



SCHOOL OF
PUBLIC HEALTH

Department of Epidemiology and Biostatistics

REQUIREMENTS AND PROCEDURES

DOCTOR OF PHILOSOPHY DEGREE IN EPIDEMIOLOGY

April 2018

DEGREE OVERVIEW

The goal of the Ph.D. program in Epidemiology is to train students for future careers in epidemiologic research and leadership in public health, with a particular emphasis on improving health and reducing health disparities in local communities, Maryland, and the nation. Epidemiology is the study of the distribution and determinants of the varying rates of diseases, injuries, and other health states in human populations. As the fundamental science underlying public health practice, epidemiology provides the conceptual and practical tools necessary for the study of public health problems and the design of adequate control measures.

Doctoral students are trained to advance knowledge of the patterns and causes of diseases and disabling conditions, to apply epidemiologic methods to the prevention and control of disease/injury, and to promote and improve population health. Students are trained not only through formal coursework, but also through active engagement in research, departmental activities, research seminars, and through attendance at professional meetings at the state, regional, national, and international levels. Program graduates are expected to understand Epidemiology as a discipline and are expected to develop teaching and presentation skills appropriate to their specialization. The graduate faculty expects all students will be “good citizens” and perform effectively in professional groups. In addition, PhD in Epidemiology students will meet the program competencies by the end of their program (Tables 1 and 2).

Completion of the Doctor of Philosophy degree signifies that a student is capable of conducting independent research and has attained a high level of scholarship. Students are expected to demonstrate high scholastic achievement, an understanding of current foundations of epidemiologic methods, and appropriate research skills necessary to advance knowledge in their specialization. The capability to conduct quality independent research using sound methodology is essential. In addition to coursework, doctoral students are expected to engage in ongoing research under the guidance of their advisor. The graduate faculty is committed to providing both the leadership and experiences necessary to attain these goals.

Table 1: PhD in Epidemiology Competencies (Before Fall 2018)

| Epidemiology Common Core Competencies (MPH) |
|---|
| 1. Identify vital statistics and other key sources of data for epidemiological purposes |
| 2. Describe a public health problem in terms of magnitude, person, time and place |
| 3. Discuss the principles and limitations of public health screening programs. |
| 4. Comprehend basic ethical and legal principles pertaining to the collection, maintenance, use and dissemination of epidemiologic data |
| 5. Explain the importance of epidemiology for informing scientific, ethical, economic and political discussion of health issues |
| 6. Calculate basic epidemiology measures |
| 7. Communicate epidemiologic information to lay and professional audiences |
| 8. Differentiate among the criteria for causality |
| 9. Draw appropriate inferences from epidemiologic data |
| 10. Describe epidemiologic study designs and assess their strengths and limitations |
| 11. Evaluate the strengths and limitations of epidemiologic reports |
| PhD Advanced Epidemiology Cognate Competencies |
| 12. Critically evaluate social determinants of health |
| 13. Explain predictors and mechanisms of disease or health events |
| 14. Calculate advanced epidemiology measures |
| 15. Critically evaluate measures of association |
| 16. Design, analyze, and evaluate an epidemiologic study |
| 17. Critically appraise epidemiologic literature |
| 18. Demonstrate skills in public health data collection and management |
| 19. Critically evaluate questionnaire and survey instruments |
| 20. Design and evaluate interventions to reduce prevalence of major public health problems |
| 21. Critique the use of meta-analytic statistical techniques |
| 22. Describe and apply statistical approaches to address threats to validity in epidemiologic studies |
| 23. Compare clustered data with traditional epidemiologic data from survey and randomized clinical trials |
| 24. Analyze causal associations |
| 25. Characterize issues associated with missing data |
| 26. Appraise how quantitative and qualitative data can be integrated into mixed methods in epidemiologic research |
| PhD Individualized Research Plan Competencies |
| 27. Develop expertise in an area of independent research interest |

Table 2: PhD Competencies (After Fall 2018)

| PhD in Epidemiology Program Competencies |
|--|
| 1. Develop novel epidemiological research questions by critically reviewing and evaluating public health literature. |
| 2. Use epidemiologic theories of disease causation to conceptualize a general casual framework that captures determinants of disease occurrence. |
| 3. Demonstrate proficiency in selecting and conducting the most appropriate study design to address a research question (e.g., ecological study, cross-sectional study, case-control study, cohort study, or randomized trials). |
| 4. Explain conceptual definitions of exposure variables, outcome variables, mediators, and modifiers in ways consistent with the casual framework guiding the research. |
| 5. Identify potential confounders, information bias, and selection bias that distort the validity of a study and ability to minimize them through design, data collection, and analysis. |
| 6. Understand required elements to estimate sample size and apply methods to provide valid estimates of parameters for sample size calculations for different study designs. |
| 7. Demonstrate skills in public health data collection and management. |
| 8. Develop analytic strategies for various study designs, guided by the principles of epidemiology, to account for confounding, interaction effects, and intermediate effects. |
| 9. Understand the rationale and assumptions underlying major statistical techniques used to analyze data from epidemiological studies. |
| 10. Critically evaluate measures of association (e.g., odds ratio, risk ratio, rate ratio, or hazard ratio) and understand how to select between them for various study designs. |
| 11. Demonstrate proficiency in communication skills in reports of findings from research projects (conference presentations, scientific publications, and grant writing). |
| 12. Develop expertise in an area of independent research interest. |

REQUIREMENTS FOR SATISFACTORY PROGRESS

Each year, students must meet *minimum* requirements for “satisfactory progress” to be permitted to continue in the doctoral program. Students must meet all degree *Milestones* within the time requirements and must maintain a 3.0 GPA throughout their program (See expanded Graduate School policy on “Academic Standing”, below). All doctoral students must register for at least 1 credit hour each semester (not including summer or winter sessions). Students should register for the number of credits that will, in the judgment of the graduate program faculty, accurately reflect their involvement in graduate study.

ACADEMIC

Academic Standing – Graduate School Policy

In order to maintain good academic standing, every graduate student must maintain a cumulative grade point average (GPA) of 3.0 for all courses taken at the University. A student whose cumulative grade point average falls below a 3.0 will be placed on academic probation by the Graduate School. The Graduate School will notify both the student and the Director of Graduate Studies of the student’s program when a student is placed on probation. A student who is on probation requires the permission of the academic advisor and the Director of Graduate Studies to register for courses for each semester that she or he remains on probation. Probation will be lifted when the student achieves a cumulative GPA of 3.0. A student at the beginning of his or her graduate program whose GPA falls below 3.0 must raise it to 3.0 or above by the end of the semester in which his or her 15 hours of course work are completed, or be dismissed from the Graduate School. A student who has completed 16 or more hours of course work and whose cumulative GPA falls below 3.0 will also be placed on probation and will have one semester in which to raise his or her GPA to a 3.0. If the student does not achieve a cumulative GPA of 3.0 by the end of that semester, she or he will be dismissed from the Graduate School.

MILESTONES AND TIMELINES

The Doctor of Philosophy degree is structured as a series of Milestones that students attain as they complete the requirements leading to the doctoral degree. Milestones represent major components of the degree that represent significant accomplishments in the process of degree completion. Each milestone is described in depth within the Procedures section. To meet the requirements for Satisfactory Progress, students must reach each milestone within the timelines and consistent with the criteria specified in the table, below. The table provides a summary of the Ph.D. Milestones and suggested and required timelines leading to satisfactory progress designations. **It is the student’s responsibility to be informed of requirements and procedures and to complete all required paperwork/forms correctly and in a timely manner.**

Table 3: PhD Program Milestone Timeline

| | YEAR IN PROGRAM | | | | |
|---|-----------------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Milestone 1 | | | | | |
| Complete program of study (coursework & research) | x | | | | |
| Milestone 2 | | | | | |
| Complete the majority of formal coursework | | x | | | |
| Complete the written comprehensive exams | | | x | | |
| Complete the oral comprehensive exam | | | x | | |
| Milestone 3 | | | | | |
| Advance to candidacy | | | x | | |
| Milestone 4 | | | | | |
| Complete/defend dissertation proposal | | | | x | |
| Milestone 5 | | | | | |
| Complete/defend dissertation | | | | | x |

RESEARCH

Students are involved in research and scholarship throughout their doctoral program. Often, they begin as members of a research group or team and gradually assume more responsibilities for methodological and conceptual contributions within the team. These and other skills developed through independent research are instrumental in the conceptualization and completion of the dissertation research. This process is documented in the Research Plan of Study, discussed in more depth in this document under the section, *Program of Study*.

TEACHING

Upon graduation, many Ph.D. graduates accept faculty positions that require graduate teaching. To prepare students for these responsibilities, students may complete the Teaching Certificate Program sponsored by the University Teaching & Learning Program (<http://www.cte.umd.edu/UTLPregs.html>). Because of the many different career trajectories available to Epidemiologists with doctoral-level training, teaching experience is an option rather than a requirement.

PROFESSIONAL AND COLLEGIAL

During their academic careers, students will find a number of opportunities to present themselves in a professional or a collegial context. Students are expected to become involved in both academic meetings and social gatherings at the department, school, and university levels that help create a sense of community among scholars. Further, students can learn from interactions with each other, from faculty both within the department and university, and by acting as a university representative to visitors. Students are encouraged to attend state, regional, national, and international conferences, first as an attendee, then as an active participant, and eventually as a first author on scholarly presentations. The image students present should be prepared, professional, and reflect the high standards of scholarship that positively represent themselves, their advisors, the research team, the department, the school, and the university at large.

Maintaining good working relationships with others aids in moving research projects forward. Being a good citizen in office and teaching areas includes respecting the space, work, schedules, equipment, and research participants of all fellow researchers.

After graduation, service is often part of the professional careers many students choose. While there is no formal service obligation for graduate students, there are numerous opportunities within the department and across the University to develop service experience. Students often hold seats on department committees, represent their individual group to the Department Chair, support social, fraternal, or intramural sports organizations, or participate in some form of Graduate Student Government.

ANNUAL PROGRESS MEETING

Annually and prior to May 1st, each student is required to meet with his or her advisor and the Epidemiology faculty, if desired, to report on their progress and to receive direction regarding future study. Students are required to provide (a) a completed **Student Degree Progress Report (EPID)** to include competencies mastery progress and (b) an unofficial transcript to faculty members in their specialization a minimum of 5 working days prior to their annual progress meeting to provide faculty adequate time for review. At the annual progress meeting, the student will provide a brief oral summary of the written assessment. The faculty and the student will discuss the student's strengths and weaknesses and jointly develop a detailed plan to address any weaknesses prior to the next annual progress meeting. At the conclusion of the annual progress meeting, faculty will evaluate the student's accomplishments and determine if the student is making satisfactory progress. Students may be advised of unsatisfactory progress at this time and told to prepare a plan and timeline to return to satisfactory progress. Failure to meet satisfactory progress requirements in two consecutive years may lead to termination. The Student Degree Progress Report (EPID) requires review by the Graduate Director. Copies of the report will be given to the student, and placed in the student's academic folder in the graduate office.

CONTINUOUS REGISTRATION

All graduate students must be registered the first semester of their doctoral program and *each successive fall and spring semester* until graduation. Graduate students must register for the number of graduate units/credits that will, in the judgment of the advisor and the Graduate Director, accurately reflect the student's involvement in graduate study and use of university resources. Students must register for a minimum of 1 credit prior to Advancement to Candidacy.

Following Advancement to Candidacy (M4), the Graduate School requires that candidates register for a minimum of 6 credits of EPIB 899 each fall and spring semester until the degree is conferred. A student who has not registered for graduate courses for two consecutive semesters and has not received written permission for a time-limited leave of absence from the Graduate Director will be terminated from the graduate program. See current Graduate School policies for latest information on this policy.

TIME LIMITATIONS

Advancement to Candidacy must be accomplished within 5 years after admission to the doctoral program. The candidate then has 4 *additional* years in which to complete the dissertation and final oral defense. Continuous registration is required throughout the doctoral degree. See the Continuous Registration policy, above, and the University of Maryland Graduate School website for the latest information on this university-wide policy.

An initial time extension of up to one year is possible if the student can document extenuating circumstances. Written requests for extensions accompanied by a rationale and a *detailed* projected monthly timeline must be approved by the advisor and Graduate Director before requests are granted. Requests without required documentation (i.e., rationale, advisor supporting letter, detailed timeline) are unlikely to be approved. Appeals of denied requests may be made to the Graduate Committee, with supporting documentation.

Students may request additional time extensions (beyond the first extension described above) due to extenuating circumstances. All requests should include a rationale for the request, advisor supporting letter, and detailed monthly timeline for degree completion. Subsequent time extensions must be approved by the Graduate Director, the Graduate Committee, and the Graduate School.

MANDATORY TERMINATION DUE TO UNSATISFACTORY PROGRESS

The advisor at any time may notify the student of unsatisfactory progress and advise her/him to withdraw voluntarily from the program. Mandatory termination due to unsatisfactory progress will be considered following two reports of unsatisfactory progress at the student's Annual Progress meeting. Decisions to terminate a student due to unsatisfactory progress will be made by the Graduate Director upon the recommendation of the advisor, the Annual Progress committee, and the Graduate Committee.

LEAVE OF ABSENCE

Students may request a leave of absence for a period normally not to exceed one year. During this period, the Graduate School time limitations on Advancement to Candidacy and Graduation will be suspended and the termination date will be extended for the leave period. Reasons for a leave of absence request may include, but are not limited to, family and medical leave and other exceptional circumstances (e.g., foreign student visa application delays, military assignment, etc.)

Requests for a leave of absence must include (a) a rationale for the request and (b) an advisor's letter of support. The request requires the approval of the Graduate Director and the Graduate School. If a student requests a one semester leave and then must extend the leave to a second semester, this request constitutes only one leave of absence. See current the Graduate School website for latest information on this policy.

GRADUATE COURSE LOAD

No full-time graduate student may carry more than 15 hours of credit during any one semester. Students who have been granted Graduate Assistantships usually enroll in 10 credits of coursework,

as tuition remission covers 10 credits per semester. If a graduate assistant student is interested in taking more credits, they may take no more than 12 credits. Full-time summer-term students may not enroll in more than 6 hours of credit in a six-week period.

Registration for a minimum of 48 graduate *units* per semester is necessary to satisfy full-time status:

- 400-level courses carry 4 units per credit hour
- 600-700 level courses typically carry 6 units per credit hour

Students receive 24 units for holding a graduate assistant and are awarded full-time status upon registration for an additional 24 graduate units (a minimum of 48 total units). See Graduate School website for latest information on this policy.

GRADUATE CREDITS

Ph.D. programs typically included coursework at the 600 - 800 levels. Occasionally, students may receive *Program of Study* Committee approval for 3-credits of 400 or 500 level courses.

Undergraduate courses (i.e., 300 level and below) and selected courses identified by the graduate faculty may be included in the graduate coursework program of study (for 0 credit) but cannot be counted as graduate credits toward the minimum 64 credit requirement for the Ph.D.

PROCEDURES FOR MILESTONE COMPLETION

PROGRAM OF STUDY (Milestone 1)

OVERVIEW

The *Program of Study* is a formal plan which incorporates courses, research, and other experiences significant to the culture of scholarship. *Program of Study* approval represents **Milestone 1** in the Ph.D. program and is a formal plan that lists courses and research experiences that meet the requirements of the Ph.D. degree. Coursework and research plan components of the *Program of Study* are approved in one inclusive committee meeting.

REQUIREMENTS AND CREDIT DISTRIBUTION FOR PH.D. DEGREE

Students in the Ph.D. program will be able to pursue an epidemiology degree with a choice of three content specializations: Epidemiologic Methods, Social Epidemiology, and Environmental Epidemiology. Students who choose to specialize in Environmental Epidemiology will take graduate courses offered in the Maryland Institute for Applied Environmental Health (MIAEH) to gain expertise in this content area. As other specialization areas are identified by the Department of Epidemiology and Biostatistics faculty, they will be offered as well. The full program is described in Table 1 below..

As shown in Table 1, the proposed program requires a minimum of 64 graduate credit hours beyond the master's degree in epidemiology or public health, including 12 credit hours of dissertation research. Students entering the program with a master's degree in a field other than epidemiology are required to take epidemiology and biostatistics coursework (see Table 1) to gain competency in these content and method areas. A minimum of 12 credit hours in a specialization cognate area (e.g. Social Epidemiology) is required for specialization (included in the 64 credits). The actual credit hours and related experiences approved by the student's Program of Study Committee may exceed 64 credits and should be based on the student's previous experiences and future scholarly goals. The graduate faculty anticipates that credit hours and ancillary experiences taken by doctoral students will vary considerably from student to student. The *Program of Study* committee determines the number of credits required in the specialization. Students admitted to the Ph.D. program advance to candidacy upon completing required coursework and passing a written and oral comprehensive examination. After advancement to candidacy, students must successfully complete the dissertation proposal defense and oral defense.

If a master's degree student in the Department of Epidemiology and Biostatistics continues into the doctoral program, the minimum total of course credits for both programs (M.P.H. & Ph.D.) is 108 credit hours. This total includes a minimum of 43 credits required for the Master of Public Health degree (37 hours of coursework + 6 hours of thesis (EPIB 799)), a minimum of 52 credit hours towards of doctoral coursework, and a minimum of 12 credits of dissertation (EPIB 899).

Table 4: PhD in Epidemiology: Program Requirements (Before Fall 2018)

| | Course Title | Credits | |
|--|--|---|----|
| Pre-Requisites (15 Credits) | EPIB 610 Foundations of Epidemiology | 3 | |
| | EPIB 611 Intermediate Epidemiology | 3 | |
| | EPIB 650 Biostatistics I | 3 | |
| | EPIB 651 Biostatistics II | 3 | |
| | EPIB 697 Public Health Data Management | 3 | |
| Core (31 Credits) | EPIB 612 Epidemiologic Study Design | 3 | |
| | <u>Pick one course in content area:</u> EPIB 620 Chronic Disease Epidemiology OR EPIB 621 Infectious Disease Epidemiology | 3 | |
| | EPIB 641 Public Health and Research Ethics | 1 | |
| | EPIB 652 Categorical Data Analysis | 3 | |
| | <u>Pick one course in advanced statistical methods:</u> EPIB 653 Applied Survival Data Analysis OR EPIB 655 Longitudinal Data Analysis | 3 | |
| | EPIB 660 Epidemiologic Methods for Primary Research | 3 | |
| | EPIB 710 Grantsmanship for Epidemiologic Research | 3 | |
| | EPIB 740a Advanced Methods in Epidemiology | 3 | |
| | EPIB 740b Advanced Methods in Epidemiology | 3 | |
| | EPIB 788 Critical Readings | 3 | |
| | EPIB 798 Independent Study | 3 | |
| | Electives (9 Credits) | 9 credits to be determined by advisement in advanced methods | 9 |
| | Specialization: Individually Tailored (12 credits) | 12 credits to be determined by advisement in areas of specialization and advanced methods | 12 |
| Specialization: Social Epidemiology (12 credits) | HLTH 665 Health Behavior 1 (Pre-requisite) | 3 | |
| | EPIB 622 Social Determinants of Health | 3 | |
| | 9 credits to be determined by advisement in areas of specialization and advanced methods to include such courses as: EPIB 623 Epidemiology of Health Disparities | 9 | |
| Specialization: Environmental Epidemiology (12 credits) | MIEH 600 Foundations in Environmental Health (Pre-requisite) | 3 | |
| | MIEH 775 Environmental and Occupational Epidemiology | 3 | |
| | 9 credits to be determined by advisement in areas of specialization and advanced methods to include such courses as: MIEH 720 Toxicology, MIEH 740 Risk Assessment, and MIEH 771 Exposure Assessment | 9 | |
| Dissertation (12 Credits) | EPIB 899 Doctoral Dissertation Research | 12 | |
| | Total Credits PhD in Epidemiology Program | 64 | |

Table 5: PhD in Epidemiology: Program Requirements (After Fall 2018)

| | Course Title | Credits |
|--|---|----------------|
| Pre-Requisites (13 Credits) | SPHL 602 Foundations of Epidemiology and Biostatistics | 4 |
| | EPIB 611 Intermediate Epidemiology | 3 |
| | EPIB 651 Biostatistics II | 3 |
| | EPIB 697 Public Health Data Management | 3 |
| Core (28 Credits) | SPHL 600 Foundations of Public Health | 3 |
| | EPIB 612 Epidemiologic Study Design | 3 |
| | <u>Pick one course in content area:</u> EPIB 620 Chronic Disease Epidemiology EPIB 621 Infectious Disease Epidemiology | 3 |
| | SPHL 612 Research Ethics | 1 |
| | EPIB 652 Categorical Data Analysis | 3 |
| | <u>Pick one course in advanced statistical methods:</u> EPIB 653 Applied Survival Data Analysis EPIB 655 Longitudinal Data Analysis | 3 |
| | EPIB 710 Grantsmanship for Epidemiologic Research | 3 |
| | EPIB 740 Advanced Methods in Epidemiology | 3 |
| | EPIB 788 Critical Readings | 3 |
| | EPIB 798 Independent Study | 3 |
| Electives (12 Credits) | 12 credits to be determined by advisement in advanced methods | 12 |
| Specialization Electives (12 Credits) | 12 credits to be determined by advisement in area of specialization (Social Epidemiology, Environmental Epidemiology, Tailored) | 12 |
| Dissertation (12 Credits) | EPIB 899 Doctoral Dissertation Research | 12 |
| | Total Credits PhD in Epidemiology Program | 64 |

Department of Epidemiology and Biostatistics Graduate Level Courses

EPIB 610 Foundations of Epidemiology (3 credits)

Prerequisite: Completion of EPIB300 or equivalent undergraduate statistics or biostatistics course with a grade of C- or higher OR score a minimum of 70% on EPIB300 placement exam. Introduction to the discipline of epidemiology and its applications to health issues and practices. Basic epidemiologic concepts and methods will be covered.

EPIB 611 Intermediate Epidemiology (3 credits)

Prerequisite: EPIB610.

Analysis of epidemiologic methods as applied to epidemiologic research, analysis of bias, confounding, effect modification issues, overview of design, implementation, and analysis of epidemiologic studies.

EPIB 612 Epidemiologic Study Design (3 credits)

Prerequisite: EPIB610, EPIB611, and EPIB650.

Application of epidemiologic study designs, analytic methods used for analysis of cohort, case-control, cross-sectional, and clinical trials research.

EPIB 620 Chronic Disease Epidemiology (3 credits)

Prerequisite: EPIB610.

Overview of prevalence and risk factors for major chronic diseases. Discussion of methodological issues unique to specific chronic disease.

EPIB 621 Infectious Disease Epidemiology (3 credits)

Prerequisite: EPIB610.

Overview of the unique aspects of infectious diseases and the epidemiological methods used in their study, prevention, and control.

EPIB 622 Social Determinants of Health (3 credits)

Prerequisite: EPIB610.

Overview of the major social variables that affect public health, including socioeconomic status, poverty, income distribution, race, social networks/support, community cohesion, psychological stress, gender, and work and neighborhood environment.

EPIB 623 Epidemiology of Health Disparities (3 credits)

Prerequisite: EPIB610.

Determinants that influence health outcomes of the most disadvantaged populations in the United States. Focus on social factors contributing to health disparities and inequities in the US.

EPIB 626 Epidemiology of Obesity (3 credits)

Prerequisite: EPIB610.

Overview of the epidemiological, prevention, and treatment of obesity, its causes and consequences, and energy balance issues; application of epidemiologic methods to the study of obesity epidemiology.

EPIB630 Epidemiologic Methods in Sexual and Reproductive Health Research (3 credits)

Prerequisite: EPIB610.

Examination of epidemiologic methods (quantitative and qualitative) for collecting and analyzing data on sexual and reproductive health. The emphasis will be to introduce students to the appropriate methods used for challenging and sensitive research topics such as sexual behavior, HIV/STI, drug use, sexual abuse.

EPIB 641 Public Health and Research Ethics (1 credits) /SPHL612

Overview and discussion of ethical issues that face public health practitioners and researchers.

EPIB 650 Biostatistics I (3 credits)

Prerequisite Completion of EPIB300 or equivalent undergraduate statistics or biostatistics course with a grade of C- or higher OR score a minimum of 70% on EPIB300 placement exam. Basic statistical concepts and procedures for Public Health. Focuses on applications, hands-on-experience, and interpretations of statistical findings.

EPIB 651 Biostatistics II (3 credits)

Prerequisite: EPIB650. Recommended: EPIB698C (SAS Basics) or EPIB697 Public Health Data Management. Introduction to a variety of statistical tools with applications in public health, including one- and two-sample inference, nonparametric methods, categorical data, ANOVA, simple and multiple regression.

EPIB 652 Categorical Data Analysis (3 credits)

Prerequisite: EPIB650 and EPIB651. Recommended: EPIB698C (SAS Basics) or EPIB697 Public Health Data Management. Methods for analysis of categorical data as applied to public health research, including contingency tables, logistic regression, multcategory logic models, loglinear models, and models for matched-pairs.

EPIB 653 Applied Survival Data Analysis (3 credits)

Prerequisite: EPIB650 and EPIB651.

Overview of statistical methods for analyzing censored survival data, including the Kaplan-Meier estimator and the log-rank test.

EPIB 655 Longitudinal Data Analysis (3 credits)

Prerequisite: EPIB650, EPIB651

Statistical models for drawing scientific inferences from longitudinal data, longitudinal study design, repeated measures and random effects to account for experimental designs that involve correlated responses, handling of missing data.

EPIB697: Public Health Data Management (3 credits)

This course is designed to provide students with the expertise needed to effectively manage research data using SAS as the statistical programming language.

EPIB 710 Grantmanship for Epidemiologic Research (3 credits)

Prerequisite: EPIB610, EPIB611, EPIB612, EPIB650 and EPIB651.

In-depth study of the knowledge and skills needed to design, conduct, and evaluate an epidemiologic research study. Development of a complete research project.

EPIB 740 Advanced Methods in Epidemiology (3 credits)

Prerequisite: EPIB610, EPIB611, EPIB612, EPIB650, and EPIB651.

In-depth investigation of epidemiologic methods for making causal inferences and solving complex methodological problems. Multivariate models emphasized.

EPIB 788 Critical Readings: In-depth examination and critical discussion of the current literature relevant to epidemiology and public health, emphasizing application of epidemiologic and biostatistical methods.

Prerequisites: EPIB610, EPIB650

EPIB 898 Pre-Candidacy Research**EPIB 899 Doctoral Dissertation Research**

COMPONENTS

The completed *Program of Study* includes both the Coursework Plan and the Research Plan and should consist of the following components:

Coursework Plan:

- 1) Schedule for epidemiology core;
- 2) Coursework outside the epidemiology core that provides important knowledge in support of the area of content specialization;
- 3) Advanced methods (e.g., statistics, computing, critical analysis) that provides competencies in research skills needed in the specialization;

Research Plan:

- 4) Describes experiences necessary to conduct research in the area of specialization. The Research Plan should include a detailed summary of research experiences completed, abstracts of presentations, manuscripts submitted (or accepted) for publication, and a plan for additional research experiences that will serve as the basis for the dissertation research.

TIMELINES

Required: The *Program of Study* approval is expected by the completion of the end of the first year of full-time study, and required not later than the completion of 20 credit hours.

Note: Once the *Program of Study* has been approved, minor modifications can be made with minimal effort (See Revisions or Modifications to the *Program of Study*, below).

The Epidemiology Faculty is responsible for examining and approving the student's Coursework and Research Plans. If the student has an area of specialization outside of the Epidemiology faculty, a graduate faculty member with that area of specialization may join the committee, with the Graduate Director's approval.

COMMITTEE

The student in consultation with the advisor selects a minimum of three (3) committee members whose expertise is relevant to the student's area of research. The Graduate Director is responsible for approving all committees.

FORMAT

The *Program of Study* contains (a) completed coursework, (b) current semester coursework, and (a) proposed coursework taken in preparation for the Comprehensive Exam and Dissertation within the student's Ph.D. area of specialization.

The *Program of Study* should consist of a Preface page and three sections:

Preface Page:

- Student Name
- University ID#
- Current Date
- Proposed date of the committee meeting
- Name of Advisor
- Names of other committee members
- Student's Undergraduate Degree: List degree awarded, institution, date awarded
- Student's Graduate Degree(s): List previous degrees awarded, institution, date awarded

Section I: Graduate Coursework Completed (use column format)

- Include coursework from master's degree and other graduate credits completed
- List: course prefix, number, title, semester/year completed, grade, credit
- Total credits for Section I.

Section II: Coursework Plan (current and proposed coursework; use column format)

- Epidemiology core;
- Coursework outside the epidemiology core that provides important knowledge in support of the area of specialization;
- Advanced methods (e.g., statistics, computing, critical analysis) that provides competencies in research skills needed in the specialization;
- Independent Study/ Dissertation
- Within each section, first list courses completed and in progress, semester and grade (if applicable).
- Next list proposed courses. Project a coursework timeline by contacting department representatives, professors, the web, etc. to determine the semester in which the course will be offered.

Section III: The Research Plan

- In consultation with the advisor, the student designs a plan that includes research competency coursework (e.g., lab group, independent studies, etc., also included in the Coursework Plan), other pilot or collaborative research, and professional experience, such as scholarly presentations, publications, and grant writing that comprise a comprehensive Research Plan. Explain how each research study or experience contributes skills and competencies leading to the dissertation.

APPROVAL MEETING(S)

The student is responsible for typing the introductory section of the **EPIB Program of Study Approval Form** and taking the form to the meeting.

During the formal *Program of Study* Committee meeting:

- The student provides an oral summary of previous educational and professional experiences and projects, future plans, and career aspirations following degree completion.
- Committee members review coursework and research experiences in each section/plan and suggest revisions or recommendations
- Committee members and student review responses from graduate faculty not on the committee submitted to the advisor in response to *Program of Study* email
- Committee members may require revision and resubmission of the plan(s)
- Committee makes final decisions and may indicate their approval by signing the **EPIB Program of Study Approval Form**.

If the *Program of Study* is approved, the advisor submits the signed Program Approval Form with a copy of the final approved *Program of Study* to the Graduate Director.

REVISIONS OR MODIFICATIONS

The *Program of Study* is a plan to guide the student's coursework and research experiences throughout the degree. It is **not** unusual for the student and advisor to seek minor revisions or modifications to the plan because of discontinued or newly offered coursework, minor refocusing within the specialization, unavailable research experiences, or new opportunities for coursework or research.

Once the *Program of Study* has been approved, minor modifications can be proposed by the student in consultation with the advisor and committee members (e.g., via email). If the committee members

agree to the modifications, a revised *Program of Study* form, signed and dated by the advisor, is placed in the student's academic file.

If major modifications are required to the *Program of Study* (e.g., substantial refocusing of degree coursework, research focus, or area of specialization), the *Program of Study* Committee must meet formally to review the changes and approve the new program. Major modifications require committee members to sign a new *Program of Study* Approval form. All changes require the approval of the Graduate Director. Substantial changes may require the formation of a new *Program of Study* committee which then considers new Coursework and Research Plans.

Distinctions between minor and major modifications will be determined by the Graduate Director in consultation with the advisor.

COMPREHENSIVE EXAMINATION (Milestone 2)

OVERVIEW

Successful completion of the written Comprehensive Examinations represents a major accomplishment in the Ph.D. program. As such, these examinations represent an opportunity to assess whether the student has demonstrated the necessary knowledge and ability to successfully pursue creative, independent research that will advance the body of knowledge within the specialization. The examinations are not simply a retesting of course content. Instead, both the written and oral portions of the comprehensive examination assess the student's ability to integrate knowledge and pursue creative, independent research in Epidemiologic methods and specific area of specialization.

The student may elect to write the comprehensive examination (a) with permission of their advisor, (b) completion of all required courses except EPIB740, and (c) upon completion of a minimum of 70% of the courses proposed in the *Program of Study* (exclusive of dissertation credits).

Timeline Reminder: The student must complete the written and oral comprehensive examinations and be Advanced to Candidacy within 5 years of their admission to the program.

CRITERIA

Responses to Comprehensive Examination questions provide students an opportunity to integrate knowledge gained from formal coursework, independent reading and study, and research competencies. As such, examination answers should demonstrate synthesis and critical analysis of material, rather than the repetition of isolated content previously assessed in formal coursework.

The student should be able to discuss theoretical issues and frameworks from the body of knowledge, synthesize findings from current research, and pose the next logical research steps to advance knowledge in the area. The student should demonstrate a high level of scholarship as evidenced by clear, logical, and scholarly thinking in both written and oral portions of the examination.

ELIGIBILITY

- The student and advisor must agree that the student is properly prepared and ready to take the Comprehensive Exam before the examination can be scheduled.
- Completion of all required courses with the exception of EPIB740.
- The student must have completed a minimum of 70% of the non-dissertation credits in the Coursework *Program of Study*.

COMMITTEE

The Comprehensive Examination Committee is responsible for the preparation and evaluation of the student's comprehensive examination. All committee members shall be selected for their relevant expertise in the student's area of specialization.

Membership Qualifications: Consistent with the criteria for all doctoral committees, the majority of committee members must be full-time, tenured or tenure-track graduate faculty in the Department of Epidemiology and Biostatistics currently engaged in conducting research in their discipline. The Graduate Director is responsible for approving all committees. The Comprehensive Examination Committee consists of:

- A minimum of 3 graduate faculty members (including the advisor; see qualifications, above).
- The committee members should possess expertise appropriate for the student's doctoral emphasis.

Special considerations/regulations apply to the nomination of members from outside the University (see the Graduate Director). This process requires an additional 1 month time period for Graduate School approval.

WRITTEN COMPREHENSIVE EXAMINATION

A written comprehensive examination for doctoral students in epidemiology will be scheduled once a year **during the first full week in September**. Students will be eligible to take the examination after they have completed all core epidemiology and biostatistics courses, with the exception of EPIB 740 (Advanced Epidemiologic Methods).

The written examination will take no longer than eight (8) hours (*9 hours total=8 hours for the exam and 1 hour for lunch and short breaks*). There will be specific start and end times arranged for each exam. Faculty will be made available throughout the day of the exam to answer questions.

Four questions will be asked covering core epidemiologic and biostatistical concepts as applied to the (a) design of epidemiologic studies, (b) critique of published epidemiologic studies, and (c) interpretation of univariate, bivariate and multivariate analyses from epidemiologic studies. The examination will also cover (d) core concepts from the student's content area. Students will have access to a computer to type their responses to the examination questions, but, will not have access to the Internet. Books, notes and other written or electronic materials can not be brought into the examination room or accessed electronically.

Evaluation of the written comprehensive examination will be as follows:

- Pass (score of $\geq 70\%$ for each of the four questions)
- Conditional Pass (score of $\geq 70\%$ for three of the four questions)
- Not pass (score of $< 70\%$ for at least two of the four questions)

Students who do not receive a "Pass" or "Conditional pass" on the written comprehensive exam may retake the examination during the following semester **during the first full week in February**. If a student does not pass the written comprehensive examination after the second try, they will be dismissed from the program.

Students may make an appointment to review their completed and graded written examination, however, the written examinations will not be returned to the student.

ADMINISTRATIVE PROCEDURES

Written Examination:

Time Frame

- The written examination is a closed-book examination that is administered over a one-day, 8-hour period. Knowledge and appropriate applications of epidemiologic methods and interpretations of analysis will be covered.

Procedures

- Student responses must be typed on a Department of Epidemiology and Biostatistics computer that is not accessible to the student prior to the examination.
- The wireless card in the computer should be removed by the advisor prior to the examination.
- The advisor is responsible for securing and monitoring the academic integrity of the testing environment.
- The written examination will take no longer than eight (8) hours (*9 hours total=8 hours for the exam and 1 hour for lunch and short breaks*). There will be specific start and end times arranged for each exam. Faculty will be made available throughout the day of the exam to answer questions.

Oral Examination:

Upon successful completion of the written examination (score of "Pass" or "Conditional Pass", the student will be allowed to prepare for his/her oral defense. Oral examinations will be scheduled within a month after the written comprehensive examinations. The Oral examination will cover the same areas as the written examination, with a particular emphasis on any areas of deficiency that were identified during the written examination.

The oral examination must be completed within a 2 hour time period.

RESULTS

The advisor is responsible for reporting the results of the Comprehensive Examination, in the form of a consensus judgment, to the student and the Graduate Director using the **Comprehensive Examination Report** form.

ADVANCEMENT TO CANDIDACY (Milestone 3)

Students who have successfully completed the Written and Oral Comprehensive Examination should complete a Graduate School **Application for Admission to Candidacy Form**, which is signed by the advisor, Graduate Director, and is submitted to the Graduate School for approval. The Graduate Director will submit these forms to the Graduate School. At this time, the student officially becomes a "Candidate" for the Doctor of Philosophy degree.

Note: Admission to Candidacy must occur within 5 years following admission to the Ph.D. program and a minimum of 6 mo. prior to the date the degree will be conferred (Graduate School requirement).

Following Advancement to Candidacy, the Graduate School requires that candidates register for a minimum of 6 credits of EPIB899 each fall and spring semester until the degree is conferred.

DISSERTATION PROPOSAL (Milestone 4)

OVERVIEW

The dissertation is the culminating experience in the doctoral program. It reflects the candidate's ability to conduct original, independent research that will expand the body of knowledge in the specialization. The dissertation topic must be consistent with the student's *Program of Study*. Research skills necessary to complete the dissertation are developed gradually throughout the curriculum as documented in the *Program of Study*. The dissertation format for the EPIB Department is the 3 paper option. The **EPIB Dissertation Proposal Template** is provided in the appendix.

PROPOSAL

Ph.D. candidates work closely with their advisor to prepare the dissertation proposal. The proposal must meet the standards and expectations established by the advisor prior to distribution to the

Dissertation Proposal Committee. The dissertation format for the EPIB Department is the 3-paper option.

The **EPIB Dissertation Proposal Template** is provided here. This is the approved template for the PhD-Epidemiology Degree Program. Any change in format needs to be approved by the Chair of the Dissertation Committee.

EPIB Dissertation Proposal Template

Chapter 1 - Introduction (*minimum of 2-3 pages*)

Chapter 2 - Manuscript 1

1. Background (*minimum of 3-5 pages*)
 - i. Significance
 - ii. Existing Knowledge
 - iii. Gaps in Knowledge
2. Specific Aims (*minimum of 1/2 - 1 page*)
 - i. Broad Objective of the Project
 - ii. Research question and hypotheses
3. Theoretical/Conceptual Framework (*minimum of 1 page*)
4. Methods (*minimum of 5-8 pages*)
 - i. Overall Study Design
 - ii. Data Sources
 - iii. Participants and Criteria for Selection
 - iv. Dependent/Outcome Variable: Potential Measurement Issues
 - v. Independent Variables: Potential Measurement Issues
 - vi. Potential Confounders and Effect Modifiers
 - vii. Mediators (optional)
 - viii. Power analysis
 - ix. Statistical Analyses
 1. Descriptive analysis & quality assurance
 2. Missing Data
 3. Model building/Assessment of model fit
 4. Analysis of potential confounders and effect modifiers
 - x. Study Strengths and Limitations
5. Human subjects/Ethical considerations

Chapter 3 – Manuscript 2

1. Background (*minimum of 3-5 pages*)
 - i. Significance
 - ii. Existing Knowledge
 - iii. Gaps in Knowledge
2. Specific Aims (*minimum of 1/2 - 1 page*)
 - i. Broad Objective of the Project
 - ii. Research question and hypotheses
3. Theoretical/Conceptual Framework (*minimum of 1 page*)
4. Methods (*minimum of 5-8 pages*)
 - i. Overall Study Design
 - ii. Data Source
 - iii. Participants and Criteria for Selection
 - iv. Dependent/Outcome Variable: Potential Measurement Issues
 - v. Independent Variables: Potential Measurement Issues
 - vi. Potential Confounders and Effect Modifiers
 - vii. Mediators (optional)
 - viii. Power analysis
 - ix. Statistical Analyses
 1. Descriptive analysis & quality assurance

- 2. Missing Data
- 3. Model building/Assessment of model fit
- 4. Analysis of potential confounders and effect modifiers
- x. Study Strengths and Limitations
- 5. Human subjects/Ethical considerations

Chapter 4 – Manuscript 3

- 1. Background (*minimum of 3-5 pages*)
 - iv. Significance
 - v. Existing Knowledge
 - vi. Gaps in Knowledge
- 2. Specific Aims (*minimum of 1/2 - 1 page*)
 - i. Broad Objective of the Project
 - ii. Research question and hypotheses
- 3. Theoretical/Conceptual Framework (*minimum of 1 page*)
- 4. Methods (*minimum of 5-8 pages*)
 - i. Overall Study Design
 - ii. Data Source
 - iii. Participants and Criteria for Selection
 - iv. Dependent/Outcome Variable: Potential Measurement Issues
 - v. Independent Variables: Potential Measurement Issues
 - vi. Potential Confounders and Effect Modifiers
 - vii. Mediators (optional)
 - viii. Power analysis
 - ix. Statistical Analyses
 - 1. Descriptive analysis & quality assurance
 - 2. Missing Data
 - 3. Model building/Assessment of model fit
 - 4. Analysis of potential confounders and effect modifiers
 - x. Study Strengths and Limitations
- 5. Human subjects/Ethical considerations

Chapter 5 – Conclusions & Public Health Significance: Policy Implications and Long Term Relevance (*minimum of 1-2 pages*)

References

Dissertation style guidelines for the University of Maryland College Park can be found on the Graduate School website: <https://gradschool.umd.edu/students/academic-progress/thesis-and-dissertation-filing>.

References and citations should follow the National Library of Medicine's *Citing Medicine* format (<http://www.ncbi.nlm.nih.gov/books/NBK7256/>) since that is the format that a large number of journals use (including many epidemiology and public health journals)--see *Uniform Requirements for Manuscripts Submitted to Biomedical Journals* from the International Committee of Medical Journal Editors (http://www.icmje.org/urm_main.html).

When reporting their own research findings and methods, students should aim as much as possible to be consistent with major biomedical research reporting guidelines (http://www.nlm.nih.gov/services/research_report_guide.html). For example, guidelines for reporting research findings and methods exist for observational studies (<http://www.strobe-statement.org/Support.html>) and clinical trials (<http://www.consort-statement.org/>).

PROPOSAL COMMITTEE

The advisor and candidate determine the constitution of the Committee within the guidelines established by the Graduate School and the department.

Membership Qualifications: Consistent with the criteria for all doctoral committees, the majority of Dissertation Proposal committee members must be full-time, tenured or tenure-track graduate faculty in the Department of Epidemiology and Biostatistics currently engaged in conducting research in their discipline. Dissertation Proposal Committee membership is subject to the approval of the Graduate Director.

- Whenever possible, the members of the proposal and the defense committee should remain the same.
- The Dissertation Proposal Committee consists of a **minimum of five (5) members**. To avoid an emergency substitution of a Committee member with another graduate faculty member unfamiliar with the student's dissertation work at the time of the dissertation defense, it is encouraged that there be at least six (6) members of the Dissertation Committee.
- At least two (2) members of the Dissertation Proposal Committee must be Epidemiology faculty
- One (1) member of Dissertation Proposal Committee must be a Biostatistics faculty member.
- One (1) member of the Dissertation Proposal Committee must be the **Graduate Dean's Representative**. The Dean's Representative's role is to ensure that the Dissertation Proposal and Defense is conducted in a manner consistent with the Graduate School's prescribed guidelines and procedures. The Dean's Representative must be a tenured UM faculty member *from a department other than the candidate's home department*, and have a related interest in the candidate's area of study.
- Additional committee members can include distinguished scholars outside the department affiliated with UM or those outside the University of Maryland who hold a terminal degree and who are experts in the area of the dissertation topic. (See the Non-UM Faculty section, below).
- Committee membership may include members of the *Program of Study* or the Comprehensive Examination Committees, although this is not required.
- The candidate is responsible for working with the department's Graduate Director to file the **EPIB Nomination of Dissertation Proposal Committee** form to initiate the nomination process

Non-UM Faculty Members

- No formal procedure is required to nominate non-UM Faculty members to the Dissertation **Proposal** Committee. However, non-UM Faculty members must be approved by the Graduate School prior to serving on the Dissertation **Defense** Committee.
- Candidates are encouraged to begin the process required by the Graduate School to approve non-UM faculty for the Defense Committee at the time of the proposal defense.

Proposal

Committee meeting:

- To nominate non-UM Faculty to serve on the Dissertation **Defense** Committee, candidates must consult with the EPIB Graduate Director *a minimum of 2 months* prior to the submission to the Graduate School of the **Nomination of the Dissertation (Defense) Committee** form to permit adequate time to process the request and receive Graduate School approval.
- To nominate a non-UM Faculty member to the Graduate Faculty, the candidate must submit a Graduate School **Nomination of Graduate Faculty** form (<http://www.gradschool.umd.edu/images/uploads/GradFacForm.pdf>) accompanied by the nominee's curriculum vitae. Candidates are reviewed and approved by the Epidemiology and Biostatistics faculty prior to submitting the request to the Graduate School.

The candidate must complete an **EPIB Nomination of Dissertation Proposal Committee Form** (<http://www.gradschool.umd.edu/images/uploads/NominationThesis.pdf>) and submit the form 1 month prior to the proposal meeting for approval by the Graduate Director. A second, Graduate School **Nomination of Dissertation Committee Form** is required prior to the Dissertation Defense.

ABSTRACT CIRCULATION

Once the advisor has approved the proposal, the candidate must:

- Distribute the proposal to the Committee a minimum of **ten (10) working days** prior to the Dissertation Proposal meeting to provide adequate time for committee members to review the proposal.
- Distribute a copy of the abstract (1 page) to all EPIB graduate faculty members a minimum of **ten (10) working days** prior to the Dissertation Proposal meeting. For example the email to the faculty might read: "Consistent with department policy, I am forwarding a copy of my dissertation abstract (attached) for your review. Please submit your comments to my advisor, Dr. _____ (advisor's email address) prior to the proposal presentation meeting on _____. Dr. _____ and I welcome your comments and questions. Thank you in advance for your assistance in this matter."
- The candidate should state in the body of the graduate faculty email that comments should be sent to the candidate's advisor and include the advisor's email address.
- Submit the abstract to the Graduate Secretary for distribution to the EPIB graduate students.
- Post a copy of the abstract on Graduate Bulletin Board in the designated area in the EPIB suite bulletin board. The posting should include the candidate's and advisor's names, committee members, and date, time, and location of proposal meeting.

PROPOSAL MEETING

A minimum of 10 working days prior to the proposal meeting, the candidate must:

- Schedule the Dissertation Proposal meeting. The meeting must be held within the School of Public Health facilities
- Post meeting information adjacent to the dissertation abstract on Graduate Office bulletin board. This information should include: type of meeting (i.e., proposal presentation), names of student, advisor, and committee members, meeting time, date, and location

Schedule the department conference room (or alternate location) for the meeting. Faculty, students, and other interested persons may attend the proposal meeting and may ask questions. The candidate, candidate's advisor, and committee members will discuss a timeline for assessing progress of the dissertation during the dissertation proposal meeting.

PROPOSAL APPROVAL

Following the Dissertation Proposal Meeting, committee-requested revisions to the proposal should be circulated to the Committee members for formal approval.

- Upon final approval, the candidate must submit the approved final proposal to the student's advisor and Graduate Director.
- The advisor is responsible for ensuring that the final proposal responds to all faculty members' comments and concerns.
- The Graduate Director will approve the **SPH Proposal Form** after the official Institutional Review Board (IRB) letter approving the research has been received and placed in the student's academic folder.

Note: Any changes or addendum to the proposal at a later date must have the approval of the IRB and the Proposal Committee. The candidate must write a summary of the changes and have committee members sign the summary. If the changes impact the research design, methods, or data collection/management procedures, an application seeking approval for the revision must be

submitted and approved by the IRB. The signed summary of changes with a copy of the official IRB approval letter should be submitted and approved by the Graduate Director.

INSTITUTIONAL REVIEW BOARD (IRB)/ HUMAN SUBJECT APPROVAL

If data collection involves working with human subjects, including use of surveys, interviews, inventories, or questionnaires, the candidate must submit an **IRB/ Human Subjects Application** (<http://www.umresearch.umd.edu/IRB/IRBreqpolsops.html>). Applications may be submitted electronically via the IRB website. See IRB website for latest policies and procedures for protection of human subjects. Prior to beginning data collection or data analysis, the candidate must submit a copy of the IRB approval letter to the student's advisor and the Graduate Director to be placed in the candidate's academic file. Substantial IRB required changes to the Dissertation Proposal require additional approval by the Dissertation Proposal Committee and may require an additional formal meeting of that committee. Likewise, any candidate or advisor-generated changes to the research design, methods, or data collection/management procedures must receive official IRB approval.

DISSERTATION FORMAT

The doctoral thesis for the PhD-Epidemiology Degree Program in the Department of Epidemiology and Biostatistics at the University of Maryland's School of Public Health should reflect the ability of the student to perform independent, high quality, original epidemiologic research. The Department requires a three-manuscript format that includes three manuscripts resulting from dissertation work that represents work with a high likelihood of being publishable in a scientific peer-reviewed journal. The three papers should revolve around some common theme, but need not be closely linked. The goal is to establish trainee expertise in the area under study, and ensure that the substantial work done by both the trainee and the primary advisor ends up as part of the literature.

"High likelihood of being publishable in a scientific peer-reviewed journal" means that the content and analysis have been approved by the thesis committee and that the student and the advisor believe the manuscript is ready to be submitted to a journal in its present form, even though it may be awaiting comments from co-authors or other sign-offs. To make most efficient use of faculty and student time, no paper should be circulated to the entire committee until a committee member (usually the advisor) has reviewed the draft, and comments have been incorporated. It is expected that committee members review thesis papers in a timely fashion (usually within 2 weeks).

Guidelines for preparing the dissertation and the submission process can be found on the Graduate School website <http://www.vprgs.umd.edu/>. The advisor determines the editorial style (APA, MLA, etc.) consistent with the expectations in the specialization.

In general, the final dissertation will have an overall 350-word abstract (required for Dissertation Abstracts International) and six chapters:

Chapter 1: Introduction (describes the problem that the student proposes to study, theoretical framework and literature review).

- 1.1. Background and rationale
- 1.2. Objectives/research questions
- 1.3. Theoretical/conceptual framework and hypotheses
- 1.4. Innovation and significance

Chapter 2: Methods (Due to journal word limits, additional detail can be provided in this section to reflect student knowledge of epidemiological principles and correct use of statistical models).

- 2.1. Detailed information about study design
- 2.2. Assessment of potential biases (selection bias, information bias, and confounding bias)
- 2.3. Statistical approaches to test hypotheses
- 2.4. Assessment of potential mediation effects or/and interaction effects
- 2.5. Model specification
- 2.6. Assessment of model assumptions
- 2.7. Limitations of the study

Chapter 3-5: Three individual manuscripts (one manuscript per chapter including title pages)
Chapter 6: Conclusions (integrates all of the research, includes overall conclusions of the findings, public health implications, limitations of the study and future directions).

References and citations for Chapters 1, 2 and 6 should follow the National Library of Medicine's *Citing Medicine* format (<http://www.ncbi.nlm.nih.gov/books/NBK7256/>) since that is the format that a large number of journals use (including many epidemiology and public health journals)--see *Uniform Requirements for Manuscripts Submitted to Biomedical Journals* from the International Committee of Medical Journal Editors (http://www.icmje.org/urm_main.html).

When reporting their own research findings and methods, students should aim as much as possible to be consistent with major biomedical research reporting guidelines (http://www.nlm.nih.gov/services/research_report_guide.html). For example, guidelines for reporting research findings and methods exist for observational studies (<http://www.strobe-statement.org/Support.html>) and clinical trials (<http://www.consort-statement.org/>).

FREQUENTLY ASKED QUESTIONS

Q: Can one or more of the papers be something I have already written?

A: The work for each paper must be completed while enrolled in the Epidemiology PhD degree program, and after your proposal has been approved.

Q: Will the dissertation committee approve for inclusion in the three-paper dissertation work I have already started while enrolled in the PhD program but before obtaining approval by the Dissertation Committee?

A: No.

Q: Who should be the first author on the papers?

A: Authorship of the papers to be included in the thesis should be discussed by the faculty advisor and student prior to the start of the dissertation and revisited often during the development of the dissertation. A paper will not qualify for inclusion in a dissertation if the student did not lead the research in a way that justifies first authorship (e.g., conducts the data analysis and writes the major parts of the paper). Generally, the student will be first author on published papers stemming from the dissertation, however, if the papers are not submitted for journal consideration within a reasonable timeframe (e.g., two years from the doctoral dissertation defense date), authorship order may be renegotiated to reflect the level of effort involved in preparing the manuscript for journal submission.

Q: Will all dissertation committee members be authors on the three papers?

A: Committee members are often included on the papers produced by the dissertation work, however, authorship by committee members should not be assumed. Paper authorship should be determined by the primary advisor and trainee based upon usual authorship guidelines in the professional journals to which the papers are being submitted, and the degree to which a given committee member influenced or contributed to each paper. For example, International Committee of Medical Journal Editors' Uniform Requirements for Manuscripts Submitted to Biomedical Journal suggest that authorship credit should be based on 1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content; and 3) final approval of the version to be published. Authors should meet conditions 1, 2, and 3.

Q: Can a paper be submitted for publication before my dissertation defense?

A: It is important that all committee members approve a manuscript before it is submitted for publication. The dissertation committee may decide that extra meetings are required if the student intends to submit one or more papers before the defense.

Q: Must each paper contain data analysis?

A: This is for the dissertation committee to decide. It is possible that a non-quantitative research synthesis or a theoretical paper would be accepted, for example.

Q: Where does my literature review go?

A: If one of the manuscripts will be a review article the literature review may be one of the three chapters containing the body of publishable manuscripts. If not, the literature review can appear in the introductory chapter or as an additional chapter.

Q: How long should the three papers be?

A: Word limits should be compatible with typical journals in the field. Due to journal word limits, additional detail can be provided in the separate methods chapter of the dissertation to reflect student knowledge of epidemiological principles and correct use of statistical models.

Q: What does it mean to be “submission-ready”?

A: The three papers should be in a format ready for submission to a peer-review journal in terms of organization, length, number of tables and figures, etc.

Q: What about all the supporting tables that I will produce in my research? Where do they go?

A: Good documentation practices are part of the dissertation experience. Supporting tables should be compiled in accompanying technical reports or appendices.

DIPLOMA

The **Application for Diploma** is a Graduate School form due during the *first 2 weeks of the graduating semester*. All Graduate School deadline dates and forms are listed on the EPIB graduate bulletin board and the Graduate School website

http://www.gradschool.umd.edu/current_students/deadlines_for_graduate_students.html. Click the “deadlines link.”

The **Application for Diploma** form and can be submitted thru TESTUDO (www.testudo.umd.edu). The candidate must be registered for at least 6 credits of EPIB899 in the graduating semester.

THE DISSERTATION DEFENSE (Milestone 5)

Ph.D. candidates work closely with their advisor to complete the dissertation and prepare for the oral dissertation defense. The dissertation must meet the standards and expectations established by the advisor prior to distribution to the Dissertation Defense (Oral Examination) Committee. Because the Defense examination typically occurs during the graduating semester, the candidate must complete several Graduate School and department forms early in the semester.

DISSERTATION DEFENSE COMMITTEE

Membership Qualifications: Consistent with the criteria for all doctoral committees, the majority of committee members must be full-time, tenured or tenure-track graduate faculty in the Department of Epidemiology and Biostatistics currently engaged in conducting research in their discipline.

Dissertation Committee membership is subject to the approval of the Graduate Director and the Graduate School.

- Whenever possible, the members of the proposal and the defense committee should remain the same.
- The Dissertation Committee consists of a **minimum of five (5) members**. To avoid an emergency substitution of a Committee member with another graduate faculty member unfamiliar with the student’s dissertation work at the time of the dissertation defense, it is encouraged that there be at least six (6) members of the Dissertation Committee.
- At least two (2) members of the Dissertation Committee must be Epidemiology faculty

- One (1) member of Dissertation Committee must be a Biostatistics faculty member.
- One (1) member of the Dissertation Committee must be the **Graduate Dean's Representative**. The Dean's Representative's role is to ensure that the Dissertation Defense is conducted in a manner consistent with the Graduate School's prescribed guidelines and procedures (link). The Dean's Representative must be a tenured UM faculty member *from a department other than the candidate's home department*, and have a related interest in the candidate's area of study.
- Additional committee members can include distinguished scholars outside the department affiliated with UM or those outside the University of Maryland who hold a terminal degree and who are experts in the area of the dissertation topic. (See the Non-UM Faculty section, above).
- Committee membership may include members of the *Program of Study* or the Comprehensive Examination Committees, although this is not required.
- The candidate is responsible for working with the department's Graduate Secretary to file the Graduate School **Nomination of Dissertation Committee Form** online to initiate the nomination process. The procedure is strictly governed by Graduate School deadlines (Note: This form must be submitted during the first few weeks of the graduating semester. Failure to meet this deadline will delay graduation until the following semester).
- An official letter of approval from the UM Institutional Review Board (IRB/Human Subjects) must be submitted along with the **Nomination of Dissertation Committee Form**.

DEFENSE (ORAL EXAMINATION) MEETING

Although the Dissertation Defense is an open meeting primarily concerned with the oral examination of the dissertation, committee members may question the candidate on any aspect of the degree specialization. Specific procedures are as follows:

- The advisor agrees to schedule the dissertation defense when the dissertation is properly prepared and consistent with the approved Dissertation Proposal.
- The candidate must submit the completed dissertation, and authorship guidelines for the target journals, to committee members a minimum of **ten (10) working days** prior to the dissertation defense date to provide adequate time for faculty to evaluate the dissertation. Should the Dissertation Committee deem it reasonable and appropriate, it may require submission of the dissertation more than ten working days in advance of the dissertation defense. Oral defenses must be held in University facilities that are readily accessible to all members of the Dissertation Committee and others attending the defense (usually the EPIB conference room). The chair of the Dissertation Committee selects the time and place for the examination.
- The candidate must submit an electronic copy of the abstract to the Department's Administrative Assistant at least **ten (10) working days** prior to the scheduled meeting; and post a flyer with the date, time and location of the defense, candidate name, dissertation title and abstract on the bulletin board located in the EPIB suite.
- The Department's Administrative Assistant will email a formal announcement of the date, time and location of the defense, candidate name, dissertation title and abstract to EPIB faculty, staff, and students at least five (5) working days prior to the defense. .
- The advisor is responsible for bringing the **EPIB Report of the Examining Committee** form to the defense meeting. This form is generated by the Graduate School and sent to the Director of Graduate Studies once the dissertation committee is approved.
- Oral defenses must be attended by all members of the student's officially established Dissertation Examining Committee as approved by the Dean of the Graduate School. They are to be physically present in the examination room during the entire examination. Should a last minute change in the constitution of the Dissertation Examining Committee be required, the change must be approved by the Dean of the Graduate School in consultation with the EPIB

Graduate Director and the chair of the student's Committee. In case of a last-minute emergency necessitating a replacement for a committee member, the proposed substitute must be a member of the Graduate Faculty consistent with the rules for committee membership, and prior written confirmation of approval from the Graduate School is required before the defense can proceed.

- The Dean's Representative will be identified at the beginning of the defense.
- The dissertation defense has two parts. Part 1 is the public presentation by the candidate on the main aspects of the research reported in the dissertation. Part 2 is the formal examination by the Dissertation Examination Committee.
- As part of the student's presentation, the student will indicate the targeted, peer-reviewed journal for each manuscript.
- Questions from the audience to the candidate will be permitted following the candidate's presentation. For questions from persons who are not members of the Dissertation Examination Committee, the Chair of the Dissertation Examination Committee shall have discretion to decide whether such questions are germane to the topic of the dissertation and how much time shall be allotted for the answers.
- Part 2 of the dissertation defense is open only to the Dissertation Examination Committee members, other members of the Graduate Faculty, and EPIB graduate students. During Part 2, only members of the Dissertation Examination Committee are permitted to ask questions. The chair will invite questions in turn from each member of the Dissertation Examining Committee. The questioning may continue as long as the Dissertation Examining Committee feels that it is necessary and reasonable for the proper examination of the student. The student will have ample opportunity to answer the Committee's questions.
- After questioning has been completed, the student and any others who are not members of the Dissertation Examining Committee will be asked to leave the room and the Dissertation Examining Committee will discuss whether or not the dissertation (including its defense) has been satisfactory.
- A successful defense requires that all committee members believe that each paper will be ready to submit to the identified journal after the suggestions made by the committee are incorporated.
- At the conclusion of the examination, the committee members vote on the candidate's competency and the dissertation's acceptability. The Committee has the following alternatives:
 - to accept the dissertation without any recommended changes and sign the Report of the Examining Committee.
 - To accept the dissertation with recommendations for changes and, except for the chair, sign the Report of the Examining Committee. The chair will check the dissertation and, upon his/her approval, sign the Report of the Examining Committee.
 - To recommend revisions to the dissertation and not sign the Report of the Examining Committee until the student has made the recommended changes and resubmitted the dissertation for the Dissertation Examining Committee's approval. The Dissertation Examining Committee members sign the Report of the Examining Committee if they approve the revised dissertation.
 - To recommend revisions and convene a second meeting of the Dissertation Examining Committee to review the dissertation and complete the student's defense
 - To rule the dissertation (including its defense) unsatisfactory. In that circumstance, the student fails.
- The student passes if either: a) all members of the Dissertation Examination Committee agree to sign the Report of the Examining Committee before or after the approval of the recommended changes; or b) one member of the Dissertation Examining Committee refuses to sign the Report of the Examining Committee, but the other members of the Committee

agree to sign the report. Two or more negative votes constitute a failure of the candidate to meet the dissertation requirement.

- In cases of failure, the Dissertation Examining Committee must specify in detail and in writing the nature of the deficiencies in the dissertation and/or the oral performance that led to failure. This statement will be provided to the EPIB Graduate Director, the Dean of the Graduate School and the student. A second defense may be permitted if the student will be in good standing at the time of the proposed second defense. A second defense requires the approval of the EPIB Graduate Director and the Dean of the Graduate School. If the student fails this second defense, or if a second defense is not permitted, the student's admission to the graduate program is terminated.
- Following the defense, the chair, in the presence of the Dean's Representative, will inform the student of the outcome of the defense. The chair and the Dean's Representative will sign the Oral Defense Report indicating which of the above alternatives has been adopted. A copy of this report will be included in the Departmental student file, and a copy will be provided to the student.

FOLLOWING THE MEETING

- After the committee approves revisions and corrections and with final approval by the advisor, the candidate prepares and submits the formal dissertation to the Graduate School in an electronic format. Submission instructions can be downloaded from the Graduate School website at http://www.gradschool.umd.edu/current_students/general_forms_for_graduate_students.html.
- The candidate must provide the advisor with a printed copy of the final dissertation document.
- The candidate must submit the final abstract and title page to the EPIB Graduate Director for their academic file.
- After the committee and advisor have approved all revisions and corrections, the advisor submits the signed and dated EPIB **Report of the Examining Committee** form for the Graduate Director's signature.

IMPORTANT FORMS

Students are responsible for preparing all forms for their degree milestones. Copies of all forms are found on the EPIB website at <http://sph.umd.edu/department/epib/phd-forms-checklist>. All form must be filed with the Director of Graduate Studies. Students will also receive a copy of the completed forms with approval signatures.

| Milestone | Form |
|-----------|---|
| 1 | Program of Study Approval Form http://sph.umd.edu/sites/default/files//files/EPIB%20PhD%20Program%20of%20StudyApproval%20Form.pdf |
| 2 | PhD Evaluation Rubric |
| | Comprehensive Examination Report |
| 3 | Advancement to Candidacy Form http://www.gradschool.umd.edu/images/uploads/Admission_to_Candidacy_Form.pdf |
| 4 | Proposal Defense Meeting Announcement |
| | PhD Evaluation Rubric |
| | SPH Proposal Approval Form |
| | Nomination of Dissertation Committee Form (after proposal is approved and IRB approval has been received) http://www.gradschool.umd.edu/images/uploads/NominationThesis.pdf |
| 5 | Dissertation Defense Meeting Announcement |
| | PhD Evaluation Rubric |
| | Report of Examining Committee Form |
| | Electronic Thesis and Dissertation Publication Form http://www.gradschool.umd.edu/images/uploads/Publishing_Your_ETD.pdf |