1. **Racial disparities in COVID-19 testing and outcomes (2021)**

Racial disparities in COVID-19 testing and infection rates.

White people had the lowest testing rates, while African American people had the highest unadjusted testing and mortality rates.

Hispanic people had the highest infection rates.

Non-White people had higher testing rates compared to White people, but significantly higher infection rates. The adjusted odds ratio for infection were significantly higher for African American, Hispanic, Asian, and other/unknown race groups compared to White people.

There were no significant racial differences in inpatient mortality or total mortality during the study period (Jan to Dec 2020) in North California.

For the infection, race was the most important predictor (80.3%) and for hospitalization and severity of illness upon admission, age was the most important predictor, with race contributing less to these outcomes.

It appears that there is a correlation between higher proportions of non-White people and increased COVID-19 infections. This suggests that geographic and community-level factors may play a significant role in the transmission and impact of COVID-19.

Comorbid conditions significantly contributed to the explanatory power of the models, especially for testing rates. However, the risk of race and ethnicity was substantially reduced when comorbidity was added to the models, indicating that health disparities are driven by a combination of race, ethnicity, and underlying health conditions.

**Interpretation:** The data highlights stark racial disparities in COVID-19 impact, with non-White populations, particularly African American and Hispanic individuals, experiencing higher testing and infection rates than White people. Despite these disparities in testing and infection rates, racial differences in mortality were not significant during the study period. The analysis suggests race as a crucial factor in infection rates, while age predominates in determining hospitalization and severity, although geographic and community-level factors also significantly influence COVID-19 transmission and outcomes. Importantly, the inclusion of comorbid conditions in the analysis diminishes the racial and ethnic disparities in testing rates, underscoring that health disparities are not solely due to race or ethnicity but are also significantly influenced by underlying health conditions.

1. **The impact of ethnicity on clinical outcomes in COVID-19: A systematic review (2020)**

Black, Hispanic, and Asian patients are more likely to test positive for COVID-19 more than White people.

Majority of studies have found Black and Asian people are at increased risk of hospitalization and ICU admission compared to White patients.

Black and Asian patients are at increased risk of death caused by COVID-19 compared to White patients.

**Interpretation:** The interpretation of these findings points to significant racial disparities in the impact of COVID-19. Black, Hispanic, and Asian populations are more likely to test positive for the virus than White individuals, suggesting higher exposure or transmission rates within these communities. Furthermore, the increased risk extends to more severe outcomes, with Black and Asian individuals facing a greater likelihood of hospitalization, ICU admission, and mortality due to COVID-19 compared to their White counterparts. These patterns underscore the need to address systemic health inequities and ensure equitable access to healthcare resources and protective measures for minority populations.

1. **Sex and gender differences in testing, hospital admission, clinical presentation, and drivers of severe outcomes from COVID-19 (2021)**

Males aged 18-74 have higher COVID-19 positivity and hospital admission rates compared to females.

The most significant gender disparity in positive COVID-19 cases is observed in the 50-64 and 18-49 age groups, favoring males. Conversely, the under 18 age group shows the smallest difference, and females over 75 have a higher percentage of positive cases than males.

Except for the under 18 category, males in all age groups are more likely to be admitted to the hospital than females, with the 65–74 age group displaying a statistically significant higher admission rate for males.

In the Black or African American demographic, males typically show a marginally higher positivity rate than females, a trend that is also observed in the Hispanic or Latino group, where the difference is more pronounced. The White or Caucasian group exhibits minimal difference between sexes.

Within the first 24 hours of medical presentation, males in the 18-49 age group face a significantly higher risk of severe disease or death compared to their female counterparts. For older age groups, the trend towards higher risk in males continues but lacks statistical significance, including in the over 75 age group where males have a seemingly lower risk, though not statistically significant.

**Interpretation:** The data indicates a clear gender and age-related disparity in COVID-19 outcomes, with males aged 18-74, especially those in the 50-64 and 18-49 age brackets, showing higher rates of positive cases and hospital admissions compared to females. This trend of higher severity in males extends across racial demographics, with Black and Hispanic or Latino males exhibiting higher positivity rates than their female counterparts, though the differences are more pronounced in the Hispanic or Latino group. Notably, younger males (18-49) are at a significantly higher risk for severe disease or death early in their medical care. However, this pattern of increased risk in males diminishes with age, and interestingly, males over 75 show a lower risk, although not statistically significant, highlighting the complex interplay of gender, age, and ethnicity in COVID-19's impact.

1. **Gender-based disparities in COVID-19 patient outcomes (2021)**

Before considering the biomarkers, there are no significant differences between males and females in terms of age, race, or the presence of other health conditions (comorbidities) for ICU admissions.

Both the baseline and maximal levels of inflammatory biomarkers, such as C-reactive protein (CRP) and ferritin, were significantly higher in men compared to women.

While baseline D-dimer levels were similar between sexes, the maximal D-dimer levels were significantly higher in men.

Men exhibited evidence of greater disease severity, demonstrated by a significantly higher admission rate to the ICU and a borderline higher hospital mortality rate.

**Interpretation:** The findings suggest that despite no initial differences in demographics or health status between men and women admitted to the ICU for COVID-19, significant disparities emerge in the progression and severity of the disease. Men have higher levels of inflammatory biomarkers, such as CRP and ferritin, indicating a more intense inflammatory response to the virus. Furthermore, men also show higher peaks in D-dimer levels, suggesting greater clotting activity, which is often associated with more severe disease manifestations. These biological markers correlate with clinical outcomes, where men not only have higher rates of ICU admission but also exhibit a trend towards increased mortality compared to women. This pattern underscores the need for gender-specific considerations in managing and treating COVID-19, reflecting the biological differences in response to the infection.

1. **Rural, underserved, and minority populations perceptions of COVID-19 information, testing, and vaccination: Report from a southern state (2022)**

Women, urban residents, and White individuals report better accessibility to information and higher confidence in protecting themselves, while racial minorities, rural populations, and younger individuals face more challenges. These insights underscore the critical need for public health communications to be tailored to address the specific barriers and concerns of diverse demographic groups to ensure equitable health outcomes during the COVID-19 pandemic.

1. **Black/African American Communities are at highest risk of COVID-19: spatial modeling of New York City ZIP Code level testing results (2020)**

The results indicate a significant disparity in COVID-19 risk based on racial composition and age within certain areas. Specifically, areas with a higher proportion of Black/African American residents experienced a nearly five-fold increase in the risk of testing positive for COVID-19 compared to areas with lower proportions. Additionally, factors such as the percentage of residents over 65, housing density, and the prevalence of heart disease roughly doubled the risk of a positive test. However, in a detailed analysis, the proportion of Black/African American residents and the percentage of older individuals were the predominant factors linked to increased testing positivity rates. This suggests that while environmental and health condition variables do influence COVID-19 risk, they do not fully account for the higher risk seen in areas with significant Black/African American populations, implying the presence of other underlying factors driving these disparities.

1. **Neighborhood inequity: Exploring the factors underlying racial and ethnic disparities in COVID19 testing and infection rates using ZIP code data in Chicago and New York (2020)**

The findings highlight significant disparities in COVID-19 testing and infection rates among different racial and ethnic communities, particularly in Hispanic-majority and Black-majority neighborhoods. Despite controlling for infection rates, Hispanic-majority neighborhoods experienced notably lower testing rates and higher infection rates, underscoring a pronounced public health disparity. Contributing factors to these disparities include lower population densities, socio-economic status, higher employment in healthcare services, and crowded living conditions, all of which are critical social determinants affecting COVID-19's spread and impact. The study suggests that these disparities may also stem from greater occupational exposure to the virus and the prevalence of multi-generational households in these communities. To mitigate the virus's spread and address these disparities, the study advocates for increased testing efforts in Hispanic-majority and other disadvantaged neighborhoods, suggesting that enhancing testing accessibility could lead to earlier detection, isolation of cases, and, ultimately, more equitable health outcomes across communities.

1. **Community and Socioeconomic Factors Associated with COVID-19 in the United States: Zip code level cross sectional analysis (2020)**

The results from the multivariable linear regression model demonstrate a clear link between certain demographic and household factors and the increased likelihood of COVID-19 cases. Specifically, a 1% increase in the proportion of residents over 65 years old, African American residents, females, and the number of persons per household, as well as in population density, were all significantly associated with a rise in the rate of COVID-19 cases within a community. These associations highlight key areas of concern, particularly in densely populated areas or those with higher numbers of vulnerable populations, where the risk of COVID-19 spread is elevated.

Interestingly, the analysis indicates that these same factors do not significantly impact mortality rates in areas with higher than median numbers of COVID-19 deaths. This suggests a complex relationship between infection rates and mortality, where the factors that drive infections might not directly influence death rates, pointing to the need for further research to understand the mechanisms at play.

The findings also draw attention to the broader challenges of managing public health crises like COVID-19 in densely populated and socio-economically disadvantaged neighborhoods. High population density, which hampers effective social distancing, along with the highlighted demographic factors, underscores the historical and ongoing challenges in controlling infectious diseases in such settings. The disproportionate impact of the pandemic on communities of color and poorer neighborhoods further emphasizes existing social and health inequities, necessitating targeted public health strategies and interventions to mitigate these disparities.

1. **Association of zip codes vaccination rate with COVID-19 mortality in Chicago, Illinois (2022)**

The study underscores significant disparities in COVID-19 vaccination rates among various demographics, with older and non-Hispanic White individuals being more vaccinated compared to non-Hispanic Black and Hispanic populations. These disparities are further influenced by socioeconomic factors, such as income and health insurance coverage, with higher vaccination rates observed in wealthier and insured segments. The analysis reveals a strong negative correlation between vaccination rates and COVID-19 mortality, highlighting the effectiveness of vaccines in reducing death rates during both the Alpha and Delta waves. A notable finding is that increasing vaccination coverage could have significantly lowered mortality rates, suggesting that up to 75% of deaths in the least vaccinated quartile were potentially avoidable. This emphasizes the critical importance of enhancing vaccination efforts, especially in under-vaccinated and socioeconomically disadvantaged communities, to mitigate the impact of COVID-19 and reduce mortality rates effectively.