

**NUTR 0392: Nutrition Systematic Reviews and Knowledge Translation
Spring 2023**

Class Meetings: TBD

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Instructor Office Hours: TBD

Teaching Asst.: TBD

Teaching Asst. Office Hours: TBD

Semester Hour Units: 3

Prerequisites: NUTR 0204: Principles of Epidemiology or equivalent, or by instructor permission.

Course Description: Systematic literature reviews are the backbone of evidence synthesis methods and the core of knowledge translation and evidence-informed decision making. In the last decades, major U.S. and international agencies have adopted such evidence-informed decision-making processes to produce nutrition and public health guidelines and policies. It is important, therefore, that nutrition scientists learn how various review approaches can be used to advance their work in nutrition epidemiology, nutrition intervention, dietetic practice, and policy advocacy.

This course is designed to teach students about the various systematic literature review approaches available for the synthesis of nutrition research and will include a deep examination of the principles and methodologies of full systematic reviews, scoping reviews, evidence mapping, and meta-epidemiological study designs. By combining classroom sessions with substantial individual work, students in this course will learn how to perform each step in a systematic review and will apply that knowledge to a topic of their choosing by writing a review protocol. Students will get feedback at each stage in the review planning process and will have the opportunity to serve as peer-reviewers for their classmates' work. The final deliverable for the course will be a protocol for a systematic literature review.

Course Goals: Through this course, students will learn how to differentiate the numerous review methods available to scientifically synthesize data across multiple studies and/or publications. Students will also be able to recognize the value of secondary research for identifying gaps in the current published literature, planning future research programs, and supporting the development of policies and guidelines. Students will gain experience planning a systematic review and practicing each stage of the review process in order to better understand the work involved.

By the end of the semester, students should have the basic tools and skills needed to:

1. Formulate key research questions for a review, and determine the type of review best suited to those research questions.
2. Conduct a systematic, replicable search of the literature used to identify studies eligible for a systematic review and based on PICO criteria; identify which literature databases to search.
3. Prepare and utilize study eligibility criteria to screen titles, abstracts, and full-text publications for consideration in the systematic review.

4. Create a flowchart outlining the search strategy and selection process.
5. Design data extraction forms, and extract relevant qualitative and quantitative information from studies in a systematic manner.
6. Select an appropriate risk of bias (ROB) assessment tool based on study design, and rate the scientific quality of each study.
7. Prepare clear and concise evidence tables and summary tables.
8. Synthesize results narratively and with the aid of graphs or figures as appropriate.
9. Interpret the pattern of evidence in terms of strength and consistency, and prepare GRADE tables for reporting strength of evidence across study outcomes.

Required Text: Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). *Cochrane Handbook for Systematic Reviews of Interventions* version 6.3 (updated February 2022). Cochrane, 2022. Available from www.training.cochrane.org/handbook.

Companion text to Cochrane handbook: *Evidence Analysis Manual: Steps in the Academy Evidence Analysis Process*
https://www.andeal.org/vault/2440/web/files/2016_April_EA_Manual.pdf

Note: Throughout the course, the instructor will put emphasis on the issues discussed in Cochrane Handbook Chapter 16: Equity, and Chapter 17: Intervention complexity. All required readings are freely accessible on PubMed Central or online. Please refer to the **Course Topics and Assignment Schedule at a Glance** table for required readings.

Class Materials: All class materials, including lecture notes and assignments, will be posted on Canvas (<https://canvas.tufts.edu>).

Communication Policy: Students should try to seek out information for themselves before contacting the instructor or the TA. If you cannot find your answer, we have included a 'Clarity Thread' discussion on Canvas. Please go there first to post your question and check if any student has already asked the same question. We will aim to check the Clarity Thread daily for any inquiries, but if other students know the answer, they should go ahead and post it. If you need to ask a more personal question, please get in touch with either the TA or instructor by email.

Academic Conduct: Each student is responsible for upholding the highest standards of academic integrity, as specified in the Friedman School's Policies and Procedures Handbook and Tufts University policies (<https://nutrition.tufts.edu/about/policies-and-procedures>) and Tufts University policies (<https://students.tufts.edu/community-standards/support-resources/academic-integrity-resources>). It is the responsibility of each student to understand and comply with these standards, as violations will be sanctioned by penalties ranging from failure on an assignment and the course to dismissal from the school.

Classroom Conduct: Students are expected to attend all classes. Absences should be explained in writing at least 24 hours before class. Missing more than one or two classes per semester will usually result in substantial underperformance. Students are also expected to read all assigned materials before class and come prepared to participate in class discussions and group activities.

Assessment & Grading: Homework assignments will provide practice on concepts discussed in class. You will be evaluated based on your ability to apply these concepts to plan a systematic review project. You are encouraged to help your classmates understand the course material. If you wish, you may work together on homework assignments; however, the work you turn in MUST be your own. Homework assignments will constitute more than half of the final systematic review protocol, so be sure to revise them based on the feedback you receive.

Class participation is important. We expect that you will be a prepared and active participant in class. If you miss class, it is your responsibility to make arrangements with another student in the class to obtain lecture notes and handouts.

Grading Range:

Grading for the course will be based on the below distribution:

Homework (3 homework assignments): 45% (15% each)
 Presentation (2 presentations): 20% (10% each)
 Final systematic review protocol: 25%
 Class participation: 10%

A passing grade in the course is B- or better. Course grades will be based on the below (subject to revision during the course):

A+ >97%
 A > 94% - 97%
 A- 90 - <94%
 B+ 87 - <90%
 B 84 - <87%
 B- 80 - <84%

Instructions for Submission of Assignments and Exams:

Assignment	Date Assigned	Due Date
Homework 1	Week 2	Week 4
Homework 2	Week 3	Week 7
Homework 3	Week 7	Week 9
Presentation 1 (presentation of homework 3)	n/a	Week 9
Presentation 2 (presentation of prefinal systematic review protocol)	n/a	Week 13
Final systematic review protocol	Week 2	Week 14 (online forum activities)

Accommodation of Disabilities:

Tufts University is committed to providing equal access and support to all students through the provision of reasonable accommodations so that each student may access their curricula and achieve their personal and academic potential. If you have a disability that requires reasonable accommodations, please contact the Friedman School Assistant Dean of Student Affairs by phone at 617-636-6719 to make arrangements for determination of appropriate accommodations. Please be aware that accommodations cannot be enacted retroactively, making timeliness a critical aspect for their provision.

Tufts Zoom:

The Friedman School’s on-campus courses may be offered by Tufts Zoom (<https://access.tufts.edu/zoom>) on days when the Boston campus is closed due to pandemic, weather or a temporary cancellation issue. Students should expect to be notified by email in the event that class is cancelled and will be provided with the Zoom link for students to attend any remote class sessions during the normally scheduled class period. The Zoom meeting video and audio will be recorded and posted on [Canvas](#) when completed. If an on-campus examination or presentation was scheduled on a day when the Boston campus is closed due to weather or a temporary cancellation issue and cannot be conducted by zoom, the exam/presentation will be rescheduled for an alternate on-campus class session date.

Diversity Statement: We believe that the diversity of student experiences and perspectives is essential to the deepening of knowledge in this course. We consider it part of our responsibility as instructors to address the learning needs of all of the students in this course. We will present materials that are respectful of diversity: race, color, ethnicity, gender, age, disability, religious beliefs, political preference, sexual orientation, gender identity, socioeconomic status, citizenship, language, or national origin among other personal characteristics.

Course Topics and Assignment Schedule at a Glance:

DATE OF CLASS	SESSION	COURSE TOPICS	ASSIGNMENTS	READINGS
Week 1	1	<p>Introduction to different types of reviews</p> <p>Understanding what capacity means for systematic reviewing</p> <p>Getting started: defining review questions</p>	<p>All readings must be done before class</p> <p>Go over the syllabus in class</p>	<p>Grant MJ, Booth A. A typology of reviews: an analysis of 14 review types and associated methodologies. <i>Health Info Libr J.</i> 2009;26(2):91-108. doi: 10.1111/j.1471-1842.2009.00848.x</p> <p>Munn, Z., Peters, M.D.J., Stern, C. et al. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. <i>BMC Med Res Methodol</i> 18, 143 (2018). https://doi.org/10.1186/s12874-018-0611-x</p> <p>Improving Population Health: The Uses of Systematic Reviews http://www.milbank.org/uploads/documents/0712populationhealth/0712populationhealth.html</p> <p>Lavis JN. How can we support the use of systematic reviews in policymaking? <i>PLoS Med.</i> 2009;6(11), e1000141. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2777391/</p> <p>Lichtenstein AH, Yetley EA, Lau J. Application of systematic review methodology to the field of nutrition. <i>J Nutr.</i> 2008 Dec;138(12):2297-306. https://doi.org/10.3945/jn.108.097154</p>
Week 2	2	<p>Developing criteria for including studies, searching the literature, and screening and identifying relevant studies for inclusion</p> <p>Literature database selection</p>	<p>Homework #1 assigned: Draft of PICO and literature review search strategy assigned today, "Build a Search Strategy Worksheet" (Due: Week 4)</p>	<p>(CH) chapter 4 (Searching & selecting studies)</p> <p>Guest Instructor: Tufts Research Librarian</p>
Week 3	3	<p>Overview of the structure and methodologies of a systematic review</p>	<p>Homework #2 assigned: Compile bibliography for review protocol; Final PICO & search strategy; draft data</p>	<p>(CH) chapter 1 (Starting a review)</p> <p>(CH) chapter 2 (Determining the scope and questions)</p> <p>(CH) chapter 3 (Inclusion criteria & grouping for synthesis)</p>

		Computer tools for conducting systematic reviews	extraction form (due on Week 7)	PRISMA for systematic review protocols (PRISMA-P): http://www.prisma-statement.org/Extensions/Protocols Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. <i>Ann Intern Med.</i> 2018;169(7):467-473. https://doi.org/10.7326/M18-0850
Week 4	4	Discussing ideas for systematic review projects and reviewing “Build a Search Strategy Worksheet”	Complete Homework 1 before class, and prepare for presenting and discussing it in class	
Week 5	5	Extracting data and summarizing the results of the literature review (part 1) - Tools and strategies for qualitative and quantitative data collection and management	In-class lab: Design a data extraction form and summary tables	(CH) chapter 5 (Collecting data)
Week 6	6	Extracting data and summarizing the results of the literature review (part 2) – Synthesizing results using narrative and quantitative approaches; Graphs, figures, and tables for presenting review data		(CH) chapter 6 (Effect measure)
Week 7	7	Risk of bias tools for various study designs Presenting your results: PRISMA reporting guidelines for abstracts and full reports	Homework #2 due today Homework #3 assigned: Identify a published systematic review of interest and applied AMSTAR 2 to appraise the	(CH) chapter 8 (Risk of bias in randomized trials) Kelly SE, et al. NUQUEST-Nutrition Quality Evaluation Strengthening Tools: development of tools for the evaluation of risk of bias in nutrition studies. <i>Am J Clin Nutr.</i> 2022 Jan 11;115(1):256-271. doi: 10.1093/ajcn/nqab335

			Quality of Systematic Reviews (due week 9)	Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomized studies in meta-analyses http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp (CH) 7 (Bias and conflicts of interest)
Week 8	8	Risk of bias assessment - what to do when there is no appropriate tool available Integrate risk-of-bias assessment with literature synthesis		Tool for Critical appraisal of a published systematic review: Shea BJ, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. <i>BMJ</i> . 2017 Sep 21;358:j4008. doi: 10.1136/bmj.j4008
Week 9	9	Student presentations: Critical appraisal of a published systematic review	Homework #3 is due today Peer and instructor feedback and Q&A	
Week 10	10	Observational versus intervention studies: common biases and causal inference Introduction to meta-epidemiological studies		Dickersin K. Systematic reviews in epidemiology: why are we so far behind? <i>Int J Epidemiol</i> . 2002 Feb;31(1):6-12. http://ije.oxfordjournals.org/content/31/1/6.1 ong
Week 11	11	Results presentation and 'Summary of findings' tables Introduction to the GRADE approach	In-class lab: Making summary tables for your systematic review	(CH) chapter 14 ('Summary of findings' tables & GRADE) Chapter 4 in GRADE handbook (Schünemann H, Brożek J, Guyatt G, Oxman A, eds. GRADE Handbook. 2013. Available from: https://gdt.gradepro.org/app/handbook/handbook.html) Guyatt GH, Oxman AD, Kunz R, et al. What is "quality of evidence" and why is it important to clinicians? <i>BMJ</i> . 2008;336(7651):995-998. doi: 10.1136/bmj.39490.551019.BE .
Week 12	12	Writing the report – part I: Interpreting the results Writing the report – part II: Drawing conclusions	Putting it all together for the final paper (systematic review protocol)	(CH) chapter 15 (Interpreting results) Step 5: Write and Grade the Conclusion Statement in <i>Evidence Analysis Manual: Steps in the Academy Evidence Analysis Process</i> https://www.andeanal.org/vault/2440/web/files/2016_April_EA_Manual.pdf

Week 13	13	Student presentation of the pre-final systematic review protocol	Peer and instructor feedback on the pre-final systematic review protocol	
Week 14	14	Final systematic review protocol due	Online discussion forum activities	

This schedule is subject to modification at the instructor's discretion.

Course Topics, Learning Objectives and Assignments

Session #1: Introduction and course overview, understanding what capacity means for systematic reviewing, & getting started defining systematic review questions

Learning objectives: Upon completion of this session, students will:

- 1: Be able to describe the differences between a traditional narrative review, scoping review, and a systematic review.
- 2: Be familiar with the need for scoping reviews and systematic reviews.
- 3: Be able to identify meaningful and important systematic review questions.

Session #2: Developing criteria for including studies, searching the literature, and screening and identifying relevant studies for inclusion

Guest Instructor: Tufts Research Librarian

Learning objectives: Upon completion of this session, students will:

- 1: Be able to substantiate why prudent literature searching is important.
- 2: Be familiar with key electronic databases of journal publications (e.g. MEDLINE and PUBMED).
- 3: Be familiar with the structure of a search strategy.
- 4: Become proficient in conducting a library database search.

Session #3: Overview of the structure and methodologies of a systematic review, & computer tools for conducting systematic reviews

Learning objectives: Upon completion of this session, students will:

- 1: Be able to describe basic steps of a systematic review, i.e., develop a good question, search for and select studies for inclusion, extract data from studies, critically appraise the included studies, synthesize the studies, and organize and write a systematic review.
- 2: Be familiar with standards for systematic review reporting, i.e., PRISMA.
- 3: Be familiar with tools for facilitating the systematic review process.
- 4: Be able to define a systematic review question that specifies the types of populations (i.e. participants), interventions/exposures (and comparisons), and outcomes that are of interest (PICO).

Session #4: Discussing ideas for systematic review projects, and reviewing "Build a Search Strategy Worksheet"

Learning objectives: Upon completion of this session, students will:

- 1: Be able to appraise a systematic review question.
- 2: Be able to describe why transparency in the search process is important.
- 3: Understand how to avoid bias when formulating a systematic review question.

Session #5: Extracting data and summarizing the results of the literature review (Part 1)

Learning objectives: Upon completion of this session, students will:

- 1: Be able to describe why data extraction is important.
- 2: Be familiar with challenges faced when extracting data.
- 3: Be able to describe the general layout of a data extraction form.
- 4: Be able to choose tools and strategies for qualitative and quantitative data collection and management.

Session #6: Extracting data and summarizing the results of the literature review (Part 2)

Learning objectives: Upon completion of this session, students will:

- 1: Understand what is meta-analysis and forest plots.
- 2: Understand how to synthesize results using narrative and quantitative approaches.

Session #7 & # 8: Risk of bias tools for various study designs (and what to do when there is no appropriate tool available)

Learning objectives: Upon completion of this session, students will:

- 1: Be able to describe the concept of risk-of-bias assessment.
- 2: Be able to identify reasons for risk-of-bias assessment.
- 3: Be able to identify methods for risk-of-bias assessment.
- 4: Understand how to integrate risk-of-bias assessment with literature synthesis.

Session #9: Student presentations: Critical appraisal of a published systematic review

Learning objectives: Upon completion of this session, students will:

- 1: Be able to critically appraise the quality of a systematic review.
- 2: Have experience verbally communicating systematic review objectives and strategies.
- 3: Understand how to critique a systematic review question and limitations.

Session #10: Observational and experimental studies: common biases and causal inference; Introduction to meta-epidemiological studies

Learning objectives: Upon completion of this session, students will:

- 1: Understand the advantages and disadvantages of various study designs used in research.
- 2: Understand the difference between observational and experimental studies.
- 3: Understand the biases that commonly occur in research and how to prevent biases in study design.
- 4: Understand the importance of critical thinking in making causal inference.
- 5: Understand the design and utilities of meta-epidemiological studies.

Session #11: Results presentations and ‘Summary of findings’ tables; Introduction to the GRADE approach

Learning objectives: Upon completion of this session, students will:

- 1: Understand the goals of presenting systematic review data in tables that summarize data across studies.
- 2: Be familiar with approaches to graphical presentations of findings not synthesized through statistical or meta-analytic techniques.
- 3: Understand the GRADE approach.

Session #12: Writing the report – Part I: Interpreting the results & Part II - Drawing conclusions

Learning objectives: Upon completion of these sessions, students will:

- 1: Understand the GRADE approach for rating the body of evidence & why it may need to be modified for nutrition research.
- 2: Be able to cite factors that decrease the quality level of a body of evidence.
- 3: Be able to cite factors that increase the quality level of a body of evidence.
- 4: Be familiar with common errors made in reaching conclusions.
- 5: Be able to properly word systematic review interpretations and conclusions.

Session #13: Student presentation of the pre-final systematic review protocol

Learning objectives: Upon completion of this session, students will:

- 1: Have experience in giving constructive comments and feedback on research protocol.
- 2: Be able to critically revise the research protocol based on the comments and feedback.

Session #14: Final systematic review protocol due & online discussion forum activities