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Jessica Gustad
Grand Valley State University

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Life in a Rural Emergency Department: Patients Speak to Underlying, Fundamental Disparities
in Physician and Resource Allocation

Author: Jessica Gustad

Advisor: Dr. Jane Toot

Introduction

When someone mentions the emergency department, it is natural to flash to the thought of sirens, accidents and patients in critical condition. It's theatrical scenes like these that dominate television shows and news stories nationwide, and it is these cases that consequently exercise control over the public opinion. This conception of the emergency department built solely upon the guiding hand of the media is severely unrealistic. While there are certainly cases that play out in this fashion, what most individuals fail to notice are the smaller cases that really speak to the underlying disparities the medical community faces on a daily basis.

In the Journal of Health Services Research and Policy, access to health care was defined as, "The availability of an adequate supply of health care services and the individual's opportunity to obtain health care when it is wanted or needed" (MacKinney, 2014). Current trends in rural emergency departments are trying to communicate a critical message about the fundamental problems with the distribution of health care services in America today and the inability to properly meet the definition above. In rural communities, patient complaints and behaviors demonstrate the pressing concerns of inadequate access to primary care, limited specialty care, insufficient mental health care services and other concerns that adversely impact community health. These detrimental disparities are affecting health care outcomes in communities nationwide leading to the unintentional marginalization of the country's rural population.

The Rural Demographic

The United States Census Bureau American Community Survey reported that rural areas cover ninety-seven percent of the nation's land area but contain just 19.3 percent of the population (about sixty million people) (Iglehart, 2018). Even with 19.3 percent of the population living in rural regions of the country, a report from the American Medical Association Journal of Ethics shows this population is serviced by a mere 11.4 percent of physicians (Mareck, 2011).

This statistic demonstrating less physicians are available to service the given population is coupled with a greater existing need. The National Institute for Health Care Management (NIHCM) identifies America's rural population as being older and sicker than their urban counterparts (2019). As the United States is seeing a population shift to favor living in urban areas, this distinction is becoming increasingly apparent. In census data compiled by the NIHCM, 18.4 percent of rural Americans are aged sixty-five or older versus 14.5 percent of urban Americans. Rural populations are also shown to exhibit higher rates of several health risk factors such as obesity, smoking and diabetes when compared to their urban counterparts (NICHM, 2019). Approximately 33.5 percent of rural populations are obese, 12.6 percent have diabetes, and 28.5 percent are regular smokers. This compares with an obesity prevalence of 28 percent in urban populations, 9.9 percent having diabetes, and 25.1 percent are smokers. These risk factors help speak to the preexisting elevated risk for disease rural communities face.

This demographic paints a comprehensive picture of rural America that demonstrates a greater fundamental need for health care accessibility. However, this population is still consistently faced with resounding shortages in nearly every aspect of medical care. The result of

this deadly combination more often than not is increased occurrences of detrimental health outcomes for the rural population.

Primary Care: Insufficient Availability

History of Present Illness:

Patient is a 28 year old male who presents to the emergency department with a chief complaint of a rash that has been persistent for the past 2 days. He describes the rash as reddened, itchy areas of skin on his bilateral forearms. The rash has not spread to any other part of his body. He has not experienced any chest pain or shortness of breath. He also denies any fevers, nausea or vomiting. He has no history of allergies and denies any exposure to new materials. He denies any chronic medical problems and further denies any other illness or injury at this time.

The above history is a sample taken from a patient presenting to a rural emergency department. At first glance, it does not seem to fit the mold for a what might seem to be a typical emergency department complaint. There seems nothing urgent or immediately life-threatening about it. However, in rural emergency departments, this is not an uncommon occurrence. Patients frequently report to the emergency room with their less than emergent complaints because of limited access to primary care providers. This gap is reported by the NIHCM as follows: for every 10,000 people, urban areas have an average of eight primary care providers while rural areas have only five (2019).

The distribution of primary care providers in the United States is significantly skewed to favor metropolitan areas. Figure 1, which was taken from a study performed by the Rural Health Information Hub and National Center for Health Statistics in 2019, demonstrates this spread

well. As seen in the figure, lighter colors indicate areas of little or no shortage, and darkening colors signify growing need. Metropolitan counties are highlighted in the left image, and nonmetropolitan counties on the right. It is obvious even at first glance that the metropolitan counties are accentuated with much lighter colors than the nonmetropolitan counties indicating that there are significantly less shortages in health care providers. Rural counties, on the other hand, are not so fortunate. Many of these counties fall at the extreme indicating that the entire county is a shortage area for primary care providers. This fact is further evidenced by Figure 3, which demonstrates the disproportionate lacking of rural physicians across the board, including primary care.

The University of Michigan Medical School published the results of a longitudinal study in 2019 that demonstrates evidence of this significant gap in rural primary care services materializing in the emergency department. Co-authors Margaret Greenwood-Ericksen, M.D. and Keith Kocher, M.D., M.P.H. studied emergency department visit data gleaned from the National Hospital Ambulatory Medical Care Survey from 2005 through 2016. During this time period, it was found that rural emergency departments saw an increase in patient visits that was greater than fifty percent, from 36.5 to 64.5 visits per 100 persons (Greenwood-Ericksen, Kocher). Urban emergency departments, on the other hand, saw an increase from 40.2 to 42.8 visits per 100 persons (Greenwood-Ericksen, Kocher). While the sheer volume seen in urban emergency departments trumps that seen in rural areas, the rate of increase in rural areas is significantly greater.

This is an interesting statistic, as rural areas have consistently been declining in overall population. To have this significant of an increase in emergency department visits makes an

important statement about the role the department plays in rural communities. To elaborate on this, Greenwood-Ericksen quotes, “The traditional perspective of emergency visits as only necessary for life-threatening illness is far from reality – particularly for rural communities where few alternatives for acute, unscheduled care needs exist.” Rural areas are increasingly forced to rely on the emergency department for health care, both emergent and noncritical, because of the scarcity of other care options available. With a significant shortage of primary care providers, rural patients often resort to the emergency department with their less than urgent complaints.

Urban areas tend to avoid this pattern with an abundance of health care options at the population’s disposal. Most cities generally have a variety of urgent care offices, university health centers, major hospitals and primary care offices to satisfy any slew of complaints. These readily accessible options tend to keep more noncritical cases out of the emergency department. Rural patients simply do not have the luxury of multiple options to which they can turn with their ailments. This predictably manifests in the form of emergency departments crowded with less than emergent complaints.

Aside from a person’s primary care physician, another primary care provider everyone should see on a regular basis is their dentist. A person’s dental health is an extremely important part of their wellbeing and must be taken into account. However, unfortunately for rural communities, the distribution of dentists looks amazingly similar to the distribution of primary care physicians. As could be anticipated, Figure 2 illustrating the distribution of dental health care professionals in the United States matches Figure 1. Most metropolitan counties experience

either partial shortages or zero shortages while the majority of nonmetropolitan areas are seeing entire counties as shortage areas (2019).

Specialty Care: Restricted Access and Limited Resources

History of Present Illness:

Patient is a 72 year old female with a history of a tonsillar carcinoma who presents to the emergency department with a chief complaint of a sore throat. She describes this current throat pain as sharp and reports it began yesterday morning when she woke up. She states it is exacerbated with swallowing and eating, and she has experienced some accompanying dysphagia. She also notes that she has noticed a small lump on her left anterior neck just below her ear. She denies noticing any bleeding or sores in her mouth or throat. She was originally diagnosed with a tonsillar carcinoma 4 years ago and underwent multiple rounds of radiation therapy. She stopped receiving treatment 6 months ago. Patient also has a history of hypertension and hyperlipidemia. She further denies any other illness or injury at this time.

This sample patient history is much more extensive than the one discussed previously and speaks to a separate obstacle facing rural medicine. Patients frequently present to rural emergency departments with complex complaints and histories such as this. As Greenwood-Ericksen quoted, “Patterns of use of emergency departments by populations are important indicators of their health care needs” (2019). Perhaps this patient’s complaint is speaking to the reality that she lacks access to an oncologist, which may very well be the case.

Especially because the rural population is one that tends to be older and sicker by nature, rural residents like this example patient are more inclined to require further medical care than

what their primary care physician can provide. This would theoretically dictate that rural areas should receive greater access to specialists and long-term care facilities. However, according to the data, it is observed that the inverse is true. As seen in Figure 3, which was referenced previously, the number of total physicians is significantly distorted to favor metropolitan areas. A report published by the NIHCM states that in rural areas, there are thirteen physicians per every 10,000 people. In urban areas, this number increases to thirty-three physicians (2019). This statistic manifests in physician shortages across all specialties in rural communities, making specialty care difficult to come by.

An array of differing health concerns necessitate the involvement of some form of specialty care, and the inability of patients to access such care in their time of need leads predictably to adverse health outcomes. The Rural Health Information Hub's 2019 study with the National Center for Health Statistics did an evaluation on multiple causes of death and the differences in prevalence in urban and rural populations.

The first examined cause of death was chronic lower respiratory disease. Figure 4 shows the number of deaths per every 100,000 people caused by this chronic illness from 2006 through 2015. As the data is examined, the space between the two trend lines is inherently obvious. What is even more alarming than the distance between the trends is their differing trajectories. While the line below representing the data for metropolitan counties seems to level off, the line representing nonmetropolitan counties continues to track upwards. This alarming trend shows that while urban populations appear to be making strides to minimize death due to chronic lower respiratory disease, rural regions are slipping behind in regards to disease management in its population.

The next to be analyzed was heart disease, today's leading killer of United States citizens. The number of deaths due to heart disease for every 100,000 people is depicted in Figure 5. Similarly to chronic lower respiratory disease, what is most alarming is the degree to which the nonmetropolitan curve begins to climb after the year 2011. While the curve depicting the trend in metropolitan counties appears to decline and then level off, the nonmetropolitan curve begins to swing upward steadily through the end of data collection in 2015. This provides direct evidence of the effects of diminished access to specialty care in the form of increased levels of adverse health outcomes in the rural population.

Cancer is another common chronic ailment for both rural and urban populations. Figure 6 examines the number of deaths due to cancer out of every 100,000 people in metropolitan and nonmetropolitan areas. The trends seen in these two populations is drastically different. While the curve plotted for metropolitan populations is trending steadily downwards, the curve plotted for rural populations is continuously trending upwards. In 2015, metropolitan counties saw deaths decline to seventy-four for every 100,000 people. This corresponding number for rural counties was an astonishing 103 for every 100,000 people. If the disparity in health care professionals cannot be mended to provide proper cancer treatment to rural areas, this dangerous trend could continue to escalate.

Aside from the chronic illnesses discussed above, disparities also exist between rural and urban areas in regards to infant care. The difference in infant mortality for metropolitan and nonmetropolitan areas is depicted in Figure 7. At first glance, the trends appear to be tracking quite similarly. However, upon closer examination, it is noticed that the decline in infant mortality has been much more rapid in urban areas than it has been in rural locations. This can be

at least partially attributed to a statistic from the NIHCM that over half of rural counties lack hospital-based obstetrics services, and only six percent of obstetrician-gynecologists practice in rural areas (2019). This is a detrimental disparity for rural families. Having greater access to specialty physicians and resources has allowed metropolitan regions to have more positive health outcomes even at the infant level and once again leave rural communities behind.

The Center for Disease Control conducted their routine Morbidity and Mortality Weekly Report (MMWR) Surveillance Summary in 2019 and particularly examined the number of potentially excess deaths for persons less than eighty years old from the top five causes of death in the United States (Garcia). The five leading causes studied were chronic lower respiratory disease, heart disease, cancer, unintentional injury and stroke. Figure 8 depicts their findings in the form of percentages of deaths that were potentially excess. Looking at this figure, it is obvious that this pattern of adverse health outcomes relating to level of urbanization does not just exist at the extremes. It is instead a spectrum with the most rural areas seeing the highest number of excess, preventable deaths and the largest metropolitan areas seeing the fewest. This finding is closely correlated with the number of physicians and resources available. In the case of complaints requiring a specialist, rural areas tend to experience worse outcomes due to their restricted access to resources and absence of appropriate personnel.

Mental Health Care: Few and Far Between

History of Present Illness:

Patient is an 18 year old male with a history of depression who presents to the emergency department with a chief complaint of anxiety. He reports experiencing frequent anxiety attacks during which he feels “shaky” and has difficulty catching his breath. These can be brought on by

stressful events or sometimes randomly throughout the day. Patient states he typically experiences 1-2 similar episodes per day, each lasting less than 5 minutes in length. He reports a family history of hypertension and otherwise denies any other medical problems. He further denies any other illness or injury at this time.

This patient profile exemplifies another unfortunate disparity in the provision of health care in the United States. Oftentimes, rural emergency departments will see increased volumes of patients of all ages with mental health concerns. This presence is indicative of the fact that there is typically no other option available for rural patients to receive mental health care. While mental health care professionals tend to be in short supply in all counties regardless of demographic, nonmetropolitan areas seem to be among the most affected.

Figure 9 helps to identify this tremendous shortcoming in the provision of mental health care. The map on the left depicts the distribution of mental health care professionals in metropolitan counties across the United States, and the map on the right depicts that in nonmetropolitan counties. Shortages are seen in many counties, both urban and rural. However, one thing that is obviously apparent is the sheer amount of the nonmetropolitan map that is colored the darkest color, indicating that most rural counties are entire shortage areas in the realm of mental health care. Providing quality care for patients incorporates all aspects of health and wellness, and this should include mental health care. This is a significant component missing from the rural health care system.

This shortage is demonstrated further in Figure 10. This figure uses bars to demonstrate what percentages of metropolitan and nonmetropolitan counties in the United States exist in

varying degrees of sparsity in regards to mental health care professionals. As is seen in the first bar, almost all counties classified as having an adequate number of mental health care professionals are metropolitan. The greatest percentage of metropolitan counties are classified as having some degree of shortage. Again, regarding this second category, very few nonmetropolitan counties are classified here. The majority of rural counties are listed under the classification of the entire county being a shortage area.

This severe discrepancy in the distribution of mental health care professionals is correlated with detrimental health outcomes. The Center for Disease Control published a study in 2017 analyzing suicide trends in the United States by level of urbanization. The results from the study can be seen in Figure 11. This data seems to exist on a spectrum and directly correlate with the number of mental health care providers available in a given area. As one might have predicted, the most rural of locations had the highest suicide rates, and the areas with the highest level of urbanization had the lowest rates (Ivey-Stevenson, 2017). This trend is not just existent at the extremes and carries through the spectrum of urbanization. The data for the United States is included as a benchmark. As seen in the figure, both middle/small metropolitan areas and nonmetropolitan areas fair worse than the United States average. Large metropolitan areas see suicide rates that continuously track lower than the United States average. These findings demonstrate that access to mental health care is directly correlated with health outcomes. Lower suicide rates in more populated areas can be attributed to greater access to mental health care professionals and resources available such as counseling, therapy and other supports. Rural, nonmetropolitan regions are again left behind to confront adverse mental health outcomes.

Rural Community Factors:

There are many factors that contribute to rural health besides the significant lack of resources and providers. It is a known fact that a person is limited in their choices based on where they reside because where a person resides determines what that they are exposed to. This extends beyond differing access to quality health care to include disparities in education, opportunities for social support, access to healthy foods, and exposure to health and risk behaviors.

Access to quality education is a critical factor in determining a person's health throughout their lifetime. Figure 12 shows the percentage of eighteen to twenty-four year olds without a high school diploma in metropolitan and nonmetropolitan counties. This data was collected by the Rural Health Information Hub in conjunction with the National Center for Health Statistics and published in 2019. According to these findings, when it comes to education, metropolitan areas surpass their rural counterparts. Approximately 12.5 percent of young adults living in urban areas do not have their high school diploma, and as the city is left behind moving into rural areas, this number climbs to approximately 16 percent. The amount of education a person receives tends to correlate with their income, stress levels and even health, so diminished education levels in rural communities does not appear favorable in regards to the general wellbeing of the population.

Nonmetropolitan areas also face the difficulty of not having access to the same healthy options metropolitan areas do. For example, as is demonstrated in Figure 13, rural areas have significantly less access to sources of healthy foods. As can be observed in the figure, most nonmetropolitan counties are complete shortage areas in this aspect. Limiting food selection in this way may influence people living in rural areas to make less healthy choices when it comes to

their diet. They may more frequently choose fast foods high in fat and sodium because they are so easily accessible. Over time, these choices can lead to numerous health problems including, but not limited to, high cholesterol, hypertension and obesity.

In a study conducted by the Center for Disease Control, individuals were surveyed regarding their health and risk behaviors. Their responses were analyzed according to their urban-rural county designation and compared accordingly. This study published in the Morbidity and Mortality Weekly Report Surveillance Summaries showed that adults living in rural counties had the lowest prevalence of health behaviors such as nonsmoking, maintaining a healthy body weight and meeting physical activity recommendations (Garcia, 2017). Regardless of residence, those surveyed with greater educational attainment exhibited greater prevalence of reporting engaging in multiple health behaviors (Garcia, 2017).

This data suggests that the problems plaguing rural health might require a more comprehensive, multilevel solution involving the changing of attitudes in order to enforce healthy habits and correct problematic risk behaviors in addition to increasing access to resources and health care providers of all specialties.

Conclusion: A Mission of Support

Given the information outlined previously, the shortages existent in rural medicine are incontestable and extensive. According to a report from the National Institute for Health Care Management, 113 rural hospitals have closed since 2010, citing financial factors as the primary reason (2019). Rural areas in the United States tend to be poorer than their urban counterparts, and this is the source of a good deal of financial instability. In the same report, it was noted that the number of stand-alone emergency departments had grown rapidly, but very few were located

in rural locations. Almost all of the 566 stand-alone emergency departments were located in metropolitan areas and often tied to more affluent neighborhoods with increased household incomes and higher amounts of privately insured patients (Iglehart, 2018). This demographic is one that most rural communities do not have and is part of the reason rural health disparities are such a deep-rooted issue. There is no simple answer to fix this overarching problem with the current health care system, but one thing is certain: any successful solution must be comprehensive in incorporating increased financial support and changes to rural health policy as well as making it a priority to channel a greater number of physicians into rural communities.

Many organizations have taken the rural mission to heart with the goal of funneling more health care providers into underserved rural areas. Medical schools are starting to offer rural tracks geared towards producing physicians equipped to handle the unique challenges that are associated with rural practice. In a statistic reported by Kaiser Health News in 2019, of the 180 medical schools in the United States, forty are now reported to offer rural tracks (Weber). This offers a hopeful optimism that medical schools are seeing these severe health disparities and are responding accordingly in order to fill the need.

Aside from medical schools, many post-graduate programs have arisen to provide opportunities for new physicians to move to and work in rural communities while they complete their training. The Health Resources and Service Administration has spearheaded the Rural Residency Planning and Development Program with the purpose of supplying grants to fund new residency programs in rural areas, which they refer to as Rural Residency Tracks (RRTs). There are currently approximately ninety rural residency programs where graduates perform greater than fifty percent of their post-graduate training in rural communities (Redford, 2019). Eligible

applicants to run these programs include rural hospitals, rural community-based patient care centers, hospitals operated by the Indian Health service, schools of osteopathic or allopathic medicine, public or private non-profit graduate medical associations and faith-based or other community-based organizations (HRSA, 2019). All applicants must be located in a rural area to be considered for the grant. This ensures that new health care providers are being channeled into these areas that demonstrate the greatest need of quality care.

During residency and upon their eventual graduation, physicians are continuously provided incentives to persevere on the path to providing medical care in a rural setting. For example, the Tennessee Rural Residency Stipend Program offers a stipend to primary care physicians in Tennessee residency programs. Any recipient of monetary funds must commit to practice in a rural, underserved area of Tennessee upon their eventual graduation from residency (RHI, 2020). Similarly, the Maine Rural Medical Access Program offers financial incentives in the form of insurance premiums for physicians coming in to provide prenatal care and deliver babies in rural communities in Maine. Similar programs are available across the entire United States to waive certain expenses and provide stipends for physicians willing to commit to completing a certain number of years of service in rural communities.

Finding good rural physicians does not begin and end with recruitment and access to training programs. Much of the difficulties faced in rural health care stems from the inability to retain providers. Rural health care providers are most likely to come from rural areas themselves (Redford), but significant barriers stand between rural students and becoming members of the health care workforce. These include but are not limited to disadvantaged educational backgrounds, poverty and availability of affordable educational opportunities. If these obstacles

were to be overcome, and the disparity in educational affordability and availability could be eliminated, more rural students may be able to enter the programs that would allow them to become future members of the rural health care workforce.

Aside from attempting to funnel more providers to work in rural areas, in order to more quickly fill the growing need for rural physicians of all specialties, more and more communities are making the shift to incorporate telemedicine into their health care system. Telehealth has the potential to mitigate the obstacle of distance in the provision of health care. This includes the distance between patients and their providers and distance between primary care providers and consulting outside specialists. According to a report published by the National Institute for Health Care Management, twenty-five percent of rural Americans already utilize some form of Telehealth services (2019).

While technological advancements have made this a great way to bridge the gap to serving America's rural population, this system is far from perfect. The significant gap existent in this network is connectivity. In order to make telemedicine effective, a stable connection and reliable broadband access is required. According to the NIHCM, an estimated twenty million Americans lack broadband access, and the majority of these live in rural communities (2019). As technology continues to evolve, this gap in connectivity access is only expected to grow. In order to ensure that telemedicine continues to be a feasible avenue to provide adequate care to remote locations, a certain amount of technological advancement will be required to connect these areas with reliable broadband access.

While rural medicine certainly faces a variety of undeniable shortages, there are many components that make rural health care preferable to receiving care in an urban setting. Medical

professionals in rural communities tend to be fewer and farther between, as evidenced in the studies outlined previously, but they also tend to be more versatile and provide extremely personalized care for their patients. This ability enhances the physician-patient interaction and helps them to provide exemplary patient-centered care despite the disparities that are present.

The United States Government Medicare data compiles hospital comparison statistics. According to the most recent data collected, hospital size does not directly correlate with patient satisfaction. Instead, a modest inverse relationship is observed. Table 1 outlines the twenty-five largest hospitals by bed number in the United States and their surveyed patient satisfaction ratings across a variety of measures. These measures include items such as communication between nurses and physicians, room cleanliness, timeliness of receiving help and understanding of care plans. The averages calculated at the bottom of the table demonstrate that in nine out of the ten measures of patient satisfaction examined, the twenty-five largest hospitals averaged scores that were lower than the national average. The only statistic in which these hospitals averaged a greater score than the national mean was, “Patients who reported YES, they would definitely recommend the hospital.” All other calculated averages across the items were lower than the reported national mean. This data is also depicted visually in Figure 14.

For direct comparison, twenty-five of the smallest hospitals in the United States were also examined using these statistics, and the results are displayed in Table 2 and Figure 15. This chart shows that across all ten measures surveyed, the smallest hospitals averaged patient satisfaction ratings that were higher than the national mean. Patient satisfaction has been shown to correlate considerably with health care outcomes, so this finding is extremely significant. Rural health

care may not have the same resources and facilities available, but physicians do not let this stop them from providing exemplary patient-centered care.

As is demonstrated by this data, what rural health care currently lacks in resources, it makes up for in immense versatility and individualization of care. This predictably leads to the dramatic increase in patient satisfaction outlined above. The goal has never been to save rural medicine. It does not need to be saved. The rural mission is simply to increase the number of resources and providers being channeled into these areas to experience and help deliver the individualized care their residents desperately need and deserve.

References

- Garcia, M. C., Rossen, L. M., Bastian, B., et al. (2019). Potentially Excess Deaths from the Five Leading Causes of Death in Metropolitan and Nonmetropolitan Counties — United States, 2010–2017. *MMWR Surveill. Summ.*, 68(10), 1–11.
- Greenwood-Ericksen, M. B., Kocher, M. (2019). Trends in emergency department use by rural and urban populations in the United States. *JAMA Network Open*. 2(4).
- Health Resources & Services Administration. (2019). Rural residency planning and development program overview. *Federal Office of Rural Health Policy*.
- Iglehart, J. K. (2018). The challenging quest to improve rural health care. *New England Journal of Medicine*, 378(5), 473–479.
- Ivey-Stephenson, A. Z., Crosby, A. E., Jack, S. P., Haileyesus, T., Kresnow-Sedacca, M. (2017). Suicide Trends Among and Within Urbanization Levels by Sex, Race/Ethnicity, Age Group, and Mechanism of Death — United States, 2001–2015. *MMWR Surveill. Summ.*, 66(18), 1–16.
- MacKinney, A. C., Coburn, A. F., Lundblad, J. P., McBride, T. D., Mueller, K. J., Watson, S. D. (2014). Access to rural health care - a literature review and new synthesis. *Rural Policy Research Institute*.
- Mareck, D. (2011). Federal and state initiatives to recruit physicians to rural areas. *AMA Journal of Ethics*, 13(5), 304–309.

Matthews, K. A., Croft, J. B., Liu, Y., et al. (2017). Health-Related Behaviors by Urban-Rural County Classification — United States, 2013. *MMWR Surveill. Summ.*, 66(5), 1–8.

National Institute for Health Care Management. (2019). Rural health in America: How shifting populations leave people behind. *NICHM Foundation*.

Redford, L. J. (2019). Building the rural health care workforce: Challenges and strategies in the current economy. *American Society on Aging*, 43(2), 71.

Rural Health Information Hub & National Center for Health Statistics. (2019). Rural-urban statistical differences. *RHIhub Association*.

Weber, L. (2019) They enrolled in medical school to practice rural medicine. What happened? *Kaiser Health News*.

Appendix A (Primary Care)

Figure 1: Health professional shortage areas in primary care. The map on the left outlines shortage areas in metropolitan counties, and the map on the right outlines shortage areas in nonmetropolitan (rural) counties.

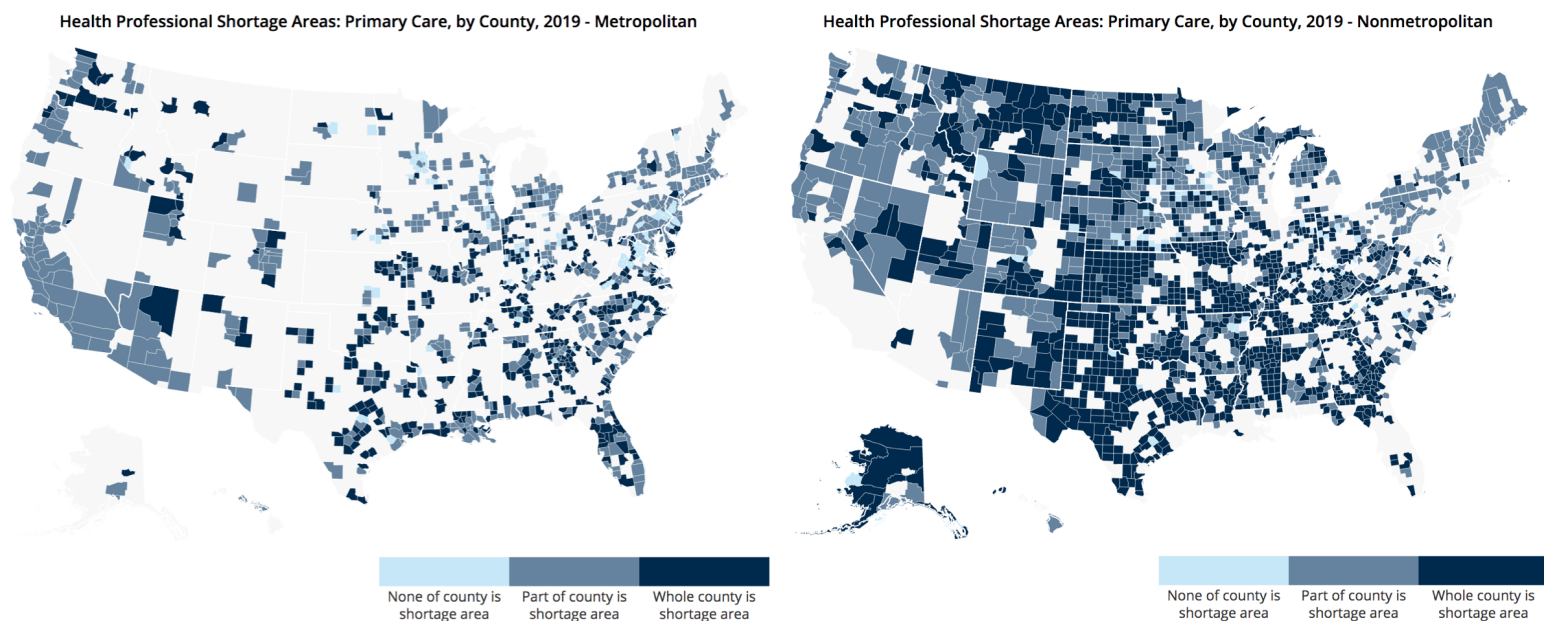


Figure 2: Health care professional shortage areas in dental care. The map on the left outlines shortage areas in metropolitan counties, and the map on the right outlines shortage areas in nonmetropolitan (rural) counties.

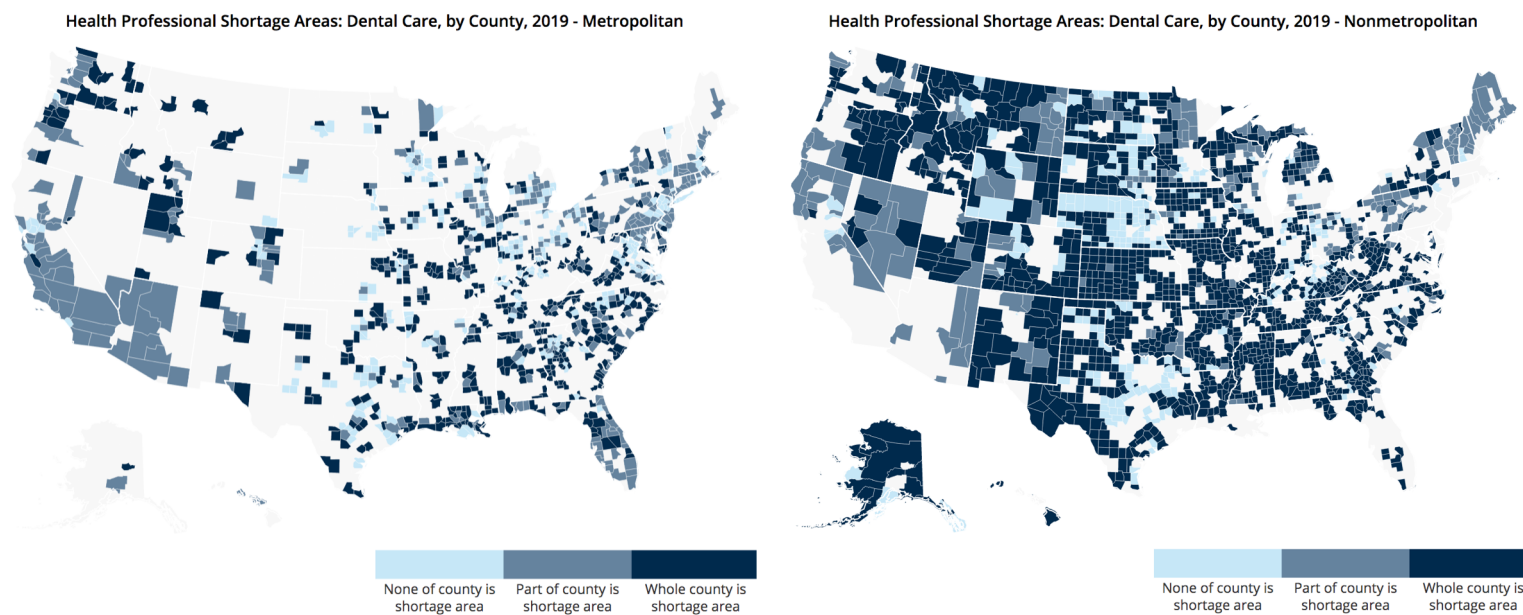
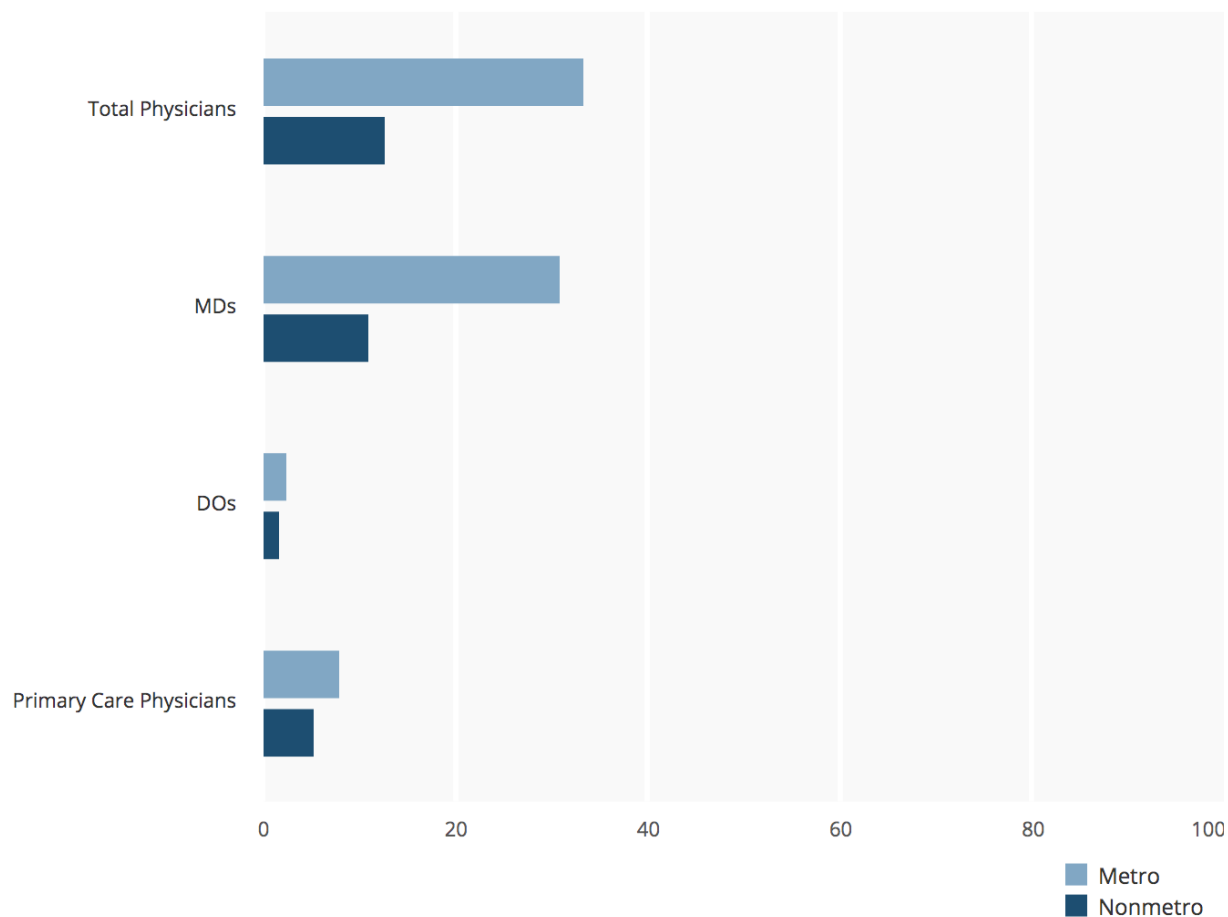


Figure 3: Physicians per 10,000 people for metropolitan and nonmetropolitan counties. Across all health care providers examined, metropolitan counties possess a greater number than nonmetropolitan counties.



Appendix B (Specialty Care)

Figure 4: Deaths per 100,000 from chronic lower respiratory disease for metropolitan and nonmetropolitan counties, 2006—2015.

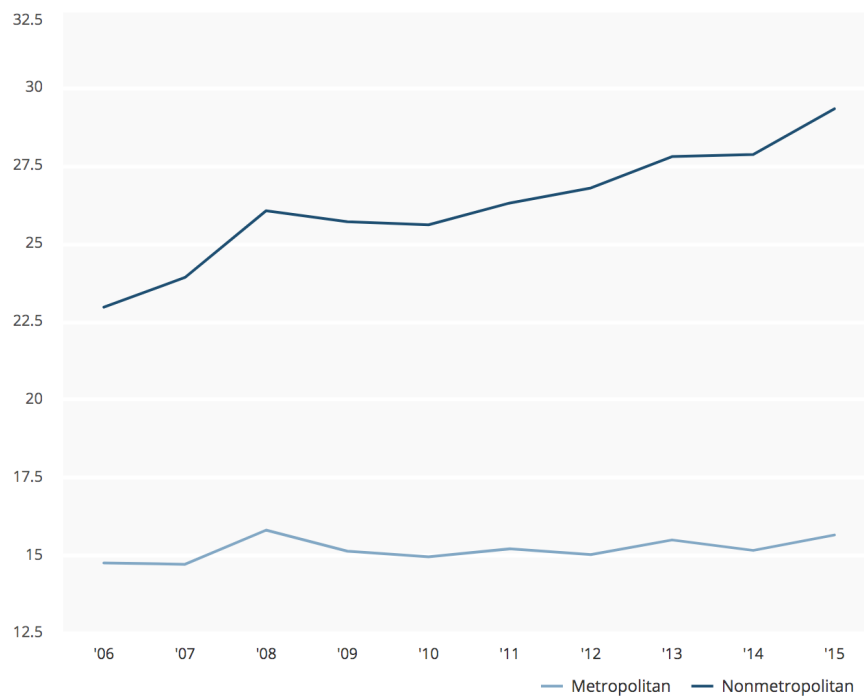


Figure 5: Deaths per 100,000 from heart disease for metropolitan and nonmetropolitan counties, 2006—2015.

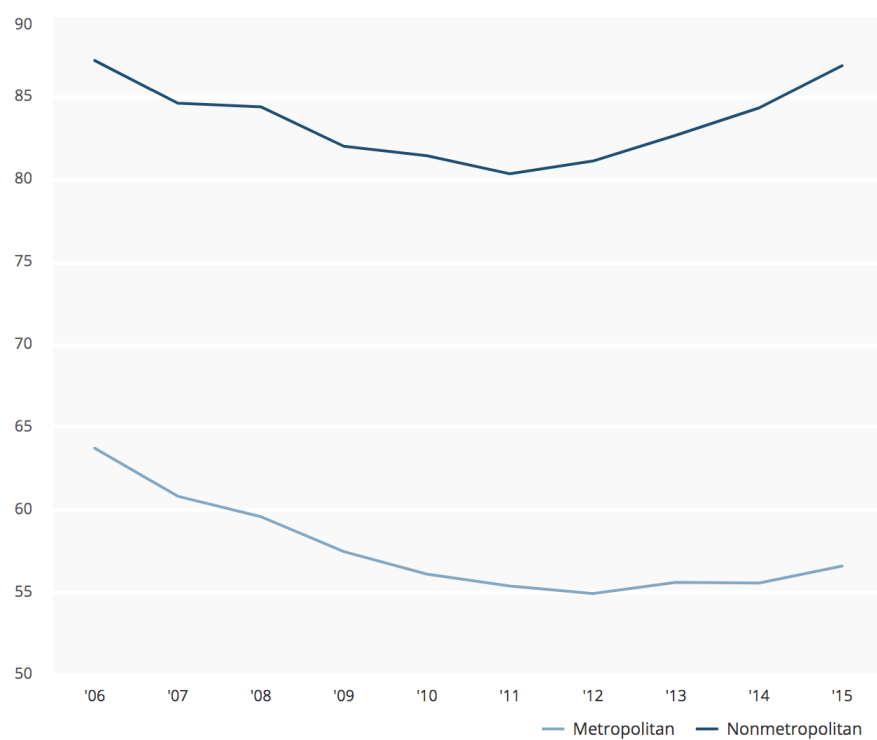


Figure 6: Deaths per 100,000 from cancer for metropolitan and nonmetropolitan counties, 2006—2015.

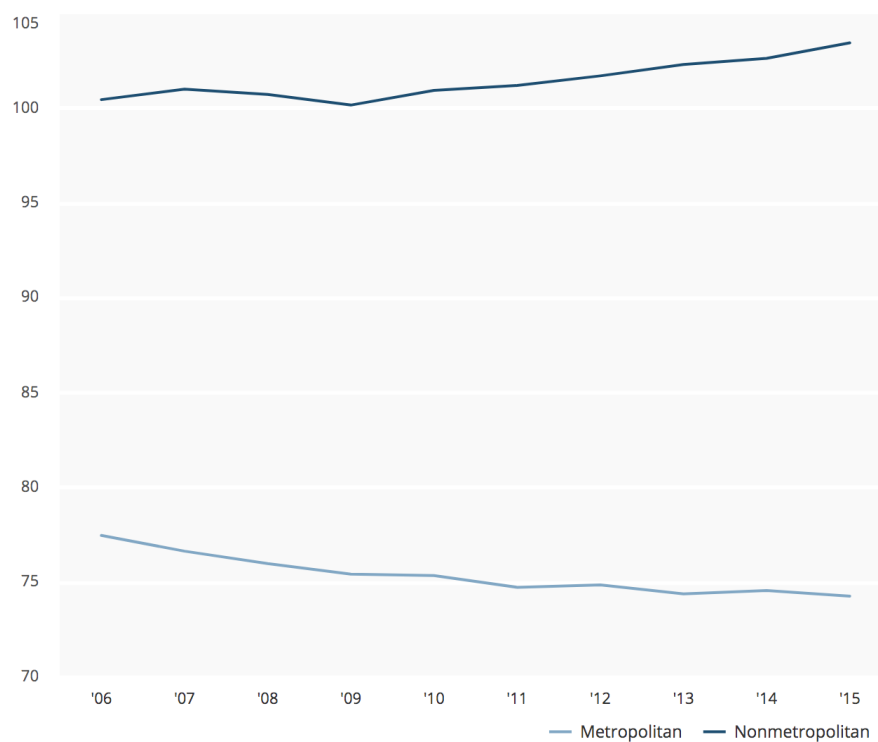


Figure 7: Infant mortality per 1,000 for metropolitan and nonmetropolitan counties, 2007—2018.

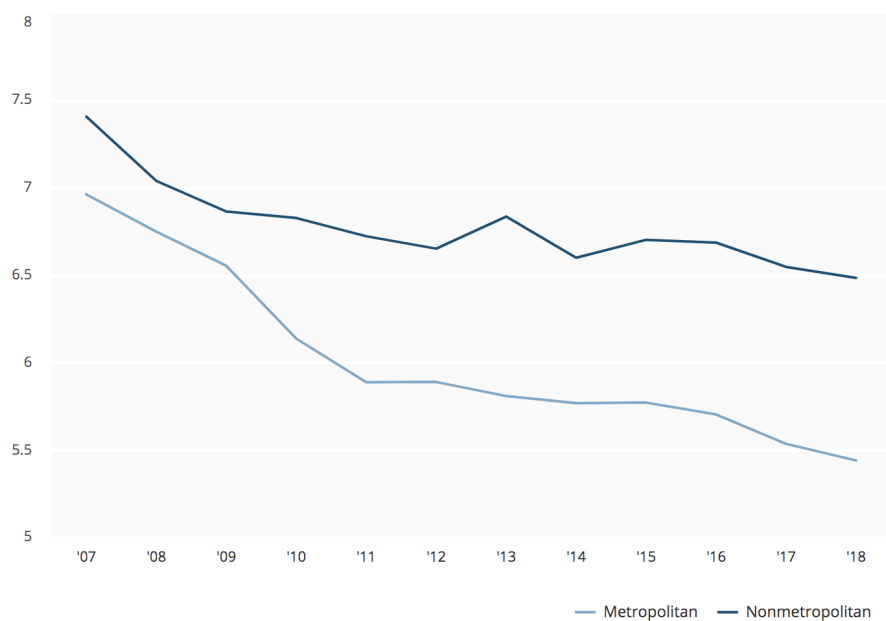
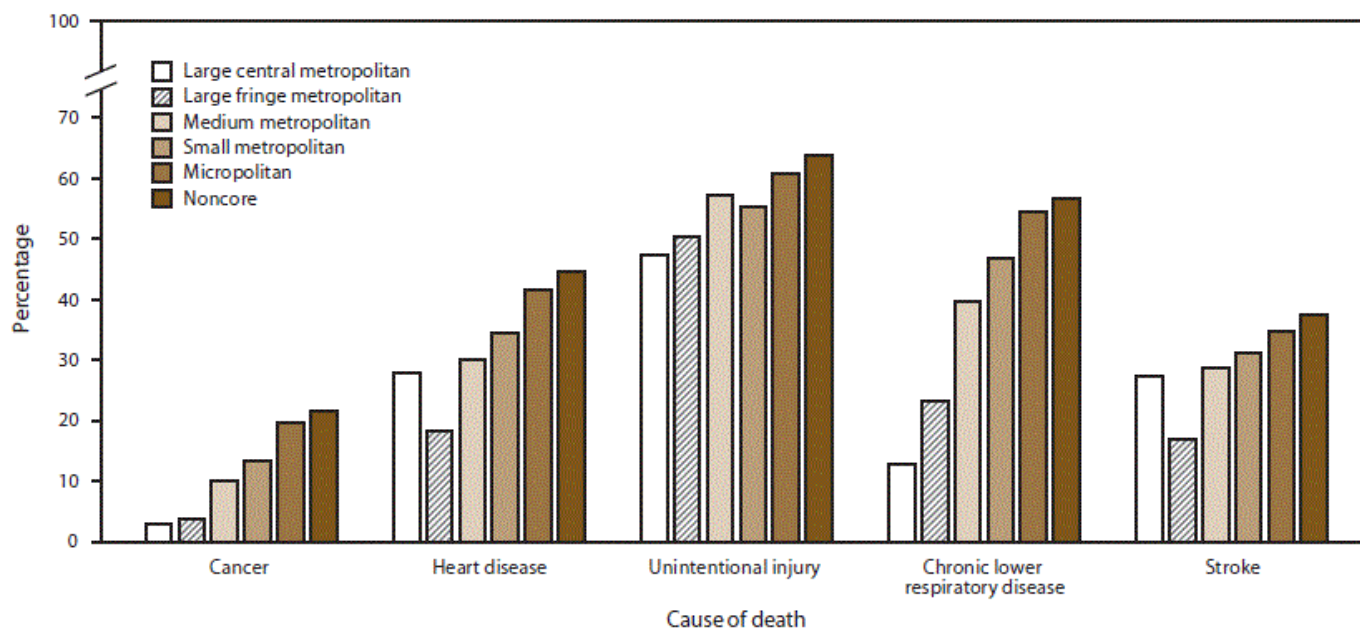


Figure 8: Percentage of deaths that were potentially excess among persons aged <80 years from the five leading causes of death, by urban-rural county classification — National Vital Statistics System, United States, 2017.



Appendix C (Mental Health)

Figure 9: Health care professional shortage areas in mental health care. The map on the left outlines shortage areas in metropolitan counties, and the map on the right outlines shortage areas in nonmetropolitan (rural) counties.

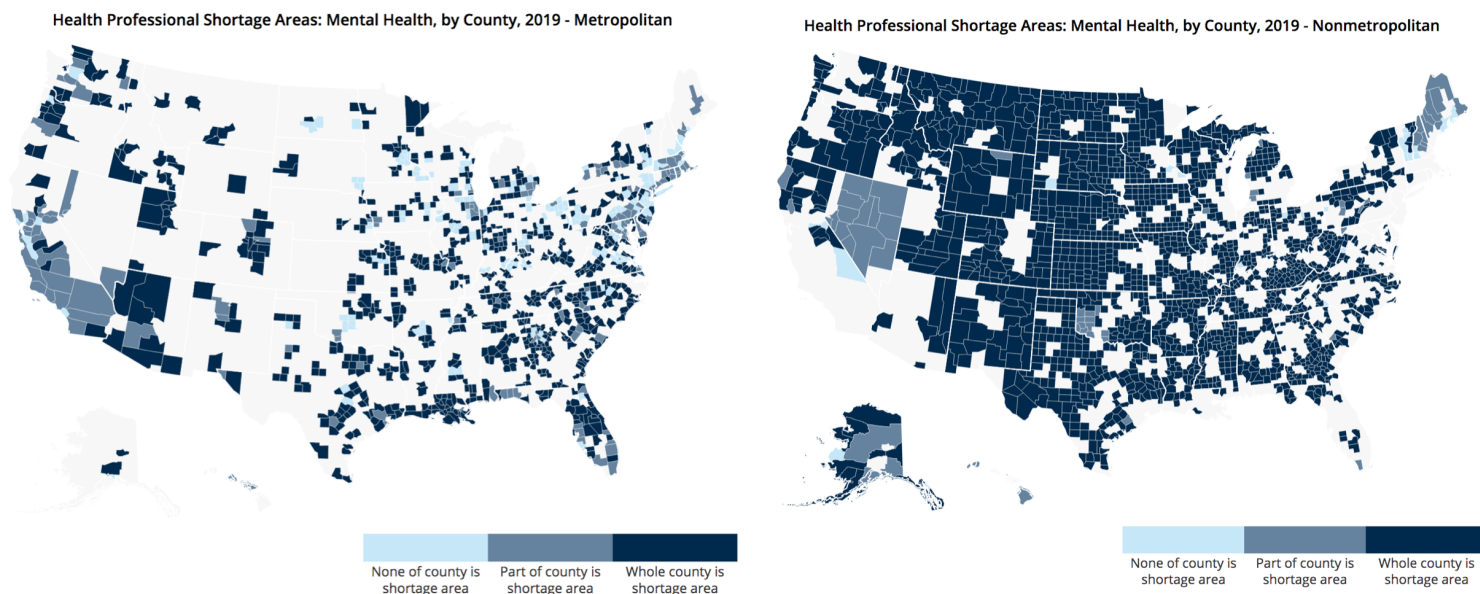


Figure 10: Mental health professional distribution and identified shortage areas among metropolitan and nonmetropolitan counties, 2019.

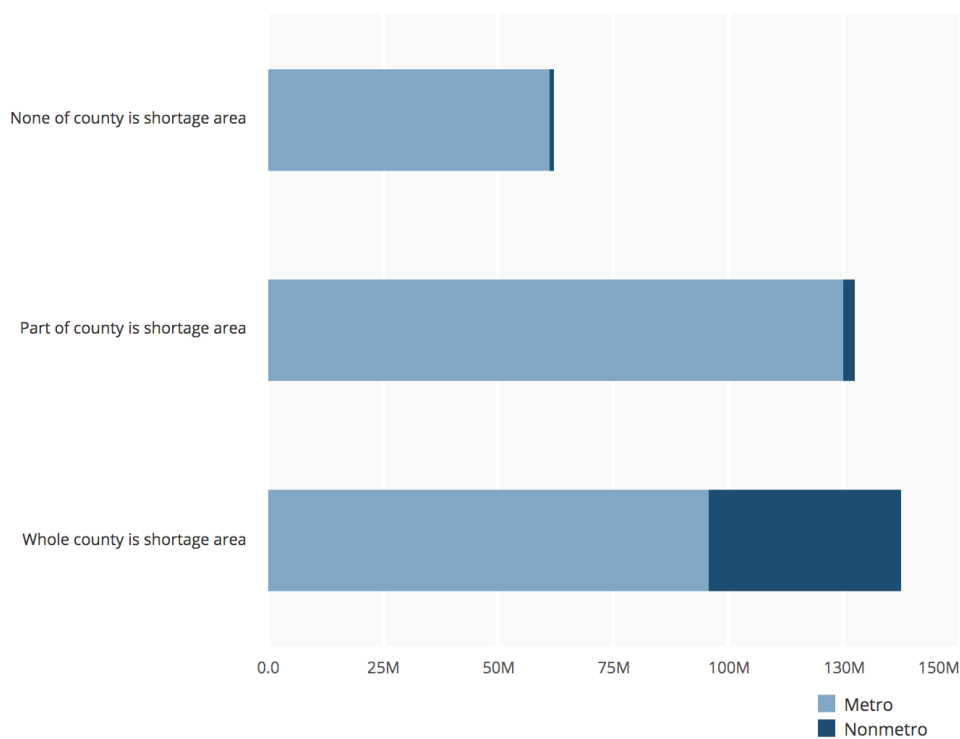
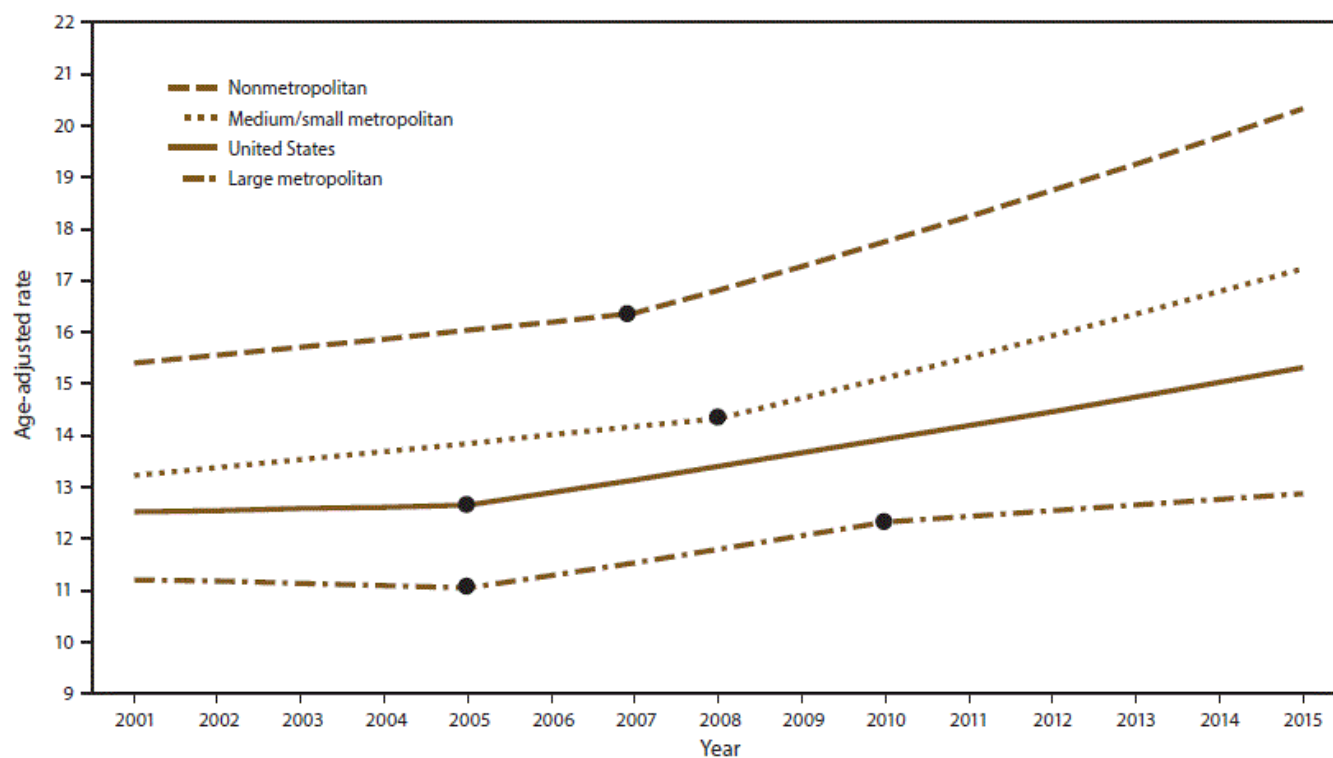


Figure 11: Suicide rates among persons aged 10 years or older by county urbanization level in the United States, 2001—2015.



Appendix D (Community Factors)

Figure 12: Percentage of 18-24 year olds without a high school diploma in metropolitan and nonmetropolitan counties, 2018.

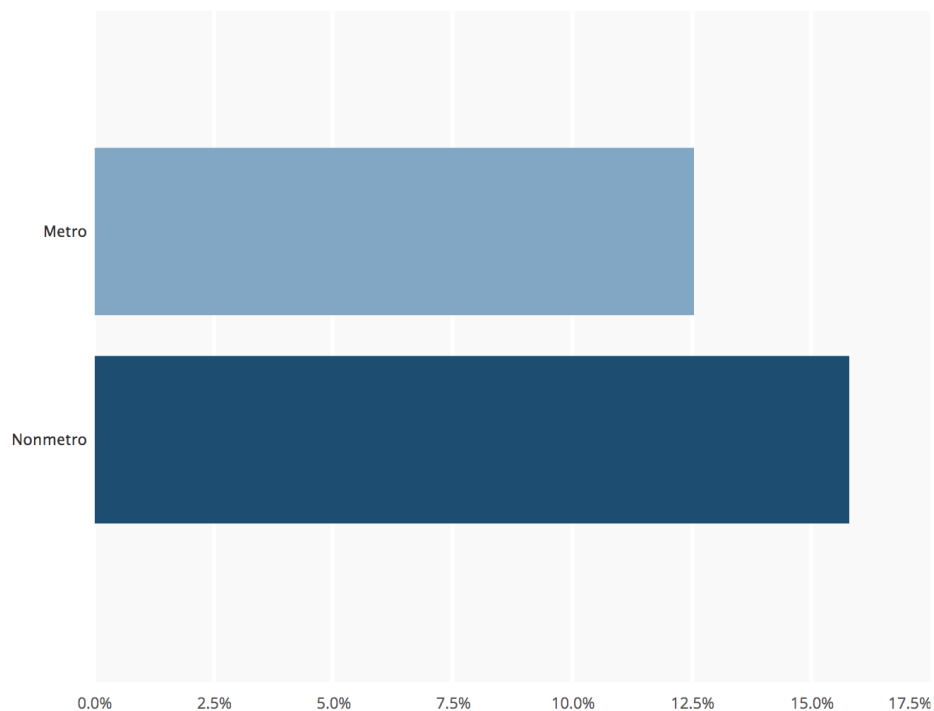
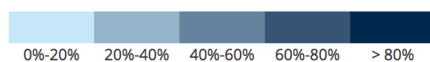
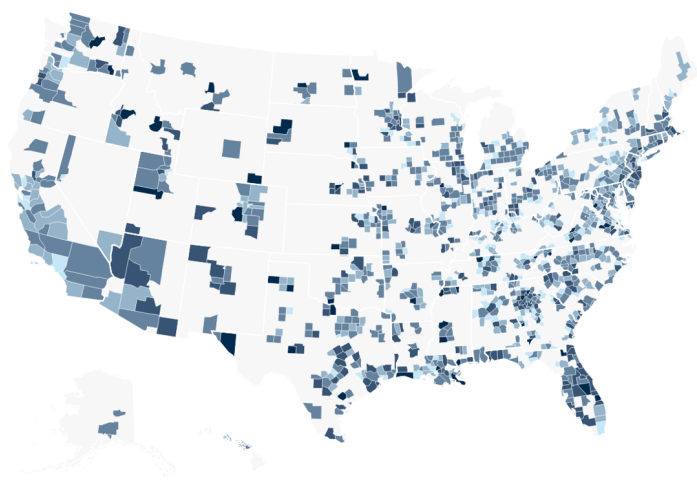
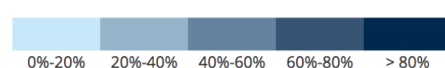
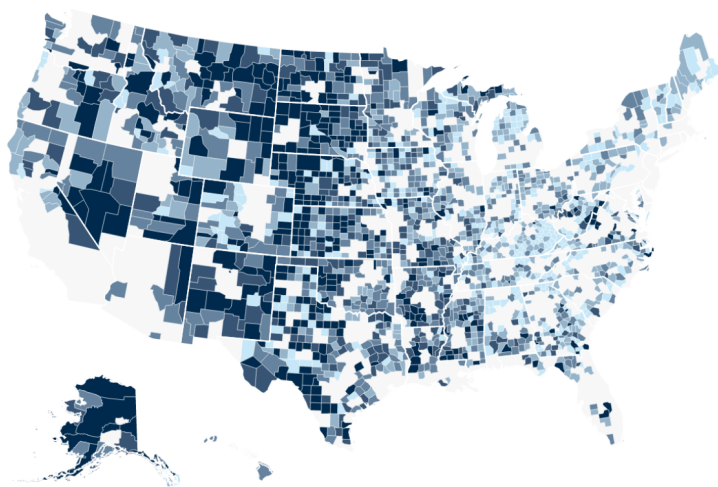


Figure 13: Decreased access to healthy food. The map on the left outlines shortage areas in metropolitan counties, and the map on the right outlines shortage areas in nonmetropolitan (rural) counties.

Low Access to Healthy Food, 2015 - Metropolitan



Low Access to Healthy Food, 2015 - Nonmetropolitan



Appendix E

Table 1: Twenty-five largest hospitals in the United States by bed number with their accompanying patient satisfaction statistics in comparison to the national mean.

25 largest Hospitals in the United States by Total Bed Number	Percent of patients who reported that their nurses "Always" communicated well	Percent of patients who reported that their doctors "Always" communicated well	Percent of patients who reported that they "Always" received help as soon as they wanted	Percent of patients who reported that staff "Always" explained about medicines before giving it to them	Percent of patients who reported that their room and bathroom were "Always" clean	Percent of patients who reported that the area around their room was "Always" quiet at night	Percent of patients who reported that YES, they were given information about what to do during their recovery at home	Percent of patients who "Strongly Agree" they understood their care when they left the hospital	Percent of patients who gave their hospital a rating of 9 or 10 on a scale from 0 (lowest) to 10 (highest)	Percent of patients who reported YES, they would definitely recommend the hospital
New York Presbyterian Hospital/New York Weill Cornell Medical Center (New York City, NY)	78	82	61	62	71	53	86	52	72	77
Florida Hospital Orlando (Orlando, FL)	82	78	67	68	77	71	89	57	77	79
Jackson Memorial Hospital (Jackson, FL)	73	77	60	62	71	55	81	42	67	68
University of Pittsburgh Medical Center Presbyterian (Pittsburg, PA)	82	81	63	64	66	50	90	55	76	78
Methodist Hospital (Indianapolis, IN)	78	76	63	66	65	54	84	50	66	61
Montefiore Medical Center (Bronx, NY)	74	77	57	60	64	49	80	46	59	62
Methodist Hospital (San Antonio, TX)	79	80	68	68	72	59	87	55	75	76
Baptist Medical Center (San Antonio, TX)	77	78	68	68	71	60	86	51	73	71
Orlando Regional Medical Center (Orlando, FL)	80	79	63	64	74	64	85	54	76	77
Methodist University Hospital (Memphis, TN)	80	81	67	67	73	66	87	55	75	76
The Cleveland Clinic (Cleveland, OH)	83	83	70	65	76	53	90	61	83	86
Barnes - Jewish Hospital (St. Louis, MO)	80	80	65	67	68	57	90	59	76	79
Buffalo General Hospital (Buffalo, NY)	78	75	57	59	62	46	89	47	64	63
The Mount Sinai Medical Center (New York City, NY)	74	77	56	56	64	50	85	50	66	71
Norton Hospital (Louisville, KY)	80	80	63	62	69	61	86	53	72	73
Erie County Medical Center (Buffalo, NY)	80	77	65	62	62	57	89	50	68	70
Memorial Hermann Southwest Hospital (Houston, TX)	78	79	62	63	75	61	86	53	73	75
UAB Hospital (Birmingham, AL)	81	82	64	64	65	65	88	56	79	83
North Shore University Hospital (Manhasset, NY)	79	80	62	60	74	53	85	50	69	72
Christiana Hospital (Newark, DE)	80	78	70	61	71	55	88	51	71	75
Beaumont Hospital (Farmington Hills, MI)	80	79	63	59	64	50	86	52	73	76
Spectrum Health Butterworth Hospital (Grand Rapids, MI)	82	81	67	62	69	57	89	55	77	79
Jewish Hospital (Louisville, KY)	75	77	57	57	62	59	85	48	65	65
Albert Einstein Medical Center (Philadelphia, PA)	78	77	62	60	64	56	84	46	63	62
Memorial Regional Hospital (Hollywood, FL)	80	80	66	64	76	57	87	56	75	78
Averages	78.84	78.96	63.44	62.80	69.00	56.72	86.48	52.16	71.60	73.28
National Averages	81	82	70	66	76	62	87	53	73	72

Figure 14: Twenty-five largest hospitals in the United States by bed number with their accompanying average patient satisfaction statistics compared to the national mean. The blue bars represent the calculated average across the United States' largest hospitals, and the yellow bars represent the national mean for comparison.

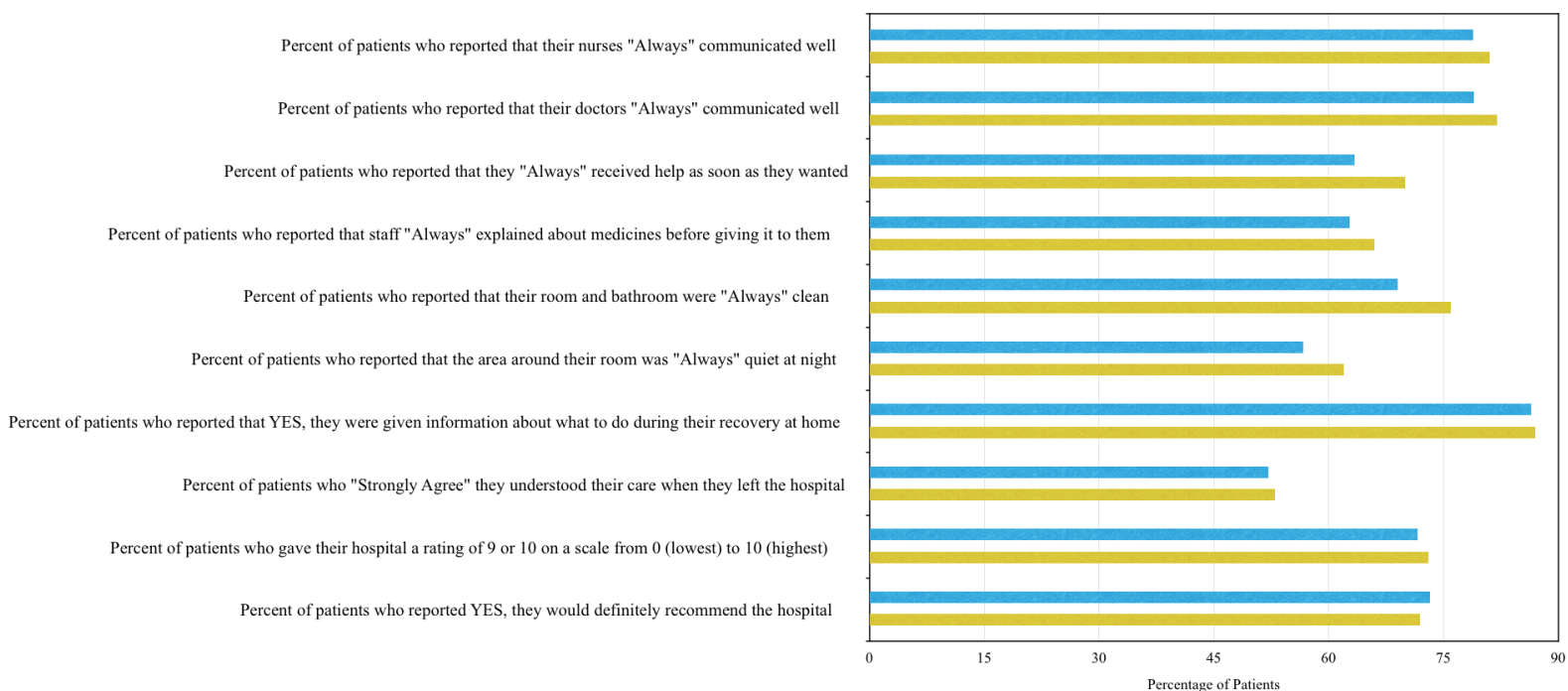


Table 2: Twenty-five smallest hospitals in the United States by bed number with their accompanying patient satisfaction statistics in comparison to the national mean.

25 Smallest Hospitals in the United States by Total Bed Number	Percent of patients who reported that their nurses "Always" communicated well	Percent of patients who reported that their doctors "Always" communicated well	Percent of patients who reported that they "Always" received help as soon as they wanted	Percent of patients who reported that staff "Always" explained about medicines before giving it to them	Percent of patients who reported that their room and bathroom were "Always" clean	Percent of patients who reported that the area around their room was "Always" quiet at night	Percent of patients who reported that YES, they were given information about what to do during their recovery at home	Percent of patients who "Strongly Agree" they understood their care when they left the hospital	Percent of patients who gave their hospital a rating of 9 or 10 on a scale from 0 (lowest) to 10 (highest)	Percent of patients who reported YES, they would definitely recommend the hospital
Greene County Hospital (Eutaw, AL)	86	92	90	76	85	81	91	57	72	66
Aspen Valley Hospital (CO)	82	82	73	66	76	65	88	56	76	76
Jay Hospital (Jay, FL)	90	89	77	80	78	75	85	55	75	71
Banner Fort Collins Medical Center (Fort Collins, CO)	82	80	79	73	80	70	92	61	82	81
Fort Washington Hospital (Fort Washington, MD)	70	72	57	52	58	48	83	44	49	57
Garrett County Memorial Hospital (Oakland, MD)	82	85	75	67	86	48	89	52	78	74
Kentucky River Medical Center (Jackson, KY)	85	84	78	69	71	69	86	55	72	69
Forest Health Medical Center (Ypsilanti, MI)	90	88	81	67	69	81	89	61	81	85
Dickinson County Hospital (Iron Mountain, MI)	74	80	65	65	77	58	91	55	66	67
Richardson Medical Center (Rayville, LA)	91	96	71	80	86	77	80	64	76	69
Goleta Valley Cottage Hospital (Santa Barbara, CA)	87	88	77	73	84	66	92	64	88	90
Sutter Davis Hospital (Davis, CA)	82	84	66	69	77	52	90	59	81	85
Blackwell Regional Hospital (Blackwell, OK)	86	90	86	85	75	64	89	61	83	80
Hillcrest Hospital Henryetta (Henryetta, OK)	84	86	76	74	78	65	84	44	87	78
Evanston Regional Hospital (Evanston, WY)	79	81	82	65	80	68	86	54	74	61
Dignity Health St. Rose Dominican (North Las Vegas, NV)	85	86	84	75	82	80	86	58	83	84
Conemaugh Miners Medical Center (Hastings, PA)	87	88	85	68	90	69	87	68	84	78
Northern Light Inland Hospital (Waterville, ME)	85	79	75	71	79	71	88	56	74	79
Perry Hospital (Perry, GA)	78	84	65	67	67	64	86	59	73	69
Bartlett Regional Hospital (Juneau, AK)	83	85	75	66	77	61	87	53	76	80
Great Falls Clinic Hospital (Great Falls, MT)	80	83	79	68	76	69	90	58	77	87
Legacy Silverton Medical Center (Silverton, OR)	81	83	69	67	84	59	91	57	80	83
Spearfish Hospital (Spearfish, SD)	78	82	79	65	71	54	91	56	68	71
Sauk Prairie Hospital (Prairie Du Sac, WI)	89	90	84	78	88	81	93	71	89	92
Wenatchee Valley Hospital (Wenatchee, WA)	86	87	76	71	79	67	93	64	80	81
Averages	83.28	84.96	76.16	70.28	78.12	66.48	88.28	57.68	76.96	76.52
National Averages	81	82	70	66	76	62	87	53	73	72

Figure 15: Twenty-five smallest hospitals in the United States by bed number with their accompanying average patient satisfaction statistics compared to the national mean. The blue bars represent the calculated average across the United States' smallest hospitals, and the yellow bars represent the national mean for comparison.

