PHA 6265
INTRODUCTION TO PHARMACEUTICAL OUTCOMES & POLICY
(POP) RESEARCH
Spring 2022

This course exposes students to the breadth of research issues in Pharmaceutical Outcomes and Policy (POP), including the following areas:

1. **Pharmacoepidemiology and Safety Sciences**– applies epidemiologic reasoning, methods, and knowledge to studies that examine the safety, effectiveness, and quality of drugs in human populations as well as healthcare systems that impact medication use. Examples of areas of research interest include drug safety, comparative effectiveness, drug utilization, and quality measures for medication safety and appropriateness.
2. **Pharmacoeconomics and Outcomes Research** – include studies that describe the cost, utilization and economic efficiency of pharmaceutical products and related services in the delivery of health care and the development and application of health care policy. Examples of research include cost-effectiveness or cost-benefit studies.
3. **Pharmaceutical Health Services Research** – including studies that evaluate the quality of medication use and medication use systems, development of target interventions to remediate identified quality deficits, and evaluation of the safety and effectiveness of such interventions.

Additionally, topics related to professional and career development are also covered.

Course Coordinator:

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Course Objectives:

1. The student will demonstrate a thorough understanding of the types of POP research and describe the research process and methods for collecting data in POP research. Students should learn the importance of various research areas, which agencies fund each type of research, the kinds of methods typically employed, and an illustrative example of each research area.
2. The student will be able to develop a well-written research question in a research area relevant to POP, explain the need for examining the question, describe the significance of research to answer the question, and critically review existing literature to serve as the foundation for the conduct of research to answer the question.

Teaching Methods:

Classes will generally meet for 1.5 hours twice weekly, but there may be changes to the schedule because of faculty's unexpected travel commitments, so please check weekly for schedule changes. The teaching methods will include [1] Group discussions in seminar format; [2] pre=recorded lectures/readings to prepare for class; and [3] Preparation exercises.

You are responsible for being prepared for each class session. Teaching materials are posted in Canvas. Approximately one week before each class, discussion questions may be posted by the class instructor based on the assigned materials. Students will be selected to discuss their responses to the

discussion questions in class. A good response will offer important insights and critical reflections pertinent to the question. While the amount of time needed to provide this commentary will, of course, vary from discussion question to question, generally, a response of 5 minutes will be expected. Students will often find that they may have to read beyond the assigned materials in answering a question. Students who do not provide an adequate presentation will be penalized by having their course grade lowered. Students will be picked randomly for each class period; this means that it's possible that some students will be called more frequently than others, and a student may be called multiple times even during the same week. Participation in each class will be graded as "++" of "+" or "-". Criteria used to assess students' participation include:

- Comments that show evidence of analysis of assigned readings;
- Comments that add to our understanding of the assigned readings/material;
- Comments that build on previous comments by other students;
- Comments that are supported by data from the assigned readings/materials;
- Comments that are questions – some of the best comments that we've heard in our classroom careers are questions that ignited a debate:
- Comments in which you take a different position from your classmates or the flow of conversation in the room AND support it with data and cogent analysis

Discussion Board:
A discussion board will be available on the course website for your use. You may use the discussion board to discuss among yourselves the discussion questions before each class period. Class instructors do not plan to monitor the discussion board since this space is intended primarily for discussing the questions among yourselves.

Class Schedule is generally Mondays and Wednesdays, but you should check the schedule below as occasionally class will occur on another day. Do note that it's possible that the class schedule could be changed due to unforeseen travel by faculty. If that should happen, an email will be sent to you as soon as possible. All meetings will be Mondays from 9:00 am – 10:30 am and Wednesdays from 12:00 pm to 1:30 pm.

Class Period	Instructor	Topic or Assignment	Topic Theme by Research Area and/or Professional Development
Monday, January 10	Segal	Course Introduction and overview and introducing research as a field of scientific inquiry	Professional Development and All Research Areas
Wednesday, January 12	Ciganic	Developing a research question	All Research Areas
Monday, January 17		No Class – MLK Day	
Tuesday, January 18		PhD students submit 3 Research Questions (RQ) to Prof. Segal and MS students submit one or more RQs relevant to the assigned topic area	
Wednesday, January 19	Segal	Planning for your doctoral dissertation/master thesis	Professional Development
Friday, January 21		PhD students, Dr. Segal will notify you of your assigned Faculty Mentor. PhD and MS students, make an appointment with Mentor to discuss RQs and select an RQ for class assignment/thesis for MS students.	

Monday, January 24	Smith	Database sources- patient and aggregated	All Research Areas
Wednesday, January 26	Rouhizadeh	Unstructured Data (NLP)	All Research Areas
Friday, January 28		Final Date for meeting with Faculty Mentor about the RQ you have selected. Provide final RQ to Mentor and Dr. Segal by Monday January 31.	
Monday, January 31	Goodin	Policy and Pharmaceutical Health Services Research	Pharmaceutical Health Services Research
Wednesday, February 2	Goodin	Policy Evaluation Methods and Research Applications	Pharmaceutical Health Services Research
Monday, February 7	Shao	Economic evaluation to guide national policy	Pharmacoeconomics and Health Outcomes Research
Wednesday, February 9	Shao	Microsimulation Experiment to model long-term health impact: moving beyond clinical trial	Pharmacoeconomics and Health Outcomes Research
Wednesday, February 9		Submit RQ, Draft Problem Statement, Draft Purpose and Draft Significance to Mentor. Use track changes if revised RQ.	
Monday, February 14	Winterstein	Research on the Quality of Care	All Research Areas
Wednesday, February 16		Final Date for meeting with Faculty Mentor about all parts of the submission. Inform Segal of the date met with mentor and made necessary revisions based on the meeting.	
Wednesday, February 16	Adkins/Segal	Literature search Strategy	All Research Areas
Monday, February 21	Vouri	Drug utilization studies	All Research Areas
Tuesday, February 22		Submit RQ/ Problem Statement/ Purpose/Significance/Draft Search Strategy to Librarian, Mentor, and Dr. Segal. Include revisions to earlier sections in track changes. Schedule an appointment with the librarian for feedback on the search strategy.	
Wednesday, February 23	Segal	Preparation of Outline	Professional Development
Monday, February 28	Segal	Research on Provider Intervention Studies	All Research Areas
Wednesday, March 2	Park	Measurement of medication adherence and persistence	All Research Areas
Thursday, March 3		Final date to get Feedback from Librarian	
		SPRING BREAK	
Monday, March 14	Park	Meta-analysis of observational studies	All Research Areas

Wednesday, March 16	Guo	Pharmacovigilance	Pharmacoepidemiology and Safety Sciences
Tuesday, March 15		Submit Outline to Mentor and Prof Segal. Include earlier sections of proposal and use track changes of revisions made since last submission.	
Monday, March 21	Wei	Drug Safety Studies	Pharmacoepidemiology and Safety Sciences
Wednesday, March 23	Wei	Patient Safety Studies	Pharmacoepidemiology and Safety Sciences
Tuesday, March 22		Final Date for meeting with Faculty Mentor about the Literature Review Outline. Notify Dr. Segal of when feedback was received and make revisions based on the meeting.	
Monday, March 28	Winterstein	Comparative effectiveness studies	Pharmacoepidemiology and Safety Sciences
Wednesday, March 30	Ciganic	Predictive Modeling	All Research Areas
Monday, April 4	Guo	Health Disparities and Social Determinants of Health	All Research Areas
Tuesday, April 5		Submit all parts of protocol including draft of Literature review. Include revisions to earlier sections using track changes.	
Wednesday, April 6	Rouhizadeh	Methods for assessing data about SDoH in EHRs	All Research Areas
Monday, April 11	Segal	Catch-up regarding final set of deliverables/exam	
Tuesday, April 12		Final Date for Meeting with Mentor to discuss last submission. Notify Dr Segal of when feedback was received.	
Wednesday, April 13	Jiao	Emulating RCT using observational database	All Research Areas
Monday, April 18	Guo	Grant Writing	Professional Development
Wednesday, April 20		Turn in final protocol to Mentor and Prof. Segal	
Wednesday, April 20	Goodin	Publishing	Professional Development
Friday, April 22 (time to be determined)		Presentations (turn in Slide deck at least one day prior to presentation)	
TBD		Final Exam	

Assignments

Research Proposal

During the semester, you will be asked to write sections of a research proposal up through the literature review. The proposal must focus on a research topic related to the discipline of pharmaceutical outcomes and policy, specifically Pharmacoepidemiology and Safety Sciences, Pharmacoeconomics and Outcomes Research, or Pharmaceutical Health Services Research. The proposal assignment will be broken down into smaller steps and you will be offered feedback throughout the process, which can be used to improve your proposal for final submission.

- You will be assigned a faculty mentor who will provide feedback on each section. Please turn in each assignment to your Mentor and the Course Coordinator by the submission deadline. It is essential that each submission be turned in on time so there is enough time to incorporate feedback before moving on to the next section of the proposal. The penalty for a late submission of a submission is a two-point deduction on your grade.
- You are responsible for setting up a meeting with your mentor by the final date specified in the course timeline. I realize that sometimes it may be impossible to meet face-to-face, so feel free to communicate by Zoom, phone, or even email as needed. The key is to be regularly communicative with your mentor and you need to let the course coordinator the date when you connected with your mentor to discuss the submission. You are responsible for notifying the course coordinator of when feedback was provided. The penalty for not doing so will be a loss of two points from your course grade for that section.
- You are expected, of course, to incorporate feedback from the mentor into a revision of each section. When submitting a section, you should include all earlier sections including any revisions made to earlier sections.
- All referencing must use the citation style of the National Library of Medicine's style guide (available at http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=citmed).
- A Rubric will be used by the mentor in assessing your proposal, which is included at the end of the syllabus.
- You must submit your own work and are not allowed to seek assistance from any other individuals except the mentor and other faculty involved in the course.
- You are expected to use the POP style guide for all written work.

Grading

Evidence of thorough preparation for class, participation in class discussion and performance on assignments.	30%
Proposal Presentation	10%
Final proposal with completed review of literature	30%
Final Exam	30%

Grading scale

95-100 = A
90-94 = A-
86-89 = B+
83-85 = B
80-82 = B-
76-79 = C+
73-75 = C
70-72 = C-
66-69 = D+
63-68 = D
60-62 = D-
<60 = E

Readings
See Canvas

Class Discussion

The course will consist largely of discussions in addition to a few lectures by us. Sometimes we will include questions to guide your reading. Typically, the discussion in class will start with those questions and then branch out. In other words, the questions are merely a starting point for your analysis with the goal of getting you oriented and are certainly not intended to be comprehensive.

We will regularly cold call. We do this in order to ensure full participation and to keep the discussion flowing and evenly distributed among the different students. We will also call on volunteers to speak so please don't hesitate to raise your hand if you feel that you have a comment that would advance the discussion.

Your active participation in class will be a part of your course grade. Most important is the quality of your class participation. Sheer quantity is neither sufficient not necessarily desirable. You'll note that sometimes we will ask some questions that are simply case regurgitation. We do this in order to get people "warmed up," and we want you to answer them, but these will not carry as much weight as the questions that require analysis on your part.

For those who are concerned about how participation will be graded, these are rough criteria that we will use to assess student's participation performance:

- Comments that show evidence of analysis of assigned readings;
- Comments that add to our understanding of the assigned readings/material;
- Comments that build on previous comments by other students;
- Comments that are supported by data from the assigned readings/materials;
- Comments that are questions – some of the best comments that we've heard in our classroom careers are questions that ignited a debate:
- Comments in which you take a different position from your classmates or the flow of conversation in the room ANS support it with data and cogent analysis

Finally, you can't contribute to class through ESP so your consistent presence is crucial.

Academic Honesty Requirement:
Familiarize yourself with the University's policy regarding academic dishonesty. This policy will be strictly enforced. The University's conduct regulations are available on the Internet at https://www.dso.ufl.edu/sccr . Please note that the course instructors will closely examine your paper submissions for plagiarism. Cautionary Note: Plagiarism will lead to failing the entire assignment at the minimum and stiffer penalties may be applied. Please take the time to review http://www4.caes.hku.hk/plagiarism/image/all_in_one.pdf for assistance in avoiding plagiarism.

Grading Rubric for Writing Assignment

	A (4)	B (3)	C (2)	F (0)
Focus: Need for the Study	Need for the Study is clear	Shows awareness of need for the study but could be clearer	Shows limited awareness of need for the study	No awareness
Research Question	Clearly written; key variables of interests identified	Reasonably well written but deserving of greater clarity	Understandable but could be much clearer	Unintelligible
Organization of the review of literature: Overall	Well-planned and well-thought out. Includes all relevant literature and does not include irrelevant literature.	Good overall organization, but may either miss some relevant literature or include some irrelevant literature	There is a sense of organization, although its severely lacking.	No sense of organization
Organization: Paragraphs	All paragraphs have clear ideas, are supported with examples and have smooth transitions.	Most paragraphs have clear ideas, are supported with some examples and have transitions.	Some paragraphs have clear ideas, support from examples may be missing and transitions are weak.	Para. lack clear ideas
Content	Exceptionally well-presented and argued; ideas are detailed, well-developed, supported with specific evidence & facts, as well as examples and specific details.	Well-presented and argued; ideas are detailed, developed and supported with evidence and details, mostly specific.	Content is sound and solid; ideas are present but not particularly developed or supported; some evidence, but usually of a generalized nature.	Content is not sound
Sources	Sources are exceptionally well-integrated and they support claims argued in the paper very effectively. Quotations and Works Cited conform to appropriate style for referencing.	Sources are well integrated and support the paper's claims. There may be occasional errors, but the sources and Works Cited conform to appropriate style for referencing..	Sources support some claims made in the paper, but might not be integrated well within the paper's argument. There may be a few errors in how Works Cited conform to appropriate style for referencing.	The paper does not use adequate research or if it does, the sources are not integrated well. They are not cited correctly according to the agreed upon style for referencing.
Style: Sentence structure	Sentences are clear and varied in pattern, from simple to complex, with excellent use of punctuation.	Sentences are clear but may lack variation; a few may be awkward and there may be a few punctuation errors.	Sentences are generally clear but may have awkward structure or unclear content; there may be patterns of punctuation errors.	Sentences aren't clear
Style: Word choice, Tone	There is clear use of a personal and unique style of writing, suited to audience and	There is an attempt at a personal style but style of writing may be awkward or unsuited	There is little attempt at style; reads as flat and perhaps uninteresting in content, which is usually	No attempt at style

	purpose; the paper holds the reader's interest with ease.	to audience and purpose; the reader may lose interest in some sections of the paper.	generalized and clichéd.	
Grammar & Mechanics	Excellent grammar, spelling, syntax and punctuation.	A few errors in grammar, spelling, syntax and punctuation, but not many.	Shows a pattern of errors in spelling, grammar, syntax and/or punctuation. Could also be a sign of lack of proof-reading.	Continuous errors

Grading Rubric for Oral Presentation

Name:_____ Total Score: _____

Oral Presentation Rubric

	4—Excellent	3—Good	2—Fair	1—Needs Improvement
Delivery Score=	• Holds attention of entire audience with the use of direct eye contact, seldom looking at notes • Speaks with fluctuation in volume and inflection to maintain audience interest and emphasize key points	• Consistent use of direct eye contact with audience, but still returns to notes • Speaks with satisfactory variation of volume and inflection	• Displays minimal eye contact with audience, while reading mostly from the notes • Speaks in uneven volume with little or no inflection	• Holds no eye contact with audience, as entire report is read from notes • Speaks in low volume and/ or monotonous tone, which causes audience to disengage
Content/ Organization Score=	• Demonstrates full knowledge by answering all class questions with explanations and elaboration • Provides clear purpose and subject; pertinent examples, facts, and/or statistics; supports conclusions/ideas with evidence	• Is at ease with expected answers to all questions, without elaboration • Has somewhat clear purpose and subject; some examples, facts, and/or statistics that support the subject; includes some data or evidence that supports conclusions	• Is uncomfortable with information and is able to answer only rudimentary questions • Attempts to define purpose and subject; provides weak examples, facts, and/ or statistics, which do not adequately support the subject; includes very thin data or evidence	• Does not have grasp of information and cannot answer questions about subject • Does not clearly define subject and purpose; provides weak or no support of subject; gives insufficient support for ideas or conclusions
Enthusiasm/ Audience Awareness Score=	• Demonstrates strong enthusiasm about topic during entire presentation • Significantly increases audience understanding and knowledge of topic; convinces an audience to recognize the validity and importance of the subject	• Shows some enthusiastic feelings about topic • Raises audience understanding and awareness of most points	• Shows little or mixed feelings about the topic being presented • Raises audience understanding and knowledge of some points	• Shows no interest in topic presented • Fails to increase audience understanding of knowledge of topic
Comments				

Framework for Critical Literature Appraisal

This framework compiles a set of questions that should be asked when evaluating a published report. While the set of questions is comprehensive, the questions may fail to discover all possible concerns in a paper. Look for obvious flaws that would not be stimulated by these questions. Please note that not all questions will apply to all types of articles that you will evaluate.

Conducting an Initial Assessment

Identify the question this study aims to answer, in terms of patient type, intervention, comparator, and outcome (PICO).

- Is this research question important, original, and how does it contribute to current evidence, and how does it relate to your question or patient case?

Assess the quality of the journal.

- Is the article from a peer-reviewed journal?
- Who publishes this journal?
- What is the impact factor of this journal and how does it compare to journals in the same category?

Do you have concerns about conflicts of interests that may have biased the design, presentation, or interpretation of results?

- Is the study sponsored by an organization that may influence the design or results?

Are the authors well-positioned and adequately trained to conduct the study?

- Are they experts in this field?
- Do they have experience doing this type of research?
- Are there members of the research team qualified to do complex methods or analyses?

Critical Assessment of the Study Methods

Did an ethics committee [Institutional Review Board or IRB] approve the study?

- Was informed consent necessary or waived?
- Were privacy concerns addressed?

Study Design

Critique the study design the authors chose.

- How does the study design affect the internal validity of the study (i.e., the ability to answer the research question)?
- What strengths or weaknesses does this type of design typically have?

How appropriate was the choice of study design given the research question?

- Could the authors have chosen a stronger design?

Patient Selection & Establishment of Patient Groups

Is the study generalizable to the patient population it claims to represent?

- Review how patients were selected for the study.
  - Are the inclusion criteria reasonable?
    - Can you justify each criterion?
  - Are the exclusion criteria reasonable?
    - Can you justify each criterion?
  - Could the selection of the sample affect generalizability?
- Are you satisfied with the demographic and baseline information collected?
  - Based on this information, should the patient population be representative?
- Is this a narrow (explanatory) or broad (pragmatic) study?
  - What would you like to see to answer your question?

Are you satisfied with the choice for a control group and the way the control group was established?

- Were control and treatment patients drawn from the same pool of patients or is there concern for selection bias?
- Is the choice of the control group appropriate given the underlying study question and current evidence?
- For drug trials, was the regimen (e.g., dose, time allowed for effect) of the control agent appropriate (a fair fight)?
- What data (for observational studies) or rationale was used to define treatment and control patients and could this method create a bias?

If patients were matched, was matching appropriate or could it create bias?

If patients were randomized, was randomization conducted properly?

- Were there planned subset analyses (i.e., stratified randomization)?

Were the groups (intervention and control) treated equally other than the intervention?

- What was done if patients changed groups during the study period and could this create bias?

Was intention-to-treat (ITT) or modified attention-to-treat used to control for attrition bias?

- Were the ITT results compared to per-protocol analyses?

Measurement of the Intervention or Exposure

Was the intervention or exposure for the treatment group clearly defined and would it be reproducible, (e.g., dosing, titration time, distinct procedures in an intervention)?

- Was the intervention or exposure isolated or were additional interventions initiated that could be responsible for the treatment effect?

How was the intervention given to the treatment group?

- Was it provided consistently across patients, across settings, and consistently over time?

Were there any direct measures for the implementation of the intervention to assure the intervention was implemented (e.g., compliance or adherence measures)?

For observational studies, how was exposure defined and would there be the possibility for a measurement bias (e.g., surveillance or misclassification bias)?

For observational studies, is there concern for confounding?

- What could be a confounder (i.e., what has been shown to previously affect the outcome measure(s)?

Measurement of Outcomes (Endpoints)

Was blinding implemented properly in all concerned entities (patients, providers, data analysts) or do you see any indication for unblinding or measurement bias?

Was the selection of outcomes appropriate?

- Was the best primary outcome selected?
- Were all important outcomes considered?

Are the measures or definitions for these outcomes appropriate and valid?

- Were measurements reliable or were there chances for large variations in measurements that could obscure the results?

Was the follow-up time sufficient to find changes in outcomes?

Other Biases

What other biases [systematic errors] need to be considered in this study?

Statistical Analysis

Does the article report a sample size determination for an experimental study?

- If yes, were the sample size determinants (alpha, beta [power], clinically significant difference, variability [if applicable], and anticipated attrition rate) reasonable?
    - If not, would you consider the study large (and long) enough to show significant changes in endpoints or would you consider the study too large and [potentially] overpowered?
- Was a power analysis performed for an observational study?

Are the statistics computed appropriate for the type of data and study design?

- Were confidence intervals calculated for the key outcome variables?
- Were absolute differences [rather than relative differences] calculated?

Critical Assessment of the Results

Are baseline characteristics of the comparison groups similar or is the concern for bias (e.g., Table 1)?

Are the participants who were enrolled in this trial appropriately accounted for in the results and conclusions of the study [Consort Flow Diagram: Enrollment, Allocation, Follow-up, and Analysis]?

- Was follow-up completed or were patients lost (i.e., attrition)?
- Were intervention and control groups similar in terms of attrition with regard to number and reasons for dropping out or is there concern for attrition bias?
- Were patients analyzed in the group to which they were initially assigned and how may this have affected the presented results (e.g., unintended cross-over)?

Are the results statistically significant and clinically significant?

- Is the change in the primary outcome measurement clinically important?
  - Are differences in secondary or post-hoc measurements clinically important?
- How does the change in the primary outcome compare with the predicted change (clinically significant difference)?
  - Why are the actual change and the predicted change not the same?
- How precise are the results (e.g., standard deviation, confidence intervals) and how does this affect statistical significance?
- Was the study over- [when a difference if found] or underpowered [when no difference is detected]?

Do the study results address the study objectives/research questions appropriately?

- Are the results for all measures reported that were mentioned in the methods section?
  - Or in the published methods (i.e., methods paper on clinical trial registry)?

Were confounding factors and other biases identified and were they addressed by the analysis?

- Did this analysis change the results and why?

Interpretation of the Results

How strong would you consider the causal association between the treatment and the outcome? Consider criteria such as:

- Consistency
  - Internal: Does the effect occur to most patients in the study?
  - External: Are findings consistent with published literature?
- Temporality
- Proximity (the effect occurred in a reasonable time frame after the exposure)
- Biological plausibility / coherence with current knowledge
- Biological gradient (did the study show dose-response relationships)
- Strength of association (e.g., the absolute risk, relative risk, effect size)
- Absence of other causes (based on the study design)

Summarize all biases and measurement problems you encountered and consider how they may have affected the internal validity of the study.

- This includes your judgment as to what direction and extend these issues may have influenced the results, i.e., can the findings be explained by bias alone or would there still be an effect after accounting for biases?

What do you think is the most appropriate interpretation of the study results?

Critical Assessment of the Discussion and Conclusions

Does the discussion section address the most important study limitations?

Are the study conclusions appropriately interpreted from the study results?

- What are the differences between your interpretation of the results and theirs?
  Is there any explanation for these differences?
- Are all study objectives/research questions addressed?
- Do the authors appropriately summarize the study findings?

Is the abstract a fair summary of the study?

- Does the abstract conclusion match the conclusion in the article?
  Describe any important differences between the abstract and the article.

Applicability of the Study to the Patient, Population, Predicament or Problem

Are the study participants (i.e., sample) similar or applicable to the patient or patients in your clinical question?

If the study describes a certain intervention, would it be feasible and reproducible?

- Does the article provide sufficient detail regarding implementation (e.g., dosage form, administration instructions, time of day, necessary monitoring) to directly apply the intervention?

Summarize the 2–3 most compelling strengths and weaknesses of the study.

Will you use the findings in patient care and will it require you to change your current practice?