Figure S1. County-level maps. (a) COVID-19 case status. Counties in grey had at least one confirmed case by 23 June 2020. Counties in white had not confirmed cases and were not used in the analysis. (b) Urban-rural status. Counties were colored based on their 2013 rural-urban continuum code (United States Department of Agriculture Economic Research Service).
Table S1. Null and full model significance and fit statistics. Significance values and fit statistics for both null (variable(s) of interest only) and full models (variable(s) of interest and confounding factors).

|                          | Null Model |                  | Full Model |                  |
|--------------------------|------------|-----------------|------------|-----------------|
|                          | F-Value    | p-Value         | AICc Score | F-Value         | p-Value         | AICc Score     |
| Deaths per 100,000       |            |                 |            |                 |                 |                |
| Rural-Urban              | 19.72      | <0.001          | 1.19       | 19886.36        | 10.56           | <0.001         | 1.20           | 19532.88       |
| Region                   | 50.93      | <0.001          | 0.98       | 19818.26        | 19.37           | <0.001         | 1.21           | 19530.05       |
| Interaction              | -          | -               | -          | 4.45            | <0.001          | 1.29           | 19408.39       |
| Deaths per cases         |            |                 |            |                 |                 |                |                |
| Rural-Urban              | 12.61      | <0.001          | 1.31       | -7677.06        | 7.32            | <0.001         | 1.30           | -7692.80       |
| Region                   | 19.20      | <0.001          | 1.47       | -7559.42        | 17.35           | <0.001         | 1.32           | -7714.03       |
| Interaction              | -          | -               | -          | 3.14            | <0.001          | 1.25           | -7780.82       |
Table S2. Population mortality rate estimates for interaction model. Model-corrected mean mortality rate per 100,000 for the interaction between US region and Rural-Urban Continuum Code. Confidence Intervals are 95%.

| Rural-Urban Code | US Region | Mean   | Lower CI | Upper CI |
|------------------|-----------|--------|----------|----------|
| 1                | Midwest   | 27.0286| 19.003   | 38.4437  |
| 2                | Midwest   | 15.8208| 10.6489  | 23.5045  |
| 3                | Midwest   | 19.8212| 14.1444  | 27.7765  |
| 4                | Midwest   | 21.052 | 13.9772  | 31.7077  |
| 5                | Midwest   | 13.5222| 7.4193   | 24.6452  |
| 6                | Midwest   | 18.1381| 14.0858  | 23.3561  |
| 7                | Midwest   | 10.7542| 8.1033   | 14.2721  |
| 8                | Midwest   | 13.5124| 8.874    | 20.5751  |
| 9                | Midwest   | 13.5222| 7.4193   | 24.6452  |
| 1                | Northeast | 54.1714| 33.9185  | 86.5175  |
| 2                | Northeast | 44.4105| 26.3462  | 74.8606  |
| 3                | Northeast | 27.7557| 14.4771  | 53.2136  |
| 4                | Northeast | 17.7833| 9.3515   | 33.8177  |
| 5                | Northeast | 3.939  | 0.3149   | 49.2679  |
| 6                | Northeast | 16.0482| 8.6996   | 29.6042  |
| 7                | Northeast | 2.862  | 1.2247   | 6.688    |
| 8                | Northeast | 2.9336| 0.6537   | 13.1659  |
| 9                | Northeast | 0.000015| 1.08×10^{-153} | 2.22×10^{143} |
| 1                | Southeast | 12.3538| 9.2226   | 16.5481  |
| 2                | Southeast | 8.8594 | 6.7271   | 11.6676  |
| 3                | Southeast | 12.6128| 9.3781   | 16.9633  |
| 4                | Southeast | 8.4136 | 5.3947   | 13.1221  |
| 5                | Southeast | 11.9758| 5.6148   | 25.5431  |
| 6                | Southeast | 13.45  | 10.4369  | 17.3331  |
| 7                | Southeast | 12.4522| 8.8415   | 17.5375  |
| 8                | Southeast | 8.0411 | 5.4204   | 11.9289  |
| 9                | Southeast | 9.9245 | 6.5864   | 14.9542  |
| 1                | Southwest | 4.9543 | 2.8597   | 8.583    |
| 2                | Southwest | 8.2249 | 4.6702   | 14.4853  |
| 3                | Southwest | 11.9765| 6.3992   | 22.4147  |
| 4                | Southwest | 14.2088| 6.7676   | 29.8317  |
| 5                | Southwest | 15.5039| 6.0647   | 39.6348  |
| 6                | Southwest | 8.6809 | 5.8062   | 12.9787  |
| 7                | Southwest | 7.2489 | 4.4667   | 11.7641  |
| 8                | Southwest | 4.6357 | 2.01     | 10.6912  |
| 9                | Southwest | 4.4569 | 2.4267   | 8.1854   |
| 1                | West      | 10.0353| 5.4573   | 18.4535  |
| 2                | West      | 7.688  | 4.4391   | 13.3146  |
| 3                | West      | 7.0635 | 4.0683   | 12.2638  |
| 4                | West      | 3.3839 | 1.6676   | 6.8669   |
| 5                | West      | 4.6738 | 2.1044   | 10.3803  |
| 6                | West      | 7.8265 | 4.388    | 13.9594  |
| 7                | West      | 11.6106| 7.7199   | 17.4621  |
| 8                | West      | 1.8717 | 0.6598   | 5.31     |
| 9                | West      | 1.7126 | 0.9482   | 3.093    |
Table S3. Case fatality rate estimates for interaction model. Model-corrected mean case fatality rate percentage (CFR%) for the interaction between US region and Rural-Urban Continuum Code. Confidence Intervals are 95%.

| Rural-Urban Code | US Region | CFR % | Lower CI | Upper CI |
|------------------|-----------|-------|----------|----------|
| 1                | Midwest   | 5.7   | 5.0      | 6.5      |
| 2                | Midwest   | 4.8   | 4.1      | 5.7      |
| 3                | Midwest   | 4.5   | 3.8      | 5.2      |
| 4                | Midwest   | 4.3   | 3.6      | 5.1      |
| 5                | Midwest   | 4.6   | 3.5      | 6.1      |
| 6                | Midwest   | 5.9   | 5.3      | 6.7      |
| 7                | Midwest   | 5.5   | 4.7      | 6.5      |
| 8                | Midwest   | 9.8   | 8.1      | 11.8     |
| 9                | Midwest   | 8.0   | 6.3      | 10.2     |
| 1                | Northeast | 7.4   | 6.3      | 8.5      |
| 2                | Northeast | 6.4   | 5.4      | 7.7      |
| 3                | Northeast | 5.6   | 4.4      | 7.1      |
| 4                | Northeast | 4.0   | 3.1      | 5.2      |
| 5                | Northeast | 3.0   | 1.0      | 8.1      |
| 6                | Northeast | 4.6   | 3.5      | 6.0      |
| 7                | Northeast | 4.5   | 3.0      | 6.8      |
| 8                | Northeast | 4.7   | 2.0      | 10.7     |
| 9                | Northeast | 9.4   | 4.9      | 17.2     |
| 1                | Southeast | 4.3   | 3.8      | 4.8      |
| 2                | Southeast | 3.8   | 3.4      | 4.3      |
| 3                | Southeast | 4.2   | 3.7      | 4.8      |
| 4                | Southeast | 3.4   | 2.8      | 4.1      |
| 5                | Southeast | 4.7   | 3.4      | 6.3      |
| 6                | Southeast | 4.2   | 3.8      | 4.7      |
| 7                | Southeast | 4.2   | 3.6      | 4.9      |
| 8                | Southeast | 4.3   | 3.6      | 5.3      |
| 9                | Southeast | 5.2   | 4.2      | 6.4      |
| 1                | Southwest | 4.7   | 3.6      | 6.0      |
| 2                | Southwest | 5.7   | 4.5      | 7.3      |
| 3                | Southwest | 5.0   | 3.7      | 6.7      |
| 4                | Southwest | 5.2   | 3.8      | 7.1      |
| 5                | Southwest | 6.2   | 4.3      | 8.9      |
| 6                | Southwest | 6.0   | 5.0      | 7.3      |
| 7                | Southwest | 7.2   | 5.5      | 9.4      |
| 8                | Southwest | 9.3   | 6.0      | 14.0     |
| 9                | Southwest | 22.8  | 17.3     | 29.4     |
| 1                | West      | 5.4   | 4.2      | 7.0      |
| 2                | West      | 4.7   | 3.6      | 6.0      |
| 3                | West      | 4.9   | 3.8      | 6.2      |
| 4                | West      | 3.7   | 2.4      | 5.7      |
| 5                | West      | 4.3   | 2.5      | 7.1      |
| 6                | West      | 5.1   | 3.6      | 7.2      |
| 7                | West      | 6.0   | 4.7      | 7.7      |
| 8                | West      | 3.9   | 1.4      | 10.1     |
| 9                | West      | 7.0   | 3.8      | 12.4     |