position. In addition, the application process has taken an extensive period of time (over 1 year) because of the lack of qualified applicants. Thus, I am delighted to learn of your proposed Ph.D. program in medical nutrition sciences.

2. Students that I have trained, especially those with an expertise in medical nutrition sciences find employment in academic institutions readily. In fact, I receive calls and correspondence frequently about position openings at other universities for qualified applicants. These are excellent career opportunities, and my observation is that there simply are not enough qualified individuals for these positions.

You have asked about the number of faculty in our department over the years. In the past 10 years our faculty number has increased by about ten tenure track faculty. Presently, we have two faculty positions open and have been search for qualified applicants for 1-2 years.

Good luck with your new program proposal.

All the best.

Penny

On Sat, Jan 24, 2009 at 11:42 AM, Susan Carlson <SCARLSON@kumc.edu> wrote:
Dear Friends,

As some of you know from conversations with us we have written proposal for a PhD in Medical Nutrition Sciences that is going before our Board of Regents this February. We feel the proposal is strong, but we have been asked to provide further evidence of need for PhD trained nutritionists. We are under the

impression that many universities are having difficulty identifying new faculty who have advanced training in nutrition for new hires. Of course many universities are now freezing open positions, but we are interested in your experience prior to our recent hard times.

If you have had a job search in the past several years, it would be wonderful if you could share your experience regarding any of the following:

Number of qualified candidates applying for each position

Approximate length of time it took to hire a candidate

Any comments about the hire, e.g.,

the best qualified person and the one hired had a PhD in a related biological field

a nutritionist was hired, but there are concerns about the ability to develop an independent funded research program

Additionally, we would be curious to know if the number of your faculty in nutrition has increased, decreased or stayed the same during the past 10 years.

We would appreciate any thoughts you are willing to share.

Best regards,

Susan

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Penny M. Kris-Etherton, Ph.D., R.D.

Distinguished Professor of Nutrition

Department of Nutritional Sciences

319 Chandlee Lab

Penn State University

University Park, PA 16802 USA

phone: 814.863.2923

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pmk3@psu.edu