

# **Epidemiology of Physical Activity, Fitness, and Health**

## **Faculty of Health School of Kinesiology and Health Science**

**Course:** HH/KINE 3640 3.0 A – Epidemiology of Physical Activity, Fitness, and Health

**Course Webpage:** moodle.yorku.ca

**Term:** Winter 2017

**Prerequisite / Co-requisite:** HH/KINE 1020 3.0 – Fitness and Health

### **Course Instructor**

Prof. Chris Ardern  
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Course consultation hours: **Tuesdays, 2:30-3:30 pm** (or by appointment; Rm 352 BC)

### **Teaching Assistant**

Theresa Kim  
Email: kimthere@yorku.ca  
Course consultation hours: available by appointment

### **Email Policy:**

Questions regarding course material can be posted on the discussion board on moodle (<http://moodle.yorku.ca>). Emails sent to the Course Director will be answered within 24 hours, between 9 am and 5 pm, Monday to Friday. Emails must include “3640” in the subject heading and should be professional and limit use of short form text.

### **Time and Location**

*Lectures: Tues/Thurs 10:00-11:30*

*Accolade East (ACE) – 013*

### **Expanded Course Description**

This course provides an overview of the epidemiology of physical activity, fitness and health. General concepts of epidemiological study will be introduced and the relationships among physical activity, fitness and disease relationships will be discussed. Approximately 50 minutes of each 80 minute session will be spent in a traditional lecture format, with the remaining time for discussion of current research issues / population health statistics, and case studies. Evaluations will be based on a midterm, methodological paper, online participation, and a final exam.

## **Course Learning Objectives**

### **(1) Purpose:**

*The purpose of this course is to assist students in the development of critical appraisal skills and to develop an understanding for the use of epidemiological methods in the area of exercise science. At completion of the course, students will be able to: i) identify appropriate sources of epidemiological data for physical activity and disease surveillance; ii) identify measures of disease frequency; iii) interpret physical activity trends, and; iv) discuss the inter-relationship between physical activity, sedentary time, and health.*

### **(2) Students will demonstrate the capacity to:**

- *Identify appropriate sources of population-level surveillance for physical activity trends, physical fitness, and chronic diseases in Canada*
- *Identify appropriate measures of disease frequency*
- *Describe the evolution of physical activity and sedentary time guidelines in Canada*
- *Contrast the feasibility and validity of a range of methods for assessing physical activity and physical fitness at the population level*
- *Understand the general relationship between physical activity, health-related fitness, and major chronic diseases*
- *Apply epidemiologic and exercise science theory to critically evaluate the strengths and limitations of various epidemiological study designs (i.e. bias, validity and reliability)*
- *Develop their ability to discuss and write about current trends and issues in physical activity and physical fitness surveillance*

## **Readings:**

There is no required text for this course. Outlines of lecture notes will be provided on a weekly basis. Assigned readings can be accessed through the electronic library holdings of York University.

### **Supplementary Readings:**

*Text:* Physical Activity Epidemiology (2<sup>nd</sup> Edition e-book)

*Authors:* Rod Dishman, Gregory Heath, and I-Min Lee

*Publishers:* Human Kinetics, 2012

NOTE: The textbook is not required, but may be useful for those who would like a broader perspective on the material covered in the lecture. The main focus of the assigned readings will be current journal articles as suggested by the course director on the moodle reference list.

Additional readings may be assigned or recommended during the course.

## Overview of Course Topics and Readings:

Date	Content	Reading*
<b><u>SECTION 1: EPIDEMIOLOGICAL METHODS</u></b>		
Jan. 5	<b>Introduction:</b> Course Overview and Review	No Reading
Jan. 10	<b>The Case for Chronic Disease Epidemiology</b> <ul style="list-style-type: none"> <li>▪ <i>Epidemiology Defined</i></li> <li>▪ <i>Tools in Epidemiology (survey, administrative data, GIS, etc.)</i></li> <li>▪ <i>Epidemiologic Transition</i></li> </ul>	Franco et al., <i>BMJ</i> (2013).
Jan. 12	<b>Methods in Epidemiology</b> <ul style="list-style-type: none"> <li>▪ <i>Types of Epidemiological Studies</i></li> </ul>	Paffenbarger RS. <i>Med Sci Sports Exerc</i> (1988).
Jan. 17	<b>Topic 1: Epidemiology in Practice</b> <ul style="list-style-type: none"> <li>▪ <i>Hill's Cause and Effect Criteria</i></li> <li>▪ <i>Working Example: Correct and Incorrect Presentation of Data</i></li> </ul> <b>Topic 2: Overview of Assignment</b> <ul style="list-style-type: none"> <li>▪ Critiquing Research</li> <li>▪ Media Release vs Research Summary</li> </ul>	No Reading  [Practice Example: Media Release – TBD]
<b><u>SECTION 2: PHYSICAL ACTIVITY MEASUREMENT AND TRENDS</u></b>		
Jan. 19	<b>Measurement of Physical Activity, Sedentary Time, and Physical Fitness</b> <ul style="list-style-type: none"> <li>▪ <i>Should we promote the harms of inactivity or the benefits of activity?</i></li> </ul> <b>Relationship between Physical Activity and Fitness</b> <ul style="list-style-type: none"> <li>▪ <i>Individual Variation (HERITAGE Family Study)</i></li> <li>▪ <i>Exercise Resistance / Non-Responders</i></li> </ul>	[Homework: Complete IPAQ S-F, EPAQ-2, RPAQ, and SITQ-7 questionnaires and 7 day Pedometer Counts]  Hills et al., <i>Frontiers Research</i> (2014).  Bouchard et al., <i>PLoS One</i> (2012).
Jan. 24	<b>Correlates of Physical Activity</b> <ul style="list-style-type: none"> <li>▪ <i>Correlate vs Predictor vs Determinant</i></li> <li>▪ <i>What makes people active?</i></li> <li>▪ <i>Do predictors of PA vary across the lifespan?</i></li> <li>▪ <i>How well does PA track?</i></li> </ul> <b>Physical Activity Trends [Adults]</b> <ul style="list-style-type: none"> <li>▪ <i>Canadian and Global Patterns</i></li> </ul>	Bauman et al., <i>Lancet</i> . (2012).          Hallal et al., <i>Lancet</i> (2012).
Jan. 26	<b>Physical Activity Trends [Adults-Cont'd]</b>	

	<ul style="list-style-type: none"> <li>▪ <i>Is there variation by Subgroup?</i></li> <li>▪ <i>Leisure time versus Occupational Activity</i></li> </ul> <p><b>Physical Activity Trends [Children]</b></p> <ul style="list-style-type: none"> <li>▪ <i>What we do and do not know</i></li> </ul>	Church et al., <i>PLoS One</i> (2011).
<b>SECTION 3: BURDEN OF DISEASE ASSOCIATED WITH INACTIVITY</b>		
Jan. 31	<p><b>Physical Activity, Fitness, and All-Cause Mortality</b></p> <ul style="list-style-type: none"> <li>▪ <i>Case Study / Examples: Statistically Adjusting for Confounders and Covariates</i></li> <li>▪ <i>Dose-Response Relationships</i></li> <li>▪ <i>Independent and Joint Effects of Inactivity and Sedentary Time</i></li> <li>▪ <i>Weekend Warrior vs Dispersed Activity</i></li> </ul>	Koster et al., <i>PLOS ONE</i> (2012).
Feb. 2	<p><b>PA and Coronary Heart Disease</b></p> <ul style="list-style-type: none"> <li>▪ <i>General Trends and Early Intervention Opportunities</i></li> <li>▪ <i>Is There a Benefit of Higher Intensity when PA Volume is Below Recommended Levels?</i></li> <li>▪ <i>Evidence for Contraindications with Statin Use</i></li> <li>▪ <i>Can There be Too Much of a Good Thing? Volume vs Intensity differences (i.e. running vs. walking) and J-shape Phenomenon</i></li> </ul>	Chomistek et al., <i>JACC</i> (2013).
Fri. Feb. 3	<b>ASSIGNMENT DUE on or before 6:00 pm (to be posted to <u>moodle</u>)</b>	
Feb. 7	<p><b>PA and Non-Communicable Disease</b></p> <ul style="list-style-type: none"> <li>▪ <i>Measurement and Quantification of Health Risks using Population Attributable Risk</i></li> </ul>	Lee et al., <i>Lancet</i> (2012).
Feb. 9	<p><b>PA Influences on Stroke and Blood Pressure</b></p> <ul style="list-style-type: none"> <li>▪ <i>Variation by Stroke Subtype</i></li> </ul>	Martinez-Gomez, (2009). Hu et al., <i>JAMA</i> (2000).
Feb. 14	<ol style="list-style-type: none"> <li>1. <b>Assignment Returned on moodle</b></li> <li>2. <b>Midterm exam review and structure</b></li> </ol>	No Reading
Feb. 16	<b>MIDTERM [10:00-11:15am]</b>	
Feb. 21, 23	<b>No Class-Reading Week</b>	
Feb. 28	<p><b>Measurement Issues in Overweight and Obesity</b></p> <ul style="list-style-type: none"> <li>▪ <i>Measurement and Controversies: Anthropometrics and Obesity Staging</i></li> <li>▪ <i>BMI, Morbidity, and Mortality</i></li> </ul> <p><b>Midterm Exam Returned</b></p>	Sharma and Kushner, <i>Int J Obes</i> (2009).

March 2	<b>Overweight and Obesity Trends</b> <ul style="list-style-type: none"> <li>▪ <i>Canadian and Global Patterns</i></li> <li>▪ <i>High-Risk Subgroups and Predictors</i></li> </ul>	No Reading
March 7	<b>Physical Activity and Obesity</b> <ul style="list-style-type: none"> <li>▪ <i>Current Recommendations</i></li> <li>▪ <i>Experimental vs Epidemiological Literature (Cross-Sectional and Longitudinal / Intervention Studies)</i></li> </ul>	Davidson et al. <i>Arch Intern Med</i> (2009).
March 9	<b>Fit-Fat Paradox</b> <ul style="list-style-type: none"> <li>▪ <i>Controversies and Limitations to Research: Epidemiological vs Experimental Studies and Different Disease States</i></li> </ul>	Lee et al., <i>Am J Clin Nutr</i> (1999).
March 14	<b>Physical Activity and Metabolic Syndrome</b> <ul style="list-style-type: none"> <li>▪ <i>Risk Factor Clusters and Patterns</i></li> </ul>	Saunders et al., <i>PLOS ONE</i> (2013).
March 16	<b>Physical Activity and Diabetes</b> <ul style="list-style-type: none"> <li>▪ <i>Controversies in the Role of Obesity vs Physical Activity</i></li> <li>▪ <i>Sedentary vs. MVPA</i></li> </ul>	Weinstein et al., <i>JAMA</i> (2004). Healy et al., <i>Diabetes Care</i> (2007).
March 21	<b>Physical Activity and Cancer</b> <ul style="list-style-type: none"> <li>▪ Mechanisms and potential influences on prevention and management</li> <li>▪ Dose-response relationships</li> </ul>	No Reading
March 23	<b>Cognition and Aging-Related Disease</b> <ul style="list-style-type: none"> <li>▪ <i>Cognition and Aging [Dementia and Alzheimer's]</i></li> <li>▪ Association between PA and quality of life</li> </ul>	Kesse-Guyot et al., <i>PLOS ONE</i> (2005).
March 28	<b>PA at the Interface of Global Health</b> <ul style="list-style-type: none"> <li>▪ Challenges to PA promotion (PA vs injury; chronic disease vs infectious disease, etc.)</li> <li>▪ Lessons Learned</li> </ul>	No Reading
March 30	<b>Special Topics [TBD]</b>	No Reading
April 4	<b>Topic 1: Group Discussion Questions</b>  <b>Topic 2: Open Exam Review</b>	No Reading
<b>FINAL EXAM [DURING EXAM PERIOD: April 7<sup>th</sup> to 24<sup>th</sup>]</b>		

\*All readings must be accessed through eJournal holdings at York University. Resource citations are provided on the course moodle site, but students must log-in through the Library page in order to download them. Note: the topics listed here are tentative, and are subject to change depending on current research, class interest, and timing.

### **Evaluation of Academic Performance \***

<b>Evaluation Format</b>	<b>Date</b>	<b>Weighting</b>
Assignment	February 3 <sup>rd</sup>	10%
Class Participation	Throughout Course	10%
Midterm	February 16 <sup>th</sup>	35%
Final Exam	Exam Period	45%

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Note: Class participation is based on online participation in discussion board and individual quizzes.

\* All exams cover material from the lectures and assigned readings. \*

**Midterm:** Covers lectures and readings from January 5<sup>th</sup> to February 9<sup>th</sup> (inclusive).

**Final Exam:** All material, with a focus on material covered from February 28<sup>th</sup> to April 4<sup>th</sup>

\*\*\*Note: Final course grades may be adjusted to conform to Program or Faculty grades distribution profiles.\*\*\*

### **Written Assignment:**

A list of articles (and library links) are available on moodle under the heading “Assignment 1 Articles”. Students must select an article from this list to review / critique. Please use the following subheadings as a guideline for your assignment:

1. Write a “lay summary” of 200 words or less. This summary should be written in non-technical language (grade 10 level with non-technical terms – see instructions on course moodle site) and describe the study background, objective, study design and population, main study finding, and interpretation of results.
2. Identify potential sources of bias in the study (including those that may not have been identified in the original study).
3. Conclude with a general critique of the study strengths and limitations and two (2) future directions or remaining research gaps.

Note: Assignments can be done on your own, or with another classmate. This is *your* choice. If you chose to complete the assignment with another student, you will receive the same grade, regardless of any potential differences in opinion in each other’s contribution to the collective work. The assignment should be a maximum of two pages using standard formatting (Times New Roman; 12 font; 1.5 spacing). Material beyond 2 pages in length will not be graded. Please provide a title page with student number and article reference. Articles must be selected from the list of eligible articles found on moodle.

- Paper due on **Friday February 3<sup>rd</sup>**, 2017. Assignments must be uploaded to moodle by **6pm (EST)**. NO EXTENSIONS will be given.
- **Twenty** percent (20%) per day will be deducted for late papers.
- Students will be marked on grammar and content of their critique.

### **Participation Grades:**

Every student is expected to come to class prepared. Participation grades can be earned by performance on “pop-quizzes”, commenting on online posts, and in-class group work. Grades will be assigned as follows:

- i) There will be 4 random “pop-quizzes” (each with 5 multiple choice questions) in selected lectures throughout the term.
- ii) The general participation mark assigned for each student is a ‘B’ (if a minimum cumulative score of 10 or more (out of 20 possible marks is achieved).
- iii) For an ‘A’, students are expected to comment on at least 3 online questions (posted randomly throughout the course)
- iv) For full participation marks (i.e. an A+), students should be active participants asking questions in lecture and commenting on lectures and readings in class and on moodle. [Note: for participation marks to count, online postings must be made within 72 hours of comment posting time.]

## **Grading, Assignment Submission, Lateness Penalties and Missed Tests**

### **There are no make-up assignments in the course.**

\*Students have 1 week after the posting of exam results or assignments to contact the instructor about marking concerns. Any request for remarking must be made in writing, and include a statement of the reason for the request and any supporting documentation; a “re-grading request form” is available in moodle. Note: for consistency, such a request will involve re-evaluation of the entire exam or assignment, and not an individual question in isolation. Grades can therefore increase, decrease, or remain unchanged after re-marking.\*

**Grading:** The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, C+ = 5, etc.). Assignments and tests will bear either a letter grade designation or a corresponding number grade (e.g. A+ = 90.0 to 100, A = 80.0 to 89.9, B+ = 75.0 to 79.9, etc.)

(For a full description of York grading system see the York University Undergraduate Calendar - [http://calendars.registrar.yorku.ca/pdfs/ug2004cal/calug04\\_5\\_acadinfo.pdf](http://calendars.registrar.yorku.ca/pdfs/ug2004cal/calug04_5_acadinfo.pdf))

Students may take a limited number of courses for degree credit on an ungraded (pass/fail) basis. For full information on this option see Alternative Grading Option in the Faculty of Health section of the Undergraduate Calendar (<http://www.registrar.yorku.ca/enrol/passfail/>):

**Assignment Submission:** Proper academic performance depends on students doing their work not only well, but on time. Accordingly, assignments for this course must be received on the due date specified for the assignment.

**Lateness Penalty:** Assignments received later than the due date will be penalized **20%** per day that the assignment is late. Exceptions to the lateness penalty for valid reasons such as illness, compassionate grounds, etc., may be entertained by the Course Instructor but will require supporting documentation (e.g., a doctor’s letter).

**Missed Tests:** Students with a documented reason for missing a course test, such as illness, compassionate grounds, etc., which is confirmed by supporting documentation (e.g., doctor’s letter) may request accommodation from the Course Instructor. Such students will be given the opportunity to add the weight of the missed evaluation component to their final exam (i.e. there are no make-ups for the midterm exam). Further extensions or accommodation will require students to submit a formal petition to the Faculty.

### **IMPORTANT COURSE INFORMATION FOR STUDENTS**

Course syllabus, readings, and regular postings will be included on the course website ([moodle.yorku.ca](http://moodle.yorku.ca)). All students are expected to familiarize themselves with the following information, available on the Senate Committee on Curriculum & Academic Standards webpage (see Reports, Initiatives, Documents) - [http://www.yorku.ca/secretariat/senate\\_cte\\_main\\_pages/ccas.htm](http://www.yorku.ca/secretariat/senate_cte_main_pages/ccas.htm)

- York’s Academic Honesty Policy and Procedures/Academic Integrity Website
- Ethics Review Process for research involving human participants
- Course requirement accommodation for students with disabilities, including physical,

- medical, systemic, learning and psychiatric disabilities
- Student Conduct Standards
  - Religious Observance Accommodation

\*Student must complete the on-line academic integrity tutorial by January 12<sup>th</sup> ([www.yorku.ca/tutorial/academic\\_integrity/](http://www.yorku.ca/tutorial/academic_integrity/)). The on-line tutorial will take approximately 30 minutes.