Introduction

The level of organ donations in economically advanced countries has been an issue for decades and it continues to worsen as lifespans continue to increase. In the United States it has been especially difficult to raise organ donation levels and researchers have tried to figure out why that is. There are many concerns that Americans have with becoming an organ donor and one is that people who register for the organ donation program will not receive proper care when hospitalized as their organs will be seen as more valuable than themselves (Mayo Clinic Staff, 2021). This concern is what has drawn the interest of our research project to see if there's any causal relationship between someone being a registered organ donor and the age at which they die. As such our official research question is does organ donation status have a causal relationship with the age that someone dies?

Data Definitions

Explain how the problem in the proposal requires the data collected.
The data we are using for our project and basing our results off is from the National Mortality Followback survey 1993. The reason we needed this data is because it included organ donation status of deceased individuals, and the sensitivity of this data made it very difficult to obtain more current information. This data contains thousands of variables that allow us to obtain characteristics of the deceased and try to determine what makes up the typical organ donor in the United States. Once we've determined that we will be able to look into whether or not there is a causal relationship between organ donation and the age at which someone dies.

Define the response variable (with units of measurement).
The response variable is the decedent's detailed age at death via their death certificate. The units of measurement come in a range of Age years from 015 - 115.

Explanatory Variables

- Sex of Decedent
    - 1 - Male
    - 2 - Female
- Decedent's region of birth
    - 01 - Northeast
    - 02 - Midwest
    - 03 - South
    - 04 - West
    - 05 - Outlying territories
    - 06 - foreign country
- Decedent's region of death

    - 1 - Northeast
    - 2 - Midwest
    - 3 - South
    - 4 - West
- Decedent's region of residence
    - 0 - foreign country
    - 1 - Northwest
    - 2 - Midwest
    - 3 - South
    - 4 - West
- Decedent’s race
    - 01 - white
    - 02 - black
    - 03 - American indian, Eskimo, Aleut
    - 04 - Asian and Pacific Islander
- Education of Decedent
    - 00 - no formal education
    - 01 - 08 - years of elementary school
    - 09 - 1 year of highschool
    - 10 - 2 years of highschool
    - 11 - 3 years of highschool
    - 12 - 4 years of highschool
    - 13 - 1 year of college
    - 14 - 2 years of college
    - 15 - 3 years of college
    - 16 - 4 years of college
    - 17 - 5 or more years of college
- Decedent’s marital status
    - 1 - never married, single
    - 2 - married
    - 3 - widowed
    - 4 - Divorced / separated

- SC0794: Wanted to be a donor when died
    - 01 - yes
    - 02 - no

- SC0610: Used Stimulants at any point in life
    - 01 - Yes
    - 02 - No

    - 03 - Unsure

- SC0611: Used Marijuana at any point in life
    - 01 - Yes
    - 02 - No
    - 03 - Unsure

- SC0612: Used cocaine at any point in life
    - 01 - Yes
    - 02 - No
    - 03 - Unsure
    -
- SC0613: Used Hallucinogens at any point in life
    - 01 - Yes
    - 02 - No
    - 03 - Unsure

- SC0487: General weight class of the decedent
    - 01 - Overweight
    - 02 - Underweight
    - 03 - About right

- SC0889: Total income (at least)
    - 01 - $0
    - 02 - $1000
    - 03 - $2000
    - 04 - $3000
    - 05 - $4000
    - 06 - $5000
    - 07 - $6000
    - 08 - $7000
    - 09 - $9000
    - 10 - $11,500
    - 11- $14,000
    - 12 - $16,500
    - 13 - $19,000
    - 14 - $21,000
    - 15 - $23,500
    - 16 - $25,000
    - 17 - $50,000

- 18 - $75,000

Data for analysis

The source of our data comes from the Inter-University Consortium For Political and Social Research (ICPSR). Specifically we gathered our data from the National Mortality Followback Survey conducted in 1993. This survey gathered information from the United States Department of Health and Human Services and National Center for Health Statistics giving us access to characteristic variables on thousands of people who had died in the U.S. This information is put together by taking information from death certificates and gathering information from next of kin familiar with the decedent's history. This information, sometimes enhanced by administrative records, is collected in order to study the etiology of disease, demographic trends in mortality, and other health issues and is why we used it to study whether organ donation status has a causal relationship with the age someone dies.

The data was loaded into SAS using the provided setup file, which had a PROC EXPORT step appended to the end in order to save the data as a csv. The csv was loaded into R, where any observations with missing or unmatched responses in the desired fields were filtered out, while any unused columns were dropped. If appropriate, each of the selected variables were coerced to factors with meaningful labels; notably, age and education were left as numeric values. Additionally, hispanic status was coerced to a factor with only two levels: Hispanic and Non-Hispanic.

Table of Summary Statistics

	Stratified by Donor Card			
	Yes	No	p	test
n	190	1602		
Sex = Female (%)	69 (36.3)	326 (20.3)	<0.001	
Birth Region (%)			0.019	
Northeast	14 (7.4)	155 (9.7)		
Midwest	60 (31.6)	403 (25.2)		
South	53 (27.9)	605 (37.8)		
West	49 (25.8)	300 (18.7)		
Outlying Territories	0 (0.0)	7 (0.4)		
Foreign Country	14 (7.4)	132 (8.2)		
Death Region (%)			0.001	
North	10 (5.3)	144 (9.0)		
Midwest	52 (27.4)	402 (25.1)		
South	60 (31.6)	665 (41.5)		
West	68 (35.8)	391 (24.4)		
Marital Status (%)			0.070	
Single	128 (67.4)	1110 (69.3)		
Married	39 (20.5)	377 (23.5)		
Widowed	1 (0.5)	11 (0.7)		
Divorced	22 (11.6)	104 (6.5)		
Residence Region (%)			0.002	
Northeast	10 (5.3)	144 (9.0)		
Midwest	49 (25.8)	406 (25.3)		
South	61 (32.1)	664 (41.4)		
West	70 (36.8)	387 (24.2)		
Foreign Country	0 (0.0)	1 (0.1)		
Hispanic = Non-Hispanic (%)	179 (94.2)	1376 (85.9)	0.002	
Race (%)			<0.001	
White	176 (92.6)	1039 (64.9)		
Black	9 (4.7)	500 (31.2)		
American Indian	3 (1.6)	30 (1.9)		
Asian and Pacific Islander	2 (1.1)	33 (2.1)		
Years of Education (mean (SD))	12.51 (1.94)	11.43 (2.08)	<0.001	
Weight (%)			0.067	
About right	151 (79.5)	1357 (84.7)		
Overweight	18 (9.5)	139 (8.7)		
Underweight	21 (11.1)	106 (6.6)		
Heroin (%)			0.041	
Yes	3 (1.6)	38 (2.4)		
No	183 (96.3)	1460 (91.1)		
Unsure	4 (2.1)	104 (6.5)		
Stimulants (%)			0.141	
Yes	10 (5.3)	80 (5.0)		
No	172 (90.5)	1389 (86.7)		
Unsure	8 (4.2)	133 (8.3)		
Marijuana (%)			0.028	

Yes	26 (13.7)	311 (19.4)	
No	152 (80.0)	1134 (70.8)	
Unsure	12 (6.3)	157 (9.8)	
Cocaine (%)			0.009
Yes	11 (5.8)	145 (9.1)	
No	172 (90.5)	1312 (81.9)	
Unsure	7 (3.7)	145 (9.1)	
Hallucinogens (%)			0.088
Yes	5 (2.6)	45 (2.8)	
No	176 (92.6)	1404 (87.6)	
Unsure	9 (4.7)	153 (9.6)	
Income at Least (%)			0.001
$0	2 (1.4)	60 (5.5)	
$1,000	3 (2.1)	15 (1.4)	
$2,000	1 (0.7)	30 (2.7)	
$3,000	6 (4.1)	23 (2.1)	
$4,000	4 (2.7)	28 (2.6)	
$5,000	6 (4.1)	37 (3.4)	
$6,000	5 (3.4)	23 (2.1)	
$7,000	5 (3.4)	79 (7.2)	
$9,000	7 (4.8)	86 (7.8)	
$11,500	3 (2.1)	83 (7.6)	
$14,000	8 (5.5)	79 (7.2)	
$16,500	5 (3.4)	33 (3.0)	
$19,000	5 (3.4)	59 (5.4)	
$21,000	4 (2.7)	31 (2.8)	
$23,500	2 (1.4)	36 (3.3)	
$25,000	42 (28.8)	260 (23.7)	
$50,000	25 (17.1)	88 (8.0)	
$75,000	13 (8.9)	46 (4.2)	