HPM 886
Advanced Health Services Research Methods and Applications
(Credit Hours: 3)
Department of Health Policy and Management
UNC Gillings School of Global Public Health

Fall 2017 Syllabus
Meeting Time: Wednesdays, 1:25-4:25 pm
Location: McGavran-Greenberg 1303

<table>
<thead>
<tr>
<th>Faculty:</th>
<th>Leah Zullig, PhD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office:</td>
<td>411 West Chapel Hill Street, Suite 600</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:leah.zullig@duke.edu">leah.zullig@duke.edu</a></td>
</tr>
<tr>
<td>Phone:</td>
<td></td>
</tr>
<tr>
<td>Office Hours:</td>
<td>Wednesdays from 1:00-1:25pm, 4:25-5:00pm, and by appointment</td>
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</tbody>
</table>

Course Overview
This course focuses on applications of research methods that are relevant to health services and health policy researchers. Skills and topics covered in HPM 884 and HPM 885 are applied to innovative and policy-relevant research areas.

Prerequisites: HPM 884 and 885

Learning Objectives and HPM Competencies

<table>
<thead>
<tr>
<th>Course Learning Objective</th>
<th>Competencies (See grid below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>For each research area / module:</td>
<td></td>
</tr>
<tr>
<td>1 Discuss the focus, research questions, and concepts used in the area.</td>
<td>1, 2, 4</td>
</tr>
<tr>
<td>2 Compare and contrast the methods and study designs used in the area to approaches covered in HPM 884 and 885.</td>
<td>6, 7, 8, 10</td>
</tr>
<tr>
<td>3 Assess the methodological challenges and potential solutions in the area.</td>
<td>6, 7, 8, 10</td>
</tr>
<tr>
<td>4 Formulate a research study relevant to the student’s research in the area.</td>
<td>5, 6, 7, 8, 13</td>
</tr>
</tbody>
</table>
HPM Core Competencies

1. Understand critical issues
2. Develop expertise in a substantive area
3. Review and synthesize a body of research literature
4. Identify, apply theoretical knowledge / conceptual models
5. Develop hypotheses that can be tested in research
6. Select appropriate research designs and methodologies
7. Understand and apply analytical strategies
8. Identify ethical implications of research methods
9. Interpret and explain the results of research
10. Critically evaluate articles from scholarly journals and research presentations
11. Write articles for submission to scholarly journals
12. Understand grant writing process / write proposals
13. Make oral presentations to scientific audiences
14. Participate in teaching a course
15. Explain research to various audiences.

Resources

Website
HPM 886 has its own Sakai website: https://sakai.unc.edu/portal/site/hpm886.001.fa17. This will be the primary resource for course-related communication. Course materials including this syllabus, presentations, assignments, optional readings, and announcements will be posted periodically. Students should check the website regularly.

Texts, Articles, Web Sources
In general, readings and sources for each module will be available online, through the UNC Libraries, or through the Sakai (Resources). Articles for study critiques are listed below:

Module 1: Comparative Effectiveness Research (CER) Module


Module 2: Decision Sciences (DS) Module


Module 3: Implementation Science (IS) Module


Module 4: Program Evaluation (PE) Module

**Requirements and Expectations**

*Roles and Responsibilities*
The instructor’s primary role is to help create an effective learning environment, act as an expert resource, help you find other resources, and facilitate learning. The student’s role is to be an open learner and to help each other learn. Students do this by keeping up with the readings, participating in class discussion, completing required assignments, and helping each other to add value to the course.

*Class Participation*
Attendance in class is mandatory for each class session. In the event of a truly extraordinary circumstance, attendance may be excused if brought to the instructor’s attention in advance. All students are expected to do the assigned reading for each class and to come to class prepared to actively participate in class discussions.

*Cell Phones and Laptops*
Turn off cell phones in class and during exams. Laptops may be used in class only for taking notes and for looking up information relevant to the topic being discussed. Please do not use laptops at all in any classes with a guest speaker.

*Course Evaluation by Students*
You will be asked to participate in a short written evaluation at the end of each module and at the end of the overall course. Your responses will be anonymous, with feedback provided in the aggregate. Open-ended comments will be shared with instructors, but not identified with individual students. Your participation in course evaluation is an expectation, since providing constructive feedback is a professional obligation. Feedback is critical, moreover, to improving the quality of our courses, as well as for instructor assessment.

**Student Evaluation Method**
The weighting of grade components is summarized in the table below. In general, class participation, course assignments, and other course requirements will be graded on a simple, 3-point ordinal scale: “H,” “P,” or “L.” The details of the grading scale for the final course grade are described below.

<table>
<thead>
<tr>
<th></th>
<th>% of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leading In-class Discussion</td>
<td>10%</td>
</tr>
<tr>
<td>Reading Questions</td>
<td>10%</td>
</tr>
<tr>
<td>Study critiques (4)</td>
<td>40%</td>
</tr>
<tr>
<td>Grant methods section (4)</td>
<td>40%</td>
</tr>
</tbody>
</table>
Leading In-class Discussion (10%)
Each student will lead the in-class discussion of one peer-reviewed journal article. The instructor will assign the presentation date, but the article will be chosen by the student. Articles must meet the following criteria:

- Peer-reviewed journal
- Published within last 10 years or “seminal” work
- Not discussed in another class
- Methods are relevant to module

All article selections are subject to instructor approval. Provide a full citation to the instructor by the second week of class for students presenting in the first module. For all other students, provide a full citation by the week before the start of the module for which they are presenting.

The discussion leader will develop list of 5 discussion questions connecting the paper to the topic of the week. The discussion questions should promote critical examination of the paper and can include questions the leader would like answered by the instructor or classmates. The leader should be prepared to discuss, in depth, the research question(s), background/context, approach/methodology (including connections to research designs covered in HPM 885), key results, strengths and weaknesses (critical evaluation), and take-away messages. Discussion leaders are encouraged to supplement the discussion with relevant examples from professional experience and/or online resources. Please submit the article no later than Monday afternoon prior to the class period when you are leading. Earlier submissions are encouraged.

All students are expected to have read the paper in advance, participate in the discussion, and share their own questions about the article.

Grading rubric:

<table>
<thead>
<tr>
<th></th>
<th>Honors</th>
<th>Pass</th>
<th>Low Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demonstrated knowledge of paper (45%)</strong></td>
<td>Explained methodological details in own words</td>
<td>Explained methods in authors’ words</td>
<td>Explained methods, but faltered when pushed beyond text of paper</td>
</tr>
<tr>
<td></td>
<td>Thoughtful responses to nearly all questions</td>
<td>Thoughtful responses to most questions</td>
<td>Thoughtful responses to some questions</td>
</tr>
<tr>
<td></td>
<td>Effectively tied methods back to session topic</td>
<td>Some connection to session topic</td>
<td>Connection to module clear, but not to specific topic</td>
</tr>
<tr>
<td></td>
<td>Discussion questions required higher-level thinking (evaluation)</td>
<td>Discussion questions required moderately complex thinking (application)</td>
<td>Discussion questions required basic tools (remembering)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Quality of discussion (45%)</strong></th>
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HPM 886
Fall 2017
Zullig
UNC-Chapel Hill
Reading questions
In advance of each session, each student will post to the Forum one question based on the core/required readings for that day (not the student-led readings). Provide a brief background to your question. The instructor will use some of the students’ questions to structure the discussions. Questions should spark insightful discussions during the sessions. Questions are due the day of each session by 9am.

Grading rubric:

<table>
<thead>
<tr>
<th>Structure/Process (10%)</th>
<th>Integrated outside experience to enhance understanding</th>
<th>Context for paper provided from w/in literature</th>
<th>Little context for paper w/in literature or student’s research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper was selected on time</td>
<td>Paper was selected on time</td>
<td>Paper was selected late</td>
<td></td>
</tr>
<tr>
<td>5 discussion questions</td>
<td>5 discussion questions</td>
<td>&lt;5 discussion questions</td>
<td></td>
</tr>
<tr>
<td>Included and showed respect for classmates</td>
<td>Most students were included in discussion</td>
<td>Only a few students included in the discussion</td>
<td></td>
</tr>
</tbody>
</table>

Quality of questions (90%)

<table>
<thead>
<tr>
<th>Honors</th>
<th>Pass</th>
<th>Low Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate understanding of papers’ context and goals</td>
<td>Demonstrate understanding of papers’ goals</td>
<td>No demonstration of papers’ context or goals (e.g., generic)</td>
</tr>
<tr>
<td>Required higher-level thinking (evaluation)</td>
<td>Required moderately complex thinking (application)</td>
<td>Required basic tools (remembering)</td>
</tr>
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</table>

Structure/Process (10%)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions submitted on time</td>
<td>Questions submitted on time</td>
<td>Questions submitted late</td>
</tr>
</tbody>
</table>

Study critique
For each module, the instructor will provide a study to review. Each student will write a brief (1-2 pages) critique of the study. The format of the critique should follow that of a journal peer review. The following is the format used by Health Affairs.

- Publication Priority – 5-point scale (1-5, routine to fast track)
- 5-point ratings (1=poor to 5=superior) on:
  - Overall quality
  - Originality
  - Data
- Analysis/Methods
- Conclusions
- Balance
- Writing
- Policy Relevance

- Recommendation: Accept as is, Accept with Revisions, Revise and Resubmit, Reject

- Comments to Author
  - Summarize in your words what the paper tried to achieve and its contribution
  - Detail concerns about any of the areas scored above. Defend why it limits the applicability of the paper. Suggest alternative approaches.

As applicable to the module, the critique should also assess adherence to discussed reporting protocols.

**Grading rubric:**

<table>
<thead>
<tr>
<th>Quality of evaluation (65%)</th>
<th>Honors</th>
<th>Pass</th>
<th>Low Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of writing (25%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure/Process (10%)</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

**Grant methods section**

For each module, the instructor will provide a grant application (program announcement, request for proposal). In teams of four or five (4 or 5) people, students will write the methodology section.
for a proposal that is responsive to the announcement and utilizes methods covered in the module. Teams will be assigned by the instructor. To the extent possible, students will be evenly distributed with regard to minor areas.

The proposals should utilize the research design principles covered in HPM 885 and the module. The proposal should include a description of the following:

- Data sources and collection
- Key variables (definition and creation)
- Statistical models
- Sensitivity analysis
- Limitations and potential fixes

The format of the proposal will use the NIH R21 format for the Research Strategy/Approach section: 5 pages maximum; margins are .5”; font is 11-black only; Arial, Helvetica, Palatino Linotype or Georgia typeface; no headers/footers. Use English and avoid jargon. Define terms with appropriate abbreviations in parentheses and use abbreviation thereafter. The proposals are due the last day of each module. There will be time provided in class to work on the proposals.

The instructor will provide each team with feedback and teams will then submit a revised grant methods section. Revised sections will be graded by peer teams.

Each team will receive one grade for each proposal. For the proposals, students will assess the contributions that team members made to team performance. Prior to the last day of class, each student will be asked to evaluate his or her teammates in four dimensions: preparation, participation and communication, helps group excel, and cooperation. Students will rank teammates in each dimension using a four-point scale: usually (over 90% of the time), frequently (more often than not), sometimes (less than half the time), and rarely (never or once in a great while). Ratings for each team member will be summed and expressed as a percentage of total possible points (16 = 4x4). The median rating by team members will be the student’s peer assessment grade.

**Grading rubric:**

<table>
<thead>
<tr>
<th>Quality of methods proposed (60%)</th>
<th>Honors</th>
<th>Pass</th>
<th>Low Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>All content areas addressed satisfactorily</td>
<td>Most content areas addressed satisfactorily</td>
<td>Some content areas addressed satisfactorily</td>
<td></td>
</tr>
<tr>
<td>Apply module-specific research design principles</td>
<td>Apply module-specific research design principles</td>
<td>Lack of module-specific design principles</td>
<td></td>
</tr>
<tr>
<td>Defend assumptions and chosen approach</td>
<td>Most design choices and assumptions justified</td>
<td>Some design choices and assumptions justified</td>
<td></td>
</tr>
</tbody>
</table>
Quality of writing (20%)

<table>
<thead>
<tr>
<th></th>
<th>Clear and concise</th>
<th>Most sections clear and concise</th>
<th>Some sections unclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organized logically</td>
<td>Organized logically</td>
<td>Disorganized</td>
<td></td>
</tr>
</tbody>
</table>

Structure/Process (20%)

<table>
<thead>
<tr>
<th></th>
<th>All formatting requirements met</th>
<th>Most formatting requirements met</th>
<th>Some formatting requirements met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submitted on time</td>
<td>Submitted on time</td>
<td>Submitted 1-2 days late</td>
<td></td>
</tr>
<tr>
<td>All students participated equally</td>
<td>All students participated equally</td>
<td>Unequal student participation</td>
<td></td>
</tr>
</tbody>
</table>

Grading Scale

*Honors* indicates exceptional graduate-level work. Exceptional means what it says: above and beyond standard/acceptable graduate-level work.

*Pass* indicates standard/acceptable graduate-level work. It is expected that most students in the course will receive a “P” for the course.

*Low pass* indicates marginally acceptable graduate-level work.

Fail indicates that the assignment does not meet an acceptable level for graduate-level work.

Late Assignments

Assignments for each module are due on the dates indicated in the schedule below. Except in the case of extenuating personal circumstances, late assignments are generally not accepted. Advance notification is required when possible (e.g., in the case of a funeral). Attendance is excused in the case of religious holidays, but assignments can be submitted in advance or on time electronically.

UNC Honor Code

The principles of academic honesty, integrity, and responsible citizenship govern the performance of all academic work and student conduct at the University as they have during the long life of this institution. Your acceptance of enrollment in the University presupposes a commitment to the principles embodied in the Code of Student Conduct and a respect for this most significant Carolina tradition. Your reward is in the practice of these principles.

Your participation in this course comes with the expectation that your work will be completed in full observance of the Honor Code. Academic dishonesty in any form is unacceptable, because
any breach in academic integrity, however small, strikes destructively at the University’s life and work.

If you have any questions about your responsibility or the responsibility of faculty members under the Honor Code, please consult with someone in either the Office of the Student Attorney General (966-4084) or the Office of the Dean of Students (966-4042).

Read “The Instrument of Student Judicial Governance” (http://instrument.unc.edu).

**Recognizing, Valuing, and Encouraging Diversity**

The importance of diversity is recognized in the mission statement of HPM. In the classroom, diversity *strengthens* the products, *enriches* the learning, and *broadens* the perspectives of all in the class. Diversity requires an atmosphere of inclusion and tolerance, which oftentimes challenges our own closely-held ideas, as well as our personal comfort zones. The results, however, create a sense of community and promote excellence in the learning environment. This class will follow principles of inclusion, respect, tolerance, and acceptance that support the values of diversity.

Diversity includes consideration of: (1) life experiences, including type, variety, uniqueness, duration, personal values, political viewpoints, and intensity; and (2) factors related to “diversity of presence,” including, among others, age, economic circumstances, ethnic identification, family educational attainment, disability, gender, geographic origin, maturity, race, religion, sexual orientation, social position, and veteran status.

**Accommodating Students with Disabilities**

UNC-CH supports all reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability, or a pregnancy complication resulting in difficulties with accessing learning opportunities.

All accommodations are coordinated through the UNC Office of Accessibility Resources & Services (ARS), http://accessibility.unc.edu; phone 919-962-8300, email accessibility@unc.edu. Students must document/register their need for accommodations with ARS before accommodations can be implemented.

**Course Schedule**

The course schedule is subject to change. Check the course website on Sakai for the most recent version.

| MODULE I: |
|-----------------|-----------------|
| **COMPARATIVE EFFECTIVENESS RESEARCH (CER)** |
| Session 1.1 | Aug 23 |
| | Comparative Effectiveness Research: Overview and Study Objectives |
### Session Learning Objectives:
- Review key goals of CER and PICOTS framework
- Consider how CER and PCOR overlap
- Use potential outcomes framework to frame CER questions
- Distinguish different types of treatment effects

### Key Concepts:
- Comparative effectiveness research
- PICOTS
- CER protocol
- Potential outcomes
- Treatment effects

### Readings:
1. Velentgas, Intro, Chapter 1, and Supplement 1, pp. 162-165
2. PCORI Methodology Report: Executive Summary, Intro and Section I
3. Imbens and Wooldridge (2009) sections 1, 2.1-2.2, and 3.1
4. Optional Reading: Tunis et al. (2010)—especially Table 1

### Assignments:
None

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### Session 2.1 Aug 30 Study Design and Target Population (with Justin Trogdon)

#### Rationale:
This session describes study designs in epidemiology and economics that address bias in observational studies.

#### Session Learning Objectives:
- Describe the problem of bias (randomized trials as well as observational studies)
- Assess the strengths and weaknesses of epidemiological and economic study designs
- Translate key study design terms across disciplines

#### Key Concepts:
- Confounding (by indication)
- New user design
- Immortal time bias
- Instrumental variables
- Regression discontinuity
- Difference-in-difference

#### Readings:
1. Velentgas, Chapter 2
2. PCORI Methodology Report: Section II {Choosing a Study Design: Translation Framework}
3. Imbens and Wooldridge (2009) sections 5, 5.1, 6.3-6.5
4. Optional Reading: Moscoe et al. (2015) for RD
5. Student-led Reading: Abby Hoffman

#### Assignments:
Reading questions and student-led discussion

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### Session 3.1 Sep 6 Estimation and Reporting of Heterogeneity of Treatment Effects

#### Rationale:
This session explores methods to account for different treatment effects for different people.
| Session Learning Objectives: |  • Understand the implications of average treatment effects for research and policy  
  • Describe the causes of heterogeneous treatment effects, and methods for addressing |
|-----------------------------|--------------------------------------------------------------------------------|
| Key Concepts:               |  • Heterogeneous treatment effects  
  • Baseline risk / responsiveness / vulnerability / utility  
  • Exploratory, initial testing, confirmatory tests |
| Readings:                   |  1. Velentgas, Chapter 3  
  2. PCORI Methodology Report: Section III Intro & Sections III.1-5 (pp 21-46)  
  3. Imbens and Wooldridge (2009) section 3.2  
  4. Willke et al. (2012)  
  5. Optional Reading: Kravitz et al. (2004)—especially Figs. 1 & 3  
  6. Student-led Reading: Anagha Gogate |
| Assignments:                |  Reading questions and student-led discussion  
  Group meeting time |
| Session 4.1 Sep 13 Exposure Definition and Measurement |  
| Rationale:                  |  This session provides recommendations for defining exposure (i.e., the “treatment” variable). |
| Session Learning Objectives: |  • Evaluate choices in exposure selection, timing, and amount  
  • Describe the importance of the unit of analysis  
  • Explain the relationship between bias and measurement error |
| Key Concepts:               |  • Frequency, format, and intensity  
  • Induction and latent periods  
  • Nondifferential and differential measurement error  
  • Immortal time bias |
| Readings:                   |  1. Velentgas, Chapter 4  
  3. Student-led Reading: Amber Haley |
| Assignments:                |  Reading questions |
| Session 4.2 Sep 13 Comparator Selection |  
| Rationale:                  |  This session discusses recommendations for choosing a comparator population. |
| Session Learning Objectives: |  • Describe the criteria for choosing a comparison group  
  • Explain the threats to validity of comparison group |
| Key Concepts:               |  • Confounding by indication  
  • Selection bias  
  • Active comparators |
| Readings:                   |  1. Velentgas, Chapters 5  
  2. Student-led Reading: Shelley Jazowski |
| Assignments:                |  Student-led discussion  
  CER Study Critique due |
| Session 5.1 Sep 20 Covariate Selection and Data Sources |  
| Rationale:                  |  This session discusses key considerations in the choice of covariates and data sources. |
### Session Learning Objectives:
- Identify key challenges in causal modeling
- Use directed acyclic graphs (DAGs) to model risk factors, confounding, and model pathways

### Key Concepts:
- Risk factors
- Confounders
- Intermediate variables
- Colliders

### Readings:
1. Garber et al. (2010)
2. Velentgas, Chapter 7
4. Optional: Velentgas, Chapter 8
5. Student-Led Reading: Sejin Lee

### Assignments:
- Reading questions
- Grant proposal methods section due

## MODULE II: DECISION SCIENCES (DS)

### Session 1.1
**Sep 20** Decision Science and Economic Evaluation: An Overview

**Rationale:**
This session provides a rationale for economic evaluation and describes the major types of economic analyses.

**Session Learning Objectives:**
- Understand the four key types of economic evaluation

**Key Concepts:**
- Reference case analysis
- Cost-effectiveness analysis
- Cost-utility analysis
- Cost-benefit analysis
- Cost-minimization analysis

**Readings:**
2. Muennig Chapters 1 & 2
3. Husereau et al. (2013) {CHEERS checklist}
4. Optional: Caro et al. (2012) {provides list of ISPOR-SMDM recommendations}
5. Student-led Reading: Connor Drake

**Assignments:**
- Reading questions and student-led discussion

### Session 2.1
**Sep 27** Overview of Modeling and Decision Trees

**Rationale:**
This session describes the key steps to developing a research question for economic evaluation and introduces the concept of decision trees to guide data collection and analysis.

**Session Learning Objectives:**
- Describe the 8 steps of creating a research project
- Interpret decision trees

**Key Concepts:**
- Decision trees

**Readings:**
1. Muennig Chapter 3
2. Roberts et al. (2012)
3. Student-led Reading: Sheila Patel

**Assignments:**
- Reading questions

### Session 2.2
**Sep 27** Measuring Costs
<table>
<thead>
<tr>
<th>Rationale:</th>
<th>This session discusses how to identify required cost data and adjusting that data for use in your analysis.</th>
</tr>
</thead>
</table>
| Session Learning Objectives: | • Review key sources of cost measures based on resource use  
• Consider issues in using charges or payments versus costs  
• Review opportunity cost considerations  
• Understand the purpose and process of discounting |
| Key Concepts: | • Opportunity costs  
• Micro costs  
• Gross costs  
• Cost-to-charge ratio  
• Discounting |
| Readings: | 1. Muennig Chapter 4  
2. Student-led Reading: Emily Haines |
| Assignments: | Reading questions and student-led discussion |
| Session 3.1 Oct 4 | Probabilities, Decision Analysis, and Markov Modeling |
| Rationale: | This session explains the role of probabilities in decision analysis and introduces Markov models. |
| Session Learning Objectives: | • Describe types of decision analysis  
• Understand the time frame and dynamics for Markov modelling  
• Consider the sources for probability parameters for Markov models |
| Key Concepts: | • Decision analysis tree  
• Markov model  
• Life expectancy |
| Readings: | 1. Muennig, Chapters 5 & 6  
2. Student-led Reading: Hailey James |
| Assignments: | Reading questions and student-led discussion  
Critique with CHEERS Checklist  
Group meeting time |
| Session 4.1 Oct 11 | Measuring Health-Related Quality of Life |
| Rationale: | This session provides a background for HRQoL and describes three approaches to calculating QALYs. |
| Session Learning Objectives: | • Learn basic theory behind HRQoL scores  
• Review key sources/methods of HRQoL  
• Generic versus disease-specific measures of HRQoL |
| Key Concepts: | • Preference score  
• Standard gamble  
• Time trade-off  
• Preference-weighted generic instruments  
• Life table method  
• Markov method  
• Summation method |
| Readings: | 1. Muennig, Chapters 7 & 8  
2. Student-led Reading: Olive Mbah |
### Assignments:
Reading questions and student-led discussion

### Session 4.2  Oct 11  
Sensitivity Analysis, Uncertainty, and Willingness to Pay

**Rationale:**
*This session discusses types of uncertainty in decision models and the rationale for and implementation of common sensitivity analyses.*

**Session Learning Objectives:**
- Use the Cost Effectiveness Acceptability Curve to portray uncertainty and value

**Key Concepts:**
- N-way sensitivity analysis
- Tornado analysis
- Monte Carlo simulation
- Triangular distribution
- Value of information
- Expected value of perfect information

**Readings:**
1. Muennig, Chapters 9 & 11
2. Briggs et al. (2012)
3. Fenwick and Byford (2005)
4. Optional: Muennig Chapter 12
5. **Student-led Reading:** Lexie Grove

### Assignments:
Reading questions  
Grant proposal methods section due

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## MODULE III: IMPLEMENTATION SCIENCE (IS)

### Session 1.1  Oct 18  
Implementation Science Overview

**Rationale:**
*This session provides an overview implementation science, including definition of key terms and the state of the literature.*

**Session Learning Objectives:**
- Describe benefits of and barriers in translating evidence into action
- Distinguish implementation science from dissemination science
- Identify research questions, theories, and research designs appropriate for implementation science

**Key Concepts:**
- Evidence-based intervention
- Diffusion / dissemination / implementation
- Adoption
- Sustainability
- Fidelity
- Adaptation

**Readings:**
2. Rabin et al. (2008)
3. Ogden and Fixsen (2014)

**Assignments:**
Reading questions and student-led discussion

### Session 2.1  Oct 18  
Study Designs in Implementation Science

**Rationale:**
*This session describes three study designs in implementation science.*
| Session Learning Objectives: | • Describe the major features of the MOST framework  
• Describe the major features of the SMART design  
• Be familiar with hybrid study designs  
• Explain how to combine effectiveness aims and implementation aims in a single study design |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------|
| Key Concepts: | • Tailoring variables  
• Time-varying adaptive intervention |
2. Palinkas et al. (2011)  
| Assignments: | Reading questions and student-led discussion |
| Session 2.2 Oct 25 Mixed Methods I |  |
| Rationale: | This session explores the theory behind mixed methods designs. |
| Session Learning Objectives: | • Define and articulate the rationale for mixed methods research  
• Explain the controversies of mixed methods research |
| Key Concepts: | • Paradigm  
• Positivism, interpretivism, and pragmatism |
2. Teddlie and Tashakkori (2012)  
4. Student-led Reading: Wei Chang |
| Assignments: | Reading questions |
| Session 3.2 Nov 1 Guest Lecture – Byron Powell: Toward Improved Effectiveness of Implementation Strategies (1:30pm-2:50pm) |  |
| Rationale: | This session will provide an overview of the state of the literature on implementation strategies, and will provide examples of ongoing work to advance our understanding of when, why, and how they work to improve the implementation of evidence-based practices in routine care settings. |
| Session Learning Objectives: | • Articulate commonly used implementation strategies  
• Describe methods for selecting and tailoring strategies to address contextual needs  
• Learn about relevant reporting guidelines  
• Identify emerging research priorities |
| Key Concepts: | • Implementation strategies  
• Tailoring  
• Reporting guidelines |
| Readings: | All readings are optional:  
1. Colquhoun et al. (2017)  
2. Powell et al. (2017)  
4. Proctor et al. (2013) |
<table>
<thead>
<tr>
<th>Session 3.2</th>
<th>Nov 1</th>
<th>Guest Lecture – Chris Shea: Theory and Measurement in Implementation Science (3:00pm-4:25pm)</th>
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<tbody>
<tr>
<td>Rationale:</td>
<td></td>
<td><em>This session discusses the link between theory and measurement with an example from our faculty.</em></td>
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</table>
| Session Learning Objectives: | | • Identify measures appropriate for implementation science  
• Articulate the connection between theory and measurement  
• Discuss the challenges in measuring group or organization-level constructs from individual-level data |
| Key Concepts: | | • Taxonomy of 8 implementation outcomes  
• Change commitment  
• Change efficacy  
• Validity and reliability |
| Readings: | | 1. Proctor et al. (2011)  
2. Weiner (2009)  
3. Shea et al. (2014) |

**MODULE IV: PROGRAM EVALUATION (PE)**

<table>
<thead>
<tr>
<th>Session 1.1</th>
<th>Nov 8</th>
<th>Program Evaluation Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rationale:</td>
<td></td>
<td><em>This session positions program evaluation in the larger set of topics covered in the course.</em></td>
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<tr>
<td>Session Learning Objectives:</td>
<td></td>
<td>• Explain the purpose of program evaluation and contrast it with research, monitoring, and quality improvement (with which it overlaps).</td>
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</tbody>
</table>
| Key Concepts: | | • Logic model  
• Utility  
• Feasibility  
• Propriety  
• Accuracy |
2. Student-led Reading: Carlos Caro Seguel |
| Assignments: | | Reading questions and student-led discussion |
| Session 2.1 | Nov 15 | Evaluation Design and Evidence Gathering |
| Rationale:  |       | *This session discusses the choice of evaluation design and recommendations for gathering data for the evaluation.* |
| Session Learning Objectives: | | • Define the purpose(s) and user(s) of the evaluation  
• Connect the evaluation questions to the purpose  
• Compare the advantages and disadvantages of various data collection methods |
| Key Concepts: | | • Implementation/Process evaluation  
• Effectiveness/Outcome evaluation  
• Indicators |
| Readings: | 1. CDC Guide – Steps 3 and 4  
2. Kellog Handbook – Chs. 2 and 4  
3. USAID – Chs. 4 |
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<tbody>
<tr>
<td>Assignments:</td>
<td>Reading questions and student-led discussion</td>
</tr>
<tr>
<td>Session 2.2</td>
<td>Nov 15</td>
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<tr>
<td>Rationale:</td>
<td>This session describes the design, implementation, and evaluation of a unique program in the Veterans Affairs healthcare system.</td>
</tr>
</tbody>
</table>
| Session Learning Objectives: | • Identify unique features of a program from development to evaluation  
• Discuss questions about program design and evaluation with an expert |
| Key Concepts: | • Lifecycle of an intervention from pilot test to evaluation |
| Readings: | N/A |
| Assignments: | IS Methods Proposal due |
| Session 3.2 | Nov 29 | Guest Lecture: Nina Sperber -- Mixed Methods II (1:25-2:30pm) |
| Rationale: | This session provides examples of mixed methods approaches. |
| Session Learning Objectives: | • Explain how to conduct mixed methods sampling  
• Identify which questions are best fits for mixed methods research  
• Understand how to propose mixed methods research in NIH proposals |
| Key Concepts: | • Triangulation  
• Sampling designs |
| Readings: | 5. Teddlie and Yu (2007)  
Student-led Reading: Garcia – Tonkin-Crine et al. (2016) |
| Assignments: | Reading questions and student-led discussion  
IS Study Critique due |
| Key Concepts: | • Interview-based methods  
• Reliability and validity |
| Readings: | 1. Creswell et al. (2011)  
2. Pope et al. (2002)  
3. Damschroder et al. (2009) |
| Assignments: | None. |
| Session 3.2 | Nov 29 | Guest Lecture: Karl Umble -- Working with stakeholders effectively to plan an evaluation (2:45-4:15) |
| Rationale: | This session focuses on working with stakeholders in a program evaluation using the CDC’s framework. |
| Session Learning Objectives: | • Describe key considerations in planning an evaluation (utility, accuracy, feasibility, propriety) and important steps in planning useful evaluations (CDC Framework). |
### Key Concepts:
- Logic model

### Readings:
1. Practical Evaluation Using the CDC Evaluation Framework: [http://www.cdc.gov/asthma/program_eval/evaluation_webinar.htm](http://www.cdc.gov/asthma/program_eval/evaluation_webinar.htm)
   a. Watch Videos 1 (25 minutes) and 1A (10 minutes) - Evaluation Pitfalls and the CDC Guide Overview
   b. Watch Video 2 Up through Example 1 on Asthma in Low income housing (about 35 minutes)
   Optional: Watch Video 3 on Describing the Program (Logic Models) and Focusing the Evaluation (about 50 minutes)

### Assignments:
- PE Study Critique due

### Session 4.1 Dec 6
**Dissemination of Conclusions**
**Rationale:**
*This session covers the analysis, interpretation, and dissemination of evaluation findings.*
**Session Learning Objectives:**
- Tie interpretation of data back to goals of the program and users
- Think broadly about potential audiences
- Describe best practices for writing evaluation reports
**Key Concepts:**
- Standards of performance

### Readings:
1. CDC Guide – Steps 5 and 6
2. Newcomer et al. (2010)

### Assignments:
- Reading questions and student-led discussion

### Session 4.2 Dec 13
**No Class Meeting, Available for Office Hours Upon Request**

### Assignments:
- PE Methods Proposal due

### Key Dates

Wednesdays at 9am beginning Aug 31 – reading questions (1 per session from core reading)

Sep 13, 1:30p – CER study critique

Sep 20, 1:30p – CER methods proposal

Oct 4, 1:30p – DS study critique

Oct 11, 1:30p – DS methods proposal

Nov 1, 1:30p—IS study critique

Nov 15, 1:30p – IS methods proposal
Nov 29, 1:30p – PE study critique

Dec 6, 1:30p – PE methods proposal

References


Creswell JW, Klassen AC, Plano Clark VL, Clegg Smith K. Best practices for mixed methods research in the health sciences. [https://obssr.od.nih.gov/mixed_methods_research/](https://obssr.od.nih.gov/mixed_methods_research/)


MEASURE Evaluation: M&E Fundamentals. Created by US AID and MEASURE Evaluation. January 2007. Available at: https://training.measureevaluation.org/certificate-courses/m-e-fundamentals-en. (Note: You will need to create an account if you want to access this minicourse.)


Woolf SH, Johnson RE. The break-even point: when medical advances are less important than improving the fidelity with which they are delivered. Annals of Family Medicine 2005;3(6):545-552. DOI: 10.1370/afm.406.