“No physician would consider prescribing strong medications whose impact and potential side-effects have not been properly evaluated. Yet in social development programs, where huge sums can be spent to modify population behaviors, change economic livelihoods, and potentially alter cultures or family structure, no such standard has been adopted.

While it is widely recognized that withholding programs that are known to be beneficial would be unethical, the implicit corollary—that programs of unknown impact should not be widely replicated without proper evaluation—is frequently dismissed.”

—Savedoff and Levine (2006) [emphasis added]

“All models are wrong, but some are useful”

—George Box

“The best thing about being a statistician is that you get to play in everyone's backyard.”

—John Tukey

Credit Hours: 3
Prerequisites: None
Instructor: Andrew Grogan-Kaylor, MA, MSSW, PhD
Office: 3847 School of Social Work
Phone: 734-615-3369
Email: agrogan@umich.edu (best way to get in touch with me)
Faculty Web Site: http://www.umich.edu/~agrogan
Office Hours: TBD

Course Web site: http://ctools.umich.edu/

Course Description:

This course is designed to introduce students to statistics and statistical methods. It is intended and designed for students who have little or no familiarity with statistics and who may want to learn at a relatively slow pace so that their knowledge base is built on a solid foundation. The course content will integrate the core themes related to multiculturalism and diversity; social justice and social change; promotion, prevention, treatment, and rehabilitation through the data sets and examples that are used to highlight statistical concepts. Students in this course will acquire the skills to comprehend simple statistical reports related to social policy and program evaluation. Students will be able to assess the

value and limitations of rates, measures, and statistical estimates. This course will help students develop the ability to use simple quantitative methods to describe real world situations in social work settings and to make ethical inferences and decisions based on the statistical results. Students will learn to choose methods of statistical analysis to improve social policy decisions and service delivery programs. Students will learn to understand and use appropriate language with their statistical analyses to clarify meaning and explain the inferences that can be appropriately made from specific data. Finally, students will learn to construct basic reports that include meaningful charts, tables, and graphs for various audiences and that provide text that is appropriate for different audiences.

Course Content:

This course focuses on learning the direct application of analytical skills and the ethical reporting of analytical results. Students will review the use of simple rates, averages, and other statistics. Students will conduct, interpret, and present statistical analyses to various audiences. Students will receive a brief introduction to the theoretical foundations of descriptive and inferential statistics. Students will practice the appropriate choice of statistics based on available data, the problem to be addressed, and the audience for the analysis. Students will learn the importance of the difference between causality and correlation. Students will learn to interpret, prepare, and report on statistical analyses of problems in policy analysis and evaluation. The course content will integrate the core themes related to multiculturalism and diversity; social justice and social change; promotion, prevention, treatment, and rehabilitation through the data sets and examples that are used to highlight statistical concepts.

Course Objectives:

Students will be able to:

1. Analyze extant research for its use and abuse of outcomes and measures of social justice, social change, and diversity
2. Construct rates, means, proportions and other simple statistics and interpret them appropriately
3. Ethically use and ethically report on the results of statistical analyses
4. Identify appropriate simple statistical methods to use in policy and program evaluation situations;
5. Conduct basic statistical analyses of common policy and program evaluation situations;
6. Use basic descriptive statistics and test simple hypotheses to help answer policy or evaluation questions.
7. Construct meaningful and readable charts, tables, and graphs of appropriate data;
8. Prepare written, oral and visual reports for different audiences using simple and appropriate statistical language.

Course Design:

This course will use lectures, computer lab exercises, applied statistical exercises, case studies, and small group exercises to convey relevant content.
| Theme Relation to Multiculturalism & Diversity: | Students will develop the capacity to identify ways in which gender, race, ethnicity, social class, age and other forms of social stratification and disenfranchisement in the community influence and are affected by the decisions made from statistical analyses and related methodologies. |
| Theme Relation to Social Justice: | The ability to assess policies and programs analytically is necessary if the social work profession is to play an important role in shaping the outcome of ongoing program and policy debates to reflect issues in social change and justice. This course provides students with the capacity to understand and influence the role statistical analysis and the interpretation of such analysis play in the formation and implementation of policy, practice and program development. |
| Theme Relation to Promotion, Prevention, Treatment & Rehabilitation: | Prevention and promotion activities are difficult to evaluate and therefore raise special challenges in statistical analysis. It is important to expose students to the language of statistics so that they may comprehend useful and appropriate statistical techniques for different problems. In this way they may analyze and evaluate promotion and prevention activities prior to the development, implementation, and analysis of any relevant policy issue or initiative that they encounter in the course of their professional activities. |
| Theme Relation to Behavioral and Social Science Research: | Social workers should examine the ways in which social science data is translated into current policy and practice and the consequences (both positive and negative) which emerge from statistical analyses. This course provides students with the capacity to understand and influence the role statistical analysis plays in the formation and implementation of policy, practice and programs. |
| Relationship to SW Ethics and Values: | Ethical standards of research methods (NIH guidelines), social work practice (NASW Code of Ethics) and evaluation practice (Program Evaluation Standards) will be used to review issues commonly confronted in the statistical analysis of policy and evaluation. |

**Required Readings:**

There is no textbook for the course. All readings are available in an online reader on CTools.

In lieu of a textbook, however, you are strongly encouraged to purchase a copy of SPSS ($35) for your personal use. SPSS is available for Windows and MacOS operating systems from the UM Computer Showcase: [http://showcase.itsc.umich.edu/](http://showcase.itsc.umich.edu/). If you do not have a laptop to use in the course, one will be provided for you via the UM Mobile Computer lab.

**Course Requirements**

1) **Two four page policy analyses on a policy question of interest.** The intent of these papers is to write a policy analysis that is based on statistical evidence, yet readable by a lay audience. The intent is that your paper will be four pages long. I recognize that different questions will lead to different lengths of papers. Papers up to six pages long are acceptable. Papers over 6 pages long will be marked down by one full grade per page. The second of these two papers will build closely
upon the first. The two papers will be due at different points over the term. Consultation with the professor and other students will be available. Quality of writing, clear formatting, especially of your quantitative results, clarity of presentation, and accuracy of your findings (both in terms of size of effect estimated and statistical significance), will be some of the criteria used in grading.

Presentation of results should have words in tables spelled out, and labels of variables spelled out. Graphs should have nicely formatted axes labels and titles and some attention to color and design.

Refer to the Student Handbook to make sure that you cite other’s work properly and avoid plagiarism. Plagiarism—when discovered—will be dealt with severely. Further details of this assignment will be forthcoming and will also appear on the class Web site.

a. **Bivariate Policy Brief.** How is at least one factor associated with an outcome of interest? This policy brief should include:

i. a review and citation of 5 key pieces of background literature

ii. a bivariate analysis such as a correlation, a cross-tabulation, or bivariate regression

iii. a well-documented and nicely formatted graph illustrating some univariate aspect of your data related to your research question

iv. a well-documented and nicely formatted graph illustrating some bivariate aspect of your data related to your research question

v. a discussion of your findings and their implications. Your discussion of your results should include a discussion of whether or not they are statistically significant and what this implies for your research question, as well as for policy, practice and intervention.

Please note that because of the way our presentation in this course is structured, it is easiest in this brief to relate one categorical variable to another categorical variable or one continuous variable to another continuous variable. [30% of grade]

b. **Regression Based Policy Brief.** How do at least two different factors contribute to a **continuous** outcome of interest? This policy brief should include:

i. a review and citation of 5 key pieces of background literature

ii. a regression analysis

iii. a well-documented and nicely formatted graph illustrating some univariate aspect of your data related to your research question

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2 Please note that for purposes of this course, plagiarism consists of six or more consecutive words, taken from another source without proper attribution. Failure upon my part to detect plagiarism does not imply approval of plagiarism.

3 For purposes of this syllabus, “well-documented” means a graph with a title, clearly labeled axes, and a note indicating the source of the data.
iv. a well-documented and nicely formatted graph illustrating some **bivariate or multivariate** aspect of your data related to your research question

v. a discussion of your findings and their implications. Your discussion of your results should include a discussion of whether or not they are statistically significant and what this implies for your research question, as well as for policy, practice and intervention.

[30% of grade]

2) **Group Presentation of a Statistical Article:** As the course progresses, there will be an opportunity for you to present the results of a statistically based article, as part of a group. The idea of this exercise is not to get everything right, but rather to dive in and give a good faith effort at presenting the important findings of a regression based academic journal article, in a way that is comprehensible, and makes the importance of the findings clear. If you hear of an article about an interesting, noteworthy, or controversial topic, and would like us to consider it as one of the possible articles for the group assignment, please let me know [20% of grade].

3) **Class participation:** [20% of grade]. You will probably learn more the more you participate. Certainly styles of participation differ across students, but some of your grade will depend upon your participation, attentiveness, and contributions to the class discussion.

4) **Attendance.** You are expected to attend each class and lab session. If you miss a class session for any reason, please see me to make sure that you are grasping the material. In particular, you will be expected to complete all lab assignments, unless we make other arrangements. Excessive absences, as determined by the instructor, may result in a reduction in grade, or a failing grade, and will be brought to the attention of the student and the faculty advisor by the course instructor.

5) **Lab Work.** We will spend some time every week in the computer lab. The purpose of the lab is to give you hands on experience with the building blocks of statistically based policy analysis: data handling and regression analysis. You'll use the lab to learn how to do important steps in statistical analysis rather than simply reading statistical analyses or reading about statistical analysis. Most of the learning in lab occurs in the doing of lab. Lab is intended to be a collaborative endeavor where students work with the instructor and with each other. Although, I may sometimes collect your work in lab, I will not grade your lab work, or be able to provide written feedback on your lab work. I am always happy to discuss lab work during lab, during office hours, or over e-mail.

A note on work handed in late: Most students turn in work in accordance with class deadlines. In order to be fair to the majority of students, I have developed the following policy: late work will be graded down by half a grade a day **unless prior arrangements for an extension have been made with me**. I very much understand that extenuating circumstances may arise which make it difficult to turn in work on time. All I am asking you to do is to communicate with me if you need some kind of extension so that we can work out an arrangement that is mutually agreeable.
Data Sets (for this project, we are looking, usually, for data at the individual level, regularly arranged in rows and columns)

- I have created an online data portal, accessible via the course CTools site, or also via http://sitemap.umd.edu/agrogan.data which provides access to many potential sources of data. (I would particularly note the General Social Survey and the National Survey of Children’s Health (2007) were datasets that many students last year found to be helpful.

- The Guardian Datablog has many interesting sources of data: http://www.theguardian.com/news/datablog

- ICPSR (http://www.icpsr.org) and The Social Science Data Analysis Network (http://www.ssdan.net/) are excellent resources for data sets. Many people with specific interests have found data from national opinion polls at ICPSR to be of interest.

- I do have some other specialized and general data sets that I can make available on CTools if there is need and interest.

Suggested Software (you do not need to purchase any software for this course)

- SPSS (available in most campus computer labs) (in class exercises will focus on the use of SPSS although the statistical concepts covered transcend any one statistical software package)

Disabilities Statement

If you have a disability of condition that may interfere with your participation in this course, please schedule a private appointment with me as soon as possible to discuss accommodations for your specific needs. This information will be kept strictly confidential. For more information and resources, please contact the Services for Students with Disabilities Office at G664 Haven Hall, (734) 763-3000.

Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Wednesday class</th>
<th>Topic</th>
<th>Readings</th>
<th>Assignments</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>9/4/13</td>
<td>Introduction</td>
<td>Selection from &quot;The Rise of the Super Crunchers&quot; (we may not have the time to discuss this articles in detail, but it illustrates the importance of statistical thinking to supplement practice wisdom.)</td>
<td></td>
</tr>
</tbody>
</table>

6
<table>
<thead>
<tr>
<th>Week</th>
<th>Wednesday class</th>
<th>Topic</th>
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<th>Assignments</th>
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</thead>
</table>
| 2    | 9/11/13        | Causal Theory  
(what does it mean to say that one thing causes another? Regression and ideas of causality are intimately intertwined. Let's talk about causation before we talk about regression.) | Gladwell article on going to college.  
Lielenfeld on "Psychological Treatments that Cause Harm" | one paragraph statement of research question of interest that will guide your work over the semester. |
| 3    | 9/18/13        | Measures of central tendency | Rubin and Babbie on univariate statistics  
Hans Rosling on "The Joy of Stats": http://vimeo.com/18477762 | form into groups for group presentation assignment |
| 4    | 9/25/13        | Statistical significance | reading on t-test from Research Methods Knowledge Base | |
| 5    | 10/2/13        | Bivariate Statistical Procedures  
(correlation, cross-tabulation, and ANOVA) | readings on correlation from Research Methods Knowledge Base and cross-tabulation from UCLA ATS website | |
| 6    | 10/9/13        | Graphing Bivariate Relationships | Abela graphic about statistical graphics  
Yau "7 Basic Rules for Making Charts and Graphs" | |
| 7    | 10/16/13       | Regression  
(understanding a continuous outcome with multiple predictors) | Grogan-Kaylor tutorial on regression analysis.  
Scott on "Answering Why Questions" | |
<table>
<thead>
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<tbody>
<tr>
<td>8</td>
<td>10/23/13</td>
<td>Regression II</td>
<td>Video--TED Talk: Dan Ariely, Are we in control of our own decisions?</td>
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</tr>
<tr>
<td>9</td>
<td>10/30/13</td>
<td>Logistic regression (understanding a dichotomous outcome with multiple predictors)</td>
<td>TBD</td>
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<tr>
<td>10</td>
<td>11/6/13</td>
<td>Interpreting a regression article</td>
<td>all three of the articles chosen by the instructor or class</td>
<td>group presentations</td>
</tr>
<tr>
<td>11</td>
<td>11/13/13</td>
<td>Lab day</td>
<td></td>
<td>bivariate statistics paper is due on Friday 11/15/2013</td>
</tr>
<tr>
<td>12</td>
<td>11/20/13</td>
<td>Multicollinearity and Categorical predictors (dummy variables)</td>
<td>Multicollinearity reading from Graphpad.com</td>
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<tr>
<td>13</td>
<td>11/27/13</td>
<td>Meta-Analysis: Combining Research Results</td>
<td>TBD</td>
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<tr>
<td>14</td>
<td>12/4/13</td>
<td>Wrap up</td>
<td></td>
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<tr>
<td>15</td>
<td>12/11/13</td>
<td>Lab Day to finish analyses</td>
<td>final multivariate statistics paper is due Monday December 16, 2013</td>
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</tbody>
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