Graduate School of Public Health

Department of Epidemiology

- Course Title: EPI2012- Writing in Population Neuroscience**.**
- Term/Academic Year: **Summer 2020**
- Dates: **Tuesday, Friday, 10:00-12:30**
- Location : **5140 Crabtree hall, GSPH**
- Credits: **2, 6-week summer course, 5 hrs/wk.**
- Instructor: Caterina Rosano, MD, MPH (email: rosanoc@edc.pitt.edu); Office Hours: TBA
- TA: n/a

Purpose of the course. The purpose of this course is to teach how to write a manuscript or grant proposal in a theme related to population neuroscience. Population neuroscience, also known as neuroepidemiology, 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: **a**. factors that influence vulnerability to onset, progression and response to treatment of neurological diseases, including geographic variations; **b**. methodologies to assess disorders of the central nervous system (CNS), including neuropsychological assessments, post-mortem methodologies and neuroimaging tools.

In addition to students pursuing Doctoral and Master level degrees in Epidemiology, this course is designed to reach trainees in a variety of fields, including neurology, neuroscience, psychology, psychiatry, medicine, physical medicine and rehabilitation, and computer science.

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

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

1. **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 approaches can help investigate and explain the variability of clinical manifestations and response to treatment of such 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.

2. **Workshops:** These sessions pertain the basis of functional neuroanatomy and methodological approaches to quantify integrity of the central nervous system as it relates to neurological diseases. Neuropsychological assessments and post-mortem methodologies. Neuroimaging methodologies will be covered only briefly as they are addressed in EPI2019. In-class exercises will be conducted to illustrate practical applications of each methodology in population studies, and advantages and disadvantages will be discussed.
3. **Research Practicum:** The research practicum is designed for students to 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. Early in the term, each student will be assigned a CNS disorder. 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 preference. These include either: **1) cognitive assessment (e.g. neuropsychological tests); or 2) post-mortem tissue assessment; or 3) neuroimaging.**

Teaching/Learning Objectives.

1. Gain a strong foundation in methodologies to quantify CNS disorders in the context of Epidemiological studies.
2. 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.
3. 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).
4. Evaluate the association of neuroimaging biomarkers, neurocognitive assessments, and post-mortem tissue measures with neurological diseases.

Additionally, the objective of the **Research Practicum** is to help the students to:

1. Apply concepts taught in formal classes.
2. Become familiar with existing neuroepidemiological studies.
3. 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/OTc4LTAtMTIt/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

Introduction to Epidemiology or equivalent or special permission of the instructor. EPI2019 is highly desirable if the main interest of the student pertains the application of neuroimaging methods to the study of CNS disorders. Separate sessions will be available upon request for students less familiar with epidemiology methods (e.g. descriptive, analytic, experimental epidemiology).

Supplemental Readings/Bibliography

1. 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.

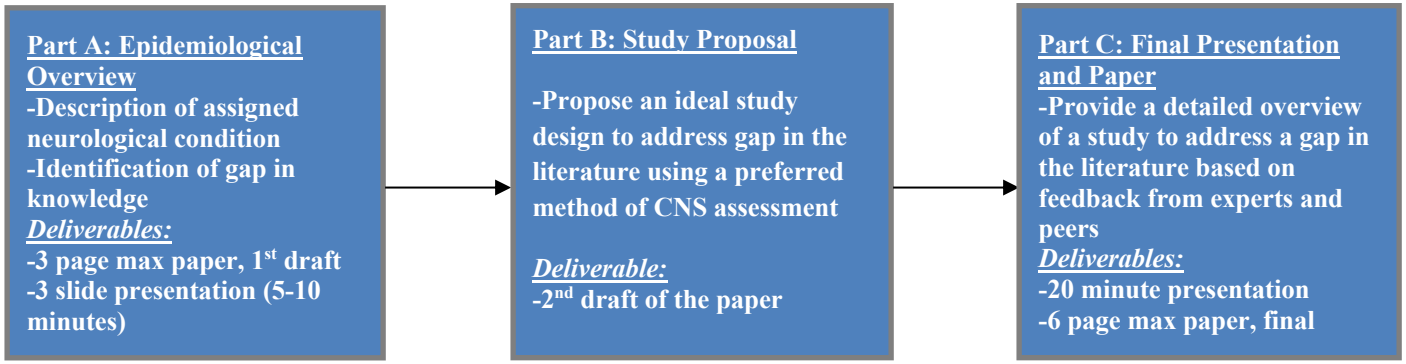
1. **Research practicum:** The research practicum is organized into three sections or parts:

   Part a: Epidemiological overview-- Provide a description of the assigned 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 2/2/17. The content of the midterm paper will also be presented in class (10 min 3 slides) 2 weeks later, 2/17/17. Students will receive feedback on their midterm paper in writing from the Instructor, TA and peers, as well as 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 an ideal study design utilizing their preferred method of CNS assessment*. Each student will present (10-15 minute presentation, plus 20 minutes for questions and feedback) their proposed study design to the class and an expert in the field immediately following the lecture pertaining that topic. The expert and the peers in the class will offer constructive criticism to improve and hone the aims and design of the research design for the study.

   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 their 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 (20 minutes presentation plus 10 minutes for questions).

Research practicum summary and deliverables:



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.

If teams will be formed, each team member is required to provide an evaluation of his/her team fellows, using the form provided by the instructor.

IMPORTANT: As 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.

1. **Readings:** Students will read the textbook and key papers related to each lecture as identified by the instructor.
2. **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) RESEARCH PRACTICUM: 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 practicum **= 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 the University's CourseWeb (Blackboard) for instructional support: reading material will be available from download from the Blackboard. 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: Consulting internet or text messaging is **not** permitted during class unless there are extenuating circumstances that have been discussed with the instructor ahead of time

DATE Week		TOPIC	Lecturer	Assignment
1	5/12	**Course Overview**	Rosano	Prepare the first draft of your mid-term paper, as well as 3 slides to present in class. Both are due on 5/22.
		Workshop I *Multimodal methodologies to assess CNS disorders in Epidemiological studies* and underlying pathophysiology.	Rosano	
	5/15	**Workshop II: writing a proposal/paper**	Ganguli	
2	5/19	**Workshop III:** *Multimodal methodologies to assess CNS disorders in Epidemiological studies:* Neuropsychological assessment- older	Snitz	
	5/22	**Workshop IV:** *Multimodal methodologies to assess CNS disorders in Epidemiological studies: Post-mortem Methods, Path Lab exercise.*	Kofler	Submit your mid-term paper (3 pages) and 3 slides to peers and instructor
3	5/26	**Workshop V: writing a proposal/paper**	Rosano	Present in class the main points of your mid-term paper in 3 slides. Return your review of your peers' mid-term paper. Feedback from the instructor also on this day.
	5/29	**Lecture: TBI** **Research practicum** I**:** Group discussion -- gold standard TBI	Wagner	Read the Chapter related to this lecture (**Chapter 12**). Come to class prepared to participate in the group discussion.
4	6/2	**Lecture: Parkinson** **Research practicum II :** Group discussion -- gold standard study of PD	Chahine	Read the Chapter related to this lecture (**Chapter 10**). Come to class prepared to participate in the group discussion.
	6/5	**Lecture: Dementia** **Research practicum III:** Group discussion -- gold standard study of AD	Ganguli/Snitz	Read the Chapter related to this lecture (**Chapter 8**). Come to class prepared to participate in the group discussion.
5	6/9	**Research practicum IV: in class review and presentations of second draft of the paper**	Class	Email students and instructors your revised paper (2nd draft) by 6/8. Come prepared to present it in class and join the discussion of your peers' papers.
	6/12	**Research practicum IV: in class review and presentations of second draft of the paper**		
6	6/16	**In class presentations of Final paper**	Class	Slides to present your project.
	6/19	No class. Independent study. Instructor available for consultation		Submit the final version of the paper