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Research Assignment
ECON 2505ID Environmental Economics
Fall 2021
Prof. MacDonald

Important deadlines and to remember:

Assignment	Due Date	Percent of course grade
● Post research question on Blackboard	September 28	2.5%
● Post hypothesis (expected outcome)	October 5	2.5%
● Complete 'preparing for research' assignment	October 19	5%
● Post draft of research assignment	November 16	20%
● Peer review assignment (class time)	November 16	5%
● Final draft of research assignment	December 7	20%

Through this research assignment, you will participate in data analysis and deepen your understanding of specific topics you choose related to environmental issues, policies and practices. Your research will connect with many of the topics covered in the class. For this project, you will research and analyze data sets and investigate relationships among variables contained in the data. The steps in this process will include selecting and downloading data into either an Excel or Google spreadsheet, interpretating the data, preparing graphs & analyzing variables, and writing a short 4-5 page paper. During our class meetings, we will review and work through each step in the research process. Specifically, we will review how to: (1) use Google sheets, (2) create a pivot table, (3) interpret the data and prepare the table and graphs, and (4) analyze the descriptive statistics represented in charts. The steps in the process are summarized in detail below and will be reviewed in our class sessions.

The research assignment is focused on key learning outcomes for students related to quantitative reasoning. Through this assignment, students will be able to:

1) Formulate a research question related to environmental economics
2) Apply the steps in the research process, including the collection, visual presentation and analysis of data, reviewing relevant literature on the selected research question, and drawing conclusions.
3) Apply the skills of quantitative reasoning (identifying dependent and independent variables, calculating percentages)
4) Collect data from openly available sites, such as New York State Open Data, New York State Open Health Data, and the Environmental Protection Agency and download it into a spreadsheet.
5) Convert continuous data into categorical data
6) Create tables of two variables using either Excel or Google Sheets
7) Prepare stacked bar charts in Excel or Google Sheets
8) Prepare written descriptions and analysis of the quantitative data in the tables and charts

For this project, you will be engaged in accessing data from the NYC Environment and Health Data Portal, an open data source. https://a816-dohbesp.nyc.gov/IndicatorPublic/publictracking.aspx

1. **By September 28, you will submit the following**: (1) your research question you are interested in researching and a definition of the variables you will use from the data sets to measure the relationship posed in your research question. Remember to frame your research question in the format we have previously reviewed in class. Everyone should obtain their data for this project from the NYC Environment and Health Data Portal. The link is as follows: https://a816-dohbesp.nyc.gov/IndicatorPublic/publictracking.aspx

Topic choices will be discussed in class on September 10. **You will post your research question on Blackboard.**

You research question should focus on inquiring about the possible relationship between one variable and another and your choice should be based on a topic you are interested in learning more about. A list of potential research questions is listed below (you are welcome to choose one of these questions, but you should also explore the data from the NYC Environment and Health Data Portal. There are more than 250 variables included there!

The following are some of the research topics you may be interested in examiningas well as examples of how you might operationalize (measure) the variables for your research question. Please indicate exactly how you plan to measure the variables you will be using to test the relationship between them. The examples below illustrate how the research question should be asked and how you might measure the variables drawing from the NYC Environmental and Health Data Portal. Please do not use the same question that is used in the demonstration video on the relationship between cockroaches and asthma. The demonstration video is here: https://tinyurl.com/Environmentdata

1. Is there a relationship between air conditioning (percent of households reporting air conditioning) and heat stress (measured by heat stress emergency department visits per 100,000 residents)
2. Is there a relationship between lead (measured by the rate of children 6 years with elevated blood lead levels) in the environment and respiratory cancers (measured by the age adjusted rate of lung and bronchus cancer)?
3. Is there a relationship between old housing (the percent of pre-1950 homes) and lead exposure (the rate of children under age 6 years with elevated blood lead levels)?
4. Is there a relationship between asthma (the rate of asthma -related emergency department visits per 10,00 residents) and measures of SO2 levels?
5. Is there a relationship between percent of households in poverty (percent of households whose income falls below 100% of the federal poverty level) and the Percentage of Children tested for lead by age 3 years?
6. Is there a relationship between the percent of households in poverty (percent of households whose income falls below 100% of the federal poverty level) and rates of children under 6 years of age with elevated blood lead levels?

2. Identify your hypothesis: Once you have selected the specific data sets you want to use, you will finalize the research question that will be the focus of your project. Your hypothesis should express what outcome you expect based upon the research question you have indicated. For example, suppose the question you are interested in researching is whether the incidence of

asthma in a particular geographic area is related to the proximity to heavily trafficked roads or to heavy manufacturing within that area. If you expect that the incidence will be higher in such geographic areas, your hypothesis should state this and you should briefly explain why you expect this outcome.

Submission of the final (revised) research question and hypothesis with reasoning constitutes 2.5 percent of course grade. This assignment is due by October 5.

3. **Preparing to conduct research:** To prepare for the research process, you will complete the following:

   1.Download data into Excel or Google sheets
   2. Identify the two variables you will compare
   3. Create a pivot table in Google Sheets or Excel
   4. Organize data in a table and a bar chart.
   5. Literature search: Complete a library search to identify three scholarly research sources that relate to your research question.

   This assignment must be completed by October 19. This component is worth 5 percent of the course grade.

4. **Draft of research assignment:** This will consist of about 3 to 4 pages that should include the following:
   1) A statement of the research question you have chosen and a hypothesis /thesis that expresses what relationship you expect to find between the variables you have identified.
   2) two tables and one or two graphs of the data related to your research question
   3) Your written analysis in two-to-three paragraphs analyzing what the data shows
   4) a two-paragraph review of the literature you researched on the topic. Do the data support or not support your thesis? Do your findings differ at all from the literature you researched or are your findings similar to that of the sources you researched?

   This assignment must be completed by Nov. 16. Completion of this draft is worth 20 percent of the course grade.

5. **Peer Review**: Your completed assignment will be the focus of the group peer review exercise during class on November 19. Participation in the peer review assignment **constitutes 5 percent of the course grade.**

   For this assignment, you will be assigned to work in teams of four, taking turns reading and reviewing each other's assignment. This will give each participant the opportunity to review and have your assignment reviewed by three of your classmates. You will evaluate each of the components of the assignment – thesis statement; tables; graphs; analysis and bibliography. Everyone will use the rubric provided for this peer review. **Since this will be completed during class, you must be present for this assignment in order to receive credit for it.**

The components of the peer-reviewed research assignment and the final research paper should include the following.

- A table in Excel or Google sheets with the survey data on the two variables you chose to study in your research question.
- A stacked bar chart or pie chart of the data in the table
- A paragraph in which you introduce the topic and briefly state your thesis (expected findings)
- A discussion of your findings as they relate to the literature you researched on your topic, a couple of paragraphs in which you present your analysis of the data in the chart, your conclusions.
- A bibliography listing a minimum of three sources (5 to 6 sources for the final paper) and your review/discussion of each of these sources (the bibliography should be in APA format).

The feedback that you receive in the peer review process is important, since it will serve as a guide for your revised final paper. *To prepare for this activity, we will review a sample assignment with the required format in class before your assignment is due.
The peer review assignment will be completed on November 16.

6. Revised final research paper: Your research paper will include the same components as the first draft assignment which was peer reviewed previously. This should incorporate the specific peer feedback you received in class on the first draft: **due date: December 7**. **This is worth 20 percent of the overall course grade.**

Rubric for the peer review assignment and the final research paper

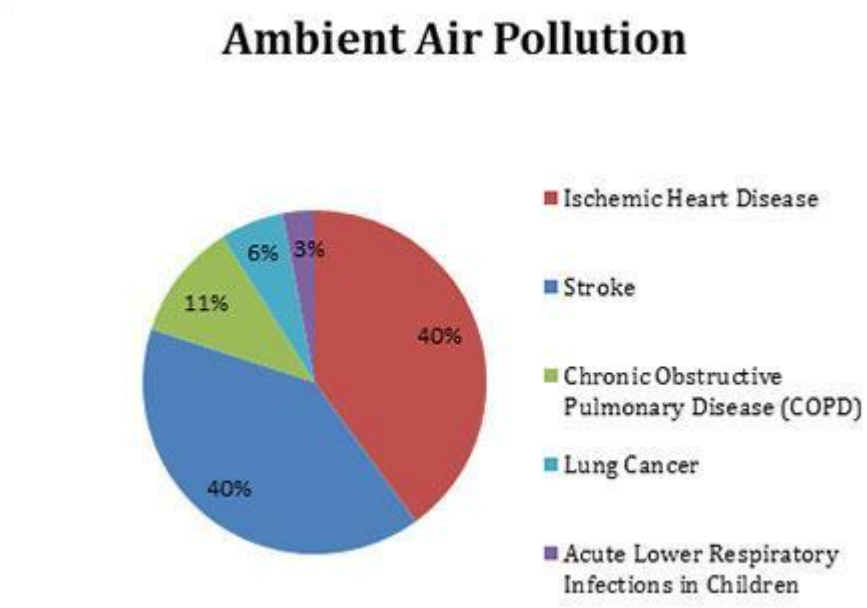
	A	B	C	D	F
Thesis	clearly stated and appropriately focused	clearly stated but focus could have been sharper	thesis phrasing too simple, lacks complexity; or, not clearly worded	thesis lacks a clear objective and/or does not 'fit' content of essay	thesis is not evident
Tables/Graphs	tables and graphs are properly formatted and labeled, and are free of quantitative errors	tables and graphs are mostly correct, but there are a few errors	tables and graphs have several errors	tables and graphs have numerous errors	tables and graphs are missing or very problematic
Data Analysis	clear and insightful descriptions and interpretations of the data that are statistically and logically correct and	the data are correctly interpreted, but thoughtful insights are absent and/or disconnected from the literature.	the data have been correctly interpreted, but little effort to make sense of the findings	there are errors in the interpretations, either statistically or logically.	the data have not been interpreted/explained.

	connected to the literature.				
Organization	obviously controlled and/or subtle organization; section headings and strong topic sentences	logical and appropriate organization; clear topic sentences	organization attempted, but unclear or inappropriate topic sentences	inconsistent organization	absence of planned organization
Style	writer's voice is strong; precision in tone, sentence structure, and word choice	precision and variety in sentence structure and word choice	limited, but mostly correct, sentence structure variety and word choice	several awkward and/or unclear sentences; problems with word choice	no apparent control over sentence structure and word choice
Mechanics and Usage	free of mechanical or usage errors	few mechanical and usage errors	some mechanical and usage errors, but not severe enough to interfere significantly with writer's purpose	mechanical and usage errors which interfere with writer's purpose	mechanical and usage errors that significantly interfere with the writer's purpose

With the exception of the rows specific to quantitative data analysis, this rubric has been adopted from Jordan LaChance (https://www.slideshare.net/jordanlachance/ewrt-2-research-paper-rubric).

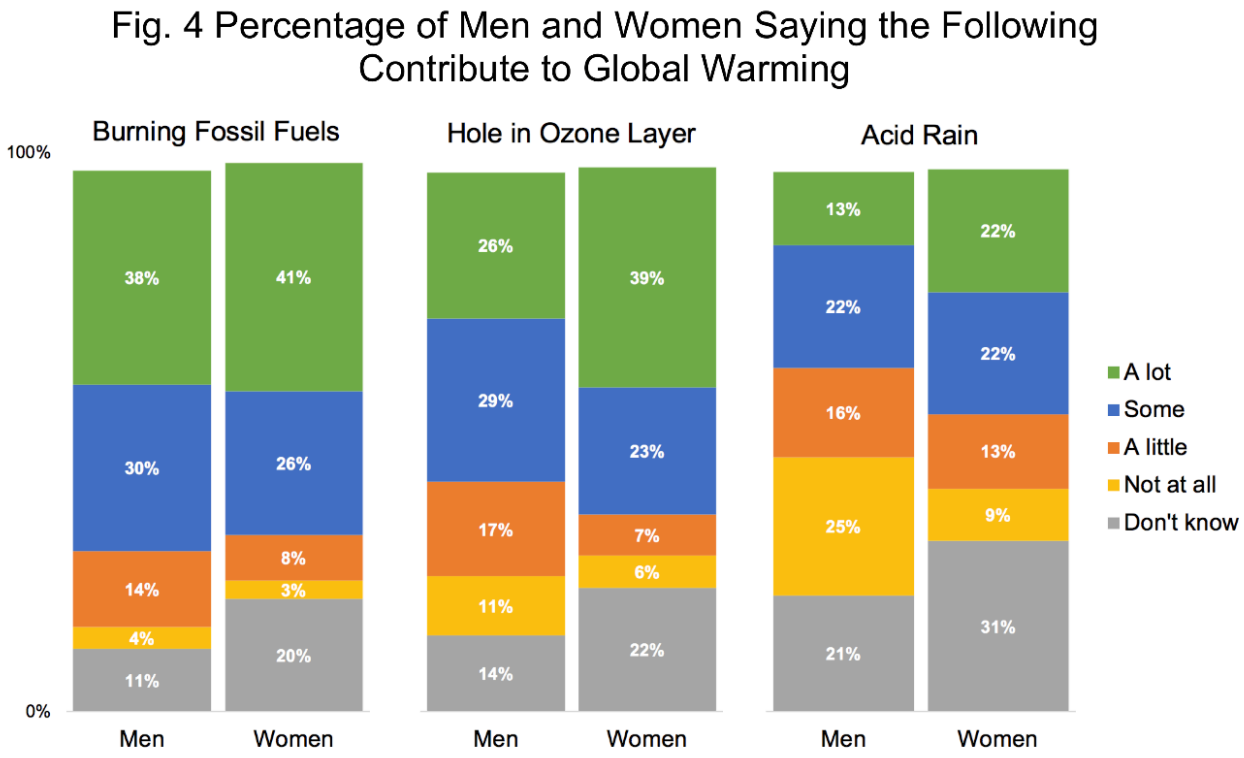
On the next two pages are samples of a stacked bar chart and a pie chart representing the relationship between two or more variables. We will refer to these and other examples in our review in class of the steps in converting raw data into percentages, creating a stacked column chart and analyzing the results.

Example 1: Percentage of deaths caused by air pollution by disease categories[1]



Source: National Institute of Environmental Health Sciences, https://www.niehs.nih.gov/research/programs/geh/geh_newsletter/2014/4/articles/air_pollution_accounts_for_1_in_8_deaths_worldwide_according_to_new_who_estimates.cfm

Example 2: Beliefs about factors contributing to climate change

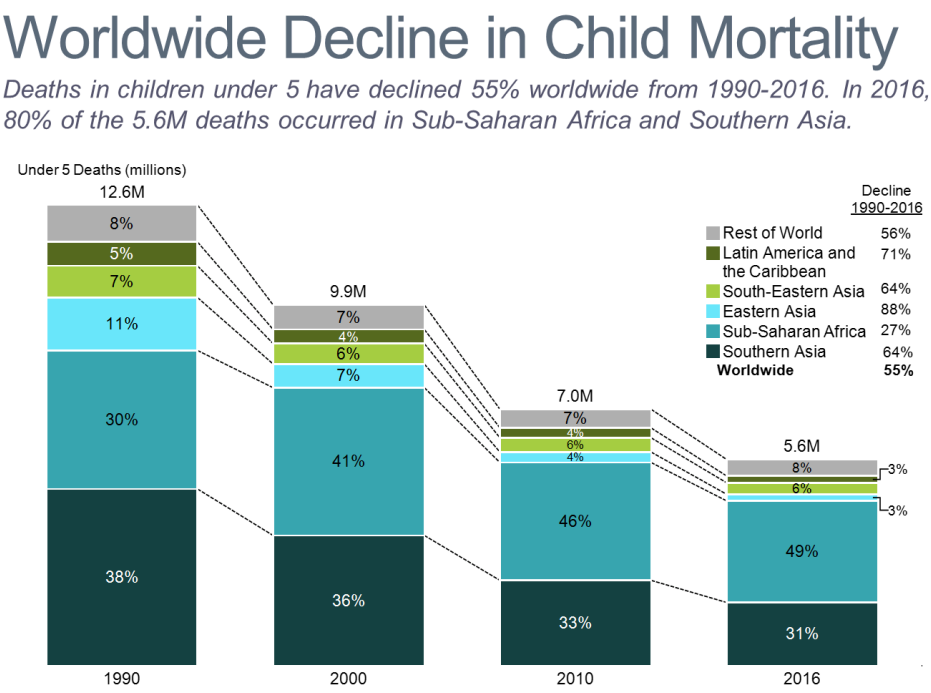


Source: Yale Program on Climate Change Communication. "Gender Differences in Public Understanding of Climate Change" Matthew Ballew, Jennifer Marlon, Anthony Leiserowitz and Edward Maibach.
https://climatecommunication.yale.edu/publications/gender-differences-in-public-understanding-of-climate-change/

Analysis of data in chart:

- What are the variables being compared in this chart?
- What factor was viewed as most contributing to climate change based on this data?
- Describe how men and women differed in their responses about the greatest contributor to climate change.
- What conclusions can you draw from the data in the chart?

Example 3: Global Trends in Child Mortality Rates from 1990 – 2016



Source: Worldwide Decline in Child Mortality. Mekko Graphics.
https://www.mekkographics.com/portfolio-item/global-health-trend/

Analysis of data in chart:

- What are the variables being compared in this chart?
- What does the data indicate about the change in child mortality from 1990 to 2016?
- In which regions of the world was progress in reducing child mortality greatest? Where did the share of child mortality increase between 1990 and 2016?
- Which part of the world accounted for the greatest share of child mortality in 1990? In 2016?
- What conclusions would you draw from this data?

One class session will review the following:

- creating a table from survey data in Excel or Google Sheets
- converting raw data into percentages
- creating a stacked bar chart from the table data in Excel
- crating categorical data from datasets
- preparing a written analysis of the data in the chart

- conducting a literature review and incorporating it into your discussion

Examples of data represented in stacked bar charts and pie charts

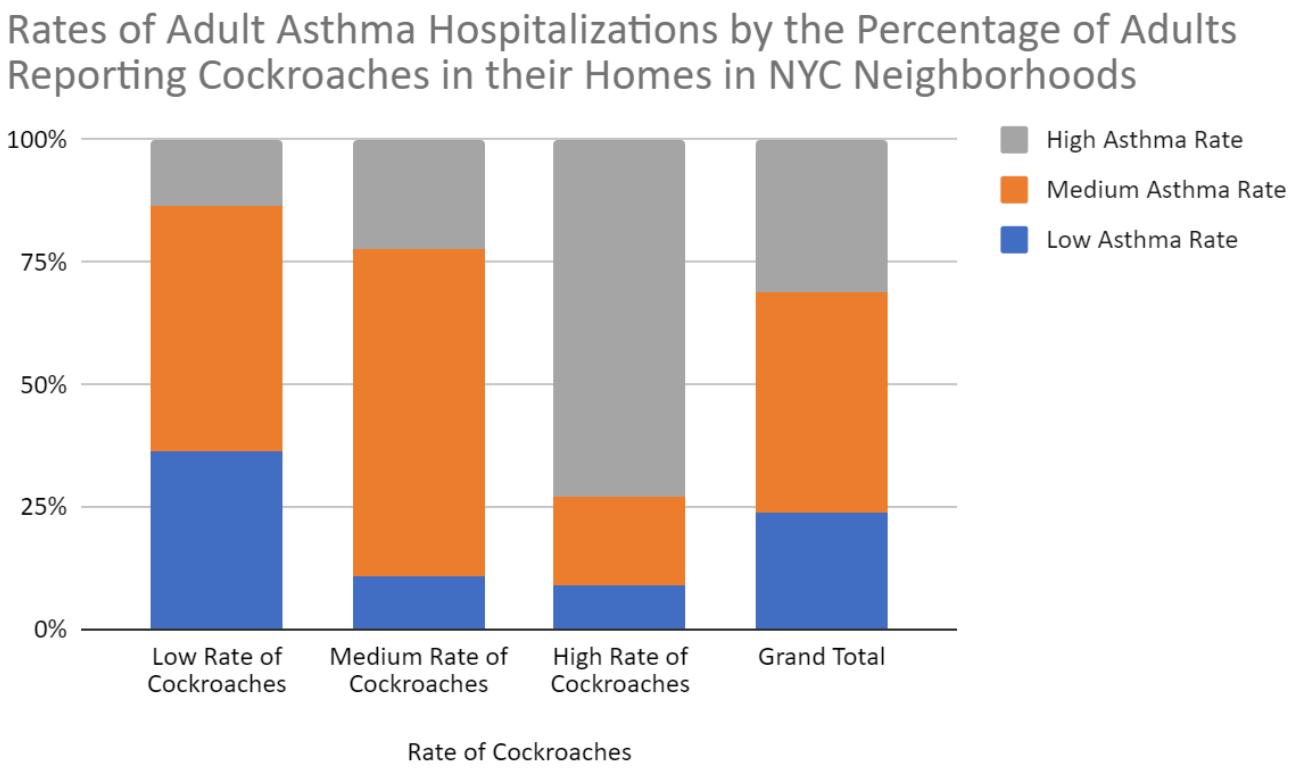
Rates of Adult Asthma Hospitalizations by the Percentage of Adults Reporting Cockroaches in their Homes in NYC Neighborhoods

	Rate of Cockroaches			
Asthma Rate	Low Rate of Cockroaches	Medium Rate of Cockroaches	High Rate of Cockroaches	Grand Total
Low Asthma Rate	36.36%	11.11%	9.09%	23.81%
Medium Asthma Rate	50.00%	66.67%	18.18%	45.24%
High Asthma Rate	13.64%	22.22%	72.73%	30.95%
Grand Total	22	9	11	42

Rate of Cockroaches: Adults Reporting Cockroaches in the Home - Percent. Low = Less than 20%; Medium = 20.1% to 35%; and High = Above 35%.
Asthma Rate: Asthma Hospitalizations (Adults) - Age-Adjusted Rate (per 10000 residents). Low = Less than 20 hospitalizations per 10,000; Medium = 20.1 to 35 hospitalizations per 10,000 and High = over 35 hospitalizations per 10,000.

Sample analysis of the data in the table:

As shown in this table, there is a positive association between the prevalence of cockroaches in peoples' homes and rates of asthma (as measured by hospitalizations per 10,000 residents). For example, in communities where there are low rates of cockroaches (that is, less than 20% of adults report cockroaches in the homes), approximately 14% of the communities have high asthma rates (more than 35 hospitalizations per 10,000 people). Meanwhile, in communities where there are high rates of cockroaches (over 35% of adults report cockroaches in their homes), there are very high rates of asthma. In fact, approximately 73% of communities with high cockroach rates also have high asthma rates (over 35 hospitalizations per 10,000 people). It seems likely that the prevalence of cockroaches are an indicator of socio-economic status, and those neighborhoods where adults report high rates of cockroaches are neighborhoods where people are poorer and socio-economically disadvantaged.



Note:

Rate of Cockroaches: Adults Reporting Cockroaches in the Home - Percent. Low = Less than 20%; Medium = 20.1% to 35%; and High = Above 35%.

Asthma Rate: Asthma Hospitalizations (Adults) - Age-Adjusted Rate (per 10000 residents). Low = Less than 20 hospitalizations per 10,000; Medium = 20.1 to 35 hospitalizations per 10,000 and High = over 35 hospitalizations per 10,000.

Resource for preparing table and graph

Data Analysis with NYC Health and Environment Data
https://tinyurl.com/Environmentdata

This video is approximately 34 minutes and serves as an overview of how to access data from the NYC environment and health data portal. It reviews how to access and download those data to make and interpret a bivariate table and a graph (a stacked bar chart).

- 0 to 5:15 How to access data from the NYC Environment and Health Portal
- 5:15 to 10:00 Ways to change continuous variables to discrete data
- 10:10 to 12:15 How to upload data (an Excel file) to Google Sheets

- 12:16 to 24:50: How to make a bivariate table using discrete categories
- 24:51 to 27:30: How to interpret bivariate tables
- 27:31 to End: How to prepare and interpret bivariate charts