



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

School of Population and Public Health

Environmental Impacts on Human Health

Course ID: SPPH 381C

CREDIT: 3 Credits

Instructor: Matilda van den Bosch, matilda.vandenbosch@ubc.ca

Teaching assistant: Federico Andrade, federicoandrade@gmail.com

Schedule: Mon and Wed, 4.00pm – 5.30pm

Location: DMP 110

Course description

This course builds upon the concept of ecological public health to cover environmental factors as determinants of health of individuals and populations. It will take an integrative approach to how our surrounding environment influences various domains of health and wellbeing, covering local, regional, and global health contexts. Scientific theories and research on the environment's impact on human health will be outlined. Biological mechanisms and pathways will be explained together with contextual mediators. The focus is on health protection and promotion as well as disease prevention. Both hazardous environmental conditions and environmental "good" will be discussed in terms of exposure or experience and how this can affect human biological systems and modify health and wellbeing. This will be considered in a social and economic context, including aspects of environmental justice, health inequalities, and community health. Exposures to chemical, biological and physical hazards in air, water, food and consumer products are considered along with current public health challenges related to urbanization, climate change, and sustainability. The course will elaborate on potential solutions to these challenges through incorporation of ecological principles in public health policy and practice.

Course format: Lectures, group discussions in seminars, and assignments

Course website: Canvas

LEARNING OUTCOMES:

By the end of the course, the student will be able to:

- Identify environmental determinants of health and describe variations between populations in a global context.
- Analyse and compare different ecological principles of relevance for public health, such as Ecosystem Services, Ecohealth, Planetary Health, and One Health
- Outline and explain health threats related to harmful environmental exposures, such as air, food and water pollution, noise, waste, and radiation



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- Outline and explain environmentally related hazards, such as natural disasters, allergenic pollens, and vector-borne diseases
- Outline and explain health promoting factors related to beneficial environmental exposures, such as green and blue spaces
- Apply basic scientific approaches used to assess potential environmental health hazards or benefits.
- Discuss urbanization, climate change, and environmental degradation and reflect on the impact on the global disease scenario
- Discuss how environmental health risks are perceived, assessed, and managed
- Suggest practical solutions for planning and creating healthier, sustainable cities
- Analyze in detail at least one current issue related to environmental impacts on health, including its potential health significance and the scientific, social and legal/political approaches to its management.

COURSE READINGS:

- *Environmental Health: From Global to Local* edited by Howard Frumkin (3rd Edition, 2016)
- Texts, video and online material as outlined in the schedule and on Canvas

HOW TO READ THE TEXTBOOK AND OTHER LITERATURE

Reading is an important tool for learning!

To facilitate the reading and make it more efficient, I suggest that you:

1. Look at topic headings before studying the chapter
2. Write down questions you would like to get answered from the chapter
3. Make marginal notes as you read
4. Underline or highlight important concepts
5. Carry on an active dialogue with the author

Reading steps – the five Rs

- Read
- Reflect
- Review
- Rethink
- Re-evaluate



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Course schedule

Instructors:

Main instructor: Matilda van den Bosch

Teaching Assistant: Federico Andrade

Guest lecturers: Hind Sbihi (UBC), Hugh Davies (UBC), Larry Frank (UBC), Ben Wheeler (Exeter University, UK)

***IMPORTANT: Students should ALWAYS refer to the Canvas site for the most updated reading assignments and information on exercises**

Week, session, and date	Instructor/TA	Topics	Readings/viewings to do in advance of lecture/seminar
1.1. 05/09	van den Bosch	Course introduction <ul style="list-style-type: none"> • Expectations • Goals • Questions • Schedule and textbook • Overview of course contents 	<ul style="list-style-type: none"> • Video: <u>Your health depends on where you live</u>
2.1. 10/9	van den Bosch	Lecture I <ul style="list-style-type: none"> • Planetary health 	Textbook (Frumkin, 2016), 56 pages: <ul style="list-style-type: none"> • Chapter 2: Ecology and ecosystems as foundational for health • Chapter 3: Sustainability and health
2.2. 12/9	Andrade	Seminar I: <ul style="list-style-type: none"> • The Global Burden of Disease, GBD • How disease scenario depends on place and geography 	Gapminder video, Hans Rosling: <u>"The seemingly impossible..."</u>
3.1. 17/9	Sbihi	Lecture II <ul style="list-style-type: none"> • Core Methods: <ul style="list-style-type: none"> ○ Epidemiology ○ Toxicology ○ Exposure Assessment 	Textbook (70 p.): <ul style="list-style-type: none"> • Chapter 4: Epidemiology • Chapter 6: Toxicology • Chapter 8: Exposure Science



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3.2 19/9	Andrade	Reading quiz I Seminar II: <ul style="list-style-type: none"> • Apply an exposure assessment method 	
4.1. 24/9	Frank	Lecture III <ul style="list-style-type: none"> ○ Urban health and built environment 	Textbook (78p.): <ul style="list-style-type: none"> • Chapter 15: Healthy communities • Chapter 20: Buildings and health
4.2. 26/9	Wheeler	Guest lecture <ul style="list-style-type: none"> • Estimating environmental exposures for public health research – a European perspective 	Textbook (12 p.): <ul style="list-style-type: none"> • Chapter 5: Geospatial data for environmental health
5.1. 1/10	van den Bosch	Lecture IV <ul style="list-style-type: none"> • Biological mechanisms • Epigenetics • The life course approach 	Textbook (28 p.): <ul style="list-style-type: none"> • Chapter 7: Genes, genomics, and environmental health <p>The Oxford Textbook of Nature and Public Health. Pdf provided on Canvas (31 p.):</p> <ul style="list-style-type: none"> • Low et al. 2018. A Life Course Approach to Public Health: Why Early Life Matters • Wahrborg et al. 2018. The physiology of stress and stress recovery • Bird et al. 2018. Unifying mechanisms: nature deficiency, chronic stress, and inflammation
5.2. 3/10	Andrade	Seminar III: Epigenetics	



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8/10	HOLIDAY: THANKSGIVING		
6.2. 10/10	Andrade	Reading quiz II Seminar IV: <ul style="list-style-type: none"> • Health impact assessment 	
7.1. 15/10	Davies	Lecture V <ul style="list-style-type: none"> • Harmful environmental exposures I <ul style="list-style-type: none"> ○ Noise ○ Water ○ Radiation 	Textbook: <ul style="list-style-type: none"> • Chapter 16: Water and Health • Chapter 22: Radiation Article: <ul style="list-style-type: none"> • Basner et al. 2014. Auditory and non-auditory effects on noise on health. The Lancet.
7.2. 17/10	Andrade	Reading quiz III Seminar V: Environmental health communications and debating	Video: Malaria and the Silent Spring
8.1. 22/10	van den Bosch	Lecture VI <ul style="list-style-type: none"> • Harmful environmental exposures II <ul style="list-style-type: none"> ○ Outdoor air pollution ○ Indoor air quality ○ Persistent organic pollutants (POPs) 	Textbook (51 p.): <ul style="list-style-type: none"> • Chapter 13: Air Pollution • Chapter 18: Pest control and pesticides
8.2. 24/10	Andrade & van den Bosch	Midterm evaluation and exam	
9.1 29/10	van den Bosch	Lecture VII <ul style="list-style-type: none"> • Biological agents <ul style="list-style-type: none"> ○ Environmental allergens ○ Vector-borne diseases and poisonous plants ○ Microbial contaminants ○ Microbial diversity 	The Oxford Textbook of Nature and Public Health. Pdfs provided on Canvas (20 p.): <ul style="list-style-type: none"> • Dahl et al. 2018. Allergenic pollen emissions from



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			<p>vegetation – threats and prevention</p> <ul style="list-style-type: none">• Wong 2018. Vector-borne diseases and poisonous plants• Rook 2018. Microbes, the immune system, and the health benefits of exposure to the natural environment <p>Research article:</p> <ul style="list-style-type: none">• Alum et al. 2016. Microbiological Contamination of Food: The Mechanisms, Impacts and Prevention. International journal of scientific & technology research 5(3).
9.2. 31/10	Andrade	<p>Reading quiz IV</p> <p>Seminar VI:</p> <ul style="list-style-type: none">• Environmental disasters and health impacts	<p>Textbook:</p> <ul style="list-style-type: none">• Chapter 24: Environmental disasters
10.1. 5/11	van den Bosch	<p>Lecture VIII</p> <ul style="list-style-type: none">• Food systems, health, and the environment	<p>Textbook:</p> <ul style="list-style-type: none">• Chapter 19: Food systems, the environment, and public health
10.2. 7/11	Andrade	<p>Seminar VII:</p> <ul style="list-style-type: none">• Urban food systems• Interdisciplinary partnerships• Policy development	



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12/11		HOLIDAY: REMEMBRANCE DAY	
11.2 14/11	van den Bosch	Lecture IX <ul style="list-style-type: none"> Climate change and sustainability 	Textbook: <ul style="list-style-type: none"> Chapter 12: Climate Change and human health The Oxford Textbook of Nature and Public Health. Pdf provided on Canvas: <ul style="list-style-type: none"> McMichael. Population health deficits due to biodiversity loss, climate change, and other environmental degradation.
12.1 19/11	van den Bosch	Lecture X <ul style="list-style-type: none"> Natural environments and impacts on health 	Textbook: <ul style="list-style-type: none"> Chapter 9: Environmental psychology The Oxford Research Encyclopedia. Pdf provided on Canvas: <ul style="list-style-type: none"> van den Bosch (2017). Natural Environments, Health, and Well-Being.
12.2. 21/11	Andrade	Reading quiz V Seminar VIII: Urban green space qualities for health Ecosystem services	
13.1. 26/11	Andrade	Lecture XI <ul style="list-style-type: none"> Environmental justice and health across the globe 	Textbook: <ul style="list-style-type: none"> Chapter 11. Environmental justice



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			and vulnerable populations
13.2. 28/11	van den Bosch, Andrade	Summing up the course, video presentations, and course evaluation!	
TBD		FINAL EXAM	

Optional material

- [Lang and Rayner. 2012. Ecological public health: the 21st century's big idea? An essay by Tim Lang and Geof Rayner. BMJ 345:e5466. https://www.bmj.com/content/345/bmj.e5466](https://www.bmj.com/content/345/bmj.e5466)
- [Whitmee et al. 2015. Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–Lancet Commission on planetary health. The Lancet 386:1973-2028. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)60901-1/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60901-1/fulltext)
- WHO website on public health, environment and social determinants of health: <http://www.who.int/phe/en/>
- The Guardian Green Newsletter: <https://www.theguardian.com/environment/2015/oct/19/sign-up-to-the-green-light-email>

LEARNING ACTIVITIES and ASSIGNMENTS

The percentage in parenthesis indicate the proportion of your final grade that will be attributed to the respective activity/assignment.

- **Reading quizzes (15%)** 5 across the term: these will cover contents from the textbook, as well as contents from the lectures and the seminars. The goal with the quizzes is to improve your understanding and knowledge of the course topic and to make it easier for you to remember for the midterm and final exam and in the future. We will ask you upload your own suggestions for questions on Canvas – good questions will be selected for the quiz! See further instructions on Canvas.
Research shows that active reading, question posing, and preparing for tests improve memory function and this means that you will have better use of what you have learnt in future jobs and commitments.
Assessment: Each quiz will include six questions and you will get 1 point per two correct answers, i.e. maximum 3 points per each quiz, adding up to 15 points for all five quizzes.
- **Midterm exam and evaluation (20%).** The midterm exam will concern the topics we have covered during the course so far (up to October 24), including material from the textbook,



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other readings, contents from lectures and seminars. The format will be mostly multiple-choice and short answer questions. A few example questions will be provided on Canvas ahead of the test. The purpose with the midterm exam is to make sure that you are updated on the course contents, that you have grasped the main concepts of some environmental determinants of human health, and to help you be better prepared for the final exam. You will also be asked to provide constructive comments on what has worked during the course so far, what can be improved, and what you want to learn more about. These comments will be considered for the teaching during the remaining parts of the course and constructive suggestions are welcome!

Assessment: maximum score, which will be weighted as 20% of the final grade, will be achieved by all correct answers and providing comments on the course.

- **Final exam (30%).** The final exam will cover all the course contents – textbook, other readings, and contents from lectures and seminars. The questions will be a mix of multiple-choice, and short and long answers. The goal is to encourage you to repeat what you have read and learnt during the course, to make the knowledge more solid and useful for you in the future. The aim is also to help you put all the material into context and understand how the various topics relate to each other. A few example questions will be provided on Canvas ahead of the exam.

Assessment: For all correct answers you will receive maximum score, which will be weighted as 30% of the final grade.

- **In-class seminars (10%).** The seminars held on Wednesdays during the course are important parts of your learning. They will provide hands-on examples of current issues in environmental health and give you the opportunity to discuss various topics of importance for anyone with interest in the interactions between the environment and human beings. The seminars will take different formats and will include exercises such as games, assessment of own environmental exposures, communication practice, policy studies, and perhaps most importantly – opportunities for questions, discussions, and debates. Attendance and active participation in the seminars are fundamental for the value of the course and for giving you a deeper understanding of the contents. Your TA and instructor will participate in the seminars and join discussions and provide feed-back on your exercises. You are expected to come prepared to the seminars, so that you are able to engage and develop your knowledge together with your peers. As a university student, you are expected to take responsibility for your own learning, why it is assumed that you will participate actively and make best use of the course.

Assessment: Attendance will be checked and you will receive one point per each attended seminar (+ the guest lecture by Ben Wheeler), adding up to nine points for attending all of them. You will also receive one point for attending the wrap-up discussion during the last



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day of the course. Particularly active, insightful, and engaged participation during the seminars will be rewarded.

- **Video projects (25%).** This is a fun part of the course. You will work in pairs with your learning partner on this assignment. **The task for each pair of students is to produce a 3-5 minutes narrated slide presentation (e.g. Power Point) or video based on a selected environmental health topic** (a list of topics will be posted on Canvas).
The topics address various aspects of interactions between the environment and human beings and how these interactions may influence health. In your video you will also often have to consider policy responses, recommendations, current state of evidence and other issues that will link data and facts to real-life situations. The goal is to give you a chance to get a deeper insight into a specific issue that interests you and to improve your understanding of, for example, contemporary management processes and legislations. A few example videos will be shared on Canvas to give you an idea of how it may look. Remember, however, that this is your chance to be creative and explore and present a topic in a unique way and that appeals to you and your peer! Consider your audience to be fellow students with little or no knowledge of the topic before.
To complete this assignment, you and your learning partner will need to identify and complete additional readings (e.g. media reports, and news and review articles where available). Be prepared to use databases such as PubMed, Scopus, Web of Science. The UBC library is a great resource for finding literature! Remember that sometimes you may need to look outside the scientific literature, for example media reports, news articles, government reports, and policy documents.
Depending on the character of your selected topic the approach will vary slightly. In general, however, the presentation should clearly identify key issues, include a discussion of the tools used to address the problem (i.e. exposure assessment techniques, major epidemiological/ toxicological evidence related to the problem), the legal, political, and social issues affecting the problem and its management, and identification of the major agencies (government and non-governmental) involved.
Share the work equally between you! One suggestion is that one student is responsible for the knowledge review and the other student oversees the part related to approaches/arguments/solutions. If you have problems with sharing the work load equally between you, please contact your TA and/or instructor!

Assessment. The video will be evaluated based on the following:

- The quality and thoroughness of your literature study (10%). To achieve 10 points, the scientific background shall be correctly and clearly presented. For example, limitations in current scientific understanding shall be addressed and evaluated. The topic shall be clearly outlined and easy to understand even for someone with limited knowledge on beforehand.



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- Your analysis of the problem (10%). You will both need to read about the topic from different sources and consider potential difference in information. Analyse the issue critically. Simply reporting summaries of information taken from other sources is not a critical analysis, but it is important that you are able to demonstrate your understanding of the complexity of the issue. We are especially interested in your critical analysis of the available scientific and policy information and on your ability to apply it to the specific topic. We encourage you to assimilate information from different sources and include it in your analysis.
- The quality, organization and creativity of your video (5%). You will need to concisely articulate the key points and convincingly present your critical analysis. Your task is to distill an abundance of often complex information and make it understandable to your audience. Some of the videos will be presented during the last day of the course.

For this kind of assignment, the assessment and grading is mostly based on an overall impression of the product. The videos will be watched iteratively and in case of ambiguity the instructor will consult with another faculty member with expertise in the topic. The experience is that eagerness to learn and genuine enthusiasm for the topic become reflected in the final grade.

IMPORTANT FORMALITIES

Plagiarism

To really learn something, which is the aim with all university studies, it is obvious that all your work must be your own. Plagiarism basically means that you are copying someone else's work, making your studies pointless. Plagiarism applies also to video presentations.

At a university, it is the student's responsibility to know what constitutes plagiarism, that plagiarism is a form of academic misconduct, and that such misconduct is subject to penalty.

Before writing your letter, please review the [Student Discipline section of the UBC Calendar](#) (plagiarism is discussed under academic misconduct)!

There is also a [good document on plagiarism](#) from the UBC Faculty of Arts and some good tutorials on plagiarism that you might also wish to complete if you have any concerns about your understanding about appropriate use and citation of materials:

[SFU tutorial](#)

[York University tutorial](#)

Laptop/tablet/phone etiquette

During face-to-face sessions, feel free to use your laptop/tablet/smartphone for activities directly related to the class including note taking or reference to the readings or other relevant material.

Using your laptop/tablet/smartphone while the class is in progress for non-class related activities



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such as email, social media or looking up unrelated web pages is not allowed. These practices are disrespectful to the instructor and to other students, and are distracting and disruptive. Texting, answering or making phone calls during class is also prohibited. This kind of behaviour will result in a lower grade.

Accommodation for students with disabilities

If you have a learning, psychological or physical disability, you may be eligible for reasonable academic accommodations or services. To request accommodations or services, please contact the [UBC Access and Diversity Office](#).