

Course Outline for HLTH460

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Goal

The goal of this course is to develop in students skills and knowledge of critical appraisal of health research and skills of critical thinking while composing research proposal and research documents. In this course, we will focus on environmental health but you should be able to apply everything you learn here to your own discipline or context.

After successfully completing the course, you will become a critical and an informed reader and author of research; you will be able to design your own research project and write a research proposal; you will be able to find out data sets and if you have your own data set, you will be able to analyse them, prepare reports & visualisation from that data set, and write research.

Objectives

Following successful completion of this course, you will be able to:

1. Frame answerable research questions for specific health related research
2. Identify an appropriate epidemiological study design for the research
3. Develop a plan of data analysis
4. Conduct simple data analyses
5. Write a short research proposal
6. Argue on the strength and weaknesses of different health related study designs

Date and Time

The dates and times vary each year. The class locations also change from year to year. For the most current and updated information, please consult [UC timetable](#) (this link is valid for 2018).

For the year 2019, these are the dates and times (9 AM - 3 PM); all classes are held in Wheki 105

Block I

Day I: 27th February, Wednesday

Day 2: 28th February, Thursday

Block II

Day 1: 27th March, Wednesday

Day 2: 28th March, Thursday

Block III

Day 1: 8th May, Wednesday

Day 2: 9th May, Thursday

The official course page is at <http://learn.canterbury.ac.nz/course/view.php?id=2908>. Selected course materials are available at the course's Github repository. These are maintained at the following site: <https://arinbasu.github.io/health460/>

Description of the course

The teaching for this course is organised in ***three blocks of two days per block***. In the *first block*, you will learn how to critically read health literature. At the end of this block you will write a research proposal following the guidelines and the lessons you will learn in the first two days. In the *second block*, you will learn about data analysis. You will learn where to look for data, how to read data into R. Then in the *third block*, you will learn how to write a research paper or a report. Here we will cover details of how to write a paper.

In this course, our emphasis will be on identifying research and reports related to environmental health but you can use any health topic for your study. The focus is on critical interpretation of research, learn about data analysis, and writing. Hence, we will introduce some statistics, mostly on statistical thinking, not statistical theory or mathematics. Ideally, if you are planning to put together a thesis for your Master degree or PhD, you should be able to write a workable first draft of your thesis proposal after taking this course.

Assessment Summary Table

Assignment	Due Date	Description
First (30%)	15/3/2019 5 PM	Research Idea
Second (30%)	15/4/2018 5 PM	Data Analysis report
Third (40%)	24/5/2018 5 PM	Research Proposal

For details of the Assessments, see the section below

For detailed description of the assignments and marking, see the Assignments section

Description of Each Block

All classes for 2019 will be held at Wheki 105.

Block 1 (Critical reading of health research)

Day One, 27th February 2019, 9 AM - 3 PM

9 AM - 9:20 AM: Introduction to the course (Introduce each other and set the scene for the course)

9:20 AM - 9:30 AM: Morning break

9:30 AM - 11:00 AM: Session 1: Professor Vincent Mor will teach critical appraisal of literature

11:00 AM - 11:30 PM: Session 2: Class discussion: identify your research idea and present/discuss

11:30-12:30 PM: Session 3: Introduction to causal inference (assumptions, hypothesis testing, bias, confounding, causal criteria) in health sciences

12:30 - 1:30 PM: Lunch break

1:30 PM - 3:00 PM: Session 4: Critical appraisal of articles in health sciences

Day Two, 28th February, 9 AM - 3 PM

9 AM - 10 AM: Identifying funding sources for your study - Dr Kathryn Mackinven will discuss how you can identify funding sources for your research

10:00 AM - 11:00 AM: Epidemiological and health sciences related study designs

11:00 AM - 12:00 PM: Critical appraisal of articles in health sciences, part 2

12:00 PM - 1:00 PM: Lunch break

*1:00 PM - 2:00 PM: Information retrieval (Margaret Paterson), Central Library Den
(Between 2:00 PM and 2:30 PM, students return to the classroom at Wheki 105)*

2:30 PM - 3:00 PM: Discussion session on writing the first assessment

Associated Assessment: Research Idea; deadline: 14th March, 2019, 5 PM via Learn

Block II (Epidemiological Data analysis)

Day One, 27th March, 9AM - 3 PM

These two days will be spent in learning about data in health sciences, how to obtain, clean, process and test with your data. No previous knowledge of statistics or expertise with any software is needed or expected; these are slow paced workshop formats. At the end of the two days of working with data, students will become competent practitioners of handling data and simple analysis (tabulation and creating graphs).

9 AM - 10 AM: Session with Anton Angelo on finding data

10 AM - 3 PM: How to manage and conduct epidemiological data analysis

10 AM - 12 PM: Data organisation in spreadsheets for health sciences

12-1 PM: Lunch break

1 - 3 PM: Data cleaning for health sciences

Day Two, 28th March, 9AM - 3 PM

9 AM - 12 PM: Manipulating data for health sciences and epidemiology using tidyverse and dplyr

12 PM - 1 PM: Lunch break

1 - 3 PM: Visualisation using ggplot

Assessment II: Write a report on your analysis of a data set provided, deadline 14th April, 2019, 5 PM, via Learn

Block III (Critical Writing of Research)

(The details of the schedule are tentative, will be finalised)

Day One, 8th May, Wednesday, 2019

9 AM - 10 AM: Introduction to STROBE

10 AM - 12:00 PM: Students examine journal articles using STROBE as a tool for composing journal articles

12:00 PM - 1:00 PM: Lunch break

1:00 PM - 2:00 PM: Introduction to GRADE

2:00 PM - 3:00 PM: Students learn to use the web based GRADE tool for quality appraisal of available evidence

Day Two, 9th May, Thursday, 2019

9 AM - 12:00 PM: Critical Writing of Research Papers using discourse analysis

12:00-1:00 PM: Lunch break & distribution of research paper assignments

1:00 PM - 3:00 PM: Workshop on writing a Masters/PhD research proposal

Assessment III: Research Proposal, deadline: 25th May, 2019, 5 PM, via Learn

Assessment

Principles

This course will focus on qualitative assessment. We will discuss the details in the first session. For individual assessments (assessments that are tied to each of the blocks), I will post questions and comments that engage your work. You will also reflect on your own work and the work of your peers. My intention is to help you focus on your work mindfully; this is not about just working as you think you're expected to.

Your best strategy should be to be present in the class & actively engage in the class discussions, engage with the readings, workshops, and complete the assignments. I invite you view the assessments in the spirit of working within a "busy-work-free zone." You should be productive not busy. If an assignment does not feel productive, we should be able to find ways to modify, remix, or repurpose the instructions.

(These principles were inspired by the work of Jesse Stommel).

First Assessment: Research Idea, weight: 30%, marked out of 30, due: 14th March, 2018, 5 PM)

Write a research proposal on a topic of your choice; word limit: 1500 words. Word count excludes tables (including words in caption), figures (including words in caption), references. Use APA style referencing. You will learn about APA referencing in the class on library use, otherwise consult the following website

<http://www.library.canterbury.ac.nz/services/ref/apa/>

What to do:

- Choose a topic that you will work on
- Research background information on the topic and write what is known about the issue, what is not known about the issue, and what knowledge gap will you address in your research (you will learn more about how to spot gaps and arguments in the first class)
- Write the method that you will use to address this problem (You will learn about study designs in the first day of the lecture)
- Write the significance of the work

What shall you include in your paper:

- Write your Student ID at the top of the paper (this is your first entry)
- Write the title of the paper
- Introduce the health issue with graphs, tables, and data - describe what is “known” about the topic
- Write about what is “missing” or “not known” about the topic and what is worth investigating
- Write about what you will investigate in your research
- Write how you will investigate in your research
- All facts must be cited and a list of references must be provided at the end of the paper (there is no fixed length of the reference list)
- Your word count cannot exceed 1500 words. The word count does not include words in your tables, captions, figures, and words contained in reference list.
- Submit the paper through Learn by 14th March, 5 PM

Second Assessment: data cleaning, weight: 30%, due: 14th April, 2018 5 PM

Read and analyse the data set and write a report on the data analysis (1500 words)

What to do:

- Read the related story and choose a data set to work on
- Read the data into dplyr/tidyverse, and clean the data set to convert the data into a tidy data
- Prepare data tables and generate relevant graphs related to your queries
- Write about the topic

What shall you include in your paper:

- Write your Student ID at the top of the paper (this is your first entry)
- Write the title of the paper
- Describe your data cleaning process
- Describe the results using graphs and tables
- Write the significance of the findings
- For all facts you state, you must cite where you found them, and you must provide a list of references at the end of the paper (there is no fixed length of the reference list)
- Your word count cannot exceed 1500 words. The word count does not include words in your tables, captions, figures, and words contained in reference list.
- Submit the paper through Learn by 14th March, 5 PM

Third Assessment, 40%, due date: 24th May 2019 5 PM

Write a research proposal as follows:

1. Write your student ID at the top of the document
2. Write the title of the research proposal
3. Write a summary of the proposal
4. Write an introduction or background section where you will write about the health issue you want to work on and the exposure or the intervention you want to explore. Next, write about gaps in the knowledge that you will investigate. Thus the introduction section will have three subsections (1) what is the issue and what do we know about the issue, (2) what is not known or what needs to be identified

about the issue, and (3) what you will investigate. This section will end with a goal and a set of objectives about the research you are about to undertake.

5. Now write a methods section, where you will (1) write the the type of study design you will employ and explain why you will use this study designs, the advantage and disadvantage of using this study design; (2) the population you will investigate, (3) describe the exposure or the intervention; (4) describe the outcome you want to study; (5) how you will go about collecting data for the study; (6) what analysis you will plan to achieve the results.

Please note:

- Your word limit: 2000 words (this is a limit not a target)
- Word count excludes words in the figures, captions, tables, references.
- All facts you state must be cited or referenced (there is no upper or lower limit to the number of references you can cite)
- Submit your proposal using Learn by 24th May, 5 PM

List of Data Sets and Challenge Problems

Resources

Critical thinking, book by Gambrill and Gibbs [Eileen Gambrill \(2017\)](#).

Studies and data sets for the third block

In the second block of this course, we will take a study and analyse the associated data sets. Here are a choice of studies

URL: <https://archpublichealth.biomedcentral.com/articles/10.1186/s13690-017-0217-5>

Description: a study by Mahmud et. al. (2017) where they analysed socio-demographic determinants of locomotor disability among Bangladeshis [Mahmud, Clarke, and Ploubidis \(2017\)](#)

Second Study:

Title: Relationship between employment types and subjective health in Belgium

Description: Van Aerden et al (2017) conducted a cross sectional survey on Belgians about their employment and their subjective health.

URL: <https://doi.org/10.1186/s13690-017-0225-5>

Link to data: <https://www.ggp-i.org/data/>

Third Study:

Home food environment ...

<https://doi.org/10.1186/s40795-018-0210-6>

Websites, Journal Articles and Books

Free online statistics textbook: Statistics at Square One

UCLA Stata Learning Modules

An Introductory Tutorial in Exploratory for Data Wrangling

An Introductory R Tutorial

RStudio Cheatsheets

STROBE Homepage

OpenEpi Homepage

The Knowledgebase of Social Research Methods

Tidying Data using Stata

Google Spreadsheet for calculation of kappa statistic

Articles

Wickham, H. (2014). Tidy data. *Journal of Statistical Software*. [Full Text Link](#)

Block I:

Harris, A., Reeder, R. N., & Hyun, J. K. (2009). Common statistical and research design problems in manuscripts submitted to high-impact public health journals. ... *Open Public Health Journal*. ([Full Text Link](#))

Ellis, T. J., & Levy, Y. (2008). Framework of problem-based research: A guide for novice researchers on the development of a research-worthy problem. *Informing Science: International* ([Full Text Link](#))

van der Zee T, Anaya J, Brown NJL. (2017) Statistical heartburn: An attempt to digest four pizza publications from the Cornell Food and Brand Lab. PeerJ Preprints 5:e2748v1<https://doi.org/10.7287/peerj.preprints.2748v1>

References

- Eileen Gambrill, L. G. (2017). *CRITICAL THINKING FOR HELPING PROFESSIONALS : a skills-based workbook* (4th ed.). OXFORD UNIVERSITY PRESS. Retrieved from <http://gen.lib.rus.ec/book/index.php?md5=F7831915AB9CF8F1E20DA4514D6A4F9A>
- Mahmud, I., Clarke, L., & Ploubidis, G. B. (2017, nov). Socio-demographic determinants of the severity of locomotor disability among adults in Bangladesh: a cross-sectional study December 2010–February 2011. *Archives of Public Health*, 75(1). Retrieved from <https://doi.org/10.1186/s13690-017-0217-5> doi: 10.1186/s13690-017-0217-5