Rural COVID-19 Cases Lag Urban Areas but Are Growing Much More Rapidly

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A number of organizations have been warning that COVID-19 infections could not only be more common but also impact rural areas more than large metropolitan centers.[1] At first glance this seems counterintuitive given that rural populations are more spread out and, indeed, the early infection hotspots in the U.S. were all based in large cities, including especially New York City. This is also where the more rapid daily increases have been observed to date.[2]

Data compiled since February of this year by the *New York Times*[3] show that the virus not only is starting to spread in rural areas but that it is now growing *dramatically* more rapidly than was the case in metro areas at a comparable stage (once a total of 10 cases occurred, see Fig. 1). In this figure we show rates in metro areas, and we separate non-metro areas into those that are and are not adjacent to metro areas (see also Fig. A1 in the Appendix).
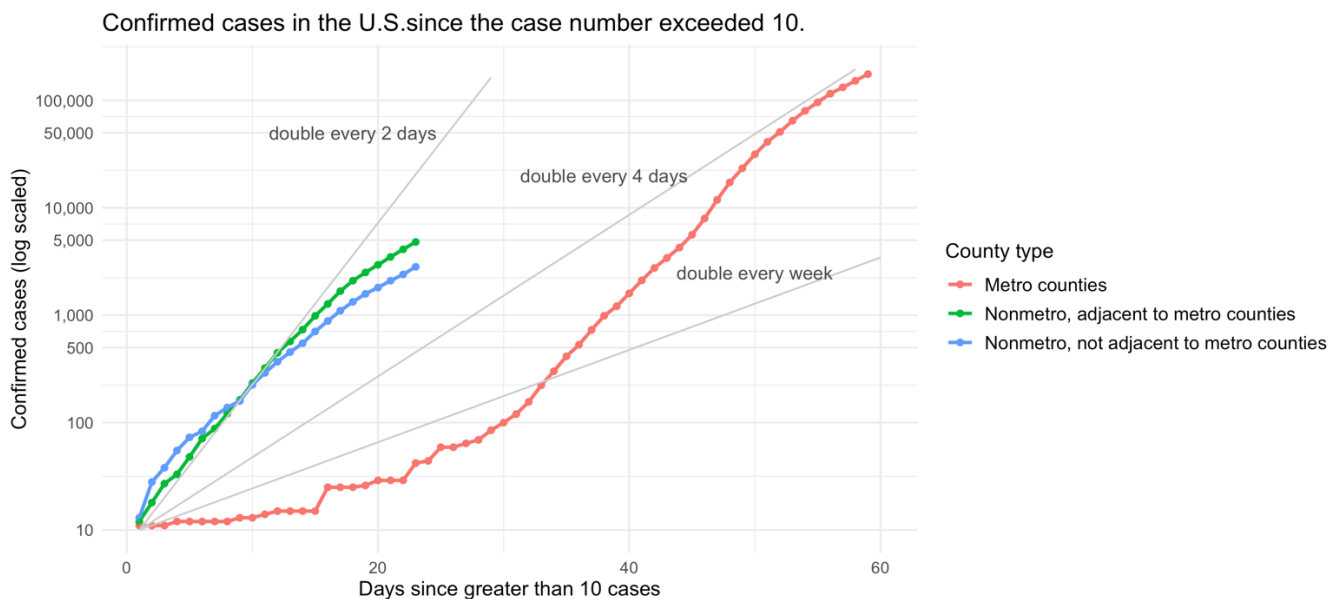

Figure 1: Confirmed COVID-19 Cases by County Type Over Time, Once Cases Reached 10. Data source: *The New York Times*, Economic Research Service, U.S. Department of Agriculture, and the authors' calculation.

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[*] Correction (4/4/2020): In the parenthetical note in paragraph 2, "deaths" was replaced with "cases": (once a total of 10 ~~deaths~~ cases were confirmed); (4/9/2020): Rural death rates in Fig. 4 are NOT rising as rapidly as those in metro areas at this time. Thanks to an alert Facebook follower for noticing this. We are in the process of updating these numbers and are also exploring different visualizations and representations (benchmarking) of the data.

A number of possible causes for this trend are being discussed. Rural communities have more older residents[4] with chronic diseases, who are more susceptible to viral diseases. In comparison to metro areas, non-metro area residents have a higher rate of heart and chronic lower respiratory diseases and cancer[5] and are more likely to smoke.[6] Many rural areas are also tourism hotspots, such as Blaine County (Idaho), Summit County (Utah) or Eagle County (Colorado), which led to an initial surge of disease spread.[7] Even though many rural residents are isolated, they need to drive to larger cities for their jobs, business, medical treatment and entertainment, which potentially exposes them to the virus.[8] Anecdotal evidence suggests rural residents socialize more even though (or because) they live in lower density areas, e.g., in churches and choir practices, and community social events, all of which are conducive to spreading the disease.

Figure 1 shows that while the disease arrived later in non-metro or rural areas, the rural case load growth is now such that it doubles every two to three days. In contrast, urban cases are doubling, from a higher base or total number, every four days. Also noteworthy in Fig. 1 is that the line for metro-non-adjacent rural counties is now below that for adjacent counties (after starting out above it), suggesting that social distancing may be having a greater impact there.

Even as rural cases grow rapidly, they are still far behind urban cases on a per capita basis (Fig. 2). Non-metro areas include just over 46 million residents or 14% of the total U.S. population; of these 46 million, about 30 million are in metro-adjacent rural counties and about 16 million are in metro-non-adjacent rural counties[9] (see Fig. A1). As of this writing, there are on average 73.2 positive cases per 100,000 population in metro areas compared with 18.7 in metro-adjacent non-metro counties and 26.0 cases per 100,000 in metro-non-adjacent counties (indicating a higher attack rate there).
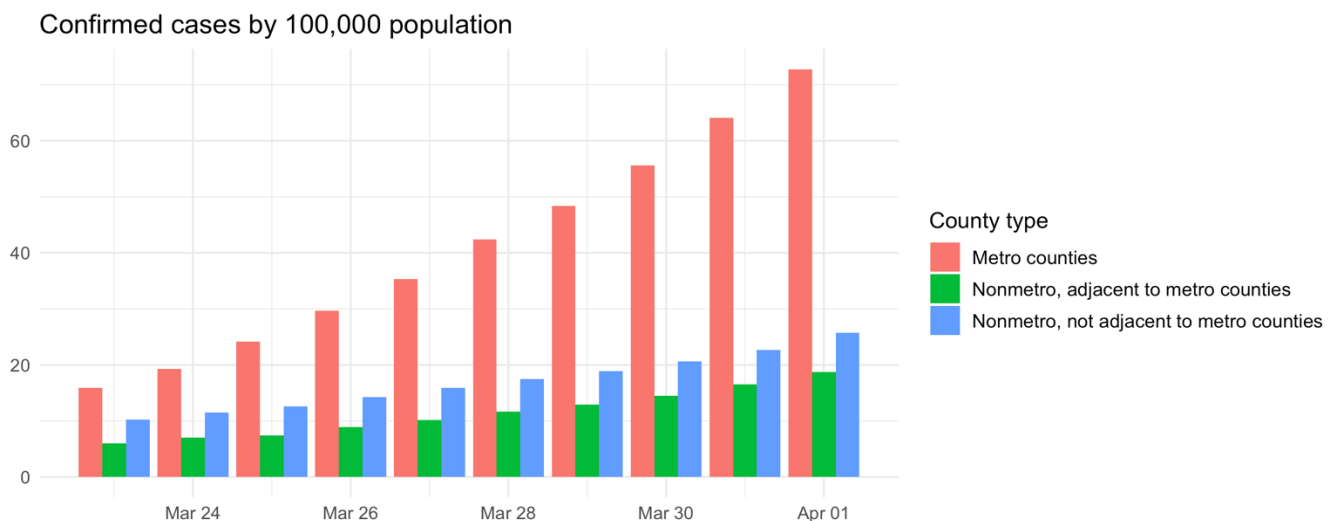
Confirmed cases by 100,000 population

Figure 2. Confirmed Cases per 100,000 Population by County Type. Data source: *The New York Times*, the 2014-18 American Community Survey, Economic Research Service, U.S. Department of Agriculture, and authors' calculation.

A somewhat different picture emerges for the growth in death rates (Fig. 3). In non-metro counties that are not adjacent to metro counties these double about every four days, while that is closer to every three days in metro counties and in counties that are adjacent to metro areas.
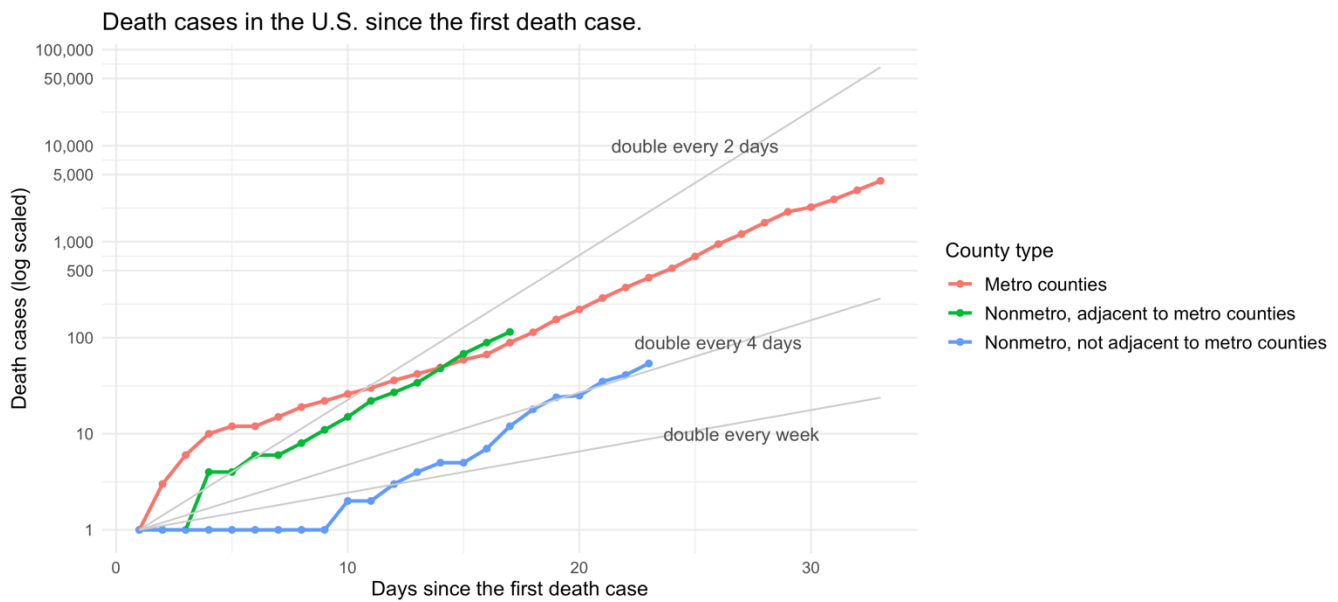
Figure 3: Number of Deaths by County Type Over Time Since the First Case. Data source: *The New York Times*, Economic Research Service, U.S. Department of Agriculture, and the authors' calculation.

There is a growing discrepancy in the number of deaths per capita in the two non-metro region types, neither of these rates is catching up with those in urban areas (Fig. 4).
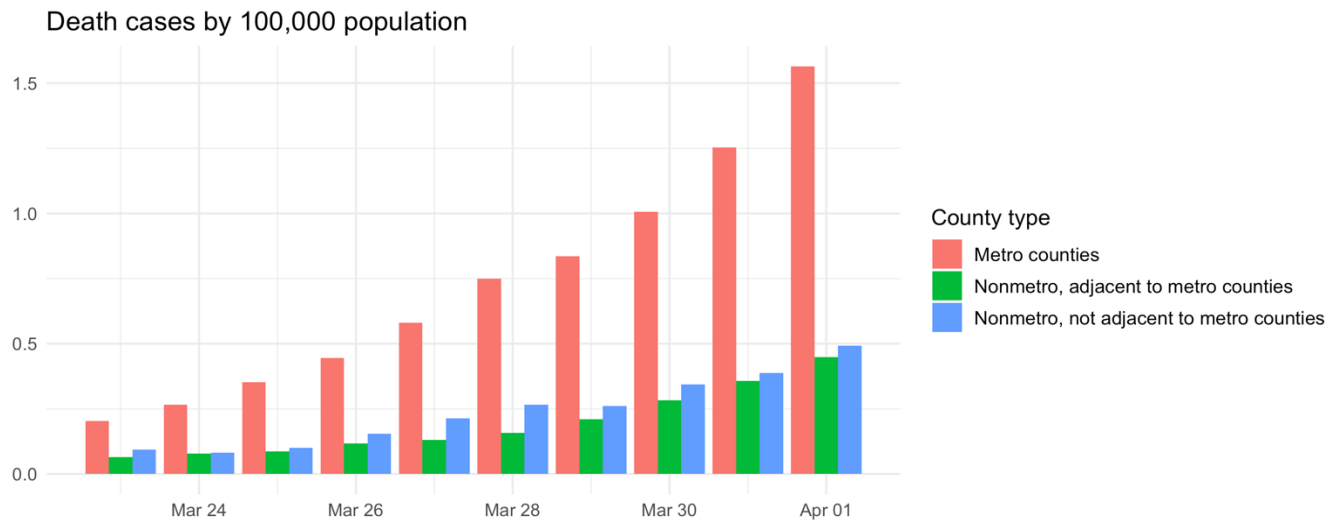

Figure 4. Deaths per 100,000 Population by County Type. *The New York Times*, the 2014-18 American Community Survey, Economic Research Service, U.S. Department of Agriculture, and the authors' calculation.

The road ahead: One critical question is how rural medical services will be able to cope with the growing number of positive cases, and individuals who require intensive care. Another is, how quickly will they be able to flatten their curves through social distancing and related strategies.

[1] E.g.,: L. Parshley, "The coronavirus may hit rural America later — and harder," March 28, 2020. https://www.vox.com/2020/3/28/21197421/usa-coronavirus-covid-19-rural-america; and F. Morris, Rural Towns Insulated From Coronavirus Now May Take A Harder Hit Later, March 13, NPR: https://www.npr.org/2020/03/13/814917520/rural-towns-insulated-from-coronavirus-now-may-take-a-harder-hit-later
[2] "Coronavirus in the U.S.: Latest Map and Case County" *The New York Times*, April 2, 2020. https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html

[3] "We're Sharing Coronavirus Case Data for Every U.S. County" *The New York Times*, March 28, 2020. https://www.nytimes.com/article/coronavirus-county-data-us.html.

[4] https://www.census.gov/content/dam/Census/newsroom/press-kits/2019/paa/paa-poster-older-population.pdf

[5] https://www.cdc.gov/mmwr/volumes/66/ss/ss6601a1.htm#F2_down

[6] https://www.npr.org/2020/03/13/814917520/rural-towns-insulated-from-coronavirus-now-may-take-a-harder-hit-later

[7] https://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=628578697fb24d8ea4c32fa0c5ae1843

[8] https://www.npr.org/2020/03/13/814917520/rural-towns-insulated-from-coronavirus-now-may-take-a-harder-hit-later

[9] "Documentation" United States Department of Agricultural, Economic Research Service, October 25, 2019. https://www.ers.usda.gov/data-products/rural-urban-continuum-codes/documentation/.

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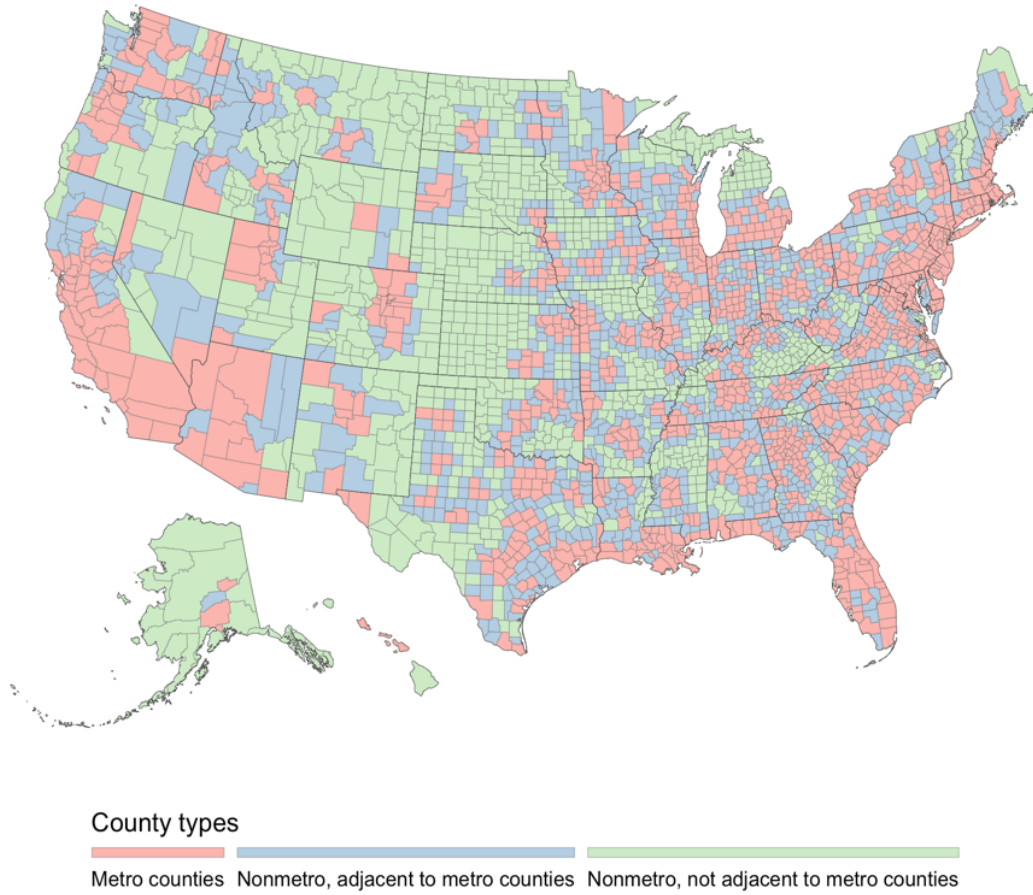**This publication is available in alternative media on request.**

Figure A1. County Types Based on the 2013 Rural-Urban Continuum Codes (RUCC). Metro counties: RUCC = 1, 2, or 3; Nonmetro, adjacent to metro counties: RUCC = 4, 6, or 8; Nonmetro, not adjacent to metro counties: RUCC = 5, 7, or 9. Data source: Economic Research Service, U.S. Department of Agriculture.

Confirmed cases per 100,000 population as of April 1, 2020

No cases   (1, 15)   (15, 29)   (29, 55)   (55, 93)   (93, 464)   (464, 1204)
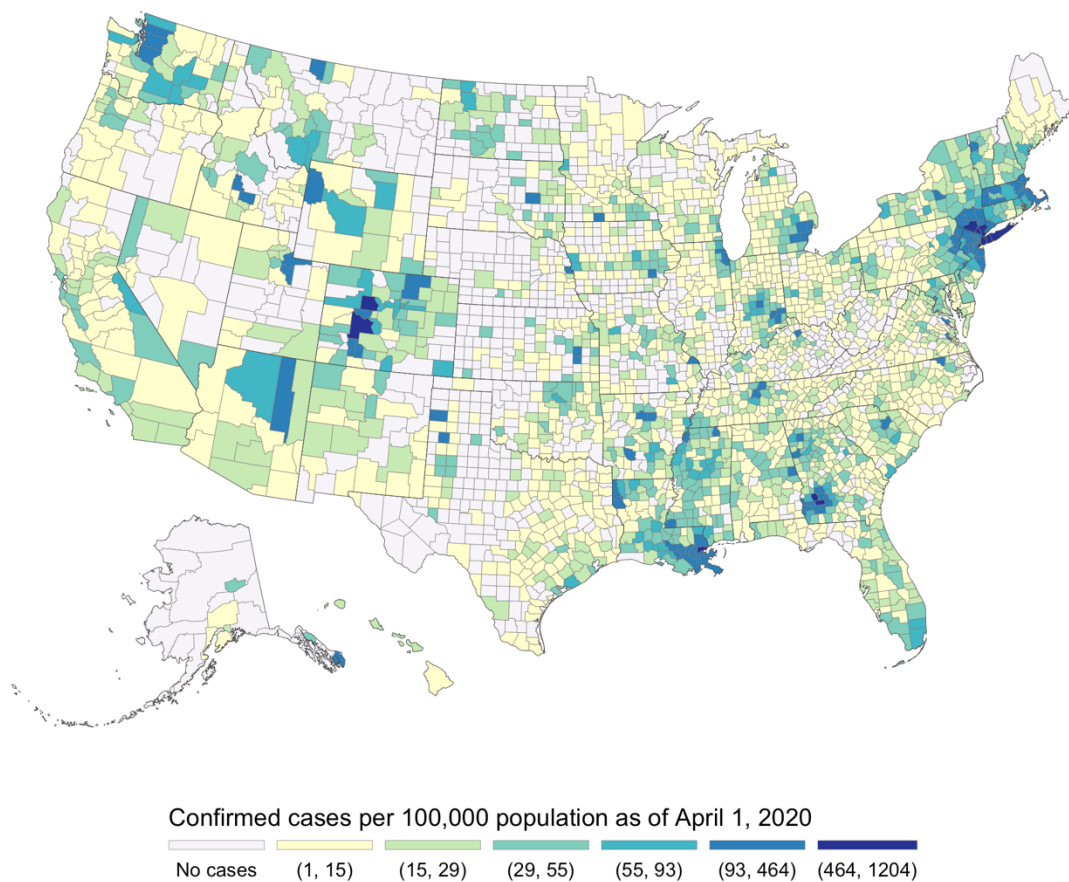
Figure A2. Map for Confirmed Cases per 100,000 Population. Data source: *The New York Times*, the 2014-18 American Community Survey, and authors' calculation.
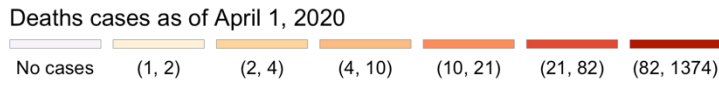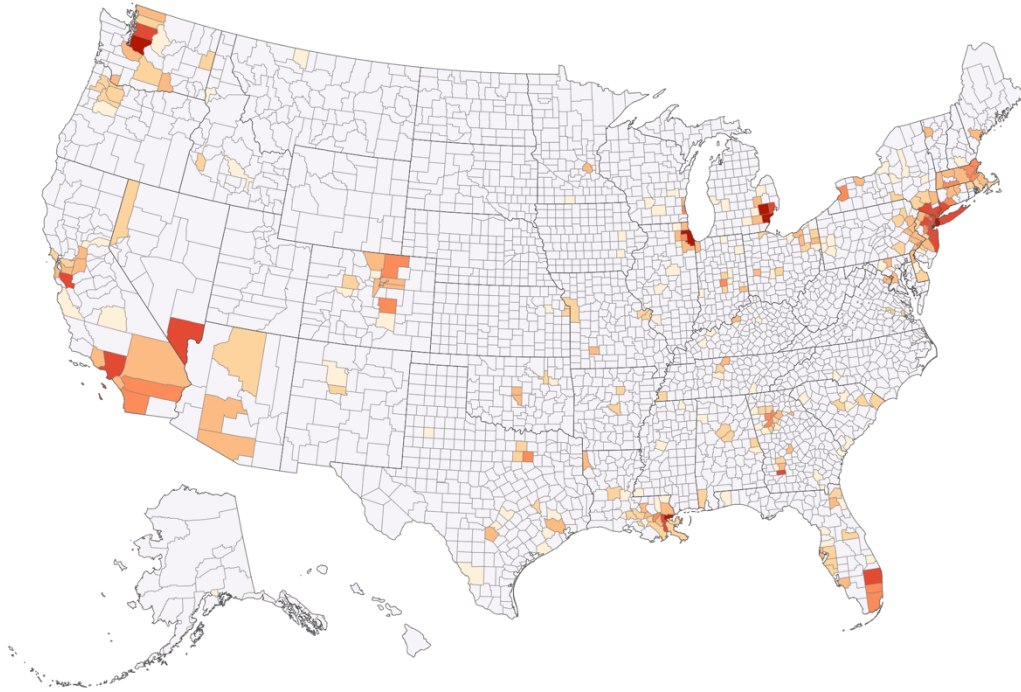
Figure A3. Map for Deaths from COVID-19. Data source: *The New York Times*.

Maps showing cases/spread of cases are available here: https://imgur.com/a/22owcUW

Table A1. Confirmed cases and deaths per 100,000 population by county type

DATE	METRO	NON-METRO, ADJACENT	NON-METRO, NOT ADJACENT
Cases per 100,000 residents (population weighted)			
3/23/20	16	6.01	10.24
3/24/20	19.45	7.13	11.54
3/25/20	24.30	7.40	12.63
3/26/20	29.85	8.93	14.23
3/27/20	35.60	10.17	15.89
3/28/20	42.66	11.63	17.52
3/29/20	48.73	12.95	18.90
3/30/20	55.97	14.49	20.60
3/31/20	64.52	16.53	22.64
4/1/20	73.21	18.66	26.02
Deaths per 100,000 residents (population weighted)			
3/23/20	0.21	0.07	0.09
3/24/20	0.27	0.08	0.08
3/25/20	0.35	0.09	0.10
3/26/20	0.45	0.12	0.15
3/27/20	0.58	0.13	0.21
3/28/20	0.76	0.16	0.27
3/29/20	0.84	0.21	0.26
3/30/20	1.01	0.28	0.34
3/31/20	1.26	0.36	0.39
4/1/20	1.57	0.45	0.49

Data source: *The New York Times*, the 2014-18 American Community Survey, Economic Research Service, U.S. Department of Agriculture, and authors' calculation.