The Importance of Learning Statistical Programs

by Ruth Kafensztok, DrPH

One of the core functions of public health is to identify unmet population health needs in order to develop policies, plan services, and implement interventions. Investigating health needs can take many forms, such as field assessment of disease outbreaks, continuous monitoring of community health status, evaluation of services and programs, policy analysis, and epidemiologic research studies.

The sources of information used in these investigations may be classified as quantitative and/or qualitative data. Here, we will focus on quantitative data.

Sources of population data used in public health practice are traditionally comprised of quantitative measurements representing population characteristics, health outcomes (morbidity, mortality or disability), health behaviors, and health services utilization.

Quantitative information may already exist (e.g., birth and death records, hospital or office visit data, national surveys of health and health behavior) or may need to be collected (e.g., ongoing public health surveillance systems and field epidemiology, program evaluation, epidemiologic research studies). Virtually all new or existing population level data are stored in electronic files.

How do we access and use data to learn about the health of populations, though? We can achieve this goal using 4 major steps:

1. Obtaining access to data
2. Managing data
3. Analyzing data
4. Reporting/disseminating findings

Obtaining access to existing data (also called secondary data) or collecting new data (primary data) is not the focus of this article. But it is a critical step that requires knowledge in data collection (including database design and electronic data entry systems) and respective research methods, as well as an understanding of the ethical and legal requirements that bound us to responsible professional conduct in the pursuit of protecting both person-level health and healthcare information accessed for data projects and research (i.e., health information privacy laws and the research ethics institutional review boards).

Our focus here, however, will rest on the management and analysis of electronic data. More specifically, we will focus on the software tools that exist to help us employ statistical computing to inquire and make sense of quantitative data.

Software suites such as Stata and Statistical Analysis Software (SAS) are very powerful statistical programming tools that integrate data management, data analysis, and graphic tools. They assist us in managing (i.e., storing,
retrieving, and preparing data files), analyzing (conducting statistical calculations), and generating reports (table and graphic displays) using large amounts of electronic data. Stata is a product of StataCorp; SAS is a product of the SAS Institute.

Learning basic programming skills for Stata or SAS provides public health professionals with the ability to explore large sets of data by aggregating information contained in individual records into group level statistics that describe (e.g., one-way and cross-tabulation frequencies, and rates) and summarize (e.g., measures of central tendency and dispersion) characteristics of a group or groups represented in the data. At an increased level of sophistication, Stata and SAS provide the tools for inferential analysis programming, supporting the manipulation of data originating from a range of data collection settings, from large administrative datasets to observational epidemiology research and clinical trials.

SAS and Stata are prevalent tools in public health academia as well as in practice activities requiring management and analysis of data. Having these programming skills greatly enhances an MPH student’s professional proficiency in at least two of the MPH core program competencies: (1) applying descriptive techniques commonly used to summarize public health data; (2) evaluating public health problems in terms of magnitude, person, time and place, and in calculating basic epidemiologic measures.

The MPH program is starting to offer dedicated SAS and Stata programming classes to our MPH students, in addition to students being introduced to Stata through Biostatistics courses. It is a great opportunity to obtain the basic skills required for both academic and practice work with public health data.

My Practice in Public Health and SAS

In my practice with the Illinois Emergency Medical Services (EMS) for Children program, a partnership between the Illinois Department of Public Health (IDPH) and Loyola, I utilize population-level data to support ongoing tracking and reporting on injury and emergency care in Illinois. The data reports I generate are mostly designed for dissemination, that is, to provide easy access to basic descriptive information on injuries and related healthcare utilization data to those needing information for planning and decision making. These projects utilize existing (secondary) state-level health data generated mostly for administrative purposes such as the enumeration of deaths in the state (death certificate data), inpatient and outpatient billing data, and state trauma registry records. The datasets may range from 40,000 to 5,000,000 records. To interact efficiently with this volume of information while preparing data reports, one must use statistical computing tools such as Stata and SAS.

In my work, I use SAS. When I receive files from the agencies with which we have data-sharing agreements, I start my work by retrieving the data files and reading them into my SAS program. To do so, I write a basic SAS code that imports the incoming data into a SAS dataset, which is a file format that I can then use to manage and analyze data inside the SAS program. Next, I examine the incoming files to determine the integrity of the data structure by checking its contents (number of records, number of data elements, format of each data elements, etc.). If all looks good, I then start to prepare the data for my projects. In this step, I write code that helps me find and manage data inconsistencies like invalid values (e.g., age = 223), records with considerable amount of missing information, or records that may have been exact duplicates. This process is called data cleaning. Next, since I need to condense information for reporting, I use SAS to help me edit the data. I may want to use only a few data elements in a dataset that contains dozens of fields, or my interest might be in only a subset of the records, such as only children 15 years of age and younger. I also may need to group data values, for example, to report age distribution not in its original, continuous values (i.e., 1,2,3,...99) but by age group categories (i.e., <1, 1-4,5-9,...70-74, 75+); or, alternatively, I may need to report on motor vehicle-related trauma center admissions as a group, and there is a range of possible diagnostic codes falling into this category—which will require grouping of records. Once I have developed the SAS code to handle the cleaning and editing of the data for each specific project, I generate code to create my analysis file. This is the data file that I will use to answer the questions I would like to know about the data, that is, this is the file that I will use for analysis calculations and for generating reports.

When you see an easy-to-read graph or a table that provides meaningful interpretation of health data, and when you understand it, that visualization has been produced through the use of these basic steps of statistical programming, all of which are necessary to translating quantitative data into formats that can be used in public health practice and research.

Returning students are reminded that they need to file an application for graduation by the specified deadlines.
Public Health Sciences and Borderlinks Participate in Immersion Trip to US-Mexico Border

Over the summer, the news was dominated by the reports of increasing numbers of Mexican and other Central American migrants, many of them women and children, arriving at the southern border seeking entrance to the United States. This phenomenon was one of many climaxes to an ongoing crisis along the hundreds of miles that constitute the US-Mexico border. In order to fully understand the various dimensions of the crisis, two PHS students, Dana Riggins and Helen Nde, accompanied by Dr. Ramon Durazo, a member of the Loyola faculty, participated in an immersion experience under the auspices of the Center for Community and Global Health of the Stritch School of Medicine, and Borderlinks, a Tucson-based nonprofit dedicated to providing dynamic educational experiences aimed at raising awareness about the impact of border and immigration policies, in order to inspire action for social transformation. The trip, which also included students, staff, and faculty from the School of Medicine and the School of Nursing, comprised four days of seminars and discussions with organizations on both sides of the border trying to provide relief and assistance to migrants, in addition to visits with migrants and deportees.

Watch the November issue of the LMSA Newsletter for an in-depth discussion with the participants about their experiences.

Find out more about Borderlinks at http://www.borderlinks.org/.

Outside Resources for Students

by Jason Gantenberg

In recent years, resources online relating to public health, medicine, and science in general have been springing up left and right, contributing to a burgeoning of spaces where professional and lay audiences alike can learn about important issues affecting their field.

The following blogs, we hope, will prove useful for students looking to deepen their knowledge of epidemiologic, epistemologic, and philosophical concepts central to epidemiology and other scientific disciplines.

- Johns Hopkins School of Public Health OpenCourseware http://ocw.jhsph.edu/
- Simply Statistics http://simplystatistics.org

Retraction Watch http://retractionwatch.com/

CDC Morbidity and Mortality Weekly Report http://www.cdc.gov/mmwr/

Loyola Public Health Sciences MPH News and Events http://mphdegree.blogspot.com/

Scientia Salon http://scientiasalon.wordpress.com/

 MPH Student Presentation at St. Albert’s Day

by Christina Small

The 35th annual St. Albert’s Day at Loyola University Chicago is being held on October 30, 2014. St. Albert’s Day is an annual event where health sciences research investigators showcase various research projects. These investigators are from the Graduate School, Stritch School of Medicine, Marcella Niehoff School of Nursing, Loyola University Chicago’s Lake Shore Campus, and Loyola University Medical Center residents and fellows. An estimated 300 presenters will be in attendance at the event. During St. Albert’s day, awards are given to one Assistant Professor and one Full Professor who demonstrate professional and scholarly excellence. Additionally, graduate students will partake in an oral competition and all programs’ posters will be reviewed.

My St. Albert’s Day abstract is titled “Cost of Vitamin D Supplementation in Chronic Kidney Disease” and is co-authored by me, Dr. Holly Mattix-Kramer, Dr. Talar Markossian, and Dr. David Leehey. There is no current literature that describes how much money is spent on Vitamin D supplements in the United States. Additionally, the clinical value of supplemental Vitamin D is largely unknown. In order to obtain this information, the 2011 Prescribed Medicines file from the Medical Expenditure Panel Survey was used. We broke down Vitamin D usage into active and nutritional Vitamin D. Our goal was to then determine who is paying for and how much is being spent on these supplements. This information will be presented at this year’s St. Albert’s Day event.
MPH Leadership Day

This semester’s leadership day will be held on October 25. The MPH Leadership Day features experts in the field of public health joining us to discuss effective public health communication, job searches, developing skill sets, and more. Participation in at least one Leadership Day workshop is required for new students, starting with the academic year 2014/2015. Participation is not mandatory for returning students, but they are nonetheless strongly encouraged to attend.

- 9:30am to 10:00am: Registration
- 10:00am to 11:30am: Job Search: Best Practices in Preparing Your Documentation by Susan Wortman, Career Advisor
- 11:30 am to 12:00 pm: Lunch Break
- 12:00 pm to 1:00 pm: Presentation and Q&A with Celine Vatterott Woznica, Director, Child-to-Child of the Americas
- 1:00 pm to 2:30 pm: Communicating Effectively in Public Health by David Macey, Assistant Director LUC Writing Center
- 2:30 pm to 2:35 pm: Closing Remarks
Student Spotlight: Divya Hariharan

Why did you decide to enroll in an MPH program?

After graduating with a biology degree, I wanted to take a break before I applied to medical school to continue my medical education. I wanted to make the most of my time by continuing to further my education but in a different path that would allow me to learn more about topics I was not exposed to. I've always been interested in infectious disease and epidemiology and therefore decided public health would be the best and most interesting fit for me!

Where are you now in the program?

I'm in my third semester right now and will be done with more than half the program after this Fall semester. I've already been able to learn a handful of information from different perspectives of healthcare and am excited to continue the program.

What is your background prior to enrolling at Loyola?

Prior to enrolling at Loyola, I graduated Wayne State University in Detroit with a Bachelor’s of Science in Biology. Alongside my undergraduate career, I've researched in the NICU department, spearheading several research studies. During the short break between graduating and starting spring semester at Loyola, I was working as an instructor for STEM.org, teaching MEAP prep classes and STEM-based courses to grades K–8.

What are your clinical or public health-related research interests?

This question is a hard one for me because I'm still being exposed to several different topics of research that interest me. I'd like to further look into different communities and their access to transportation, food, and healthcare and learn about how those factors affect quality of life. Specifically, I'm interested in cities such as Detroit and Chicago, where there is a reoccurring pattern of a common disease.

What are you hoping to do after you complete your MPH?

I'm hoping to either be accepted into medical school and further my education or start working as a public health consultant in Chicago. I won't know which one until later into the year.

What are your hobbies and interests outside of public health?

I like to explore new cities, run, read, and ski. My interests range from martial arts to research in anything and everything. I'm a firm believer in the saying “knowledge is power” and there's always something to learn, so I try to make the most of my time by absorbing new information and exposing myself to new encounters!

Important Dates

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<tr>
<th>Date</th>
<th>Event</th>
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<tr>
<td>October 11</td>
<td>Maywood Fine Arts Pumpkin Patch Parade</td>
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<td>October 24</td>
<td>Maywood Fine Arts Fun Night</td>
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<td>October 25</td>
<td>Leadership Day</td>
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<td>At least one attendance mandatory for incoming students</td>
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<td>October 30</td>
<td>35th Annual St. Albert’s Day</td>
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<td>October 31</td>
<td>Last day to withdraw with a grade of “W”. After this date, the penalty grade of “WF” is assigned.</td>
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<td>November 3</td>
<td>Spring 2015 registration begins</td>
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<td>November 26–29</td>
<td>Thanksgiving break—no classes</td>
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December 1

Extension of time requests for Spring 2015 due at the Graduate Office, Granada Center, 4th floor

December 6

Fall semester classes end

December 8–16

Final exams (none on Sunday)

December 15

Last day to file a late application for May 2015 degree conferral ($25 late fee)
Faculty Profile: Jennifer Layden

Courses Taught

I teach in the medical school, give several lectures in the Intro to Public Health, Intro to Epi, and Global Health Epidemiology courses. I will teach an Infectious Disease Epidemiology course in either Spring 2015 or Fall 2015.

What were the driving factors in your decision to join the LUC faculty?

I liked the smaller academic environment and commitment to service. It seemed like an excellent opportunity to be part of a great clinical institute while at the same time becoming a member of the growing Public Health Department.

What’s your teaching philosophy or your outlook on higher education?

I believe that education needs to be engaging. We all learn best when we are active learners.

What is the main focus of your coursework/research right now?

Much of my time is devoted to research. We have established a network, HepNet, that brings together individuals interested in the global study of viral hepatitis. We are actively conducting research on viral hepatitis in West Africa. Our goal is to enhance our epidemiology understanding of these devastating infections, identify the main transmission mechanisms, and study the viral genetics of the diseases.

Any opportunities for student involvement? In what capacity?

Yes! There are many opportunities to be involved in the projects. There are opportunities to be involved with data entry, analyses, and even site visits / field work.

What do you love most about your job at Loyola University, and your work through the Department?

I like the collaborative environment. The Department is a collegial, friendly place to work and brings together individuals from vastly different backgrounds, areas of expertise, and interests.

What are you most looking forward to in the next year?

I am looking forward to continuing our research project, publishing a few papers, and beginning the ID epidemiology course here.

What did you worry about most as a graduate student? What advice would you give yourself?

I was always worried about not completing everything, or not completing projects to the standards that I wanted. Looking back, I would advise myself not to stress so much about the exams and deadlines and, rather, enjoy the moment, taking advantage of all opportunities to learn. Graduate school is such a unique time to learn and be surrounded by individuals who are lifelong learners!

What activities were you involved with a graduate student?

I was an MD/PhD graduate student, so I was involved in programs both on the medical school side and graduate side. My most enjoyable activity was the brown bag lunch series that a bunch of us graduate students started. We would meet once a month to discuss relevant news, articles, and ideas.

What are some of your favorite things to do when you’re not teaching?

I spend most of my non-work time with my family. I have two kids, ages 8 and 11, that keep me quite busy!

What would be something that many would be surprised to know about you?

I played basketball in college. I am short, so most have no clue!

Favorite Song?

“Kind and Generous” by Natalie Merchant

Favorite Spot in Chicago?

The lakefront, especially near the Museum campuses.
This semester LMSA has decided to get involved with Maywood Fine Arts (http://www.maywoodfinearts.org) for community service opportunities. An arts organization may not be the first thing that comes to mind when thinking about public health, but their mission aligns quite well with public health goals: “...to provide quality arts and fitness education to enrich and transform the lives of children and families in Maywood and surrounding communities.” With children’s classes in dance, tumbling, and karate, as well as fitness classes for adults, they’re a great resource for helping to keep the community active. They also sponsor the grand family challenge, which offers focused coaching on improving lifestyle habits and overall health of families.

Fun Night

Helen and I [Jollyn] were able to volunteer for one of the “fun nights” they host for children in the community. It offers activities for kids in the evening in a safe environment with trampolines, zip lines, dancing, and plenty of other excitement. Before the kids arrived, Helen got to have her very first experience jumping on a trampoline. She then immediately decided it would be her last. After a rundown and a brief training on the activities they offered, we were placed on supervisory/assistance roles to help keep everything and everyone running smoothly. Right as the event began turnout seemed small but, soon after, there was a sea of children quickly filling up the room, and all of them seemed so excited to be there. Helen assisted on the trampoline (at the end, off of the apparatus, of course), and I was on zip-line duty. If you’re looking for a fun total body workout, zip-line duty is a fantastic opportunity for that. Two hours of lifting and pushing doesn’t feel like work while you’re watching kids have a blast. After meeting everyone and making it through the tiring but fun event, Helen and I are both extremely glad to be getting involved with this organization.

Pumpkin Patch Parade

Saturday, October 11 started as a crisp, cold autumn morning in Maywood, IL, but by 9 a.m. the block of 5th Avenue just south of Lake Street was filled with the sounds of laughter and music. Maywood Fine Art’s biggest event of the season, their annual Rising Stars Pumpkin Patch Parade was already in full swing.

Students of the MFA program took the stage to perform their dance routines for parents and peers, while others availed themselves of the pumpkin-shaped bouncy house and the obstacle course. Yet others played games that tested their strength, their aim, and their jump shots. Perhaps most vexing was a stand where participants were asked to identify a variety of fruits, both common and exotic. (Certainly, this reporter would have logged a remarkably low score had he thrown in his cap into the ring.)

Between games, the Parade itself set off on an hourlong sojourn—a cheery crowd accompanied by Benny the Bull, State Representatives Kathleen Willis and Chris Welch, and State Senator Kim Lightford. Loyola was represented by Dr. Amy Luke, director of the Institute of Public Health; Virginia McCarthy, assistant director of the Center for Community and Global Health; and MPH students Helen Nde, Jason Gantenberg, Natalia Arroyo, and Kyle Carey.
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