The coronavirus COVID-19 pandemic currently besetting the United States, with over 9 million confirmed cases and 230,000 deaths as of November 1, 2020, has displayed an uneven and constantly evolving geography across the rural-urban continuum. The virus arrived in the United States in early winter and spread quickly in metropolitan areas. Data from the U.S. Census Bureau indicates that COVID-19, as of late October, was widespread across the United States but more prevalent in nonmetropolitan areas. This is consistent with the fact that deaths in nonmetropolitan areas surpassed those in metropolitan areas starting in late August. Over time and across urban and rural areas, three COVID-19 death flare-ups are evident. The first flare-up occurred primarily in large metropolitan and rural areas, three COVID-19 death flare-ups are evident. The first flare-up occurred primarily in large metropolitan and rural areas, and areas, three COVID-19 death flare-ups are evident. The first flare-up occurred primarily in large metropolitan and rural areas, and areas, three COVID-19 death flare-ups are evident. The second flare-up, which began with a rise in cases in early July and a rise in deaths two weeks later, was different in two respects. First, it initially involved both rural and urban areas as the virus spread from major urban areas. Second, while the increase in the weekly rate of infections was larger in the initial flare-up, the spike in deaths was much smaller because testing was more widespread, the infected population was younger and less vulnerable, and treatments were more effective.

The third flare-up, ongoing as of this writing, presents an urban-rural geography exactly the opposite of the initial flare-up, being higher the more rural is the type of area across the urban-rural scale. Rural rates of COVID-19 mortality were never previously higher than they were in late October, and while some cases during this period suggests that rural mortality is likely to continue increasing. In contrast, rates in large metro areas were the lowest since the beginning of the pandemic, although their recent rise in cases rates suggests that this may change.

COVID-19 and Rural Healthcare Resources

Several factors likely help explain relatively higher rural COVID-19 adult death rates in late October. The first is that rural areas had more cases of infection per 100,000 adults than urban areas in early September. This is not the whole story, however, as there were two average weekly rural deaths per 100 cases of infection 2 weeks prior (to account for lag between infections and deaths) in late October, 50 percent higher than the corresponding rural death rate of 1.4. The population appears to be more vulnerable to serious infection in several ways. The Centers for Disease Control and Prevention (CDC) identified two personal characteristics of people highly vulnerable to the coronavirus: (1) old age, especially very old age (over 75), and (2) the presence of underlying health problems. People may also be more vulnerable when they have difficulty accessing healthcare, measured here as lacking health insurance and residing far from hospitals. In each case, rural residents are much more likely to live in a high vulnerability county (top 20 percent of all counties) than are metro residents.

Nonmetro population characteristics and hospital distance indicate ways the rural population is more vulnerable to severe illness or death from COVID-19 infection than the metro population.

Percentages of nonmetro and metro adult populations in U.S. high vulnerability counties (in top 20 percent) defined by each source of vulnerability

<table>
<thead>
<tr>
<th>Vulnerability Source</th>
<th>Nonmetro</th>
<th>Metro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underlying health problems (ages 20 to 84)</td>
<td>23.7</td>
<td>3.0</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old adult population scale</td>
<td>15.9</td>
<td>4.0</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low death rate</td>
<td>20.2</td>
<td>10.5</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance to hospital with intensive care unit (ICU)</td>
<td>11.3</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Note: Underlying health problems are measured on the average yearly age-standardized mortality rate in 2014-18 from natural causes (excludes accidents, including overdoses; homicide, and suicide). The old adult population scale is measured by the percent of adult population ages 60 to 74 plus double the percent age 75 and over. Distance is measured between county geographic centers. Both nonmetro and metro population percentages can be lower 20 percent vulnerability is greater in counties with relatively small populations.


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Nonmetro population characteristics and hospital distance indicate ways the rural population is more vulnerable to severe illness or death from COVID-19 infection than the metro population.

Comparing COVID-19 case rates across time and space is sometimes problematic because infection with the coronavirus can result in a wide range of outcomes, ranging from no symptoms to serious illness and death. Deaths from COVID-19, as measured so far using data collected from COVID-19 may provide a better gauge of the extent to which severe COVID-19 infections are affecting the population and the likely demand on rural healthcare resources. Over time and across urban and rural areas, three COVID-19 death flare-ups are evident. The first flare-up occurred primarily in large metropolitan and rural areas, and areas, three COVID-19 death flare-ups are evident. The second flare-up, which began with a rise in cases in early July and a rise in deaths two weeks later, was different in two respects. First, it initially involved both rural and urban areas as the virus spread from major urban areas. Second, while the increase in the weekly rate of infections was larger in the initial flare-up, the spike in deaths was much smaller because testing was more widespread, the infected population was younger and less vulnerable, and treatments were more effective. The third flare-up, ongoing as of this writing, presents an urban-rural geography exactly the opposite of the initial flare-up, being higher the more rural is the type of area across the urban-rural scale. Rural rates of COVID-19 mortality were never previously higher than they were in late October, and while some cases during this period suggests that rural mortality is likely to continue increasing. In contrast, rates in large metro areas were the lowest since the beginning of the pandemic, although their recent rise in cases rates suggests that this may change.

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Not all counties have medical care facilities. In 2016-17, 116 counties (4 percent) in the United States were without a clinic, Health Maintenance Organization medical center, Rural Health Clinic, or hospital to provide basic medical care to residents. Ninety-seven of these counties (83 percent) are nonmetro, and most of them (73 counties, or 63 percent) are low distance if they are at least 32.4 miles from the county with an intensive care unit (ICU). Some of these counties, particularly when other counties in their hospital service areas were also experiencing flare-ups. The rural population is more vulnerable to severe illness or death from COVID-19 infection than the metro population.

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COVID-19 Cases in Meatpacking-Dependent Counties

Just over 500,000 people work in the meatpacking industry in the United States. Many plants are in cities such as Sioux Falls, SD, where meatpacking is just one of many major employers. However, several other plants are in much smaller municipalities such as Dakota City, NE, and Worthington, MN, where meatpacking is the primary employer in the city. In 56 counties in the United States—49 nonmetro counties and 7 metro counties—meatpacking is estimated to account for more than 20 percent of all county employment.

While these counties make up 2.5 percent of all rural counties and 0.6 percent of urban counties, they represent 19.0 percent and 2.9 percent, respectively, of all meatpacking employment in the United States. The employment dependence of these counties on a single industry makes meatpacking a unique phenomenon where meatpacking is the primary employer in the county. In 56 counties in the United States—49 nonmetro counties and 7 metro counties—meatpacking is estimated to account for more than 20 percent of all county employment.

Unlike the reductions in employment experienced in most nonmetropolitan areas, the two largest meatpacking counties saw decreases in meatpacking employment from January to March, but experienced significant increases through September. Beginning in mid-February, the number of cases of COVID-19 in meatpacking-dependent counties started to outpace those seen in all other counties across the country.

The 2-week moving average number of new cases rose in meatpacking-dependent counties through the remainder of April, reaching a peak of nearly 50 cases per 100,000 population by the end of the month. More than 10 times the prevalence seen in other rural counties. Even though cases in meatpacking-dependent counties started to decline in May, they remained significantly higher compared to other rural counties, falling to just under 7 times the number of average daily cases per 100,000 population by the end of May. Partial plant closures and increased social distancing protocols were implement ed in meatpacking plants across the country starting in late May. These measures appear to have slowed infection rates, as June saw a sharp reduction in cases in meatpacking-dependent counties. As the pandemic began to spread more widely throughout rural America in July, rates in meatpacking-dependent counties leveled off and then declined slightly in August. Both meatpacking-dependent and other rural counties saw modest declines in the 2-week moving average number of new daily cases per 100,000 through mid-September. Since September 15, all rural counties have seen a surge in average new cases per 100,000. This surge in rural new cases does not appear to be driven by new outbreaks in the meatpacking industry, as meatpacking-dependent counties have maintained an almost identical pattern to other rural counties for the 4 most recent weeks of data.

COVID-19 case rates remained much higher in meatpacking counties compared to other nonmetro counties from May through mid-July

Two-week moving average of new daily COVID-19 cases per 100,000 population since March 1, 2020, in nonmetro counties with 20 percent or more employment in meatpacking compared to all other rural counties in the United States

Two-week moving average of new daily COVID-19 cases, per 100,000 population

Counties. High rates of COVID-19 cases in many nonmetro areas were associated with economic activities that did not shed jobs, most notably farming and meatpacking.

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Summary of new daily COVID-19 cases per 100,000 population during the last 3 weeks of October

The spread of the pandemic varied across rural counties, shaped in part by the dominant economic sector (e.g., recreation and manufacturing-dependent) and rural counties with a high proportion of jobs in meatpacking operations, COVID-19 case peaks at the end of April at nearly 50 per 100,000 population, compared with roughly 5 per 100,000 in other rural counties.

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This pattern is consistent with national job loss trends. The leisure and hospitality sector declined 42 percent between February and April, the largest percentage decline in employ -ment in any major sector during this period. Employment in agri -culture declined only 1.2 percent during the same period, helping to explain the lower unemploy -ment rate in farm-dependent counties. Higher rates of COVID-19 cases in many nonmetro areas were associated with economic activities that did not shed jobs, most notably farming and meatpacking.

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