

**BIOA 450**  
**Biodemography**  
Spring Quarter 2009

**Time:** T Th 3:30-5:20

**Place:** Denny Hall 314

**Class Website:** <http://courses.washington.edu/biodemog/>

**Instructor:** Dr. Kathleen O'Connor  
420 Denny Hall  
(206) 543-9605 (office)

**Office Hours:** T Th 12-1 or by appt

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### **Course Description**

This course is an introduction to the theory, methods and literature of biodemographic research. Biodemography examines the biological aspects of aging, mortality, and fertility, typically within a life history framework. Biodemography is an interdisciplinary field, specifically using and tying together theory and methods from the fields of demography, anthropology, sociology, evolutionary biology, molecular biology and population biology. It covers pre-historic, historic and modern human populations, as well as non-human model systems (e.g. non-human primates, fruit flies, nematode worms, bats, cars). The goal of this course is to broadly survey the biodemographic literature focusing on the life history biology of the fundamental demographic measures of reproduction and mortality.

### **Course Objectives**

The course will be run in a seminar format, and is designed to facilitate discussion about, and thoughtful exploration of, the following four broad biodemographic research questions:

1. What is the mortality pattern and life span of humans today?
2. What were mortality patterns and lifespan of humans like in the prehistoric past?
3. What is the mortality pattern and life span of nonhuman primates?
4. What is the relationship between nutrition and fertility?

Upon completion of the course students will be able to provide well-informed answers to these broad questions about the biological aspects of the history, and future, of the human population, and the field of biodemography.

### **Course Requirements**

1. Readings. The assigned readings are largely from the primary literature (that is, not textbooks). All readings are available via UW Libraries Ereserves, which you can link to from the class website.
2. Presentations. Each student will give one 30 minute presentation to the class. These presentations are based on the course readings. 15% of course grade. (Grad students give 2 presentations each, at 7.5% each).
3. Presentation Paper. Each student will prepare a 3-5 page summary paper on their presentation and the relevant reading(s). The paper is due one week after the presentation. 15% of course grade.
4. Two Response Papers: The course is built around the 4 overarching biodemographic research questions listed above. You are required to prepare a written answer to two of these questions, in two separate papers. Each response paper should be 5-10 pages (typed, double-spaced), and summarize the main research topics, issues, methods and findings of the relevant class readings, the material covered in class, and any aspects of the work that you feel are particularly interesting, remain unanswered, unclear, or merit further investigation. These papers are due during final exam week. Each paper is worth 30% of your grade; total=60% for the two papers.
5. Attendance and participation: Regular attendance and participation are necessary for success in this course. Breakout Groups are 10% of your grade.

**Please Note:** Rules and regulations governing student conduct as outlined by the University of Washington will be strictly observed. (<http://www.washington.edu/students/handbook/conduct.html>).

**Disabled Student Services:** If you would like to request academic accommodations due to a disability, please contact Disabled Student Services, 448 Schmitz Hall (206) 543-8924 (V/TTY). If you have a letter from Disabled Student Services indicating you have a disability that requires academic accommodations, please present the letter to me so we can discuss the accommodations you might need for the class.

## Course Calendar

**Important Notes:** GSP = grad student presentation; SP = student presentation; Breakout Groups schedule is subject to change.

### Introduction To Demography

Mar 31 Course Introduction

Apr 2

- The History of the Human Population. By AJ Coale. 1974. *Scientific American* 231(3):40-51.
- Human Population: The Next Half Century. By JE Cohen. 2003. *Science* 302:1172-1175.
- Introduction (to Basic Formal Demography)—Chapter 1. By C Newell. 1988. In: *Methods and Models in Demography*. Pp 3-12. The Guilford Press New York.
- The reversal of fortunes: Trends in county mortality and cross-county mortality disparities in the United States. By M Ezzati et al. 2008. *PLoS Medicine* 5(4):0557-0568. (**SEE ESPECIALLY THE EDITORS SUMMARY**, p. 0568)
- *Breakout Groups*

### Demographic and Epidemiologic Transitions

Apr 7

- The epidemiologic transition model: Accomplishments and challenges. By M Feinleib. 2008. *Annals of Epidemiology* 18(11):865-867.
- **(GSP)** The epidemiologic transition theory revisited thirty years later. By AR Omran. 1998. *World Health Statistics Quarterly* 51:99-119.
- **(GSP)** Are modern environments really bad for us?: Revisiting the demographic and epidemiologic transitions. By TB Gage. 2005. *Yearbook of Physical Anthropology* 48:96-117.
- *Breakout Groups*

### Principles Of Biodemography

Apr 9

- How to Live Like a Mammal. By PH Harvey and S Nee. 1991. *Nature* 350:23-24.
- Principles of Biodemography with Special Reference to Human Longevity. By JR Carey and DS Judge. 2001. *Population: An English Selection* Vol 13 (1):9-40.
- Life history changes in disease-ravaged Tasmanian devil populations. By ME Jones et al. 2008. *Proceedings of the National Academy of Sciences* 105(29):10023-10027.
- **(ADDITIONAL OPTIONAL READING/REQ for GRAD STUDENTS)** A Survey of Human Biodemography. By KM Weiss. 1989. *Journal of Quantitative Anthropology* 1:79-101.
- *Breakout Groups*

### Mortality Paradoxes and Health Disparities

Apr 14

- **(GSP)** Differential mortality and the Donner Party disaster. 1993. By DK Grayson. *Evolutionary Anthropology* 2(5): 151-159.
- **(GSP)** Differential fitness costs of reproduction between the sexes. By DJ Penn and KR Smith. 2007. *Proceedings of the National Academy of Sciences* 104:553-558.
- **(GSP)** Sexual Selection and the Male/Female Mortality Ratio. By DJ Kruger and RM Nesse. 2004. *Evolutionary Psychology* 2:66-85.
- **(GSP)** Exogenous shocks to the human sex ratio: the case of September 11, 2001 in New York City. By R. Catalano et al. 2006. *Human Reproduction* 21:3127-3131.

Apr 17

- **(SP)** Men: good health and higher mortality. Sex differences in health and aging. By A Oksuzyan, K Juel, JW Vaupel, K. Christensen. 2008. *Aging Clinical and Experimental Research* 20(2): 91-102.
- **(SP)** Gender differences in the association between morbidity and mortality among middle-aged men and women. By A. Singh-Manoux, A Gueguen, J. Ferrie, M Shipley, P Martikainen, S Bonenfant, M Goldberg, M Marmot. 2008. *American Journal of Public Health* 98(12):2251-2257.
- *Breakout Groups*

Apr 21

- **(GSP)** Changing patterns of mortality among American Indians. By SJ Kunitz. 2008. *American Journal of Public Health* 98(3):404-411.
- **(GSP)** Aging, migration, and mortality: Current status of research on the Hispanic paradox. By KS Markides and K Eschbach. 2005. *Journals of Gerontology* 60B(Special Issue II):68-75.
- **(GSP)** Hispanic Paradox in Biological Risk Profiles. By EM Crimmins, JK Kim, DE Alley, A Karlamangla, T Seeman. 2007. *American Journal of Public Health* 97(7):1305-1310.

## Mortality Selection

Apr 23

- **(SP)** Inflammatory exposure and historical changes in human life-spans. By Finch CE, Crimmins EM. 2004. *Science* 305:1736-1739.
- **(SP)** Selectivity of Black Death mortality with respect to preexisting health. By SN DeWitte and JW Wood. 2008. *Proceedings of the National Academy of Sciences* 105(5):1436-1441.

## Longevity, Life Span, Aging

Apr 28

- The coming acceleration of global population aging. By W Lutz, W Sanderson and S Scherbov. 2008. *Nature*. 451:716-719.
- **(SP)** Why do we age? By TBL Kirkwood and SN Austad. 2000. *Nature* 408:233-238.
- Understanding the odd science of aging. By TBL Kirkwood. 2005. *Cell* 120:437-447.
- **(SP)** Trajectories of mortality at advanced ages. By JW Vaupel. 1997. In: *Between Zeus and the Salmon*, edited by KW Wachter and CE Finch. Pages 17-37.
- **(ADDITIONAL OPTIONAL READING/REQ for GRAD STUDENTS)** Ever since Gompertz. By SJ Olshansky and BA Carnes. 1997. *Demography* 34(1):1-15.
- *Breakout Groups*

Apr 30

- **(SP)** (Two papers, one student does both)
  - 1) What demographers can learn from fruit fly actuarial models and biology. JR Carey. 1997. *Demography* 34:17-30.
  - 2) Get Wild. By RJ Davenport. [sageke.sciencemag.org/cgi/content/full/sageke;2003/8/ns2](http://sageke.sciencemag.org/cgi/content/full/sageke;2003/8/ns2) Pp.1-3.
- **(SP)** (Two papers, one student does both)
  - 1) Life history, ecology and longevity in bats. By GS Wilkinson and JM South. 2002. *Aging Cell* 1:124-131.
  - 2) Dietary Drawbacks. By K Hopkin. 2003. [sageke.sciencemag.org/cgi/content/full/sageke;2003/8/ns4](http://sageke.sciencemag.org/cgi/content/full/sageke;2003/8/ns4) Pp.1-4.
- **(ADDITIONAL OPTIONAL READING/REQ for GRAD STUDENTS)** Subfield History: Caloric Restriction, Slowing Aging, and Extending Life. By EJ Masoro. 2003. [sageke.sciencemag.org/cgi/content/full/sageke;2003/8/re2](http://sageke.sciencemag.org/cgi/content/full/sageke;2003/8/re2) Pp 1-7.

## Non-Human Primate Demography

May 5

- **(SP)** Postreproductive life predicted by primate patterns. By DS Judge and JR Carey. 2000. *The Journals of Gerontology* 55A:B201-B209.
- **(SP)** Age-related patterns of reproductive success among female mountain gorillas. By AM Robbins, MM Robbins, N Gerald-Stetkalis, H.D. Stetkalis. 2006. *American Journal of Physical Anthropology* 131:511-521.
- **(ADDITIONAL OPTIONAL READING/REQ for GRAD STUDENTS)** The comparative demography of primates: With some comments on the evolution of life histories. By TB Gage. 1998. *Annual Review of Anthropology* 27:197-221.
- *Breakout Groups*

May 7

- **(SP)** The aging baboon: Comparative demography in a non-human primate. By AM Bronikowski, SC Alberts, J Altmann, C Packer, KD Carey, M Tatar. 2002. *Proceedings of the National Academy of Sciences* 99(14):9591-9595.
- **(SP)** Demography, female life history, and reproductive profiles among the chimpanzees of Mahale. By, T. Nishida et al. 2003. *American Journal of Primatology* 59:99-121.
- *Breakout Groups*

## Fertility

May 12 No readings! Class will be on the female reproductive axis, in preparation for the next three classes.

May 14

- (SP) Does malnutrition affect fecundity? A summary of evidence. By J Bongaarts. 1980. *Science* 208:564-569.
- (SP) Timing in prenatal nutrition: A reprise of the Dutch Famine Study. By M Susser and Z Stein. 1994. *Nutrition Reviews* 52:84-94.
- *Breakout Groups*

May 19

- (SP) Caloric restriction reduces age at menopause: the effect of the 1944-45 Dutch famine. By SG Elias et al. 2003. *Menopause: The journal of the North American Menopause Society* 10(5):399-405.
- (SP) Maternal nutrition and reproduction: Why demographers and physiologists disagree about a fundamental relationship. By JW Wood. 1994. *Annals of the New York Academy of Sciences* 709:101-116.

May 21

- (SP) Energetic factors and seasonal changes in ovarian function in women from rural Poland. By Jasienska and Ellison 2004. *American Journal of Human Biology* 16:563-580
- (SP) Interpopulational differences in progesterone levels during conception and implantation in humans. 2004. By VJ Vizthum, H. Spielvogel, J. Thornburg. *Proceedings of the National Academy of Sciences* 101(6):1443-1448.
- *Breakout Groups*

## Paleodemography

May 26

- (GSP) Chapters 1, 4, 5 and 8 in *Health and the Rise of Civilization*. By MN Cohen. 1989.
- (ADDITIONAL OPTIONAL READING/REQ for GRAD STUDENTS) Chapter 7 in *Health and the Rise of Civilization*. By MN Cohen. 1989.
- *Breakout Groups*

May 28

- (SP) Fertility changes with the prehistoric transition to agriculture. By GR Bentley, RR Paine, JL Boldsen. 2001. In: *Reproductive Ecology and Human Evolution*. Edited by PR Ellison, Aldine de Gruyter: New York. Pp. 203-231.
- (SP) (Two papers, one student does both)
  - 1) Paleodemography of the Libben Site, Ottawa County, Ohio. By CO Lovejoy, RS Meindl, TR Pryzbeck, TS Barton, KG Heiple, D Kotting. 1977. *Science* 198:291-293.
  - 2) Village composition implied by a paleodemographic life table: the Libben site. By N. Howell. 1982. *American Journal of Physical Anthropology* 59:263-269.

June 2

- (SP) The osteological paradox. By JW Wood, GR Milner, H Harpending, KM Weiss. 1992. *Current Anthropology* 33:343-370.
- (SP) Does paleopathology measure community health? A rebuttal of "The Osteological Paradox" and its implication for world history. By MN Cohen. 1997. In: *Integrating Archaeological Demography*. Edited by RR Paine. Center for Archaeological Investigations, Occasional Paper No. 24. Pages 242-260.
- *Breakout Groups*

June 9

**TWO RESPONSE PAPERS DUE (final exams week)**

NO FINAL EXAM