## PhD Milestones - Preliminary Exam

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<tr>
<th>Matriculation:</th>
<th>Attend program orientation and graduate school on-line orientation</th>
<th>Student</th>
<th>Faculty</th>
<th>Program</th>
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<tr>
<td>Meet with Academic Advisor before matriculation (and every year thereafter) to go over academic plan - update plan online</td>
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<td>Register for classes</td>
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<tr>
<th>Preliminary Exam: 6 weeks prior (end of 1st year of didactic course work)</th>
<th>Indicate your intent to take the exam - e-mail Galit</th>
<th>Student</th>
<th>Faculty</th>
<th>Program</th>
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<tr>
<td>Galit will check completion of required core courses</td>
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<td>Receive further instructions</td>
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<td>Results will be provided within 4 weeks of the exam date</td>
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The Preliminary Examination

At the end of the first year of didactic course work, students will take a written Preliminary Exam (http://www.ucdenver.edu/research/CCTSIEducation-training/clsc/phd-program/Requirements/Pages/Preliminary-Exam.aspx) to assess their comprehension of the educational concepts covered in the coursework. The Graduate School requires a Preliminary Examination to ensure that students are qualified for doctoral study. The purpose of the Preliminary Examination is to determine potential for successful completion of the program and to use the results in subsequent academic advising. The Preliminary Examination covers the core content areas of:

- Biostatistics
- Ethics
- Research Methods

The Preliminary Examination is held every year over a three-day period between the end of the spring and beginning of the summer terms (typically late May or early June). You will be asked to indicate your intent to take the examination about 4-6 weeks prior to the date of the Preliminary Examination. Students typically take the Preliminary Examination after completing the first year of required core courses.

Course Requirements for Taking the Preliminary Exam

CLSC Students:
For students who started the program during or after summer 2012, the following courses must be completed prior to taking the Preliminary Examination:

- Biostatistics: BIOS 6601 and BIOS 6602 or BIOS 6611 and BIOS 6612
- Ethics: CLSC 7150
- Methods: EPID 6630
- Methods: EPID 6626 or EPID 6631 or BIOS 6648 or CLSC 6270 or CLSC 7202

For students starting the program after May 2008 and before summer 2012, the following courses must be completed prior to taking the Preliminary Examination:

- Biostatistics: BIOS 6601 and BIOS 6602 or BIOS 6611 and BIOS 6612
- Ethics: CLSC 7150
- Methods: EPID 6630

HSR Students:
For students starting the program during or after summer 2013, the following courses must be completed prior to taking the Preliminary Examination (Part 1):

- Biostatistics: BIOS 6611
- Ethics: CLSC 7150
- Epidemiology: EPID 6630
- Methods: HSMP 7010 (Fall) and HSMP 7607

At the end of the second year of didactic course work, students will take a written Part 2 of the Preliminary Exam to assess their comprehension of HSR Methods covered in HSMP 7607, HSMP 7609, and core tenets of outcomes research covered in CLSC 7202.
For students starting the program during or after summer 2012 and before summer 2013, the following courses must be completed prior to taking the Preliminary Examination:

- Biostatistics: BIOS 6611
- Ethics: CLSC 7150
- Epidemiology: EPID 6630
- Methods: HSMP 7607 and HSMP 7010 (Fall)
- Methods: EPID 6626 or EPID 6631 or BIOS 6648 or CLSC 6270 or CLSC 7202

For students starting the program during or after summer 2011 and before summer 2012, the following courses must be completed prior to taking the Preliminary Examination:

- Biostatistics: BIOS 6601 or BIOS 6611
- Ethics: CLSC 7150
- Methods: EPID 6630
- Methods: HSMP 7607 and HSMP 7010 (Fall)

For students starting the program before summer 2011 and after May 2008, the following courses must be completed prior to taking the Preliminary Examination:

- Biostatistics: BIOS 6601 and BIOS 6602 or BIOS 6611 and BIOS 6612
- Ethics: CLSC 7150
- Methods: PRMD 6630

Exam Format

The Preliminary Examination is OPEN BOOK. Students should feel free to use textbooks, reference materials, class notes, peer-reviewed publications, and credible websites.

Students may choose to complete the Biostatistics section in the classroom or at work/home (you are still obligated to report to the classroom the morning of the exam in order to sign the honor codes and receive the exam folder). The other two sections (content areas) can be completed off campus.

Since the examination is open book, students should remember to bring the necessary materials, such as biostatistics textbooks and class notes. The other two sections (content areas) can be completed at work/home. A printer will be available locally for printing.

On the morning of the exam, students will be given an exam folder. Once the seal is broken, students have committed to taking the exam in its entirety. Students will be asked to read the instructions completely and to ask questions prior to starting the exam. All questions raised will be answered openly and shared with all students. A failing grade will be given to any exam section not completed.

CLSC Program Honor Code and Grading Policy

Before beginning the exam, you must sign the honor code policy for each exam section and submit this to the CLSC Program staff.

All doctoral students taking the CLSC preliminary exam will be requested to sign the following statement for their work:

“As noted in the exam instructions, I have abided by the CU Denver | Anschutz Medical Campus Graduate School honor system whereby I have not used any reference material, computer files, or worked with any person in a manner that would unfairly advantage my performance on this Ph.D. Program in Clinical Science Preliminary Examination. Moreover, I will not share a copy of this
Preliminary Exam (either the questions or my responses) with anyone without written pre-
authorization from the Ph.D. Program in Clinical Science administration.”

Faculty members will be using a grading rubric for scoring each exam section. The pass/fail designation you receive will reflect faculty scores submitted for: 1) Research Methods, 2) Ethics, and 3) Biostatistics. In order to pass the Preliminary Exam, you will need to receive a passing designation in ALL three sections. If you fail any one, you will need to talk with the Program Director and your Academic Advisor to identify the next steps. If you fail any two or all three sections, you will be administratively withdrawn from the Clinical Science graduate program. Possible next steps include re-taking the failed section of the exam within a designated time period, completing additional courses before retaking the examination, or withdrawal from the program.

The scoring is as follows:

- 100 to 80 score = Pass
- Less than 80 = Fail

Historically, the most common error made is not reading the instructions carefully and/or not answering ALL components of each question. This exam process is the equivalent to writing academic papers. Ensure your thoughts are well thought out, articulated, and supported by references.

Skipping a question or a section of a question is not a wise choice. It is better to provide your best answer possible than no answer at all. You should respond in full sentences — not outline format. The use of tables and figures to illustrate points is encouraged. Overall writing style and correct use of spelling and grammar are taken into consideration during scoring. Organizing responses according to the sections of the examination questions and sub-questions (with headers) is a useful approach (and makes your exam easier to grade).

Criteria Used for Grading

ANALYSIS
- Identify and organize elements in ways that demonstrates a logical coherent response
- Explain the central issues, problems and “puzzles” with respect to the topic under discussion
- Identify and explain unstated assumptions, logical fallacies, and extraneous aspects of an issue, problem or position
- Project the implications of an issue, problem, or position
- Explain and compare alternative views

SYNTHESIS
- Present succinct summaries of ideas that reflect comprehension of the whole while building a deliberate message concerning the topic under discussion
- Convey abstract relationships that form conceptual wholes
- Integrate a variety of sources to form a foundation for the student’s unique ideas

CRITICAL SCHOLARLY ABILITIES
- Demonstrate critical self-awareness and reflective thinking
- Provide succinct, complete and direct responses to the issues
- Demonstrate a breadth of knowledge of the topic under discussion that is consistent with the breadth covered in the entry doctoral level courses
- Interpret existing literature without misrepresentation
- Demonstrate the ability to defend a logical position without prejudice
Preparation Tips and Study Guide

At a minimum, it is suggested that you dedicate at least 40 hours of study time for the Preliminary Exam. You should review the course reading materials, textbooks, and class notes, as well as spend time reviewing the literature.

**Biostatistics Section**

The objectives for the biostatistics section are three-fold:

1) To demonstrate your familiarity with fundamental concepts and elements of probability, descriptive statistics and hypothesis testing;

2) To demonstrate that you can define and carry out a basic design and analytic plan for a study; and

3) To demonstrate that you can use appropriate computer packages for design and analysis.

Students should be comfortable with the following concepts:

- Dichotomous and continuous variables
- Power of a statistical test
- Sample size calculation
- Power calculation
- Normal distribution
- Inference from two-way tables

Be sure that you are comfortable programming in SAS and PASS (or some statistical software that can be used for sample size/power calculations).

**Research Methods Section**

From your epidemiology and research methods course material, you should review study designs that are commonly used in the field of clinical science research. The primary objectives for the research methods section of the exam are to ensure that students have the ability to:

1) Describe in detail each type of research design studied (providing definitions of key terms and appropriate examples);

2) Compare and contrast the strengths and weaknesses of various study designs, as well as in comparison to the randomized, controlled clinical trial;

3) Design and compare alternative design approaches to the randomized, controlled clinical trial; and

4) Select the best design to answer a clinical question or hypothesis and provide the rationale for the selection.

The questions in this section of the CLSC Preliminary exam will expect you to identify the "optimal" study design for a specific clinical question or hypothesis. Thus, you should examine each study design's applicability to different types of clinical science research questions. Be sure to highlight and discuss literature-based examples of how different study designs have been used successfully.
**Ethics Section**

The primary objectives for the ethics section of the exam are to ensure that students have the ability to:

1) Describe the COMIRB requirements for paperwork and approvals (based on COMIRB web site). Additionally, it is important that student can explain the common pitfalls to avoid (based on COMIRB reviewer criteria) in preparing an informed consent document for approval;

2) Explain the historical foundations of the current requirements for ethical review of human subjects research. Please review the seminal works (e.g., Declaration of Helsinki, the Nuremberg Code, and the Belmont Report) carefully to identify the basic ethical principles that should guide the conduct of human subjects research; and

3) Apply their knowledge of ethical principles and regulatory issues to be addressed in a human subjects research to a selected case study situation.