School of Public Health

Department of Epidemiology

- Course Title: EPI2012- Writing in Population Neuroscience**.**
- Term/Academic Year: **Summer 2024**
- Dates: **Tuesday, Friday, 10:00-12:30**
- Location : **https://pitt.zoom.us/j/4127593572**
- Credits: **2, 6-week summer course, 5 hrs/wk.**
- Instructor: Caterina Rosano, MD, MPH (email: rosanoc@edc.pitt.edu); Office Hours: by appointment
- TA: n/a

Purpose of the course. The purpose of this course is to write a manuscript or grant proposal on a topic related to population neuroscience. Population neuroscience consists of the application of state-of-the-art population science and neuroscience to better understand the pathogenesis and etiology of a given disease of the central nervous system. This course provides the students with a practical opportunity to write a proposal or a manuscript using neuroepidemiological methods that focus on a specific CNS disease/condition. Emphasis is placed on factors that influence vulnerability to onset, progression and response to treatment of neurological diseases, including geographic variations. In addition to students pursuing Doctoral and Master level degrees in Epidemiology, Neuroscience, Psychology, this course is designed to reach trainees in a variety of fields, including neurology, psychiatry, medicine, physical medicine and rehabilitation, and computer science. **Students are expected to be proficient in scientific writing, in functional neuroanatomy and familiar with the methods to assess the integrity of the central nervous system. Neuropsychological and Neuroimaging methodologies will be covered only briefly as they are addressed in EPI2019.**

Before the 2nd class, students have to consult with the instructor to identify the base knowledge of epidemiology methods (descriptive, analytic, experimental) and neuroscience. Separate sessions will be available upon request for students less familiar with either one of these two sciences.

The course is articulated in workshops, lectures, and exercises as follows:

1. **Workshops:** These sessions pertain the approaches to write a proposal in population neuroscience.
2. **Lectures.** The lectures cover some of the most common CNS disorders, including but not only limited to: a) protein misfolding (Parkinson's disease, Alzheimer's disease, Amyotrophic Lateral Sclerosis), b) brain abnormalities accompanying chronic diseases (e.g. Type 1 Diabetes, Sickle Cell Disease) c) "normal" brain aging, d) a selection of neurological disorders related to environmental, genetic and infectious factors (multiple sclerosis, epilepsy, encephalitis, autism, brain tumor, traumatic brain injury). A total of 3-5 CNS disorders will be presented throughout the course. These lectures serve as an example to illustrate how epidemiological studies can help investigate and explain the variability of clinical manifestations and response to treatment of neurological disorders. Each disorder is covered using a 4-level approach: First, each neurological disorder is presented through clinical characterization; an epidemiological perspective is then introduced; next, etiologic factors and underlying mechanisms that influence the onset, progression and recurrence will be covered. Lastly, a practical example of a manuscript or a grant proposal will be presented; this approach will illustrate how epidemiological methods and neuroscience methods combined can serve to answer specific research questions. Neurological disorders related to genetic and environmental risk factors will be examined to teach the basis for differences in susceptibility to the diseases in individuals and populations. Methods to assess the frequency, severity, risk factors, natural history, outcomes and effective treatment strategies will be illustrated. Research ethics considerations about neurological patients as vulnerable populations for study recruitment will be addressed. Geographic variation of risk factors will be examined through the critical comparisons of international neuroepidemiological studies.

3. **Exercises.** Students will be assigned a CNS disorder ahead of time and will be required to outline a mock research project. The presentation occurs on the same day as the lecture, and the lecturer will be engaged in providing feedback to the students.
4. **Required Meetings with Instructor:** Students are required to have at least two individual, one-on-one meetings with instructor. The first one is at the beginning of the semester

Project Presentation. Students gain experience in generating thoughtful and impactful research questions, and using those ideas to design a research study. Students may elect to work on a manuscript, especially if they have access to data. Depending on the class size and student's preference, students may be grouped or may work on their own independent project. First, the student will independently conduct a critical review of the existing literature on their assigned disorder, with the goal to identify a "gap in the literature" in their topic area. Based on this gap, a student will propose a study to address the gap in the literature. The student will focus on a method of CNS measurement of their choice.

Teaching/Learning Objectives.

1. Identify the basis for differences in susceptibility to neurological disorders in individuals and populations, including the etiologic factors and underlying mechanisms that influence the onset, progression and recurrence of major neurological disorders.
2. Gain an appreciation of the role of demographic factors and of other biomarkers to predict variability of clinical manifestations and of response to treatment (implications for personalized based medicine).
3. Apply concepts taught in formal classes.
4. Become familiar with existing neuroepidemiological studies.
5. Learn practical aspects of transitioning from the conceptualization of a research question to the design of a research proposal.

Texts: Required

Neuroepidemiology, Volume 138, edited by Caterina Rosano, M. Arfan Ikram, and Mary Ganguli. ISBN-9780128029732, Printbook , Release Date: 2016. Textbook is available on line **http://elsev.spi-bpo.com/books/EComp/HCN138/1/OTc4LTAtMTlt/index.php?Type=E**. **Hard copies** will be on reserve at Falk Library, and will be available for consultation in the offices of the course directors or from the teaching assistants.

Prerequisite/Recommended preparation

Proficient in scientific writing. Introduction to Epidemiology or equivalent or special permission of the instructor. EPI2019 is highly desirable because it provides students with an overview of the methods to study the CNS. Separate sessions will be available upon request for students less familiar with epidemiology methods (e.g. descriptive, analytic, experimental epidemiology).

Supplemental Readings/Bibliography

Journal Articles: References will be provided for individual classes. Students are encouraged to attend the monthly Journal Club in Neuroepidemiology. Contact the instructor for dates and location.

Assignment/Project Description

The assignments in this course include readings related to lectures, active participation in class through questions and comments, and the Research practicum.
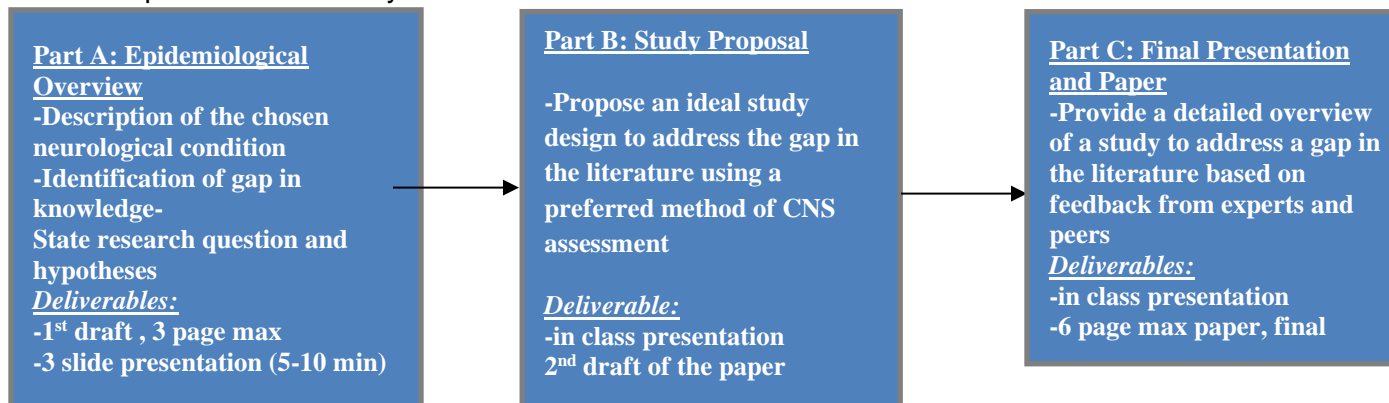
1. **Research practicum:** The research practicum is organized into three sections or parts:

Part a: **Epidemiological overview--** Provide a description of the neurological condition, including clinical and epidemiological manifestations and identify a critical gap in knowledge pertaining to this condition (e.g. causes, pathogenesis, treatment). The student should focus on literature pertaining to their preferred method of CNS disease assessment (e.g. neuroimaging, cognitive assessment, post-mortem studies). This is the mid-term paper (3 pages max, single spaced, 11-inch margins) due on 5/27. The content of the midterm paper will also be presented in class (10 min 3 slides, + 10 min Q&A) the following week. The slides are to address three main points: Slide 1= state your research question, why it is important to answer it? *(e.g. very common, prevalence of the condition, costly diseases)*. Slide 2. Outline your conceptual model, use the template provided in class (identify who, what and when, that is: target population, predictor, outcome, temporal link between predictor and outcome, as well as hypothesized mediator(s), moderator(s), confounder(s); Slide 3: articulate your hypotheses. No need to address the study design yet. Students will receive feedback on their midterm paper in writing from the Instructor and from their peers on the day when they present in class.

Part b: **Study Proposal--** Based on the critical gap in knowledge identified in part (a), and on the feedback received from the instructor, TA and peers, the student will *propose their chosen study design utilizing their preferred method of CNS assessment*. Each student will present their proposed study design to the class.

Part c: Final Presentation and Paper-- From feedback gained in parts (a) and (b), the student will provide a detailed description of their CNS disorder and a proposed study to address a significant gap in knowledge. The student is expected to focus on how his/her study addresses key limitation from prior studies. This will be presented in class by the student (or team), at the end of the course, along with parts a and b.

Research practicum summary and deliverables:

Part A: Epidemiological Overview	Part B: Study Proposal	Part C: Final Presentation and Paper
-Description of the chosen neurological condition -Identification of gap in knowledge- State research question and hypotheses *Deliverables:* -1st draft , 3 page max -3 slide presentation (5-10 min)	-Propose an ideal study design to address the gap in the literature using a preferred method of CNS assessment *Deliverable:* -in class presentation 2nd draft of the paper	-Provide a detailed overview of a study to address a gap in the literature based on feedback from experts and peers *Deliverables:* -in class presentation -6 page max paper, final

The final project is a written report of parts a-c and it is due the last day of the course (6 pages max, single spaced, 11-inch margins). Feedback on this assignment is provided at several stages: when the mid-term paper is returned and when it is presented in class (part a), during the group discussion following each lecture (part b), and during in-class recitations at the end of the course (parts a-c). It is highly recommended that the student set up an independent meeting with the instructor and/or TA outside of the regular class time to work through the formulation of their research question.

IMPORTANT: If a group report is submitted, the intellectual ownership for ***each contributor*** must adhere to the ICMJE uniform requirements for manuscripts submitted to medical journals <http://www.icmje.org/> as follows:

1. Substantial contributions to conception and design of the proposal

2. Drafting the report or revising it critically for important intellectual content

3. Final approval of the version to be submitted.

4. Other (to be specified)

*All conditions must be met by all authors. General supervision of the research group does not constitute authorship.

Each team member is required to provide an evaluation of his/her team fellows, using the form provided by the instructor.

Late Assignment Policy: Assignments submitted past the required date will be noted as follows: 30% of the grade in the "attendance" will be lost.

Student Performance Evaluation (Factors and Weights)

1) INDEPENDENT PROJECT: 50% = 50 points max of 100 total

> Scores are weighted as follows:
> - Knowledge of the epidemiology, causes and pathophysiology of the CNS condition of interest and identification of current gaps in knowledge (part a, Mid-term paper)= **15 points max**
> - Critical review of existing studies with discussion of advantages and disadvantages (Part b in the final written report) = **15 points max**
> - Identification of study design to answer the question (Part c in the final written report)= **15 points max**
> - Adding feedback received in class to the final written report = **5 points max.**

2) Active participation: 40% = 40 points max of 100 total

> Scores are weighted as follows:
> - Lead discussion of assigned CNS condition= **12 points max**
> - Questions during lectures or workshops = **8 points max**
> - In-class presentation of the research project = **12 points max**
> - Returning comments to the mid-term paper (each student reviews the mid-term of his/her peers) = **8 points max**

4) Attendance and timeliness of assignment submission: 10%= 10 points max of 100 total

Grading Scale The scale to be applied in grading will be as follows:

90%-100% A	80-89% B	70-79% C	60-69% D	> 60% F

CourseWeb/BlackBoard Instruction

The instructors will be using onedrive to share documents. Students are expected to download reading material and handouts prior to each class an also to consult the Blackboard for announcements.

Accommodation for Students with Disabilities

If you have any disability for which you may require accommodation, you are encouraged to notify both your instructor and the Office of Disability Resources and Services, 216 William Pitt Union (412-648-7890) during the first two weeks of the term.

Academic Integrity

All students are expected to adhere to the school's standards of academic honesty. Any work submitted by a student for evaluation must represent his/her own intellectual contribution and efforts. The GSPH policy on academic integrity, approved by EPCC on 10/14/08, which is based on the University policy, is available online at http://www.publichealth.pitt.edu/interior.php?pageID=126. The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy.

Students committing acts of academic dishonesty, including plagiarism, unauthorized collaboration on assignments, cheating on exams, misrepresentation of data, and facilitating dishonesty by others, will receive sanctions appropriate to the violation(s) committed. Sanctions include, but are not limited to, reduction of a grade for an assignment or a course, failure of a course, and dismissal from GSPH.

All student violations of academic integrity must be documented by the appropriate faculty member; this documentation will be kept in a confidential student file maintained by the GSPH Office of Student Affairs. If a sanction for a violation is agreed upon by the student and instructor, the record of this agreement will be expunged from the student file upon the student's graduation. If the case is referred to the GSPH Academic Integrity Hearing Board, a record will remain in the student's permanent file.

OTHER GROUND RULES: Please keep your camera on at all times during class.

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DATE Week		TOPIC	Lecturer	Assignment due on this day
1	5/14	**Course Overview**	Rosano	
		Workshop I: Population Neuroscience: overview	Rosso	Prepare the graphical abstract of your paper (1 slide). Due for presentation on 5/20.
	5/16	**Workshop II:** Population Neurosciences: Examples of PN projects **Project presentation I**	Rosano Class	PRESENT graphical abstract of your paper (1 slide).
2	5/21	<mark>**Lecture 1: AD**</mark> <mark>**Lecture II:** Group discussion -gold standard AD study</mark>	<mark>Class</mark>	<mark>Read the Chapter related to this topic (**Chapter 8**). Come to class prepared to participate in the group discussion.</mark>
	5/23	**Workshop III:** Population Neuroscience: from research question to hypotheses. **Project presentation II**	Rosano Class	PRESENT graphical abstract of your paper (1 slide, with revisions based on feedback from 5/19)
3	5/28	**Workshop IV:** Population Neuroscience: Bringing it all together **Project presentation III**	Rosano	Submit PART A (3 pages) and the graphical abstract (1 slide) to instructor and peers.
	5/30	**Project presentation IV:** 1st draft of paper **(= PART A)**	**Class**	Present in class PART A - 3 slides max. Return your review of your peers' mid-term paper. Feedback from the instructor is due to you on this day.
4	6/4	**Lecture II: Parkinson** **Exercise II:** Group discussion -- gold standard PD study	<mark>Chahine</mark> Class	Read the Chapter related to this lecture (**Chapter 9**). Come to class prepared to participate in the group discussion.
	6/6			
		Email your peers and instructor your revised paper (2nd draft- PART B) on 6/9.		
5	6/11	**Project presentation VI:** 2nd draft of paper **(=PART B)**	Class	Come prepared to present the 2nd draft of your paper in class and provide feedback to your peers' papers. 20min/each + 15min Q&A

	6/13	No class. Independent study. Instructor available for consultation. Work on your final paper
6	6/18	**In class presentation.** 10 min max + 10 min Q&A
	6/20	Final revisions_ meet with the instructor and submit the final version of the paper