

Techniques of Demographic Analysis Spring 2014

Maxcy 108 Thu 2-5PM

Instructor: Michael J. White

Goals. This course is designed to introduce students to basic concepts of demographic measurement and modeling used to study changes in size, composition, and distribution of population. The course covers basic population measures of mortality, fertility, migration, and health; life table construction and survival analysis, and population projection. Several additional applications, such as qualitative data analysis, index construction, and inequality measurement are also included. Beyond establishing basic competence in the methods themselves, the course seeks enhance the ability to critically assess the suitability of method to problem at hand, both in the literature and in one's own research.

Audience. Soc 2230 introduces the conscientious student to a variety of practical techniques for analyzing data throughout the social sciences. Undergraduates who wish to enroll in this course must obtain permission.

Prior Preparation. There are no specific course prerequisites for Soc 2230. Presentations rely on algebra, while background in calculus will enhance appreciation. It is assumed that students are up to date on access and processing of electronic research material, both through the course website, and other resources (Web of Knowledge, JSTOR, etc.). Students will also be expected to analyze and/or extract data across the internet for certain applications. The course will make significant use of spreadsheet software and some use of the Stata statistical package.

Philosophy. The field of demography continues to evolve with respect to the set of methods most applicable for the next generation of population studies. Current methodology reflects significant changes in sources of data, ways of analyzing those data, and the models upon which social and health scientists draw to understand population phenomena. This syllabus reflects current thinking about key demographic methods needed by up-and-coming investigators. Soc 2230 not only includes traditional methods, such as sources of data, errors, calculation of basic rates, life tables, standardization and some formal analysis of demographic dynamics, but also recognizes the extensive contemporary reliance on microdata and statistical analysis, fieldwork and sampling. Soc 2230 will coordinate with the weekly PSTC colloquium series, as well as current news items illustrating demographic methods or related substantive results of note.

Course Materials. This course makes use of the Canvas course website. Required readings will be listed there, usually via link to OCRA. The following textbook is on order at the Brown Bookstore:

Preston, S.H., P. Heuveline and M. Guillot. (PHG). *Demography: Measuring and Modeling Population Processes*. (Oxford 2001) A standard text that contains formal demographic development of key material, emphasizing fertility, mortality, and age structure.

In addition, you may wish to consult other treatments. All are useful in their own way, and they take up population methods from different viewpoints.

Rowland, DT *Demographic Methods and Concepts* (Oxford, 2003). Comprehensive but less technical than PHG. It contains a series of spreadsheet modules on a supplementary CD.

(Indicated in the reading list as "Rowland"). See also:

<http://www.oup.com/uk/orc/bin/9780198752639/>

Poston & Micklin (P&M) *Handbook of Population*. (Springer, 2005) contains comprehensive overviews of major topics in demography. Several chapters treat methodological issues. Also in paper and an e-book via Josiah.

Siegel and Swanson. *Methods and Materials of Demography* (Elsevier 2004) The latest version of a long-standing comprehensive text in US demography.

Newell, Collin, *Demographic Methods and Models*. A handy compact treatment of basic demographic material, with most standard methods represented.

Haupt & Kane *The Population Handbook*, available online:
http://www.prb.org/pdf/PopHandbook_Eng.pdf

Requirements and Grading. The course is mandatory S/NC. Still, there is regular work that is part of the course progression. Problem sets will account for 60% of the course evaluation. A research “note” paper will account for 20% of the evaluation. Class participation is considered vital to “satisfactory” performance and includes seminar discussion, posting to the discussion board, and presentations; this will account for another 20%. The course format consists of weekly assigned readings with accompanying in-class lectures. Several weeks will include student presentations.

Readings. Each week has assigned core reading. In addition, the reading list indicates weekly topical or supplementary readings. Some extend the methods, others provide examples of applications. In selected weeks, these readings will form the basis of discussion and critical review.

Relevant Dates

February 17-18	Long Weekend (Presidents’ Day)
March 24-30	Spring Recess
April 25-May6	Reading Period
May 5 (Mon)	Final papers (research note) due

Schedule of Meetings and Topics

[Selected key articles appear in canvas/OCRA]

1. BASIC CONCEPTS; CURRENT TRENDS

BASIC MEASURES OF POPULATION GROWTH AND STRUCTURE;
RATES & RATIOS, PERSON-YEARS; COHORT VS. PERIOD
DEMOGRAPHIC TECHNIQUES AND CURRENT POPULATION DEBATES

PHG, Ch 1, "Basic Concepts and Measures."

P&M, Prologue "The Demographer's Ken: 50 Years of Growth and Change."

Lee, R. "Demography Abandons its Core" (see ms on course website)

Campbell, M., J. Cleland, A. Ezeh, and N. Prata. 2007. "Return of the population growth factor." *Science* (Washington) 315(5818):1501-1502.

Duncan, GJ. 2008. "When to Promote, and When to Avoid, a Population Perspective" *Demography*, 45 (November): 763-784.

ADDITIONAL READINGS

Cohen, J. 2005. "Human population grows up." *Scientific American* 293(September 3):48-55.

Van Dalen, H.P. and K. Henkens. 2011. "What's on a Demographer's Mind? A World-Wide Survey." *Demographic Research* 26: 363-408

APPLICATIONS: DHS STAT-COMPILER, PRB WEBSITE, & IPUMS

Population Reference Bureau (PRB). 2012. World Population Data Sheet:

<http://www.prb.org/Publications/Datasheets/2012/world-population-data-sheet.aspx>

PRB website video re population data:

<http://www.prb.org/Journalists/Webcasts/2012/distilled-demographics-population-data.aspx>

Van Hook, J. and J.E. Glick. 2007. "Immigration and living arrangements: moving beyond economic need versus acculturation." *Demography* 44(2):225-249. [IPUMS-I]

2. FUNDAMENTAL DATA SOURCES; DEMOGRAPHIC COMPOSITION

AGE-SEX PYRAMIDS; STANDARDIZATION
DEMOGRAPHIC DATA COLLECTION

P&M, Ch 1 "Age and Sex."

PHG, Ch 2 "Age-Specific Rates and Probabilities"

Vaupel, J and E. Loichinger. 2006. "Redistributing Work in Aging Europe." *Science* 312 (30 June 2006): 1911-1913.

ADDITIONAL READINGS

Hawkes, K and N Blurton-Jones. 2005. "Human Age Structures, Paleodemography and the Grandmother Hypothesis." In *Grandmotherhood : the evolutionary significance of the second half of female life* (Rutgers, 2005)

FOR MORE RE: DATA QUALITY AND BIAS

Rowland, CHS 2-3

Chan, A. 2009. "The 2008 SIPP Event History Calendar (EHC) Field Test: Respondents' Reactions to the Interview." Statistical Research Division, US Bureau of the Census. Research Report Series, Survey Methodology #2009-03. [ONLINE LINK]

Halpern-Manners, A. and J.R. Warren. 2012. "Panel Conditioning in Longitudinal Studies: Evidence From Labor Force Items in the Current Population Survey." *Demography* 49:1499-1519

Hauser, RM "Comparable Metrics" (ms). 2010. [ONLINE LINK]

- Hirschman, C., R. Alba, and R. Farley. 2000. "The meaning and measurement of race in the U.S. census: glimpses into the future." *Demography* 37(3):381-393.
- Kean, S. 2010. "Can the Census Go Digital?" *Science* 330(6002):310.
- Martin, E. 2007. "Strength of attachment: Survey coverage of people with tenuous ties to residences." *Demography* 44(2):427-440.
- Mishra, V., B. Barrere, R. Hong, and S. Khan. 2008. "Evaluation of bias in HIV seroprevalence estimates from national household surveys." *Sexually Transmitted Infections* 84(Suppl 1):i63
- Savitz, D.A. and R.B. Ness. 2010. "Saving the National Children's Study." *Epidemiology* 21(5):598.
- Smith, J.P. and D. Thomas. 2003. "Remembrances of things past: test-retest reliability of retrospective migration histories." *Journal of the Royal Statistical Society* 166(1):23-49.
- VanWey L. et al. 2005. "Confidentiality and Spatially Explicit Data." *Proceedings of the National Academy of Sciences* 102:15337-15342.

FOR MORE RE: DECOMPOSITION

Rowland, CH 4

- Heuveline, P. and M. Weinshenker. 2008. "The international child poverty gap: Does Demography matter?" *Demography* 45(1):173-191.
- Johnston, D.W. and W.S. Lee. 2011. "Explaining the female black-white obesity gap: A decomposition analysis of proximal causes." *Demography* 48(4):1429-1450.
- Smith, H.L., S.P. Morgan, and T. Koropecj-Cox. 1996. "A decomposition of trends in the nonmarital fertility ratios of blacks and whites in the United States, 1960–1992." *Demography* 33(2):141-151.
- Powers, D. A. 2013. "Paradox Revisited: A Further Investigation of Racial/Ethnic Differences in Infant Mortality by Maternal Age." *Demography* :1-26.
- Iceland, J., Sharp, G., & Timberlake, J. M. 2013. "Sun belt rising: Regional population change and the decline in black residential segregation, 1970–2009." *Demography*, 50(1), 97-123.
- Sharkey, P. 2012. "Temporary integration, resilient inequality: Race and neighborhood change in the transition to adulthood." *Demography*, 49(3), 889-912.

COMPUTING: Stata *dstdize*

Extension: Blinder-Oaxaca decomposition (Stata also)

3. LIFE TABLE: BASIC FUNCTIONS & CONSTRUCTION [12 FEB ANDREW FENELON]

SINGLE DECREMENT LIFE TABLE; BASIC COLUMNS AND RELATIONSHIPS

PHG CH 3 "The Life Table and Single Decrement Processes"

See also: Rowland, Chs 6,8

ADDITIONAL READINGS

- Fenelon, A. 2013. "Revisiting the Hispanic mortality advantage in the United States: the role of smoking." *Social Science and Medicine* Forthcoming.
- Kaneda, T. and J.B. Kirby. 2010. "Unhealthy and Uninsured: Exploring Racial Differences in Health and Health Insurance Coverage Using a Life Table Approach." *Demography* 47:1035-1051.
- Wildeman, C. 2009. "Parental imprisonment, the prison boom, and the concentration of childhood disadvantage." *Demography* 46(2):265-280.
- Bongaarts, J 2006. "How Long Will We Live?" *Population and Development Review* 32: 605–628.

4. LIFE TABLE: EXTENSIONS

MULTIPLE DECREMENT (CAUSE-DELETED) LIFE TABLE;

MEASURING THE BURDEN OF DISEASE

PHG CH 4 "Multiple Decrement Processes"

Gold, M., D. Stevenson, and D. Fryback. 2002. "HALYs and QALYs and DALYs, Oh My; Similarities and differences in summary measures of public health." *Annu Rev Public Health* 23:115-134.

FOR MORE RE: LIFE TABLES

PHG CH 12 "Increment Decrement Life tables"

Eloundou-Enyegue, P. 2004 "Pregnancy-Related Dropouts and Gender Inequality in Education: A Life-Table Approach and Application to Cameroon." *Demography* 41:509-528.

INDEPTH Network. 2004 *INDEPTH model life tables for Sub-Saharan Africa*. (Ashgate, 2004)

Lichter DT, Qian ZC, Mellott LM. 2006. "Marriage or dissolution? Union transitions among poor cohabiting women." *Demography* 43 (May): 2230-240 [MDLT]

Mensch BS, Grant MJ, Blanc AK. 2006. "The changing context of sexual initiation in sub-Saharan Africa." *Population and Development Review* 32 (Dec): 699-727 [MDLT]

COMPUTING: STATA *ltable*

FOR MORE RE: BURDEN OF DISEASE

Murray, C.J.L., et al.. 2013. "Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010" *Lancet* 380(9859):2197-2223. [and others in [GBD 2010]Lancet issue.]

Baltussen, R., M. et al. 2002. "Obtaining disability weights in rural Burkina Faso using a culturally adapted visual analogue scale." *Health Economics* 11(2):155-163.

Bloom, D. and D. Canning. 2000. "The Health and Wealth of Nations" *Science* 287:1207-1209.

Hyder, AA; Morrow, RH. "Disease Burden Measurement and Trends" Ch1 IN Merson, MH et al *International Public Health* (Aspen 2001)

Wang, H., et al. 2013. "Age-specific and sex-specific mortality in 187 countries, 1970–2010" *The Lancet* 380(9859):2071-2094. [GBD 2010]

5. MEASURING NUPTIALITY AND FERTILITY; FAMILY AND HOUSEHOLD STRUCTURE

TFR, NRR, SMAM, AND RELATED MEASURES

PHG, Ch 5 "Fertility and Reproduction"

Rowland, CH 7

FOR MORE RE: LIFE TABLE APPLICATIONS TO FAMILY DYNAMICS

Feyisetan, B. and J.B. Casterline. 2000. "Fertility preferences and contraceptive change in developing countries." *International Family Planning Perspectives* 26(3):100-109.

Goldstein, J.R. 1999. "The Leveling of Divorce in the United States" *Demography*, 36: 409-414.

Lam D, and Marteleto L. 2008. "Stages of the Demographic Transition from a Child's Perspective." *Population and Development Review*, 34: 225-252.

Retherford, R., N. Ogawa, R. Matsukura, and H. Eini-Zinab. 2010. "Multivariate analysis of parity progression—based measures of the total fertility rate and its components." *Demography* 47(1):97-124.

6. POVERTY, INEQUALITY, AND SEGREGATION MEASURES

LORENZ, GINI, DISSIMILARITY, ENTROPY, SPATIALLY INFORMED MEASURES

White, M and A Kim. 2005. "Residential Segregation" *International Encyclopedia of Social Measurement*, Vol 3 (2005). pp. 403-9.

Yang, Y. 2007. "Age/Period/Cohort Distinctions." *Encyclopedia of Health and Aging* :20-22. [e-document]

FOR MORE RE: INCOME INEQUALITY INDICES; LDC ASSET INDICES

McCall, L. and C. Percheski. 2010. "Income inequality: new trends and research directions." *Annual Review of Sociology* 36:329-347.

Filmer, D. and K. Scott. 2012. "Assessing Asset Indices." *Demography* 49:359-392.

Heilig, G.K. 2006. "Many Chinas? The economic diversity of China's provinces." *Population and Development Review* 32(1):147-161.

World Bank, "Measuring Poverty" [online link]

FOR MORE RE: SEGREGATION MEASUREMENT

Clark, W. A. V. and M. Fossett. 2008. "Understanding the social context of the Schelling segregation model." *Proceedings of the National Academy of Sciences* 105(11):4109-4114.

Fotheringham, A.S. and D.W.S. Wong. 1991. "The modifiable areal unit problem in multivariate statistical analysis." *Environment and Planning A* 23(7):1025-1044.

Reardon, S.F. and D. O'Sullivan. 2004. "Measures of Spatial Segregation." *Sociological Methodology* 34:121-162.

White, M.J., A.H. Kim, and J.E. Glick. 2005. "Mapping Social Distance." *Sociological Methods & Research* 34(2):173.

COMPUTING: STATA *inequal*, *Gini*

7. ANALYSIS OF POPULATION DISTRIBUTION AND MIGRATION

GROSS AND NET MIGRATION; MULTISTATE MODELS

Rowland CHS 10,11

P&M Ch 11 "Internal Migration" pp 326-339

FOR MORE RE: GROSS AND NET MIGRATION

Bell, M., et al., G. 2002. "Cross-national comparison of internal migration: issues and measures." *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 165(3), 435-464.

Bell, Martin and Muhidin, Salut. "Cross-National Comparison of Internal Migration." Queensland Centre for Population Research, University of Queensland. July 2009
http://mpra.ub.uni-muenchen.de/19213/1/MPRA_paper_19213.pdf

Martine, G et al. 2013. Urbanization and Fertility Decline. IIED Working Paper. London.

DeWaard, J., K. Kim, and J. Raymer. 2012. "Migration systems in Europe: Evidence from harmonized flow data." *Demography* :49:1307-1333.

Kim, K; Cohen, J. 2010. "Determinants of International Migration Flows to and from Industrialized Countries: A Panel Data Approach Beyond Gravity". *International Migration Review* 44:899–932.

Schmertmann, C.P., R.M. Assunção, and J.E. Potter. 2010. "Knox Meets Cox: Adapting Epidemiological Space-Time Statistics to Demographic Studies." *Demography* 47(3):629-650.

Voss, P. R. (2007). "Demography as a spatial social science." *Population Research and Policy Review*, 26(5), 457–476.

8. POPULATION PROJECTIONS; SIMULATION IN DEMOGRAPHY

COHORT COMPONENT PROJECTION; POPULATION MOMENTUM

PHG, Ch 6 "Population Projection"

See also: Rowland, CH 9, 12, 13

National Research Council (US). 2000. *Beyond Six Billion: forecasting the world's population* pp. 1-36. (Wash, DC, NAP)

FOR MORE RE: PROJECTION

Cohen, J.L. 2004. "Comparing long-range global population projections with historical experience." In: UN Population Division, *World Population to 2300*, pp. 123-126. ST/ESA/SER.A/236

Preston, S.H. and H. Wang. 2007. "Intrinsic Growth Rates and Net Reproduction Rates in the Presence of Migration." *Population and Development Review* 33(4):357-666.

U. S. Census Bureau (2010). International data base: Population estimates and projections methodology. (June 2010) <http://www.census.gov/ipc/www/idb/estandproj.pdf>.

- Alkema, L., A.E. Raftery, P. Gerland, S.J. Clark, F. Pelletier, T. Buettner, and G.K. Heilig. 2011. "Probabilistic projections of the total fertility rate for all countries." *Demography* 48(3):815-839
- O'Neill, B.C. 2005. "Population scenarios based on probabilistic projections: An application for the Millennium Ecosystem Assessment." *Population & Environment* 26(3):229-254.

FOR MORE RE: SIMULATION

- Bruch, E.E. and R.D. Mare. 2006. "Neighborhood Choice and Neighborhood Change." *American Journal of Sociology* 112(3):667-709.
- Mare, R.D. and V. Maralani. 2006. "The intergenerational effects of changes in women's educational attainments." *American Sociological Review* 71(4):542-564.

9. INSIGHTS FROM FORMAL DEMOGRAPHY

STABLE POPULATION, MODEL SCHEDULES, AGE-PERIOD-COHORT

PHG, Ch 7 "The Stable Population Model"

PHG, Ch 9 "Modeling Age Patterns of Vital Events"

Tolnay, S (and other contributors), Age Period Cohort estimation [Special Section]. *Demography* 6 (December 2013):1943-1988

FOR MORE RE: COHORT ANALYSIS; INTRO TO APC ANALYSIS

- Masters, R.K., R.A. Hummer, and D.A. Powers. 2012. "Educational Differences in US Adult Mortality A Cohort Perspective." *American Sociological Review* 77(4):548-572.
- Park, J. and D. Myers. 2010. "Intergenerational Mobility in the Post-1965 Immigration Era: Estimates by an Immigrant Generation Cohort Method." *Demography* 47(2):369-392.
- Wilmoth, J., J. Vallin, and G. Caselli. 1990. "When does a cohort's mortality differ from what we might expect?" *Population. English Selection* 2:93-126.
- Yang, Yang. 2008. "Social Inequalities in Happiness in the U.S. 1972-2004: An Age-Period-Cohort Analysis." *American Sociological Review* 73:204-226.

10. ISSUES IN DATA COLLECTION AND INFERENCE

DATA QUALITY, EXPERIMENTS, QUASI-EXPERIMENTS, AND QUALITATIVE METHODS

PHG, Ch 10 "Methods of Evaluating Data Quality"

- Fu, H., & VanLandingham, M. J. 2012. "Mental Health Consequences of International Migration for Vietnamese Americans and the Mediating Effects of Physical Health and Social Networks: Results From a Natural Experiment Approach. *Demography*, 49(2), 393-424.
- Kreuter, F. 2013. Facing the Nonresponse Challenge. *The ANNALS of the American Academy of Political and Social Science*, 645(1), 23-35.

FOR MORE RE: QUALITATIVE ANALYSIS AND MIXED METHODS

- Lee, J and FD Bean, *The Diversity Paradox* (RSF, 2012) Ch 3 "What is this person's race?"
- White MJ; S; Judd, M, Poliandri. 2012. "Illumination with a Dim Bulb? What Do Social Scientists Learn by Employing Qualitative Data Analysis Software in the Service of Multi-Method Designs?" *Sociological Methodology* 42:43-76.
- Kertzer, David I. 1997. "Qualitative and Quantitative Approaches to Historical Demography." *Population and Development Review* 23(4):839-846.
- Knodel, John. 1997. "A Case for Nonanthropological Qualitative Methods for Demographers." *Population and Development Review* 23(4):847-853.

FOR MORE RE: EXPERIMENTS AND QUASI EXPERIMENTS

- Binka FN, Bawah AA, Phillips JF, Hodgson A, Adjuik M, MacLeod B. Rapid achievement of the child survival millennium development goal: evidence from the Navrongo experiment in northern Ghana. *Trop Med Int Health*. 2007;12:578-93.

- Lacy, Michael G. 1997. "Efficiently Studying Rare Events: Case-Control Methods for Sociologists." *Sociological Perspectives* 40(1):129-54.
- Madigan, D. and P. Ryan. 2011. "Commentary: What Can We Really Learn From Observational Studies?: The Need for Empirical Assessment of Methodology for Active Drug Safety Surveillance and Comparative Effectiveness Research." *Epidemiology* 22(5):629-631.
- Pager, D. 2007. "The Use of Field Experiments for Studies of Employment Discrimination: Contributions, Critiques, and Directions for the Future." *The Annals of the American Academy of Political and Social Science* 609(1):104.
- Schmertmann, C.P., R.M. Assunção, and J.E. Potter. 2010. "Knox Meets Cox: Adapting Epidemiological Space-Time Statistics to Demographic Studies." *Demography* 47(3):629-650.
- Smith, Herbert L. 1997. "Matching with Multiple Controls to Estimate Treatment Effects in Observational Data." *Sociological Methodology* 27:325-53.
- Brand, J. E., & Thomas, J. S. (2013). Causal Effect Heterogeneity. In *Handbook of Causal Analysis for Social Research* (pp. 189-213). Springer Netherlands.

11. DISCIPLINARY VIEWPOINTS; PRESENTATION STRATEGIES

CAUSAL INFERENCE & THE POPULATION PERSPECTIVE

- Winship, C. and S.L. Morgan. 1999. "The estimation of causal effects from observational data." *Annual Review of Sociology* :659-706.

FOR MORE RE: CAUSAL INFERENCE

- Bachrach, C. and G. McNicoll. 2003. "Causal analysis in the population sciences: Introduction." *Population and Development Review* 29:442-447.
- Bollen, K.A. and S. Bauldry. 2011. "Three Cs in measurement models: Causal indicators, composite indicators, and covariates." *Psychological Methods* 16(3):265.
- Moffitt, R. 2003. "Causal Analysis in Population Research: An Economist's Perspective." *Population and Development Review* 29(3):448-458.
- Moffitt, R. 2005. "Remarks on the analysis of causal relationships in population research." *Demography* 42(1):91-108.
- Smith, H. L. 2003. "Some Thoughts on Causation as It Relates to Demography and Population Studies." *Population and Development Review* 29(3):459-469.

DISCIPLINARY (AND ANTI- DISCIPLINARY ?) PERSPECTIVES

- Ehrlich, P.R. 2008. "Demography and policy: A view from outside the discipline." *Population and Development Review* 34(1):103-113.
- Fricke, T. 2003. "Culture and Causality: An Anthropological Comment." *Population and Development Review* 29(3):470-479.
- Glynn, A.N. and J. Wakefield. 2010. "Ecological inference in the social sciences." *Statistical Methodology* 7(3):307-322.
- Sampson, R.J. 2008. "Moving to Inequality: Neighborhood Effects and Experiments Meet Social Structure." *American Journal of Sociology* 114(1):189-231

FOR MORE RE: PRESENTATION STRATEGIES

- Miller, J.E. 2005. *The Chicago Guide to Writing about Multivariate Analysis* (Chicago: University of Chicago Press), Chs 5 (Tables) 6 (Charts)
- Yau, Nathan 2011. *Visualize This: The Flowing data Guide To Design, Visualization, And Statistics* (Wiley 2011) e-book [brown ebrary]

12. STUDENT PRESENTATIONS (TBA)