COVID-19 Statistics Project

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COVID-19 TOPIC

- COVID-19 is an infectious disease discovered in Wuhan, resulting in the 2020 pandemic outbreak.

- Personal and familial experiences with COVID-19 short-term and drastic long-term symptoms.

- Over 1.1 million deaths in U.S. and 86 million people worldwide.

RESEARCH QUESTION: What is the relationship between age groups and COVID-19 mortality rates in the United States over time, and how have these rates evolved from the start of the pandemic until June 28, 2023?

OUR DATASET

A tibble: 2,002 × 8

Data as of <chr>	State <chr>	MMWR Week <dbl>	End Week <chr>	Sex <chr>	Age Group <chr>	Total Deaths <dbl>	COVID-19 Deaths <dbl>
06/28/2023	United States	1	01/04/2020	All Sex	Under 1 year	403	0
06/28/2023	United States	1	01/04/2020	All Sex	1-4 Years	79	0
06/28/2023	United States	1	01/04/2020	All Sex	5-14 Years	99	0
06/28/2023	United States	1	01/04/2020	All Sex	15-24 Years	605	0
06/28/2023	United States	1	01/04/2020	All Sex	25-34 Years	1261	0
06/28/2023	United States	1	01/04/2020	All Sex	35-44 Years	1771	0
06/28/2023	United States	1	01/04/2020	All Sex	45-54 Years	3284	0
06/28/2023	United States	1	01/04/2020	All Sex	55-64 Years	7936	0
06/28/2023	United States	1	01/04/2020	All Sex	65-74 Years	11789	0
06/28/2023	United States	1	01/04/2020	All Sex	75-84 Years	14546	0

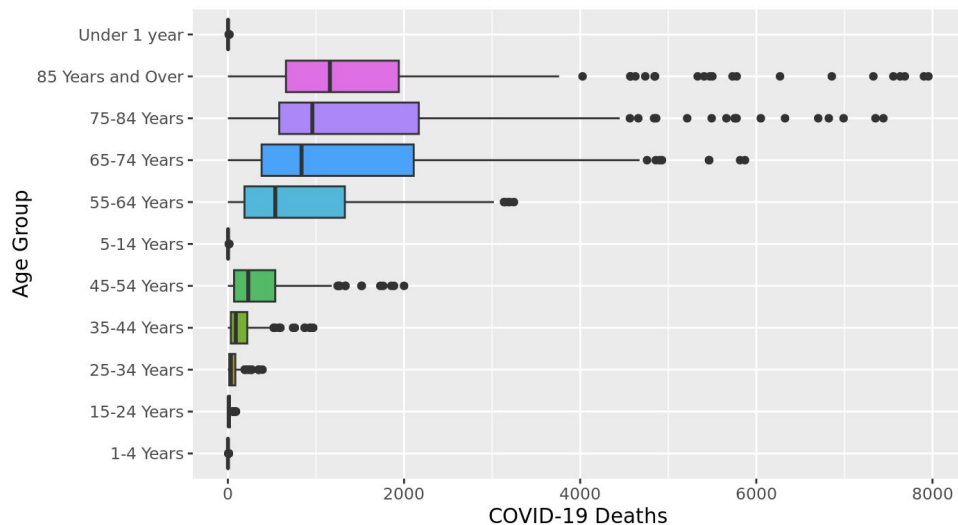1–10 of 2,002 rows   Previous 1 2 3 4 5 6 … 100 Next

- The data in this data set is collected and updated every week and covers information within all 50 states of the USA and the District of Columbia.
- Sourced from the CDC's National Center for Health Statistics (NCHS, 2023).

EDA Highlights

Relationship between Age and COVID-19 Deaths
Deaths Per Week From 01/04/2020 to 06/24/2023
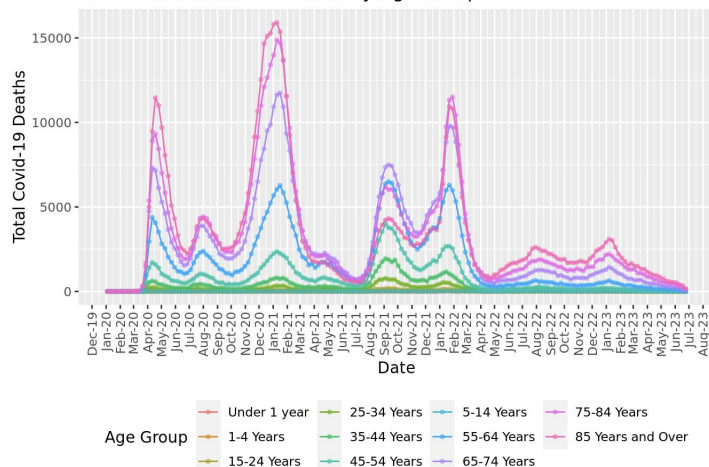

COVID-19 Deaths Over Time by Sex
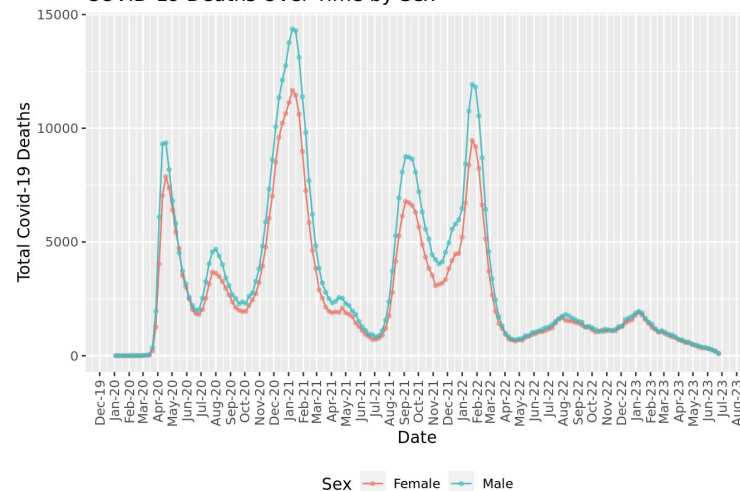
The line plot showing the relationship between covid-19 deaths of males compared to females illustrates consistently higher number of deaths among males over time.

Models and Other Analysis

Interaction Model

COVID-19 Deaths Over Time by Age Group

Table of coefficients for easier visualization:

Term	Coefficient	Term	Coefficient
Intercept	0.70330	Age Group 55-64 Years	337.03297
Age Group 15-24 Years	5.98352	Age Group 65-74 Years	570.49451
Age Group 25-34 Years	25.41758	Age Group 75-84 Years	717.50549
Age Group 35-44 Years	62.17033	Age Group 85 Years and Over	944.03297
Age Group 45-54 Years	141.42308	Age Group Under 1 year	0.55495
Age Group 5-14 Years	0.63187	Sex Male	0.09890
Age Group 15-24 Years:Sex Male	3.02198	Age Group 35-44 Years:Sex Male	38.73626
Age Group 25-34 Years:Sex Male	15.27473	Age Group 45-54 Years:Sex Male	106.48901
Age Group 5-14 Years:Sex Male	-0.02747	Age Group 55-64 Years:Sex Male	197.43956
Age Group 65-74 Years:Sex Male	258.33516	Age Group 75-84 Years:Sex Male	194.54945
Age Group 85 Years and Over:Sex Male	-198.97253	Age Group Under 1 year:Sex Male	0.14286

Separate linear regression models were constructed for age and sex.
Additive Model AIC: 60474.25
Interaction Model AIC: 60423.79
Lower AIC for the interaction model indicates an important interaction effect.

CONCLUSION AND LIMITATIONS

- Age appears to have a significant impact on COVID-19 deaths.
  - The higher the age group an individual is in, the higher their mortality likelihood.
- Effect of age group on deaths is different for males and females.
  - Males had a higher mortality rate.
- Applicable to vaccine research with emphasis on uncovering treatments for older individuals rather than focusing on gender related treatments.
- <u>Limitations</u>: underlying health conditions, behavioral impacts, socioeconomic status, country of collected dataset. Future work could explore these variables' impact on COVID-19 deaths.