SPPH 504 – 2016
APPLICATION OF EPIDEMIOLOGICAL METHODS

TIME AND PLACE: Term 1, Tuesdays, 9 am - noon

LOCATION: Room B108
School of Population and Public Health
2206 East Mall

INSTRUCTOR: Mieke Koehoorn
Room 293, 2206 East Mall
School of Population and Public Health
University of British Columbia
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OFFICE HOURS: By Appointment

TEACHING ASSISTANT: Jennifer Guthrie
jguthrie@ubc@yahoo.com

PRE-REQUISITES: SPPH400 Statistics for Health Research, and
SPPH500 Analytical Methods in Epidemiological Research, and
SPPH502 Epidemiological Methods I, and one of
SPPH503 Epidemiological Methods II, or
SPPH506 Quantitative Research Methods, or
SPPH519 Qualitative Methods for Health Research Design, or
SPPH530 Epidemiology of Occupational and Environmental Health
COURSE OVERVIEW:

The purpose of this course is to apply core epidemiological concepts in the field of population and public health; and to develop practical skills in research design, data management, data analysis/ building an epidemiologic model, power and sample size calculations, interpretation of analytic output and biases such as confounding, and presentation and write-up of research findings suitable for a public health conference and academic journal.

COURSE ACTIVITIES:

To access Statistics Canada health survey data files via the UBC Research Data Centre and associated resources and documentation;
To develop a research protocol that includes formulating an epidemiological/population health research question (i.e. the relationship between a risk factor and a health outcome) using Statistics Canada health data, including the identification of the dependent and independent variables, as well as confounders; the identification of a study sample and the development of an analysis plan;
To carry out the research protocol using the Statistics Canada survey data, including the application of skills in the areas of statistical software, data management, descriptive analysis, building an epidemiologic model, and interpretation of analytic output (coefficients, odds or risk ratios, 95% confidence intervals, confounding, model errors and model fit);
To conduct a sample size calculation for the research question;
To present preliminary descriptive and bi-variable results as part of an in-class ‘lightning talk’ presentation suitable for a public health, academic conference;
To write a journal paper suitable for publication in a health-related journal based on findings from your analysis, including writing an Abstract, Introduction, Methods, Results, Discussion and Reference section; as well as practical experience adhering to journal and authorship guidelines, and presenting findings in tables and figures;
To participate in class discussion and problem solving around the development of research protocols and the application of epidemiological skills throughout the term.

IMPORTANT NOTES with regards to late assignments and plagiarism

Each written assignment is to be uploaded via CONNECT on time and on the designated due date. Typically, no late assignments will be accepted. Extensions of the due date for the written assignments will be considered pending extenuating circumstances with the approval of the instructor. The instructor will require documentation of extenuating circumstances (medical certificates, etc.). Assignments submitted later than the due date will be penalized 10% of the possible grade for each day past due (i.e. one minute past the due date/time is considered a day late).

Students are expected to know what constitutes plagiarism, that plagiarism is a form of academic misconduct, and that such misconduct is subject to penalty. Please review the Student Discipline section of the UBC Calendar, available on-line at http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,959
STUDENT EVALUATION:
Paper Proposal for your public health journal article          P/F
Draft Introduction section of journal article                10%
Draft Methods section of journal article                    15%
Draft Results section of journal article                    15%
Lightning Talk presentation of study with descriptive/bi-variable findings 10%
Final article suitable for submission to a public health academic health journal 50%

GRADING (from the UBC Department of Educational Studies, Graduate Course Grading Policy, D. Pratt):

A Level (80% to 100%)
A+ is from 90% to 100%; It is reserved for exceptional work that greatly exceeds course expectations. In addition, achievement must satisfy all the conditions below.
A is from 85% to 89%; A mark of this order suggests a very high level of performance on all criteria used for evaluation. Contributions deserving an A are distinguished in virtually every aspect. They show that the individual (or group) significantly shows initiative, creativity, insight, and probing analysis where appropriate. Further, the achievement must show careful attention to course requirements as established by the instructor.
A- is from 80% to 84%; It is awarded for generally high quality of performance, no problems of any significance, and fulfillment of all course requirements.

B Level (68% to 79%)
This category of achievement is typified by adequate but unexceptional performance when the criteria of assessment are considered. It is distinguished from A level work by problems such as: One of more significant errors in understanding, superficial representation or analysis of key concepts, absence of any special initiatives, or lack of coherent organization or explanation of ideas. The level of B work is judged in accordance with the severity of the difficulties demonstrated. B+ is from 76% to 79%, B is from 72% to 75%, and B- is from 68% to 71%

C Level (55% to 67%)
Although a C+, C, or C- grade may be given in a graduate course, the Faculty of Graduate Studies considers 68% as a minimum passing grade for doctoral graduate students.

SOME SUGGESTED RESOURCES/TEXTS:
COURSE SUMMARY
Course lectures will be supplemented with on-site tutorials/problem solving sessions, typically held over the lunch hour following class.

<table>
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<tr>
<th>Week</th>
<th>Topic(s)</th>
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| Sept 6 | • Introduction to course – activities, assignments, expectations, evaluation  
• Introduction to StatsCan health survey data via UBC Research Data Centre  
• Introduction to statistical learning environment (via SAS) |
| Sept 13 | • Working with health data (documentation, sampling, coding, data checking)  
• Creating analytic datasets (sub-setting to analytic sample/variables, new variables)  
• Discussion on research questions using StatsCan data |
| Sept 20 | • Class discussion of research proposals, including peer review and problem solving  
• Working with health data and creating analytic datasets, continued  
• Directed Acyclic Graphs (DAGs) for confounders (plus on-line Tutorial) |
| Sept 27 | • Descriptive and bivariate analyses  
• Key elements of a scientific paper; format requirements, choosing a journal, authorship  
• DAGS continued  
• In-class problem solving session |
| Oct 4 | • Peer review of draft Introduction section  
• Using survey sampling weights  
• In-class problem solving session  
  o On-site Tutorial: Basic SAS Commands and Troubleshooting, 12:30-1:30pm |
| Oct 11 | • Bivariate analyses continued  
• Sample size/power calculations for research questions  
• Writing tips and techniques; writing a better paragraph, common grammatical errors;  
• In-class problem solving session |
| Oct 18 | • Bivariate analyses continued  
• Peer review of Methods section  
• Tips and techniques for presentation of research findings – tables, figures, slides  
• In-class problem solving session |
| Oct 25 | • Introduction to multivariable analyses/modeling – building logistic and linear regression models, statistical issues related to confounding, comparison of risk estimates, and interpretation of model results  
• In-class problem solving session |
| Nov 1 | • Student in-class ‘lightning talk’–presentation of key descriptive/bivariable findings only (evaluated on presentation and slides) |
| Nov 8 | • Multivariable analysis continued  
• Discussion of p values versus confidence intervals, interpretation of ORs  
• In-class problem solving session |
| Nov 15 | • Peer review of Results section  
• Multivariable analysis continued, plus introduction to other models (multinomial, ordinal, interactions/effect modification)  
• Journal article reviews and responding to reviewers’ comments |
| Nov 22 | • Multivariable modeling continued, plus introduction to Poisson, multi-level, predictive/determinants models with stepwise options  
• Tips and techniques for communicating research findings (e.g. media, public)  
• In-class problem solving session |
| Nov 29 | • Problem solving session and Q&A on topics/issues suggested by students  
• Course evaluation – UBC Course Evaluation Form plus in-class recommendations  
• RDC process/bootstrapping/authorship |
COURSE ASSIGNMENTS AND DUE DATE – All assignments are to be submitted electronically via CONNECT by the due dates/times.

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<tr>
<th>Dates</th>
<th>Activity</th>
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<tr>
<td><strong>ASSIGNMENT#1</strong></td>
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<tr>
<td>1a.</td>
<td>Monday, Sept 19(^{th}) (6 pm) Draft one-page research proposal for peer review (see attached template)</td>
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<td>1b.</td>
<td>Tuesday Sept 20(^{th}) (9 pm) Revised one-page research proposal for instructor evaluation</td>
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<td><strong>ASSIGNMENT#2</strong></td>
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<td>2a.</td>
<td>Monday, Oct 3(^{rd}) (6 pm) Introduction assignment for peer review</td>
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<td>2b.</td>
<td>Tuesday Oct 4(^{th}) (9 pm) Revised Introduction assignment for instructor evaluation</td>
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<td><strong>ASSIGNMENT#3</strong></td>
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<td>3a.</td>
<td>Monday Oct 17(^{th}) (6 pm) Methods assignment for peer review</td>
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<tr>
<td>3b.</td>
<td>Tuesday, Oct 18(^{th}) (9 pm) Revised Methods assignment for instructor evaluation</td>
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<td><strong>ASSIGNMENT#4</strong></td>
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<tr>
<td>4a.</td>
<td>Monday, Oct 31(^{st}) (6 pm) Copy of slides for in-class study presentation and for evaluation (pdf preferred)</td>
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<td>4b.</td>
<td>Tuesday, Nov 1(^{st}) (9 am-noon) In-class ‘lightning-talk presentations</td>
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<td><strong>ASSIGNMENT#5</strong></td>
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<td>5a.</td>
<td>Monday Nov 14(^{th}) (6 pm) Results assignment for peer review</td>
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<td>5b.</td>
<td>Tuesday Nov 15(^{th}) (9 pm) Revised Results assignment for instructor evaluation</td>
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<td><strong>ASSIGNMENT#6</strong></td>
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<td>6.</td>
<td>Tuesday, Dec 6(^{th}) (6 pm) Final journal article (Abstract, Introduction, Methods, Results plus Discussion, including References and Figures, Tables)</td>
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DESCRIPTION OF ASSIGNMENTS
The intent is that your paper will evolve over the course of the term and that you will revise draft sections of your paper to incorporate instructor and peer feedback into your final paper assignment.

Completion of Research Proposal (P/F) as per the Proposal Template below for a public/population health study and journal article; reflecting careful consideration of an appropriate research question, study sample, key study variables (one explanatory and one outcome variable), potential confounders and analytic approach. This is a Pass/Fail assignment - you must submit a proposal to proceed with course. Students with a Failing grade will be asked to submit a revised proposal incorporating instructor feedback.

Completion of an Introduction assignment for your public/population health journal article (10%). The Introduction must include three paragraphs documenting 1) an introduction to the issue with statistics describing the ‘problem’ of relevance to public/population health research, 2) a summary of previous key studies/findings (i.e. the background) that informs your research question/hypothesis, and 3) a summary of key issue(s)/gap(s)/problem(s) leading to the rationale for your study and research question. This assignment should be no more than 500 words, excluding reference list.

Completion of a Methods assignment for your public/population health journal article (15%). The Methods must include four paragraphs that describe 1) the study design, 2) the study sample (and inclusion/exclusion criteria where relevant), 3) definitions for the outcome and explanatory variable, plus potential confounders, and 4) the analysis plan. This assignment should be no more than 750 words, excluding figures, graphs and reference list.

Completion of a Results assignment for your public health journal article (15%). Results must include four paragraphs that describe 1) the study sample (with a flow chart demonstrating how you went from the survey sample to your analytic sample with numbers), 2) the distribution of the key outcome and explanatory variables, 3) the bi-variable (unadjusted) and multivariable (adjusted) relationship between the key outcome and explanatory variable, and 4) an additional section with findings of interest to the reader as they relate to sample size or power, issues of confounding, interaction terms etc. The results section must include a visual presentation of key findings either using tables or figures. This assignment should be no more than 750 words, excluding figures, graphs and reference list.

Student ‘Lightning Talk’ Presentation (Instructor Evaluation of both slides and in-class presentation - 10%) Students are responsible for an academic-style, ‘lightning talk’ presentation suitable for public health, academic conference. See the following link for a description of ‘Lightning Talk’: https://en.wikipedia.org/wiki/Lightning_talk. Lightning talks will be between five to ten minutes per student (length will be determined by final class enrolment) and limited to five slides. A copy of the slides is due to the TA on the Monday before the in-class presentation (pdf version preferred to avoid formatting issues). The presentation must provide the audience with an overview of the study (brief rationale, research question, key methodological components), findings to-date (key descriptive findings on the study sample and key bi-variable findings on the relationship between the main explanatory and outcome variables) and a discussion of key study limitations/biases. Instructor evaluation form attached below.
Class Paper - Academic Journal Article (50%)
The objective of the class paper is to write a scientific article suitable for publication in a public or population health-related journal. The intent is also that the final version of your academic journal article incorporates feedback provided by the instructor and peers on your draft assignments and your in-class presentation. The paper must include 7 sections (adhering to journal guidelines and instruction to authors): 1) Title Page (title of article and full author name), 2) Abstract, 3) Introduction, 4) Methods (with Study Sample Diagram), 5) Results (with Tables and Figures), 6) Discussion and 7) References (Vancouver style).

The Abstract must be structured and include: Introduction, Methods, Results and Discussion.

The Introduction section must include a minimum of three paragraphs: 1) a description of the health ‘problem’ illustrating the importance of the population/public health issue, 2) a summary of previous key studies/findings (i.e. the background) that informed the rationale for your study, and 3) a summary of key issue(s)/gap(s)/problem(s) leading to your stated research question.

The Methods section must include a minimum of four paragraphs that describe: 1) the study design; 2) the study sample with inclusion and exclusion criteria, 3) variable definitions for the outcome and explanatory variable, plus potential confounders (and interaction terms, effect modifiers if appropriate), and 4) the analysis plan.

The Results section must include a minimum of four paragraphs: 1) a description of the study sample (including a flow diagram demonstrating how you went from the survey sample to your analytic sample with inclusion and exclusion criteria, with numbers), 2) the distribution of the key outcome and explanatory variables, 3) the bivariable (unadjusted) and multivariable (adjusted) relationship between the key outcome and explanatory variable, plus the relationship with confounders, and 4) a section with additional results of interest to the reader such as ‘sensitivity analyses’, sample size or power calculations, confounding/effect modification, model statistics etc. The results section must include a visual presentation of key findings using tables and/or graphs/figures. **A maximum of 3 tables/figures/graphics** can be used in the entire paper, including the flow diagram for the study sample in the Methods section.

The Discussion section must include a minimum of four paragraphs: 1) a summary of key finding(s) relative to the research question; 2) a discussion of similarities and differences between the current findings and previous research and an explanation of the current findings (why are they the same or different from previous findings, why did you observe what you observed); 3) a discussion of the strengths and limitations of the study, including the potential influence of key biases on the results/findings; and 4) conclusions on how the current findings influence our knowledge, practices, or understanding of the health problem, plus recommendations for future studies.

**The maximum word count for the article (Introduction, Methods, Results, Discussion sections, excluding Title Page, Abstract, References and Tables/Figures/Graphs) is 3000 words.** Usually the Discussion section is the longest (approximately 1,000 words) and the Introduction the shortest (approximately 500 words). This leaves approximately one-half of the paper for your Methods and Results Sections (750 words each). **The maximum word limit for the Abstract is 250 words.** There are no word limits for the Title Page, References or Tables/Figures. **Criteria for Evaluation – see Marking Rubric for the journal article (below).**
Research Proposal – SPPH504 (P/F)

Research Question (relationship and direction of relationship between one key explanatory factor and one health outcome of relevance to population/public health):

Data Source/Survey and Data Years:

Description/Definition of Study Sample with exclusion criteria (if any): and estimated n (based on survey documentation)

Description/Definition of Study Outcome (dependent variable). Include the variable name(s) from the survey documentation and estimated number of respondents.

Description/Definition of Explanatory Variable (independent variable). Include the variable name(s) of from the survey documentation and estimated number of respondents.

Potential Confounders (include the variable name(s) from the survey documentation):

Proposed Analytic Model: