PUBLIC HEALTH 446
THE DESIGN, CONDUCT, and ANALYSIS of CLINICAL TRIALS
1.0 Credit
SPRING QUARTER 2013

Wednesday evenings 6-9PM

Location: McGaw 1-401

Course Director (office hours by appointment):
Borko Jovanovic, MS, PhD
Associate Professor, Department of Preventive Medicine
Feinberg School of Medicine of Northwestern University
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Tel. (312) 503-2008
borko@northwestern.edu

Office Hours: By appointment

Teaching Assistant: TBD

Guest Instructors:

Roneil Malkani, MD, MSCI
Chintan Desai, MD, MSEB
Raymond C. Bergan, MD
Ashlee Draws, MS
Joy Hsu, MD
David Walega, MD
Dana Gossett, MD, MSCI
Jennifer Beaumont, MS
Kelly Carroll, PhD
Jim Kyriacou, MD, PhD
Tanya Shimuni, MD
John Wilkins, MD, MSCI
Amisha Walia, MD, MSCI
Adin-Christian Andrei, PhD
### I. Course Description

Introduction to fundamentals of clinical trials, including design, conduct, analysis and interpretation of trial results. Topics include commonly used Phase I, Phase II and Phase III, designs, methods for randomization, blinding and sample size determination, choice of controls, collaborative/ multicenter trial requirements and operational issues, data management and data quality issues, interim analysis methods, critical review of clinical trial results and statistical techniques for analyzing clinical trial data.

### II. Prerequisites

**Required:** Introduction to Biostatistics (PUB HLTH 302) and Introduction to Epidemiology (PUB HLTH 304) or permission of course director to verify equivalent previous course work.

**Recommended:** Intermediate Epidemiology and Intermediate Biostatistics, working knowledge of R, Stata, SPSS, SAS or other standard statistical software program(s).

### III. Course Objectives

This course is designed to familiarize students with clinical trials, including design, conduct, analysis and interpretation of trial results. After completion of the course, students should be able to:

a. Identify basic characteristics of a clinical trial and differentiate clinical trials from other types of clinical investigations and epidemiologic studies.

b. Apply basic principles to design a clinical trial.

c. Construct randomization schemes and determine sample sizes for trials of simple designs.

d. Identify the basic ethical principles that should guide the design of clinical trials, apply them in the design of a clinical trial, and use them to critique the designs of others.

e. Specify variables requiring special attention for quality control and set up monitoring procedures.

f. Identify and compare various approaches to interim analyses for safety and efficacy studies.

g. Review critically the published results of a clinical trial.

h. Apply appropriate statistical techniques for the analysis of data from clinical trials.
IV. Teaching Format

New material will be presented in lectures. Phase III material will be based on the textbook. Guest lecturers will each provide a specific angle or insight into day to day running of various types of clinical trials. Students will be expected to read assigned reading material prior to the lecture or the discussion. Participation in group discussion and presentation of one’s work is mandatory.

V. Student Evaluation

Classroom participation is essential to the course and will count 25% toward evaluation. Students are expected to come to class prepared and to take part in the classroom discussions. In terms of classroom participation I am looking for quality, not necessarily quantity. Some of the things I look for in terms of classroom participation:
• Posing of thoughtful questions relative to our topic(s) of interest
• Integration of readings/assignments into discussion
• Respect for others’ opinions/interests
• Extending ideas/skills covered to new situations
• Participation in in-class exercises

Homework assignments will comprise 35% of the final course grade.
Examinations - There will be a final project which will carry 40% of the grade (40% = 20% for Phase III clinical trial protocol, 20% for the slide presentation).
The final project will be a double spaced 20 page protocol for a randomized Phase III clinical trial, which needs to be handed in by email before the last class, prior to presentation. The protocol must follow the format assigned; one cannot use the write-up of a protocol one worked on previously, even if it is active and approved. Presentation should be sent to instructor via email; it should be 15 min long, will be presented in class in Power Point, during the last class or on Wednesday of the exam week. The timing of presentation may depend on the number of students in class and/or scheduling issues.

VI. Required Textbook

VII. Course Evaluation

The Program in Public Health administers web-based course evaluations to students for each course near the end of the quarter. **Your completion of both the unit (course) and faculty evaluation components is required; failure to complete either of the evaluations will result in an incomplete grade until the evaluations are submitted.** You will be sent the web link and instructions via email later in the quarter. You will have about two weeks to complete the evaluations before grades are submitted.

VIII. Academic Integrity

Academic integrity at Northwestern University is based on a respect for individual achievement that lies at the heart of academic culture. Every faculty member and student, both graduate and undergraduate, belongs to a community of scholars where academic integrity is a fundamental commitment. The Program in Public Health abides by the standards of academic conduct, procedures, and sanctions as set forth by The Graduate School at Northwestern University. Students are responsible for knowledge of the information provided by The Graduate School on their Web page at [http://www.tgs.northwestern.edu/studentsvcs/ethics/](http://www.tgs.northwestern.edu/studentsvcs/ethics/).

Additionally, faculty reserve the right to use the “Safe Assignment: Plagiarism Detection Tool” that is part of the Course Management System. Info about this tool is found at [http://course-management.northwestern.edu/tipsheets.html](http://course-management.northwestern.edu/tipsheets.html).

IX. Course Outline (Student assignments in bold)

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<tr>
<th>Date</th>
<th>(Day)</th>
<th>Topic</th>
<th>Description</th>
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<tbody>
<tr>
<td>April 3</td>
<td>(Wed)</td>
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<td>Introduction of the course plan, introduction of the text FFD. Background: Intermediate Epidemiology and Biostatistics – Clinical Trials - a review.</td>
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<td>April 10</td>
<td>(Wed)</td>
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<td>Guest Lecture: Observational and Experimental Studies. Lecture: Phase I trials are not trivial Practice: Escalation trials in cancer – computation with Excel. <strong>Homework #1 assigned</strong></td>
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<tr>
<td>April 17</td>
<td>(Wed)</td>
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<td><strong>Homework #1 due</strong> Guest Lecture: Prevention phase I and II trials at NU Lecture: Phase II trials, randomization and stopping rules Practice: Probability in Phase II trials, randomization with Excel <strong>Homework #2 assigned</strong></td>
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<td>April 24</td>
<td>(Wed)</td>
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<td><strong>Homework #2 due</strong> Guest Lecture: Writing and submitting Phase I, II and III protocols at the CCC CRO Lecture: FFD Chap 1-4 <strong>Homework #3 assigned</strong>: sketch your own Phase III protocol</td>
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<td>May 1</td>
<td>(Wed)</td>
<td><strong>Homework #3 due</strong>&lt;br&gt;Guest lecture: “My own Phase III trial in this class”&lt;br&gt;Lecture: FFD Chapters 5, 6, 7</td>
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<td>May 8</td>
<td>(Wed)</td>
<td><strong>Student presentation of possibly revised Homework #3:</strong>&lt;br&gt;“My phase 3 clinical trial proposal”&lt;br&gt;(10 min each, using one sheet paper handout)&lt;br&gt;Lecture: FFD Chap 8, 9, 10</td>
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<td>May 15</td>
<td>(Wed)</td>
<td>Guest lectures: 1) QOL and FDA, 2) Example of a trial&lt;br&gt;Lecture: FFD Chapters 11, 12, 13&lt;br&gt;<strong>Homework #4 assigned</strong></td>
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<td>May 22</td>
<td>(Wed)</td>
<td><strong>Homework #4 due</strong>&lt;br&gt;Guest lectures: 1) Patient Advocacy + 2) Example of a trial&lt;br&gt;Lecture: FFD: chap 14, 15, 16&lt;br&gt;<strong>Homework #5 assigned</strong></td>
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<td>May 29</td>
<td>(Wed)</td>
<td>Critical Review of Published Trials; Recent Innovations and Controversies in Design and Analysis of RCTs + Other issues in trials&lt;br&gt;<strong>HW #5 due:</strong> Critical review of literature</td>
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<td>June 5</td>
<td>(Wed)</td>
<td><strong>Final Term Project Protocol is due</strong>&lt;br&gt;Final Term Project Presented – 15 min slide presentation</td>
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<td>June 12</td>
<td>(Wed)</td>
<td>Final Term Projects Presented</td>
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<td>June 14</td>
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<td>End of Spring Quarter</td>
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