Graduate Group in Epidemiology and Biostatistics

Nutritional Epidemiology

EPID 7012

Spring 2024

1. Course Description

This course introduces students to key concepts and methods in Nutritional Epidemiology to equip them with the tools needed to design, analyze, and critically evaluate population-based nutrition research. The course also reviews several specific diet/disease relationships, integrating information from secular trends, cohort studies, clinical trials, and animal experiments. Knowledge in nutrition is useful but not required. Prerequisites include introductory epidemiology.

2. Course Learning Objectives

After completing this course, students will be able to:

- Describe the strengths and limitations of different epidemiological study designs for research in nutritional epidemiology;
- Discuss in detail the strengths and limitations of different nutritional assessment methods for population health research;
- Describe the current state of epidemiological evidence for relationships of diet to the development of selected diseases;
- Identify sources of bias in nutritional data and ways to address them;
- Critically interpret and critique nutritional epidemiologic literature;
- Formulate study designs to assess the nutritional status of a study population.

3. General Course Information

Co-Directors: Stefanie N. Hinkle, PhD (Stefanie.Hinkle@pennmedicine.upenn.edu)
Sunni L. Mumford, PhD (Sunni.Mumford@pennmedicine.upenn.edu)
TA: Kelli Williams (Kelli.Williams1@pennmedicine.upenn.edu)
Location: Blockley Hall Room 418
Credits: 1.0 course unit
Prerequisites: EPID 7010, EPID 5100, PUBH502, or equivalent; permission of course director.

4. Course Format

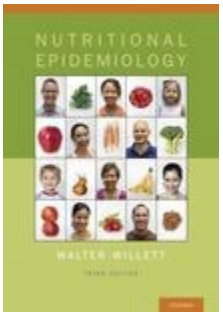
This seminar format class will take place in person twice a week for 90 minutes for a total of 14 weeks. The class scheduled on Tuesday and Thursday from 1:45 to 3:15 pm. Students are expected to attend all class sessions and actively participate. Class periods will include lectures, journal clubs, and small group discussions.

5. Course Competencies

The course emphasizes the following core competencies: knowledge within nutritional epidemiology; research skills (study planning, data interpretation, reading and understanding published research); quantitative and computational methodologies (data analysis overview and interpretation of output); communication (writing and presentation skills).

6. Materials

- Willett W. Nutritional epidemiology. Oxford university press; 2012 Nov 7.



Nutritional Epidemiology (3rd edn)
The digital version of the book is available through the library at this link:
https://doi.org/10.1093/acprof:oso/9780199754038.001.0001

- Selected required readings are provided in the Files folder on Canvas, in the subfolder for each class session.

7. Scientific Rigor and Reproducibility

Through in-depth reading and evaluation of research literature, course discussions, and assessment work this course will provide instruction on rigorous experimental design and data interpretation.

8. Assessments

- Dietary Assessment Report (10%): Students will self-complete a food frequency questionnaire, a 24-hour dietary recall, and a food diary. Students will complete a 2 to 3-page (double spaced- 0.5-inch margins, 11 pt Arial font) report discussing: 1) pros and cons of each method including the reproducibility and validity; 2) students should identify a primary source published, peer-reviewed journal article (different from those discussed in class) discussing the validation of a food frequency questionnaire in a selected population and provide a discussion of the adequacy of the reference source, generalizability, validity of the findings, etc.
- Presentation on the development and state of the research of an assigned dietary pattern (20%): Students will prepare and present a 9-to-10-minute presentation on the state of the science regarding a selected dietary pattern or food group. Presentations should cover themes related to how to define/assess intake of the selected dietary pattern or food group, current state of evidence related to health outcomes, recommendations if any by advisory organizations. Presentations will take place in person with all students presenting on a single day. Topics will be assigned at random by the course director in advance.
- Paper and presentation on a controversial topic in nutrition (30%): Students will prepare a 4-5 page (double spaced- 0.5-inch margins, 11pt Arial font) research paper on a controversial topic in nutrition. Students will identify at least one published primary research article for each side of the debate and discuss the potential biases within the papers, comparisons of the study samples, dietary assessment methods, generalizability, and biological plausibility of the findings. Students will prepare and present a 9-to-10-minute presentation on their findings. The paper is worth 20% and the presentation is worth 10%.
- Journal Club (15%): Students will prepare and lead a journal club discussion on a pre-selected paper by the course instructors.

- Final Exam (25%): The final exam will assess the whole semester course material. Assessments will include short answer questions on covered topics and data interpretation.

9. Inclusive Environment

In our Nutrition Epidemiology course, we prioritize creating an inclusive and supportive environment that welcomes students of all backgrounds. Diversity, inclusion, and belonging are at the heart of our course values. We believe that every participant, regardless of their race, ethnicity, gender identity, sexuality, religious beliefs, physical or mental health status, or socioeconomic status, deserves to be treated with respect and consideration.

We expect all students to engage in respectful communication, actively listen to diverse perspectives, and refrain from any demeaning, discriminatory, or harassing behavior. Our commitment is to ensure that lectures, office hours, and group sessions are safe and welcoming spaces for everyone. This approach is essential for fostering a learning environment where every student feels valued and can thrive both academically and personally.

10. Office hours

We are available immediately before and after class and are also available by appointment. If you have any questions or problems, it is important to see us as soon as possible so we can appropriately address the situation.

11. Resources

It is important to us that you have the resources you need to be able to focus on learning in this course – this includes both the necessary academic materials as well as taking care of your day-to-day needs. Students who are struggling to afford sufficient food to eat every day and/or lack a safe and suitable space to live should contact Student Intervention Services (vpul-sisteam@pobox.upenn.edu). Students may also wish to contact their Financial Aid Counselor or Academic Advisor about these concerns. You are welcome to notify us if any of these challenges are affecting your success in this course, as long as you are comfortable doing so – we may have resources to support you.

12. Mental health and wellness

Your mental health and wellness is of utmost importance to the course instruction staff, if not the University as a whole. All members of the instruction staff will be happy to chat or just to listen if you need someone to talk to, even if it's not specifically about this course.

Penn also has a Counseling and Psychological Services program which offers free confidential help to students. Here is the link: http://www.vpul.upenn.edu/caps/ If you or someone you know is in distress and urgently needs to speak with someone, please do not hesitate to contact CAPS: 215-898-7021; 3624 Market St. If you are uncomfortable reaching out to CAPS, any member of the instruction staff will be happy to contact them on your behalf.

13. Artificial intelligence

Within this class, you are welcome to use foundation models (like ChatGPT) for any purpose, at no penalty. However, you should note that all large language models still have a tendency to make up incorrect facts and fake citations. You will be responsible for any inaccurate, biased, offensive, or otherwise unethical content you submit regardless of whether it originally comes from you or a foundation model. If you use a foundation model, its contribution must be acknowledged. The university's policy on plagiarism still applies to any uncited

or improperly cited use of work by other human beings, or submission of work by other human beings as your own.

14. Attendance

Attendance at lectures is highly encouraged. A major part of the work of this course includes the in-person journal clubs. However, if you are feeling at all sick or displaying any COVID-19 related or flu like symptoms, please be considerate of your classmates and stay home. Students who cannot attend in-person lectures can view the recorded lectures afterwards. Slides will be posted before each session. Please make a serious effort to be in person when we have guest lectures.

15. Class Schedule

Class	Date	Topic
1	Thurs, Jan.18, 2024	Overview of Nutritional Epidemiology
2	Tues, Jan.23, 2024	Food Records, 24-hour Dietary Recall
2	Thurs, Jan.25, 2024	Food Frequency Questionnaires
3	Tues, Jan.30, 2024	Assessment of Nutrients and Variability in Self-Reported Diet
4	Thurs, Feb.1, 2024	Biomarkers
5	Tues, Feb.6, 2024	Measurement Error Part 1 (DIETARY ASSESSMENT HOMEWORK DUE)
6	Thurs, Feb.8, 2024	Total Energy Intake
7	Tues, Feb.13, 2024	Measurement Error Part 2
8	Thurs, Feb.15, 2024	New Methods in Nutritional Epidemiology
9	Tues, Feb.20, 2024	Child Growth (Guest: Zemel)
10	Thurs, Feb.22, 2024	Anthropometric Measures, Body Composition
11	Tues, Feb.27, 2024	DEBI Research Day – No class
12	Thurs, Feb.29, 2024	Dietary Patterns (STUDENT PRESENTATIONS)
13	Tues, Mar. 5, 2024	SPRING BREAK
14	Thurs, Mar. 7, 2024	SPRING BREAK
15	Tues, Mar. 12, 2024	Obesity Paradox
16	Thurs, Mar. 14, 2024	Nutritional Monitoring and Surveillance, Dietary Guidelines for Americans, and Nutrition Policy
17	Tues, Mar. 19, 2024	Food Insecurity (Guest: Kinsey)
18	Thurs, Mar. 21, 2024	Physical Activity
19	Tues, Mar. 26, 2024	Microbiome and Metabolomics (Guest: Wu)
20	Thurs, Mar. 28, 2024	Sleep
21	Tues, Apr. 2, 2024	Diet, Infertility, and Pregnancy
22	Thurs, Apr. 4, 2024	Beverages
23	Tues, Apr. 9, 2024	Nutrition and Chronic Disease
24	Thurs, Apr. 11, 2024	Genomics and Nutrition (Guest: Vujkovic)
25	Tues, Apr. 16, 2024	Dietary Supplements and Food Fortification
26	Thurs, Apr. 18, 2024	International Nutrition (Guest: Rawal)
27	Tues, Apr. 23, 2024	Asynchronous class (Passover)
28	Thurs, Apr. 25, 2024	Podcast Discussions STUDENT PRESENTATIONS Part 1 of Controversial Topics in Nutrition Student Presentations
29	Tues, Apr. 30, 2024	STUDENT PRESENTATIONS Part 2 Controversial Topics in Nutrition Student Presentations - Papers Due
	TBD	FINAL EXAM