Population Burden Measures in Cardiovascular Disease Epidemiology
EPID 889, Section 01
Fall, 2017

Lead instructor: Christy Avery
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Chapel Hill, NC 27514
919/966-4312
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Office hours: By appointment.

Pre-requisites: EPID 715/EPID716 or permission of the instructor with demonstrated SAS competency.

Time and place: Tuesdays 2:00 – 3:50 PM. Location: 2304 McGavran-Greenberg

Credits: 1 credit

Course objectives: This course will provide students with a practical knowledge of disease burden metrics that can serve as a substitute or companion to traditionally reported ratio measures. Although this course will use examples from the cardiovascular disease literature, the concepts presented are applicable to a broad range of topical areas.

Course structure: This course is a combination of lecture and laboratory analysis and is organized around five themes: ratio and difference measures, population attributable fractions, generalized impact fractions, the global burden of disease project, and estimating intervention effects using the g formula. Each class, with the exception of the introduction, will begin with an overview, which is provided by the instructor. After the overview, the class will change to a lab format and use a common data set provided by the instructor to estimate the effect measures discussed during the lecture using SAS and limited STATA.

Attendance policy: As the class meets only seven times, attendance is mandatory. If a student knows before enrollment that s/he will miss any classes, s/he should discuss the absence with the instructor to decide whether to postpone enrollment until the subsequent year. If an unforeseeable emergency or illness prevents a student from attending class, please notify the instructor as soon as possible. One excused absence per student is permitted.

Course project: Students will choose an exposure and/or outcome relevant to public health research and of interest to them (e.g. cigarette smoking, diabetes, stroke, air pollution, adiposity etc.). If you are unsure if your topic is appropriate, please discuss it...
with the instructor. This paper should not be structured as a critique of an article that
reports a metric that we evaluated in class. Instead, you should think of it as a mini-
review and commentary, i.e. briefly review the state of the science today and comment
how population burden measures could contribute. No population burden measures
published for your topic of interest? Recall that several approximations of population
burden measures were presented in class; approximation is acceptable if you believe
the assumptions behind such approximations are appropriate for your topic of interest.
In the paper, please:

1. Describe your exposure/outcome and its relevance to epidemiology and public
health.
2. Interpret published research examining the selected exposure/outcome and at
least two separate population burden metrics discussed in class. (The
attributable fraction and population attributable fraction or DALYs and YLLs or
YLDs are not considered separate metrics.)
3. Compare and contrast associations between traditionally reported relative effect
measures and the population burden metrics interpreted in (2).
4. Evaluate the use of the population burden metrics described in (2). Do they
provide information not captured by traditionally selected disease metrics? Do
you perceive any barriers to the use, interpretation, or widespread adoption of
population burden measures? Would you draw different inferences based on the
metrics you select, either comparing one to the other or your metrics to
commonly reported measures? Which metric/s do you believe is/are most
relevant to public health practice?

The paper will be no longer than four double-spaced pages with one inch margins, 12
point font, and exclusive of references and the honor code. Text exceeding the four-
page limit will not be reviewed. If figures or tables are needed to help convey
information, they may be submitted as an appendix, but should be used judiciously and
formatted for publication. The course project is due via SAKAI Dropbox upload on
November 17, 2017. Please include your PID and the page number on each page
(including the appendix, if applicable) in a footnote. Do not forget to cite all references
using whatever format you prefer.

**Grading:** The course project accounts for 50% of the class grade. The remaining 50%
of the grade is class participation, which is assessed by the instructor. The grade scale is:

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<tr>
<th>Score</th>
<th>Grade</th>
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<tbody>
<tr>
<td>&lt;60.0</td>
<td>F</td>
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<td>60.0 – 74.9</td>
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<td>75.0 – 89.9</td>
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<td>≥ 90.0</td>
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**Late policy:** The course project is due on November 17, 2017. Please submit the
assignment through the SAKAI Dropbox feature. Assignments submitted after
November 17 will receive a 10% deduction for each day they are overdue. Course
projects submitted after November 24, 2017 will not be accepted.
Honor code: Please submit the course project with a signed honor code stating that: "On my honor, I have neither given nor received unauthorized aid on this assignment". The project is not considered complete until it is accompanied by the honor code. Additional information on the honor code is available at: http://honor.unc.edu/

Data set: Several topics presented in this class will be accompanied by a lab (predominantly SAS, but some STATA will be used.) These labs will use the Atherosclerosis Risk in Communities Study (ARIC) academic data set. ARIC is a prospective epidemiologic study conducted in four U.S. communities that was designed to investigate the etiology and natural history of atherosclerosis, the etiology of clinical atherosclerotic diseases, and variation in cardiovascular risk factors, medical care and disease by race, gender, location, and date. ARIC includes two study designs: the Cohort Component and the Community Surveillance Component. The Cohort Component, from which the data for this course were obtained, began in 1987, and each ARIC field center randomly selected and recruited a cohort sample of approximately 4,000 individuals aged 45-64 from a defined population in their community. A total of 15,792 participants received an extensive examination, including medical, social, and demographic data. These participants were reexamined every three years with the first screen (baseline) occurring in 1987-89, the second in 1990-92, the third in 1993-95, and the fourth and last exam was in 1996-98. Follow-up occurs yearly by telephone to maintain contact with participants and to assess health status of the cohort. Cardiovascular disease hospitalizations continue to be adjudicated by a combination of active and passive surveillance.

Exposure of interest: Systolic blood pressure

Outcome of interest: Incident CHD
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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
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<tbody>
<tr>
<td>September 12, 2017</td>
<td>• Review of syllabus</td>
<td>Required: Cates 2013; Galea 2013; Galea 2013</td>
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<td>• Brief history of CVD epidemiology: then and now</td>
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<td>• Consequentialist epidemiology</td>
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<td>September 19, 2017</td>
<td>• Reliance on ratio measures / distortion of relative effects</td>
<td>Required: *list looks long, but many are letters</td>
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<td>• Introduction to ARIC academic dataset</td>
<td>Kauffman, 2005</td>
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<td>• Calculating IRRs/IRDs in SAS</td>
<td>Baylin, Hernandez-Diaz et al. 2006; Poole 2007; Boshuizen and Feskens 2010; Kaufman 2010</td>
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<td>Optional: Poole 2010</td>
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<td>Langholz 2010</td>
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<td>Ridker, Cook et al. 2005; Hernan 2010; Xu, Cheung et al. 2010</td>
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<td>October 3, 2017</td>
<td>Shifting the population burden of disease/exposure</td>
<td>Required: Rose 2001; Hardy, Loehr et al. 2015</td>
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<td>October 10, 2017</td>
<td>Cumulative incidence</td>
<td>Required: Kubota, Heiss et al. 2017</td>
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<td>Optional: Beiser, D'Agostino et al. 2000</td>
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<td>September 26, 2017</td>
<td>• Population attributable fraction</td>
<td>Required: Rockhill, Newman et al. 1998</td>
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<td>• Generalized impact fraction (continuous and categorical)</td>
<td>Optional: Flegal, Graubard et al. 2005; Loehr, Rosamond et al. 2010</td>
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<td>October 17, 2017</td>
<td>Global Burden of Disease (GBD) project</td>
<td>Fineberg 2013; Murray, Atkinson et al. 2013</td>
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<td>October 24, 2017</td>
<td>Estimating effects of interventions in epidemiologic studies</td>
<td>TBD</td>
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Readings


