Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Short Communication

County-level association of COVID-19 mortality with 2020 United States presidential voting

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ABSTRACT

Objective: The objective of this study was to assess the association between United States county-level COVID-19 mortality and changes in presidential voting between 2016 and 2020.
Study design: The study design is a county-level ecological study.
Methods: We analysed county-level population-weighted differences in partisan vote change, voter turnout and sociodemographic and health status characteristics across pre-election COVID-19 mortality quartiles. We estimated a population-weighted linear regression of the 2020–2016 Democratic vote change testing the significance of differences between quartiles of COVID-19 mortality, controlling for other county characteristics.
Results: The overall change in the 2020–2016 Democratic vote was +2.9% but ranged from a +4.3% increase in the lowest mortality quartile counties to +0.9% in the highest mortality quartile counties. Change in turnout ranged from +9.1% in the lowest mortality counties to only +6.2% in highest mortality counties. In regression estimates, the highest mortality quartile was associated with a −1.26% change in the Democratic 2020–2016 vote compared with the lowest quartile ($P < 0.001$).
Conclusions: Higher county-level COVID-19 mortality was associated with smaller increases in Democratic vote share in 2020 compared with 2016. Possible explanations to be explored in future research could include fear of in-person voting in heavily Democratic, high-mortality counties, fear of the economic effects of perceived Democratic support for tighter lockdowns and stay-at-home orders and general exhaustion that lowered political participation in hard-hit counties.

Introduction

The United States saw more than 9.4 million confirmed cases and 230,000 deaths due to COVID-19 between the first confirmed case on January 21, 2020 and the November 3, 2020 presidential election. The virus disproportionately affected minority communities, the elderly and individuals with comorbidities. The virus reached rural and urban areas at different times, with the early wave of infections striking densely populated cities such as Seattle and New York, while rural and suburban areas were relatively unscathed until the 'second wave' beginning in July 2020.[1]

Democratic state and local governments – many of which saw high death tolls in the 'first wave' – imposed stricter lockdown measures for residents early on in the pandemic. Conversely, conservative media sources frequently minimized the severity of the pandemic, resisting public health measures such as mask wearing.[2,3] Residents of counties where Trump won the 2016 popular vote were less adherent to social distancing during the early pandemic, a finding that correlated with greater COVID-19 incidence.[4] Divergent partisan views on mail ballot voting and COVID-19–related policies were key election issues.

This study assesses to what extent county-level COVID-19 mortality rates were associated with change from 2016 to 2020 in population-weighted Democratic versus Republican vote margins. This work builds on an emerging body of research regarding COVID-19 and its association with partisanship,[4] voter turnout[5] and

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prepandemic studies linking county-level voting patterns to health outcomes.

Methods

COVID-19 deaths by county were obtained from the New York Times Coronavirus Database on November 2nd, 2020.[1] This database reports the five counties comprising New York City as a single area. Because the infection rate is an unreliable marker for COVID-19 cases due to differences in the availability of testing, we used death rates as our primary COVID-19 measure.

Presidential voting data from 2016 were obtained from the MIT Election Lab,[6] and 2020 voting data were obtained from Edison Research and the National Election Pool via the New York Times.[7] The 2020 totals reflect 99.6% of the 2020 vote.

Estimates for the proportion of each county's population who aged younger than 18 years, aged 65 years and older, were Black, were Hispanic, were 'rural' (living in a rural area), had completed college and were not proficient in English were taken from 2018 five-year American Community Survey (ACS) estimates. The median household income was taken from 2018 US Census Small Area Income and Poverty Estimates. Estimates of self-reported fair or poor physical health, obesity and diabetes were taken from the 2016–2017 Behavioral Risk Factor Surveillance System survey. The number of uninsured was obtained from 2017 Small Area Health Insurance Estimates. The August 2020 county-level unemployment rate was obtained from the Bureau of Labor Statistics. Inclusion of multiple other health status and demographic measures (including disability status, smoking status, years of potential life lost, county jail population and a continuous measure of population density) produced virtually identical results.

Statistical analysis

Population-weighted voting and COVID-19 death data were available for 3104 county equivalents representing more than 322 million inhabitants. County deaths per 10,000 were computed using 2018 one-year ACS county population estimates. 'Democratic vote change' was defined as the 2020 Democratic vote percentage minus the 2016 Democratic vote percentage.

Counties were stratified into quartiles of roughly equal population based on their COVID-19 mortality rate. Analysis of variance and Chi-square tests of proportions were used to determine the significance of death rate comparisons. Multiple linear regression of the (normally distributed) 2020–2016 Democratic vote change was used to test the significance of differences in COVID-19 death quartiles, controlled for the simultaneous effects of county-level health status and sociodemographic characteristics. Sensitivity analyses using a continuous death rate instead of quartiles or using the Democratic 2016 vote as an independent variable predicting the 2020 Democratic vote yielded virtually identical results.

Analyses used STATA, version 15 (College Station, TX), with analytic weights based on 2018 county population estimates. A bivariate map displaying the overlap of quartiles of county-level death rate and Democratic vote change was created using ESRI ArcGIS PRO software (Plantation, FL).

Results

COVID-19 mortality quartiles ranged from <3.22, 3.22–5.54, 5.55–8.45 and >8.45 deaths per 10,000, with each area representing approximately 80 million residents. Mean voting, health status and sociodemographic characteristics for the residents of each mortality quartile are included as Supplementary Table 1. Supplementary Figs. 1 and 2 present histograms of population-weighted county-level COVID-19 death rate and change in Democratic vote from 2016 to 2020.

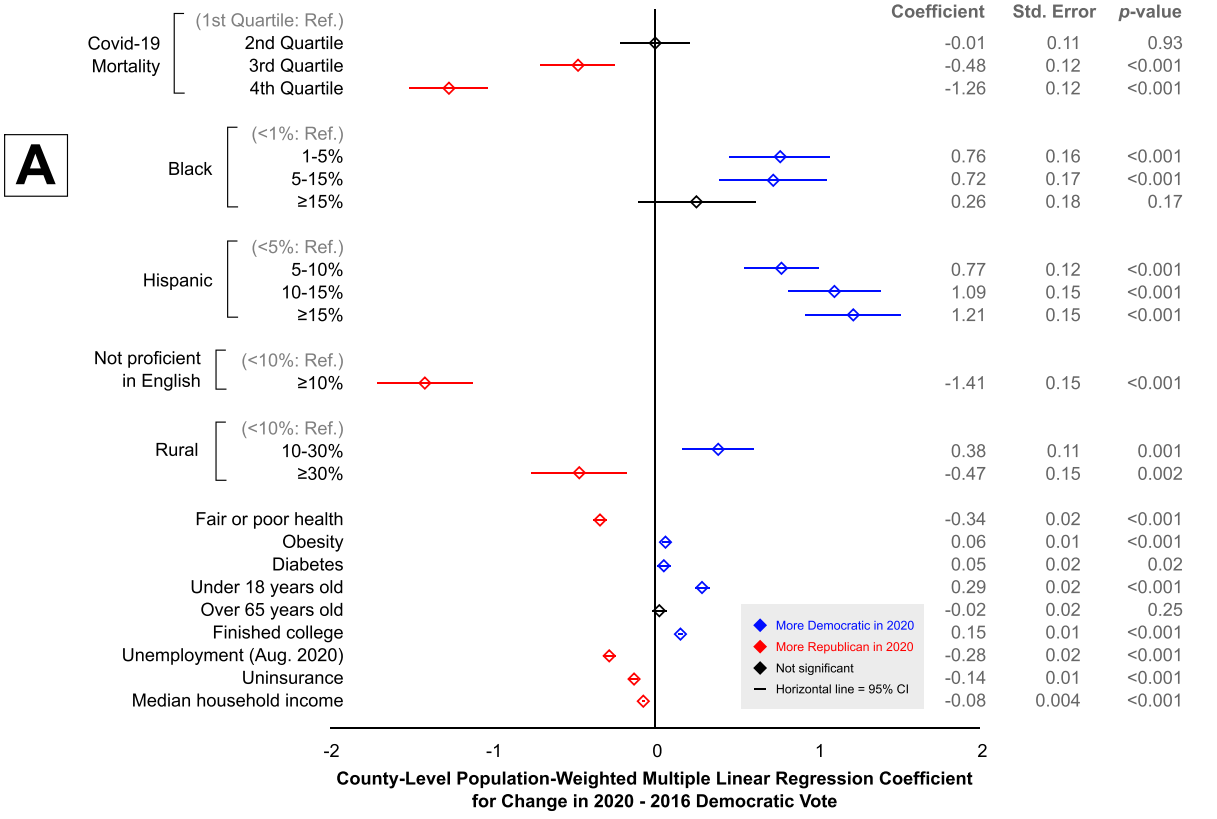
The mean voter turnout increased by 8.3% from 2016 to 2020. The highest death rate counties had the highest voting margin favouring Democrats, in 2016 (15.8% as compared with −6.4% in the lowest death rate counties). However, in 2020, voter turnout increased the least in the highest death rate quartile (6.2%) and the most in the lowest death rate quartile (9.4%). While the mean Democratic vote increased by 2.9% nationally from 2016 to 2020, there was only a 0.9% increase in the highest mortality counties as compared with a 4.3% increase in the lowest mortality counties. Republican vote change (0.8% nationally) showed a different trend. The highest death rate counties had a 1.5% increase in Trump votes over 2016 versus a 1.1% increase in the lowest death rate quartile and −0.2% decrease in the second lowest death rate quartile.

Mortality quartile sociodemographic differences were most pronounced for counties with high August 2020 unemployment, a high percentage of Black, Hispanic or non-English proficient residents and a low percentage of rural residents. For example, only 6.4% of the populations of >15% Black counties lived in lowest death rate quartile counties; 41.7% of the residents of these counties lived in highest death quartile counties. Of populations living in >15% Hispanic counties, 17.3% lived in lowest death rate quartile counties versus 30.8% in highest death rate quartile counties.

Fig. 1A illustrates multiple linear regression results for change in the Democratic vote, describing 65% of the variance. The coefficients for death rate quartiles represent the independent effect of COVID-19 mortality after controlling for the simultaneous effects of other characteristics that may have differed among counties with different changes in their 2016–2020 Democratic vote margin. As compared with the lowest death rate quartile, residents of the highest mortality quartile had an estimated −1.26% lower change in the Democratic vote between 2020 and 2016 ($P < 0.001$) attributable to COVID-19 mortality. Counties with younger, more college-educated populations and those with higher minority populations had a higher Democratic vote change, although this was not significant for counties with >15% Black populations. Counties with a higher proportion of rural residents, non-English proficient residents and unemployed or uninsured residents had a significantly lower Democratic vote change. When estimated using continuous death rate instead of quartiles, a 10 per 10,000 increase in the death rate was associated with 0.8% decrease in the Democratic vote change. Fig. 1B presents a bivariate county map overlaying Covid-19 mortality quartiles with Democratic vote change quartiles.

Discussion

Our study was undertaken prospectively before the 2020 election, with the expectation that there would be an inverse association between COVID-19 severity and persistent support for President Trump. However, many large urban counties with high COVID-19 mortality surprisingly saw a relatively small change in the Democratic vote, compared with Biden's significant gains over Clinton in less hard-hit suburban and exurban areas.[8] Among the approximately 80 million residents of high-mortality counties, more than 53 million (65.5%) lived in counties where Biden defeated Trump, including large densely populated cities such as New York, Philadelphia, Chicago, Miami and Detroit. In this highest mortality quartile, the Democratic vote increased by only 0.9%. For example, the combined New York City counties, with a death rate of 28.6 per 10,000, had a −2.5% lower Democratic vote, while Philadelphia, with a 12.0 per 10,000 death rate, had a −1.1% lower Democratic vote. Conversely, in the lowest mortality quartile, where the majority of residents (54.1%) lived in counties won by Trump, there was a 4.3% increase in the



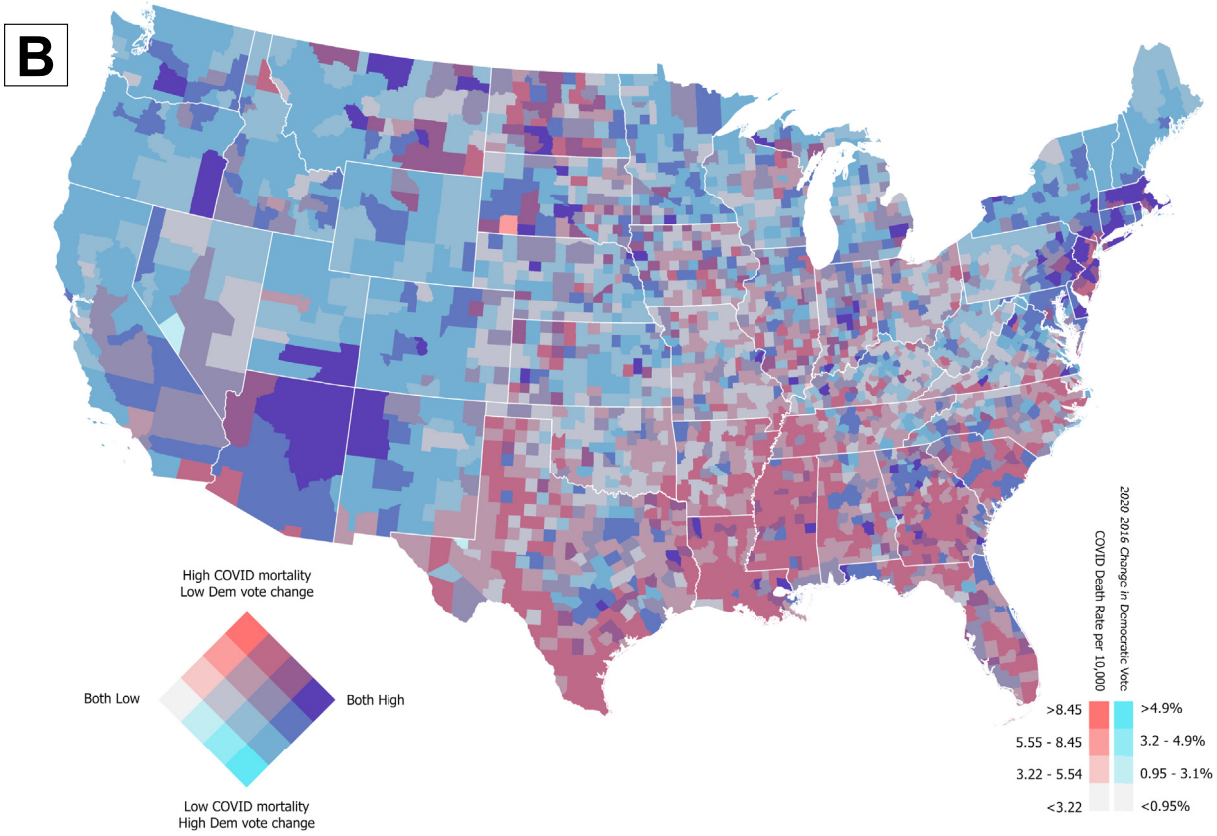


Fig. 1. Key findings of association between county level Covid-19 mortality and U.S. presidential election voting behaviour. **A:** Forest plot of population-weighted multiple linear regression coefficients for percent change in the 2020–2016 Democratic vote by COVID-19 mortality and other demographic and health status variables. Positive values reflect association with an increase in county-level Democratic vote in 2020 compared with 2016 and negative values with a decrease. Coefficients for categorical variables reflect comparisons with the reference categories as described at left. **B:** Bivariate county map overlaying Covid-19 mortality quartiles with Democratic vote change quartiles. Pink hue represents Covid-19 mortality while blue hue represents change in Democratic vote 2016 − 2020.

Democratic vote. For example, the predominantly Republican (suburban Milwaukee) Waukesha County, Wisconsin had a 3.2 per 10,000 death rate and 5.6% increase in the Democratic vote in 2020 compared with 2016.

It remains unknown how partisan vote margins were influenced by perceptions of governmental policies enacted (or not enacted) because of the virus. It is possible that residents of high-mortality counties were more fearful about in-person voting, especially in areas where lower in-person voting was not offset by mail voting opportunities disproportionately used by Democratic-leaning residents. High-mortality county residents may have reacted more negatively to stricter lockdowns and business closures imposed or advocated by Democratic policymakers. Trump may have gained support among voters fearful of an economic collapse, especially in the absence of robust federal recovery spending in the months before the election.[9] It is also possible that residents of areas hit hardest by COVID-19 were simply exhausted by the economic and social disruption of the pandemic and may not have prioritized voting.

Conclusions

The 2020 US election saw a large Democratic shift by more affluent, educated suburban voters, ostensibly driven in part by the incumbent President Trump's 'anti-science' stance on the pandemic. These voters also tended to hold 'safer' jobs that permitted work from home. Conversely, working class voters who tended to have greater concerns over pandemic-related job losses held 'essential' or service sector jobs with a high risk of exposure to COVID-19 and lived in higher density housing, shifted towards Trump. Our 2020 election findings thus document the association of pandemic mortality rates and the ongoing dealignment of the U.S. party system.[10]

Author statements

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Ethical approval

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Competing interests

None declared.

Data availability statement

Data were aggregated from multiple publicly available sources which are cited previously. Aggregate data are available upon reasonable request to the corresponding author.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2021.06.011.

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