RUTGERS
School of Public Health

Course Title: Pharmacoepidemiology & Therapeutic Risk Management
Course Number: *EPID 0672*
Course Location: Web-based
Course Date & Time: Web-based
Course Instructor: Yola Moride PhD FISPE, Research Professor of Pharmacoepidemiology, Institute for Health, Health Care Policy and Aging Research. Moride@yolarx.com; 514.903.3389
Office Hours: Contact by e-mail or telephone appointment
Course Assistant: *Not applicable*
Required Course Text: *Not applicable*

Additional/Supplemental Readings/Resources:

- *Weekly list of references provided for each session.*
- *Textbook of Pharmacoepidemiology, 2nd Edition. Strom B (Editor), Kimmel SE (Editor), Hennessy S (Editor). Wiley-Blackwell 2013.*

Course Description: This web-based course is designed to introduce students to the basic concepts and methods of pharmacoepidemiology and therapeutic risk management. Pharmacoepidemiology is the study of the use and effects (benefits and risks) of therapies in the real-world setting. Specifically, the course will address how to formulate research questions that are appropriate for each type of stakeholders, study designs, measures of risks, drug utilization studies, control of biases, and examine sources of data that can be used in post-approval studies.

Selected Department Competencies Addressed: Each Department identifies competencies for each degree offered. The competencies addressed in this course for the MPH or PhD/DrPH for the School of Public Health include:

MPH or PhD\DrPH competencies

- Critique epidemiologic literature, assess its strengths and weaknesses and determine if conclusion(s) are supported
- Use epidemiologic techniques to quantitatively assess patterns and changes in disease occurrence
- Formulate a specific hypothesis and determine an appropriate study design and analysis plan
- Design, implement and assess ordinary data collection systems for public health research
- Appropriately analyze and interpret epidemiologic data, including large national and state level datasets
- Communicate and present study findings to professional audiences

Please visit the Department webpages on the School of Public Health's website at http://sph.rutgers.edu/ for additional competencies addressed by this course for other degrees and departments.

Course Objectives: By the completion of this course, students will be able to:

- Define the scope of pharmacoepidemiology and its role in drug regulation and reimbursement decisions;
- Formulate research questions that are appropriate for each type of stakeholders;
- Describe and explain pharmacoepidemiological study designs and data sources, as well as their major strengths and weaknesses;
- Explain modern pharmacoepidemiological methods of analysis and control of biases;
- Critically review and interpret the medical and epidemiological literature related to studies of drug safety and effectiveness.
- Measure patterns of drug utilization
- Assess benefit-risk of new and existing treatments

Course Requirements and Grading:

The course is taught using a web-based format on the Canvas platform and is based on self-learning (directed study) with:

- Assigned readings
- Links to relevant sites on the internet;
- Narrated PowerPoint slideshows;
- Directed discussion activities;
- Written assignments;
- Term paper

All session assignments, PDF formatted handouts, web-conference sessions, hyperlinks, readings and other information will be available at the course website or through the Rutgers Library Resources website.
PDF-based PowerPoint lecture handouts are located on the course lesson page and can assist the student in extracting the most relevant information from the readings. Web sites provide more detailed information and examples to clarify discussed material. Through directed study, the student will learn and apply the content materials by completing structured assignments and discussion activities, as well as a term paper that consists of study protocol.

The instructor's role is to:

- Design the appropriate assignments and activities to ensure active learning;
- Provide guidance, expertise and feedback to help the student complete the assignments;
- Promote student collaboration by participating and guiding discussions.

The student will be notified of any changes to this syllabus. Any changes to the schedule will be posted in the course calendar.

Written Assignments:

Five (5) written assignments are spaced out throughout the semester. The assignments expand on important aspects of topics covered in the course. Each will require research, interpretation, consideration and opinion from the student. Demonstration of good command of written English will be important for success in these assignments. Each assignment will be worth a maximum of **10 points**.
Each session will open on a Sunday AM; the assignment is due on the following Saturday at 23:55. Late submissions will receive a zero, unless excused by the instructor. All assignments should be submitted through the Canvas platform for that week's lecture topic. They will be returned with feedback within 7 days.

	Excellent (5 pts)	**Competent (4 pts)**	**Needs improvement (3 pts)**
Knowledge	Narrative demonstrates a depth of understanding by using accurate and relevant details. Supporting evidence for student's viewpoint is presented. Work demonstrates that the student has gone beyond what was presented in class	Narrative demonstrates understanding by using relevant details with minimal inaccuracies. Some evidence is presented that supports student's viewpoint. Work does not go beyond what has been present in class	Narrative is filled with several inaccuracies. No support is given for student's viewpoint. Does not go beyond what has been presented in class
Mechanics	Narrative is clear and concise. Uses proper grammar and sentence structure. No misspellings	Few or no errors but sentence structure could be improved	Several errors in spelling, punctuation, and/or sentence structure

Total possible points per assignment = 10 points
Adapted from Stevens, D. D. & Levi, A. J. (2005). *Introduction to Rubrics*. Sterling, VA: Stylus Press

Discussion Activities:

There will be six (6) separate discussion topics throughout the semester. Students are expected to participate in all discussions and will be graded on their level of contribution. The discussion forum for each topic will run from Sunday to Saturday of each week they are assigned (exceptionally they may run longer if necessary- please make sure to verify the end date of each discussion). In order to allow for interactions between participants, you will be expected to provide a response to each of the discussion topic/question(s) for each unit of class. In order to obtain full credit for weekly participation, you will need to post your initial responses to these) question(s) by Wednesday midnight each week. Then you will be asked to post a reply to any of your colleagues' questions by Saturday midnight. Quality of thought and writing, rather than simple number of contributions, will be considered important in evaluating each student's participation.

Student participation in the online discussions will be graded by the instructor using
the following criteria:
1. Student has posted at least two times during the Unit.
2. The information contributed is correct and supported by references.
3. Statements and ideas build on the comments by others.
4. The information contributed is relevant to the discussion
5. Postings are submitted on time.

Each criterion is worth one point therefore each discussion is worth a total of **5 points.**

Please note that a post that states "I agree with my colleague's comment" will not earn any points. You must contribute arguments to the discussion.

Individual term paper:

Each student will develop a study protocol that will investigate the effect of a drug on an outcome. Each student will be responsible for selecting the drug and the outcome he/she wishes to work on. Topic is selected by the student and needs to be submitted to the Instructor for approval at the beginning of the semester. Once topic is approved, there will be several milestones throughout the semester: 1) Topic approval (5

points); 2) Research questions (5 points); 3) Study concept (15 points); 4) Study protocol, Version 1 (30 points); 5) Study protocol, Final version (15 points). Feedback from Instructor will be provided within 1 week after submission of topic approval, research questions and study concept. Students will submit Version 1 of the protocol and will receive comments from Instructor within 2 weeks after submission. Students will have the opportunity to revise their protocol for the final submission.

1. Course Evaluations

Total Points	Points/item	Number	Category	Format
30	5	6	Discussion Board	Evaluation based upon active participation using the Discussion Board, and demonstration of understanding of the concepts for the lesson
50	10	5	Assignments	These assignments will consist of multiple choice questions and short answer questions, which will be applications of the week's topics.
5	5	1	Topic for term paper	Short answer – Subject approval
5	5	1	Research questions	Short answer
15	15	1	Study concept	Template provided
30	30	1	Protocol, Version 1	Template provided
15	15	1	Protocol, Final version	Incorporate comments on Version 1
150	**Total Possible**			

Course Schedule:

Week/ Date	Topics	Instructor
1 Sept.3-8* (*Exceptionally Sunday due to Labor Day)	**Introductions and Housekeeping** **Required Viewing/Listening:** • Course logistics & Grading schemes • Role of Pharmacoepidemiology in Drug Development • How to formulate research questions **Required Reading:** • Jones JK. Tilson HH. Lewis JD. Pharmacoepidemiology:defining the field and its core content. Pharmacoepidemiolo Drug Safety 2012;21(7):677-689 **Week One Discussion (1): Post your introduction** (who you are, your background and program you are registered in) **Week one Assignment (1): Fibromyalgia treatment.** Using the description provided in the assignment sheet, formulate 4 research questions for each of the following perspectives: 1) Regulatory perspectives; 2) Third-party payers perspectives; 3) Prescribers perspective.	Y. Moride
2 Sept.8-14	**Measures of Risk** **Required Viewing/Listening:** • Measures of Risk (PPT and Podcast) **Required Reading:** • Quartey G. Wang J. Kim J. A review of risk measures in pharmacoepidemiology with tips for statisticians in the pharmaceutical industry. Pharm Stat. 2011;10(6):548-553 **Week Two Discussion (2):** Participate in discussion on risks **Week Two Assignment (2) :** Calculate and interpret different measures of risk. **Term Paper (Milestone 1):** Select your topic and submit for approval	Y. Moride
3 Sept.15-21	**Cohort Studies** **Required Viewing/Listening:** • Cohort Studies (PPT and Podcast) **Required Reading:** • The Nurses' Health Study. http://www.channing.harvard.edu/nhs • Raebel MA, Carroll NM< Andrade SE, et al. Monitoring of drugs with a narrow therapeutic range in ambulatory care. Am J Manage Care 2006;12:268-274 • Herrinton LJ. Liu, L. Chen L. et al. Association between anti-TNF-a therapy and all-cause mortality. Pharmacoepidemiology and Drug Safety. 2012. DOI: 10.1002/ods.3354 • Lo Re V. Haynes K. Ming EE. Et al. Safety of saxagliptin:rationale for and design of a series of postmarketing observational studies. Pharmacoepidemiology and Drug Safety. 2012. DO!: 10.1002/pds.3318	Y. Moride

	Week Three Assignment (3): Read your assigned article and discuss the elements that make this a cohort study. **Term paper (Milestone 2):** Submit your research questions	
4 Sept.22-28	**Data Sources in Pharmacoepidemiology** **Required Viewing/Listening:** • Automated and Spontaneous Reporting Databases (PPT and Podcast) • Pharmacoepidemiology and healthcare Databases epi.grants.cancer.gov/pharm/pharmacoepi_db/ **Required Reading:** • Harpe SE. Using secondary data sources for pharmacoepidemiology and outcomes research. Pharmacotherapy. 2009;29(2):138-153. • Hennessy S. Use of health care databases in pharmacoepidemiology. Basic Clin Pharmacol Toxicol. 2006;98(3):311-313 • Tannen R. Xie D. Wang, X. Yu M. Weiner MG. A new Comparative Effectiveness assessment strategy using the THIN database:comparison of the cardiac complications of pioglitazone and rosiglitazone. Pharmacoepidemiology and Drug Safety. 2012; DOI:10.1002/pds.3360 • Hall GC. Sauer B. Bourke A. Brown JS. Reynolds MS. Guidelines for good database selection and use in pharmacoepidemiology research Pharmacoepidemiology and Drug Safety. 2011. DOI!:10.1002/2229 **Week Four Discussion (3):** Provide the description, data collection structure, strengths and weaknesses of your assigned database. Examples include: HMO, Commercial Health Insurance, US Government Claims Databases, Medical Record Databases, In-hospital Databases, Pharmacy based Medical Record Linkage Systems,	Y. Moride
5 Sept.29-Oct.5	**Case-control Studies** **Required Viewing/Listening:** • Case-Control Studies (PPT and Podcast) **Week Five Discussion (4):** Situational problem	Y. Moride

6 Oct.6-12	**Nested case-control studies** **Required Viewing/Listening:** • Nested Case Control Studies (PPT and Podcast) **Required Reading:** • Nested case-control studies: advantages and disadvantages. BMJ 2014; 348 : g1532. doi: https://doi.org/10.1136/bmj.g1532 • Graham DJ, Campen D, Hue R, et al. Risk of acute myocardial infarction and sudden cardiac patients treated with cyclo-oxygenase 2 selective and non-selective non-steroidal anti-inflammatory: nested case-control study. Lancet 2005;365-475-481 **Week Six Assignment (4) :** Critique the Graham et al. Paper using the checklist.	Y. Moride
7 Oct.13-19	**Self-controlled Designs** **Required Viewing/Listening:** • Self-controlled designs (PPT and Podcast) **Required Reading:** • Wilson K. Hawken S. Drug safety studies and measures of effects using the self-controlled case series design. Pharmacoepidemiology and Drug Safety. 2012. DOI:10.1002/pds.3337 • Schneeweiss S. Case-crossover and case-time – control designs as alternatives in pharmacoepidemiologic research. Pharmacoepidemiology and Srug Safety. 1997;6(suppl. 3):S51-S59 **Week Seven Discussion (5):** Compare self-controlled case series and case crossover designs	Y. Moride
8 Oct.20-26	**Qualitative and quantitative benefit-risk assessment** **Required Viewing/Listening:** • Benefit-risk assessment (PPT and Podcast) **Required Reading:** • Mt-Isa S et al. Balancing benefit and risk of medicines: a systematic review and classification of available methodologies. Pharmacoepidemiol. & Drug Safety 2014; 23:667-678. https://doi.org/10.1002/pds.3636 • Levitan BS et al. Application of the BRAT framework to case studies: observations and insights. Clin Pharmacol Ther. 2011 Feb;89(2):217-24. doi: 10.1038/clpt.2010.280. Epub 2010 Dec 22.	Y. Moride

	Term paper (Milestone 3): Develop and submit your study concept • See instructions and template	
9 Oct.27-Nov.2	**Bias and Interactions- Part I** **Required Viewing/Listening:** • Bias and Interaction (PPT and Podcast) **Required Reading** • Gardarsdottir H. Heerdink ER. Egberts AC. Potential bias in pharmacoepidemiological studies due to the length of the drug free period: a study on antidepressant drug use in adults in the Netherlands. Pharmacoepidemiology Drug Saf. 2006;15(5):338-343 • Suissa S. Immortal time bias in pharmacoepidemiology. Am J Epidemiol. 2008;167:492-299 • Levesque LE. Hanley JA. Kezouh A. Suissa S. Problem of immortal time bias in cohort studies: Example using statins for preventing progression of diabetes. BMJ. 2010;340:b5087. • Gerhard T. Bias: Considerations for research practice. Am J Health Syst Pharm. 2008;65:2159-2168 • Weldeselassie YG. Use of the self-controlled case-series method in vaccine safety studies:review and recommendations for best practice. Epidemiol Infect. 2011;139:1805-1817 **Week Nine Discussion (6):** Compare and contrast the following articles on oral contraceptive studies that used the same database but came up with opposite conclusions. • Farmer RD. Williams TJ. Simpson EL. Nightingale AL. Effect of 1995 pill scare on rates of venous thromboembolism among women taking combined oral contraceptives: analysis of General Practice Research Database. BMJ 2000;321:477-479. • Jick H. Kaye JA. Risk of venous thromboembolism among users of third generation oral contraceptives compared with users of oral contraceptives with levonorgestrel before and after 1995: cohort and case-control analysis BMJ. 2000;321:1190-1195	Y. Moride
10 Nov.3-9	**Bias and Interactions II** **Required Reading** • Schneeweiss S. Adjusting for unmeasured confounders in pharmacoepidemiologic claims data using external information..Epidemiology 2005;16:17-24. **Week Ten Assignment (5) :** Identify and discuss the different types of biases and confounding characteristics in your	Y. Moride

	assigned article. Describe some possible solutions for bias as related to your reading.	
11 Nov.10-16	**Drug Use Measurements** **Sub-optimal Drug Use and Associated Factors** **Required Viewing/Listening** • Sub-optimal drug use (PPT and Podcast) **Required Reading:** • Hilmer SN. Gnjidic D. Abernethy DR. Pharmacoepidemiology in the postmarketing assessment of the safety and efficacy of drugs in older adults. J Gerontol A Biol Sci Med Sci. 2012;67(2):181-188 • Neyarapally GA. Hammad TA. Pinheiro S. Iyasu S. Review of quality assessment tools for the evaluation of pharmacoepidemiological safety studies. BMJOpen. 2012 http://dex.doi.org/10.1136/bmjopen-2012-001362 **No discussion or assignment for this session.**	Sarah Frise
12 Nov.17-23	**Catch-up week – No lecture for this session** **Term paper (Milestone 4):** Submit Protocol, Version 1	
13 Nov.24-30	**Guest Lecture- Pharmacoepidemiology in Mental Health** **Required Viewing/Listening:** • PE in Seniors (PPT and Podcast) **No discussion or assignment for this session.**	Tobias Gerhard
14 Dec.1-7	**Principles of risk management planning** **Required Viewing/Listening** • Risk management planning (PPT and Podcast) **No discussion or assignment for this session.**	Y. Moride
15 Dec.8-14	**Term paper (Milestone 5)-** Submit Protocol, Final version	Y. Moride

School of Public Health Honor Code: The School of Public Health Honor Code is found in the student bulletin (sph.rutgers.edu/academics/catalog/index.html). Each student bears a fundamental responsibility for maintaining academic integrity and intellectual honesty in his or her graduate work. For example, all students are expected to observe the generally accepted principles of scholarly work, to submit their own rather than another's work, to refrain from falsifying data, and to refrain from receiving and/or giving aid on examinations or other assigned work requiring independent effort. In submitting written material, the writer takes full responsibility for the work as a whole and implies that, except as properly noted by use of quotation marks, footnotes, etc., both the ideas and the works used are his or her own. In addition to maintaining personal academic integrity, each student is expected to contribute to the academic integrity of the school community by not facilitating inappropriate use of her/his own work by others and by reporting acts of academic dishonesty by others to an appropriate school authority. It should be clearly understood that plagiarism, cheating, or other forms of academic dishonesty will not be tolerated and can lead to sanctions up to and including separation from the Rutgers School of Public Health.

Policy Concerning Use of Recording Devices and Other Electronic Communications Systems: When personally owned communication/recording devices are used by students to record lectures and/or classroom lessons, such use must be authorized by the faculty member or instructor who must give either oral or written permission prior to the start of the semester and identify restrictions, if any, on the use of mobile communications or recording devices.