SOCI 633–601/320–500
Demographic Methods
Spring 2023

ASSIGNMENT 4
Due by May 02, 2023 (Tuesday) at 11:59pm
Percent of final grade: 20%

Instructor information

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Submission

This assignment should be submitted through Turnitin within Canvas. Turnitin is an online database system designed to help instructors **detect plagiarism**, track citations, facilitate peer reviews, and provide paperless grading markup in written assignments. Students should develop this assignment **individually**.

Answers to substantive questions should be around 150 words (for each question) and be written in Microsoft Word. The Word document should be on US Letter paper size, one-inch margins, Arial font, size 11, 1.5 line spacing. Answers to methods questions should be solved in Microsoft Excel, but the final results and interpretations should be exported and properly formatted in the Word document. Students should include detailed formulas utilized to answer the questions in Word and Excel. Students should submit both the Word file and the Excel file on Canvas.

Look at examples of how to properly format tables and figures in Word at http://www.ernestoamaral.com/docs/soci633-23spring/Examples_tab_fig.pdf.

See examples of how to place tables and figures in your document, as well as of how to cite them throughout the document on this link (http://www.ernestoamaral.com/drafts.html).

Purpose

The purpose of this assignment is to test the knowledge about topics on period mortality and migration, as discussed in the classroom and course material. These topics are the foundation to understand a series of demographic methods discussed throughout this course.

Main references

Poston, Dudley L.; Bouvier, Leon F. 2017. **Population and Society: An Introduction to Demography**. New York: Cambridge University Press. 2nd edition.

Wachter, Kenneth W. 2014. **Essential Demographic Methods**. Cambridge: Harvard University Press

Period mortality (14 points)

Questions 1.1 and 1.3 are worth 5 points each. Question 1.2 is worth 4 points.

1.1. Collect death and population data for two U.S. states in 2017 by sex and five-year age groups. In order to download this data, visit the CDC WONDER data website (https://wonder.cdc.gov/), provided by the Centers for Disease Control and Prevention.

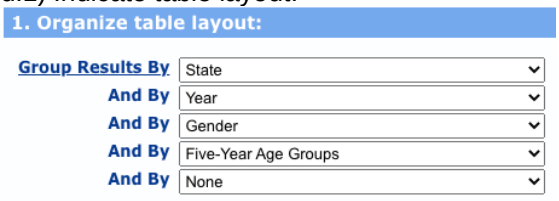
a) Under the tab "WONDER Systems," topic "Deaths," sub-topic "All Ages," click on the link "Underlying Cause of Death".

b) In the new page, click on "2018–2021: Underlying Cause of Death by Single-Race Categories."

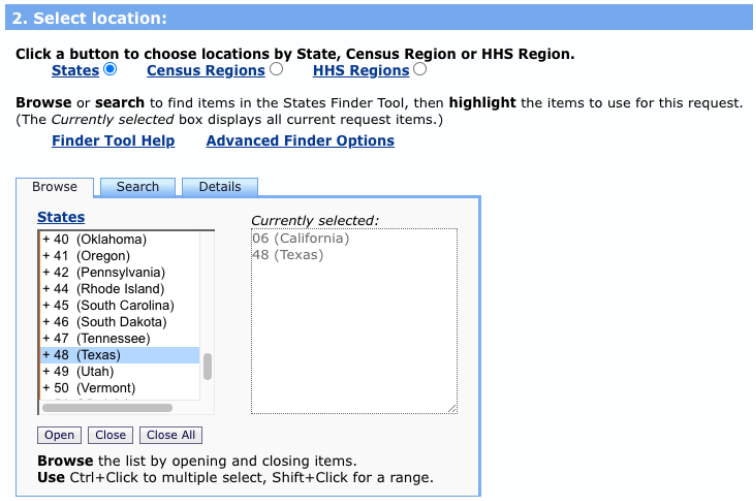
c) In the new page, under the tab "About," click on button "I Agree."

d) Under the tab "Request Form:"

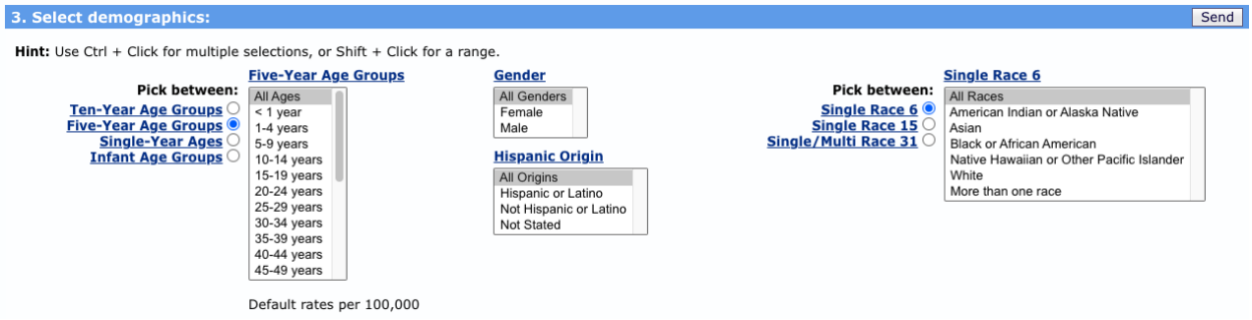
d.1) Indicate table layout:



d.2) Select two states. You can repeat these steps for one state at a time. Or you can use Ctrl+Click to select multiple states. When you click on the left window, the state will appear on the right window:

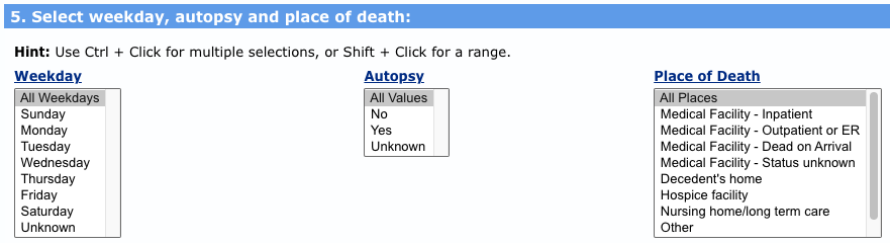


d.3) Select “Five-Year Age Groups” and keep “All Ages,” “All Genders,” “All Origins,” “All Races:”

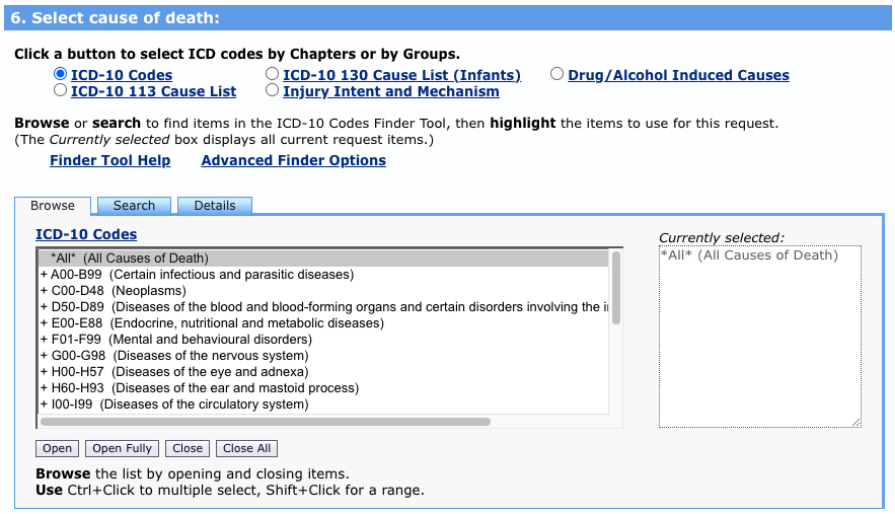


d.4) Select years 2019 and 2021. When you click on the left window, the year will appear on the right window. You can use Ctrl+Click to select multiple states:

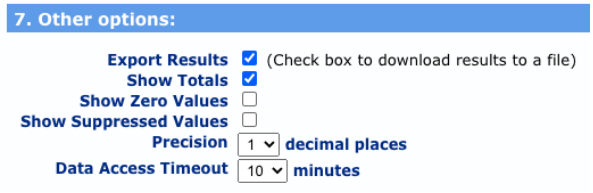
d.5) Keep “all weekends,” “all values,” “all places” selected:



d.6) Keep “all causes of death” selected:



d.7) Select “Export Results” and “Show Totals:”



d.8) Click on the “Send” button at the bottom of the page to save the table as a TXT file. You can also check the results of your selection by going back to the top of the window and clicking on the tab “Results.” You can also click on the “Export” button to save the table as a TXT file. Columns are separated by tabs, a format that allows this file to be imported into a wide variety of programs, such as Microsoft Excel.

Request Form | Results | Map | Chart | About

Underlying Cause of Death Data | Dataset Documentation | Other Data Access | Help for Results | Printing Tips | Help with Exports | Save | Export | Reset

Quick Options | More Options | Top | Notes | Citation | Query Criteria

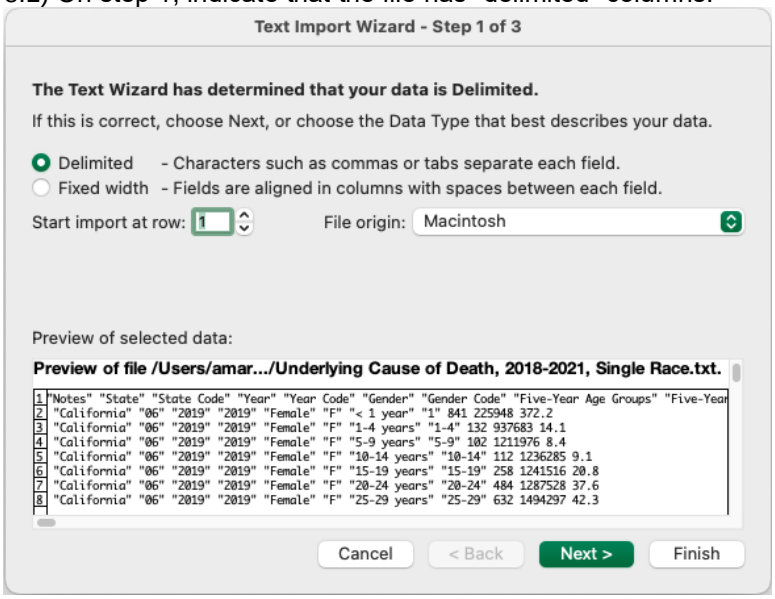
Messages:

- Totals are not available for these results due to suppression constraints. More Information.
- Rows with suppressed Deaths are hidden. Use Quick Options above to show suppressed rows.

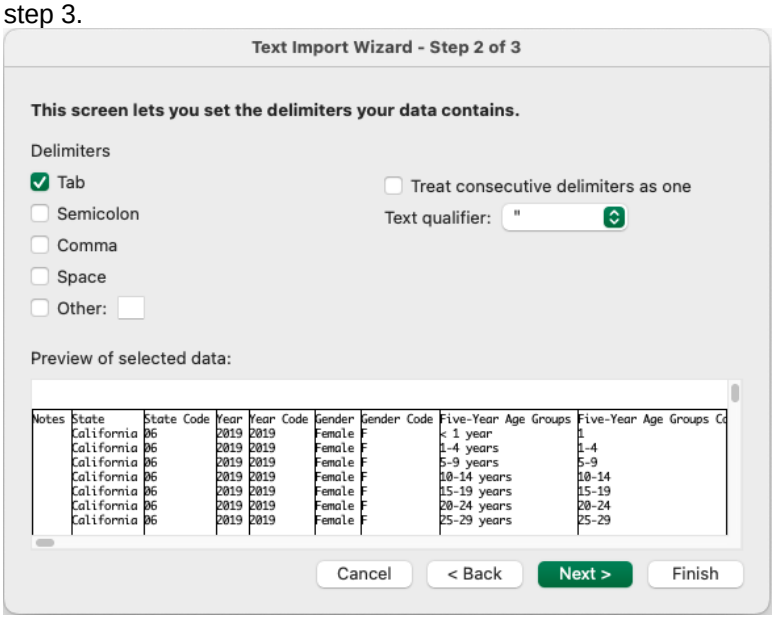
State	Year	Gender	Five-Year Age Groups	Deaths	Population	Crude Rate Per 100,000
California (06)	2019	Female	< 1 year	841	225,948	372.2
California (06)	2019	Female	1-4 years	132	937,683	14.1
California (06)	2019	Female	5-9 years	102	1,211,976	8.4
California (06)	2019	Female	10-14 years	112	1,236,285	9.1
California (06)	2019	Female	15-19 years	258	1,241,516	20.8
California (06)	2019	Female	20-24 years	484	1,287,528	37.6
California (06)	2019	Female	25-29 years	632	1,494,297	42.3
California (06)	2019	Female	30-34 years	909	1,432,403	63.5
California (06)	2019	Female	35-39 years	1,166	1,363,988	85.5
California (06)	2019	Female	40-44 years	1,478	1,245,533	118.7
California (06)	2019	Female	45-49 years	2,212	1,263,078	175.1
California (06)	2019	Female	50-54 years	3,306	1,236,296	267.4
California (06)	2019	Female	55-59 years	5,339	1,276,289	418.3
California (06)	2019	Female	60-64 years	7,580	1,178,827	643.0
California (06)	2019	Female	65-69 years	9,012	1,002,526	898.9
California (06)	2019	Female	70-74 years	11,338	807,409	1,404.2
California (06)	2019	Female	75-79 years	13,187	564,629	2,335.5
California (06)	2019	Female	80-84 years	16,447	391,601	4,199.9
California (06)	2019	Female	85-89 years	19,722	Not Applicable	Not Applicable
California (06)	2019	Female	90-94 years	19,818	Not Applicable	Not Applicable
California (06)	2019	Female	95-99 years	11,202	Not Applicable	Not Applicable
California (06)	2019	Female	100+ years	2,847	Not Applicable	Not Applicable
California (06)	2019	Female	Not Stated	11	Not Applicable	Not Applicable

e) Open Microsoft Excel and open the TXT file:

e.1) On step 1, indicate that the file has “delimited” columns:



e.2) On step 2, indicate that columns are delimited by tabs. Then click on “Finish.” You do not have to go to step 3.



f) Your data will appear in an Excel spreadsheet. For this assignment, you will use data from columns "Deaths" and "Population" (not from "Crude Rate").

You will notice that the "Population" column does not have information for the 85–89, 90–94, 95–99, and 100+ age groups (it ends on 80–84, which is actually 80+ for population counts). Thus, in the "Deaths" column, you should add rows for the 80–84, 85–89, 90–94, 95–99, and 100+ age groups. This information will become the 80+ age group (the final age group in your life table).

Organize death and population counts in a table by five-year age groups (ending with 80+ age group) and sex for each of the two selected states, such as illustrated below. Generate age pyramids for each state and year. Interpret the results.

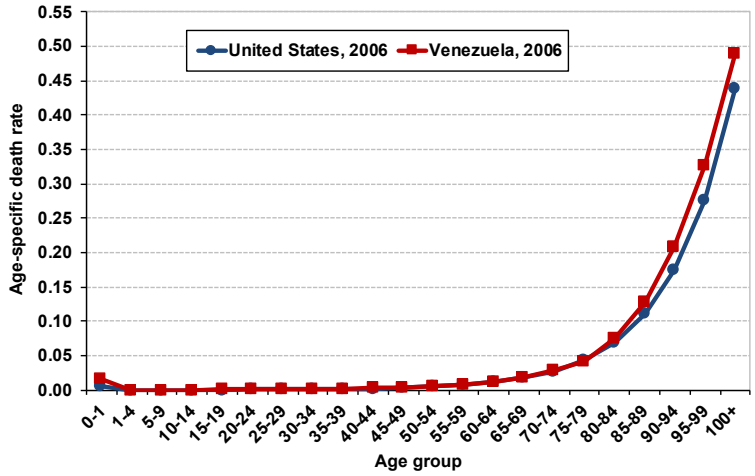
Table 1. Total deaths and population by age group and sex, State 1

Age group	Width	2019				2021			
		Females		Males		Females		Males	
		Deaths	Population	Deaths	Population	Deaths	Population	Deaths	Population
0	1								
1-4	4								
5-9	5								
10-14	5								
15-19	5								
20-24	5								
25-29	5								
30-34	5								
35-39	5								
40-44	5								
45-49	5								
50-54	5								
55-59	5								
60-64	5								
65-69	5								
70-74	5								
75-79	5								
80+	∞								

Source: CDC WONDER data website (https://wonder.cdc.gov/), provided by the Centers for Disease Control and Prevention.

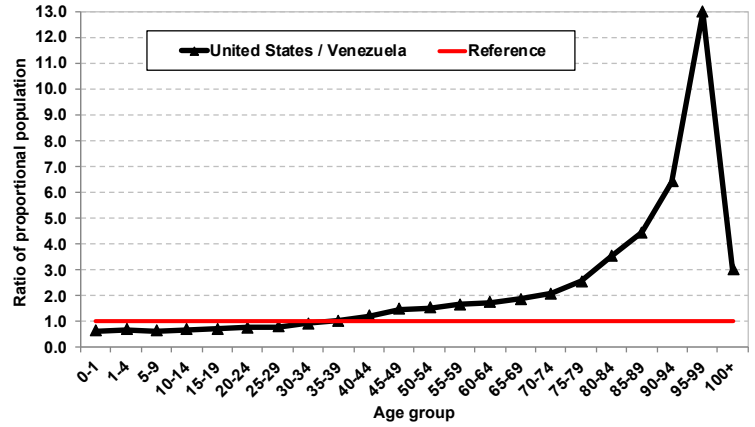
1.2. Calculate crude death rates for each state using data organized on question 1.1 (both sexes combined and up to 80+ age group). Provide a graph with age-specific death rates (such as Figure 1) and a graph with ratio of proportion population between the two states (such as Figure 2) comparing the selected states for each year. Figures 1 and 2 were used as examples during lectures. Taking the population counts of one state as a standard, calculate an age-standardized death rate for the other state for each year. Interpret the results.

Figure 1. Age-specific death rates for the United States and Venezuela, 2006



Source: Poston and Bouvier (2017).

Figure 2. Ratio of proportional population of the United States to Venezuela, 2006



Source: Poston and Bouvier (2017).

1.3. Utilizing the data organized on question 1.1 (up to 80+ age group), calculate all the columns of a period lifetable by sex for each of the two selected states and for each year. Use the formula specifications provided by the course textbook (Wachter, 2014).

(a) Interpret the results for each sex, state, and year.

(b) Generate age pyramids for the stationary population based on the life table calculations for each state and year. Interpret these age pyramids, comparing to the age pyramids with observed population counts from question 1.1.

(c) What do the different interpretations of a life table mean (synthetic cohort and stationary population)? What are the interpretations of these terms (l_x, ${}_nd_x$, ${}_nL_x$, T_x) using the two different approaches?

Migration (6 points)

All questions below are worth 1.5 points each.

2.1. Give three examples of measures of migration. What is meant by the concept of migration efficiency? How do demographers measure this phenomenon?

2.2. Explain the main differences of estimating migration rates by age group with: (1) last-move data (previous residence) and duration of residence; or (2) place of residence at a fixed date in the past.

2.3. Why mathematical models are useful to analyze migration rates? What are their limitations?

2.4. Why gravity models and spatial models are useful to understand factors associated with migration?