

## Using Administrative Data for Health Services Research (M19-5251)

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<b>TAs:</b>	Matt Keller, MS e-mail: <a href="mailto:kellermr@wustl.edu">kellermr@wustl.edu</a>	Dustin Stwalley, MA <a href="mailto:stwalleyd@wustl.edu">stwalleyd@wustl.edu</a>
<b>Dates:</b>	Spring 1 and 2 (1/21-5/6) Thurs 10-1 p.m., 2 <sup>nd</sup> floor, TAB	

### **Course Description and Objectives:**

The objective of this advanced graduate course is to prepare students to perform outcomes, comparative effectiveness, and health services research using administrative data. Lectures will cover various types of national and state administrative databases, review journal articles using these databases, instruction in SAS programming, and application of research methods using administrative databases. Strengths and limitations of large databases commonly used for research will be considered, and special attention will be devoted to large databases readily available to new investigators. Students will learn how to link and analyze large databases, understand the key issues related to data security and confidentiality, and become knowledgeable about key methodologic issues in studies using administrative data. Students will develop a research proposal in their own area of interest and complete a short research project that uses administrative data.

### **Competencies**

- Identify the different types of administrative data and understand the origin and completeness of the information available.
- Identify population and other data sources that can be used to augment readily available medical administrative data.
- Understand the validity of data elements in administrative data and what can be done to improve the accuracy of information available.
- Use statistical software to perform common data management steps with large administrative datasets and perform basic analyses.
- Draw appropriate inferences from analysis of administrative data, understanding the limitations of the various datasets.
- Communicate the strengths and limitations of observational studies using administrative data.

### **Recommended Textbooks (not mandatory):**

Delwiche and Slaughter. 2012. *The Little SAS Book: A Primer, Fifth Edition*. SAS Institute

Alternative: <http://www.ats.ucla.edu/stat/sas/default.htm>

ICD-9-CM book (old) – strongly recommended. Available through Amazon for < \$10

**Required Software:** SAS Enterprise Guide 7.1 and access to CADR LINUX server

## Expectations

- Students will have a basic background in epidemiology and biostatistics.
- Attendance in lectures, which will be as interactive as possible, is expected.
- Required readings should be read before class each week; they will allow the students to understand the topics in greater depth and enable more active participation in class. Recommended readings provide more detailed information about particular subject areas selected as resources or guidance materials for a specific database or topic of interest. Articles will be selected after the first class based on the background and experience of students.
- Students are required to use SAS statistical software and write basic code.
- There will be a series of short assignments over the course of the semester with a project due at the end of the course.
- Final grades will be based on the assignments below.

### Formal review of journal article (10 points):

Review journal articles related to administrative data and outcomes, CER, or health services research. Students will present the information in class (~ 10 minutes).

Guidelines for review of article will be provided in class.

### Programming Exercises (30 points total)

Students will be asked to complete a number of programming exercises to demonstrate mastery of SAS programming. The exercises must be turned in prior to the next class.

### Project Proposal (10 points):

Students will submit a 1 to 2-paragraph description of their proposed course project (see description below), including the primary research question, proposed study population, and database. Students will be provided timely feedback so that they can take comments into account before finalizing their project.

### Course Project (50 points):

Students will implement a project, preparing an abstract for poster or oral presentation. The hope is that the topic is of sufficient interest to the student that the presentation becomes a full manuscript after completion of the course. Using HCUP data accessed through the Center for Administrative Data Research, students will examine an outcomes, CER, or health service question. Students will identify a study cohort based on demographic and/or clinical criteria, select relevant data elements from the database, and propose statistical analyses to address the study question. At a minimum, the proposed analyses should include simple descriptive (univariate and bivariate) statistics for the study cohort, such as demographic and clinical characteristics and the main outcomes of interest. Students should do more advanced multivariate statistics, addressing analytic and methodologic issues covered in the course as well as epidemiology and biostatistics courses, such as confounding variables, risk adjustment, clustering of data, and weighting. *Due Date: May 10*

Mental Health Services are available for full-time students enrolled on the Medical School campus. Students can self-refer to a counselor (phone: **314-362-2404, Option # 1 or Option # 2**); or make an appointment with **Dr. Karen Winters** through **Student Health Services** (SHS), telephone: **314-362-3523**, and follow the prompts.

There are also contractual mental health service providers who are available off-campus. More information regarding this coverage and a list of participating providers are accessible via <https://wumhealth.wustl.edu/> and then clicking on **Students** and scrolling down to **Mental Health Information**

<https://wumhealth.wustl.edu/students/mental-health-information/>.

Please do not hesitate to reach out to Dr. Winters, 314-362-3523, or to any of our off-campus providers <https://wumhealth.wustl.edu/>

## SCHEDULE

- Jan. 21** Introduction to Administrative Data and Research – Regulations Measurements, Algorithms (Olsen, Butler)
- Recommended Articles:*  
Smith, AK, Ayanian JZ, Covinsky KE, Landon BE, McCarthy EP, Wee CC, Steinman A., Conducting High-Value Secondary Dataset Analysis: An Introductory Guide and Resources, *J Gen Intern Med* 2011; 26(8):920–9.
- Schneeweiss S, Avorn J. A review of the uses of health care utilization databases for epidemiologic research on therapeutics. *J Clin Epidemiol* 2005; 58: 323-337.
- Haider AH, Bilmoria KY, Kibbe MR. A checklist to elevate the science of surgical database research. *JAMA Surg* 2018;153:505-7.
- Kaji AH, Rademaker AW, Hyslop T. Tips for analyzing large data sets from the JAMA Surgery statistical editors. *JAMA Surg* 2018;153:508-9.
- Lucyk K, Tang K, Quan H. Barriers to data quality resulting from the process of coding health information to administrative data: a qualitative study. *BMC Health Serv Res* 2017;17:766.
- Jan. 28** SAS Lab – Introduction to SAS, working with HCUP data (Keller)
- Feb. 4** Discharge/Billing Data: Healthcare Cost and Utilization Project (HCUP) Facility coding (Olsen)  
SAS Lab
- Recommended Articles:*  
Schoenman JA, Sutton JP, Elixhauser A, Love D. Understanding and Enhancing the Value of Hospital Discharge Data. *Med Care Res Rev* 2007;64:449-468.
- Andrews RM. Statewide hospital discharge data: collection, use, limitations, and improvements. *Health Serv Res* 2015;50(S1):1273-99.
- Khera R, Angraal S, Couch T, et al. Adherence to methodologic standards in research using the National Inpatient Sample. *JAMA* 2017;318:2011-8.
- Feb. 11** Claims Data: Private Insurer Data (Butler)  
*Student Article Presentations – HCUP data*  
SAS Lab

*Recommended Articles:*

Olsen MA, Nickel KB, Margenthaler JA, et al. Increased risk of surgical site infection among breast-conserving surgery reexcisions. *Ann Surg Oncol* 2015;22:2003-9.

Durkin MJ, Keller M, Butler AM, et al. An assessment of inappropriate antibiotic use and guideline adherence for uncomplicated urinary tract infection. *Open Forum Infect Dis* 2018;9:ofy198.

**Feb. 18**

Claims Data: CMS Medicare Data (Olsen)  
*Student article presentations – private insurer data*  
SAS Lab  
Outline of project proposal due

*Recommended Articles:*

Ghafari AA, Dimick JB. Practical guide to surgical data sets: Medicare claims data. *JAMA Surg* 2018;153:677-8.

Stevens JP, Nyweide DJ, Maresh S, et al. Comparison of hospital resource use and outcomes among hospitalists, primary care physicians, and other generalists. *JAMA Int Med* 2017;177:1781-7.

**Feb. 25**

Validation studies (Butler)  
SAS Lab  
*Student Article Presentations – Medicare data*  
Table 1 due

*Recommended Articles:*

Wahl PM, Rodgers K, Schneeweiss S, et al. Validation of claims-based diagnostic and procedure codes for cardiovascular and gastrointestinal serious adverse events in a commercially-insured population. *Pharmacoepidemiol Drug Saf* 2010;19:596-603.

Rhee C, Murphy MV, Li L, et al. Comparison of trends in sepsis incidence and coding using administrative claims versus objective clinical data. *Clin Infect Dis* 2015;60:88-95.

Rhee C, Murphy MV, Li L, et al. Improving documentation and coding for acute organ dysfunction biases estimates of changing sepsis severity and burden. *Crit Care* 2015;19:338.

**Mar. 4**

Veterans Administration Data – Benjamin (Charlie) Bowe  
Clinical Epidemiology Center, St. Louis VAMC  
*Student Article Presentations – Validation studies or coding algorithms*  
SAS lab

*Recommended Articles:*

Bowe B, Xie Y, Xian H, Lian M, Al-Aly Z. Geographic variation and US county characteristics associated with rapid kidney function decline. *Kidney Int Rep* 2016;2:5-17.

Xie Y, Bowe B, Li T, Xian H, Yan Y, Al-Aly Z. Long-term kidney outcomes among users of proton pump inhibitors without intervening acute kidney injury. *Kidney Int* 2017;91:1482-4.

**Mar. 11** Medicaid data – Derek Brown, PhD  
*Student Article presentations – VA data*  
SAS Lab

*Recommended Articles:*

Kilany M, Morrissey JP, Domino ME, et al. Utilization and adherence in medical homes. *Med Care* 2018;56:870-6.

Huybrechts KF, Hernandez-Diaz S, Straub L, et al. Association of first-trimester ondansetron use with cardiac malformations and oral clefts in offspring. *JAMA* 2018;320:2429-2437.

**Mar. 18** Propensity scores (Butler)  
*Student Article Presentations – Medicaid data*  
SAS Lab

*Recommended Articles:*

Deb S, Austin PC, Tu JV, et al. A review of propensity-score methods and their use in cardiovascular research. *Can J Cardiol* 2016;32:259-65.

Sturmer T, Wyss R, Glynn RJ, Brookhart MA. Propensity scores for confounder adjustment when assessing the effects of medical interventions using nonexperimental study designs. *J Int Med* 2014;275:570-80.

Ali MS, Groenwold RHH, Belitser SV, et al. Reporting of covariate selection and balance assessment in propensity score analysis is suboptimal: a systematic review. *J Clin Epidemiol* 2015;68:122-31.

**Mar. 25** Hierarchical models (Olsen)  
*Student Article Presentations – propensity scores*  
SAS Lab

*Recommended Articles:*

Houchens R, Chu B, Steiner C. Hierarchical Modeling using HCUP Data HCUP Methods Series Report # 2007-01. January 10, 2007.

Walkey AJ, Weinberg J, Weiner R, et al. Association of do-not-resuscitate orders and hospital mortality rate among patients with pneumonia. *JAMA Int Med* 2016;176:97-104.

**Apr. 1** Survey and other data – Medicare Current Beneficiary Survey  
Kenton Johnston, PhD  
St. Louis University College of Public Health and Social Justice  
*Student Article Presentations – Hierarchical/IV models*  
SAS Lab

*Recommended Articles:*

Johnston KJ, Wen H, Hockenberry JM, Joynt Maddox KE. Association between patient cognitive and functional status and Medicare total annual cost of care: implications for value-based payment. *JAMA Int Med* 2018;178:1489-97.

Johnston KJ, Hockenberry JM. Are two heads better than one or do too many cooks spoil the broth? *Health Serv Res* 2016;51:2176-205.

**Apr. 8** Thinking outside the box – additional data for enrichment (Butler, Olsen)  
*Student Article presentations – MCBS or other survey data*  
SAS Lab – work on final project

*Recommended Articles:*

Anthony CA, Peterson RA, Polgreen LA, et al. The seasonal variability in surgical site infections and the association with warmer weather: a population-based investigation. *Infect Contr Hosp Epidemiol* 2017;38:809-16.

Lian M, Perez M, Liu Y, et al. Neighborhood socioeconomic deprivation, tumor subtypes, and causes of death after non-metastatic invasive breast cancer diagnosis: a multilevel competing-risk analysis. *Breast Cancer Res Treat* 2014;147:661-70.

**Apr. 15** Pharmacoepidemiology (Butler)  
SAS Lab – work on final project

*Recommended Articles:*

Shrank WH, Patrick AR, Brookhart MA. Healthy user and related biases in observational studies of preventive interventions: a primer for physicians. *J Gen Int Med* 2011;26:546-50.

Funk , Landi SN. Misclassification in administrative claims data: quantifying the impact on treatment effect estimates. *Curr Epidemiol Rep* 2014;1:175-85.

Levesque LE, Hanley JA, Kezouh A, Suissa S. Problem of immortal time bias in cohort studies: example using statins for preventing progression of diabetes. *BMJ* 2010;240:907-11.

Jackson LA, Jackson ML, Nelson JC, et al. Evidence of bias in estimates of influenza vaccine effectiveness in seniors. *Int J Epidemiol* 2006;35:337-44.

- Apr. 22** SAS – work on final project
- Apr. 29** *Student presentations of final project*
- May 6** *Student presentations of final project*