Do Masks Matter in Kansas?

Carlos Zambrana, Associate Researcher, Institute for Policy & Social Research
Donna K. Ginther
Roy A. Roberts Distinguished Professor of Economics
Director, Institute for Policy & Social Research, University of Kansas
Research Associate, National Bureau of Economic Research

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Do Masks Work?

- On July 3rd, the Governor implemented a mask mandate for the state of Kansas.
- Counties could opt-out of the mandate.
- Some cities imposed a mandate but the surrounding county did not
  - Manhattan has a mask mandate but Riley County does not.

Source: IPSR
We can think of counties with a mask mandate as the treatment and counties without a mask mandate as the control. Taking the difference in the difference in cases for the treatment and control groups provides an estimate of the treatment effect of masks on cases.
• Daily total number of cases per county March – October 11th

• 2019 Population per County
  • US Census Bureau

• City and County Face mask policies

• Social Mobility Data
  • Maryland Transportation Institute
  • https://data.covid.umd.edu
# Dates of County Mask Orders

## New Counties

<table>
<thead>
<tr>
<th>County</th>
<th>Date Adopted</th>
<th>Enforced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geary</td>
<td>8/5/2020</td>
<td>Y</td>
</tr>
<tr>
<td>Gove</td>
<td>8/3/2020</td>
<td>Y</td>
</tr>
<tr>
<td>Grant</td>
<td>7/3/2020</td>
<td>N</td>
</tr>
<tr>
<td>Harvey</td>
<td>9/16/2020</td>
<td>Y</td>
</tr>
<tr>
<td>Morris</td>
<td>7/10/2020</td>
<td>Y</td>
</tr>
<tr>
<td>Pratt</td>
<td>7/16/2020</td>
<td>Y</td>
</tr>
<tr>
<td>Republic</td>
<td>8/4/2020</td>
<td>Y</td>
</tr>
<tr>
<td>Saline</td>
<td>7/9/2020</td>
<td>Y</td>
</tr>
<tr>
<td>Scott</td>
<td>8/10/2020</td>
<td>Y</td>
</tr>
<tr>
<td>Sedgwick</td>
<td>9/9/2020</td>
<td>Y</td>
</tr>
<tr>
<td>Stanton</td>
<td>7/23/2020</td>
<td>Y</td>
</tr>
</tbody>
</table>

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Kansas 7-Day Rolling Average Daily Cases per 100K Population

- Counties with a mask mandate saw a decrease starting 14 days after the mandate
- New spikes afterwards despite mandate
- Mask counties held cases flat
- No-Mask counties steadily increasing
Johnson County vs. No Mask Counties 7-Day Rolling Average

- Johnson County had a decrease starting 14 days after the mandate
- Results are not increasing over time for Johnson County
- No-Mask counties now have much higher case rates than Johnson County
Sedgwick County vs. No Mask Counties 7-Day Rolling Average

- Sedgwick County had a decrease starting 23 days after the mandate
- No-Mask counties now have much higher case rates than Sedgwick County
Difference-in-Differences Model

What is the average effect starting 21 days after the mandate?

\[ Y_{it} = \alpha + \beta \text{Mandate}N_{it} + \eta X_t + \gamma_t + \delta_t + \epsilon_{it} \]

Where:
- \( Y_{it} \): Daily cases in county \( i \) at day \( t \)
- \( \text{Mandate}N_{it} \): Dummy equal to one starting \( N = 21 \) days since mask mandate in county \( i \), and zero otherwise
- \( X_t \): A vector with variables controlling for social distancing behavior
- \( \gamma_t \): A vector with day fixed effects
- \( \delta_t \): A vector with county fixed effects
- \( \epsilon_{it} \): Error term
Difference-in-Difference Estimates

- Mask mandate associated with an average 7 fewer cases per day in Kansas and 6.5 fewer cases in Johnson County (50% reduction)
- Sedgwick County: between 9 fewer cases (61% reduction)
- Analysis drops counties that had late mandate, no enforcement or city-only mandates.

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<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Full Sample</th>
<th>Johnson</th>
<th>Sedgwick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mask Mandate + 21 days</td>
<td>-7.30***</td>
<td>-7.12***</td>
<td>-6.49*</td>
</tr>
<tr>
<td></td>
<td>(1.13)</td>
<td>(1.15)</td>
<td>(3.88)</td>
</tr>
<tr>
<td></td>
<td>(5.69)</td>
<td>(9.09)</td>
<td>(9.62)</td>
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<tr>
<td>Observations</td>
<td>11,424</td>
<td>11,424</td>
<td>9,928</td>
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<tr>
<td>R-squared</td>
<td>0.24</td>
<td>0.24</td>
<td>0.25</td>
</tr>
<tr>
<td>Number of Counties</td>
<td>84</td>
<td>84</td>
<td>73</td>
</tr>
<tr>
<td>Average New Daily Cases</td>
<td>14.27</td>
<td></td>
<td>14.99</td>
</tr>
<tr>
<td>County FE</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Day FE</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

Note: Non-Enforcers, Late Adopters and Mixed Counties dropped. Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Do Masks Work in Kansas?

- Yes!
  - We found a 50% reduction in the spread of COVID-19 in counties that had a mask mandate compared to those without.
  - Masks do not eliminate COVID, but they significantly slow the spread of the disease.
Thank You!

Thank You

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