SPPH 516 - Systematic Review Methods in Health Research
Course Syllabus September 2019

TIME AND PLACE: Term 1, Tuesdays 9am - 12pm
School of Population and Public Health,
Room B151, 2206 East Mall
University of British Columbia

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COURSE WEBSITE: www.canvas.ubc.ca - use your CWL login to access our course homepage.
The full syllabus is available on the course website.

COURSE OVERVIEW:

SPPH 516 is a 3-credit graduate course. It is an introduction to systematic review methodology, and is designed for students to acquire practical skills in research synthesis. Students will develop or enhance their skills to

- recognize different types of evidence syntheses and the features of a high-quality systematic review,
- identify and formulate health research or clinical questions suitable for systematic review,
- plan a research synthesis (protocol development) and the steps needed to complete a systematic review,
- develop and implement search strategies for published and unpublished literature,
- critically appraise individual studies and applying risk of bias tools within systematic reviews,
- apply basic statistical techniques for data synthesis (meta-analysis), and
- assess, interpret and summarize clinical evidence across studies.

The course focus is on systematic reviews of quantitative studies that address clinical and policy questions on health care interventions, with health care and interventions broadly defined. Other types of systematic reviews will be discussed briefly. For assignments, students are encouraged to carry out a review on randomized trial evidence, in order to build an experience base before addressing more complex designs. Systematic reviews of non-randomized or observational studies will also be introduced in the course. Students may include diverse primary study designs in their review project if justified by their research question, and in consultation with Dr. Puil. The course is not designed to provide in-depth detail on reviews of qualitative studies although mixed-methods reviews may be briefly discussed.

INSTRUCTION FORMAT:

The course is organized into 12 weekly 3-hour sessions, which include didactic presentations, hands-on exercises, and discussions. Core topics are supplemented by 'special' topics in research synthesis that may vary from year to year. An optional tutorial in RevMan will be scheduled during the term, based on student

availability and needs. The course instructor is available to meet with students during office hours (by appointment) to discuss research protocols and address questions. A librarian will also be available to answer questions about search strategy development, also by appointment.

Students will be introduced to systematic review methods via a variety of topics in health research that are related to each component of a systematic review, for example:

- question formulation,
- the process of developing a search strategy,
- application of study inclusion and exclusion criteria,
- data extraction,
- assessment of risk of bias and other aspects of critical appraisal,
- data synthesis including choice of meta-analytical model, and
- interpretation of results.

Students will also learn to use the following systematic review software:

- Review Manager (RevMan) (meta-analysis)
- GRADEpro/GDT (evidence profiles and summary of findings tables)
- Screening software (e.g. Covidence).

PREREQUISITES:

Students should have a basic understanding of health research design / methodology and an introductory understanding of medical statistics. There are no course prerequisites for students enrolled in SPPH master's and PhD programs. Students in other graduate programs may enrol with permission from the instructor.

ASSIGNMENTS:

Course assignments include both individual and group work and involve development of a systematic review protocol and a partial systematic review. Feedback on each assignment aims to contribute to development of subsequent components of the draft review in an iterative process.

Students will formulate an initial research question appropriate to a systematic review. These questions will be used as the basis for pairs of students to carry out each review stage. Each member of a review team will have primary authorship and responsibility for a section of the review, but both team members are expected to provide substantive contributions to the entire review.

COURSE EVALUATION:

Students will receive individual grades on participation/preparation and on the section of Assignment #3 on clinical study critical appraisal. The rest of the assignments will be carried out as research teams, with a single grade. Please note the following is subject to change prior to course commencement.

- Participation/preparation for class [individual grade] 10%
- Assignment 1 - Research question and scoping search [team grade] 10%
- Assignment 2 - Protocol [team grade] 35%

- Assignment 3 - Draft mini-review 40%
    - individual grade 20%
    - team grade 20%
- Team presentation [team grade] 5%

UBC/SPPH grading details are located on the General UBC Policy page.

READINGS/TEXTBOOKS and RESOURCES:

You are not required to buy textbooks for this course. A freely accessible on-line manual provides core course instructional materials. Students are encouraged to access this text and to refer to it throughout the course:

The Cochrane Handbook for Systematic Reviews of Interventions

- For this semester, updated chapters of the Cochrane Handbook (version 5.2.0, scheduled to be published as a book in late 2019) are available in Canvas.
- Alternatively, you may consult the on-line Cochrane Handbook (2011): Higgins JPT, Green S. Cochrane Handbook for Systematic Reviews of Interventions. Cochrane Collaboration. Version 5.1.0 [updated 2011 March]. Available for browsing at handbook.cochrane.org. The online Handbook is scheduled to be updated in November 2019. Any substantive changes will be identified in class.

Weekly readings also include journal articles as identified on the course website.

REFERENCE TEXTBOOKS OR GUIDES (OPTIONAL ONLY):

- Borenstein M, Hedges LV, Higgins JPT, Rothstein HR (2009) Introduction to Meta-Analysis, Chichester, UK: John Wiley & Sons Ltd. Available on-line via Canvas. [more detail on statistical techniques]
- Egger M, Smith GD, Altman DG, editors (2008). Systematic reviews in health care: meta-analysis in context. [monograph on-line]. London: BMJ Publishing Group. Available on-line via Canvas. [An additional classic resource that may be referred to for some readings.]
- Higgins J, Lasserson T, Chandler J, Tovey D, Churchill R. Standards for the conduct and reporting of new Cochrane intervention reviews, reporting of protocols and the planning, conduct and reporting of updates. Available on-line from community.cochrane.org/mecir-manual.

SOFTWARE:

- Review manager (RevMan 5.3.5) software will be used in the course. The downloadable version is available free of charge at: community.cochrane.org/help/tools-and-software/revman-5/revman-5-download/installation
- GRADEpro, an on-line program, will be used for GRADE evidence tables and summary of finding tables. This program interfaces with RevMan. Sign up for a GRADEpro account on-line, free of charge at: https://gradepro.org
- Access to Covidence, an on-line program that partially interfaces with RevMan, is available through the trial version for screening citations.

- Software may be used in class exercises. Additional software for meta-analysis may be used, with the prior permission of the instructor.

ADDITIONAL RESOURCES:

There are many additional resources available on-line as the field of research synthesis continues to expand. We will discuss some of these in class. In addition, the course site provides folders of additional methods resources that are not required reading. These include additional articles and resource material for searching, quality assessment tools for the critical appraisal of both systematic reviews and primary studies, and reporting guidance. These materials are provided for your interest either during the course or in the future.

The 2019 course schedule is on the next page.

2019 COURSE SCHEDULE

Date	*Session Topic*	*Instructor*
Sept 4	*No class, SPPH orientation*	
Week 1 Sept 10	- Overview of the syllabus, key resources, assignments and aims - Introduction to the research synthesis landscape - What makes a review systematic? - Judging the strength of evidence - Begin to form research teams and identify project topics	Dr. Lorri Puil
Week 2 Sept 17	- Introduction to components of a systematic review - Introduction to tools to assess review quality - Formulating research questions and 'PICOS' - Scoping literature searches	Dr. Lorri Puil Charlotte Beck
Week 3 Sept 24	- Literature search techniques - Developing a comprehensive literature search strategy	Charlotte Beck Dr. Lorri Puil
Week 4 Oct 1	- Developing a systematic review protocol - Applying eligibility criteria and selecting studies	Dr. Lorri Puil
Week 5 Oct 8	- Critical appraisal of randomized trials; assessment of risk of bias (internal validity) and applicability (external validity)	Dr. Lorri Puil
Week 6 Oct 15	- Data and statistics I: dichotomous and continuous outcomes; meta-analysis concepts and models	Dr. Lorri Puil
Week 7 Oct 22	- Continuation of data and statistics I - Introduction to Review Manager (RevMan) (please bring a laptop)	Dr. Lorri Puil
Week 8 Oct 29	- Data and statistics II: heterogeneity and subgroup analyses; sensitivity analyses; unit of analysis issues and more	Dr. Lorri Puil
Week 9 Nov 5	- Critical appraisal of a systematic review - Special Topic: RIAT initiative and other trends	Dr. Penny Brasher Dr. Lorri Puil
Week 10 Nov 12	- Observational studies and systematic review; introduction to the Cochrane ROBINS risk of bias tool for non-randomized studies - GRADE and summary of findings tables; formulating conclusions and completing your review	Dr. Lorri Puil Dr. Lorri Puil
Week 11 Nov 19	- Student presentations - Special Topic: Gender and equity in systematic reviews	Class Dr. Lorri Puil
Week 12 Nov 26	- Knowledge translation, policy perspective and health economics - Indirect comparisons and network meta-analysis - Course wrap-up	Dr. Stirling Bryan Dr. Lorri Puil Dr. Lorri Puil
Dec 3	Optional tutorial on RevMan	Dr. Lorri Puil

COURSE SYLLABUS - SESSION DESCRIPTION

WEEK 1 SEPT 10

- Introduction to research synthesis
- What makes a review systematic?
- Judging the strength of research evidence - levels of research evidence
- Review syllabus, assignments and course expectations
- Begin to form research teams and identify project topics

Learning goals

- Understand why there is an evolving science of research synthesis
- Distinguish a systematic review from a narrative review
- Become familiar with different types of systematic reviews
- Understand the relative strength and applicability of various research designs

WEEK 2 SEPT 17

- Introduction to systematic review components
- Methods and tools to assess review quality
- Formulating research questions and 'PICOS'
- Scoping literature searches

Learning goals

- Identify the elements of a systematic review
- Be aware of features that determine the quality of a systematic review and tools to assess quality
- Understand 'PICOS' components of a clinical research question
- Explore the appropriate level of precision needed for an informative and relevant systematic review research question
- Explore framing of research questions from a patient health perspective
- Understand how inclusion and exclusion criteria are set in relation to the review question
- Know how to do a scoping search

WEEK 3 SEPT 24

- Literature search methods

Learning goals

- Understand the difference between a scoping search and a comprehensive literature search
- Identify bibliographic databases and grey literature sources appropriate for a comprehensive search for primary studies
- Understand the components of a search strategy that will help you to find all or the majority of relevant primary studies
- Know about best practices for managing search results and documenting the search process

WEEK 4 OCT 1

- Development of a systematic review protocol
- Applying eligibility criteria and selecting studies

Learning goals

- Know the rationale for developing a research protocol prior to conducting a systematic review
- Become familiar with the components of a systematic review protocol
- Learn to 'operationalize' inclusion criteria for a review by considering:
    - the reproducibility of decisions to include studies
    - the approach needed to 'count and account' for studies
    - the potential impact of publication bias
- Become familiar with PRISMA flow diagrams and screening software

WEEK 5 OCT 8

- Critical appraisal of individual randomized trials
    - Assessment of risk of bias (internal validity)
    - Assessment of generalisability or applicability (external validity)

Learning goals

- Identify methodological details that are required to judge the quality of studies in a systematic review
- Know the main elements of internal and external validity to consider when assessing and applying clinical trial results
- Gain experience with the Cochrane risk of bias tool for randomized trials v1.0 or v2.0
- Understand why quality assessment of primary studies is needed in systematic reviews

WEEK 6 OCT 15

- Data, statistics, and meta-analysis I
    - Dichotomous and continuous outcomes
    - Meta-analysis concepts and models

Learning goals

- Understand why meta-analysis is used rather than simple data pooling
- Be familiar with key measures of effect for dichotomous and continuous outcomes and how to choose which measure to use
- Know how data collection forms are developed for extracting information from study reports
- Differentiate fixed-effect from random-effects models of meta-analysis

WEEK 7 OCT 22

- Continuation of data and statistics I
- Introduction to Reference Manager (RevMan) (please bring a laptop)

Learning goals

- Gain experience using RevMan and become more familiar with data, statistics and meta-analysis.

WEEK 8 OCT 29

- Data, Statistics and Meta-analysis II
    - Unit-of-analysis issues
    - Heterogeneity and subgroup analyses
    - Sensitivity analyses
    - Funnel plots

Learning goals

- Describe different types of heterogeneity and ways to explore heterogeneity
- Consider potential sources of error and bias in extracting and combining data
- Understand what funnel plots are used for

WEEK 9 NOV 5

- Critical appraisal of a systematic review: a systematic review and its included trials will be made available the week before this session.
- Special topic: Restoring invisible and abandoned trials (RIAT) and other initiatives

Learning goals

1. Critical appraisal of a systematic review
    - Apply your knowledge to the assessment of quality and risk of bias in the conduct of a systematic review and meta-analysis.
    - Review a randomized trial for risk of bias and extract the data pertinent to the quantitative synthesis for the review's primary outcome.
2. Observational studies introduction
    - identify strengths/limitations of different types of observational studies
3. RIAT and other initiatives
    - Understand the implications of reporting and publication bias
    - Be aware of initiatives to restore trials and other trends in data transparency
    - Identify the multiple data sources for trials, and be familiar with the differences between clinical study reports (CSRs) and publications

WEEK 10 NOV 12

- Introduction to systematic review of non-randomized studies
- Assessing evidence across studies: the GRADE framework and summary of findings tables, and formulating conclusions for a review

Learning goals

1. Non-randomized studies in systematic review
    - Be aware of the strengths and limitations of different observational study designs
    - Identify reasons for including observational or quasi-experimental studies in a systematic review
    - Be aware of the different approaches to the inclusion of non-randomized evidence
    - Be familiar with tools to assess risk of bias in observational studies such as the Cochrane Risk of Bias tool for non-randomized studies of interventions (ROBINS-I)
2. GRADE

- Identify the domains of the GRADE framework
- Learn to apply outcome-specific evidence ratings
- Create GRADE evidence profile and summary of findings tables in GRADEpro
- Be aware of pitfalls in formulating conclusions

WEEK 11 NOV 19

- Team Presentations
- Special Topic: Gender and equity in systematic reviews

Learning goals

Gender and equity

- Understand the interrelated concepts of 'sex' and 'gender', and their importance in the context of health care
- Be aware of methods that can be used to consider sex, gender and equity in systematic reviews
- Gain experience asking the question "to whom does the evidence apply"?

WEEK 12 NOV 26

- Knowledge translation, health economics and policy
- Indirect comparisons and network meta-analysis
- Course wrap-up

Learning goals

1. KT, health economics and policy:
    - Consider models of knowledge use
    - Explore what types of knowledge should change policy and practice
    - Understand how systematic reviews are used in economics
2. Network meta-analyses:
    - Be familiar with indirect comparisons and network meta-analyses, and the steps involved
    - Identify the limitations and assumptions inherent in network meta-analysis
    - Know how to read league tables
    - Be aware of some tools to use for critiquing and conducting network meta-analysis