

**PROPOSAL FOR A DOCTOR OF PHILOSOPHY PROGRAM IN EPIDEMIOLOGY ON  
THE INDIANAPOLIS CAMPUS**

**DEPARTMENT OF PUBLIC HEALTH  
INDIANA UNIVERSITY SCHOOL OF MEDICINE**

**INSTITUTION: Indiana University, Indianapolis (IUPUI)**

**SCHOOL: University Graduate School**

**DEPARTMENT: Public Health**

**DEGREE PROGRAM TITLE: Epidemiology**

**FORM OF RECOGNITION TO BE AWARDED/DEGREE CODE: Doctor of Philosophy (Ph.D.)**

**SUGGESTED CIP CODE:**

**LOCATION OF PROGRAM/CAMPUS CODE: Indianapolis, IUPUI**

**PROJECTED DATE OF IMPLEMENTATION: August 2009**

**DATE PROPOSAL WAS APPROVED BY  
INSTITUTIONAL BOARD OF TRUSTEES:**

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**SIGNATURE OF AUTHORIZING  
INSTITUTIONAL OFFICER**

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**DATE RECEIVED BY COMMISSION FOR  
HIGHER EDUCATION**

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**COMMISSION ACTION (DATE)**

## **A. ABSTRACT**

This document proposes that a Ph.D. degree in Epidemiology be offered on the Indianapolis (IUPUI) campus and administered by the Indiana University School of Medicine, Department of Public Health.

### **1. PROGRAM OBJECTIVE AND RATIONALE**

The proposed program will develop scholars who will carry out original research that will contribute to the understanding of the occurrence of illness and injury, including investigations of the etiology, prevention, and control of disease and injury. An epidemiologist is a public health scientist who studies patterns of disease and injury in defined populations, investigates disease and injury etiology and uses the results of research to develop effective measures of control and prevention. Epidemiologists are the basic scientists in public health who collect and provide the data upon which population-based health surveillance and preparedness are founded. Epidemiology has been recognized as a key discipline in the expanding agenda of translational research across academic institutions in Indiana. Establishment of a Ph.D. program in Epidemiology on the IUPUI campus will strengthen our collaborations and enhance the Department of Public Health's competitiveness for external, peer-reviewed research support. Research indicates that graduates of this program will be in high demand across the state, nationally and globally.

### **2. UNIQUE FEATURES AND STRENGTHS OF THE PROGRAM**

The Indiana University School of Medicine, Department of Public Health is the only academic program in the state of Indiana that offers a degree in epidemiology (M.P.H.). As the focal point for life sciences in Indiana, the IUPUI campus is the ideal location for a doctoral program in epidemiology.

### **3. CLIENTELE TO BE SERVED**

This program is designed to meet the needs of full-time and part-time students.

The potential candidates for the Ph.D. will consist primarily of graduates of any accredited M.P.H. program, or related health professions programs. While it is expected that most applicants will have graduated from a previous M.P.H. or graduate health professional program, students with baccalaureate level training along with substantial professional experience will not be excluded.

### **4. EMPLOYMENT POTENTIAL**

Graduates with an academic degree in epidemiology would be employed in academic institutions, biotech/pharmaceutical industries, health care systems, federal, state or local government agencies, and health-related non-government agencies.

The 2006 National Assessment of Epidemiologic Capacity in Public Health conducted by the Council of State and Territorial Epidemiologists indicated the need to employ substantially more

epidemiologists—an estimated 34% (859 epidemiologists) above current personnel—to sufficiently staff essential services to protect the public’s health.

Using data from the Bureau of Labor Statistics and other resources, a list of the top 25 jobs for 2005-2009 was published by Fast Company magazine. “Epidemiologist” was eighth on the list. The selection criteria gave the highest weight to *demand* and *salary growth potential*.

The Association of Schools of Public Health estimate that in order to reach the goal of having over 250,000 additional trained public health workers in the U.S. by 2020, schools and graduate programs of public health will have to increase their number of graduates three-fold over the next 12 years.

## **B. PROGRAM DESCRIPTION**

### **1. INTRODUCTION**

The Ph.D. Epidemiology Program is designed for advanced graduate students who wish to be prepared to study the distribution of health and illness in diverse populations, to study the occurrence of illness, and to assess the determinants of health and disease risk in human populations. At the Ph.D. level, students are trained to become scientific leaders in academic, governmental, non-governmental, and industry settings. Graduates will be trained to develop and conduct epidemiologic research and to translate their findings to the biomedical research community, to public health practitioners, to health policy makers, and to clinicians in the health professions, as well as to the general public and its diverse populations and communities.

### **2. ADMISSION REQUIREMENTS**

Admission into the Ph.D. Program is based on completion of a baccalaureate degree, although it is anticipated that many applicants will have completed a post baccalaureate degree in epidemiology or another health related discipline. Admission criteria will follow the policies and procedures of the IUPUI Graduate Office. Admission requirements include:

- a. Formal application to the University Graduate School
- b. Resume or curriculum vita
- c. Personal statement
- d. Three letters of recommendation
- e. In-person interview
- f. Completion of an on-site essay
- g. Competitive scores on the either the GRE, MCAT, LSAT, or PSAT exams
- h. TOEFL score of 213 on the computer version (or iBT equivalent of 79) is required for applicants whose native language is not English.
- i. Official transcripts from all colleges and universities attended with:
  - i. a cumulative GPA of at least a 3.0 on a 4.0 scale in any prior completed degree program
  - ii. a letter grade of B or higher in all courses applied toward prerequisites

**Prerequisite Coursework and/or Degrees** Completion of a baccalaureate degree with substantial professional experience in epidemiology is required. It is anticipated that many applicants will have a post-baccalaureate degree in epidemiology, public health, or a related health care discipline.

**Selection Criteria** Initially, the number of students in the Ph.D. Program is expected to be small, totaling 5-10 students admitted annually. The initial size of the student cohort is deliberately small so as to ensure that adequate resources and student funding opportunities are available to support the development of a program of high quality. Steady growth in student numbers will occur as the program matures and support for students through scholarships and faculty research funding increases. Acceptance into the Ph.D. program will be determined by the Admissions Committee applying the following selection criteria:

- 1) **Scientific Leadership Potential:** Assessed by the applicant's resume / curriculum vita, personal statement, and personal interview.
- 2) **Ability to Engage in Advanced Graduate Work:** Assessed by the applicant's personal interview, evaluation of letters of recommendation, overall grade point average in prior graduate work, and either GRE,MCAT,LSAT, or PSAT scores.
- 3) **Learning Goals and Objectives:** Assessed by the applicant's personal statement and personal interview.

**Transfer Credit:** Upon review and recommendation of the Admissions Committee and with the approval of the Chair of the Department of Public Health, work taken for graduate credit at other institutions may be transferred in partial fulfillment of degree requirements. To qualify for transfer courses taken at another institution, the course grade must be B or higher.

### **3. CURRICULUM**

Students entering the Ph.D. program directly from a baccalaureate program or from a health-related masters program other than epidemiology will be required to complete the 90 credits of the Ph.D. program. Students who have an M.P.H. degree in Epidemiology or equivalent may be able to transfer up to 18 credits of coursework into the program. Candidates for the Ph.D. must spend two consecutive semesters during one academic year on the Indianapolis campus.

A total of 90 credits are required to complete the Ph.D. program in Epidemiology. The curriculum consists of:

**Required Core Courses** (31 credit hours): A common core of 31 credit hours of coursework will be required of all students. Students will complete 10 required core courses totaling 31 credits.

**Methods Courses** (9 credit hours): All students must take 9 credit hours of methods courses in epidemiology.

**Elective Courses** (15 credit hours): All students must take 15 credit hours of substantive elective courses.

**Minor Area** (12 credit hours): All students must complete a minor in any area related to a health and life science. The minor choice must be approved by the student's advisor. Examples of minors include: biostatistics, genetics, pharmacology and toxicology, health economics, environmental health, and bioinformatics. The minor must contain a minimum of four graduate level courses (12 credit hours) in the chosen area and comply with the minor requirements of the respective department/unit.

**Doctoral Research Seminars** (3 credit hours): All students will enroll in 3 doctoral research seminars; each seminar is 1 credit for a total of 3 credits.

**Dissertation** (20 credit hours): The remaining hours to total 90 will be guided research dissertation hours.

### **Competencies for the Doctoral Curriculum**

1. Design investigations of acute and chronic conditions as well as other adverse health outcomes in targeted populations.
2. Analyze and evaluate data from epidemiologic investigations and surveillance systems.
3. Differentiate special populations by race, ethnicity; culture; societal, educational, and professional backgrounds; age; sex; religion; disability; and sexual orientation.
4. Critically evaluate results of epidemiologic studies, including analyses, interpretation and conclusions.
5. Use current knowledge of causes of disease to guide epidemiologic practice.
6. Prepare written and oral reports and presentations to effectively communicate necessary information to professional audiences, policy makers, and the general public.
7. Develop community partnerships to support epidemiologic investigations.
8. Prepare proposals for extramural peer-reviewed funding.
9. Promote and model ethical conduct in epidemiologic practice.
10. Bring epidemiologic perspectives to the development and analysis of public health policies.

The curriculum will include courses that currently exist on the IUPUI campus as well as courses that will be developed over the next two years. Course descriptions of the existing courses are included in the appendices. Faculty members who teach the existing courses listed in other departments have been contacted and will allow Ph.D. students in Epidemiology to enroll in their courses. Courses that students will need during their first year either currently exist or will be developed prior to the matriculation of the first cohort of doctoral students, which if this proposal is approved, would be in the Fall of 2010. The remaining courses will be developed by 2011.

Course	Course Needs to be Created	Course Exists on Campus	Semester Offered	Level of Course	Credit Hours
<b>Required Core Courses = 31 credit hours</b>					
Fundamentals of Epidemiology		PBHL H517	Fall, Spring	500	3
Advanced Epidemiology		PBHL P601	Spring	600	3
Epidemiology Research Methods		PBHL P600	Fall	600	3
Health Outcomes Research		PBHL P612	Spring	600	3
Biostatistics for Public Health I		PBHL P651	Fall, Spring	600	3
Biostatistics for Public Health II		PBHL P652	Fall	600	3
Advanced Public Health Survey Methods or Survey Methods	PBHL P6XX	NURS R601	Spring	600 600	3 or 3
Analysis of Case-Control Studies	PBHL P7XX			700	3
Analysis of Cohort Studies	PBHL P7XX			700	3
Applied Multivariate Anal. in Pub Hlth w/Lab	PBHL P7XX			700	4
<b>Choose 3 Courses from the Following List of Methods Elective Courses = 9 credit hours</b>					
Epidemiologic Surveillance Systems	PBHL P6XX			600	3
Categorical Data Analysis		STATS 523	Spring	500	3
Survival Data Analysis		STATS 536	Fall	500	3
Applied Spatial Statistics		GEOG G588	Spring	500	3
Clinical Trials		GRAD G661	Spring	600	3
Qualitative Methods		NURS R610	Fall	600	3
<b>Choose 5 Courses from the Following List of Substantive Elective Courses = 15 credit hours</b>					
Nutritional Epidemiology	PBHL P6XX			600	3
Occupational Epidemiology	PBHL P6XX			600	3
Injury Epidemiology	PBHL P6XX			600	3
Pharmaco-Epidemiology	PBHL P6XX			600	3
Doctoral Level Directed Studies	PBHL P8XX			800	3
Molecular Epidemiology	PBHL P6XX			600	3
Environmental Epidemiology	PBHL P6XX			600	3
Cardio-vascular Epidemiology	PBHL P6XX			600	3
Infectious Disease Epidemiology		PBHL P609	Spring	600	3
Chronic Disease Epidemiology		PBHL P610	Fall	600	3
Cancer Epidemiology		PBHL P505	Fall	600	3
Human Population Genetics		MGEN Q580	Fall	500	3
Mental Health & Illness		SOC R585	Spring	500	3
<b>Minor = 12 credit hours</b>				Variable	12
<b>Doctoral Research Seminars = 3 credit hours</b> (3 semesters of seminar @ 1 cr. hr. each = 3 cr. hrs.)	PBHL P7XX			700	3
<b>Dissertation Research = 20 credit hours</b>	PBHL P8XX			800	20
<b>Total Number of Credit Hours = 90 credit hours</b>					<b>90</b>

## PhD in Epidemiology Sample Schedule

### First Year

#### Fall Semester

PBHL H517	Fundamentals of Epidemiology	3 credits
PBHL P600	Epidemiology Research Methods	3 credits
PBHL P651	Biostatistics for Public Health I	3 credits

#### Spring Semester

PBHL P601	Advanced Epidemiology	3 credits
PBHL P612	Health Outcomes Research	3 credits
PBHL P652	Biostatistics for Public Health II	3 credits

### Second Year

#### Fall Semester

PBHL P6XX	Advanced Public Health Survey Methods	3 credits
PBHL P7XX	Analysis of Case-Control Studies	3 credits
PBHL P7XX	Applied Multivariate Analysis in Public Health w/Lab	<u>4 credits</u>
Total		10 credits

#### Spring Semester

GEOG G588	Applied Spatial Statistics	3 credits
PBHL P7XX	Analysis of Cohort Studies	3 credits
STAT 523	Categorical Data Analysis	<u>3 credits</u>
Total		9 credits

### Third Year

#### Fall Semester

STAT 536	Survival Data Analysis	3 credits
PBHL PXX	Cancer Epidemiology	3 credits
PBHL P7XX	Doctoral Research Seminar	1 credit
Minor		<u>3 credits</u>
Total		10 credits

#### Spring Semester

PBHL P6XX	Nutritional Epidemiology	3 credits
PBHL P6XX	Environmental Epidemiology	3 credits
PBHL P7XX	Doctoral Research Seminar	1 credit
Minor		<u>3 credits</u>
Total		10 credits

### Fourth Year

#### Fall Semester

PHBL P6XX	Pharmaco-Epidemiology	3 credits
PBHL P6XX	Molecular Epidemiology	3 credits
PBHL P7XX	Doctoral Research Seminar	1 credit
Minor		<u>3 credits</u>
Total		10 credits

#### Spring Semester

PBHL P8XX	Dissertation Research	6 credits
Minor		<u>3 credits</u>
Total		9 credits

### Fifth Year

#### Fall Semester

PBHL P8XX	Dissertation Research	7 credits
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#### Spring Semester

PBHL P8XX	Dissertation Research	7 credits
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## **OTHER DEGREE REQUIREMENTS:**

### **a. Preliminary Examination**

The preliminary examination will be taken after completion of the four required courses: Survey Methods, Analysis of Case Control Studies, Analysis of Cohort Studies, and Applied Multivariate Analysis in Public Health.

### **b. Ph.D. Advisor**

The Department of Public health will assign the student to an advisory committee no later than one year after admission to the Ph.D. program. The advisory committee will include at least two epidemiologists; one member may be from another discipline. The advisory committee will approve the student's program of study and counsel the student until he or she passes the qualifying examination.

### **c. Qualifying Examinations**

The qualifying examination will cover the subject matter on which the dissertation work will be based and will be taken after the coursework for the Ph.D. has been completed. Students who fail the qualifying examination are normally allowed to retake it only once.

Students who have passed the qualifying examination must enroll each semester (excluding summer sessions) for dissertation credits. Once such students have accumulated 90 credit hours in completed course work and deferred dissertation credits, they may maintain continuous enrollment by enrolling in one credit of G901; G901 may be taken for no more than a total of six credits.

The Department of Public Health will monitor the students' progress toward the Ph.D. degree and will make recommendations to the University Graduate School regarding the nomination to candidacy, the appointment of a research committee, the defense of the dissertation, and the conferring of the Ph.D. degree.

### **d. Minor Area**

The student will select at least one minor from outside the Department of Public Health. It must include at least four graduate level courses and comply with requirements of the respective minor department or program. The minor area must be approved by the student's doctoral committee.

### **e. Dissertation**

The dissertation will be written on an original topic of research and presented as one of the final requirements for the Ph.D. degree. The student's dissertation research committee will be comprised of members of the graduate faculty. The chair of the dissertation research committee must be a regular faculty member in the Department of Public Health and a full member of the Graduate Faculty. The student will submit to the IUPUI Graduate Office, acting for the University Graduate School, a two-page prospectus of the dissertation research and the

membership of the research committee at least six months before the defense of the dissertation for their approval.

When the dissertation has been completed and approved by the dissertation research committee chair, the student will submit an unbound copy to each member of the research committee as the initial step to the dissertation defense.

After the committee has reviewed the dissertation, the decision to schedule the defense will be made. The student will then present and defend the dissertation orally in a public forum before the committee. Following the dissertation defense, all deficiencies must be adequately addressed to obtain approval by the dissertation research committee.

**f. Form of Recognition**

Students who successfully complete this program will receive an Indiana University degree of Doctor of Philosophy (Ph.D.) in Epidemiology, from the Indiana University Graduate School.

**g. CIP Code**

When a new degree program is created, the appropriate CIP code is suggested at the campus level and approved by the Indiana Commission on Higher Education.

**4. PROGRAM ADMINISTRATION AND FACULTY**

**a. Program Administration**

The IUPUI Ph.D. Program in Epidemiology will be administered by the Department of Public Health of the Indiana University School of Medicine. Primary responsibility will reside with the Chair of the Department of Public Health and the Director of the M.P.H. Program (who will become the Director of Academic Programs when this proposal is approved). Fiscal oversight will be provided by our Business Manager.

**b. Program Faculty**

In order to be an accredited public health doctoral program, the Council on Education for Public Health (CEPH) requires at least five full-time faculty, trained and experienced in the discipline to support it. While teaching resources may be drawn from other university departments and from professionals in practice settings, a central core of faculty to sustain the curricular requirements for the Ph.D. program will be ensured. These five full-time faculty constitute the central core required by CEPH.

The Department of Public Health currently has two full-time epidemiology faculty (G. Marie Swanson, Ph.D., M.P.H. and Greg Steele, Dr.P.H.) with recruitment underway for additional faculty in epidemiology. A third faculty member has accepted an offer and will join the faculty on August 1, 2009. There will be five full-time faculty members in the Department of Public Health by the time the first students are enrolled in this Ph.D. program. Discussions are

underway with two additional faculty who are expected to begin their appointments by July 1, 2009. There are numerous faculty (full-time, part-time and adjunct) on the IUPUI campus and in the Indianapolis area (Lilly, ISDH, MCHD) who currently support existing programs in the department and who are committed to also supporting doctoral teaching and research in epidemiology. The following faculty members have agreed to serve as adjunct faculty in the proposed Ph.D. Program in Epidemiology.

There is strong support from Dean D. Craig Brater, IU School of Medicine, (as shown in the attached letter) for this new doctoral program and for the participation of adjunct faculty from other IU School of Medicine departments.

The responses we received from the following adjunct faculty enthusiastically endorsed a doctoral program in epidemiology. Several commented that they had been waiting years for such a program to be established here.

Name	Employer	Specialization	Dept. of Public Health Appointment	Academic Degree
G. Marie Swanson	Dept. of Public Health	Epidemiology	Full-Time	Ph.D., M.P.H.
Gregory Steele	Dept. of Public Health	Epidemiology	Full-Time	Dr.P.H.
Jianjun Zhang	Dept. of Public Health	Epidemiology	Full-Time	Ph.D.
New Hire	Dept. of Public Health	Epidemiology	Full-Time	
New Hire	Dept. of Public Health	Epidemiology	Full-Time	
Malaz Boustani	IU School of Medicine	Epidemiology	Adjunct	Ph.D., M.P.H.
James Brokaw	IU School of Medicine	Epidemiology	Adjunct	Ph.D., M.P.H.
Linda DiMeglio	IU School of Medicine	Epidemiology	Adjunct	M.D., M.P.H.
Rose Fife	IU School of Medicine	Epidemiology	Adjunct	M.D., M.P.H.
J. Dennis Fortenberry	IU School of Medicine	Epidemiology	Adjunct	M.D., M.S.
Bill Groh	IU School of Medicine	Epidemiology	Adjunct	M.D., M.P.H.
Barry Katz	IU School of Medicine	Biostatistics	Adjunct	Ph.D., M.P.H.
Suthat Liangpunsakul	IU School of Medicine	Epidemiology	Adjunct	M.D., M.P.H.
Gil Liu	IU School of Medicine	Biomed. Eng.	Adjunct	M.D., M.S.
Gerardo Maupome	IU School of Medicine	Epidemiology	Adjunct	BDS, Ph.D.
Indiana Strombom	Eli Lilly & Co.	Epidemiology	Adjunct	Ph.D., M.S.N.
Nancy Swigonski	IU School of Medicine	Hlth. Serv. Res.	Adjunct	M.D., M.P.H.
Barbara Van Der Pol	IU School of Medicine	Epidemiology	Adjunct	Ph.D., M.P.H.
Sarah Wiehe	IU School of Medicine	Epidemiology	Adjunct	M.D., M.P.H.
Paul Zitterbart	IU School of Dentistry	Epidemiology	Adjunct	D.D.S., M.P.H.
Terrell Zollinger	IU School of Medicine	Epidemiology	Adjunct	Dr.P.H., M.S.P.H.

### **c. Needed Learning Resources**

Opportunities to engage in research activities are essential for students in this program. Such opportunities are possible only when faculty themselves are actively engaged in research. Research curricula will culminate in an integrative activity that permits the student to demonstrate the ability to successfully undertake research. Extensive research opportunities will be available to these doctoral students across the IUPUI academic health center. There is no other location in Indiana that could offer such a diverse and rich research environment for epidemiology.

Our Ph.D. students will be able to work one-on-one with individual faculty members and can pursue topics of interest as they arise, capitalizing on faculty's research expertise and on-going projects. The key areas of research available to epidemiology doctoral students on the IUPUI campus include the etiology and prevention of cancer and other chronic diseases, molecular epidemiology and genetics, injury epidemiology, pharmaco-epidemiology, and environmental epidemiology.

Extensive databases that are ideal for epidemiology research are available in numerous IUPUI research centers and institutes, governmental agencies, and businesses in central Indiana. These include the Regenstreif Institute for Health Care, Melvin and Bren Simon Cancer Center, Center for Medical Genomics, Center for Aging Research, Center for Health Services and Outcomes Research, Informatics Research Institute, Oral Health Research Institute, Polis Center, Bowen Research Center, Center for Health Policy, Center for Law and Health, Indiana State Department of Health, Marion County Health Department, and Eli Lilly & Co.

## **C. *PROGRAM RATIONALE***

### **1. INTRODUCTION**

The Department of Public Health is located in the IU School of Medicine on the IUPUI campus. The mission of the Department of Public Health is to improve the health of the residents of Indiana, the United States and the world through teaching, research and community practice programs. The Department of Public Health offers quality degree programs to prepare professionals to work in many different types of public health positions to improve the quality of health and life around the globe as well as right here in our home state. The Department of Public Health also offers non-degree public health programs to educate professionals and agency staff to advance their knowledge and skills in public health. The Ph.D. program in Epidemiology fills a much needed component in the Department of Public Health mission.

A Ph.D. program in epidemiology will support IUPUI's mission to advance the State of Indiana and the intellectual growth of its citizens to the highest levels nationally and internationally through research and creative activity, teaching and learning, and civic engagement. The Ph.D. in Epidemiology will promote educational, cultural, and economic development through research collaborations, public health partnerships, and a commitment to diversity.

Now is the opportune time to supplement the current M.P.H. program in epidemiology with doctoral education in epidemiology. Significant investments have been made by IUPUI, the IU School of Medicine, and collaborating schools to develop the Department of Public Health and its M.P.H. program. But the scale and scope of the education offered is limited to the master's level and is inadequate to meet the pressing needs without doctoral level education. The M.P.H. Program lacks the depth and breadth of scholarship and research that a doctorate in epidemiology would offer to compete successfully for major private, federal and state grants and contracts. A doctoral program in epidemiology would provide highly educated public health professionals prepared to serve Indiana through research, service and teaching.

## **2. EVIDENCE OF DEMAND**

We expect the first Ph.D. students to come from several sources: graduates of our Master of Public Health Program, graduates of other health related masters programs from other IU campuses and universities, as well as members of the regional public health workforce, and employees of businesses and industry.

In September of 2008, an electronic survey went to the alumni of the M.P.H. Program at IU School of Medicine. The survey asked about their interest level in a doctoral program in epidemiology at IUPUI. Of the 69 responses, 11 (15.9%) indicated that they would apply to the program and 26 (37.7%) indicated that they might apply to the program.

As the program matures, it is anticipated that applicants from other states and countries would apply to the Ph.D. Program in Epidemiology. Enrollment in this doctoral program will increase with recruitment efforts at universities and at governmental and non-governmental agencies performing public health functions in Indiana.

## **3. INSTITUTIONAL FACTORS**

Epidemiology is a discipline that is present in many schools and departments on the IUPUI campus, especially in the IU School of Medicine and the Regenstrief Institute. These faculty members will serve multiple roles in the proposed Ph.D. program – teaching doctoral level courses, serving on dissertation committees, supporting doctoral students through their research projects, and through faculty training grants. Through grants and departmental fundraising efforts, scholarships and financial support will be made available for full-time doctoral students.

Financial information is provided in the tables included in the appendices. Associated costs to support the Ph.D. program include a program director (.20 FTE faculty salary & fringe), faculty to teach and advise doctoral students, an administrative assistant (1.0 FTE staff salary & fringe), 6 workstations with computers/printer, tuition support for selected students, annual stipends for doctoral students working as teaching assistants and research assistants. It is projected that five to ten students would be admitted the first year, and four or five would be admitted each year after that for about the first five years.

#### 4. LOCAL, STATEWIDE , NATIONAL AND GLOBAL FACTORS

Local and State-wide Factors: There is strong interest in graduate public health education because of the unprecedented local and state focus on public health issues (i.e. cancer, diabetes, heart disease, West Nile virus, severe acute respiratory syndrome, emergency preparedness, obesity, tobacco use, sexually transmitted infections, etc.) and, in part, from the demand of the market place for qualified public health professionals. The Indiana University School of Medicine Department of Public Health is witnessing record enrollments in its M.P.H. courses, particularly in the Epidemiology concentration.

Faculty and staff in the Department of Public Health continually receive inquiries about doctoral programs in epidemiology. Over the past three years, at least 15 individuals per year have inquired about a doctoral program in epidemiology. Currently there are about 12 students who have indicated that they would wait to pursue their doctorate degree until a program is developed here. The interest in pursuing a doctoral degree in epidemiology comes from employees of state and local health departments, non-government organizations, hospitals and corporations. Because a doctoral degree in epidemiology is not offered in Indiana, individuals who cannot leave Indiana to obtain doctoral education in epidemiology have enrolled in online epidemiology doctoral programs that are not CEPH accredited, or have enrolled in alternate health-related doctoral programs.

As the state's only academic department of public health, our goal is to eliminate the continuing "brain drain" of public health doctoral students who attend programs surrounding states and subsequently do not return to Indiana to practice. With only one academic health center in Indiana, it falls to IUPUI and its health schools, particularly the IU School of Medicine, to provide leadership to establish the doctoral program in epidemiology in Indiana. The health and economic future of Indiana—a state with among the worst health outcome indicators in the country--- will be dependent, in no small part, on creating the capacity to develop the intellectual capital to address the public health research and scholarship needs in Indiana.

An increased public health workforce with expertise in epidemiology is necessary to address the demand for services, demographic changes/growth, changes in the environment, and new information needs in our state. The effectiveness of public health in Indiana is currently limited by insufficient public health education and research at the doctoral level.

Our aim is to better position the Department of Public Health to support development of our research, teaching, and service initiatives parallel to the marked expansion of national and state funding. We believe this positioning is directly relevant to the life sciences initiative and would support our interest in collaborative research and teaching efforts with our colleagues on the IUPUI campus.

Doctoral students in epidemiology will be good candidates for participation in the new Clinical Translational Sciences Initiative (CTSI) at Indiana University. The CTSI program will provide substantial support to participants, both mentoring and financial to assist young researchers establish their research agendas.

National and Global Factors: According to the Institute of Medicine (IOM) report, titled *Who Will Keep the Public Healthy? Educating Public Health Professionals for the 21st Century*, the

extent to which we are able to address the complex challenges of the 21st century depends, in large part, upon the quality and preparedness of our public health workforce, which, in turn, is dependent upon the relevance and quality of public health education. The Association of Schools of Public Health released a report in February 2008 titled, **CONFRONTING THE PUBLIC HEALTH WORKFORCE CRISIS: ASPH STATEMENT ON THE PUBLIC HEALTH WORKFORCE** indicating that the U.S. faces a future public health workforce crisis. The current public health workforce is inadequate to meet the health needs of the U.S. and global population. The full report is available at <http://www.asph.org/UserFiles/PHWFShortage0208.pdf>.

Public health workforce shortages are even more critical in much of the developing world. For example, despite representing 11% of the world's population and 24% of the global burden of disease, sub-Saharan Africa has only 3% of the world's health workers and commands less than 1% of the world's health expenditures. The 2006 *World Health Report* states that there is a "major mismatch" between population needs and the available public health workforce in terms of overall numbers, relevant training, practical competencies and sufficient diversity to serve all individuals and communities. Multifaceted efforts are needed to increase the capacity of the global public health workforce, given the increasingly easy cross-country and transcontinental transmission of disease. Program directors and decision makers with strong epidemiological skills are critical to enable the public health infrastructure to meet the health promotion and disease prevention demands in these areas.

## 5. EMPLOYMENT FACTORS

The doctorate in epidemiology is designed primarily for those who plan to pursue academic careers involving research and teaching, as well as research and project directorship careers in industry, government, and non-governmental agencies. The increased development of accredited schools and programs of public health has resulted in an increased demand for Ph.D. candidates in epidemiology as qualified faculty in those institutions.

In addition to the need for doctorally prepared epidemiologists in schools of public health, there is a growing need for such professionals in other schools. In the September 19, 2008 Washington Post, it was reported that courses in epidemiology are attracting undergraduates in record numbers, prompting a scramble by colleges to hire faculty. "Schools that have taught the subject for years have expanded their offerings in response to surging demand."

The February 2008 Association of Schools of Public Health (ASPH) report concluded the following:

- 250,000 more public health workers will be needed by 2020.
- The current trends indicate that the public health workforce is diminishing over time (there were 50,000 fewer public health workers in 2000 than in 1980), forcing public health workers to do more for more people with fewer resources.
- This challenge is compounded by the fact that 23% of the current workforce – almost 110,000 workers – are eligible to retire by 2012.
- There are documented and forecasted shortages of public health physicians, public health nurses, epidemiologists, health care educators, and administrators. Without enough public



health workers protecting us where we live, work and play, we all are vulnerable to serious health risks.

- To replenish the workforce and avert the crisis, schools of public health will have to train three times the current number of graduates over the next 12 years.

While specific surveys have not been done to assess the need for doctoral level epidemiologists in academia, estimates suggest a current shortage of 30% that could increase to 50% over the next decade. In addition to academia, epidemiologists work in all levels of government, hospitals, businesses, military, health agencies, not-for-profits, and private organizations.

The following table is provided by the Council of State and Territorial Epidemiologists (CSTE) 2006 National Assessment of Epidemiologic Capacity: Findings and Recommendations.

**Total number of persons working in state health departments as epidemiologists and estimated need, by degree (N=55 agencies)**

<b>Academic Degree</b>	<b>Current</b>	<b>%</b>	<b>Est. Need</b>	<b>%</b>
MD, DO	282.3	11%	381.6	11%
DDS	10.5	0%	31.8	1%
DVM	76.4	3%	108.8	3%
<b>Ph.D., Dr.P.H., other</b>	<b>352.7</b>	<b>14%</b>	<b>519.7</b>	<b>16%</b>
M.P.H., MSPH, other	1185.6	47%	1622.9	48%
BA, BS, BSN, other	464.2	19%	592.5	18%
Associate or none	64.9	3%	104.3	3%
Unknown	65*	3%	N/A	N/A
<b>Total</b>	<b>2502</b>	<b>100%</b>	<b>3361</b>	<b>100%</b>

The following excerpts were taken from the February 2008 report released by the Association of Schools of Public Health.

Dramatic public health advances in the 20th century have improved the quality of life—an increase in life expectancy, worldwide reduction in infant and child mortality, and the elimination or reduction of numerous life-threatening communicable diseases. These achievements could not have occurred without the research, practice and service of professionals who comprise the public health workforce. This multi-disciplinary workforce includes public health clinicians, occupational and environmental health specialists, epidemiologists, biostatisticians, health program administrators and educators, health economists, planners and policy analysts.

More than 50% of states cite the lack of trained personnel as a major barrier to our nation’s preparedness. Additionally, a recent Institute of Medicine report states that there is a shortage of 10,000 public health physicians—double the amount estimated to be practicing currently. Other reports have documented and forecast shortages among public health nurses, epidemiologists, health care educators, and administrators. Moreover, there are demonstrated

disparities in the public health workforce related to racial and ethnic parity, as well as geographic mal-distribution.

## **6. IMPACT ON OTHER UNITS AND PROGRAMS AT IUPUI AND IUB**

Students in this program will conduct scientific research into problems unique to the health of populations, collaborate with medical researchers in many other departments and schools, provide a critically needed academic resource to support our state's public health infrastructure, build upon the considerable investments that Indiana has made in the life sciences initiative, provide data that will impact health policy and health services delivery systems, address the growing demand for experts in epidemiology across a wide range of organizations, and increase Indiana University's opportunity to obtain funding for research and training.

The Department of Public Health currently collaborates with other academic units on the IUPUI and IUB campuses by offering 12-credit hour doctoral minors in epidemiology and in public health, which were approved by the IUPUI Graduate Affairs Committee several years ago. Doctoral students from other disciplines have pursued these minors to complement their major discipline of study.

Recently academic and public leadership have recognized that the genomics/proteomics advances must be directly linked with public health if quality science, scholarship, education, public health policy and practice are to be advanced over the next 25-50 years. Major academic institutions have already forged this important link. A doctoral program in epidemiology will extend the investments the State of Indiana, Indiana University, and partner institutions have made in genomics and the life sciences initiative.

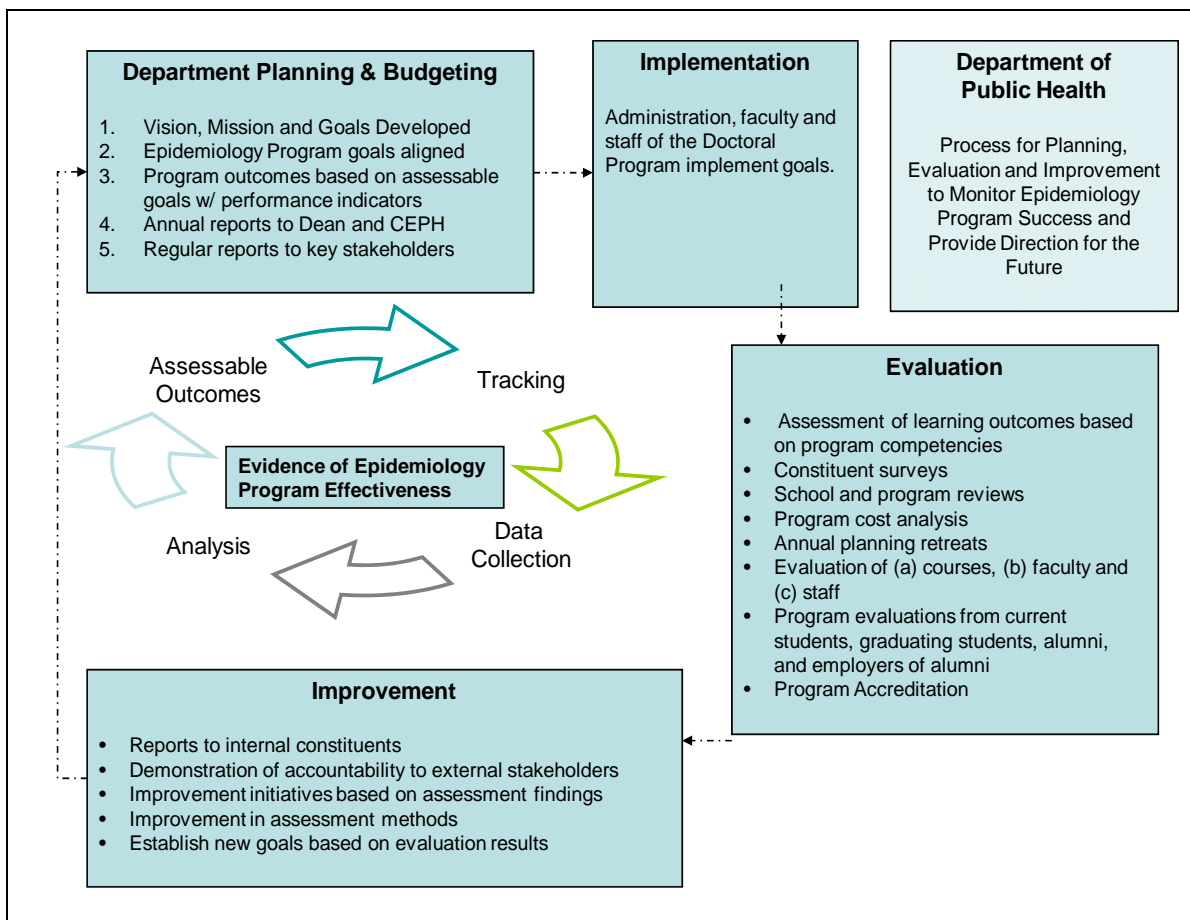
Letters of support for this proposal are included in the appendices.

## 7. PLANNING AND IMPLEMENTATION

According to the accrediting body, the Council on Education for Public Health (CEPH), Ph.D. programs in epidemiology must provide an interdisciplinary learning environment in which students can acquire a broad public health orientation, as well as depth of education in the discipline of epidemiology. Since this program will prepare students who may become public health faculty, as well as prepare researchers who will be expected to work in multidisciplinary settings, the curriculum was developed to provide the Ph.D. students with a broad public health perspective.

The CEPH requirements further stipulate that students in academic curricula be familiar with the basic principles and application of epidemiology and develop competence in other areas of public health knowledge that are particularly relevant to their own disciplines. Opportunities for cross-disciplinary work will be afforded to students in the doctoral program in epidemiology.

Doctoral Program in Epidemiology: Process for Planning, Implementation, Evaluation and Monitoring



## 8. EVALUATION AND ASSESSMENT

The major evaluation and assessment for any public health program in our department is through the Council on Education for Public Health (CEPH). We are currently beginning our self-study for reaccreditation of our MPH Program. If the doctoral program in epidemiology is approved, it will be reviewed at the same time as the MPH Program and would receive accreditation in June of 2012.

An advisory board will ensure continuous assessment and improvement of this program. The following advisory board, consisting of internal and external partners, will oversee the program's evaluation and assessment process.

The following advisory board, consisting of internal and external partners, will oversee the program's evaluation and assessment process.

G. Marie Swanson, Ph.D., M.P.H.  
Professor and Chair, IU Department of Public Health  
Former CEPH Board Member  
Founding Dean of the University of Arizona Zuckerman College of Public Health

Gregory Steele, Dr.P.H.  
IUSM Associate Professor  
Former Indiana State Epidemiologist

Terry Zollinger, Dr.P.H.  
IUSM Professor  
Epidemiologist - Bowen Research Center

Indiana Strombom, Ph.D., MSN  
IUSM Adjunct Faculty  
Epidemiologist - Eli Lilly & Company

Barry Katz, Ph.D.  
IUSM Professor  
Biostatistics Division Director

Gerardo Maupome, B.D.S., Ph.D.  
IUSD Professor  
Epidemiologist - Oral Health Research Institute

Joe Gibson, Ph.D.  
IUSM Adjunct Faculty  
Epidemiologist - Marion County Health Department

Dr. Swanson has served on the CEPH Board of Councilors, the body that makes all public health accreditation decisions. Her familiarity with the accreditation criteria will enable us to develop evaluation measures for this Ph.D. program that meet the highest national standards. She continues to chair site visits of public health programs and schools for CEPH.

Quantitative and qualitative measures of performance to determine success of the doctoral program include, but are not limited to, the following:

1. Applicant to Enrollee Ratio
2. Number and Diversity of Active Students
3. Flexibility of Program Design
4. Student Performance in Required and Elective Courses
5. Student Performance in 12 cr. hr. Minor
6. Student Performance on Preliminary Exam, Qualifying Exam, Dissertation Defense
7. Faculty to Student Ratio
8. Student Feedback
9. Research Opportunities and Funding
10. Quality and Level of Journals in which Students' Research is Published
11. Student Presentations, Awards, Recognition at Scientific Conferences
12. Average Length of Time to Complete Degree
13. Number of Graduates Per Year
14. Employment Rates of Graduates
15. Feedback from Campus and Institution
16. Feedback from Employers of Graduates
17. Feedback from Alumni
18. Feedback from the Public Health Community

Appendices:

Appendix I: Course Descriptions

Appendix II: Financial Tables

Appendix III: Letters of Support

## Appendix I: Course Descriptions

<b>Course Title:</b>	Fundamentals of Epidemiology
<b>Course Number:</b>	H517
<b>Home School:</b>	Department of Public Health
<b>Credit Hours:</b>	3.0
<b>Prerequisites:</b>	
<b>Description:</b>	This course will introduce students to basic epidemiologic concepts including determinants of health and patterns of disease in populations, population health descriptive techniques, use of health indicators and secondary data sources. Students will gain an understanding of the role of Epidemiology in developing prevention strategies and policy. Among the topics to be covered are measures of mortality and morbidity, design and analysis of observational studies, community health assessment and program evaluation.
<b>Course Title:</b>	Advanced Epidemiology
<b>Course Number:</b>	P601
<b>Home School:</b>	Department of Public Health
<b>Credit Hours:</b>	3.0
<b>Prerequisites:</b>	H517 & P651(or concurrently enrolled)
<b>Description:</b>	This course provides students with an in-depth understanding of advanced epidemiologic concepts introduced in other courses as well as a fundamental understanding of epidemiologic techniques not covered in other classes. Topics included will represent cutting edge techniques, philosophical issues and insights to appropriately conduct and interpret the findings of epidemiological studies. Students will gain an understanding of these concepts and issues through discussions with expert epidemiologists and hands-on exercises.
<b>Course Title:</b>	Epidemiology Research Methods
<b>Course Number:</b>	P600
<b>Home School:</b>	Department of Public Health
<b>Credit Hours:</b>	3.0
<b>Prerequisites:</b>	H517 & P651
<b>Description:</b>	This course provides an in-depth presentation of the major research designs, analytical methods, and practical issues specifically related to conducting research in the field of epidemiology, outcomes research, and health economics. Descriptive, observational and experimental designs are included. In addition, issues of ethics, protocol, data quality, instrument design, and analysis are covered.
<b>Course Title:</b>	Health Outcomes Research
<b>Course Number:</b>	H615
<b>Home School:</b>	Department of Public Health
<b>Credit Hours:</b>	3.0

**Prerequisites:** H501, H502 & H514.  
**Description:** Health care leaders of the future will be judged increasingly on their ability to achieve positive quality outcomes and safe patient care through working together in interdisciplinary leadership teams. This course is designed for graduate level learners in medicine, nursing, public health, informatics, health administration and other health related disciplines. The course content is an introduction to evidence-based quality and patient safety programs. Included will be content and practical application about the current science and best practices, essential leadership skills, and techniques and tools for measurement and analysis.

**Course Title:** Biostatistics for Public Health I  
**Course Number:** P651  
**Home School:** Department of Public Health  
**Credit Hours:** 3.0

**Prerequisites:**  
**Description:** This course introduces the basic principles and methods of data analysis in public health biostatistics. Emphasis is placed on public health examples as they relate to concepts such as sampling, study design, descriptive statistics, probability, statistical distributions, estimation, hypothesis testing, chi-square tests, t-tests, analysis of variance, linear regression and correlation.

**Course Title:** Biostatistics for Public Health II  
**Course Number:** P652  
**Home School:** Department of Public Health  
**Credit Hours:** 3.0  
**Prerequisites:** P651

**Description:** This course introduces the advanced principles and methods of data analysis in public health biostatistics. Emphasis is placed on public health examples as they relate to concepts such as: Multiple regression, analysis of variance and covariance, logistic regression, nonparametric statistics, survival analysis, statistics used in epidemiology, and repeated measures analysis.

**Course Title:** Infectious Disease  
**Course Number:** P609  
**Home School:** Department of Public Health  
**Credit Hours:** 3.0

**Prerequisites:**  
**Description:** Designed to provide a basic overview of the infectious disease process, including disease agents, transmission, routes, immunity and public health significance. The course introduces principles of infectious disease epidemiology, including outbreak investigation and surveillance using case studies as examples. Concepts on globalization of disease, microbial ecology, and disease eradication are also discussed.

**Course Title:** Chronic Disease Epidemiology  
**Course Number:** P610  
**Home School:** Public Health  
**Credit Hours:** 3.0  
**Prerequisites:** PBHL H517 or equivalent  
**Description:** Examines chronic health conditions from epidemiological perspectives. Concepts include distribution, determinants, measures of severity, treatment modalities, surveillance measures, survival and prognosis and quality of care measures. Research methods, prevention strategies and screening tests are presented. Clinical expert's present diagnosis and treatment methods.

**Course Title:** Cancer Epidemiology  
**Course Number:** P505  
**Home School:** Public Health  
**Credit Hours:** 3.0  
**Prerequisites:** H517  
**Description:** This course is an overview of cancer epidemiology, focusing on key concepts, etiologic research, applications to public health practice and major methodologies.

**Course Title:** Instrumentation and Measurement  
**Course Number:** R601  
**Home School:** Nursing  
**Credit Hours:** 3.0  
**Prerequisites:** R603, R604, or faculty consent  
**Description:** This course provides an opportunity for the student to develop expertise in developing and testing the psychometric properties of an instrument to measure health-related phenomena. Content focuses on theoretical foundations of measurement, item construction, questionnaire design, and content analysis, item analysis, assessment of reliability and validity, accuracy and precision, and manuscript preparation to report psychometric properties.

**Course Title:** Qualitative Inquiry & Research Methods  
**Course Number:** R610  
**Home School:** Nursing  
**Credit Hours:** 3.0  
**Prerequisites:** R500. R603, or faculty consent  
**Description:** Required course that introduces students to the philosophical and methodological foundations of qualitative research in nursing. Students develop skills in understanding and critiquing health sciences research using qualitative designs and methods. Students acquire beginning skills in planning and conducting research in the qualitative paradigm.



**Course Title:** Categorical Data Analysis  
**Course Number:** 523  
**Home School:** Statistics  
**Credit Hours:** 3.0  
**Prerequisites:** 528 or equivalent, or faculty consent  
**Description:** Models generating binary and categorical response data, two-way classification tables, measures of association and agreement, goodness-of-fit tests, testing independence, large sample properties. General linear models, logistic regression, and probit and extreme value models. Loglinear models in two and higher dimensions; maximum likelihood estimation, testing goodness-of-fit, partitioning chi-square, and models for ordinal data. Model building, selection, and diagnostics. Other related topics as time permits. Computer applications using existing statistical software.

**Course Title:** Introduction to Survival Analysis  
**Course Number:** 536  
**Home School:** Statistics  
**Credit Hours:** 3.0  
**Prerequisites:** 517 or equivalent  
**Description:** Deals with the modern statistical methods for analyzing time-to-event data. Background theory is provided, but the emphasis is on the applications and the interpretations of results. Provides coverage of survivorship functions and censoring patterns; parametric models and likelihood methods, special life-time distributions; nonparametric inference, life-tables, estimation of cumulative hazard functions, and the Kaplan-Meier estimator; one- and two-sample nonparametric tests for censored data; and semiparametric proportional hazards regression Cox Regression, parameters' estimation, stratification, model fitting strategies, and model interpretations. Heavy use of statistical software such as Splus and SAS.

**Course Title:** Applied Spatial Statistics  
**Course Number:** G588  
**Home School:** Geology  
**Credit Hours:** 3.0  
**Prerequisites:**  
**Description:** The objectives of this course: To explore the foundations of spatial analysis (related mathematical and statistical theory) at a level and depth appropriate for someone aspiring to study higher-level environmental science and/or to become a professional environmental health scientist. To present an introduction to the field of topology, with emphasis on those aspects of the subject that are basic to advanced spatial statistics. To introduce the student to what it means to do spatial statistics, as opposed to learning about spatial statistics or to learning to do exercises. To help the student learn how to write spatial statistics text according to the standards of the profession. To develop

competence in handling large multivariate spatial analysis e.g. analyzing EPA point source data and population health data.

**Course Title:** Clinical Trials

**Course Number:** G661

**Home School:** Graduate

**Credit Hours:** 3.0

**Prerequisites:**

**Description:**

This course covers core topics in conducting clinical trials, including design, recruitment, informed consent, randomization, blinding, data collection and analysis, safety monitoring, study closeout, and alternative designs such as cross-over and nonrandomized trials. Also, regulatory and special topics are covered including drug trials phase I through IV, patenting and other legal issues, institutional review boards, cancer trials, cells and human tissue, and trials involving special populations.

**Course Title:** Social Aspects of Mental Health and Mental Illness

**Course Number:** R585

**Home School:** Sociology

**Credit Hours:** 3.0

**Prerequisites:** graduate standing or consent of instructor

**Description:**

This is a graduate-level course on the sociology of mental illness and mental health. Provides a thorough grounding in the research issues and traditions that have characterized scholarly inquiry into mental illness in the past. Students will become familiar with public policy as it has had an impact on the treatment of mental illness and on the mentally ill themselves.

**Course Title:** Basic Human Genetics

**Course Number:** Q580

**Home School:** Medical and Molecular Genetics

**Credit Hours:** 3.0

**Prerequisites:** General Genetics and consent of instructor

**Description:**

An introduction to the genetics of human traits and heritable disease. EM.P.H.asis will be on general aspects of eukaryote genetics as it applies to humans, but some prokaryote genetics will be included for comparison.

Questions can be addressed to:  
G. Marie Swanson, Ph.D., M.P.H.  
Professor and Chair  
Department of Public Health  
IU School of Medicine  
317-274-3126  
swanson3@iupui.edu



**Appendix II: Click here to open Financial Tables:**



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