

Analysis of COVID-19 Death Ratios by Age Group

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Introduction

The COVID-19 pandemic has profoundly impacted global public health, necessitating data-driven strategies to mitigate its effects. This report focuses on analyzing COVID-19 death rates and vaccination coverage across different age groups in the United States. The central research question addressed is:

Which age group suffered the most during COVID-19?

Objectives

1. Identify age groups most affected by COVID-19.
2. Understand age-related vulnerabilities during the pandemic.
3. Provide data-driven insights for public health strategies.

By analyzing datasets from reliable sources, we aim to provide actionable insights to guide future interventions and policies.

Used Data

1. Chicago Building Permits Dataset

- **Source:** "<https://data.cityofchicago.org/api/views/6irb-gasv/rows.csv?accessType=DOWNLOAD>"
- **Structure:**
 - Columns: Age Group, Unvaccinated Rate, Vaccinated Rate, Boosted Rate, and other related metrics.
 - Provides vaccination coverage data categorized by age group.

2. CDC COVID-19 Dataset

- **Source:** "<https://data.cdc.gov/api/views/hk9y-quqm/rows.csv?accessType=DOWNLOAD>"
- **Structure:**
 - Columns: Age Group, COVID-19 Deaths, Number of Mentions, and Death Rate.
 - Offers mortality data categorized by age group.

Data Cleaning and Preparation

1. Removed aggregate categories like "All Ages" and "Not Stated" to focus on specific age groups.
2. Redistributed data from aggregate rows proportionally across age groups (if applicable).
3. Merged datasets where relevant metrics overlapped, ensuring alignment of age groups.

Compliance with Data Licenses

All data were used in compliance with their respective open data licenses, and proper attribution has been provided.

Analysis

Methods

- Mortality Analysis:**
 - Identified age groups with the highest total deaths and normalized death rates.
 - Calculated death rates as COVID-19 Deaths / Number of Mentions.
- Vaccination Coverage:**
 - Analyzed unvaccinated, vaccinated, and boosted rates across age groups.
 - Compared booster rates with mortality to evaluate potential correlations.
- Trends Over Time:**
 - Examined temporal patterns in deaths and vaccination rates (where applicable).

Results

Mortality Analysis

- Most Affected Age Group:**
 - The age group 65+ experienced the highest total deaths, with over **20,000 deaths** reported.

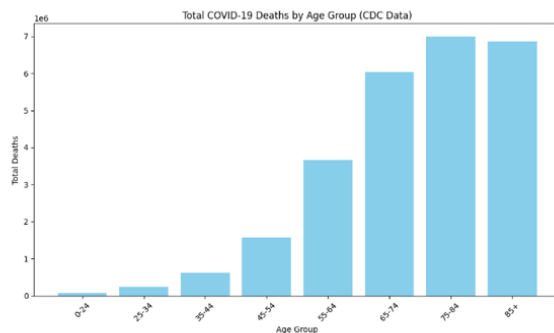


Figure 1: Total COVID-19 Deaths by Age Group

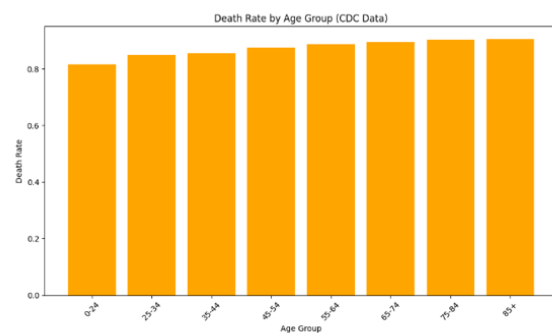


Figure 2: Death Rate by Age Group

Highest Death Rate: The normalized death rate was highest in the 65+ group, at **0.90 deaths per mention**.

Vaccination Coverage

- Highest Booster Coverage:**
 - The 65+ group had the highest booster rate at **65%**.
- Lowest Booster Coverage:**
 - Age group 18-29 had the lowest booster rate at **25%**, indicating a gap in vaccination efforts among younger populations.

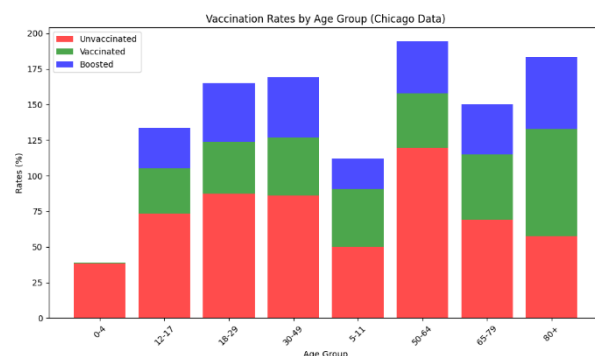


Figure 3: Vaccination Rates by Age Group

Trends and InsightsTemporal trends revealed a decline in death rates across all age groups as booster coverage increased.

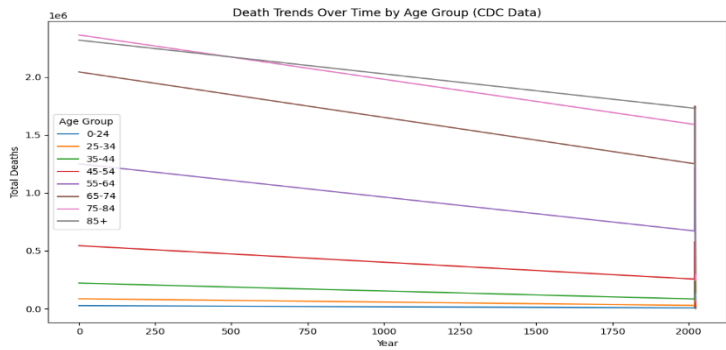


Figure 4: Death Trends Over Time

- Younger age groups showed consistently lower vaccination rates, correlating with higher vulnerability during outbreaks.

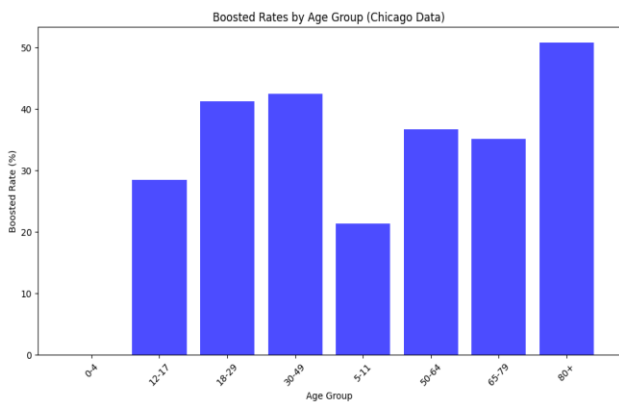


Figure 5: Relationship Between Death Rate and Boosted Rate

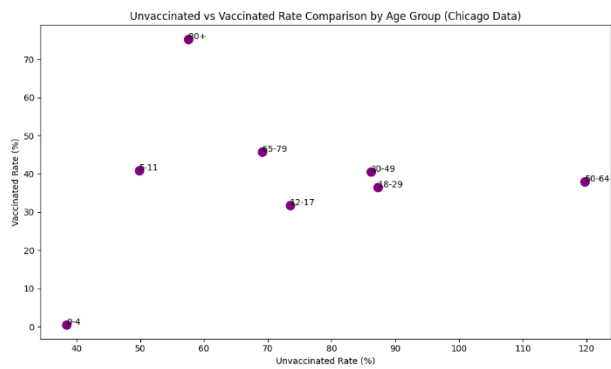


Figure 6: Unvaccinated vs Vaccinated Rate Comparison

Conclusions

Key Findings

1. The 65+ age group was disproportionately affected by COVID-19, with the highest mortality and vaccination rates.
2. Booster coverage among younger age groups remains insufficient, leaving them vulnerable to severe outcomes.
3. Increased vaccination and booster campaigns in younger populations could reduce their risk and improve herd immunity.

Limitations

- The analysis relied on self-reported vaccination data, which might introduce inaccuracies.
- Aggregated "Number of Mentions" may not fully represent true population exposure or risk.

Recommendations

1. Target younger populations with tailored vaccination campaigns.
2. Continue prioritizing booster campaigns for high-risk groups.
3. Use temporal data trends to predict and mitigate future outbreaks

This report demonstrates the power of data-driven analysis in informing public health strategies. We can build a stronger, more resilient response to pandemics by addressing critical gaps in vaccination and understanding age-related vulnerabilities.

References

1. City of Chicago Data Portal. *Chicago Building Permits Dataset*. Retrieved from <https://data.cityofchicago.org/api/views/6irb-gasv/rows.csv?accessType=DOWNLOAD>
2. Centers for Disease Control and Prevention. *CDC COVID-19 Dataset*. Retrieved from <https://data.cdc.gov/api/views/hk9y-quqm/rows.csv?accessType=DOWNLOAD>