

Tracing the Curves: An Analysis of Tennessee COVID-19-Related Deaths By Occupation and Industry

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BACKGROUND

- Since winter 2022, state occupational health surveillance programs have reported COVID-19 deaths by employment sector within their states.
- COVID-19 testing data typically don't include occupation information, making it difficult for programs to quantify COVID-19 spread and severity linked to the workplace.
- Death data routinely include occupation and were used to review COVID-19 severity, timing, and spread within the Tennessee (TN) workforce.

Definitions

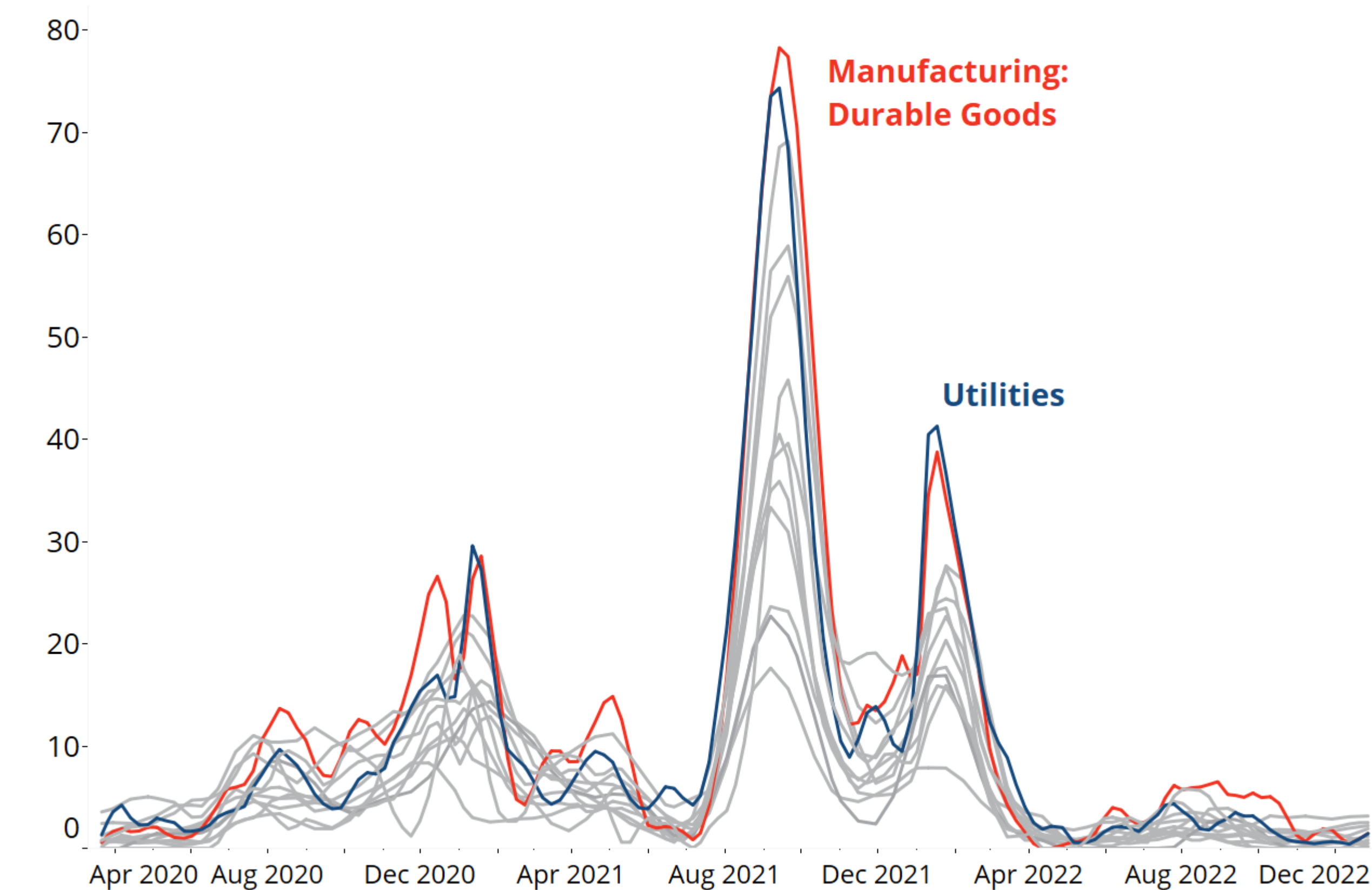
- Industry classifications were based on the North American Industrial Classification System (NAICS).
- Occupation classifications were based on the Standard Occupational Classification (SOC) system.
- Case data are from the National Electronic Disease Surveillance System (NEDSS) Base System (NBS) and include confirmed and probable cases in TN.
- A "COVID-19 Related Death" included any deaths in which COVID-19 was listed as a factor of death.

METHODS

- This project examined deaths, defined as COVID-19 related or directly due to a confirmed COVID-19 case by the TN Department of Health, between 2020 and 2022, for individuals 18 - 65 years.
- Deaths were grouped by week, and industry or occupation sector.
- Death counts were smoothed using locally estimated scatterplot smoothing and converted to rates based on the 2020 estimates of workers by sector.
- Due to small sizes, certain industry and occupation sectors were excluded.
- The death rate time series was compared to statewide case counts and predominant variant peaks.

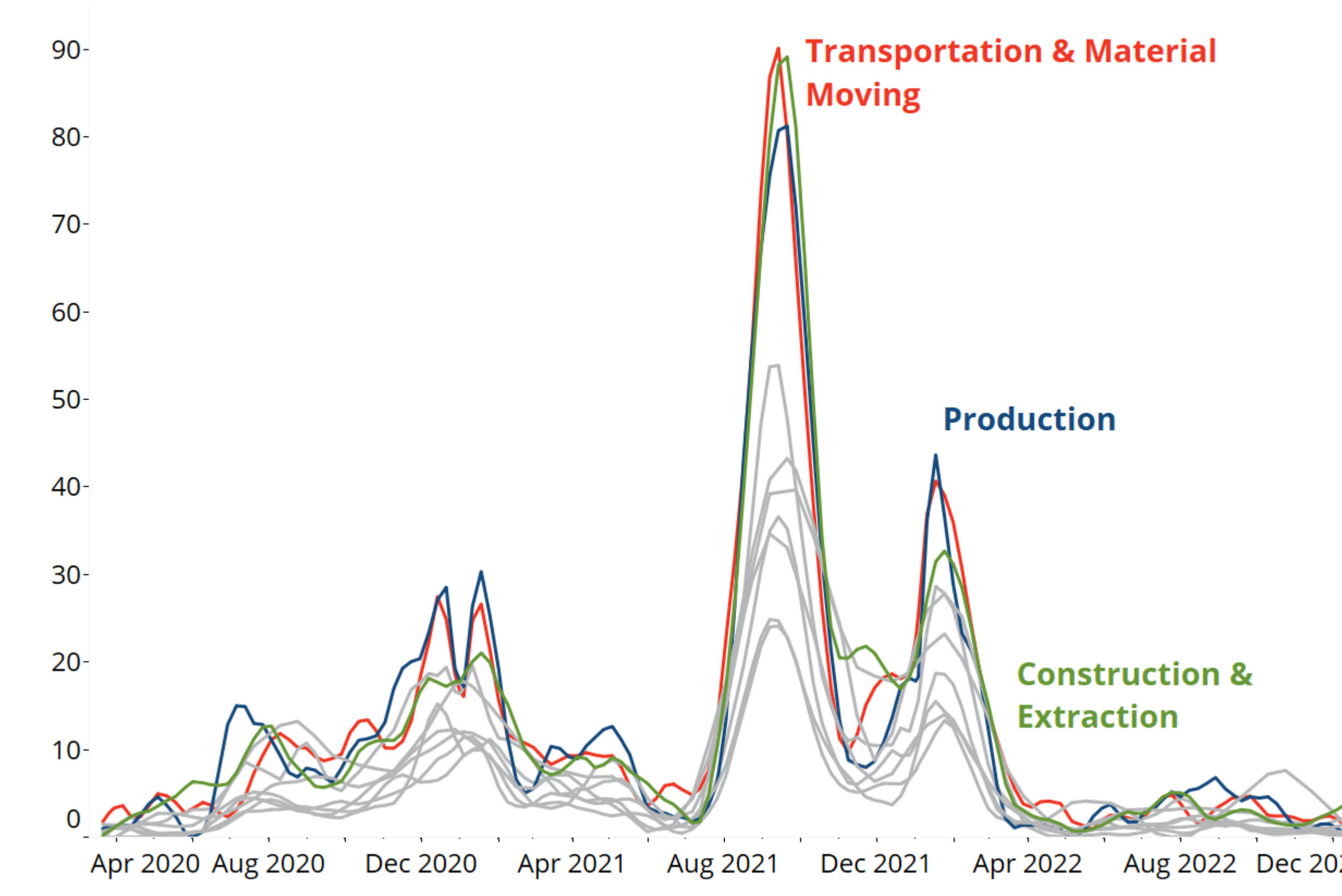
Results

Rate of COVID-19 Deaths based on Industry Over Time



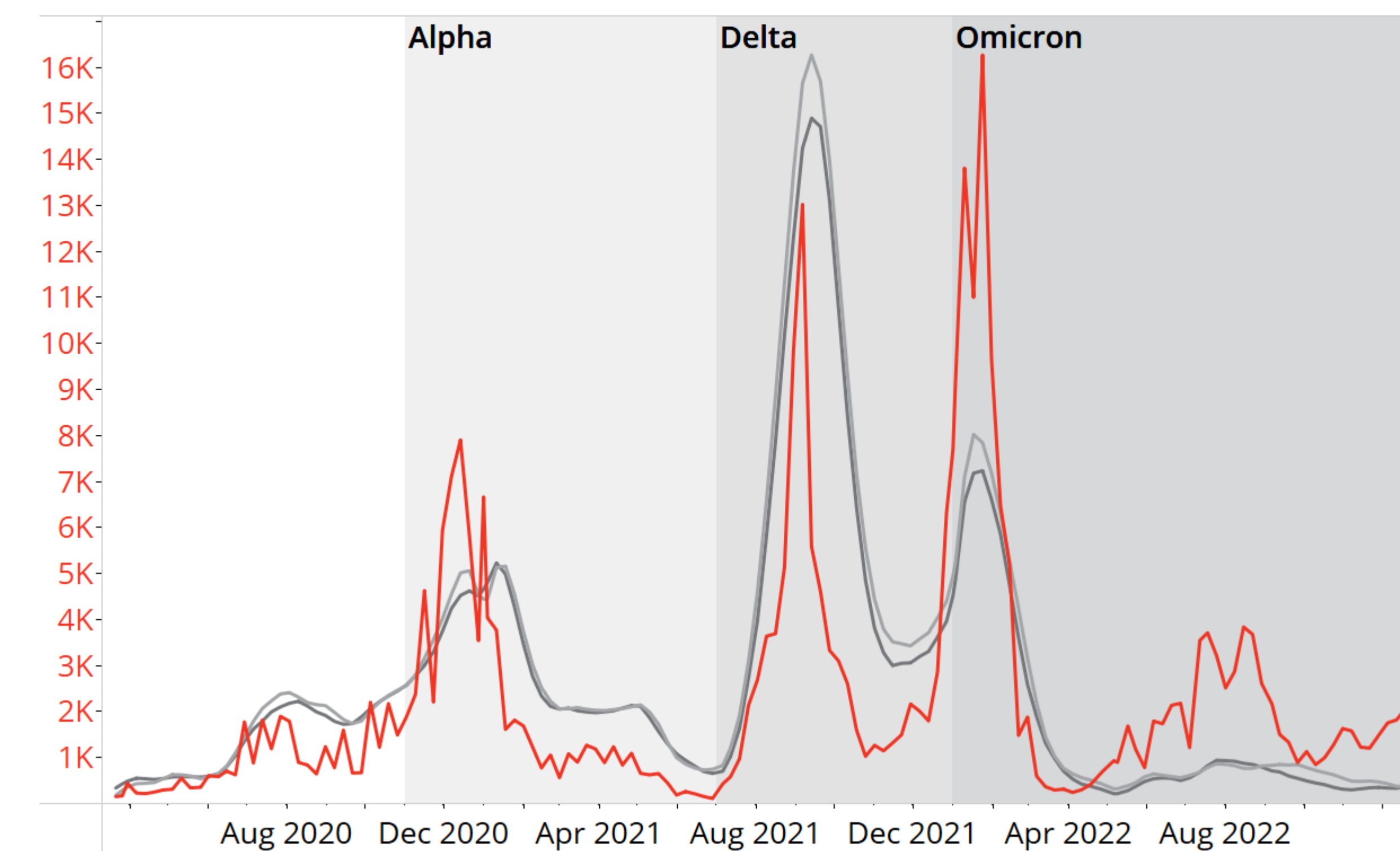
Manufacturing of Durable Goods and Utilities industries had the highest rates of deaths for all three peaks.

Rate of COVID-19 Deaths based on Occupation Over Time



Production, Construction & Extraction, and Transportation & Material Moving occupations had the highest rates of deaths for all three peaks.

Average Rate of COVID-19 Industry and Occupation Deaths and Case Counts Over Time



Death rates of all sectors increased simultaneously during Delta and Omicron peaks.

Deaths correlated closely to reported cases for most of the study period.

Reported cases peaked in January 2021, September 2021, and January 2022, and deaths peaked shortly thereafter.

The spike in Omicron variant cases was the largest, but deaths were lower compared to Delta variant deaths during fall 2021.

After April 2022, deaths remain flat although cases spike.

CONCLUSIONS

- Deaths and cases were correlated clearly in the pandemic, suggesting that death data can be used as a proxy for case data in occupation sector analyses during this time.
- Prior to July 2021, death rates between occupations and industries varied significantly.
- The weakening correlation between deaths and cases over time could be due to changing variant severity and greater immunity within the population.
- Variations in death rates by sector prior to July 2021 may indicate differences in COVID-19 spread in various workplaces.
- The similarity in the timing of peaks across sectors during Delta and Omicron peaks is likely due to the number of cases during this time. Variations in deaths are more likely due to outside factors.

FUTURE CONSIDERATIONS

- Including occupation and industry data within case data would provide a more streamlined process of analysis in the future, especially in situations of large quick-moving outbreaks.
- Although not available at the time of analysis, having workforce rates annually throughout the analysis time, rather than rates being purely based on initial workforce, would provide better coverage based on workforce changes due to the pandemic.

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