Disparity in COVID-19 Outcomes for Eastern North Carolina Compared to the State Overall (2020 Data)

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On March 2nd, 2020 North Carolina's first COVID-19 case was identified, and the first confirmed death occurred on March 12, 2020.[1] By the end of the year, 7,909 COVID-19 deaths had been reported in the state, and the virus had become the third leading cause of death for the entire year, surpassing stroke, despite emerging only in March (Fig. 1).[2] Despite the rapid shut-down of schools, businesses and public spaces, the virus spread quickly, with the number of cases and deaths peaking in July, and then again in the fall.

COVID-19 deaths occurred across all regions, age groups, and populations, but pre-existing disparities by population and geographic region emerged as important contributing factors. Nationwide, it quickly became clear that COVID-19 death rates were higher for non-Whites than Whites, although it remains unclear whether that disparity is due to race, or to other characteristics that, for reasons of structural inequality, align with racial groupings. [3,4] Individuals with certain chronic health conditions such as diabetes, obesity, and chronic kidney disease were at a significantly higher risk for severe COVID-19 and death. But, those conditions are also more prevalent for minority and low-income populations, making it difficult to distinguish a racial or income effect from a chronic condition effect. Age was also a key risk factor for severe COVID-19 and death;[3] 83% of the COVID-19 deaths in NC were in individuals age 65 or older. Occupation and household size also emerged as important factors in the spread of the virus, with those in frontline occupations at much greater risk of contracting the virus, while those in large or crowded households were less able to isolate when one or more members had the illness.

In this brief, we look at the disparity in COVID-19 mortality rates in 2020 for the 29-county eastern region of North Carolina (ENC29) and the state overall, with a particular focus on differences by race and sex.[5] Eastern NC is poorer and has more non-Whites than the rest of the state, and has historically had poorer health outcomes. The region also had higher COVID-19 mortality. Through a series of charts and graphs, we explore some of the social and health disparities that may be a factor in the COVID-19 disparities.

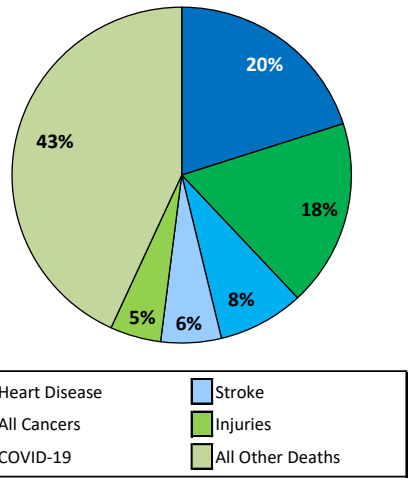
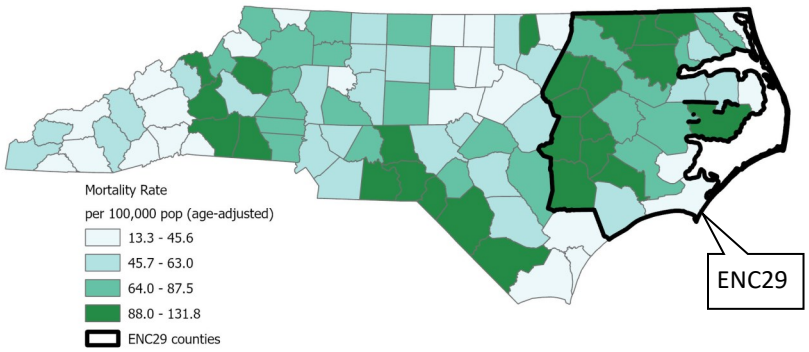


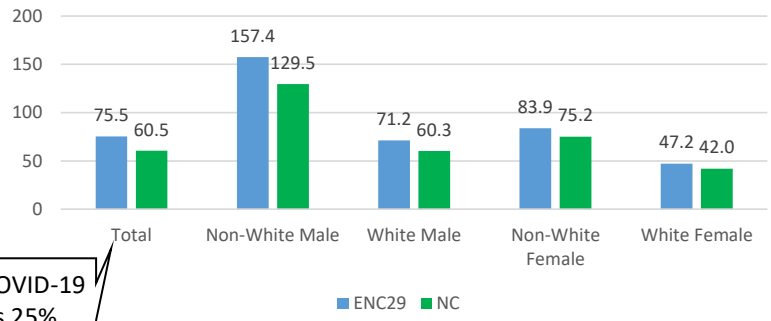
Figure 1. Distribution of Causes of Death in North Carolina in 2020

Figure 3. COVID-19 Mortality Rates by County (2020)



Source: NC Vital Statistics—Deaths 2020

Figure 4. COVID-19 Age-Adjusted Mortality Rate for ENC29 and NC by Race and Sex (2020) per 100,000 population



ENC's COVID-19 rate was 25% higher than NC's rate.

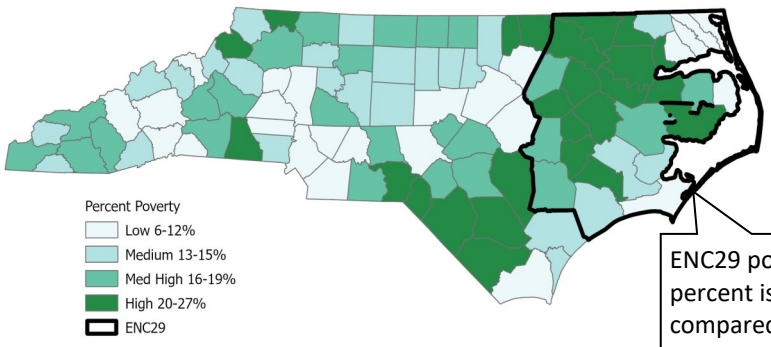
COVID-19 by Race and Sex

- **In ENC29 Non-White males make up 17% of the population but were 25% of the COVID-19 deaths.[2,7]**
- **Non-White females make up 18% of the population but 21% of the deaths.**

The total age-adjusted mortality rate due to COVID-19 for North Carolina in 2020 was 60.5 deaths per 100,000 population (Fig. 4). The COVID-19 mortality rate was higher for males than for females, and higher for non-Whites than for Whites (also see Fig. 2). Non-White males in NC had the highest rate, at 129.5. For the ENC29 region, the total death rate was 25% higher than the overall state rate, at 75.5 deaths per 100,000 population. The ENC29 COVID-19 mortality rates were higher than those for the state across all race and sex groups.

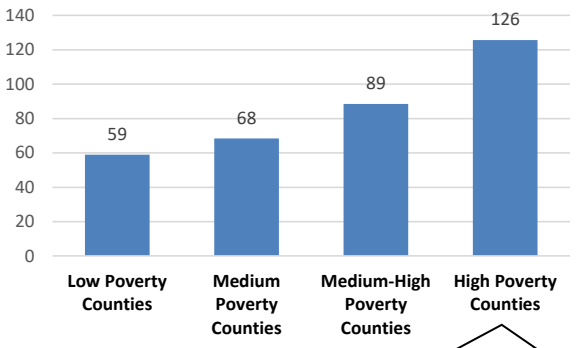
- **Low socioeconomic status is associated with higher COVID-19 incidence and mortality.[6]**
- **ENC29 is poorer, more rural, and less educated than the rest of the state.**

Figure 5. Percent Living in Poverty for NC Counties (2016-2020)



ENC29 poverty percent is 17%, compared to 14% for NC.

Figure 6. NC COVID-19 Mortality Rate by Poverty Category (2020)
per 100,000 population



Mortality rate for High Poverty counties is 113% greater than for Low Poverty counties.

Social and economic factors play an important role in geographic health disparities. Early research during the pandemic demonstrated that counties with lower socioeconomic status had higher rates of COVID-19 incidence and death. [6] ENC29 has lagged behind the rest of the state for many years on measures of health, income, education, and overall well being (Fig. 5). Percent poverty in ENC29 is 17%, compared to 14% for the state.[7] Twenty-two percent of the ENC29 over-25 years old population has a college degree, compared to 32% for the state. Forty-seven percent of ENC29's population lives in a community that is rural, compared to 34% for the state. Figure 5 shows that 14 of the counties in ENC29 are in the highest poverty quartile for the state. The COVID-19 mortality rate for high poverty counties was 113% greater than the rate for the lowest poverty counties (126 deaths per 100,000 compared to 59) (Fig. 6).

The CDC identified these chronic conditions as risk factors for serious COVID:[9]

- **Diabetes**
- **Kidney Disease**
- **Cardiovascular Disease**
- **Obesity**
- **COPD**

Figure 7. Prevalence (%) of Chronic Conditions for ENC29 and Rest of NC (2019)

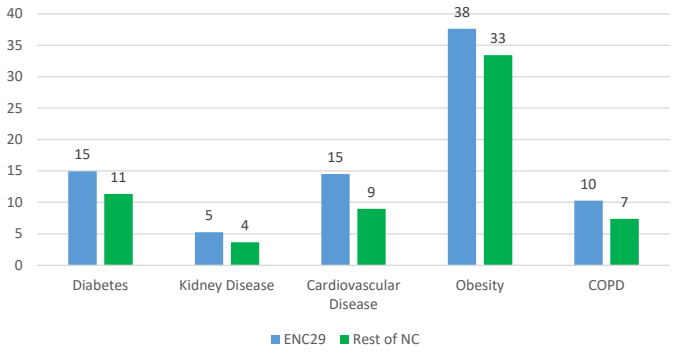
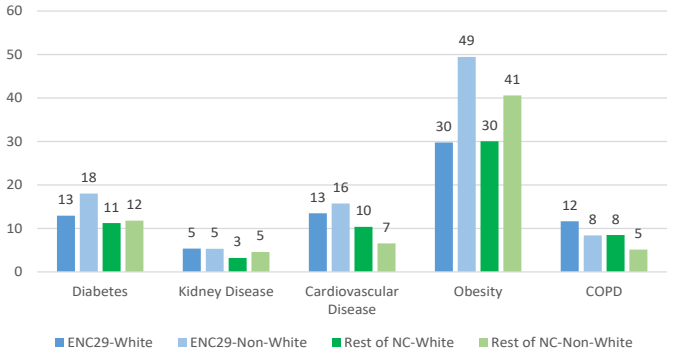


Figure 8. Prevalence (%) of Chronic Conditions for ENC29 and Rest of NC by Race (2019)

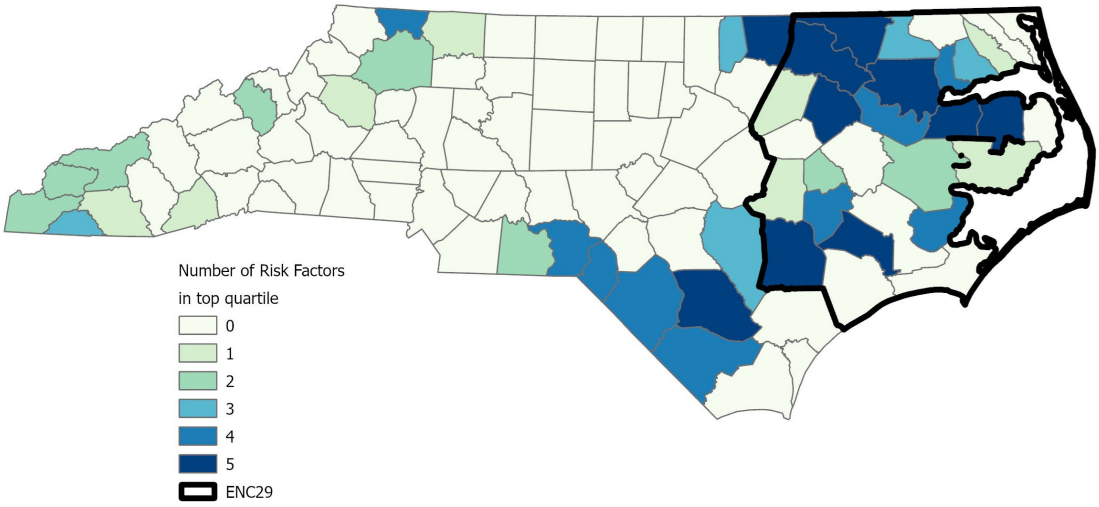


The CDC identified certain underlying chronic conditions that increase the risk for severe COVID-19 illness and death. These conditions are diabetes, chronic kidney disease, cardiovascular disease, COPD, and obesity. The prevalence of each of these conditions was higher in ENC29 than the rest of the state before the pandemic [8] (Fig. 7). Within ENC29 the prevalence of 3 of the conditions was higher for non-Whites than for Whites (diabetes, cardiovascular disease, obesity) (Fig. 8).

To assist in the identification of areas at higher risk for COVID-19, the CDC developed a county-level data and mapping tool using Behavioral Risk Factor Surveillance System data to estimate the prevalence of diseases considered a COVID-19 risk factor.[9] Data from this public online dataset was downloaded for North Carolina and individual counties were ranked for each disease.

The counties were then grouped into quartiles based on prevalence (low, medium, medium high, and high). In the map below (Fig. 9), counties were shaded based on the number of chronic diseases they had in the highest prevalence quartile. Many counties in ENC29 were in the top quartile for all 5 diseases.

Figure 9. Number of Chronic Conditions with Prevalence in the Top Quartile



The total mortality rate for North Carolina for 2020 was 13% higher than for 2019, largely due to COVID-19. The ENC29 2020 rate was 16% higher than 2019, and COVID-19 mortality was higher than the state for all individual race and gender categories. The ENC29 region has many of the social disparities that were associated with severe COVID-19 in the first year of the pandemic; it is poorer, has a larger proportion of non-White individuals, and has a higher prevalence of chronic conditions linked to poor outcomes, such as diabetes, obesity, and cardiovascular disease. By the end of 2020, however, the first COVID -19 vaccines were released. 2021 brought more COVID-19, but as the year progressed vaccines reached frontline workers and older adults, and some patterns changed. At the time this brief was prepared, we only had access to 2020 data, but a close examination of subsequent years is warranted, and may show very different patterns. COVID-19 will be an important topic for 2021, 2022, and for the foreseeable future.

References

1. NC COVID-19 Dashboard, NC DHHS COVID-19 Response.

2. North Carolina Vital Statistics—Deaths 2020. NC State Center for Health Statistics.

3. Selden TM, Berdahl TA. COVID-19 and racial/ethnic disparities in health risk, employment, and household composition. *Health Affairs.* 2020; 39(9): 1624-1632.

4. For this report non-White includes Black or African-American, American Indian or Alaska Native, Asian, Hawaiian or Pacific Islander, and Other.

5. For this report we used a 29 county definition of eastern North Carolina including just the northeastern counties because this region is the service area for ECUHealth (https://www.ecuhealth.org/).

6. Karmaker M, Lantz P, Tipirnen R. Association of social and demographic factors with COVID-19 incidence and death rates in the US. *JAMA Network Open.* 2021; 4(1): 1-12.

7. US Census, ACS 2016-2020. Note: Poverty is defined as the percent of individuals that live in a household where income is below the poverty threshold, which was $26,200 for a 4-person household in 2020.

8. North Carolina Behavioral Risk Factor Surveillance System. North Carolina State Center for Health Statistics, Division of Public Health, Raleigh, NC. 2019. Analysis by Satomi Imai, Department of Pbulic Health, East Carolina University.

9. Razzaghi H, et.al. Estimated county-level prevalence of selected underlying medical conditions associated with increased risk for severe COVID-19 illness—United States 2018. *Morbidity and Mortality Weekly Report*. Centers for Disease Control and Pre-

Suggested Citation

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