

**BOARD OF GOVERNORS
STATE UNIVERSITY SYSTEM OF FLORIDA
NEW DOCTORAL DEGREE PROPOSAL STAFF ANALYSIS**

Program: Biostatistics
Institution: University of Florida
Staffed By: Jon Rogers

CIP Code: 26.1102 **Degree Level: PhD**
Proposed Implementation Date: Fall 2008
Initial Review Date: 10/07 **Last Update: 11/13/07**

Estimated Costs:

	Total	% & \$ Current	% & \$ New	% & \$ C&G	Cost per FTE	SUS 2005-2006 Average Costs*
Year 1	\$160,135	\$145,655 (91%)	\$14,480 (9%)	0	\$106,757	CIP 26 \$24,753-SUS \$17,220-UF**
Year 5	\$321,700	\$287,717 (89%)	\$33,983 (11%)	0	\$25,231	

* SUS Expenditure Analysis

** If inflated to Yr. 5:
\$29,556-SUS \$20,562-UF

Projected FTE and Headcount are:

	Projected Headcount	Student FTE
First Year	2	1.5
Second Year	4	3
Third Year	7	5.25
Fourth Year	12	8.62
Fifth Year	18	12.75

On April 30, 2003, the Florida Board of Governors approved eight criteria, divided into the two categories of Readiness and Accountability, by which implementation authorization of new doctorates was to be assessed, and further revised those policies on March 29, 2007. Because this proposal had substantially moved through the institutional approval process prior to revision of the policies, the following is an analysis of the University's proposal based on the eight criteria approved in 2003.

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INSTITUTIONAL READINESS					ACCOUNTABILITY		
Mission & Strength	Program Quality	Curriculum	Faculty	Resources	Need	Budget	Productivity
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READINESS

*1. **Mission and Strength** - The goals of the program are aligned with the university's mission and relate to specific institutional strengths. The program is aligned with goals identified within the State University Strategic Plan.*

Evidence that the proposed program is responsive to the goals of the current State University System Strategic Plan and the goals of the proposed program relate to the institutional mission statement as contained in the Strategic Plan.

The University of Florida College of Public Health and Health Professions proposes to establish a Ph.D. program in Biostatistics. This degree program would address two of the goals of the Board of Governors as expressed in its State University System Strategic Plan: meeting statewide professional and workforce needs and building world-class academic programs and research capacity.

The doctoral program in Biostatistics would provide research training for graduate students in a number of health care fields, and would be designed to facilitate students' development of a strong theoretical foundation in biostatistics, broad-based understanding of bio-statistical methods, and expertise in a cognate field. The program is consistent with and supportive of the University's goals to become a top tier institution nationally and to continue to be a leader in health care research effort and discovery.

The University of Florida established the Department of Epidemiology and Biostatistics in 2006 and believes that biostatistics is integral to strong research in the health sciences and addresses the critical need for technical support in medical science and health care fields. Additionally, this doctoral program is fundamental to research areas highlighted in the University's strategic plan, including the specific areas of: brain imaging, identification of influential genes, clinical trials in cancer, evaluation of new biotechnology, remedying health problems associated with aging, assessment of environmental impacts on health, and health issues important to children and families.

Evidence of a relationship to specific institutional strengths

The University of Florida College of Public Health and Health Professions currently offers PhD programs in Clinical and Health Psychology, Health Services Research, and Rehabilitation Science, and professional doctoral programs in Audiology and Physical Therapy. In addition, master's degree programs in public health are offered in Health Administration, Occupational Therapy, Public Health, and Rehabilitation Counseling.

The Biostatistics doctoral program is being designed in collaboration with the Colleges of Liberal Arts and Sciences and Agricultural and Life Sciences, and both colleges have faculty with strong bio-statistical expertise who would participate in the Ph.D. program. Active collaboration would be sought among faculty within the College of Public Health and Health Professions, particularly in the Epidemiology and Environmental

Health Departments. Additional collaborations are anticipated with the College of Medicine faculty in the Departments of Epidemiology and Health Policy Research and Molecular Genetics and Microbiology.

The University of Florida is in the application process for becoming an accredited college of public health through the Council on Education for Public Health. The proposal states that the ability of the College to compete on a national level as an accredited program aligns with the University's goal to become a top tier institution of high quality.

2. Program Quality – Planning activities have been sufficient and responses to any recommendations to program reviews or accreditation activities in the discipline pertinent to the proposed program have been addressed.

Evidence that planning for the proposed program has been a collaborative process involving academic units and offices of planning and budgeting at the institutional level, as well as external consultants, representatives of the community, etc.

Planning for the doctoral program began in 2005 and was led by Department of Biostatistics faculty. Two committees were formed to develop the program proposal. A structural committee determined the appropriate organization for the Ph.D. program, especially in terms of interaction with the Department of Statistics. An initial core of faculty members with graduate faculty status and rules for admitting other faculty were established. An academic committee researched other doctoral biostatistics programs and established the academic requirements for the proposed Ph.D. program, including course requirements and complete new course development for program implementation.

Following review and revision by UF statistics and biostatistics faculty, the planning leader consulted with graduate coordinators of other doctoral biostatistics programs, including Brown University, Johns Hopkins University, and Emory University prior to finalizing the proposal. The PhD proposal was approved by the UF Graduate Council on February 15, 2007 and approved by the UF Board of Trustees on June 15, 2007.

Evidence of an appropriate timetable of events leading to the implementation of the proposed program

With an assumption made that the proposal would be approved by the Board of Governors at its December 2007 meeting, the revised timetable is as follows:

Spring 2008

- Hire fifth faculty member.
- Assign specific administrative responsibilities for program operation.
- Acquire approval of new courses necessary for Year One by April and assign teaching responsibilities for Year One.

Fall 2008

- Admit the first class of students.

Evidence that progress has been made in implementing the recommendations from program reviews or accreditation activities in the discipline pertinent to the proposed program

The University of Florida established the Department of Epidemiology and Biostatistics in 2006. The Ph.D. program would respond to the standards and requirements for accreditation of the College of Public Health and Health Professions by the Council on Education for Public Health. According to the Council's Accreditation Criteria for Schools of Public Health (Amended June 2005), accredited public health colleges must offer three doctoral programs relevant to basic public health knowledge, which is defined as biostatistics, epidemiology, social and behavioral sciences, health management and policy, and environmental health. Accordingly, the proposal states that the Ph.D. in Biostatistics is an essential component of the accreditation efforts of the College (see further discussion at page 5).

An initial accreditation site visit is tentatively scheduled in September 2008, and the Council's decision on accreditation would occur, most likely, in June 2009.

3. Curriculum - The proposal describes an appropriate and sequenced course of study, admissions and graduation criteria are clearly specified and appropriate, and the appropriateness of specialized accreditation is addressed.

Evidence of an appropriate, sequenced, and fully described course of study; evidence of specific learning outcomes and industry driven competencies are discussed for any science and technology programs

A minimum of 90 credits beyond the bachelor's degree would be required for the doctoral degree. The biostatistics curriculum would share some components with the existing Ph.D. in Statistics program. There would be, however, considerably more emphasis on methodology courses in this curriculum and less on mathematical theory courses.

Five courses would compose the biostatistics core of the Ph.D. program, and the courses "Survival Analysis", "Longitudinal Data Analysis", and "Generalized Linear Models" would make up the methods core. The courses "Large Sample Theory" and "Statistical Inference" would form the theoretical part of the core and would provide students with the mathematical foundation necessary to do their dissertation research. Students would be required to complete at least three additional biostatistics/statistics courses and three elective courses.

Students would be required to explore a selected cognate field in some depth, such as

Genetics, Epidemiology, or Environmental Health. Additionally, students would acquire experience in the planning of experiments and establishing a collaborative interaction with an investigator. Program graduates would be expected to:

- Conduct independent research in the development of new bio-statistical methodology.
- Engage in successful collaborations with investigators in new quantitative fields.
- Write statistical methodology papers for peer-reviewed statistical and bio-statistical journals.
- Write collaborative papers for peer-reviewed subject matter journals.
- Compete successfully for research and teaching positions in academic institutions, federal and state agencies, or private institutions.

Evidence that, if appropriate, the bachelor's and master's degree programs associated with the program are accredited and that the institution anticipates seeking accreditation for the proposed program if available

The proposal states that the Ph.D. program is a key component for accreditation of the College of Public Health and Health Professions by the Council on Education for Public Health (CEPH). Accredited public health colleges must offer three doctoral programs relevant to basic public health knowledge, as defined as biostatistics, epidemiology, social and behavioral sciences, health management and policy, and environmental health. The College reports that it would not be able to compete on a national level as a new College of Public Health if it does not meet the standards set forth by the accrediting body. An initial accreditation site visit is tentatively scheduled for March 2008.

Additional information received from the CEPH clarifies accreditation standards and expectations for colleges and schools of public health. For Ph.D. programs, accreditation criteria impose requirements on the curriculum that specify that these academic degrees must provide a broad introduction to public health, must provide instruction in the principles and applications of epidemiology, and must, through the curriculum, make the links between the field of study and other public health disciplines clear. The Council indicates that the appellation "Ph.D. in Public Health" can be used for the three or more doctoral degrees, as long as there are at least three distinct public health areas of concentration offered within that degree. In this regard, each distinct area must have sufficient advanced-level coursework in the particular area, and each area must have sufficient faculty with expertise, training, and experience in the specific area. Further, each distinct area must have its own set of defined competencies that explain what a graduate would know and be able to do. The focus of the curricular review by the CEPH will relate to standards for public health graduate programming.

The National Board of Public Health Examiners (NBPHE) was established in 2005 as an independent organization dedicated to credentialing public health graduates. The

NBPHE is in the process of developing a voluntary credentialing examination. The exam will cover the five core areas of knowledge offered in CEPH-accredited programs and schools – biostatistics, epidemiology, environmental health, health policy and management, and social and behavioral sciences. The impact of this new initiative on accreditation and accredited schools and programs will evolve in the coming years. The intent of this Board, however, is to assure that graduates from schools and programs of public health accredited by the Council on Education for Public Health have mastered required competencies, as there is increasing recognition that public health professionals are daily facing complex and critical health issues, such as controlling infectious diseases, reducing environmental hazards, public health preparedness, and substance abuse.

Evidence that the institution has analyzed the feasibility of providing all or a portion of the proposed program through distance learning technologies via its own technological capabilities

The Ph.D. program would be delivered in the traditional manner of doctoral education: on-campus work and seminars leading to qualifying exams and dissertation research. The proposal states that being located in a health science center and an academic environment is integral to proper training in biostatistics, and it would not be appropriate to offer this program through a distance learning mechanism.

4. Faculty – A critical mass of faculty would be available to initiate the program based on estimated enrollments, and faculty in the aggregate has the necessary experience and research activity to sustain a doctoral program.

Evidence that there is a critical mass of faculty available to initiate the program based on estimated enrollments.

The proposal was revised and now identifies six faculty members who would be directly involved in the Ph.D. Biostatistics program and six faculty who would have secondary roles in the program. The primary program faculty would consist of all members of the Department of Epidemiology and Biostatistics in the College of Public Health and Health Professions. The faculty group with secondary roles would include members from the College of Agricultural and Life Sciences and the College of Liberal Arts and Sciences and other Public Health disciplines.

At the onset of the Ph.D. program, the College anticipates five full-time faculty members in the Division of Biostatistics. The Department of Epidemiology and Biostatistics is hiring a tenure-track assistant professor for the Biostatistics Division, which would be a requirement for the Ph.D. program in terms of the College becoming accredited by CEPH.

The bulk of the teaching workload would be provided by faculty members from the Division of Biostatistics. The Chief of the Division would have the most administrative

responsibility for the program and would serve as the graduate coordinator. The remaining faculty members identified in the proposal would teach individual courses in the program.

Evidence that the faculty in aggregate have the necessary experience and research activity to sustain the program

The revised proposal states that six faculty would be directly involved in the Ph.D. program, and six faculty would have secondary roles. Data in the report express the following scholarly activities for the faculty: 75 master's theses directed, 97 Ph.D. dissertations directed, 239 collaborative publications produced, and 482 methods publications produced.

National Science Foundation data on separately budgeted R & D expenditures is included in the proposal for the University of Florida Epidemiology and Biostatistics programs (12 faculty identified) that total \$2.8 million (most recent three years of data).

Evidence that, if appropriate, there is a commitment to hire additional faculty in later years, based on estimated enrollments

The proposal states that, as the program grows, the College anticipates another hire necessary by Year Five (2012) to help teach additional elective courses which would be developed, and to serve as a mentor, particularly for dissertation supervision.

The report includes a data comparison of the proposed UF doctoral program with peer institution programs selected by the University. Data comparisons are offered with the University of South Florida biostatistics program, the University of Iowa biostatistics program, and the University of South Carolina biostatistics program. Using National Research Council (NRC) data, the display yields comparable data in regards to total program faculty, external support for faculty, publications/faculty ratios, and the number of enrolled graduate students. Using National Science Foundation (NSF) data on separately funded R & D expenditures for the four programs, the UF projections indicate a program that would be established slowly and would grow more gradually, as compared to the existing programs in the analysis.

5. Resources – The necessary library volumes and serials; classroom, teaching laboratory, research laboratory, office space, equipment, clinical and internship sites, fellowships, scholarships, and graduate assistantships would be sufficient to initiate the program.

Evidence that library volumes and serials are sufficient to initiate the program

The University of Florida Health Sciences Library supports instruction and research for the six Health Sciences Center colleges. The HSC Libraries hold nearly 90,000 books and more than 250,000 journal volumes. The Libraries currently hold about 500 books and 2000 journal volumes on statistics and biostatistics, including more than 60 journal titles that cover both statistical and bio-statistical training.

Evidence that classroom, teaching laboratory, research laboratory, office, and any other type of space that is necessary for the proposed program is sufficient to initiate the program

The proposal states that no additional facilities are anticipated for this program. The current infrastructure of the College provides adequate instructional support for the proposed Ph.D. program. The majority of instruction would occur in the HPNP complex, a state-of-the-art facility that opened in 2003. The building includes a 500-seat auditorium and a 76-seat distance learning lab. All classrooms are equipped with a broad range of audio-visual services, including networked PC capabilities. The faculty office and research space for the Ph.D. program includes six offices for the Division of Biostatistics (12 for the Department as a whole), two staff offices, and accessible conference rooms.

Evidence that necessary and sufficient equipment to initiate the program is available

Faculty members and graduate students have access to a wide variety of teaching facilities to meet educational goals. All UF students are required to have access to a computer with minimum specifications for coursework. The College of Public Health and Health Professions provides support staff who have access to a cache of commonly used equipment to address audiovisual needs not met by the equipment already in the classroom.

Evidence that, if appropriate, fellowships, scholarships, and graduate assistantships are sufficient to initiate the program

The College of Public Health and Health Professions has a proven record of support for its doctoral students. In academic year 2005-06, graduate assistantship support totaled \$1.46 million for 122 students, and pre-doctoral fellowships totaled \$986,593 for 71 students. For the proposed Ph.D. program, anticipated primary sources of support include research assistantships from externally funded faculty research, internal and external fellowship opportunities, and teaching assistantships.

The Chief of the Division of Biostatistics submitted an application for a training grant, which could support three to five students per year in the program. Current faculty have grants to support research assistants in the program. In addition, the Public Health Advisory Board is an important resource for the program.

Evidence that, if appropriate, clinical and internship sites have been arranged

Not applicable.

ACCOUNTABILITY

6. Need - There is a need for more people to be educated in this program at this level and if the program duplicates other professional and doctorate degrees in Florida, a convincing rationale

for doing so is provided.

Evidence that there is a need for more people to be educated in this program at this level

The proposal cites recent national reports on health care needs which state that the U.S. faces a critical shortage of biostatisticians with graduate training. The current demand for biostatisticians far exceeds the supply, and the gap is expected to continue to widen. The biostatistics profession is a key component of many research areas and continues to be a major contributor to the advancement of the health sciences. Areas of increased demand include epidemiological studies, clinical trials, health services assessments, basic laboratory research, biomedical imaging, and most recently, genetics and genomics. In addition, neuroscience and computational biology are growth areas.

The Florida Agency for Workforce Innovation job forecasts do not specify projections for “biostatistician.” Instead, they show an increase in statistician and mathematical scientist jobs in Florida during the period 2006-2014.

The American Statistical Association reports that biostatisticians with advanced degrees can look forward to excellent career opportunities in government, industry, and academia. The Association found that job prospects for new master’s and PhD graduates in biostatistics are excellent. Typical starting salaries range from \$35,000 to \$65,000 for master's degrees and from \$55,000 to \$85,000 for PhD degrees. The shortage of biostatisticians is noted in The Seventh Report to the President and Congress on the Status of Health Personnel in the United States and Objectives for the Nation.

The proposal states that recent graduates with biostatistics degrees have found positions with employers as diverse as pharmaceutical companies, university research groups, hospitals, health-related industries, and other organizations. Positions are available in academia (biostatistics, statistics, public health, epidemiology, and in the biological, medical, agricultural and environmental sciences), in industry (pharmaceutical, biotechnology, food science, nutrition, genome data banks, agribusiness, biochemical, software, statistical consulting, bio-statistical and environmental consulting, medical diagnostic and therapeutic technology, medical informatics, medical clinical trials, life insurance, health insurance, health care and HMOs, think tanks, health policy, etc.), and in government (federal agencies such as the Food and Drug Administration, Census Bureau, National Biological Survey, National Forest Service, Environmental Protection Agency, National Institutes of Health, Centers for Disease Control), and state agencies such as state health offices and state environmental agencies.

Evidence that the proposed program does not duplicate other SUS or independent college offerings or, otherwise, provides an adequate rationale for doing so

The University of South Florida offers a Ph.D. program in Biostatistics and Florida State University gained approval by the Board of Governors in December 2006 to offer the Ph.D. in Biostatistics. The UF proposal does not mention the Ph.D. program in

Biostatistics at Florida State University that was approved by the Board of Governors in 2006.

Currently, the Florida International University School of Public Health and the University of South Florida College of Public Health are accredited by the Council on Education for Public Health. The FIU School of Public Health offers a PhD in Public Health, with concentrations in Health Promotion and Community Nutrition. FIU also offers a master's in Public Health via an affiliated program with the University of Miami School of Medicine Department of Epidemiology and Public Health. The University of South Florida offers PhD programs in Community and Family Health, Environmental and Occupational Health, Epidemiology and Biostatistics, Global Health, and Health Policy and Management.

The proposal states that the UF Department of Statistics would be an invaluable resource to the new doctoral biostatistics program. There is a close connection between the Department of Biostatistics and Epidemiology in the College of Public Health and Health Professions and the Department of Statistics in the College of Liberal Arts and Sciences.

Evidence of reasonable estimates of student headcount and FTE who would major in the proposed program, and commitment to a diverse student body

The proposal states that students with an M.S. in Statistics or Biostatistics would be eligible to apply to the Ph.D. program. The proposal states that the Ph.D. program would slowly build over a five-year period, starting out with two students and gradually building to a steady state of eight new students by Year Five. Table Three-B displays potential sources of students for the Ph.D. program. As displayed, in the initial year, the program would enroll one master's degree graduate from UF and one master's degree graduate from another state university. In subsequent years, out-of-state and international students would be actively recruited, and Table Three-B shows that the program's fifth year enrollment of 18 students is projected to consist of nine non-Florida students.

The University of Florida maintains a varied program of recruitment and retention that promotes a diverse student enrollment, centered at a University Office of Graduate Minority Programs. The University employs a Director of Graduate Minority Programs to recruit both minority and women students. Activities include recruitment services (graduate fairs, partnerships with foundations and organizations, and the campus visitation program) and retention services (FBOE Summer programs, OGMP supplemental retention programs, and academic support services and programs for graduate students.

Partnerships exist with the Florida Educational Fund, Florida A & M University Feeder programs, Santa Fe Community College Faculty Development Project, the National Consortium for Graduate Degrees for Minorities in Engineering and Sciences, and the

National Science Foundation-Alliance for Graduate Education and the Professoriate.

The University EEO Officer has attested that these University programs would supplement the efforts of the program faculty to recruit, retain, and graduate Ph.D. biostatisticians from underrepresented groups.

*7. **Budget** - A complete and realistic budget for the program is provide, and any redirection of funding would not have an unjustified negative impact on other needed programs.*

Evidence of a budget for the program that is complete and reasonable, and comparable to the budgets of similar programs at other SUS institutions, and reflective of the proposal's text

According to the proposal, the resources for this program would come from the budget for the original planning of the University of Florida's public health initiative, and no other programs would be negatively affected. A significant proportion of the core support for the new program would be derived from current budget allocations to the Department. Resources have been set aside for the new biostatistics faculty lines. Over the course of the five-year start up of this program, the program proposes to hire two faculty (1.0 FTE) and dedicate .25 secretarial support. Student support would be primarily derived from grants as the program grows and increased external funding is secured.

The proposal provides student headcount and FTE estimates for Ph.D. majors for years. Estimated costs for the first year of implementation and the fifth year of implementation have been calculated. Projections show total first year program costs of \$160,135 for an initial program enrollment of two students (1.5 FTE), which calculates to \$106,757 per FTE student. The projected fifth year costs are \$321,700 to support 18 students (12.75 FTE) for a \$25,231 per FTE student cost. As a point of comparison, the SUS Expenditure Analysis documents reveal an average cost per FTE student for SUS graduate programs in the 26 C.I.P. (Biological and Biomedical Sciences) in 2005-06 was \$24,753, and the average cost for University of Florida graduate programs in the 26 C.I.P. in the same year was \$17,220 per FTE student.

Evidence that, in the event that resources within the institution are redirected to support the new program, such a redirection would not have a negative impact on undergraduate education

The proposal states that there would be no negative impacts by the proposed program on related undergraduate degree programs. The Ph.D. program would expand research opportunities for undergraduate students and increased opportunities for undergraduates to attend seminars related to cutting-edge biostatistical research. Further, the proposal states that the Master's of Public Health (MPH) program would be enhanced by the ability to attract top-notch researchers who would teach specific MPH courses and would be attracted by the opportunity to supervise Ph.D. students.

8. Productivity - The academic unit(s) associated with this new degree have been productive in teaching, research, and service.

Evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service.

The proposal includes extensive data on publications and dissertations supervised by the faculty members who would be involved in the program. Faculty who would be involved in the Ph.D. program have averaged four publications per year and have served on the editorial boards of top biostatistical journals. Faculty within the Division of Biostatistics in the Department of Epidemiology and Biostatistics have taught an average of three courses per year and advised doctoral students. Faculty from the Department of Statistics have produced five publications per year and have served as officers in national biostatistical organizations, including the American Statistical Association and the Eastern North American Region of the International Biometrics Society.

Funding for biostatistical methodology and collaborative research has been obtained from NIH, CDC, the VA, and the Florida Fish and Wildlife Commission due to the involvement and activities of the faculty.