



HEALTH
in RURAL MISSOURI

Biennial Report
2020-2021



EXHIBIT B

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thank you

Office of Rural Health and Primary Care

Sara Davenport, Chief
 Barbara Brendel, Rural Health Manager
 Aleesha Jones, Primary Care Office Manager

Bureau of Health Care Analysis and Data Dissemination

Andrew Hunter, Chief
 LeighAnna Hentges, Research/Data Analyst
 Haley Stuckmeyer, Associate Research/Data Analyst
 Chelsea Fife, Research/Data Analyst
 Sarah Finley, Research/Data Analyst
 Chase Schlesselman, Research/Data Analyst
 Madison Wiseman, Associate Research/Data Analyst

Office of Epidemiology

Erin Miller, Lead Chronic Disease Epidemiologist

EXECUTIVE SUMMARY

The Missouri Office of Rural Health (MORH), located within the Office of Rural Health and Primary Care (ORHPC), Division of Community and Public Health (DCPH), Department of Health and Senior Services (DHSS), biennially reports its activities and recommendations to the Governor and members of the General Assembly on or before November 15 of odd-numbered years, as set forth by the Missouri General Assembly 192.604 RSMo.

The ORHPC promotes and develops diverse and innovative health care services and models in rural areas and has selected several initiatives for inclusion in the *2020-2021 Health in Rural Missouri Biennial Report*. This report demonstrates the initiatives to educate the public and recommends appropriate public policies regarding the continued viability of rural health care delivery in Missouri, as well as the quality and cost-effectiveness of such care and identify conditions obstructing or hindering that delivery of essential health care services to rural Missouri. This report demonstrates the impacts on Missouri's 2.06 million rural residents and includes Missouri's aging population, social determinants of health (SDOH), poverty, education, unemployment, transportation, COVID-19, leading causes of death, infant and child mortality and access to care.

The *2020-2021 Health in Rural Missouri Biennial Report* analyzed the SDOH to examine health behaviors, health outcomes and access to healthcare issues by addressing Missourians' barriers or disparities associated with where they are born, live, learn, work, play and worship. This report focuses on the 5 SDOHs impacting Missourians and rural health: economic stability, education access and quality, health care access and quality, neighborhoods and built environment, and social and community context. This report addresses creating social, physical and economic environments that promote health equity and decreasing health disparities by achieving the full potential for health and well-being for all.

This report reveals that Missourians living in rural counties seem to experience higher instances of health disparities, when compared to urban counties, which produces worsening health behaviors, health outcomes, and more difficulty accessing necessary health care services as compared to urban Missourians. The *2020-2021 Health in Rural Missouri Biennial Report* key findings include:

- Rural populations have higher rates than urban populations in each of the top 10 causes of death.
- Poverty is much more prevalent in rural areas than in urban areas, with 16.5% of rural residents and 12.3% of urban residents in poverty. Rural Missouri also has much higher percentages of children and elderly living in poverty.
- Rural Missourians have a more difficult time accessing health services for reasons including distance to a healthcare provider, lower rates of insurance coverage, and cost.
- Rural Missouri experienced a higher COVID-19 mortality rate (94.2) than both statewide (87.3) and urban rates (83.2). Black/African American persons living in rural areas were 80% more likely to die from COVID-19 than White persons living in rural areas.
- The rate of opioid-related deaths in Missouri's rural areas (8.7) was 16.6% lower than the national rate (10.4). Missouri's urban death rate for opioids was 44.8% above the national average. Opioid overdose death rates are highest in rural and urban counties in the eastern portion of the state.
- Infant mortality rate in rural Missouri declined by 24.9% between 2009 and 2019. However, the rural rate for infant mortality was 6.8% higher than the urban rate (6.3%).

EXECUTIVE SUMMARY (CONT'D)

- The infrastructure for Community Health Workers is being built to increase frontline public health workers with experience in the communities they serve.
- Accessing basic hospital services is becoming increasingly difficult due to hospital closures and fewer available hospital beds in rural areas. Since the last published *Health in Rural Missouri Biennial Report* in 2019, one rural, general acute care hospital closed bringing the number of hospital closures to 15 leaving 55 counties without a hospital. Many health services available in rural areas are provided by clinics, although they are not equipped to handle medical emergencies.
- Much of rural Missouri is designated by the federal government as a Primary Care Health Professional Shortage Area in medical, dental and mental health.

and access to care for Missourians, especially in rural areas. Recognizing health equity and SDOH prospective for policy implications associated with accessibility as a fundamental move to focus on patients and considerations for health literacy, culturally competent communication, patient-centered standards, and simplifying and streamlining cost and complexity of the health care system. Throughout the evaluation in this report, it was evident that rural Missourians have the greatest unmet health care needs. However, all Missourians suffer from high mortality rates, chronic diseases, poor access to care and health behaviors, high levels of unmet health care needs, which exhibits the need for analysis of social systems and evaluation of resources, impactful programs and funding allocations to reduce and prevent poor health quality of Missourians.

A broad, systematic, policy-level approach is needed that brings new and innovative strategies to reduce barriers while improving access to care. The data provided in this report illustrates the ongoing need to improve the health status



INTRODUCTION

The MORH was established by the 1990 General Assembly (192.604 RSMo) to “assume a leadership role in working or contracting with state and federal agencies, universities, private interest groups, communities, foundations, and local health centers to develop rural health initiatives and maximize the use of existing resources without duplicating existing effort.” This report demonstrates the adherence to the statute requirement associated with biennially reporting the rural health activities and related recommendations to the Governor and members of the General Assembly.

The MORH demonstrates efforts associated with providing a central information and referral source and serving as the primary state resource in coordinating, planning and advocating for the continued access to rural health care services in Missouri for the poor, the uninsured, the underinsured, the medically deprived, mothers, newborns, children and seniors.

The *2020-2021 Health in Rural Missouri Biennial Report* describes the health disparities rural Missourians experience, as compared to the urban Missourians. The report utilizes data analysis to compare the rural and urban health related and SDOH disparities, including the demographical differences and population changes, difficulties in increasing healthy behaviors, health outcomes, health care access, health conditions, and maternal and child health.

In order to position the rural health activities and recommendations into context, this report focuses on the health status and factors that impact the health of rural Missourians. Urban Missouri data is included for 2 purposes:

- Allow for a natural and readily understandable comparison to better highlight and understand health in rural Missouri, and
- Present compelling evidence that geographic location in Missouri has a significant bearing on health.



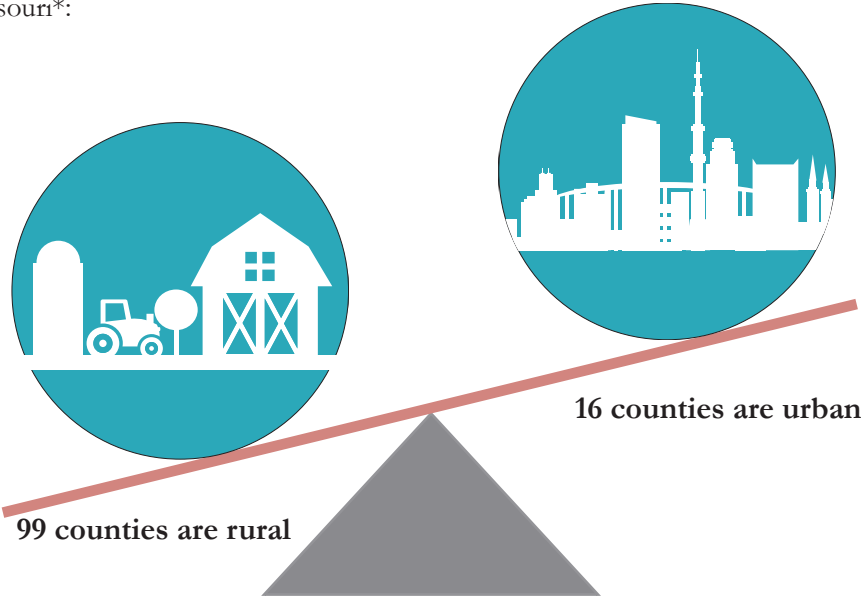
DEFINING RURAL HEALTH

The United States (U.S.) Census Bureau and other federal agencies define rural areas differently. Each definition uses different criteria, such as commuting patterns, population size, and population density. DHSS, ORHPC uses the same rural and urban definitions in this *Health in Rural Missouri Biennial Report* as recent editions of the report.

A Missouri county was considered rural if:

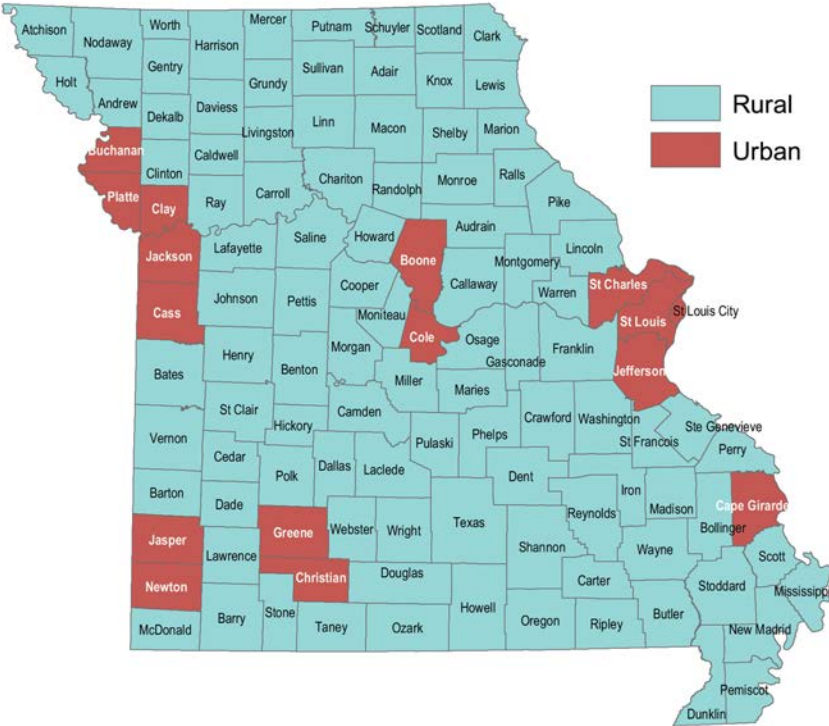
- There are less than 150 people per square mile; and
- Does not contain any part of a central city in a Metropolitan Statistical Area.

Based on this criteria and using 2019 population estimates of the 115 counties in Missouri*:



*St. Louis City is an independent city which functions as its own county. It is therefore included as one of the 16 urban counties.

Rural/Urban County Classification Missouri, 2019



Source: Missouri Department of Health and Senior Services. Bureau of Health Care Analysis and Data Dissemination.

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Rural Counties

Adair
Andrew
Atchison
Audrain
Barry
Barton
Bates
Benton
Bollinger
Butler
Caldwell
Callaway
Camden
Carroll
Carter
Cedar
Chariton
Clark
Clinton
Cooper
Crawford
Dade
Dallas
Davies
DeKalb
Dent
Douglas
Dunklin
Franklin
Gasconade
Gentry
Grundy
Harrison
Henry
Hickory
Holt
Howard
Howell
Iron
Johnson
Knox
Laclede
Lafayette
Lawrence
Lewis
Lincoln
Linn
Livingston
Macon
Madison
Maries
Marion
McDonald
Mercer
Miller
Mississippi
Moniteau
Monroe
Montgomery
Morgan
New Madrid
Nodaway
Oregon
Osage
Ozark
Pemiscot
Perry
Pettis

Phelps
Pike
Polk
Pulaski
Putnam
Ralls
Randolph
Ray
Reynolds
Ripley
Saline
Schuyler
Scotland
Scott
Shannon
Shelby
St. Clair
St. Francois
Ste. Genevieve
Stoddard
Stone
Sullivan
Taney
Texas
Vernon
Warren
Washington
Wayne
Webster
Worth
Wright

Urban Counties

Boone
Buchanan
Cape Girardeau
Cass
Christian
Clay
Cole
Greene
Jackson
Jasper
Jefferson
Newton
Platte
St. Charles
St. Louis
St. Louis City

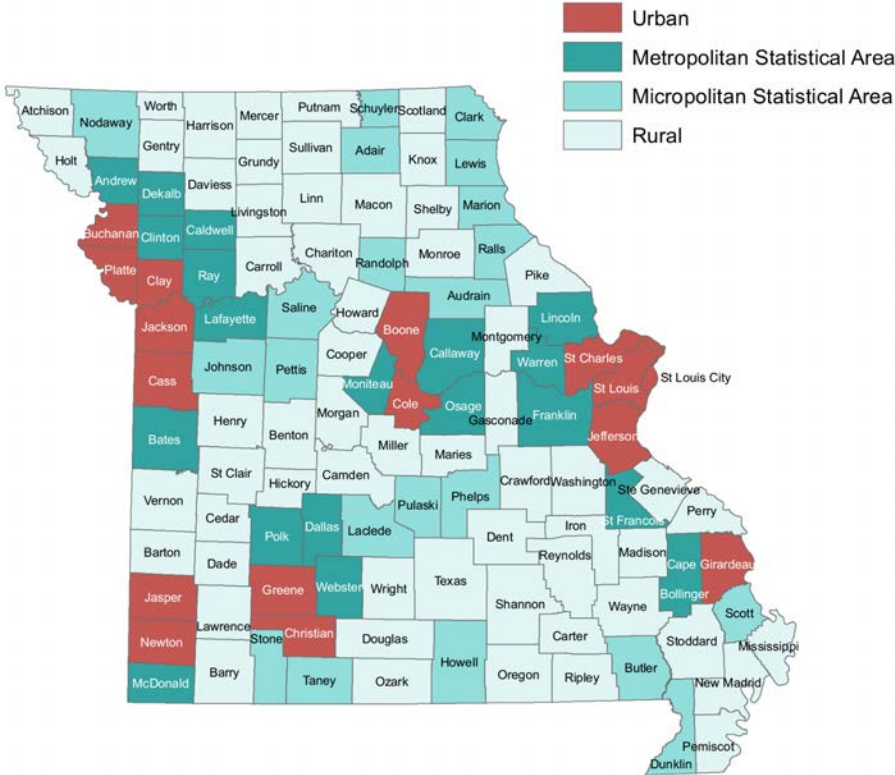
THE PEOPLE OF MISSOURI

POPULATION DISTRIBUTION

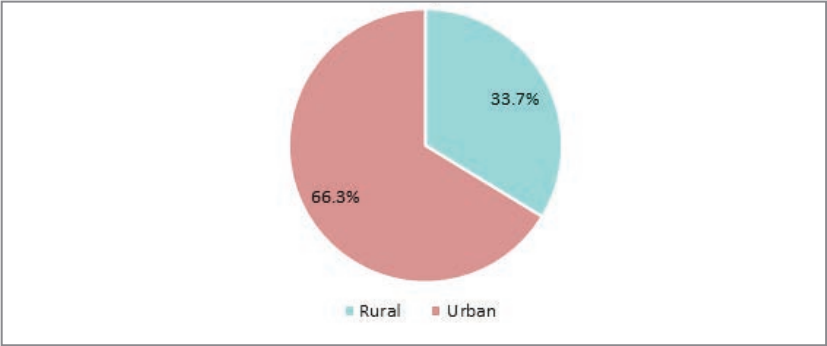
According to the U.S. Census Bureau, the 2019 Missouri population was estimated at 6,137,428 residents. Approximately 2.06 million people, or 33.7% of Missouri's total population, live in rural counties. The remaining 4.07 million people, or 66.3% of Missouri's population, live in urban counties.

Out of 115 Missouri counties including St. Louis City, 99 counties are rural and 16 counties are urban. The rural counties span a variety of contexts, and the U.S. Census Bureau has a classification system that provides an opportunity for additional analysis. Using the U.S. Census Bureau classification, Metropolitan Statistical Areas in Missouri are adjacent to and somewhat integrated with urban population centers, and Micropolitan Statistical Areas contain or are socially and economically connected to rural population centers. The Missouri rural counties are comprised of 19 Metropolitan Statistical Areas and 21 Micropolitan Statistical Areas. There are 59 rural counties in Missouri that do not meet either of these definitions. In addition to defining rural and urban areas, this report analyzes the population change overtime.

Metropolitan and Micropolitan Statistical Areas



Rural/Urban County Proportions Missouri, 2019



Source: Missouri Census Data Center. (<https://mcdc.missouri.edu/>). Accessed April 27, 2021.

Source: Centers for Disease Control and Prevention. National Center for Health Statistics. https://www.cdc.gov/nchs/nvss/bridged_race.htm. Accessed April 9, 2021.

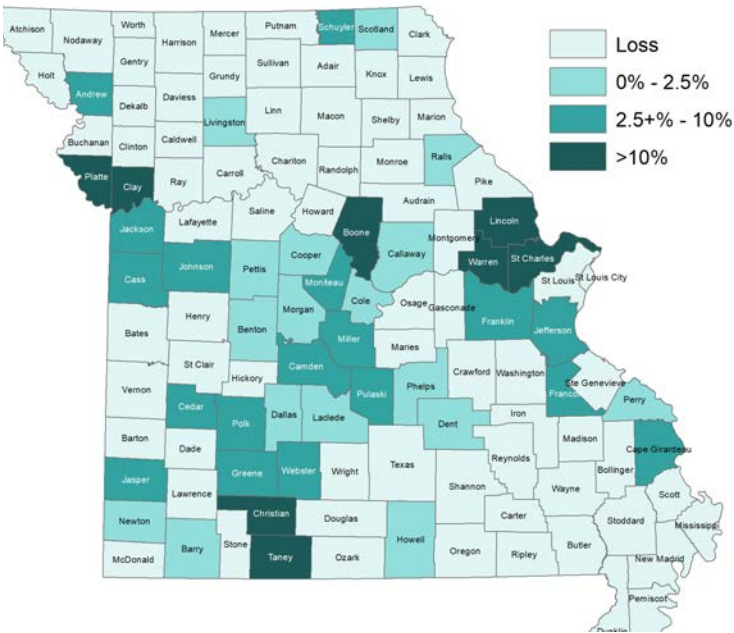
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POPULATION CHANGE

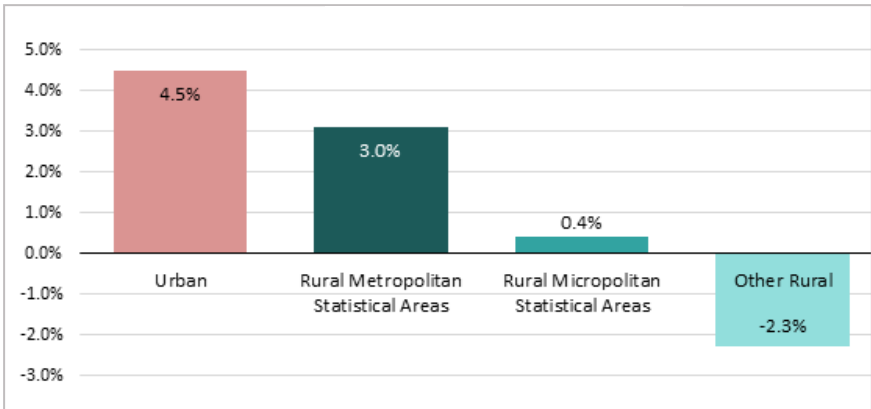
Between 2009 and 2019, Missouri experienced a 3% population increase, particularly lower than the national population increase of about 7%. Missouri's population continued to grow less than the national average, as shown in the *2018-2019 Health in Rural Missouri Biennial Report*; from 2007-2017, Missouri grew by 3.8% versus the national average of 8.1%. The Missouri and national averages appear to be slowing overtime. From the 99 Missouri rural counties, 30 counties had a population increase. In aggregate, the 99 rural counties had a total population increase of 0.05%, compared to the 16 urban counties' population increase of 4.5%.

Rural counties in Metropolitan Statistical Areas had a total population increase of 3.1%, and rural counties in Micropolitan Statistical Areas had a population increase of 0.4%. In contrast, rural counties that did not meet either criteria suffered population loss of 2.3%.

Missouri Population Change 2009-2019



Population Change in Missouri 2009-2019



Source: Centers for Disease Control and Prevention. National Center for Health Statistics. https://www.cdc.gov/nchs/nvss/bridged_race.htm. Accessed April 9, 2021.

Source: Centers for Disease Control and Prevention. National Center for Health Statistics. https://www.cdc.gov/nchs/nvss/bridged_race/data_documentation.htm. Accessed April 9, 2021

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Other notable population changes include:

- Nine rural counties had a population increase of less than 1%.
- Phelps and Dent rural counties had the lowest population increase around 0.1%. Population growth of more than 5% occurred in 14 counties; 6 rural and 8 urban.
- Both urban St. Louis County and St. Louis City saw population decrease.
- Two rural counties on the outskirts of the St. Louis area, Lincoln (13% growth) and Warren (10% growth), had a 10% or greater population increase.
- Rural Taney County, where most of Branson is located, also had a 10% population increase.
- Even as Missouri statewide population increased, 72 counties in Missouri experienced a population decrease over the 10-year period, of which 69 were rural and 3 urban. From the 99 rural counties, two-thirds of rural counties had a population decrease, and 20 rural counties had more than a 5% decline in population. St. Louis City was the only urban county with more than a 5% decline in population.

Three rural counties in Missouri had a large population decrease:

- Pemiscot County's population decreased by 14% in this 10-year period.
- Atchison and Holt counties population decreased greater than 10%.

Atchison, Holt and Pemiscot counties had a large population decrease.

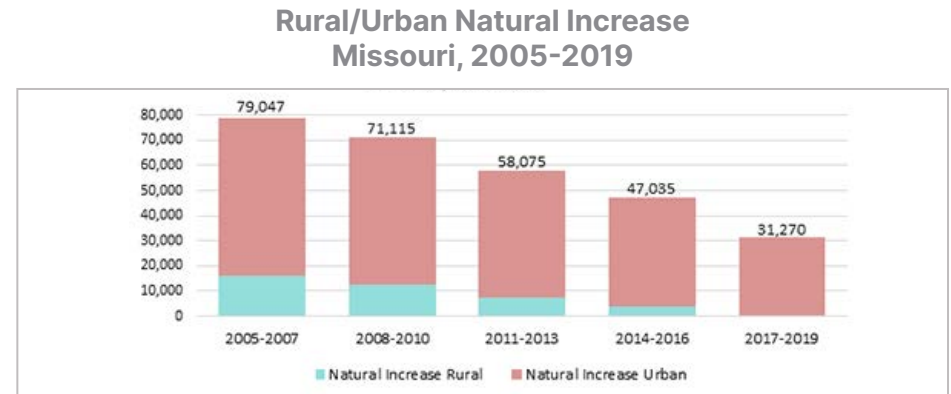


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NATURAL INCREASE

Natural increase is an additional tool commonly used to track population trends, calculated by taking the total deaths for a specific area and subtracting those from the total births for that area. When the location has more births than deaths, it will have a positive natural increase indicating a population growth. When the location has more deaths than births, there is a natural decrease or population loss.

The number of births for every 1 death is related to natural increase. A ratio of 1.00 means that there were equal numbers of births and deaths for the years selected. If the ratio was above 1.00, then there were more births than deaths, and if the ratio was less than 1.00, there were less births than deaths.



Source: Centers for Disease Control and Prevention. National Center for Health Statistics. https://www.cdc.gov/nchs/nvss/bridged_race.htm. Accessed April 9, 2021

Between the years 2017-2019, the natural increase was 31,270 people. While this represents a net population growth, natural increase in Missouri was growing at a slower pace when compared to prior years. In fact, totals have been steadily declining since 2005. Natural increase in 2017-2019 was less than half the increase experienced during 2005-2007.

- Natural increase was slowing for both urban and rural areas.
- Between 2005-2007 and 2017-2019, rural counties experienced a faster decline, as compared to urban.
- Rural locations decreased 98.5%.
- Urban locations decreased 50.8%.
- Between the years 2017 and 2019, rural counties only experienced a natural increase of 242, compared to 3,619 the 3 years prior.
- Between 2005 and 2007, rural population accounted for 20.2% of natural increase but declined to less than 1% in 2017-2019.

	Births	Deaths	Natural Increase	Number of Births for Every 1 Death
Missouri	218,401	187,131	31,270	1.17
Rural Missouri	73,070	72,828	242	1.00
Urban Missouri	145,331	114,303	31,028	1.27

Source: Centers for Disease Control and Prevention. National Center for Health Statistics. https://www.cdc.gov/nchs/nvss/bridged_race.htm. Accessed April 9, 2021.

Key Missouri findings include:

- The urban population contributed 99.2% to the total statewide natural increase, while the rural population comprised of less than 1%.
- Both the statewide and urban ratios were above 1.00, indicating that there were more births than deaths.
- Rural areas had a ratio of exactly 1.00, with only 242 more births than deaths.

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RACE AND ETHNICITY

Missouri's urban counties were more racially and ethnically diverse than rural counties. From 2015 to 2019, approximately 7% of Missouri residents in rural counties identified as non-White, as compared to urban (23%). In both rural and urban counties, those who identified as Black/African American comprised of the second largest racial group.

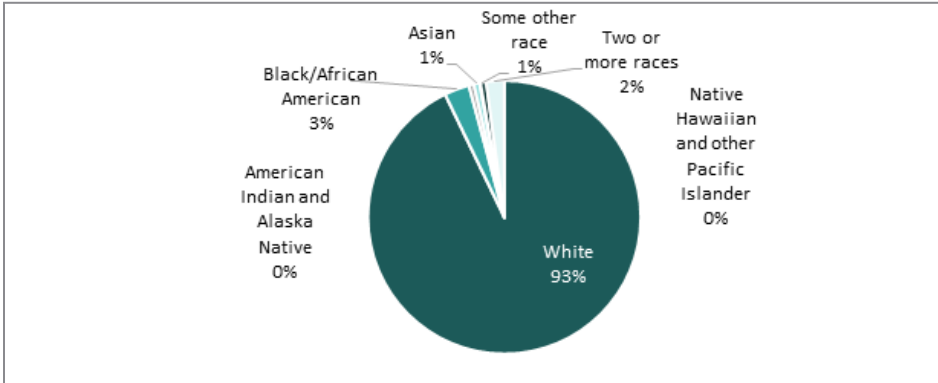
Further Missouri notable statistics include:

- In urban counties, Black/African American population was 16%, which was more than 5 times the Black/African American population in rural areas (3%).
- Black/African Americans comprised of more than 15% of the population in 3 of the 6 counties in rural southeast Missouri; Pemiscot (27.5%), Mississippi (24.9%), and New Madrid (15.4%).
- Missouri's 4.3% total Hispanic and Latino population was relatively small,

especially when compared to the overall U.S. Hispanic population of 18.4%.

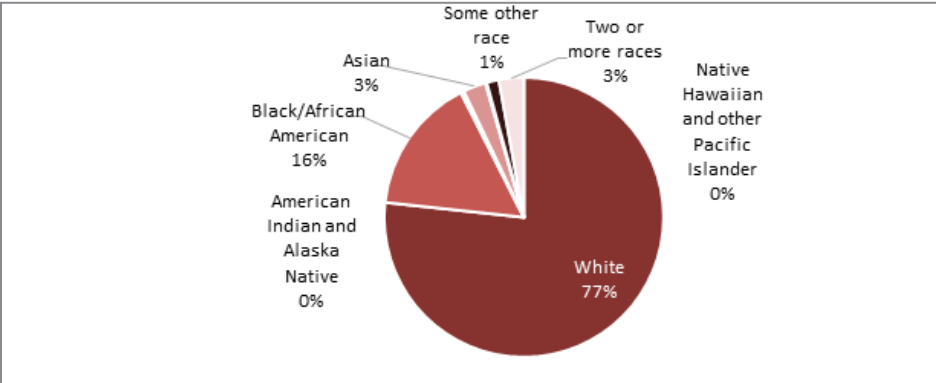
- Missouri's total Hispanic and Latino population consisted of 4.7% of the 4.07 million people in urban counties, and 3.0% of the 2.06 million people in rural counties.
- There were 51 counties where the Black/African American population was less than 1% of the total population, and 48 of those counties were rural.
- Other races, such as Indigenous Americans, Alaskan Natives, Asians, and others, comprised 7% of Missouri's urban population and 5% of Missouri's rural population.
- While it was true that Missouri's small Hispanic and Latino population was more widely dispersed than the Black/African American population, the majority (75%) of this subpopulation live in urban locations.

Racial Diversity in Rural Counties Missouri, 2015-2019



Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates, Table DP05. Accessed April 9, 2021.

Racial Diversity in Urban Counties Missouri, 2015-2019



Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates, Table DP05. Accessed April 9, 2021.

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AGING IN MISSOURI

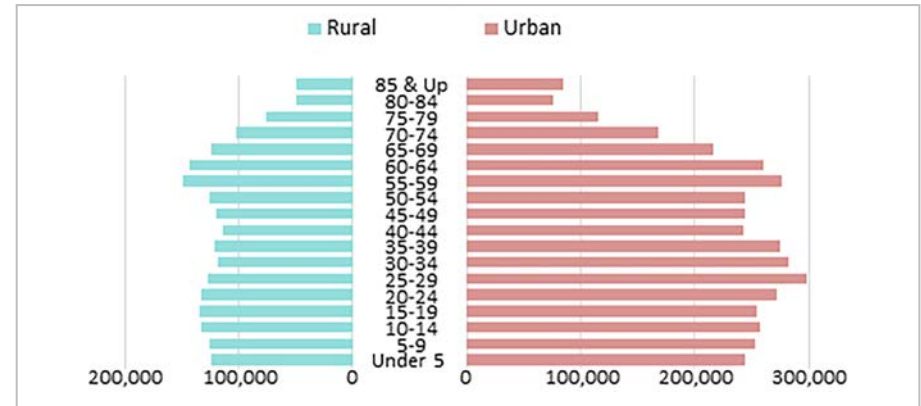
Age pyramids are often a good way to visually display age structure differences for a population. This graphic shows an overview of the different age groups in Missouri, separated by rural versus urban counties. Rural populations were smaller than their urban counterparts for each age group but the general patterns were similar.

The biggest difference was that rural Missouri was slightly older as illustrated by the following examples:

- The largest single age group for rural was 55-59 year olds (the youngest of the Baby Boom generation).
- The largest single age group for urban was the 25-29 year olds (the youngest of the Generation Y or Millennial generation).
- The senior population (65 & older) comprised of 19.4% of rural areas, while in urban areas that percentage was only 16.2%.
- In contrast, young adults (20-34) are more frequent in urban areas (20.9% in urban versus 18.3% in rural).

It is important to emphasize that individual counties, especially rural areas, may have different population patterns compared to these overarching rural and urban trends. Colleges, prisons, and military bases are examples of institutions that often have a large impact on the age distribution (usually making them much younger).

Rural vs. Urban Population Missouri, 2019



Source: Centers for Disease Control and Prevention. National Center for Health Statistics. https://www.cdc.gov/nchs/nvss/bridged_race.htm. Accessed April 9, 2021.



SOCIAL DETERMINANTS OF HEALTH

IMPACT ON HEALTH OF RURAL MISSOURIANS

Social Determinants of Health (SDOH) are non-medical factors and conditions in the environments and places where people are born, live, age, learn, work, play, and worship that influence and affect a wide range of functioning, quality-of-life, and health risks and outcomes. Several key factors play a role in determining one's overall health. These factors include family history of disease and health behaviors, such as diet and exercise. While those indicators directly influence health outcomes, SDOH factors also impact health. Factors include where people are born or currently live, previous education history, work environment, employment status, or access to health insurance for basic health care needs. All of these conditions or barriers to being and staying healthy are known as SDOH. These are conditions in the environment that affect a wide range of health and quality-of-life outcomes and risks, while also contributing to wide health disparities and inequities.¹ In Missouri, SDOH were considered when looking at rural and urban environments to analyze how some disparities may be contributing to adverse health outcomes in certain parts of the state. SDOH influence health inequities, which are the unfair and avoidable differences in health status seen within the different Missouri areas. The following sections include some highlighted SDOH that have an impact on the health status of those living in rural Missouri.

Social Determinants of Health



Source: Healthy People 2030. Social Determinants of Health. <https://health.gov/healthypeople/objectives-and-data/social-determinants-health>. Accessed August 13, 2021.

Social Determinants of Health (SDOH) are non-medical factors and conditions in the environments and places where people are born, live, age, learn, work, play, and worship that influence and affect a wide range of functioning, quality-of-life, and health risks and outcomes.

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POVERTY

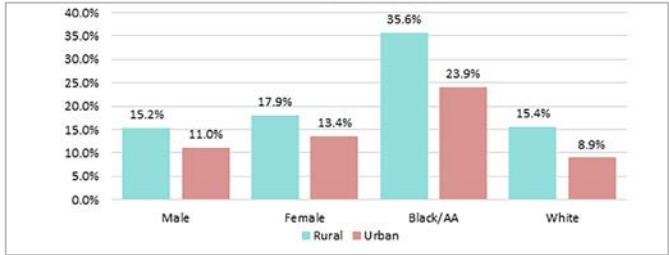
The link between income and life expectancy has been well established.² Education, race, and gender also intersect with income and health to further complicate the relationship between income and life expectancy. Increases in mortality, in the recent past, was concentrated in lower-income groups, and those living below the Federal Poverty Level (FPL) were 3 times more likely to suffer disruptions in daily activities due to chronic disease.³ Economic policies impact health outcomes,⁴ thus recognizing the importance of reducing poverty as a necessary first step to improving health.

In Missouri from 2015 to 2019, 13.7% of residents were living below the FPL. Almost half of those living below FPL were living in extreme poverty, which was at or below 50% of the FPL. Rural counties in Missouri had a higher rate of poverty than urban counties, with 16.5% of rural residents and 12.3% of urban residents in poverty. Nationally, 13.4% of Americans lived at or below the FPL.

County Differences

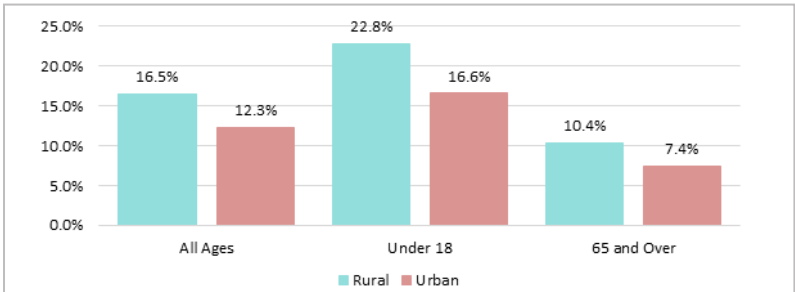
- The top 18 counties for poverty rates were all rural, with the highest urban county being St. Louis City with a rate of 21.8%.
- The 10 highest county poverty rates were all in Southeast Missouri.

Poverty rates by Sex and Race Missouri, 2015-2019



Source: United States Census Bureau. American Community Survey 5 Year Estimates. Table S1701.

Poverty Rates by Age Group Missouri, 2015-2019



Source: United States Census Bureau. American Community Survey 5 Year Estimates. Table S1701.

- Rural Ozark County had the highest poverty rate at 29.6%.
- Outside of Southeast Missouri, rural Adair County, in the Northeast Region, was the county with the next highest poverty rate at 23.8%.
- Rural counties, Osage and Perry, had the lowest rural poverty rates at 7.4%.

Gender Differences

- Female residents had higher poverty rates than males in both rural and urban areas.
- In both areas, female residents were at least 2.4 percentage points higher than males.
- In rural counties, 17.9% of the female residents were living under the FPL.

Racial Differences

- Black/African American residents in both rural and urban counties had higher rates of poverty than White residents.
- Rural Black/African American residents had the highest poverty rate among the race and geography groups displayed (35.6%).

Missouri's poverty rate decreased in recent years, from 15.6% in 2010-2014 to 13.7% in 2015-2019. Statewide, poverty in the under 18 population and the over 65 population also decreased in this time period.

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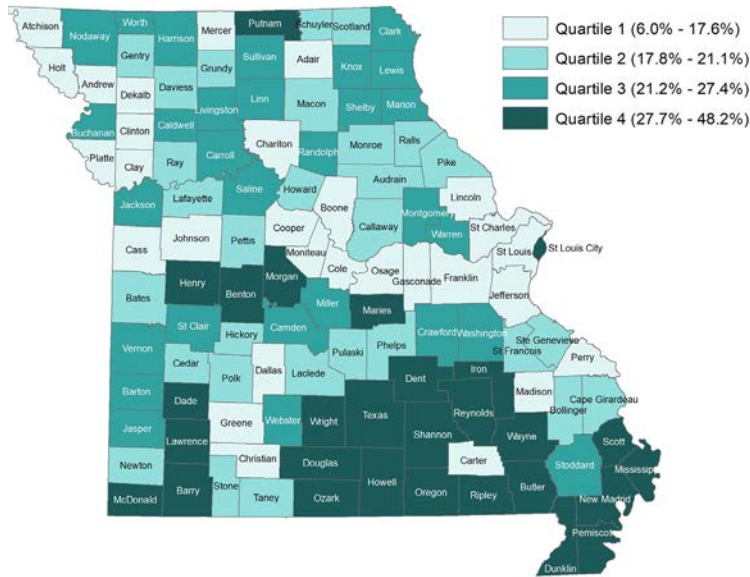
CHILDHOOD POVERTY

Poverty in children under age 18 was correlated with adverse childhood health, morbidity, and decreased psychosocial wellness outcomes in adulthood.⁵ Therefore, childhood poverty is an important indicator of current population health as well as future population health trends as those children grow into adulthood. From 2010-2014 and 2015-2019, childhood poverty decreased from 21.5% to 18.7%. In 2015-2019, rural counties had a higher childhood poverty rate than urban counties.

- Rural Putnam County had the largest percentage difference between childhood poverty (31.1%) and total poverty (17.0%).

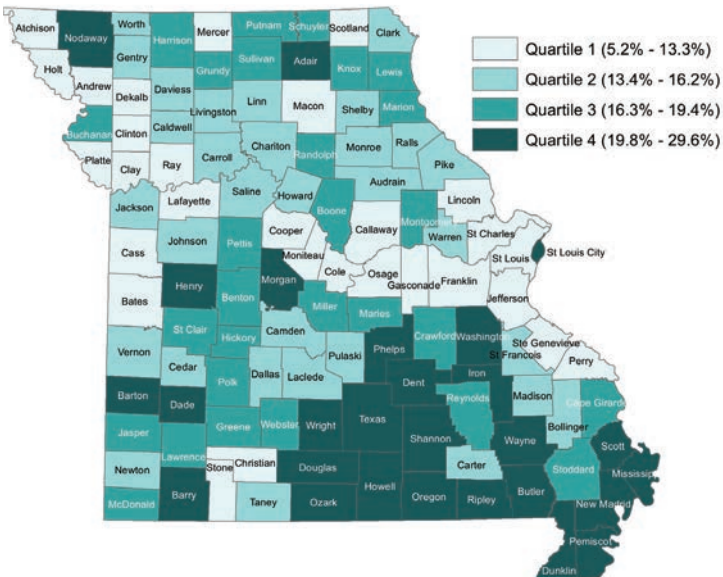
- Rural Ozark County had the highest poverty rates of all counties for both children (48.2%) and adult populations.
- The counties with the highest childhood poverty were in Southern Missouri, with 17 of 28 counties in the fourth quartile for childhood poverty located in the Southeast Region.
- The large adult population in Adair, Phelps, Boone, and Green counties was contributed by the student populations of the universities. All of these counties fall in the highest quartile for overall poverty but this could be a function of the large student population.

**Under 18 Poverty Rates
Missouri, 2015-2019**



Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates, Table S1701.

**Total Poverty Rate
Missouri, 2015-2019**



Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates, Table S1701.

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SENIOR POVERTY

In Missouri, poverty for the 65 years and older population was less than the poverty rates for all other age groups. Social programs have positively impacted national rates of senior poverty exhibited by the recent decline in poverty rates among the senior population. Since the start of social security, national senior poverty rates have decreased; however, those in older-age groups are more economically vulnerable due to higher amounts of income spent on medical costs and the rising cost of healthcare.⁶ In 2015-2019, Missouri's poverty rate for the 65 and older population was 8.6%, down from 9.0% in 2010-2014. In 2015-2019, rural counties had higher senior poverty (10.4%) than urban counties (7.4%).

- Rural Shannon County, in the Southeast, had the highest senior poverty rate (19.5%).
- Senior poverty follows similar regional trends of total and childhood poverty, but was more dispersed.
- The 10 counties with the highest senior poverty are rural, and 7 of those 10 are located in the Southeast (with rates ranging from 15.6%-19.5%). Counties outside of the Southeast that are in the top 10 include Morgan (17.8%), Grundy (15.9%), and Schuyler (15.6%) counties.

Social programs have positively impacted national rates of senior poverty exhibited by the recent decline in poverty rates among the senior population.



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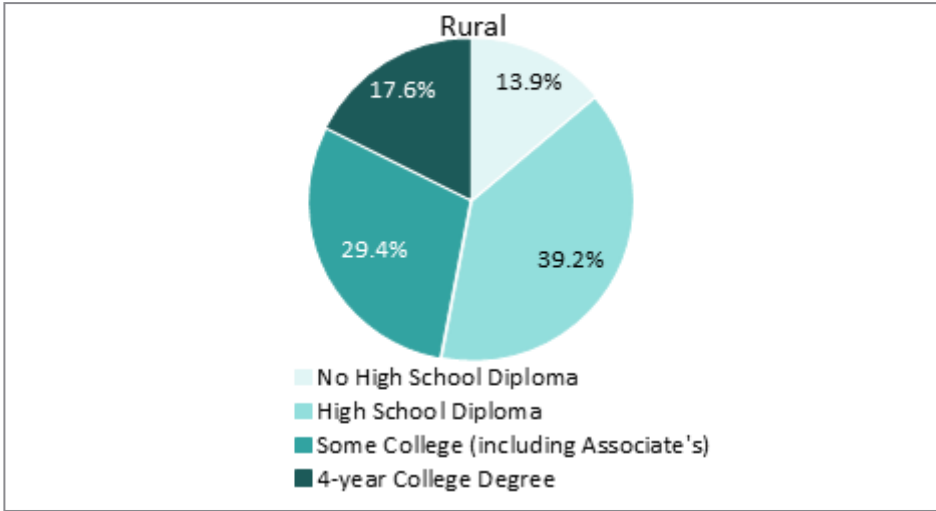
EDUCATION

Educational status was a major predictor of health outcomes. Nationally between 1990 and 2018, the gap in life expectancy for U.S. adults with and without a Bachelor’s degree widened. From 2011-2018, as life expectancy for those with a Bachelor’s degree continued to increase, life expectancy decreased for those without a Bachelor’s degree, highest education a high school degree or equivalent. The decrease in life expectancy was correlated with higher rates of death due to drug overdose, suicide, alcoholic liver disease, and cardiovascular disease. These trends were true for all age, race, and ethnic groups.⁷ Higher education can be used as a means to obtain access to higher earnings, affordable health insurance, and skills necessary to navigate health care. Correlation relationships between

education, health, and poverty tends to be widely supported and education may play a role in mitigating the impacts of both childhood poverty and adverse childhood experiences.⁸

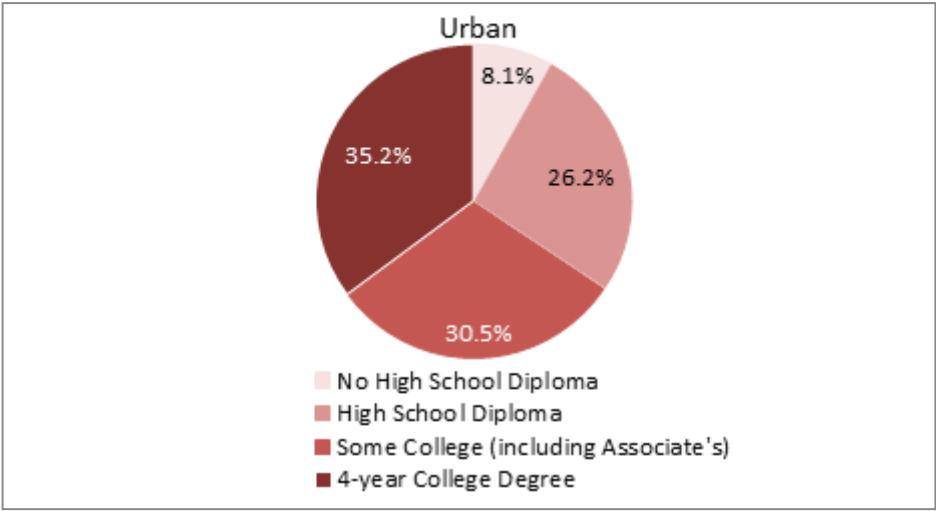
In Missouri from 2015 to 2019, rural counties had a higher percentage of residents 25 years old and over without a high school degree or equivalent (13.9%) than urban counties (8.1%). Among high school graduates, urban counties had increased rates of 4-year or higher postsecondary education degrees. This data did not take into account other postsecondary education, such as trade schools.

Educational Attainment for Adults 25+ Missouri, 2015-2019



Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates, Table S1501

Educational Attainment for Adults 25+ Missouri, 2015-2019



Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates, Table S1501

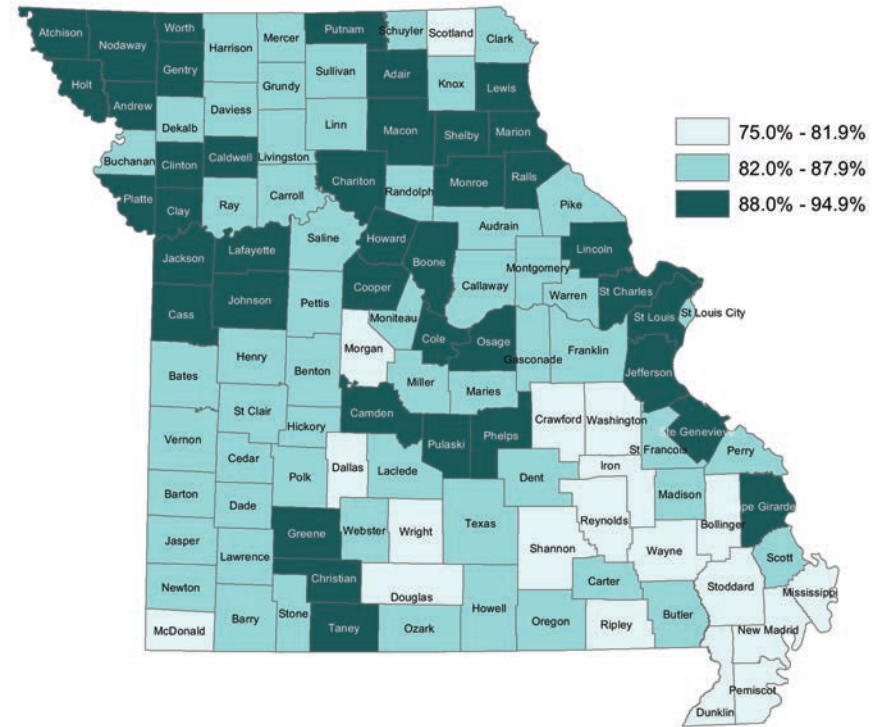
EXHIBIT B

Other Missouri education trends include:

- Counties in Southeast Missouri had the lowest rates of high school graduation. Rural counties Mississippi (75.7%), Wayne (76.2%), and Dunklin (76.3%) had the lowest 3 rates for high school diplomas or higher.
- Pulaski County was ranked sixth in the state (92.9%) as the highest rural county for high school graduation rate. Fort Leonard Wood, a large army training installation located in Pulaski County, may be the most prevalent contributing factor to the large number of high school graduates.
- St. Louis City was the lowest urban county for high school graduation rate, with 87.8% of residents obtaining a high school diploma.
- In both rural and urban counties, about 30% of the population attended at least some college education, including receiving an associate degree.
- Adair County was ranked tenth (31.0%) as the highest rural county for Bachelor's degree attainment.



**Percent of County 18+ with High School Diploma
Missouri, 2015-2019**



Source: U.S. Census Bureau, 2015-2019 American Community Survey 5 Year Estimates, Table S1501.

EXHIBIT B

UNEMPLOYMENT

Unemployment was closely associated with poverty and other economic variables that may lead to poor health outcomes. Individuals who were unemployed often did not have health insurance. They were more likely to suffer from poor mental health, such as elevated anxiety and depression. They also had increased chances for high blood pressure, heart disease, arthritis, and other chronic diseases.⁹

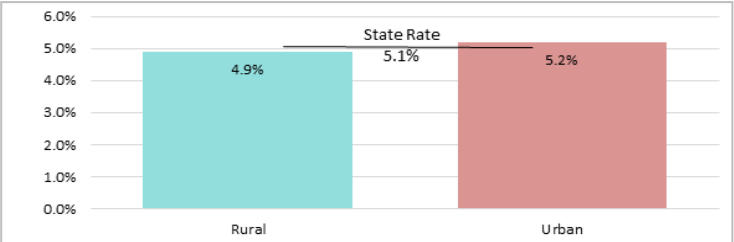
In 2020 and 2021, the COVID-19 public health emergency affected unemployment rates. The latest unemployment estimates only cover the month of June 2021 and show the state unemployment rate at 5.1%. The rural rate was slightly lower at 4.9%, while the urban rate was 5.2%. This indicated that individuals were employed at a higher rate in rural counties as compared to urban. Data was not available to allow for testing of significance for the unemployment rate. In 2019, the unemployment rate for rural was higher (3.8%) than urban (3.2%).

According to the U.S. Bureau of Labor Statistics, the 2019 average unemployment rate for the State of Missouri was around 3.4; however, in April and May of 2020, that rate almost tripled. Being unemployed creates a great barrier to adequate health care. Job loss, underemployment, low pay, or unemployment can also cause stress that can impact physical and mental health.¹⁰ Since the onset of COVID-19, unemployment rates have increased (see below).

Other Missouri trends include:

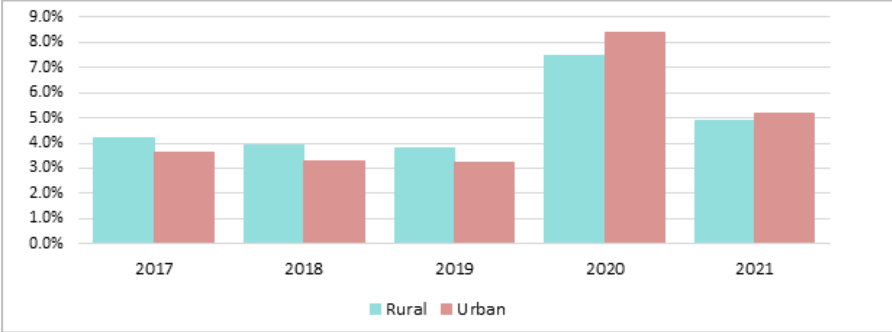
- Compared to June 2019, the unemployment rate was up about 1 percentage point in rural areas and 2 percentage points in urban.
- In June 2021, no county in Missouri had an unemployment rate above 10%.
- Rural counties with the highest unemployment rates: Ray County (9.4%) in the Kansas City Region was highest, followed by rural counties, Pemiscot (8.3%) in the Southeast Region, and Taney (7.9%) in the Southwest Region.
- 9 of the 10 counties with the lowest unemployment were rural. Seven of those 9 were located in Northern Missouri. Mercer, Worth, and Osage were the 3 counties with unemployment rates below 3%.
- St Louis City had the highest urban unemployment rate and fourth highest rate overall at 7.4%.
- Urban Cole County, where the state capital of Jefferson City is located, had the lowest rate among urban counties at 3.4% and ranked seventh best overall.

Unemployment Rate Missouri, June 2021



Source: Missouri Economic Research and Information Center (MERIC). Local Area Unemployment Statistics. <https://meric.mo.gov/data/economic/local-area-unemployment-statistics/laus>. Accessed October 12, 2021.

June Unemployment Rate Missouri, 2017-2021



Source: Missouri Economic Research and Information Center (MERIC). Local Area Unemployment Statistics. <https://meric.mo.gov/data/economic/local-area-unemployment-statistics/laus>. Accessed October 12, 2021.

EXHIBIT B

TRANSPORTATION: WORK COMMUTE

The availability and accessibility of transportation is important for many aspects of Missourians' daily lives, including travel to work. Longer daily work commutes correlate with many negative physical and mental health indicators, including, higher blood pressure and cholesterol levels,¹¹ reduction in sleeping times,¹² and higher risk of depression and anxiety.¹³

In Missouri from 2015-2019, people spent an average of 23.9 minutes driving to work, which was a little less than the national average of 26.9 minutes. Fourteen counties had a 30 minute or longer average commute to work, and 13 of those counties were rural. On average, residents of rural counties had a slightly longer commute to work at 24.8 minutes, whereas residents of urban counties had a 22.7 minute commute to work. Jefferson County was the only urban county demonstrated in the chart below.

**Average Minutes to Work
Missouri, 2015-2019**

Rank	County	Average Minutes to Work
1	Worth	34.5
2	Lincoln	33.8
3	Maries	33.4
4	Caldwell	33.1
5	Clinton	32.7
6	Washington	32.4
7	Bates	31.9
8	Bollinger	31.9
9	Ozark	31.7
10	Hickory	31.4
11	Jefferson	31.2
12	Warren	30.7
13	Dallas	30.2
14	Monroe	30.0

Source: United States Census Bureau, American Community Survey 2019 5-year Estimates. Table S0801.

TRANSPORTATION: HOSPITAL COMMUTE

Time spent driving to necessary health care services can significantly impact health outcomes. Hospitals typically offer a large variety of health services, provide emergency and acute care, and may be the only available point of care for many people in rural areas. In emergency medical situations, especially in areas where available transportation is sparse, drive time to hospitals is critical, and often means life or death.

Missouri had 46 counties without a general acute care hospital, 45 of which were rural counties. Therefore, demonstrating that due to longer travel distances over 45% of Missouri's rural counties (45 out of 99) had inadequate access to necessary hospital health care services. From the most populous city in each rural county without a hospital, it took an average of 31 minutes to drive to a hospital. The shortest drive to a hospital in these cities was 17 minutes from New London in Ralls County to Hannibal Regional Hospital, and the longest drive was 65 minutes from Ava, in Douglas County, to Mercy Hospital, in Springfield. In 6 of the 45 rural counties without a general hospital, the drive to the nearest hospital from the most populous city was over 40 minutes. However, this does not address the large disparity in access to clinics, health care services, and health care providers.

Access to health care continues to be a significant challenge for rural residents due to the limited availability of transportation but also travel time and travel costs. Rural residents' lack of access to healthcare providers increases the distances rural residents must travel for healthcare.

Average Time to a Hospital

Rank	County	Time to Hospital (minutes)	From City
1	Douglas	65	Ava
2	Ozark	52	Gainesville
3	Reynolds	50	Ellington
4	Wayne	47	Piedmont
5	Dade	45	Greenfield
6	Morgan	45	Versailles
43	Caldwell	19	Hamilton
44	New Madrid	19	Portageville
45	Ralls	17	New London

EXHIBIT B

TRANSPORTATION: PUBLIC OPTIONS

Transportation access issues negatively affect those seeking care, and also results in financial costs for everyone involved, including the patients, hospitals, and practitioners.

If patients are unable to access health care services, their health conditions or problems often worsen and they may not be able to seek care until emergency care is needed. When patients cannot secure transportation to medical appointments patients' conditions worsen and the providers lose revenue, insurance reimbursement, and time from missed appointments. Access to healthcare lowers costs associated with hospital admissions, long term care services, and poor health outcomes caused by disruption of treatments or medication.¹⁴ Access to transportation options also allows many people with higher health needs or disabilities to live independently. With shortages of health services in many Missouri areas, transportation to more distant health services is crucial for all residents to receive adequate care.

Every county in Missouri had an option for public or non-emergency medical transportation. However, this sector was largely dependent on non-profit and private organizations in Missouri. Out of the 99 rural counties, only 15 had a publicly funded transportation program, and many of these programs were restricted to city limits of select municipalities. While there may be options for transportation in each county, people may be too far away or not on the designated route to access the services. Therefore, access to transportation services remains an overwhelming issue. A large number of rural residents were unable to use these services for medical appointments since the companies may only provide set routes on a fixed schedule, some rides must be called 24 to 48 hours in advance, and longer trips may also be cost prohibitive. Access to health care continues to be a significant challenge for rural residents due to the limited availability of transportation as well as travel time and travel costs.



EXHIBIT B

ACCESS TO HEALTH CARE: HEALTH INSURANCE

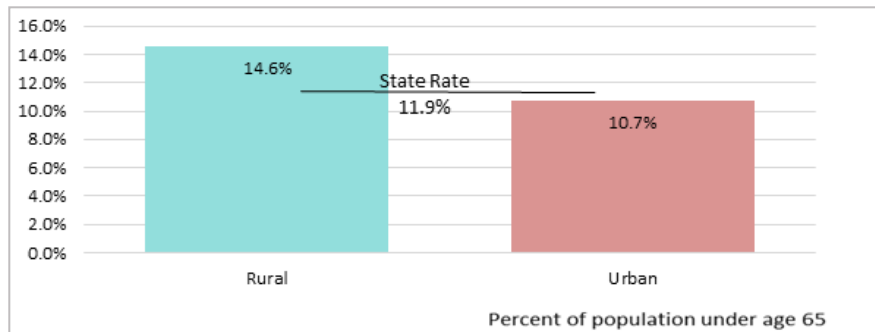
Health care access and quality is identified as 1 of the 5 key areas in the SDOH framework by Healthy People 2030. Available transportation options and driving distance to quality health care services at hospitals or clinics impacts health care access just as significantly as access to insurance. Insurance status impacts access to health care services, especially in situations when primary care physicians can coordinate so a patient can receive the appropriate health screenings. Individuals without health insurance are less likely to have a primary care provider, and they may not be able to afford health care services and medications they need.¹⁵

In Missouri, the Small Area Health Insurance Estimates Program (SAHIE) provides data that allows for analysis by rural and urban metrics for a variety

of demographic indicators. Due to SAHIE being a national survey, neither confidence intervals nor statistical significance for any of the comparison groups in Missouri could be determined. Because most persons 65 and older receive Medicare coverage, analysis was limited to the under 65 population.

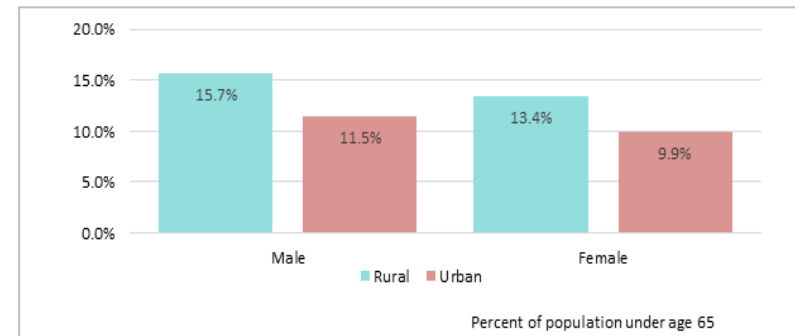
Estimates based on county data from 2019 revealed that the uninsured rate for the under age 65 population was 3.9 percentage points higher in rural areas compared to their urban counterparts (14.6% versus 10.7%). The uninsured rate improved over the last decade with both rural and urban rates decreased by slightly more than 3 percentage points. In 2009, the rural uninsured rate was 17.9% and the urban rate was 13.9% for the under age 65 population.

Percent Without Health Insurance Missouri, 2019



Source: United States Census Bureau, Small Area Health Insurance Estimates. <https://www.census.gov/data/datasets/time-series/demo/sahie/estimates-acs.html>. Accessed July 23, 2021.

Percent Without Health Insurance by Sex Missouri, 2019



Source: United States Census Bureau, Small Area Health Insurance Estimates. <https://www.census.gov/data/datasets/time-series/demo/sahie/estimates-acs.html>. Accessed July 23, 2021.

EXHIBIT B

Data for a limited number of age groups was available and analysis provided additional insights. The under 19 population had much lower uninsured rates for both rural and urban populations. The state average for the under 19 population was 6.5%, which was less than half of the 13.9% rate for persons age 21-64. The rural versus urban disparity was slightly less for the under 19 population with the rural uninsured rate 2.5 percentage points higher (8.2% versus 5.7%). The 50-64 age group had an uninsured rate below the state average at 10.1%. The rural versus urban disparity was also below the state average at 3.2 percentage points. Although uninsured percentages for the young adults (20-39) was not utilized (due to not being directly available), it could be inferred based on the age groups used that rates for younger adults were both above the state average and also had the highest rural versus urban disparity.

Other demographic analyses reveal:

- For the under 65 age group, the counties with the highest uninsured rates are all rural.
- The 4 counties with uninsured rates above 20% were scattered throughout the state with McDonald in the Southwest Region having the highest rate at 22.7%.
- Northeast counties, Scotland (21.6%), Morgan (21.0%), and Knox (20.8%), had the next highest uninsured rates.
- The 4 counties with uninsured rates below 10% were all urban. St. Charles had the lowest uninsured rate at 6.9%.
- For the under 19 age group, the 16 counties with the highest rates (all above 10%) were all rural. Maries in the Central Region experienced the highest uninsured rate for children at 14.8%.

- While data by race was not available for rural/urban analysis, estimates show that statewide the Hispanic uninsured rate (22.4%) was around double both the White non-Hispanic (11.1%) and Black/African-American non-Hispanic (13.6%) rates.
- Male uninsured rates were higher than female rates for both rural and urban counties. However, this gender disparity was higher for rural areas where the difference was 2.3 percentage points compared to 1.6 points for urban regions.
- Uninsured rates were highest for persons near or below the FPL. The rural uninsured rate of 23.1% for persons below 138% of the FPL nearly matched the 22.8% estimate for urban areas. For persons between 138-400% of the FPL, the uninsured rates declined to 17.4% in rural counties and 15.6% in urban.



EXHIBIT B

ACCESS TO HEALTH CARE: DENTAL

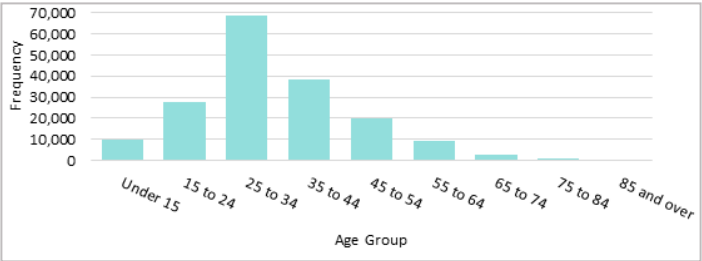
There is a growing prevalence of patients seeking dental care at hospital Emergency Rooms (ER), which is often more costly than visiting a primary dental care office. Preventive dental care is particularly salient for overall health and avoidance of significant deliberating emergencies and treatments. Most dental emergencies can be avoided with preventative dental care, but leaving even a mild dental problem for too long may later require hospital-level care for severe infection or surgery. Many times, patients who arrive at the ER for a dental complaint are given pain medication or antibiotics, as ERs are not equipped to deal with most dental services, leaving the root of the patient’s medical problem unaddressed.¹⁶ Nationally in 2019, about 20% of American adults may have delayed dental care due to the cost.¹⁷ Missouri data indicates correlations similar to the nation in rural and urban areas as well as other characteristics.

- In Missouri, rural counties had a 15% higher rate of ER visits due to non-traumatic dental complaints than urban counties.
- Nationally, the majority of patients who sought dental care in the ER were uninsured or insured through Medicaid.¹⁸
- In Missouri, the majority of these patients primarily paid resulting hospital bills without insurance (40.9%) or using Medicaid (29.0%).

- In both urban and rural areas, 60% of dental ER visits were for patients aged 25 to 44 years.
- Bates County had the highest rate of ER visits due to non-traumatic dental complaints in 2016 through 2019, at 15.6 visits per 1,000 residents.
- The 17 highest rates of ER visits per 1,000 residents due to non-traumatic dental complaints were in rural counties, 8 of which are located in the Southeastern portion of the state: Washington (15.6), St. Francois (14.1), Iron (13.6), Butler (12.7), Dent (11.5), Ripley (11.0), Crawford (10.7), and Dunklin (10.5) counties.

Preventative dental care is an important part of reducing dental emergencies. The Preventative Services Program (PSP), implemented by Missouri DHSS, is focused on the oral health of school-aged children throughout Missouri. DHSS provides oral health education and preventative services, including screening, dental cleaning, and applying a fluoride varnish to prevent tooth decay.¹⁸ From 2009 to 2020, the PSP program increased the number of participants by 47%, from seeing 54,187 participants in a school year to 79,869 participants.¹⁸ In 2020, the PSP oral hygiene assessment by dental professionals demonstrated that the oral hygiene scores of participants from rural and urban areas were similar, with more than 75% of participants in both areas achieving satisfactory oral hygiene.¹⁹

Age Distribution of ER Visits Missouri, 2016-2019



Source: Missouri Patient Abstract System

ER Visits for Non-Traumatic Dental Complaints Missouri, 2016-2019



Source: Missouri Patient Abstract System

THE HEALTH STATUS OF RURAL MISSOURIANS

THE IMPACT OF COVID-19 ON RURAL HEALTH

The COVID-19 public health emergency has been the dominant feature in the public health landscape, and while all Missourians felt COVID-19's impact, different regions of the state had markedly different experiences. In March of 2020, Missouri experienced its first confirmed case of COVID-19. From that point forward, both rural and urban Missouri have been continually combating the spread of this disease.

Provisional data on testing, case counts, and mortality help fill in the depiction of COVID-19's impact on Missouri. There were 3 types of testing for COVID-19 that were used throughout the state:

1. Polymerase Chain Reaction (PCR) tests look for the viral genetic material throughout the respiratory tract to determine active infection with SARS-CoV-2, the virus that causes COVID-19. Positive case counts are determined using positive PCR tests only; therefore, this was the most prevalent type of testing in Missouri in 2020 for both rural and urban populations.
2. Antigen tests allow for a more rapid detection of the virus that causes COVID-19, but is not as sensitive as PCR tests. Therefore, often negative antigen test results may need to be confirmed with a PCR test.
3. Serology tests look for antibodies against SARS-CoV-2 in the blood to determine, if there has been an infection in the past. Serology testing is the least common method of testing used in Missouri.

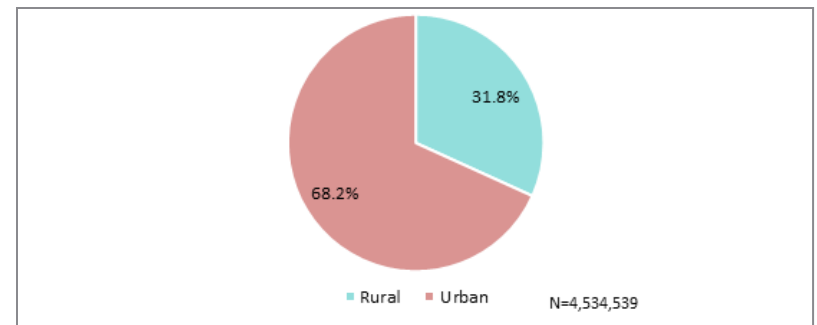
The following statistics were provisional and included figures for Calendar Year 2020 only:

- More COVID-19 tests were administered in urban areas (68.2% of all tests) than in rural areas (31.8% of all tests). Controlling for population size, the rate of total tests per 100 persons was also higher in urban areas (76.0 versus 69.7). This includes all 3 forms of testing.

- Of the total number of rural COVID-19 tests, 81.4% were PCR tests, compared to 87.4% of urban tests being PCR tests.
- Rural counties (16.9%) utilized antigen testing more than urban counties (10.9%).
- Rural counties had a slightly higher positive PCR test rate of 6.8 per 100 persons, compared to 6.5 per 100 persons for urban counties.
- Rural counties of Gentry (114.0) and Clinton (105.6) in the Northwest had the highest total PCR test rates per 100 persons in the state, while Shannon (29.3) and Reynolds in the Southeast (26.5) had the lowest overall total rates.
- The urban counties with highest total PCR test rates per 100 persons were Cole (88.6) and Boone (86.5).

COVID-19 is not included in the Leading Causes of Death section of the report because that section combines 10 years of data and COVID-19 began in 2020. As a result, COVID-19 case and mortality data were developed in this stand-alone section.

**Total COVID-19 Tests*
Missouri, 2020**



*Includes PCR, antigen, and serology tests. Source: Missouri Department of Health & Senior Services, COVID Daily Testing Data

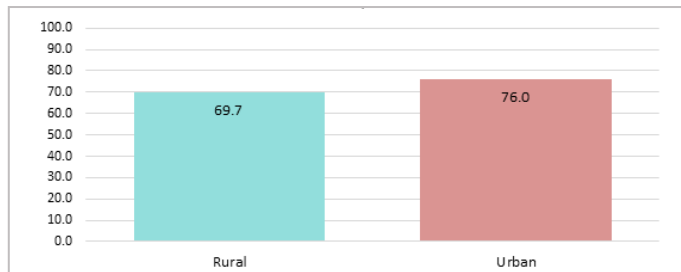
EXHIBIT B

Although there were several fluctuations in rates, as a whole, rural counties experienced higher 7-day positivity rates than urban counties. This trend line showed the rural and urban PCR positivity rates during 2020. Positivity rates were often used to determine testing capacity, as well as to observe trends and case totals throughout a designated area. This data used the Centers for Disease Control and Prevention (CDC) method which stated that the data was not de-duplicated, meaning that it did not remove multiple tests for the same person before or during the 7-day period. The positivity rate was calculated by taking the number of positive PCR tests in the past 7 days, over the total number of PCR tests in the past 7 days. Overall, the state average for 7-day positivity rates across 2020 was 11.6%. For rural counties the average was 13.3%, and for urban counties it was 11.0%.

Key findings include:

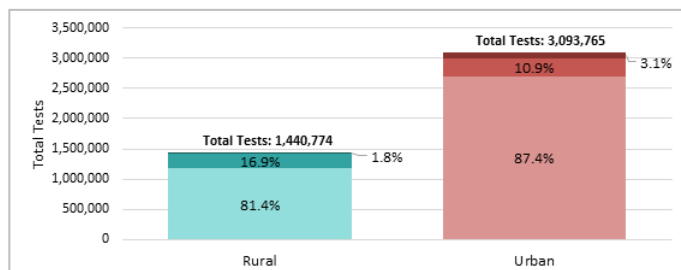
- In March through August of 2020, urban counties consistently had higher 7-day positivity rates than rural counties.
- Starting in mid-August 2020, rural counties experienced a continual rise in positive cases, surpassing their urban counterparts. Rural 7-day positivity rates then continued to be greater than urban rates throughout the end of 2020.
- Both rural and urban regions reached peak positivity rates in early November of 2020. The rural positivity rate reached 25.8%, while the rate in urban regions peaked at 20.6%.
- The highest disparities between rural and urban regions occurred on April 3, 2020, when urban areas had an 8.9% higher positivity rate, and on October 29, 2020, when rural areas had a 6.2% higher positivity rate.

**Total COVID-19 Tests*per 100 Persons
Missouri, 2020**



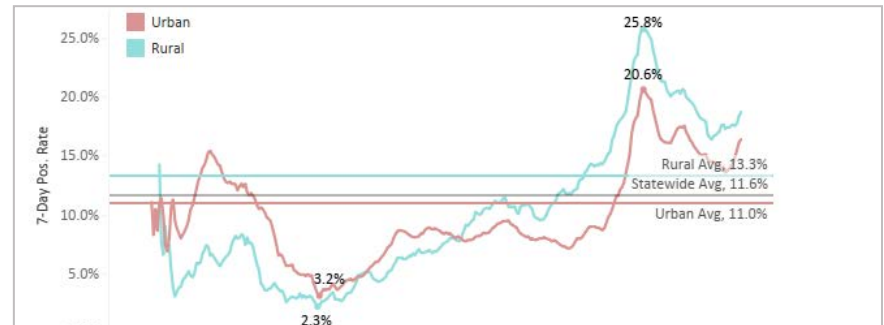
*Includes PCR, antigen, and serology tests. Source: Missouri Department of Health & Senior Services, COVID Daily Testing Data

**Total COVID-19 Testing by Test Type
Missouri, 2020**



Source: Missouri Department of Health & Senior Services, COVID Daily Testing Data

**Rural vs. Urban Moving 7-day PCR Positivity Rate over Time-
Not Deduplicated to the Individual
(CDC method) - (2020)**



Source: Missouri Department of Health & Senior Services, COVID Daily Testing Data

*All COVID-19 testing totals are considered provisional data and thus subject to change. This data was collected on May 13, 2021 and covers data from Calendar Year 2020.

EXHIBIT B

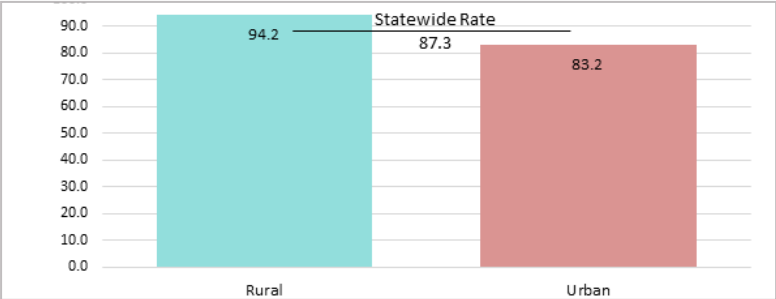
COVID-19 MORTALITY

Although COVID-19 was not included in the top 10 leading causes of death for 2009-2019, provisional data suggests that it will rank as the third leading cause of death for the year 2020, following heart disease and cancer. In 2020, death counts continued to rise as the year progressed and peaked in November (rural) and December (urban). These rates were calculated using COVID-19 as the underlying cause of death, and did not include COVID-19 cases that would be listed as a secondary cause of death. There were great disparities that can be recognized when comparing mortality rates for rural and urban counties.

Mortality disparities in 2020:

- Rural Missouri experienced a higher COVID-19 mortality rate (94.2) than both statewide (87.3) and urban rates (83.2).
- While rural counties had higher mortality rates in all age groups, both rural and urban counties had the highest mortality rates among Missourians age 65 and older.
- Males living in rural areas were 16% more likely to die from COVID-19 than males in urban areas. Likewise, females living in rural areas were 7% more likely to die from COVID-19 than those in urban areas.
- Black/African American persons living in rural areas were 80% more likely to die from COVID-19 than White persons living in rural areas.

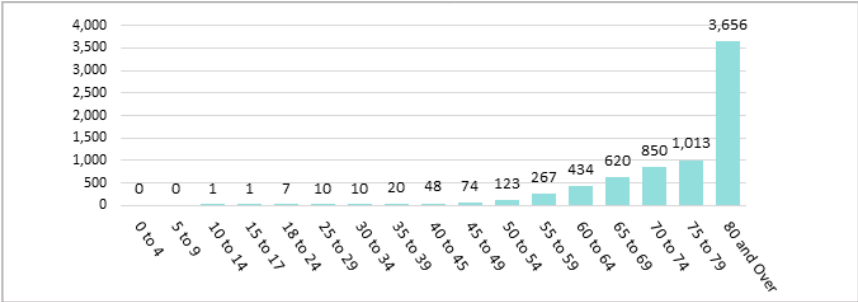
**COVID-19 Mortality Rates*
Missouri, 2020**



Source: Missouri Vital Statistics Death File
*2020 mortality data is considered provisional and subject to change
Age-adjusted rates per 100,000 population.

Missouri’s population has been greatly affected by the COVID-19 public health emergency. From March 1, 2020, through December 31, 2020, there were almost 454,000 cases including both probable antigen and all confirmed cases. Also, there were over 7,130 deaths and almost 4.5 million PCR, antigen, and serology tests administered. While the majority of COVID-19 related deaths in Missouri have occurred in individuals age 50 and older, 171 deaths were attributed to those under the age of 50.

**Total COVID-19 Deaths by Age Group
Missouri, 2020**



Source: Missouri Vital Statistics Death File

EXHIBIT B

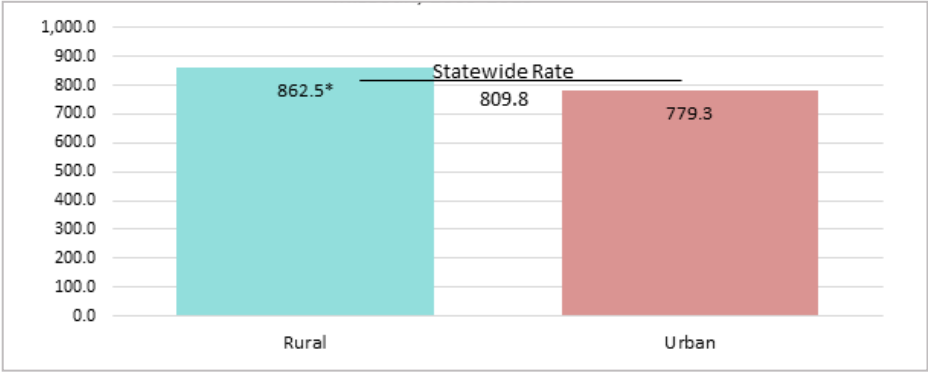
DEATH: ALL CAUSES

Missouri experienced a total of 642,662 deaths between 2009 and 2019, with an annual average of 58,424 deaths. Since Missouri’s population is aging, the death counts for more recent years have been higher than in the past. From 2017-2019, death counts were above 60,000. The age-adjusted death rate for Missouri was 809.8 (per 100,000 population) for 2009-2019. Age-adjusting rates largely eliminates the changing age structures impact on death analysis. In the rest of this report, all death rates were age-adjusted, unless a specific age-range was listed. Rates at the state level have fluctuated, decreasing from 2010 to 2013, then increasing from 2014 to 2018. However, the highest and lowest observed rates occurred in consecutive years at the end of the time-period. The highest rate occurred in 2018 (823.0) and the low transpired in 2019 (797.7).

One consistent statistical trend was that rural rates (862.5) were higher than urban rates (779.3). The 10.7% higher rate difference found in rural areas was statistically significant. The disparity between rural and urban areas had not changed in any meaningful way during this time period, with rural rates varying between 8 to 13% higher than urban.

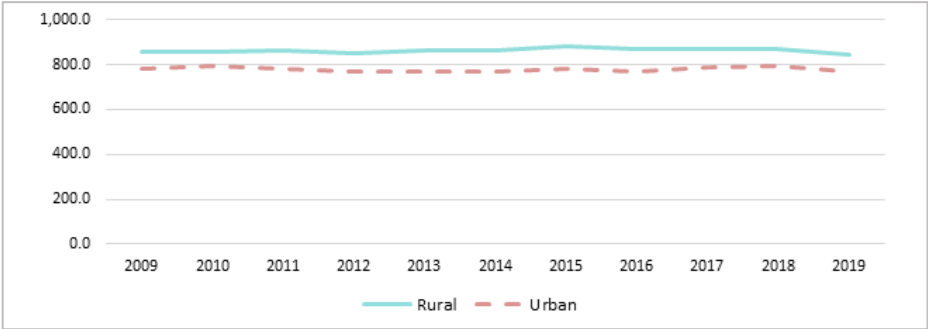


**All Causes Death Rates
Missouri, 2009-2019**



*Indicates a rate this is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

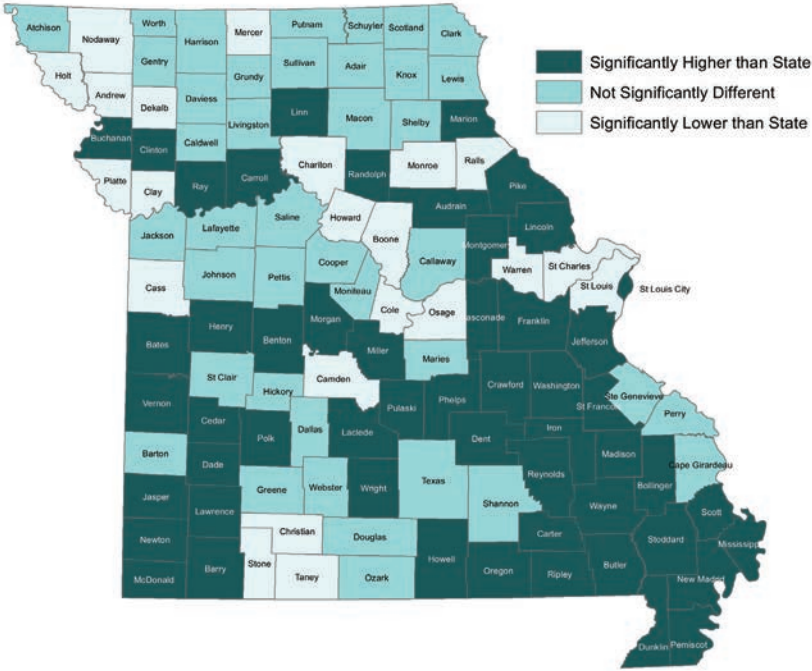
**All Causes Death Rates by Year
Missouri, 2009-2019**



Age-adjusted rates per 100,000 population

EXHIBIT B

Death Rates from All Causes Missouri, 2009-2019



Other geographic trends to highlight include:

- The highest death rates in the state were located in 12 counties exclusively in the Southeast Region. No county in this region was significantly lower than the state.
- The 3 highest rates were found in the Bootheel rural counties of Pemiscot, Dunklin, and Mississippi. Pemiscot had the highest death rate of 1,132.0 and was 68.6% higher than the lowest county death rate (urban county St. Charles, 671.6) in the state.
- Only 14.1% of rural counties (14 of 99) were significantly lower than the state rate while exactly 50.0% (8 of 16) of urban counties were significantly lower.
- There was a clear north/south divide in rural Missouri related to death rates. Only 23.7% of the 38 rural counties, north of the Missouri River, were significantly higher, while 62.2% of the 61 rural counties south of the Missouri River were significantly higher.

Source: The Missouri Public Health Information Management System (MOPHIMS): Death MICA.



EXHIBIT B

Leading Causes of Death Summary Table Missouri, 2009-2019

LEADING CAUSES OF DEATH

The National Center for Health Statistics (NCHS) has a long established method for ranking various mortality categories. The rank order was based on the count (or frequency) of deaths instead of the age-adjusted death rate.²⁰ In the table (right) and throughout this report, causes of death were listed in order of leading causes for rural residents. In this report, the rankings for deaths in rural counties did mirror the state order. There were slight differences in the order of the leading causes for urban residents. In urban counties, Accidents/Unintentional Injuries ranked third and Chronic Lower Respiratory Diseases ranked fourth, whereas this order was switched for the state and rural counties.

Comparing the rates of the rural and urban regions provided some important insight about the differences in causes of death for rural and urban residents of Missouri. The rural rates were statistically significantly higher for all 10 causes of death compared to urban. Heart Disease and Cancer are ranked first and second, as they have been for many decades. Not quite half (47.7%) of all rural deaths were from 1 of these 2 causes. This was a decrease from an earlier decade (1999-2009) where deaths from Heart Disease and Cancer accounted for 51.9% of all deaths. The biggest decreases in rank from comparing the 2 different decades included Stroke dropping from third to fifth in rank and Influenza and Pneumonia sliding from sixth to ninth. Alzheimer's moved from eighth to sixth, while Chronic Lower Respiratory Diseases, Accidents/Unintentional Injuries, and Kidney Disease all moved up 1 rank.

Rank	Cause	Missouri Frequency	Missouri Rate	Rural Frequency	Rural Rate	Urban Frequency	Urban Rate
1	Heart Disease	157,199	194.0	65,357	216.7	91,842	180.7
2	Cancer	140,621	173.9	55,743	183.6	84,877	168.3
3	Chronic Lower Respiratory Diseases	41,224	51.0	18,958	61.7	22,265	44.6
4	Accidents/Unintentional Injuries	36,686	52.4	13,802	57.5	22,883	50.0
5	Stroke (cerebrovascular diseases)	33,176	41.0	12,951	42.7	20,225	40.0
6	Alzheimer's Disease	23,967	29.2	9,434	30.6	14,533	28.4
7	Diabetes	16,267	20.3	6,897	23.1	9,370	18.6
8	Kidney Disease (nephritis, nephrotic syndrome and nephrosis)	15,233	18.9	6,117	20.1	9,116	18.1
9	Influenza and Pneumonia	13,878	17.2	5,702	18.9	8,176	16.2
10	Suicide	11,177	16.5	4,219	18.4	6,958	15.5

Age-adjusted rates per 100,000 population

EXHIBIT B

HEART DISEASE: NUMBER 1 LEADING CAUSE OF DEATH

In Missouri between 2009 and 2019, there was a total of 157,199 deaths due to heart disease, making it the number 1 leading cause of death for both rural and urban Missourians. The rate for rural counties during this time span was 216.7, which was 20.0% higher than urban counties. Other important findings include:

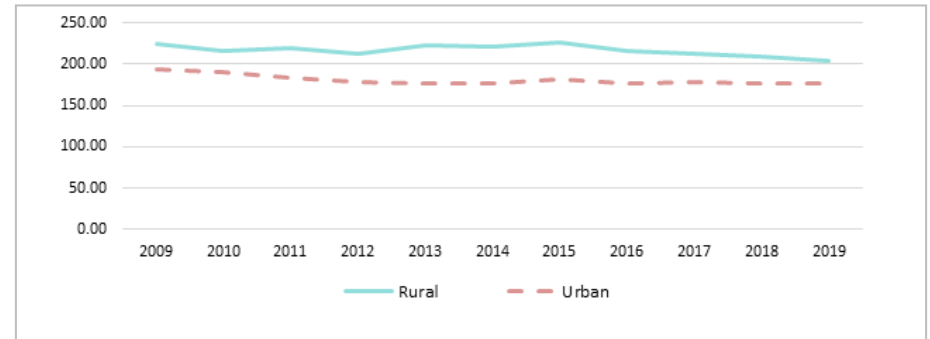
- During the years of 2009-2019, Missouri experienced a 9.2% decrease in heart disease deaths throughout the state. Comparatively, while rural Missouri still sustained a higher death rate, these rural counties experienced a decrease (9.3%) in heart disease deaths that was slightly more than the urban decrease (8.9%) for this time period.
- Males living in rural Missouri were 16.2% more likely to die from heart disease than males in urban Missouri, while females living in rural Missouri were 19.6% more likely to die from heart disease than females in urban Missouri.

**Heart Disease Death Rates
Missouri, 2009-2019**

	Rural	Urban
Frequency	65,357	91,842
Rate	216.7	180.7
Percent Change (2009-2019)	-9.3%	-8.9%

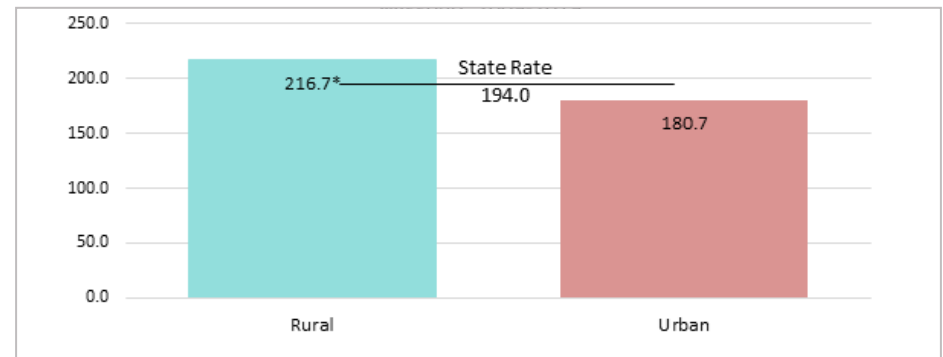
Age-adjusted rates per 100,000 population.

**Heart Disease Death Rates by Year
Missouri, 2009-2019**



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

**Heart Disease Death Rate
Missouri, 2009-2019**

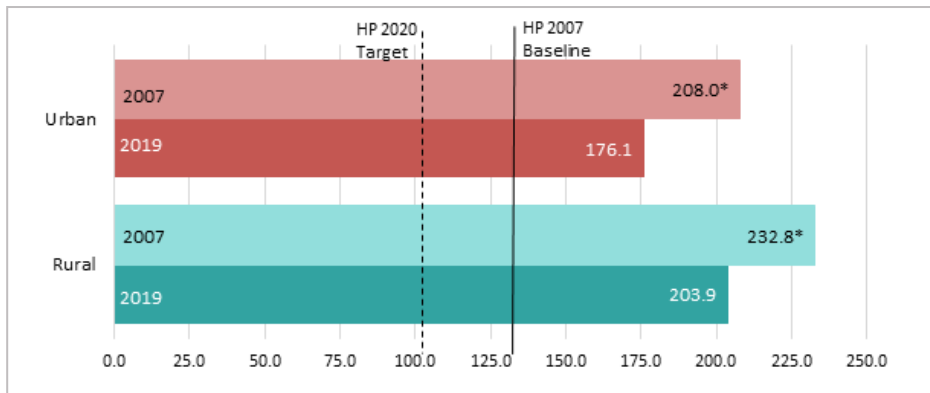


*Indicates a rate this is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

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- Healthy People 2020 set a target goal of 20% reduction of deaths due to heart disease from a rate of 129.2 deaths in 2007, to a rate of 103.4 in 2020.²¹ In 2019, both rural (203.9) and urban (176.1) Missouri had death rates from heart disease that were above this national goal, but rural counties had a rate that was almost double. Rural Missouri had a 12.4% reduction in heart disease deaths from 2007 to 2019, and urban Missouri had a 15.3% reduction, both lower than the 20% goal.

**Heart Disease Death Rate
Missouri, 2007 and 2019**



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

The top 10 leading counties for heart disease death rates were all rural, with 9 located in the Southeast Region of the state (Carroll, in North Central Missouri and ranked tenth, was the only exception). Jasper County was the highest urban county with a rate of 247.2, which was still outranked by 19 of Missouri's rural counties.

There were several risk factors to be aware of concerning heart disease. Important categories of risk factors include underlying lifestyle choices as well as demographics, such as age and family history.²² Some individual risk factors for heart disease include:

- High blood pressure
- Unhealthy blood cholesterol levels
- Diabetes mellitus
- Obesity
- Tobacco use

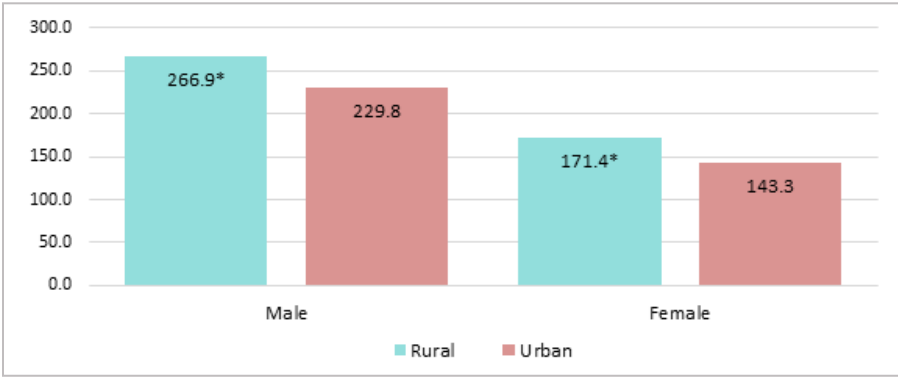
Preventative measures, such as increased health screenings, healthy lifestyle choices, awareness of risk factors, and increased physical exercise could greatly decrease the risk of developing heart disease. According to the American Heart Association (AHA), regular physical activity can help with several risk factors related to heart disease, such as helping to lower blood pressure, improving blood sugar, reducing feelings of stress, controlling body weight, and even improving memory and reducing the risk of dementia.²²

Missouri's Behavioral Risk Factor Surveillance System (BRFSS) is an ongoing telephone health survey of adults that collects information on health conditions, behaviors, preventive practices, and access to health care.²³ In the 2019 survey, rural Missouri reported that 35.3% of adults had not participated in physical activity outside of the workplace in the last 30 days. This was statistically significantly higher than both urban and state rates. Lack of physical activity could

EXHIBIT B

be an indicator for detecting future diagnosis of heart disease. By working on preventative strategies, heart disease deaths rates have potential to continue to decrease throughout the state, and if focused on areas of extreme need, rural counties in Missouri could see some of the greatest benefits.

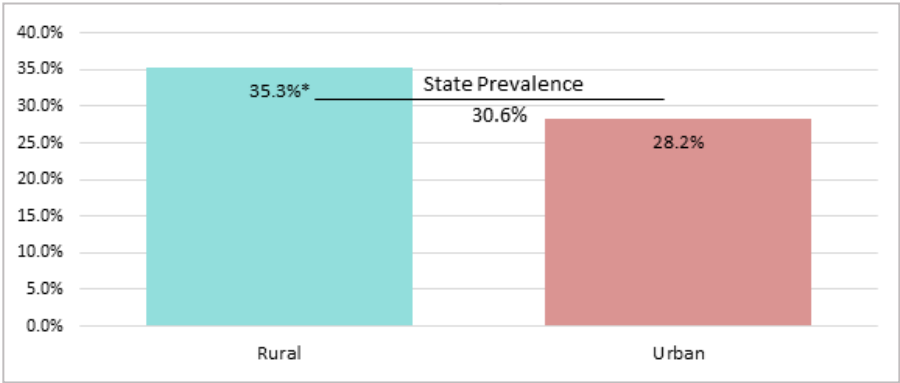
Heart Disease Death Rate by Sex Missouri, 2009-2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population



Low/No Participation in Physical Activities in the Last 30 Days Missouri BRFSS, 2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Results based on the response “No” to the question “During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise.”



EXHIBIT B

CANCER

From 2009 to 2019, cancer caused 140,621 deaths, making it the second leading cause of death in Missouri. During this period, rural Missouri counties endured a rate of 183.6 deaths from cancer, a statistically significantly higher rate than urban counties at 168.3 deaths.

- Out of the 20 counties with the highest cancer death rates in 2009-2019, 19 counties were rural. The top 10 counties were all in Southeastern Missouri.
- Three counties in the Bootheel Region, Pemiscot, Mississippi, and Dunklin, had the highest cancer death rates in the state.
- St. Louis City was the highest ranked urban county, ranked twentieth in the state, with a cancer death rate of 198.1.

The cancer death rate has been decreasing in Missouri. The Healthy People 2020 goals set a target of a 10% reduction in cancer related deaths from 2007 to 2020, from a rate of 179.3 to 161.4.²⁴ Missouri met that goal, with a 16.4% reduction in

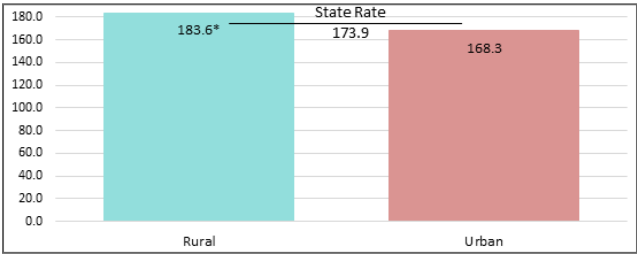
deaths to a rate of 159.3 in 2019. Although rural counties had a higher than target death rate, rural Missouri saw a significant 16.1% reduction in deaths from 2007 to 2019.

Cancer Death Rates Missouri, 2009-2019

	Rural	Urban
Frequency	55,743	84,877
Rate	183.6	168.3
Percent Change (2009-2019)	-12.4%	-14.7%

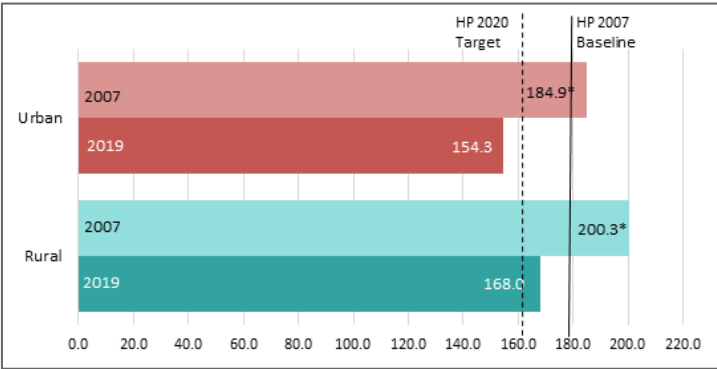
Age-adjusted rates per 100,000 population.

Cancer Death Rates Missouri, 2009-2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

Cancer Death Rate Missouri, 2007 and 2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

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There were 5 subtypes of cancer that comprised of more than half of all cancer deaths in Missouri. Of those 5 subtypes, the leading 2, lung and colon cancer, caused a significantly higher number of deaths in rural areas. Breast cancer was the only major subtype of cancer with a statistically significantly higher death rate in urban areas than in rural areas. There was no significant difference in pancreas or prostate cancer deaths between the 2 areas.

Leading Causes of Cancer Death Missouri, 2009-2019

Rank	Cause	Rural Rate	Urban Rate
1	Lung/Trachea/Bronchus	57.0*	47.6
2	Colon/Rectum/Anus	17.2*	14.3
3	Breast	11.5	12.2*
4	Pancreas	11.3	11.3
5	Prostate	7.7	7.2

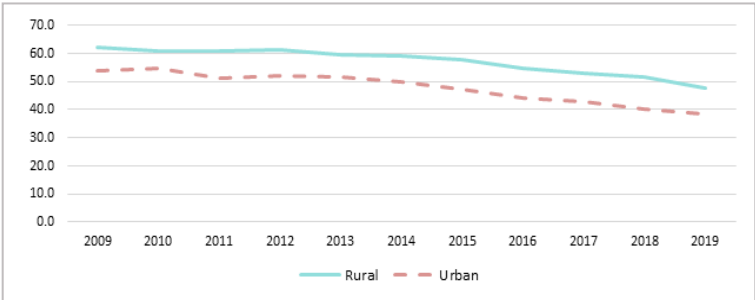
* Indicates a rate that is significantly higher, using 95% confidence intervals.
Age-adjusted rates per 100,000 population.

Only female population counts are used to calculate the death rates for breast cancer, and only male population counts are used to calculate prostate cancer death rates.



- Lung cancer was the leading cause of cancer death, comprising of 29.7% of all cancer deaths in Missouri. Fortunately, the lung cancer death rate has been decreasing over the past decade. However, rural counties had a significantly higher rate of lung cancer than urban counties.
- The counties with the highest lung cancer death rates were in Southeastern Missouri, with rates ranging from 86.5 in Madison to 74.7 in Ripley.
- The top 2 counties with highest colon cancer death rates were in Northern Missouri, Carroll (28.4) and Scotland (27.2) counties.
- The 12 highest counties for breast cancer death rate were rural. Dade County had the highest breast cancer death rate at 19.4.

Lung/Trachea/Bronchus Cancer Death Rates by Year Missouri, 2009-2019



Age-adjusted rates per 100,000 population

EXHIBIT B

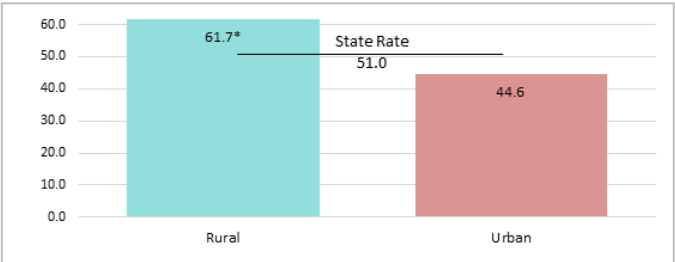
CHRONIC LOWER RESPIRATORY DISEASES

From 2009 to 2019, there were 41,224 deaths from Chronic Lower Respiratory Diseases (CLRD) in Missouri, ranking it third for that time period. CLRD includes a variety of chronic lung diseases that create shortness of breath caused by airway obstruction. More specifically, it is comprised of conditions such as Chronic Obstructive Pulmonary Disease (COPD), emphysema, bronchitis, and asthma. Rural Missouri consistently had higher mortality rates from CLRD compared to urban; from 2009-2019, the rural CLRD mortality rate was 38.3% higher. The disparity in mortality between these groups had nearly doubled. Rural Missourians were 44.9% more likely to die from CLRD than urban Missourians, up from 23.1% in 2009.

Other notable details about CLRD in Missouri include the following:

- The rural CLRD mortality rate was 61.7; significantly higher than the urban CLRD mortality rate of 44.6.
- In 2019, urban CLRD mortality rates dropped significantly compared to 2009 rates.
- While urban CLRD mortality rates have largely declined since 2009, rural CLRD mortality rates fluctuated throughout the years. From 2009-2015, rural CLRD mortality rates hovered around a rate of 61.0. Rural CLRD mortality rates peaked in 2016 at 65.2 and have since been gradually dropping to 57.8 in 2019. This rate nearly mirrored the 2009 rate of 58.3, which was the second lowest rate for that time period.
- Since 2016, both urban and rural counties have seen a decrease in CLRD mortality rates.
- The top 23 counties with the highest CLRD mortality rates in Missouri consist entirely of rural counties. A majority (7) of the top 10 counties were located in the Southeast Region. The urban county with the highest CLRD mortality rate was Buchanan, ranking nineteenth overall in Missouri with a rate of 75.8.
- Males had a significantly higher mortality rate from CLRD in both rural and urban counties. These rates were especially high for rural males, who were 46.7% more likely to die from CLRD than urban males. This gap was also greatest in rural counties. Rural males were 27.5% more likely to die from CLRD than rural females, the gender disparity was only 14.3% in urban counties.

Chronic Lower Respiratory Disease Death Rates Missouri, 2009-2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

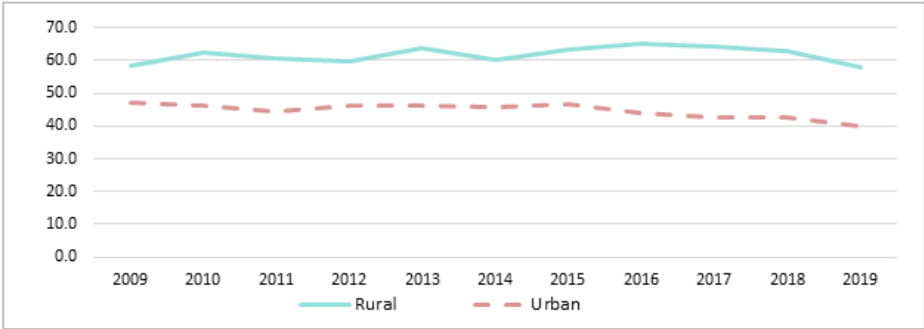
Chronic Lower Respiratory Disease Death Rates Missouri, 2009-2019

	Rural	Urban
Frequency	18,958	22,265
Rate	61.7	44.6
Percent Change (2009-2019)	-0.8%	-15.8%

Age-adjusted rates per 100,000 population

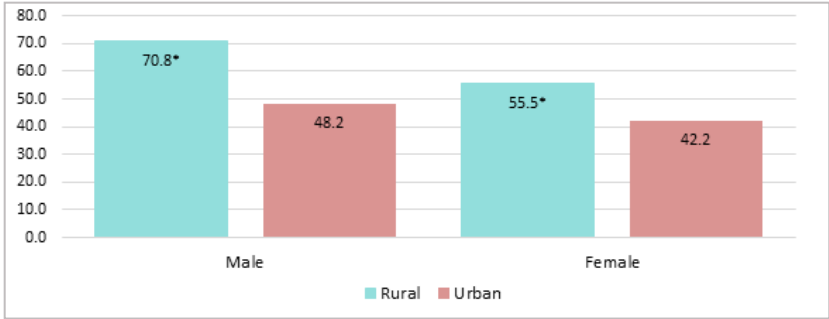
EXHIBIT B

Chronic Lower Respiratory Disease Death Rates by Year Missouri, 2009-2019



Age-adjusted rates per 100,000 population

Chronic Lower Respiratory Disease Death Rates by Sex Missouri, 2009-2019

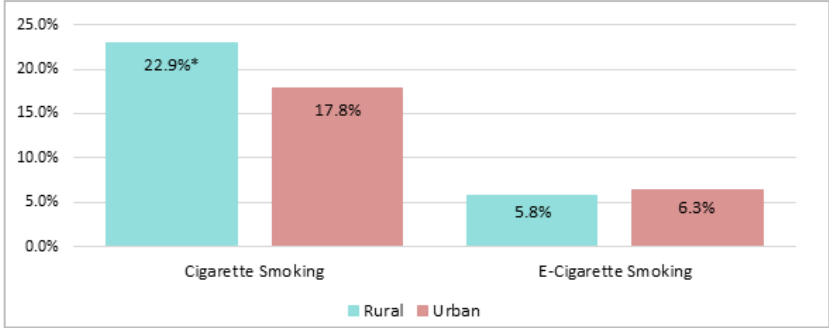


*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

The predominant risk factor for chronic bronchitis and emphysema, 2 of the major diseases encompassed by CLRD, was tobacco smoking. Cigarette smoking increases the amount of mucus produced in the airways, resulting in a buildup of mucus and contaminants within it.²⁵ As time progresses this could lead to the development of chronic bronchitis. According to Missouri BRFSS in 2019, rural areas (22.9%) had a statistically significantly higher prevalence of smoking among adults compared to urban areas (17.8%).

Similarly, recent research has shown that the use of e-cigarettes also increases the risk for developing CLRD.²⁶ The ultra-fine particles, heavy metals, and volatile organic compounds found within e-cigarettes are associated with increased airway resistance and lung inflammation. Compared to tobacco smoking, Missouri adults report using e-cigarettes much less, with no statistical significance between rural and urban areas.

Smoking Among Adults Missouri BRFSS, 2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Results are based on response of 'yes' and 'every day or some days' to the questions. 'Have you ever smoked at least 100 cigarettes in your entire life?' and 'Do you now smoke cigarettes (or electronic vaping products) every day, some days, or not at all?'

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ACCIDENTS/UNINTENTIONAL INJURIES

Between 2009 and 2019, there were 36,686 accidents/unintentional injury deaths, ranking it the fourth leading cause of death in Missouri. The most frequent unintentional injuries for this time period were:

- Drug overdoses and poisonings
- Motor Vehicle Accidents (MVA)
- Falls
- Fires
- Drownings

Over the 2009-2019 time period, rural Missouri counties had statistically significantly higher rates of death from accidents/unintentional injuries (57.5) compared to urban counties (50.0). Other important unintentional injury statistics include:

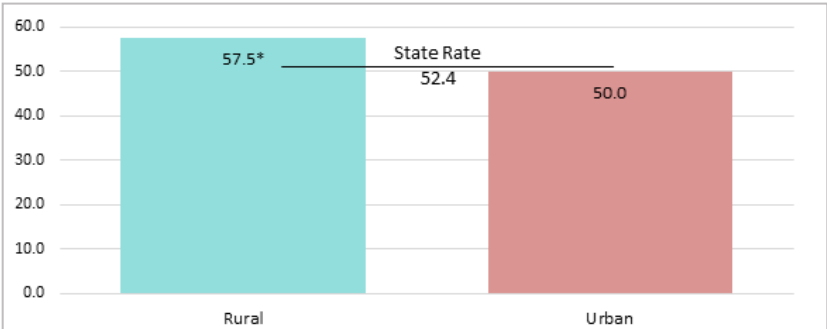
- The Healthy People 2020 goals set a target mortality rate of 36.4 unintentional injury deaths in 2020, a 10% reduction from the 2007 baseline of 40.4.²⁷ In 2019, both rural (63.1) and urban (59.5) counties did not have an improvement in the target death rate due to an increase in deaths, with an 8.4% and 38.0% increase respectively.
- When looking at deaths from unintentional injuries by sex regardless of geography, males were statistically more likely to die than females. In addition, rural males (74.6) and females (40.6) were statistically more likely to die than urban males (67.6) and urban females (33.8).

Accidents/Unintentional Injury Death Rates Missouri, 2009-2019

	Rural	Urban
Frequency	13,802	22,883
Rate	57.5	50.0
Percent Change (2009-2019)	+13.8%	+41.4%

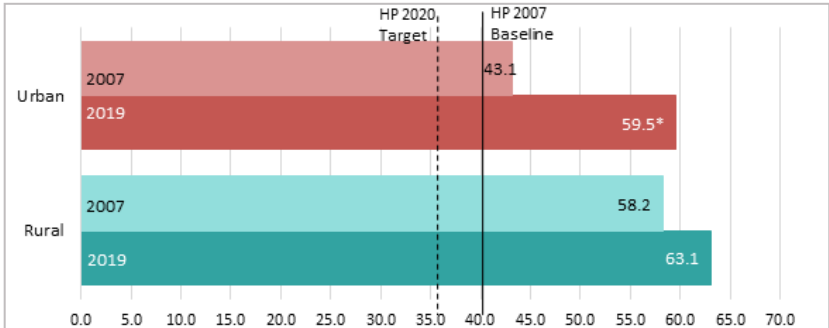
Age-adjusted rates per 100,000 population

Accidents/Unintentional Injury Death Rates Missouri, 2009-2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

Unintentional Injury Death Rate Missouri, 2007 and 2019



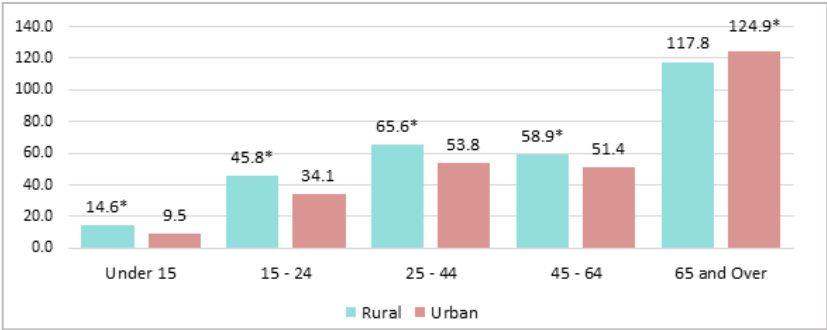
*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

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- Motor vehicle accidents accounted for 35.7% of unintentional injuries for rural residents and 21.1% for urban. Missouri’s rural counties had a statistically significantly higher rate of deaths due to motor vehicle accidents (21.3) compared to urban counties (10.8).
- Largely due to falls, individuals age 65 and over had the highest death rates for unintentional injuries for both rural and urban populations. This was the only age group where the rural rate (117.8) was actually lower than the urban rate (124.9).

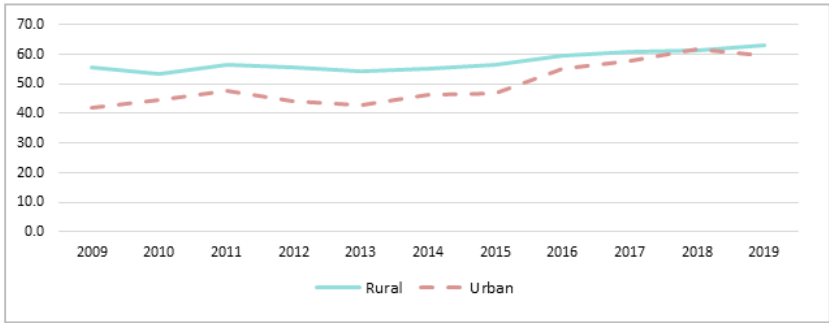
During 2009-2019, rural counties consistently had a higher rate when it comes to unintentional injury deaths. In recent years, the rates appear to converge, due largely to surges in accidental drug overdoses. In 2018, the rural unintentional injury rate actually fell below the urban rate. In 2019, the rural rate edged back above the urban rate, but the difference remained very small.

Accidents/Unintentional Injury Death Rates by Age Group Missouri, 2009-2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

Accidents/Unintentional Injury Death Rates by Year Missouri, 2009-2019



Age-adjusted rates per 100,000 population

EXHIBIT B

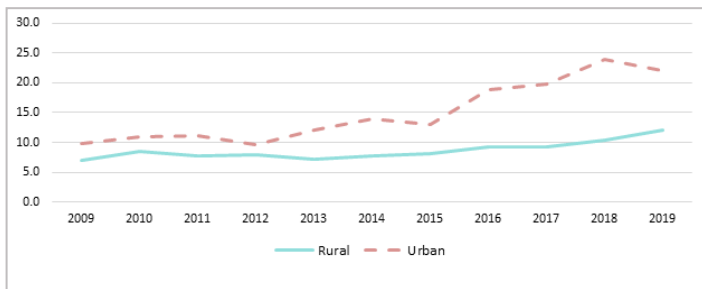
ACCIDENTS/UNINTENTIONAL INJURIES: OPIOID OVERDOSE

Between 2009 and 2019, there were 8,271 opioid overdoses in Missouri, comprising almost 25% of the unintentional injury/accidental death category. From prescription opioids, to heroin, and now synthetic opioids, the opioid epidemic continues to change as new trends emerge. To be consistent with other reports where overdose data was shared, all manners of opioid overdose deaths were included in this analysis. However, about 90% of opioid overdose deaths in Missouri were unintentional. Some important opioid overdose statistics for Missouri include:

- Between 2009 and 2019, Missouri’s state rate of opioid-related mortality was 13.0, which was higher than the national rate of 10.4.²⁸
- Between 2009 and 2019, the rate of opioid-related deaths in Missouri’s rural areas (8.7) was 16.6% lower than the national rate. In contrast, Missouri’s urban death rate for opioids was 44.8% above the national average.
- From 2009-2019, opioid overdose deaths in rural Missouri increased quickly (72.8% increase), though much more dramatic in urban areas (126.9% increase).

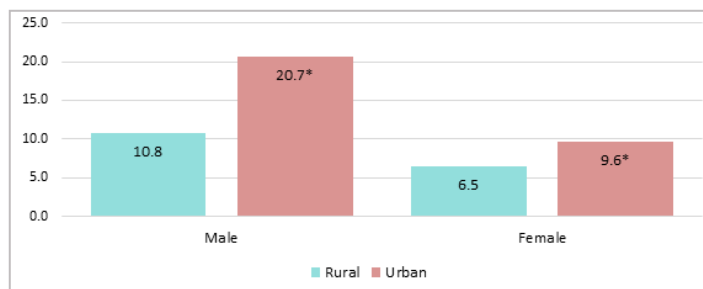
- In 2018, Missouri hit an all-time high in opioid overdoses for the year. Rural areas had a 12.2% increase from the previous year, and urban areas experienced a larger jump (20.4%). In 2019, after a record year in 2018, Missouri saw a small decrease in opioid overdoses in urban areas (-7.8%); however, rural areas still continued to increase by 15.9%.
- Opioid overdoses were highest for both rural and urban counties in Eastern Missouri. Franklin County, near the St. Louis Region, had the highest rural rate at 23.7, ranking it third highest among all counties in the state. St. Louis City, an urban county, had the highest rate (37.5) of all counties and was almost 3 times greater than the state average of 13.0.
- Males were statistically more likely to fatally overdose from opioids than females in both rural and urban areas. The rate of opioid overdoses for rural males (10.8) was 66.2% higher than the rural female rate (6.5).

**Opioid Overdose Death Rates by Year
Missouri, 2009-2019**



Age-adjusted rates per 100,000 population.

**Opioid Overdose Death Rates by Sex
Missouri, 2009-2019**



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals. Age-adjusted rates per 100,000 population.

**Opioid Overdose Death Rates for Selected Rural and Urban Counties
Missouri, 2009-2019**

Rank	County	Rate	Type
1	St. Louis City	37.5	Urban
2	Jefferson	29.3	Urban
3	Franklin	23.7	Rural
4	Pulaski	20.4	Rural
5	St. Louis County	19.8	Urban
6	Ste. Genevieve	18.7	Rural
7	Lincoln	18.2	Rural
8	Dent	17.9	Rural
9	Warren	17.6	Rural
10	Gasconade	17.6	Rural

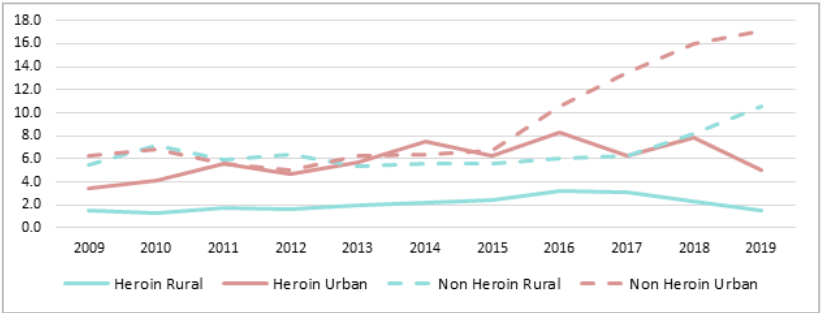
Age-adjusted rates per 100,000 population.

EXHIBIT B

STROKE

The rise of illicitly manufactured fentanyl and other synthetic opioids are changing overdose patterns, causing heroin rates to decline and non-heroin rates to escalate quickly. It is common for fentanyl to be found combined with other drugs such as heroin, counterfeit pills, or cocaine.²⁹ Over recent years, there has been a decline in heroin rates for both rural and urban areas across Missouri. Because of illicit fentanyl, over the last several years, non-heroin rates climbed steadily for both areas.

Heroin and Non-Heroin Opioid Overdose Death Rates by Year Missouri, 2009-2019



Age-adjusted rates per 100,000 population

Stroke was the fifth leading cause of death for Missouri, with 33,176 deaths during the years 2009-2019. Missouri’s stroke death rate in 2019 (37.6) was not statistically different from the stroke death rate in the U.S. (37.0).³⁰ Certain demographic characteristics correspond with higher rates of stroke deaths in Missouri:

- Rural counties in Missouri had a statistically significantly higher stroke death rate than both the state and urban counties.
- In 2009-2019, the top 10 counties for stroke death rate were all rural, with rates ranging from 66.6 to 53.0. Five of the top 10 counties were located in Southeastern Missouri: Dunklin (66.6), Iron (57.8), Carter (57.7), Mississippi (56.4), and Butler (53.9).
- The urban county with the highest stroke death rate was Buchanan, ranking fourteenth with a rate of 51.4.
- Statewide from 2009-2019, Black/African American residents were 40.5% more likely to die from a stroke than White residents. This trend was similar and statistically significant in both rural and urban areas.

Stroke Death Rates Missouri, 2009-2019

	Rural	Urban
Frequency	12,951	20,225
Rate	42.7	40.0
Percent Change (2009-2019)	-19.4%	-13.8%

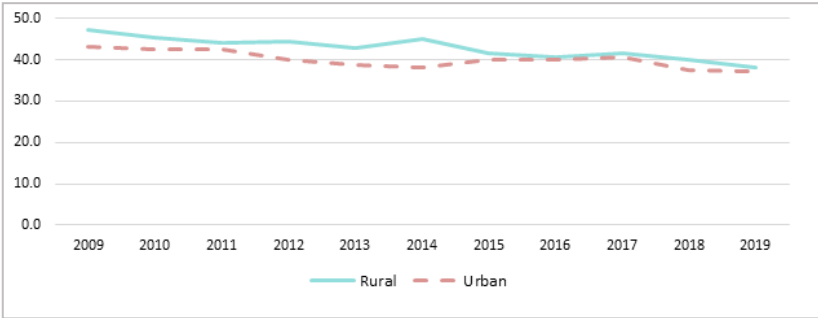
Age-adjusted rates per 100,000 population

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Fortunately, stroke mortality has been declining in the past decade, and the gap between rural and urban areas is shrinking. Cardiovascular health efforts, such as hypertension and blood sugar screening and control as well as smoking cessation programs, are likely contributing to this decline in stroke incidence and death.³¹

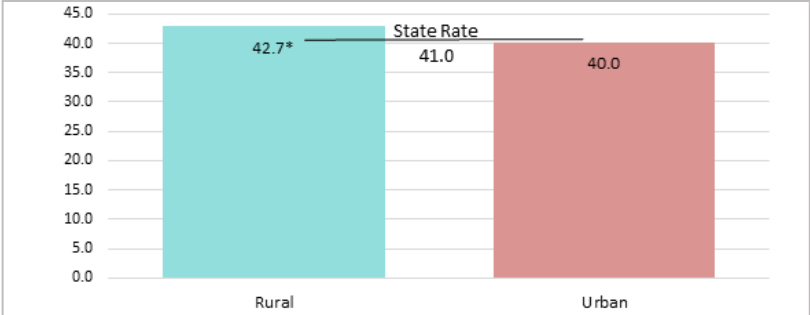
- The Healthy People 2020 goals set a target of a 20% reduction in deaths due to stroke from 2007 to 2020, from 43.5 deaths to 34.8 deaths per 100,000 residents.³² Both rural and urban Missouri stroke death rates in 2019 exceeded the 2020 target death rate of 34.8, but rural Missouri saw a significant 30% decrease in deaths due to stroke from 2007 to 2019.
- Although total deaths due to stroke are decreasing, stroke deaths for Black/African American Missourians continued to increase since 2014. For residents aged 50 years old and over, which comprised of 97.3% of Missouri stroke deaths, the gap in stroke death rates between White and Black/African American residents widened.

**Stroke Death Rates by Year
Missouri, 2017- 2019**



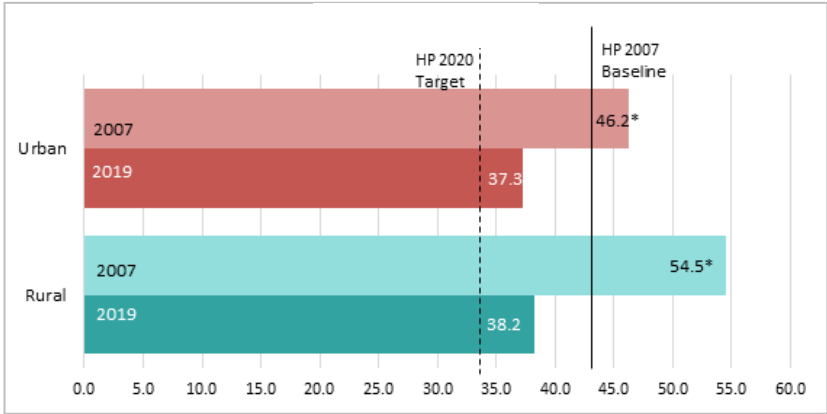
Age-adjusted rates per 100,000 population

**Stroke Death Rates
Missouri, 2009-2019**



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

**Stroke Death Rate
Missouri, 2007 and 2019**

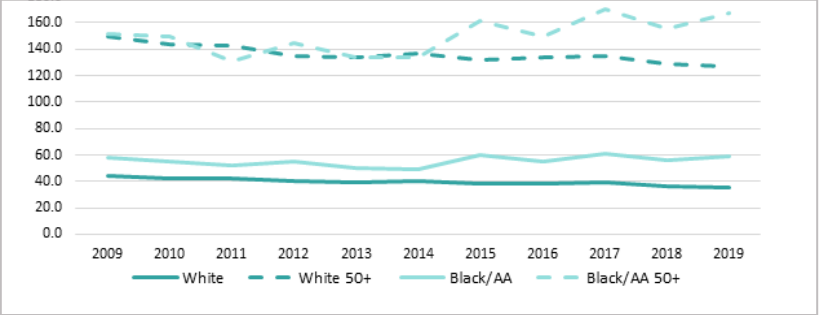


*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

EXHIBIT B

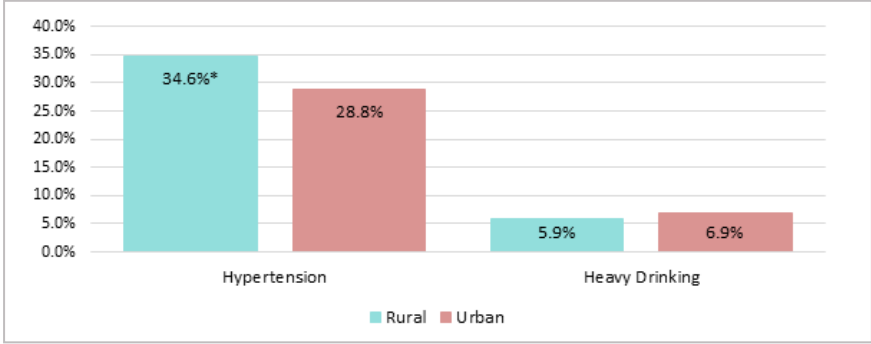
The leading causes of stroke are high blood pressure, high cholesterol, smoking, and diabetes.³³ According to Missouri BRFSS, a significantly higher percentage of people in rural counties reported having hypertension (34.6%) than in urban counties (28.8%). Heavy drinking, another risk factor, was shown to be higher in urban areas (6.9%) than in rural areas (5.9%). It was estimated that up to 80% of strokes are preventable. Maintaining good blood pressure control and healthy levels of cholesterol, as well as limiting intake of alcohol and tobacco products, lowers the risk of stroke remarkably.³³

Stroke Death Rates by Race and Age Missouri, 2009-2019



Rates for race populations are either age-specific or age-adjusted as appropriate and all rates are per 100,000

Stroke Risk Factors Missouri, BRFSS, 2009-2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals. Results are based on a response of “yes” to the questions “Have you ever been told by a medical professional you have high blood pressure?” and for men, “Do you have more than 14 drinks per week?” or for women, “Do you have more than 7 drinks per week?”



EXHIBIT B

ALZHEIMER'S DISEASE

During the years 2009-2019, Missouri experienced 23,967 deaths due to Alzheimer's disease (AD) making it the sixth leading cause of death for both rural and urban Missouri. AD is a disease that progressively destroys memory and thinking skills, and eventually, the ability to handle even simple tasks. Those with AD also experience changes in personality and behavior as time progresses. More than 6 million Americans were estimated to have AD; the majority of them age 65 and older.³⁴ Early detection of AD is critical in order to determine appropriate care and safety of the individual. Some other benefits of early detection include:

- Allows individuals to participate in care planning at a time when they can express their needs and wishes.
- May slow progression of disease with medical intervention early in diagnosis.
- Offers potential for functional stabilization and independence.

From 2009-2019, there was a 34.2% increase in Missouri AD deaths. While urban counties had a greater percent increase for this time period, rural counties still had a rate (30.6) that was statistically significantly higher than that of urban counties (28.4).

Other characteristics of AD in Missouri's rural counties include:

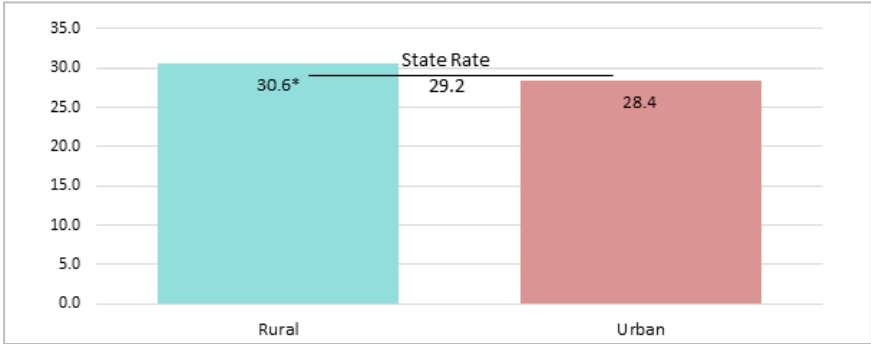
- The stages of AD continue to progress and can result in late-stage AD, meaning that the individual can no longer communicate and are completely dependent on others for care. As age increases, death rates also increase for those diagnosed with AD. In rural Missouri, those who were 85 and older were over 5 times more likely to die from AD (1,206.9) than those who were 75-84 years of age (221.3).
- Nine of the top 10 leading counties for death rates from AD were rural with the exception of Cape Girardeau, ranking tenth as the only urban county to make the list.

Alzheimer's Disease Death Rates Missouri, 2009-2019

	Rural	Urban
Frequency	9,434	14,533
Rate	30.6	28.4
Percent Change (2009-2019)	+16.6%	+47.6%

Age-adjusted rates per 100,000 population

Alzheimer's Disease Death Rates Missouri, 2009-2019

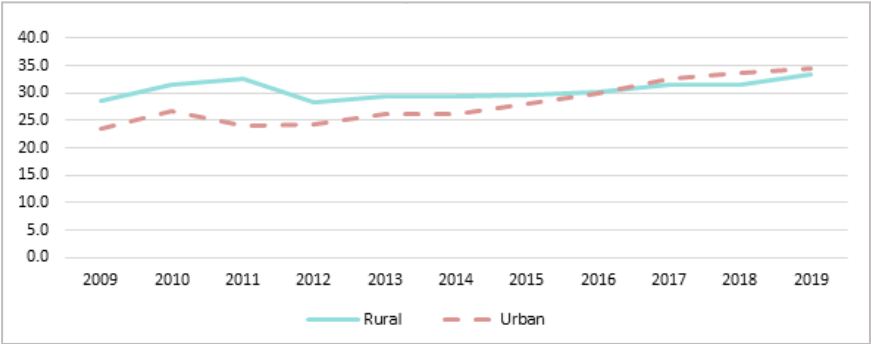


*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

EXHIBIT B

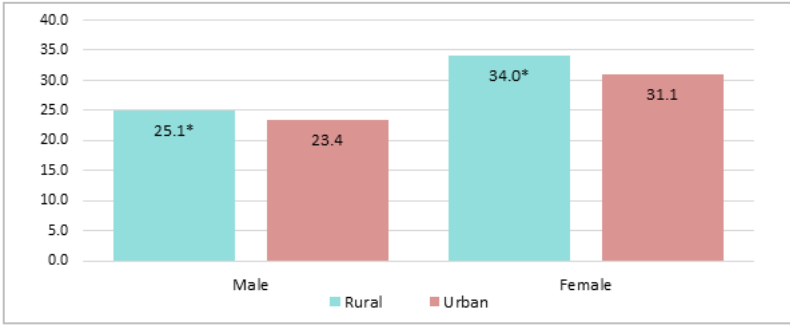
- White residents in both rural (30.9) and urban (28.9) areas had higher death rates than Black/African American residents in rural (20.5) and urban (25.2) areas.
- Females living in rural counties were 9.5% more likely to die from AD than those living in urban counties. Comparatively, males living in rural areas were 7.0% more likely to die from AD than those living in urban areas. Females in both urban and rural counties were more likely to die from AD than males.
- AD has continued to steadily increase for both rural and urban areas. From 2017 to 2019, the yearly death rates for AD in urban counties surpassed rural counties, resulting in the 11-year combined rates being much closer than in prior editions of this report.

**Alzheimer’s Disease Death Rates by Year
Missouri, 2009-2019**



Age-adjusted rates per 100,000 population

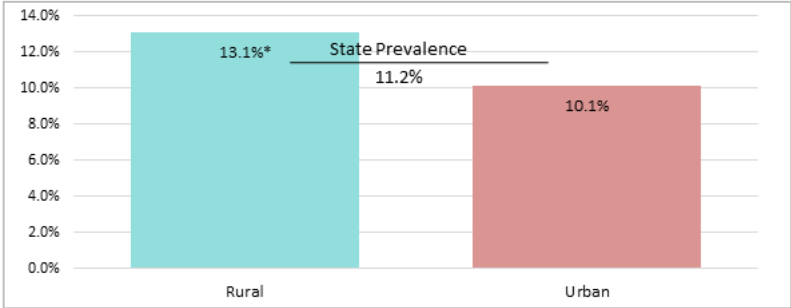
**Alzheimer’s Disease Death Rates by Sex
Missouri, 2009-2019**



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

According to 2019 BRFSS, 13.1% of adults who were age 45 and older living in rural Missouri reported subjective cognitive decline within the last year. This was statistically significantly higher than those in urban counties (10.1%). It is important for adults who are experiencing cognitive decline to report this to their physician in order to quickly detect signs of possible early-onset AD.

**Adults 45+ Years Experiencing Cognitive Decline
Missouri BRFSS, 2019**



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals. Results are based on the response “Yes” to the question “During the past 12 months, have you experienced confusion or memory loss that is happening more often or is getting worse”.

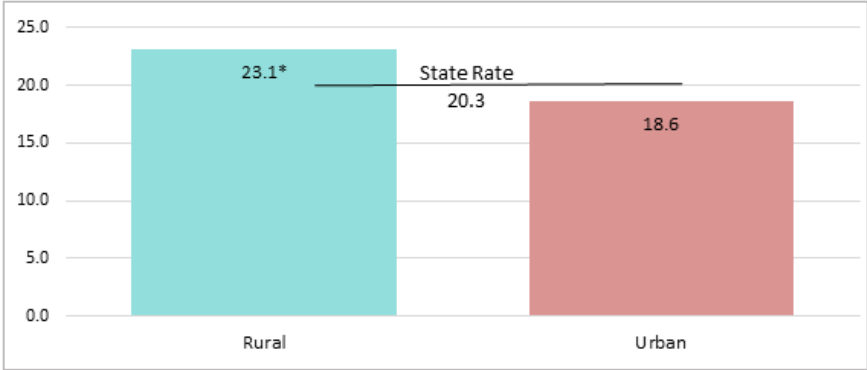
EXHIBIT B

DIABETES

Between 2009 and 2019, diabetes ranked as the seventh leading cause of death in Missouri and was listed as the underlying cause of death for 16,267 residents. The rural rate of 23.1 was statistically significantly higher than the urban rate of 18.6. This 24.2% disparity was due to a fairly dramatic increase in rural areas in recent years. Rural (19.5) and urban (19.9) areas of the state had similar rates of death in 2009, but diabetes deaths in rural areas demonstrate an upward trend (27.2%), while deaths in urban areas have modestly declined (-6.3%). Additionally:

- The greatest disparity in death rates was in 2018, where rural rates (25.85) were 43.9% higher than urban rates (18.0).
- Diabetes deaths occurred in ages slightly younger than most other causes of death. For instance, more than 40% of rural diabetes deaths occurred to persons below the age of 70. In contrast, only 35% of all other deaths in rural areas were to persons below age 70.
- Nine of the 28 rural counties with statistically significantly higher death rates than the state average were located in the Central Region. The 14 rural counties with significantly low rates were spread relatively evenly throughout the state.

Diabetes Death Rates Missouri, 2009-2019



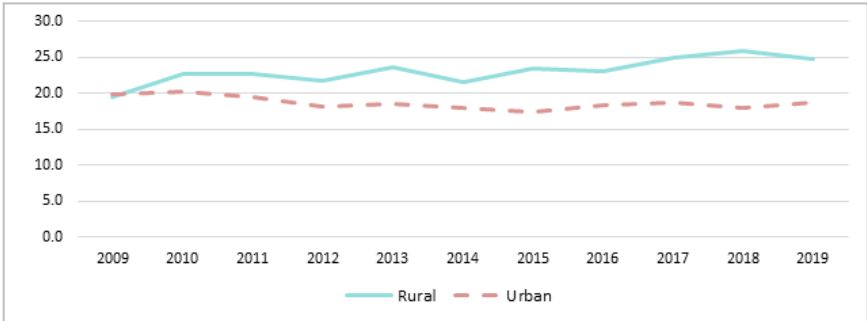
*Indicates a rate this is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

Diabetes Death Rates Missouri, 2009-2019

	Rural	Urban
Frequency	6,897	9,370
Rate	23.1	18.6
Percent Change (2009-2019)	+27.2%	-6.3%

Age-adjusted rates per 100,000 population

Diabetes Death Rates by Year Missouri, 2009-2019



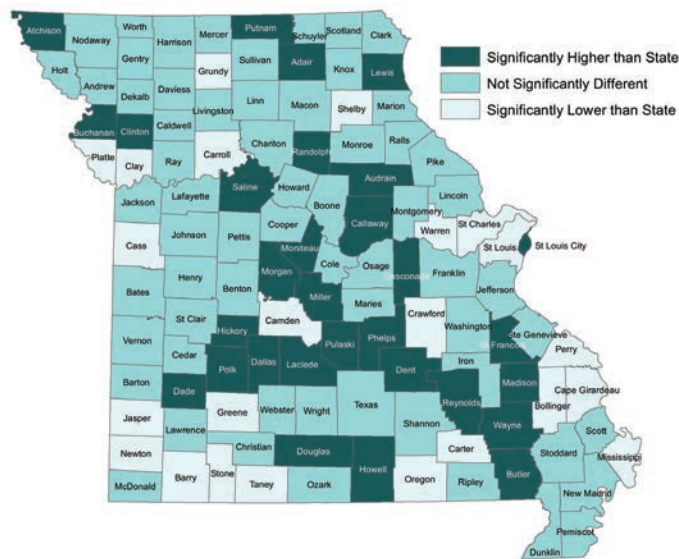
Age-adjusted rates per 100,000 population

EXHIBIT B

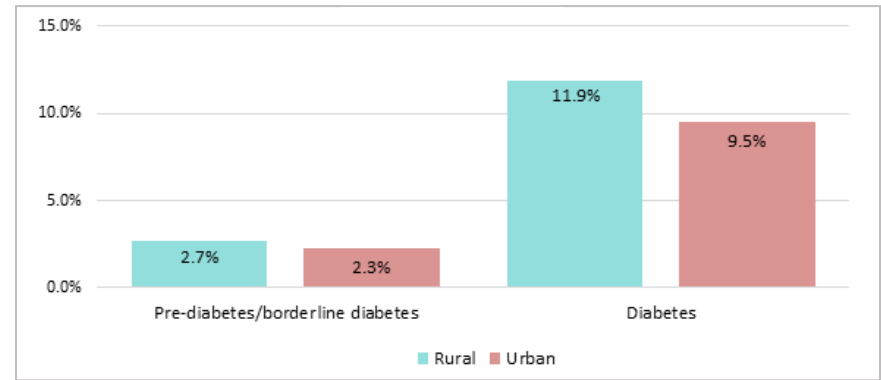
In-patient hospitalization rates between 2016 and 2019 increased for urban and rural areas, but urban areas had consistently higher rates than rural areas. This could be due to rural counties experiencing less access to facilities with adequate in-patient programs to treat diabetes. Those living with diabetes in rural areas may live further away from a hospital than those in urban areas and may have slower response times in the case of a medical emergency. These factors may account for the much higher death rates in rural areas, but lower rates of hospitalizations. The Missouri counties that comprise the Bootheel Region: Dunklin, Mississippi, New Madrid, and Pemiscot, had significantly higher rates of hospitalization for diabetes than the urban counties, other rural counties, or the entire state. In 2019, the Bootheel in-patient hospitalization rate for diabetes was 34.8% higher than all other rural counties combined.

Missouri BRFSS data revealed that adults living in rural areas self-reported higher rates of pre-diabetes, borderline diabetes, or diabetes than those living in urban areas. An estimated 11.9% of respondents reported having diabetes in rural areas, compared to 9.5% of urban respondents.

Diabetes Death Rate Missouri, 2009-2019



Diabetes Prevalence Missouri BRFSS, 2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals. Results are based on the response “Yes” to the question “Ever told you had pre-diabetes, borderline diabetes, or diabetes?”

The Missouri Public Health Information Management System (MOPHIMS): Death MICA.

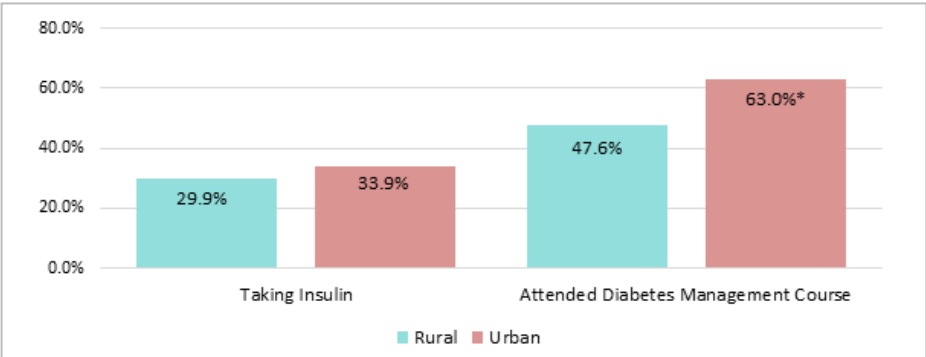
EXHIBIT B

While Missourians in rural areas tend to be at risk for diabetes at higher rates than those in urban areas, their access to diabetes management was lower. Of those with diabetes, urban respondents reported higher rates of taking insulin to manage their diabetes, and also reported higher rates of having attended a class or course on how to self-manage their diabetes than rural respondents. An estimated 63.0% of urban respondents took a class on how to manage their diabetes, compared to only 47.6% of rural Missourians.

Rural areas tend to have higher risk factors associated with developing diabetes, such as obesity, older age, and poor diet. Residents of rural areas also experience more barriers to accessing healthcare providers, health insurance, and transportation opportunities.³⁵ Diabetes Self-Management Education and Support programs (DSMES) provide patients with information and skills to manage their diabetes, and aim to reduce healthcare costs and improve health outcomes. Despite being at higher risk for developing diabetes, 62% of rural counties did not have any DSMES program. The CDC supports both telehealth and community based settings for DSMES, in order to reach patients and family members outside of typical health care venues, which may be beneficial in rural areas.³⁶



**Diabetes Management
Missouri BRFSS, 2019**



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Results are based on the response “Yes” to the question only asked to those with diabetes “Are you now taking insulin?” and “Have you ever taken a course in how to manage your diabetes yourself?”

EXHIBIT B

KIDNEY DISEASE

From 2009-2019, Missouri resident deaths due to kidney disease totaled 9,116, which ranked it eighth among all death categories. The National Kidney Foundation described kidney disease as an ‘unrecognized public health crisis’, with an estimated 1 in 7 adults suffering from it, but 90% of those with the disease did not know they had it.³⁷ In addition to the over 800 annual deaths where kidney disease was the underlying cause, it was also a contributing cause for an additional 550 deaths per year.

Kidney disease deaths were statistically significantly higher in rural areas (20.1) compared to their urban counterparts (18.1). Death rates appear stable over the last decade with rural rates averaging about 10% higher than urban rates. Other trends for kidney disease mortality include:

- The year 2017 was the only year in this timespan where the rural rate was lower than the urban rate.
- Twenty rural counties had significantly higher rates compared to the state for kidney disease mortality, and over half of the 20 were located in the Southeast Region.
- Kidney disease death rates were significantly higher for Black/African Americans in both rural and urban areas. In fact, Black/African American residents in both areas had rates more than double the rate of White residents. Rural Black/African American residents had the highest death rate (46.1) while urban White residents had the lowest (15.8).

**Kidney Disease Death Rates
Missouri, 2009-2019**

	Rural	Urban
Frequency	6,117	9,116
Rate	20.1	18.1
Percent Change (2009-2019)	-0.3%	+1.2%

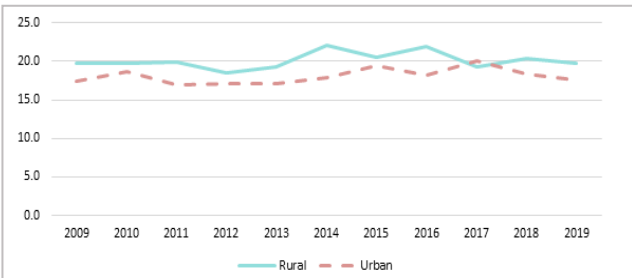
Age-adjusted rates per 100,000 population

**Kidney Disease Death Rates
Missouri, 2009-2019**



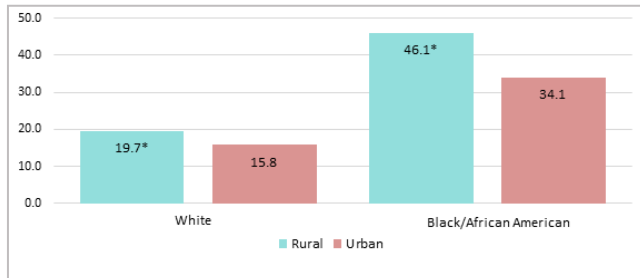
*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

**Kidney Disease Death Rates by Year
Missouri, 2009-2019**



Age-adjusted rates per 100,000 population

**Kidney Disease Death Rate by Race
Missouri, 2009-2019**



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

EXHIBIT B

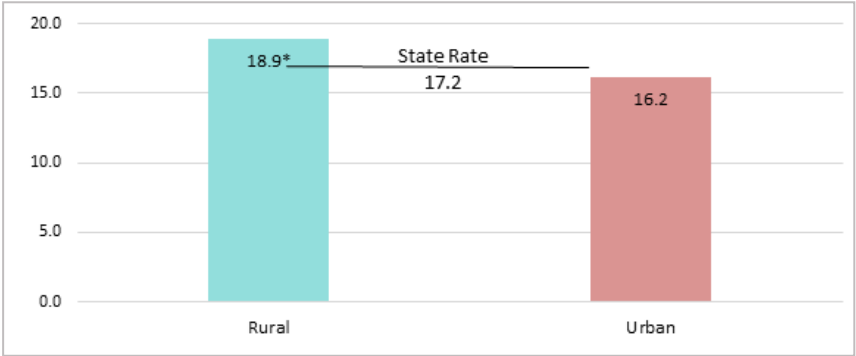
PNEUMONIA AND INFLUENZA

From 2009-2019, there were 18,878 deaths caused by pneumonia and influenza statewide. This ranked pneumonia and influenza the ninth highest cause of death for that time period. Missouri saw a pneumonia and influenza death rate of 17.2. When comparing urban and rural areas, the urban counties saw a lower death rate of 16.2 compared to 18.9 for rural counties. Some other notable statistics for pneumonia and influenza deaths include:

- Statewide, the death rate decreased from 19.9 to 13.0 (34.7%), since 2009. The death rates for both urban and rural counties decreased at a similar pace as well. The urban death rate declined from 18.5 to 12.1, while rural deaths declined from 22.2 to 14.5.
- Between 2009 and 2019, rural counties had 23 of the 25 highest pneumonia and influenza death rates in Missouri. The rural counties with the highest death rates from pneumonia and influenza were spread geographically around the state, but there were clusters of high rate counties in the Southeastern and Southwestern Regions of the state.

Pneumonia and influenza were much deadlier to older populations. Over 85% of deaths caused by pneumonia or influenza in Missouri occurred in individuals age 65 or over. The CDC recommends adults 65 and over receive vaccinations to prevent bacterial pneumonia infections.³⁸

Pneumonia and Flu Death Rates Missouri, 2009-2019



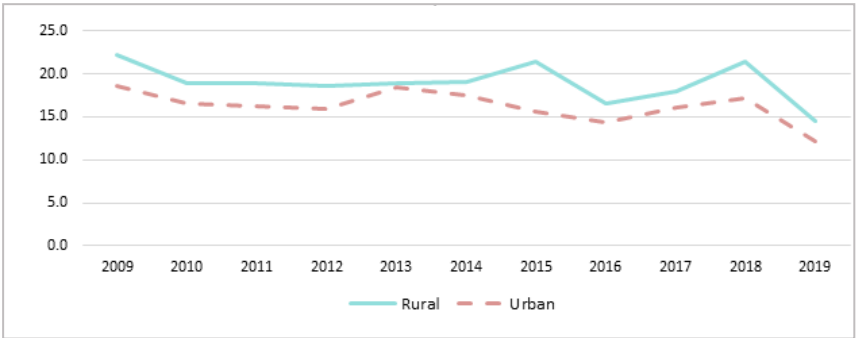
*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

Pneumonia and Flu Death Rates Missouri, 2009-2019

	Rural	Urban
Frequency	5,702	8,176
Rate	18.9	16.2
Percent Change (2009-2019)	-34.7%	-34.6%

Age-adjusted rates per 100,000 population

Pneumonia and Flu Death Rates by Year Missouri, 2009-2019



Age-adjusted rates per 100,000 population

EXHIBIT B

SUICIDE

Between 2009 and 2019, deaths from suicide comprised the tenth leading cause of death for Missourians with 11,177 suicides. Suicides are a growing public health problem in not only Missouri but the U.S. as a whole. According to the CDC, the number of people who think about, plan, or attempt suicide is much higher than the actual number of suicide deaths.³⁹ The top 3 mechanisms for suicides in Missouri for this time period were:

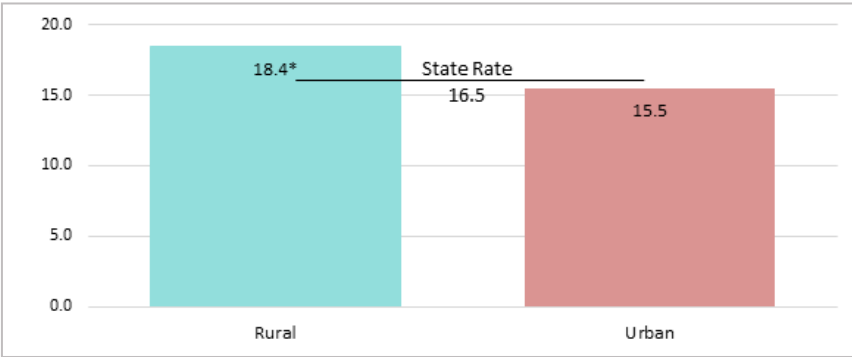
- Firearms
- Hanging, Strangulation, or Suffocation
- Overdose or Self-Poisoning

**Suicide Death Rates
Missouri, 2009-2019**

	Rural	Urban
Frequency	4,219	6,958
Rate	18.4	15.5
Percent Change (2009-2019)	+25.9%	+28.4%

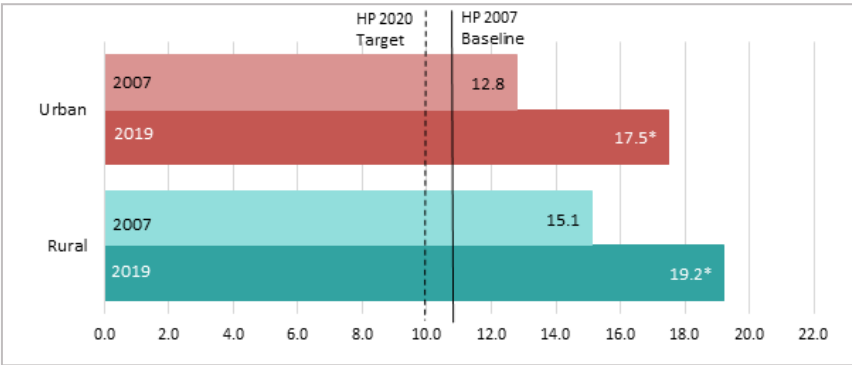
Age-adjusted rates per 100,000 population

**Suicide Death Rates
Missouri, 2009-2019**



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

**Suicide Death Rates
Missouri, 2007 and 2019**



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

EXHIBIT B

The rural suicide rate of 18.4 was significantly higher than the urban rate of 15.5.

Other suicide statistics of interest include:

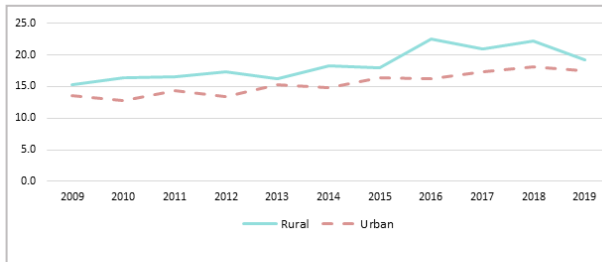
- In 2019, both rates were higher than the Healthy People 2020 target of a suicide death rate of 10.2.⁴⁰ Healthy People 2020 set a goal of a 10% reduction in the suicide death rate from 2007 to 2020 but urban areas increased by 37.3% and rural areas increased by 27.2%.
- Rural and urban counties both increased between 2009 and 2019; rural experienced a 25.9% increase and urban a 28.4% increase. However, between 2018 and 2019, both rates decreased. This was the first time during this time period that rural and urban rates decreased at the same time.
- Suicides in both rural and urban Missouri counties were drastically higher for males in comparison to females. In addition, the rural male suicide rate of 30.1 was significantly higher than the urban male rate of 25.2.
- Suicide rates were higher in rural counties than in urban counties for all age

groups. The 25-44 age group (26.1) had the highest rate of suicide deaths in rural counties. For urban counties, the 45-64 age group (22.5) had the highest rate.

- Out of 115 counties, the 29 highest rates of suicide mortality (20.5 to 29.5) were found in rural counties.

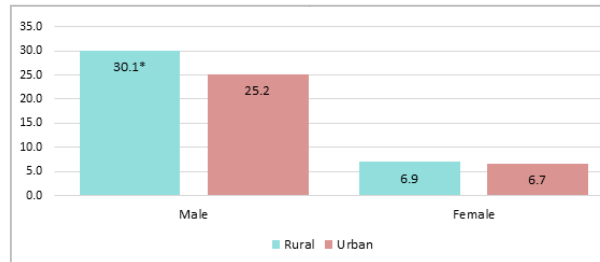
There are several risk factors associated with suicide deaths, which include a person’s mental health. The 2019 BRFSS survey contained several questions that allowed people to share information related to their mental health and risk factors associated with suicides. More rural Missourians reported having 14 or more poor mental health days in a month than those in urban areas. The rate of Missourians who reported they were told they have a depressive disorder was very similar in rural and urban parts of the state, reaching nearly 23% in both regions. These rates were not significantly different between regions.

Suicide Death Rates by Year Missouri, 2009-2019



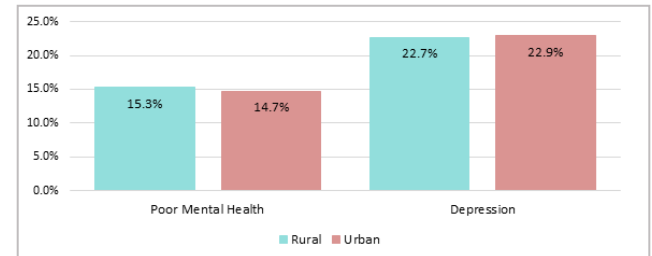
Age-adjusted rates per 100,000 population

Suicide Death Rates by Sex Missouri, 2009-2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals
Age-adjusted rates per 100,000 population

Mental Health Among Adults Missouri BRFSS, 2019



*Indicates a statistically significant difference at the 95% confidence level. Results are based on response of “Yes” to the questions “Ever told you had a depressive disorder (including depression, major depression, dysthymia, or minor depression)?” or a response of “14 days or more” to the question “Including stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?”

EXHIBIT B

MATERNAL, INFANT, AND CHILD HEALTH

Maternal, infant, and child health (MCH) is another area that can provide an important source of information about the well-being of some of Missouri's more vulnerable populations. In addition, these MCH indicators can be a good overall gauge of health status for communities.

At 37 weeks, a pregnancy is considered full-term and the average baby weighs around 3,000-4,000 grams (6-8 pounds). Prematurity (defined as babies born less than 37 weeks gestation) and low birth weight (defined as births weighing less than 2,500 grams or 5.5 pounds) are MCH indicators that are often intertwined. In Missouri during 2009-2019, a little over two-thirds (68.0%) of all low birth weight births were born prematurely. Most indicators associated with prematurity and birth weight show outcomes that were slightly better in rural areas.

- The percent of low birth weight births was 7.9% in rural areas compared to 8.5% in urban areas. The difference between the rates was statistically significant.
- The rate of premature births was 10.9% in rural areas, and was significantly

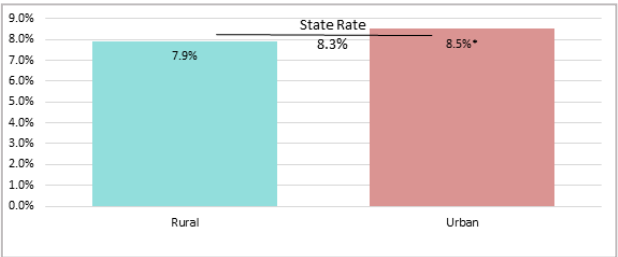
better than the 11.2 rate for urban Missouri.

- For births where the pregnancy went full-term and the birth weight was low, the rural and urban rates were identical at 3.0%.

Even though MCH indicators for the general population were relatively better in rural areas, there were still subpopulations that had poor health outcomes for many of these indices. The Black/African American population had rates around double the White rate for low birth weight. This was true for both rural regions (7.7% for Whites and 14.3% for Black/African Americans) and in urban regions (6.8% for Whites and 14.5% for Black/African Americans). Similar patterns hold true for other indicators:

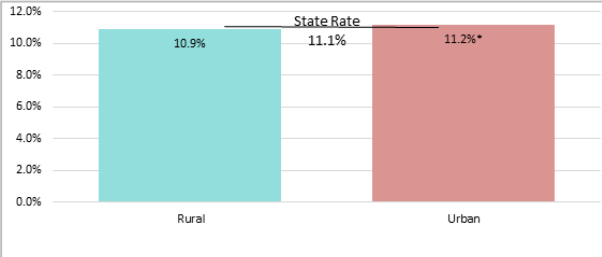
- For preterm births, the Black/African American rate (16.4%) in rural areas was higher compared to Whites in rural areas (10.7%) and urban Black/African Americans (16.0%).

Low Birth Weight Rates Missouri, 2009-2019



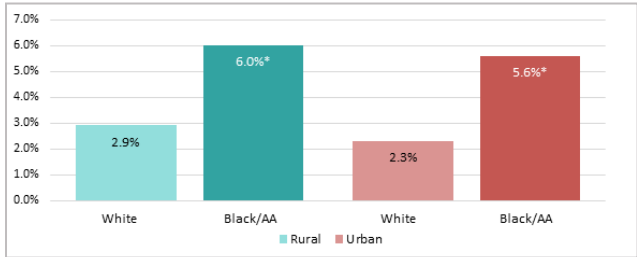
*Indicates a rate that is statistically significantly higher, using 95% confidence intervals

Premature Birth Rate (Less than 37 completed weeks) Missouri, 2009-2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals

Low Birth Weight and Full Term by Race Missouri, 2009-2019



* Indicates a rate that is statistically significantly higher, using 95% confidence intervals

EXHIBIT B

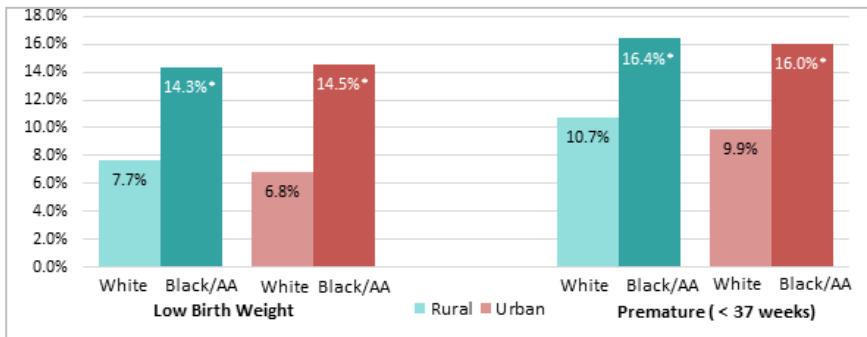
- The low birth weight rate for full-term pregnancies was highest among Black/African Americans in rural areas (6.0%) compared to 2.9% for Whites in rural areas and 5.6% for Black/African Americans in urban areas.

Prematurity and low birth weight also had some distinct regional patterns. For low birth weight, there were 11 counties with rates significantly higher than the state average (8.3%). For prematurity, there were 17 counties with significantly higher rates than the state (11.1%). Additional information about counties with high rates for these MCH indicators include:

- Among the 8 rural counties with significantly higher low birth rates, 7 of them were located in the Southeast Region.
- Three of the largest urban counties (St. Louis City, St. Louis County, and Jackson) had significantly high rates for low birth weight. St. Louis City had the highest rate in the state at 12.6%.

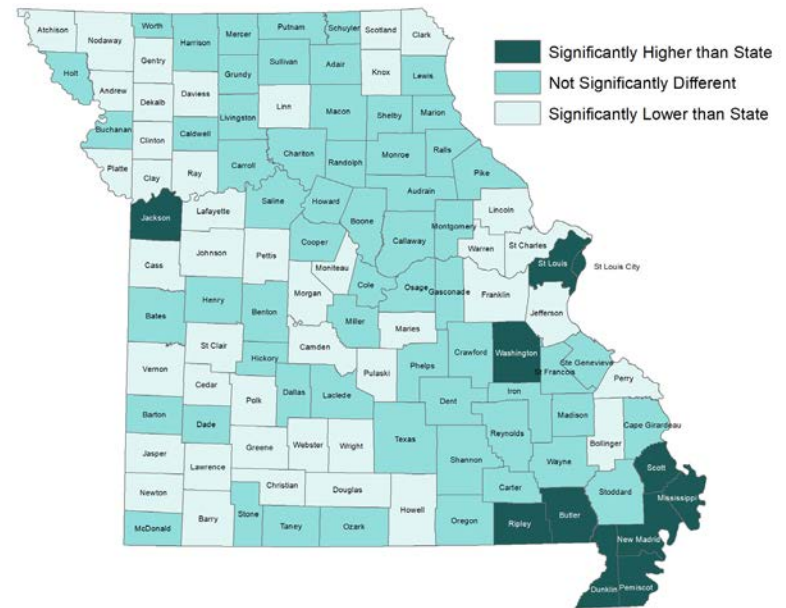
- Counties in the Southeast Region ranked second through fifth highest for low birth weight. Pemiscot had the highest rural low birth weight rate at 12.3%. Mississippi, Dunklin, New Madrid, and Butler were the other counties with rates above 10%.
- For prematurity, 12 of the 15 rural counties with high rates were in the Southeast Region.
- There were 6 counties with prematurity rates above 15%, and all 6 were rural. Carter County, in the Southeast Region, had the highest rate at 17.8%.

Low Birth Weight and Premature Rates by Race Missouri, 2009-2019



*Indicates a rate that is statistically significantly higher, using 95% confidence intervals

Low Birth Weight Missouri, 2009-2019



The Missouri Public Health Information Management System (MOPHIMS): Birth MICA.

EXHIBIT B

INFANT MORTALITY

Deaths to children under the age of 1 are classed as infant deaths. The infant mortality rate (expressed as deaths per 1,000 live births) have been a key concern of public health since its inception. In 1912, the U.S. Federal Children’s Bureau had their very first initiative centered on infant mortality. Moreover, infant mortality is considered 1 important gauge in assessing related indicators, such as poverty and health care access.⁴¹

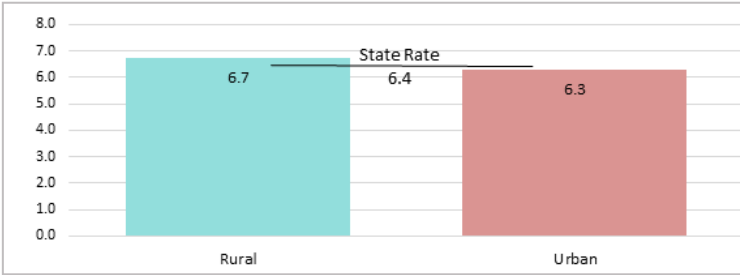
In Missouri, infant mortality have been declining for many years. The infant mortality rate was cut in half in the 20 years between 1960 and 1980 (24.7 versus 12.3). While the pace of the decline has slowed, the rate was again halved in the 39 years between 1980 (12.3) and 2019 (6.0). From 2009 to 2019, Missouri averaged about 475 infant deaths per year and the infant mortality rate declined by 16.2%. Rural patterns follow similar trends as the state including:

- The infant mortality rate in rural areas declined by 24.9% between 2009 (7.6) and 2019 (5.7). Due in part to small numbers, this was not a statistically significant change.
- For the combined time period of 2009-2019, the rural rate (6.7) for infant mortality was 6.8% higher than the urban rate (6.3). The rate difference was

not statistically significant. There were 3 years in the last 11 where the rural rate was higher than the urban rate, including the 2 most recent years (2018 and 2019).

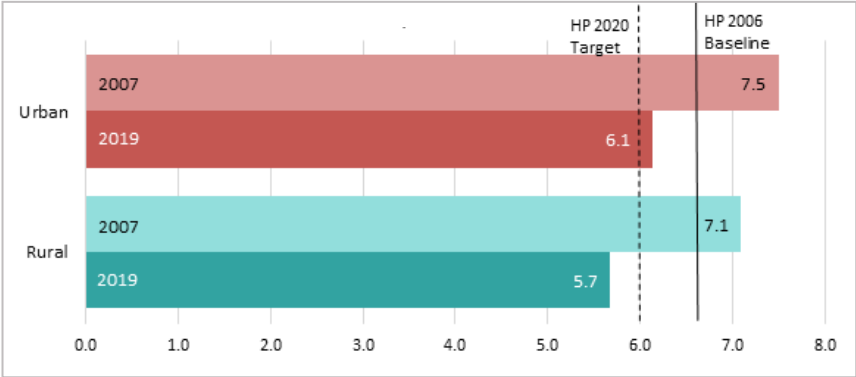
- Rural Missouri achieved a Healthy People 2020 target related to infant mortality. In both 2018 and 2019 rates were below the Healthy People 2020 Target of 6.0.⁴² Urban Missouri had a rate of 6.1, which was just above the target. Both rural and urban Missouri rates in 2006 were well above the Healthy People baseline rate of 6.7,⁴² indicating there has been a marked improvement over the past several years.
- There were 7 counties with statistically significantly high infant mortality rates compared to the state over the 2009-2019 time period. Six of the 7 were rural counties, and 5 of those 6 rural counties were in the Southeast Region. Pemiscot and Dunklin counties, in the Southeast Region, experienced the 2 highest rates in the state for this time period.

Infant Mortality Rates Missouri, 2009-2019



Rates per 1,000 live births

Infant Mortality Rate Missouri, 2007 and 2019



Rates per 1,000 live births

EXHIBIT B

HEALTH CARE IN RURAL MISSOURI

Basic access to primary care physicians, psychiatrists, dentists, in-patient and out-patient, hospital, and specialty care services improve overall health and contribute significantly to an area’s economic vitality. However, in rural Missouri, access to these health care services are limited, even for those who have health insurance, are financially stable, and have access to transportation. Furthermore, there are vast differences between urban and rural access to hospital, specialty care, and primary care services.

People in rural areas generally have less access to healthcare than their urban counterparts. Fewer primary care practitioners, mental health programs, and healthcare facilities in these areas often mean less preventative care and longer response times in emergencies.

SPECIALTY SERVICES

The lack of access to and sufficient number of hospital and specialty services in rural Missouri is one of the contributors to the higher death rates seen in the Health Status section of this report. Given the lower incomes and increased age of rural residents compared to urban counterparts, the lack of specialty care services can mean no access to or less consistent care for vulnerable populations. Rural Missourians generally have to travel long distances to obtain specialty care, such as cardiology, oncology, and nephrology. Additionally, only 28 rural communities have access to the specialty emergency care necessary to save lives when minutes matter.

No rural Missouri counties have a Level 1 Trauma Center, Pediatric Trauma Center, Stroke Center, or STEMI Center as this level of care is only available in urban Missouri. STEMI (ST-Elevation Myocardial Infarction) is the term used for a type of serious heart attack where 1 of the major arteries that supply oxygen and blood to the heart is blocked.

Designated Hospitals: Rural vs. Urban

	LEVEL 1		LEVEL 2		LEVEL 3		LEVEL 4	
	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN
TRAUMA CENTER	0	19	0	8	5	4	N/A	N/A
STROKE CENTER	0	11	3	24	23	4	3	0
STEMI CENTER	0	19	6	17	8	0	8	0

Source: <https://health.mo.gov/living/healthcondiseases/chronic/tcdsystem/designatedhospitals.php>

RURAL HOSPITALS

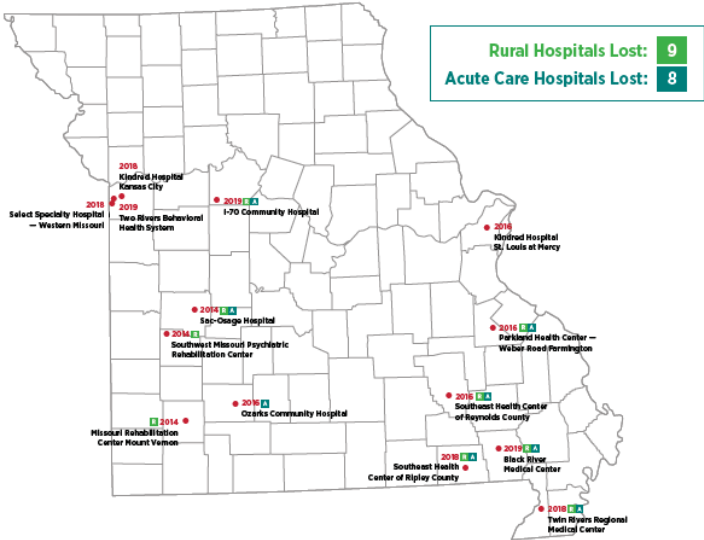
Rural hospitals are a crucial component of a community’s wellbeing. In addition to providing primary, acute, and long-term care they are often a major employer and natural leader in community-based health programs and initiatives. However, low reimbursement rates from Medicare, Medicaid, and other types of insurance, and increased regulation, reduced patient volumes, and unpaid patient medical bills have caused many rural hospitals to struggle financially.⁸⁶

From 2014-2020, a total of 15 Missouri hospitals have closed, of which 10 were located in rural counties. Hospital closures have increased the number of rural counties without a hospital from 51, in 2017, to 55, in 2020. All 15 hospitals were in located in geographic and population based HPSAs.

EXHIBIT B

14 Hospital Closures in Missouri

Since 2014



- Southwest Missouri Psychiatric Rehab Center, El Dorado Springs, in 2014 **R**
- Sac-Osage Hospital, Osceola, in 2014 **R A**
- Missouri Rehabilitation Center, Mount Vernon, in 2014 **R**
- Parkland Health Center, Farmington, in 2016 **R A**
- Southeast Health Center of Reynolds County, Ellington, in 2016 **R A**
- Ozarks Community Hospital, Springfield, in 2016 **A**
- Kindred Hospital St. Louis at Mercy, St. Louis, in 2016
- Kindred Hospital Kansas City, in 2018
- Select Specialty Hospital - Western Missouri, Kansas City (non-member), in 2018
- Twin Rivers Regional Medical Center, Kennett, in 2018 **R A**
- Southeast Health Center of Ripley County, Doniphan, in 2018 **R A**
- Two Rivers Behavioral Health System, Kansas City, in 2019
- Black River Medical Center, Poplar Bluff, in 2019 **R A**
- I-70 Community Hospital, Sweet Springs, in 2019 **R A**

09/19

As of August 2021, Missouri has 126 licensed general acute care hospitals, 46.8% (59 total) are located in rural counties. These hospitals provide 1.84 beds per 1,000 residents in rural counties while urban counties have 3.96 beds per 1,000 residents. Of the 161 licensed hospitals in Missouri, 64 (40%), including 5 behavioral health hospitals, are located in rural counties. Of those 64 hospitals, 48 are small rural hospitals of which 31 are Critical Access Hospitals (CAHs) in rural areas. There are an additional 4 CAHs located in non-rural counties.

Closure of the rural hospitals reduces access to needed care which increases health disparities. Along with the health impact, there is an economic impact. Communities see a reduction in taxes collected from the hospital and individuals purchasing goods. As a major employer, the individuals working for rural hospitals often have difficulty finding employment within their community. These individuals have to travel a great distance to the nearest large city for employment.

EXHIBIT B

SMALL RURAL HOSPITALS

A small rural hospital is defined as a non-federal, short-term general acute care hospital that: (i) is located in a rural area as defined in 42 U.S.C. 1395ww(d) and (ii) and has 49 available beds or less, as reported on the hospital's most recently filed Medicare Cost Report. These small rural hospitals provide short-term, general acute care to their communities. Eligible hospitals may be for-profit or not-for-profit, including faith-based. There are 48 small rural hospitals in Missouri of which 35 are CAHs.

CRITICAL ACCESS HOSPITALS

The Critical Access Hospital (CAH) designation is given to eligible rural hospitals by the Centers of Medicare and Medicaid Services (CMS) and designed to improve access to health care in rural areas while reducing the financial vulnerability of rural hospitals by keeping essential services in rural communities. This is accomplished through cost-based Medicare reimbursement. Missouri has 35 CAHs, 31 of which are located in rural counties. In order to be designated as a CAH, a hospital must meet the following criteria:

- Have 25 or less acute care inpatient beds.
- Be more than 35 miles from another hospital.
- Have an average length of stay of no more than 96 hours for acute care patients.
- Provide 24/7 emergency care services.

FEDERALLY QUALIFIED HEALTH CENTERS

Federally Qualified Health Centers (FQHCs) are local, non-profit, community-driven health care providers delivering quality health care services to Missouri's low income and medically underserved populations in rural and urban areas. Missouri has 28 main FQHC sites and 314 service delivery sites of the 28 main sites:

- 13 have sites in rural areas only.
- 7 have sites in urban areas only.
- 8 have sites in both rural and urban areas.

Missouri's FQHCs have provided high-quality, affordable primary care and preventive services, often including dental, pharmaceutical, mental health, and substance abuse services for over 50 years. FQHCs are located in areas where care is needed and otherwise scarcely available. Missouri's FQHCs improve access to care for thousands of Missourians regardless of their insurance status or ability to pay. They provide services in each region of the state and serve individuals from every county, including the City of St. Louis.

A total of 75% of FQHC patients are below poverty level. One in 6 rural residents receive their essential services, including primary care, behavioral health, and dental care, from FQHCs. Deemed a "safety net" provider, FQHCs must meet the following qualifications in order to qualify:

- Offer services regardless of the person's ability to pay.
- Establish a sliding fee discount program.
- Be a nonprofit or public organization.
- Be community-based, with the majority of its governing board of directors composed of patients.
- Serve a medically underserved area or population.
- Provide comprehensive primary care services.
- Have an ongoing quality assurance program.

EXHIBIT B

RURAL HEALTH CLINICS

Rural Health Clinics (RHCs) are public, nonprofit, or for-profit healthcare facilities intended to increase access to primary care in rural areas. RHCs utilize a team approach of physicians, nurses, and physician assistants to provide quality health care services to Missouri’s rural populations. The main advantage of RHC status is the enhanced reimbursement rates for providing Medicare and Medicaid services. RHCs are required to adhere to following requirements:

- Be located in a rural, underserved area.
- Be staffed at least 50% of the time with a Nurse Practitioner (NP), Physician Assistant (PA), or Certified Nurse Midwife (CNM).
- Have a team approach of physicians working with non-physician providers such as NPs, PAs, or CNMs.
- Provide out-patient primary care services.
- Provide basic laboratory services.

Missouri has 343 Rural Health Clinics, the most of any other state.

HEALTH PROFESSIONAL SHORTAGE AREAS

A Health Professional Shortage Area (HPSA) is a geographic area, population group, or health care facility designated by the Health Resources and Services Administration (HRSA) as having a shortage of health professionals. HPSAs also indicate that an area does not have enough health care resources to meet the need of its residents. HPSAs occur in both urban and rural settings. HPSAs can occur when there are too few, if any, providers in an area; when there are more patients than providers can see; or when transportation barriers prevent patients from

reaching providers. HPSAs can be based on geography (a county, defined service area, or census tract), population-based (including specific population groups such as low income or Medicaid eligible), or facility-based (including correctional facilities, state/county mental hospitals, FQHCs, and other Auto-HPSA facilities). The HRSA National Health Service Corp created shortage designations to assist in distributing participants where they are needed most. There are 3 types of designations: Primary Care, Dental Health, and Mental Health. While HPSA designations change frequently, as of August 2021, there were 885 designations.

Designation Type	Discipline	Number of Designations
Facility Based: RHC, FQHC, Correctional Facility, FQHC Look-a-Like	Primary Care	218
	Mental Health	224
	Dental Health	219
Geographic or Population	Primary Care	106
	Mental Health	23
	Dental Health	95

EXHIBIT B

More than 35 federal programs use HPSA designations to determine if a facility, program, or area is eligible for federal funding. Primary care, dental health, and mental health each have unique HPSA designations. Large sections of Missouri, especially rural Missouri, are designated HPSAs due to low-income populations.

Missouri only has 1 county (Clay) that does not have a HPSA; primary care, dental health, or mental health HPSA. According to the HRSA Shortage Designation Management System, Missouri has a total of 8,135 primary care, mental health, and dental health providers, of which 1,696 (21%) practice in rural counties. Even though 34% of Missouri's total population lives in rural areas, only 21% of available healthcare providers deliver services to rural Missourians. More providers practice in urban areas, as compared to rural, of which 79% provide services to the 66% urban residents. This deficit and difference further demonstrates and necessitates programs and recruitment and retention efforts to increase the number of providers practicing in rural areas.

PRIMARY MEDICAL CARE

83 of the 106 Primary Care geographic and population based HPSAs in Missouri are in rural areas.

Primary Care HPSAs are defined using a ratio between the general population and the number of Full-Time Equivalents (FTE), of licensed Primary Care Physicians (Allopathic and Osteopathic Doctors who specialize in Family Practice, General Practice, Pediatrics, Internal Medicine, and Obstetrics/Gynecology); as well as a wide range of other factors such as the percent of the population below the FPL, the Infant Health Index (based on Infant Mortality Rate or Low Birth Weight) and the travel time to the nearest source of care outside the HPSA designation's given service area.

MENTAL HEALTH

19 of the 23 Mental Health geographic and population based HPSAs are in rural areas of Missouri.

In Missouri, Mental Health HPSAs are designated using a ratio between the general population and the number of FTE licensed Psychiatrists (Allopathic and Osteopathic); as well as other factors such as the percent of population below 100% of the FPL, the elderly ratio of the population, the youth ratio, the alcohol abuse prevalence, the substance abuse prevalence, and the travel time to the nearest source of care outside the HPSA designation's given service area.

DENTISTS

79 of the 95 Dental Health geographic and population based HPSAs in Missouri are in rural areas.

Dental Health HPSAs are designated using a ratio between the general population and the number of FTE licensed General, or Pediatric, Doctors of Dental Surgery (DDS) or Doctors of Dental Medicine (DMD), the percent of the population below 100% of the FPL, the water fluoridation status, and the travel time to the nearest source of care outside the HPSA designation's given service area.

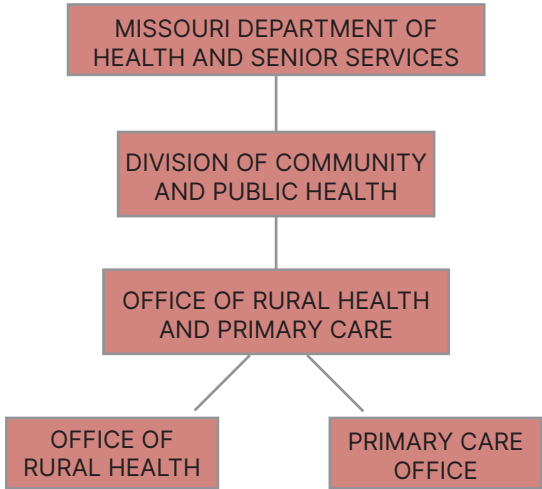
EXHIBIT B

OFFICE OF RURAL HEALTH AND PRIMARY CARE

The Missouri Office of Rural Health and Primary Care (ORHPC), located within the Missouri Department of Health and Senior Services (DHSS), Division of Community and Public Health (DCPH), includes the Office of Rural Health (ORH) and the Primary Care Office (PCO). This organizational structure enables a unique environment in which to engage in close collaboration enhancing equitable health care services to rural and underserved populations and communities.

VISION: HEALTHY MISSOURIANS FOR LIFE.

MISSION: TO BE THE LEADER IN PROMOTING, PROTECTING AND PARTNERING FOR HEALTH



The DHSS serves the citizens of Missouri by working to improve the health and quality of life for Missourians of all ages.

The DHSS aspires to protect the health and keep Missourians safe. The DCPH is responsible for supporting and operating more than 100 programs and initiatives addressing public health issues, such as communicable disease control, chronic disease management, genetic health conditions, cancer, pregnancy, vital statistics and health care access. The division also assures the continuity of essential public health services to all citizens of and visitors to the state of Missouri

The ORHPC administers programs that serve and support communities, health care providers, FQHCs, RHCs, and rural hospitals, including small rural hospitals, and CAHs. The ORHPC focuses on increasing access to quality health care, increasing healthcare workforce in healthcare professional shortage areas, and targeting health improvements in rural and underserved areas, utilizing partnerships to make an impact in health in Missouri.

The ORHPC overall goals include decreasing health disparities and increasing health equity in rural and underserved areas by implementing initiatives and programs focusing on increasing access to quality health care services. The ORHPC increases the health care workforce in health care professional shortage areas and targets health improvements in rural Missouri. The ORHPC initiatives and priorities include:

- Identifying the obstacles and needs faced by health care providers and patients in rural areas and underserved areas.
- Developing Rural Health Initiatives designed to improve the health of people living in rural and underserved areas.

EXHIBIT B

- Collaborating with partners to implement strategies and create impactful outcomes.
- Addressing SDOH as a primary approach to achieving health equity.

The ORHPC, utilizing both ORH and PCO, manages federally funded grants and multiple programs within each grant, specifically related to COVID-19:

- The Epidemiology and Laboratory Capacity for Prevention and Control of Emerging Infectious Diseases (ELC) Enhanced Detection (ED) provides funding through November 30, 2022, to increase the capacity of healthcare providers in underserved communities to be able to enhance detection and respond to COVID-19 infectious disease within the community.
- The Epidemiology and Laboratory Capacity for Prevention and Control of Emerging Infectious Diseases (ELC) Enhancing Detection Expansion (EDE) provides funding through July 31, 2024, for preventing infectious disease threats by strengthening the Health Departments, providing resources for public health educators in rural communities to enhance awareness of strategic and tactical behaviors to reduce risk of chronic public health risks, such as heart disease, cancer, smoking, and other leading causes of death among rural communities.
- The National Initiative to Address COVID-19 Health Disparities Among Populations at High-Risk and Underserved, including Racial and Ethnic Minority Populations and Rural Communities provides funding to address COVID-19 and advance health equity (e.g., through strategies, interventions, and services that consider systemic barriers and potentially discriminatory practices that have put certain groups at higher risk for diseases like COVID-19) in racial and ethnic minority groups and rural populations. The project period covers June 1, 2020, through May 31, 2023.

OFFICE OF RURAL HEALTH

<https://health.mo.gov/living/families/ruralhealth/index.php>.

The Missouri Office of Rural Health (MORH) was established by the General Assembly in 1990 with the intent to support rural health care delivery systems and communities through various activities. The MORH's purpose includes to support rural healthcare delivery systems and communities through the following activities:

- Acting as a central location for the collection and dissemination of information related to rural health care issues.
- Research findings related to rural health.
- Innovative health care delivery approaches.
- Monitoring, coordinating, and facilitating rural health efforts with a focus on avoiding duplication and inefficiencies.
- Providing technical assistance (TA) and educational opportunities to rural health stakeholders to support and improve efforts on quality, operational, and financial outcomes.
- Promoting and developing diverse and innovative health care service models.
- Educating and recommending appropriate public policies to ensure the viability of rural health care delivery.
- Biennially report activities and recommendations to the Governor and members of the General Assembly, to include an overview of health data and issues in rural Missouri.

A primary function of the MORH comprises collecting and disseminating information and resources to rural and underserved areas. The MORH utilizes a variety of mechanisms, including presentations, materials, and web-based media. The MORH maintains and continuously updates a Rural Health webpage (<https://health.mo.gov/living/families/ruralhealth/>) serving as a resource for rural and underserved communities, organizations, hospitals, clinics, and

EXHIBIT B

providers. The webpage has educational resources, such as publications, trainings, events, toolkits, infographics, fact sheets, special reports, rural health policy announcements, and grant opportunities.

The MORH also manages and maintains the Rural Spotlight webpage (<https://ruralhealthinfocenter.health.mo.gov/>) with news from federal and state partners, associations, and organizations, including information about funding opportunities, federal policy updates, research updates, and informational webinars and resources.

Additionally, MORH manages 6 federally funded grants and multiple programs within each grant, specifically designed to strengthen the viability of rural health care providers, hospitals and clinics, while improving their quality of care. The list below includes the federally awarded grants providing pass-through funding or services for hospitals and clinics.

- The State Office of Rural Health (SORH) Grant requires a \$3 state to \$1 federal match providing the infrastructure for managing the requirements associated with all the grants and programs within the MORH. The SORH Grant establishes the MORH requiring the maintenance of a state clearinghouse, coordination of activities within the MORH, and identifying federal and state programs regarding rural health, and providing technical assistance to rural and underserved populations.
- The Small Hospital Improvement Program (SHIP) Grant provides funds for small rural hospitals for a variety of operational projects. The SHIP provides funds to participating hospitals to purchase hardware, software, and telemedicine equipment to assist in meeting data system requirements

established under the Medicare Program and assists hospitals to improve health care quality and value.

- The Medicare Rural Hospital Flexibility Program (FLEX) Grant provides support to CAHs focusing on continuous quality improvements and reporting, performance improvements, and benchmarking to improve patient care, financial practices and hospital operations.
- The Coronavirus State Hospital Improvement Program (COVID-SHIP) Grant utilized Coronavirus Aid, Relief, and Economic Security (CARES) Act funds for the project period April 1, 2020, through September 30, 2021, to assist eligible hospitals with preventing, preparing for, and responding to the COVID-19 public health emergency.
- The American Rescue Plan Act of 2021 (ARP) COVID-19 Testing and Mitigation Grant provides one-time funding to support hospitals for testing education, establishment of alternate testing sites, test result processing, arranging for the processing of test results, and engaging in other activities within the CDC Community Mitigation Framework to address COVID-19 in rural communities. Funding and project period covers July 1, 2021, through December 31, 2022.

EXHIBIT B

PRIMARY CARE OFFICE

<https://health.mo.gov/living/families/primarycare/>

The PCO aims to improve access to comprehensive primary care services for underserved and rural populations increasing health care workforce availability to meet the needs of the Missouri underserved populations. The PCO supports and enhances health systems programming to optimize effectiveness and eliminate health disparities.

Access to quality preventive and primary care services remains central to improving the health status of Missourians. The PCO efforts are vital to ensuring that actions are undertaken related to the availability of primary care services for Missourians. The PCO collaborates with various state and federal organizations, coordinates activities in the state related to the delivery of primary care services, and supports facilitation of the recruitment and retention of health care providers. The PCO initiatives and priorities include:

- Measuring access to primary care through health care workforce and shortage designation analysis; addressing the HPSAs in Missouri.
- Recruitment and retention efforts for a diverse primary care workforce of medical, dental, and mental health care providers in underserved areas.
- Managing the Conrad State 30/J-1 Visa Waiver Program, National Interest Waiver Program, and health professional student loan and loan repayment programs.
- Conducting a Statewide Primary Care Needs Assessment.
- Collaborating and providing technical assistance to support improved access to primary care services.
- Collaborate with organizations and facilities to apply for HPSA designations where need exists to improve access to health care.
- Assist those working to increase access to primary care services for all, and reduce disparities seen in Missouri’s rural and underserved populations.

J-1 Visa Waiver Program (Conrad 30 Waiver Program)

<https://health.mo.gov/living/families/primarycare/j1visa/>

- The PCO handles the administration of the J-1 Visa Program. The J-1 Visa waives the 2-year home residency requirement allowing a foreign medical graduate to attend an advanced training program in the U.S. and waives the requirement for graduates to return to their native country.
- The J-1 Visa waiver is granted in exchange for an obligation to practice in a federally designated HPSA/Medically Underserved Area (MUA).
- States are allotted 30 recommendations during each federal fiscal year (214(l) of the Immigration Nationality Act).

The table below illustrates the (2015-2020) number of J-1 Visa Waivers supported, percentage distribution in rural and urban underserved areas, and percentage distribution of primary care physicians and specialist physicians.

Year	Number of J-1 Visa Waiver Applications Supported	Percent Employed in Rural Areas	Percent Employed in Urban Areas	Percent Primary Care Physicians	Percent Specialist Physicians
2015	30	13%	87%	43%	57%
2016	30	23%	77%	17%	83%
2017	30	20%	80%	83%	17%
2018	30	7%	93%	7%	93%
2019	30	20%	80%	10%	90%
2020	30	20%	80%	10%	90%

EXHIBIT B

National Interest Waiver Program (NIW)

<https://health.mo.gov/living/families/primarycare/j1visa/niw.php>

The NIW Program allows professionals of exceptional ability to request a waiver of the U.S. Immigration labor certification requirements, based on a letter of recommendation from the PCO. The PCO provides an official letter to the U.S. Citizenship and Immigration Services (USCIS), housed within the Department of Homeland Security (DHS).

- The NIW Program effectively helps foreign physicians attain permanent residency status in the U.S. and increases access to care in Missouri’s underserved areas.
- Physicians applying for a NIW are required to work full-time for 5 years in a Missouri HPSA (<https://data.hrsa.gov/tools/shortage-area/hpsa-find>). Time spent in H1-B status to fulfill J-1 Visa Waiver requirements may be counted towards the 5-year term.
- The PCO official letter of support indicates that the work of the health professional is in the public interest and emphasizes the importance and value in retaining the health professional
- The employment of these professionals greatly benefits Missouri and the nation.

The table below exhibits the number NIW Waiver requests DHSS supported (2015-2020), percentage distribution in rural and urban underserved areas, and percentage distribution of primary care physicians and specialist physicians.

Year	Number of NIW Waiver Requests Supported	Percent Employed in Rural Areas	Percent Employed in Urban Areas	Percent Primary Care Physicians	Percent Specialist Physicians
2015	15	13%	87%	13%	87%
2016	18	11%	89%	83%	17%
2017	19	4%	96%	11%	89%
2018	12	16%	84%	16%	84%
2019	7	0%	100%	0%	100%
2020	30	12%	88%	12%	88%

EXHIBIT B

Health Professional Student Loan and Loan Repayment Programs

<https://health.mo.gov/living/families/primarycare/hpl-lr/index.php>

The Health Professional Loan and Loan Repayment Programs administered by the PCO are designed to increase access to health care for Missourians located in HPSAs. In parts of Missouri, a shortage of primary health care providers makes it difficult for low-income, uninsured, and geographically isolated Missourians to receive health care. By working with health care providers and communities, access to care can be improved for the underserved.

Nurse Student Loan (NSL) Program

<https://health.mo.gov/living/families/primarycare/healthprofloans/>

The NSL Program is a competitive state program that awards funding to Missouri residents attending a Missouri institution pursuing education leading to careers as licensed practical nurses or professional nurses. NSL recipients earn forgiveness on their DHSS-issued loans by providing direct patient care services in any Missouri hospital, or in a facility located within a Missouri HPSA. The table to the right shows the eligible nursing programs, associated licensure, enrollment requirements, and the amount of funding, per award, provided by the NSL Program.

Program Type	Must be Licensed as	Must be Enrolled	Funding Amount Per Academic Year
Practical Nursing Certificate or Diploma	Licensed Practical Nurse (LPN)	Full-time	\$2,500
Diploma Nurse (DN)	Registered Nurse (RN)	Full-time	\$5,000
Associate Degree in Nursing (ADN)	RN	Full-time	\$5,000
Bachelor Degree in Nursing (BSN)	RN	Full-time	\$5,000
Master Degree in Nursing (MSN)	Advanced Practice Registered Nurse (APRN)	Full-time	\$5,000
Doctoral Degree in Nursing (PhD, DNP, EdD)	APRN	Part-time or Full-time	\$5,000

EXHIBIT B

The tables below illustrate how many NSL awardees completed their service obligations in 2018, 2019, and 2020, by licensure type and by rural or urban service setting.

2018-2020 NSL Completed Service Obligation by License Type				
	LPN	RN	APRN	Total
2018	1	23	1	25
2019	3	20	1	24
2020	2	20	2	24
Total 2018-2020	6	63	4	73

2018-2020 NSL Completed Service Obligation by Rural/Urban			
	Rural	Urban	Total
2018	4	21	25
2019	4	20	24
2020	4	20	24
Total 2018-2020	12	61	73

In 2020, 33 NSL recipients were actively fulfilling their services obligations, with 82% serving in urban underserved areas, and 18% in rural underserved areas.

Nurse Loan Repayment Program (NLRP)

<https://health.mo.gov/living/families/primarycare/loanrepayment/>

The NLRP is a competitive state program that awards funding for educational loan repayment to Missouri Registered Nurses (RN) and Advanced Practice Registered Nurses (APRN). NLRP recipients earn forgiveness on their loans by providing direct patient care services in any Missouri hospital, or in a facility located within a Missouri HPSA. The table below shows eligible nursing programs, the associated licensure, and the amount of funding, per award, provided by the NLRP.

Program Type	Must be Licensed as	Funding Amount
DN	RN	\$10,000
ADN	RN	\$10,000
BSN	RN	\$10,000
MSN	APRN	\$20,000
PhD, DNP, EdD	APRN	\$20,000

EXHIBIT B

The table below illustrates the number of NLRP awards provided per licensure type and rural or urban service for 2015-2020.

Year Awarded	Licensure Type	Awards Provided	Rural Service	Urban Service	Total Awards
2015	APRN	12	5	7	26
	RN	14	4	10	
2016	APRN	10	6	4	19
	RN	9	6	3	
2017	APRN	12	5	7	25
	RN	13	5	8	
2018	APRN	21	12	9	39
	RN	18	10	8	
2019	APRN	4	2	2	7
	RN	3	0	2	
2020	APRN	14	5	9	33
	RN	19	8	11	

In 2020, 49 NLRP recipients were actively fulfilling their services obligations, with 33% serving in rural underserved areas, and 67% in urban underserved areas.

Primary Care Resource Initiative for Missouri (PRIMO) Program

<https://health.mo.gov/living/families/primarycare/primo/>

The PRIMO Program is a competitive state program, designed to improve health care delivery in Missouri, which awards forgivable loans to Missouri residents attending a Missouri institution pursuing primary care training leading to Missouri licensure, as Physicians, Dentists, Dental Hygienists, and Psychiatrists. After obtaining the appropriate degree and licensure, PRIMO recipients earn forgiveness on their loans by providing direct patient care services in rural and underserved communities. The table below illustrates the number of PRIMO student loans issued from 2015-2020, displayed by discipline.

PRIMO Student Loans 2015-2020				
Year	Medical	Dental	Behavioral	Total by Year
2015	20	3	2	25
2016	7	10	0	17
2017	12	6	0	18
2018	4	4	0	8
2019	1	6	0	7
2020	0	4	0	4
Total by Loan Type	44	33	2	79

EXHIBIT B



2017-2020 PRIMO Completed Service Obligation by Specialty					
	2017	2018	2019	2020	Total 2017-2020
Family Medicine	5	2	5	6	18
Dentist	1	2	2	1	6
Pediatrics	0	0	2	0	2
Internal Medicine	1	0	1	0	2
OB/GYN	1	0	0	2	3
Psychiatry	0	0	1	0	1
Dental Hygienist	0	1	0	0	1
Total	8	5	11	9	33

The two tables on the right illustrate the number of PRIMO recipients, who have completed their service obligations per specialty and rural or urban service area from 2017-2020.

In 2020, 27 PRIMO recipients were fulfilling their service obligations, 22 of which were serving in Missouri rural areas, and five in underserved urban areas. Of these 27 providers, 4 were General Dentists; 16 were Family Medicine physicians; 2 were Family Medicine and Obstetrics physicians; 3 were Pediatricians; 1 was an OB/GYN physician; and 1 was a Psychiatrist.

2017-2020 PRIMO Completed Service Obligation by Rural/Urban			
	Rural	Urban	Total
2017	5	3	8
2018	4	1	5
2019	7	4	11
2020	7	2	9
Total 2017-2020	23	10	33

EXHIBIT B

The State Loan Repayment Program (SLRP)

<https://health.mo.gov/living/families/primarycare/loanrepayment/slrp.php>

The SLRP is a federally funded grant with state matching dollar-to-dollar. This competitive loan repayment program seeks to recruit and retain providers in rural and underserved communities. SLRP funding is awarded to eligible Missouri licensed practicing psychiatry, medical, and dental health professionals (osteopathic and allopathic providers of the following disciplines: General Obstetrics/Gynecology, Pediatrics, Family Practice, Internal Medicine, Psychiatry, and Dentists with a Doctor of Dental Surgery), in exchange for services in Missouri areas with a shortage of mental health, medical, and dental professionals. Forgiveness of this award is earned with a 2-year, full-time of service obligation, which must be provided in a qualifying location. The table to the right illustrates the SLRP awards granted from 2015-2020, including awardee specialties.



SLRP Awards by Specialty 2015-2020							
Specialty	2015	2016	2017	2018	2019	2020	Total 2015-2020
General Family Medicine	10	6	2	5	6	9	38
General Family Medicine and OB	0	0	0	0	0	1	1
General Internal Medicine	0	0	0	0	0	0	2
General Internal Medicine and Pediatrics	0	0	0	0	1	0	1
General Pediatrics	4	1	2	2	1	1	11
General OB/GYN	1	0	0	0	0	1	2
General Psychiatry	0	0	0	0	0	2	2
General Dentist	7	6	7	10	8	9	47
General Pediatric Dentist	0	0	1	0	1	0	2
Total Per Year	22	13	12	17	17	25	106

In 2020, 61 SLRP recipients were fulfilling their service obligations, 38 of which were serving in rural areas of the state, and 23 in underserved urban areas. Of the 61 providers, 28 were General Dentists; 1 was a Pediatric Dentist; 20 were Family Medicine physicians; 1 was a Family Medicine and Obstetrics physician; 4 were Pediatricians; 1 was an Internal Medicine and Pediatrics physician; 1 was an OB/GYN physician; and 2 were Psychiatrists.

EXHIBIT B

INTERNET AND TELEHEALTH

Through telehealth advancements, access to quality primary and specialty health services increases for people in rural areas, when broadband is available. As telehealth progressively becomes a part of the nation's healthcare delivery system, access to healthcare is increasingly being linked to access to broadband. Broadband connectivity has become critical as a means of providing care in HPSAs. Broadband access was defined as having at least 1 broadband provider servicing their area. Providers were only counted if they generated speeds of 25 megabits per second (Mbps) for downloads, and 3 Mbps for uploads. Internet by satellite was excluded due to noted concerns on speed, interference and costs.⁴³

- Only 83% of rural Missourians have access to broadband internet, which is over 13 percentage points less than the urban rate (98.9%).
- South Central Missouri has a block of 7 counties with less than half of their population having high-speed access.
- Rural Central and Southwest Missouri have the highest rural rates of access (90.3% and 87.5% respectively).
- Rural Southeast Missouri had the lowest rates at 79.0% access, however there was a clear divide between the 5-county Bootheel area with 95.5% access and the rest of the Southeast Region (74.0%).

All urban counties had at least 83% coverage with 8 of the 16 urban counties having over 96% coverage.

Missouri recognizes that utilizing technology such as telehealth to bridge the large geographic spread of rural Missouri will improve access to care.

RURAL HEALTH PARTNERS

- Partnerships are essential in initiatives to improve health equity.
- Internal and external partnerships increase healthy outcomes.
- Partnerships help leverage resources.; maximizing rural health efforts.
- Work with partners to implement strategies and create impactful outcomes.

Partnerships are essential to any effort targeting health improvements in rural Missouri. ORHPC is fortunate to have the crucial partnerships needed to make an impact in rural health. ORHPC coordinates with partners to support rural health needs and leverage resources for services, activities and programs.



EXHIBIT B

COMMUNITY HEALTH WORKERS

Community Health Workers (CHWs) are frontline public health workers with expertise in the communities they serve. They advocate and promote public health within the communities and in healthcare settings. CHWs serve as liaisons linking between health and social services in the communities to help facilitate access to services and improve the quality and culture competence within service delivery settings. CHWs are a great resource for citizens throughout the state; they are especially valuable when it comes to the health of rural counties. The lack of healthcare infrastructure in these rural locations can make it difficult for local residents to find specialized care. CHWs play a crucial role by acting as a liaison to help extend health services to span a larger geographic region than healthcare facilities could ordinarily reach.

Some of the services that CHWs provide include:

- Referrals for rides to primary care doctors or other appointments.
- Helping to enroll patients into preventative health programs.
- Working with patients to alleviate insurance coverage and payment issues, or other barriers to healthcare.
- Ongoing peer-to-peer engagement to provide encouragement and social support to help individuals with goal setting.
- Recognizing gaps and advocating for individual and community health needs.

In Missouri, CHWs work to build trustworthy, reliable relationships within their local community. In order to become a CHW in Missouri, one must undergo a certification process at 1 of the following training locations:

- State Fair Community College
- Metropolitan Community College of Kansas City
- St. Louis Community College
- Southeast Missouri State University
- Ozark Technical College
- Three Rivers Community College
- Crowder College
- Central Christian College of the Bible in collaboration with Randolph County Caring Community Partnership

Once this required training is complete, CHWs are then eligible to provide services within the community.

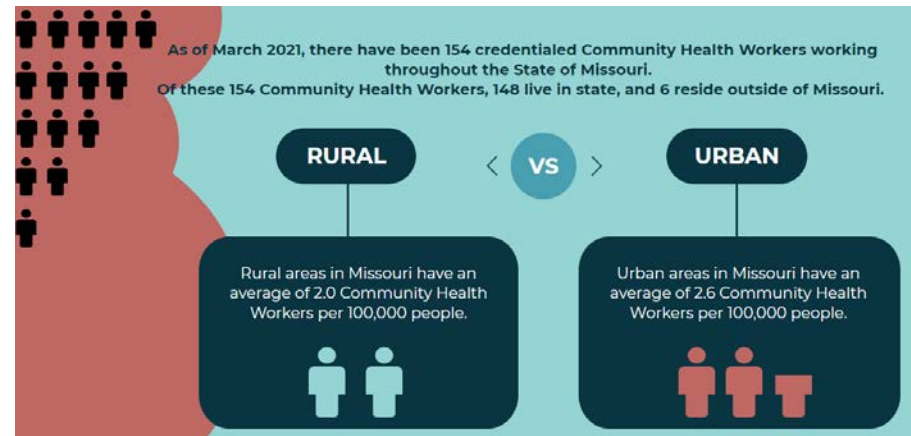


EXHIBIT B

MISSOURI MILLION HEARTS

The Missouri Million Hearts (MMH) Initiative is a partnership comprised of DHSS, American Heart Association, Health Quality Innovators (QIO), Missouri Pharmacy Association, University of Missouri Kansas City School of Medicine, University of Missouri Columbia School of Medicine, Center for Lifelong Learning, Missouri State Medical Association, and Provider Champions. The goal of MMH is to prevent 1 million heart attacks and strokes across the U.S. by 2022. If successful over 5 years, MMH will have saved the lives of approximately 20,000 Missourians, enough people to fill up the Scottrade Center in St. Louis or the Sprint Center in Kansas City.

Several committees guide the work of the MMH Initiative.

- Cardiac Rehab Committee: Enhance referral, enrollment and completion of eligible cardiac rehab patients; develop innovative Cardiac Rehab programs, such as home-based Cardiac Rehab or hybrid Cardiac Rehab
- Communications/Messaging Committee: Oversee communication venues, information-sharing, and messaging among partners in the MMH Initiative and the general public.
- Community Engagement Committee: Develop strategic partnerships with community organizations inclusive of the faith community, which raises awareness of the risk factors, increase knowledge of prevention strategies and treatment options.
- Evaluation Committee: Develop performance metrics for the overall MMH Initiative and development systems for ongoing reporting of the progress of each implementation team.
- Membership Committee: Develop and maintain database of partners and provider champions inclusive of their membership.

- Continuing Education Committee: Develop Continuing Medical Education (CME) opportunities which build on evidence-based interventions and promotes provider engagement in MMH. <https://www.pri-med.com/online-education/webcast/self-measured-blood-pressure-monitoring>
- MMH Data Group Committee: Respond to data requests from the Initiative, pilot communities, and general public for community level heart disease and stroke data, and develop a template for CVD Burden Report.
- Patient Engagement Committee: Foster the development and statewide use of plain-language, culturally-sensitive patient education materials pertaining to the ABCS (A: Take aspirin as directed by your health care professional. B: Control your blood pressure. C: Manage your cholesterol. S: Don't smoke.) of heart disease and stroke prevention in clinical and community settings, to empower patients through enhanced health literacy and improved knowledge so they may actively participate in the management of their cardiovascular health and outcomes.
- Provider Champions/Quality Improvement Committee: Promote provider engagement of the MMH Initiative and foster implementation of the ABCs of heart disease and stroke prevention in clinical settings. A Patient Engagement tool kit has been developed to foster understanding of health terminology and use of terms in chronic disease prevention.

EXHIBIT B

ENDING THE HIV EPIDEMIC

In August of 2019, work began on Missouri’s Ending the HIV Epidemic (EHE) initiative as the Bureau of HIV, STD, and Hepatitis (BHS) launched the groundwork for upcoming activities and introduction of the EHE Plan. Missouri was 1 of 57 jurisdictions selected for Phase I of the initiative due to the disproportionate occurrence of HIV in rural areas of the state. (See image to the right from the AHEAD dashboard.) Though EHE may be new terminology, this initiative is about building on existing system strengths and infrastructure while creating strategies with the community, partners, and stakeholders to address challenges and gaps in HIV diagnosis, treatment, prevention, and response.

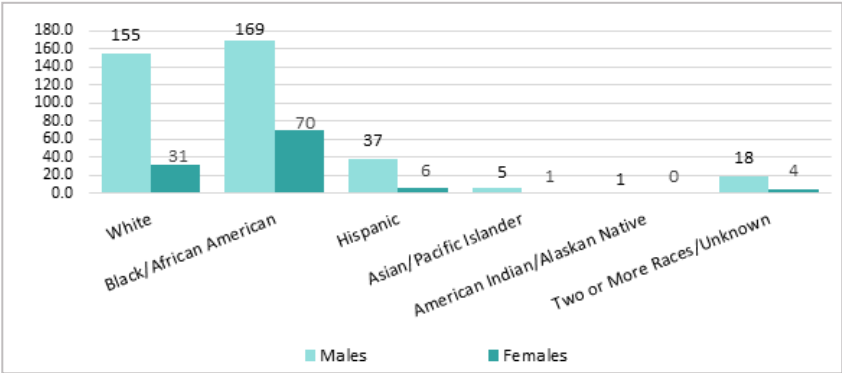
While HIV disproportionately impacts rural Missouri, it also disproportionately affects Black/African Americans in our state. Black/African Americans are

8.3 times more likely to be diagnosed with HIV than Whites, with most new diagnoses continuing to be among men who have sex with men. The graphs below show a snapshot of newly diagnosed HIV cases by race and per region as of 2019.

In 2020, there were a total of 384 individuals diagnosed with HIV/AIDS in Missouri, of those individuals 62 lived in rural Missouri. The bar graph on the next page shows the total number of individuals newly diagnosed with HIV/AIDS in urban and rural Missouri in 2020. The second bar graph, also on the next page, shows the total number of HIV/AIDS related deaths in Missouri in 2020.

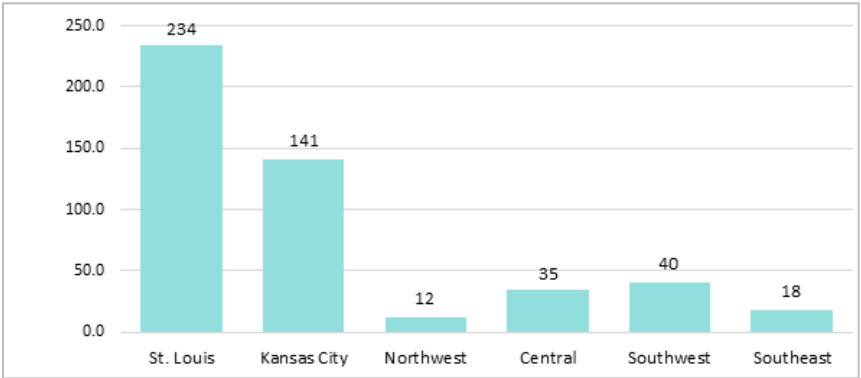
Despite the impacts of COVID-19, BHS has continued to push forward with EHE planning and implementation activities, e.g., amplified community engagement, improved harm reduction efforts, increased Hepatitis C and STD

Newly Diagnosed HIV Cases by Race (2019)



Source: Missouri Department of Health and Senior Services, Bureau of Reportable Diseases Information, enhanced HIV/AIDS Reporting System (eHARS) Reflects data reported and entered as of 2/28/2020.

Newly Diagnosed HIV Cases by Region (2019)



Source: Missouri Department of Health and Senior Services, Bureau of Reportable Diseases Information, enhanced HIV/AIDS Reporting System (eHARS) Reflects data reported and entered as of 2/28/2020.

EXHIBIT B

testing, and improved education on Pre-exposure Prophylaxis (PrEP). As a result of COVID-19 (including the reassignment of key personnel), many planned in-person events had to be modified to a virtual setting. In June of 2021, BSHH held its first virtual Ending the HIV Epidemic Community Engagement Forums. The forums were designed for all community members to share what barriers they face concerning HIV, what would assist in risk reduction, and how we can partner together to end the HIV epidemic in Missouri. These forums will continue to be held quarterly through December 2022, during flexible times that allow the community to attend. To learn more visit health.mo.gov/ehe or email EHE@health.mo.gov to be added to the EHE email list.

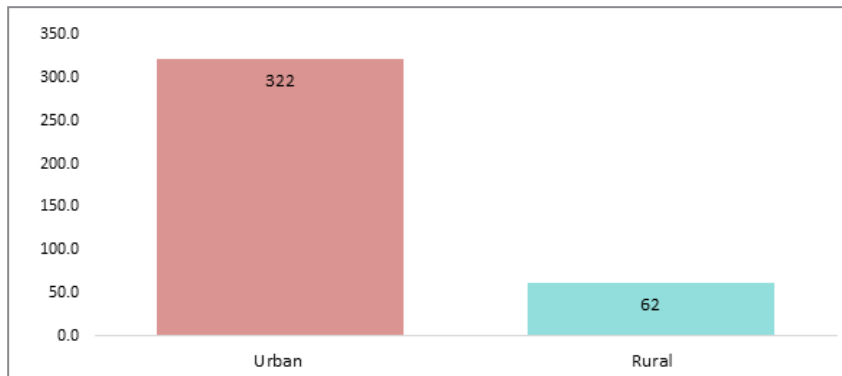
BHSH, in collaboration with the Missouri Primary Care Association and 2 FQHCs, is working on expanding availability and accessibility to HIV, STD, Hepatitis C Virus (HCV), and harm reduction services specifically in rural Missouri. The goal is for Missouri Highlands Health Center and Your Community

Health Center to provide free services such as testing kits, condoms, education, and resources, to increase service options related to HIV, STD, and Hepatitis C. The goal is to create a blueprint model to share with other FQHCs across the state to increase access and availability for all communities within Missouri, specifically rural Missouri.

A Harm Reduction Coordinator was hired to improve harm reduction services, and a harm reduction campaign was launched in March of 2021 called Stay Safe. The campaign encourages drug users to use slowly, not to use alone, and use fresh needles and naloxone. In June of 2021, BSHH also held the first-ever Harm Reduction Conference. This 2-day virtual event had an overwhelming response, with over 600 participants attending.

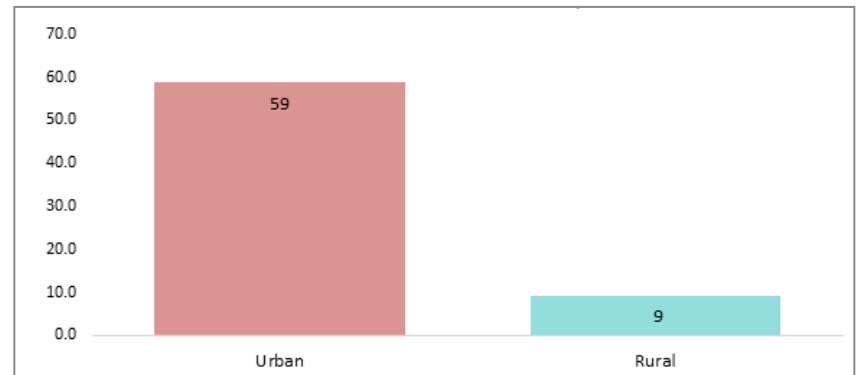
The Viral Hepatitis Prevention Program will be creating a Missouri Viral Hepatitis Elimination Plan to address testing, linkage to care and treatment of HCV. This

MO HIV/AIDS Incidence 2020



Source: Missouri Department of Health and Senior Services, Bureau of Reportable Diseases Information, enhanced HIV/AIDS Reporting System (eHARS) Reflects data reported and entered as of 6/24/2021

MO HIV/AIDS Mortality 2020



Source: Missouri Department of Health and Senior Services, Bureau of Reportable Diseases Information, enhanced HIV/AIDS Reporting System (eHARS) Reflects data reported and entered as of 6/24/2021

EXHIBIT B

plan is an objective of the Integrated Viral Hepatitis Surveillance and Prevention Funding for Health Departments' grant, through the CDC. A workgroup is being created to develop the plan and will include members from across Missouri that include local public health agencies (LPHA), hospital staff, community based organizations (CBO), other state agencies, FQHCs, or any organization that is vested in increasing testing and linkage to care for HCV. This plan is projected to be complete by April 2022.

As part of the Bureau's improved communication plan, an EHE needs assessment was conducted via an HIV awareness social media campaign from November 2020 through January 2021. The campaign focused on gathering information from priority populations; men who have sex with men (MSM), young Black/African-American men, Black/African-American women, Latinx populations, injection drug users, sex workers, and the transgender population. The needs assessment ensures that the HIV-related needs of the entire state are a priority. In addition, a pre-exposure prophylaxis (PrEP) awareness campaign began in the summer of 2021. The campaign uses CDC's "Let's Stop HIV Together" PrEP campaign materials to streamline messaging at the local and state level. The campaign also encompasses feedback from a focus group of FQHCs that determined the best placement for marketing materials per region of the state. The focus group allowed maximization of resources and engaged priority populations across Missouri to prevent, test, treat and care for HIV.

Missouri recognizes the need to expand its focus to better engage persons with HIV and HCV, particularly priority populations disproportionately impacted, living in rural portions of Missouri. As a part of this undertaking, more efforts are being directed towards the following:

- Prioritizing the inclusion of persons with HIV in EHE planning, which includes those who do not work in HIV agencies/organizations.
- Developing strategies focused on improving equity to ensure better prevention, testing, linkage to care, and retention in care for priority populations.
- Using data to drive program planning and development efforts to meet CDC and HRSA performance measures and improve health outcomes for persons with HIV/HCV or at risk of HIV/HCV, especially those in priority populations.
- Providing an opportunity for regular meetings for partners and target populations to provide input.

While Missouri has been making strides on EHE efforts, continued community engagement and improved communication will allow for the evolution of HIV, STD, Hepatitis C, and harm reduction activities to best meet Missouri's changing needs. As new groups are identified, outreach is extended to include them in Missouri's efforts. BSHS understands the value of inclusion and the need for diverse priority groups and partners' involvement to end the HIV epidemic in Missouri.

RECOMMENDATIONS

As demonstrated throughout this report, rural Missourians experience many challenges related to their health and access to health care services. Transforming the health care delivery system to overcome the inequity in health for rural Missourians, and between rural and urban Missourians, will require a systematic approach. State regulations and policies need to continue to consider the unique qualities that define rural health as well as the particularly difficult healthcare challenges that impact rural health systems.

Access to health care services needs to continue to improve, throughout rural Missouri. Health care services are limited for rural Missourians, even for persons with health insurance, adequate transportation, and adequate financial resources. Nearly all rural counties are considered Primary Care HPSAs, with the only non-designated counties being adjacent to urban counties.

Addressing the health disparities, access to care problems and deficiencies will require innovative initiatives and collaboration and partnerships. Such efforts include, to educate Missouri's youth in rural practice and health professional careers, support schools that offer health professional career training, recruiting and retaining qualified health professionals, improving care models to allow for access, utilizing technology such as telehealth, and improving rural residents' ability to be educated, obtain gainful employment and insurance to pay for health care services.

Rural areas present a unique set of challenges that impacts health. Limited access to health care providers, economic challenges, geographical barriers, lack of transportation resources, and limited telehealth services are some factors that disproportionately impact rural healthcare delivery. Rural hospitals, clinics, and providers have limited resources, experience payer reimbursement issues, and serve a population characterized by poorer health, lower education levels, less income, and lack of insurance. While urban health facilities face many unique challenges as well, regulations and policies that may be worthy for providers in large urban areas may not be for rural areas; therefore, it is imperative that systemic changes address those differences and focus on health equity for rural Missourians.



EXHIBIT B

APPENDIX A – USING THE DHSS COMMUNITY DATA PROFILES AND MISSOURI INFORMATION FOR COMMUNITY ASSESSMENT (MICA) WEBSITES

Many of the health data included in this report may be accessed on DHSS's Missouri Public Health Information Management System (MOPHIMS) website, which includes the Community Data Profile and the Missouri Information for Community Assessment (MICA) tools. Users can easily create different types of tables, graphs, charts and maps pertaining to health indicators.

The MOPHIMS home page can be found at <https://healthapps.dhss.mo.gov/MoPhims/MOPHIMSHome>. From here users can access the Community Data Profiles, Data MICAs, and EPHT (Environmental Public Health Tracking) query system.

Information about the MOPHIMS system, opportunities for free health data training, and online versions of our course materials can be found on the Health Data Training webpage at <https://health.mo.gov/data/mica/MICA/healthdatatraining.html>.

For more information on using the Community Data Profiles and MICAs, please contact the DHSS Bureau of Health Care Analysis and Data Dissemination at 573-751-6285 or email MOPHIMSUserGroup@health.mo.gov.

For more information regarding Community
Data Profiles and MICAs:

573-751-6285

MOPHIMSUserGroup@health.mo.gov

EXHIBIT B

APPENDIX B – DEATH NUMBERS AND RATES BY CAUSE, GENDER AND AGE GROUP

2009-2019 Age-Adjusted Death Rates per 100,000 Population	Rural Number	Rural Rate	Urban Number	Urban Rate
<i>All causes</i>	254,021	862.51	388,626	779.30
Males	131,275	1,008.94	192,946	928.63
Females	122,746	734.40	195,680	659.91
Under 15	2,767	64.18	4,843	57.51
15 to 24	2,673	87.48	5,403	90.05
25 to 44	10,490	199.16	20,097	172.00
45 to 64	50,041	817.72	77,924	676.85
65 and Over	188,049	4,696.28	280,349	4,470.01
<i>Heart disease</i>	65,357	216.70	91,842	180.73
Males	34,967	266.92	47,494	229.76
Females	30,390	173.30	44,348	143.32
Under 15	63	1.46	88	1.04
15 to 24	89	2.91	132	2.20
25 to 44	1,458	27.68	2,253	19.28
45 to 64	12,332	201.52	17,316	150.41
65 and Over	51,415	1,284.02	72,050	1,148.80
<i>Cancer</i>	55,743	183.61	84,877	168.27
Males	30,642	220.86	43,493	201.33
Females	25,101	154.55	41,384	145.29
Under 15	113	2.62	171	2.03
15 to 24	94	3.08	190	3.17
25 to 44	1,128	21.42	2,045	17.50
45 to 64	14,976	244.72	23,819	206.89
65 and Over	39,432	984.76	58,652	935.17

EXHIBIT B

APPENDIX B – DEATH NUMBERS AND RATES BY CAUSE, GENDER AND AGE GROUP

2009-2019 Age-Adjusted Death Rates per 100,000 Population	Rural Number	Rural Rate	Urban Number	Urban Rate
<i>Chronic obstructive pulmonary diseases (COPD)</i>	18,958	61.69	22,265	44.57
Males	9,553	70.79	9,913	48.23
Females	9,405	55.52	12,352	42.21
Under 15	11	0.26@	44	0.52
15 to 24	17	0.56@	29	0.48
25 to 44	142	2.70	185	1.58
45 to 64	3,122	51.02	3,313	28.78
65 and Over	15,666	391.24	18,694	298.07
<i>Stroke</i>	12,951	42.74	20,225	40.01
Males	5,404	42.04	8,149	40.61
Females	7,547	42.52	12,076	38.99
Under 15	16	0.37@	42	0.50
15 to 24	24	0.79	24	0.40
25 to 44	194	3.68	305	2.61
45 to 64	1,501	24.53	2,540	22.06
65 and Over	11,216	280.11	17,314	276.06

EXHIBIT B

APPENDIX B – DEATH NUMBERS AND RATES BY CAUSE, GENDER AND AGE GROUP

2009-2019 Age-Adjusted Death Rates per 100,000 Population	Rural Number	Rural Rate	Urban Number	Urban Rate
<i>Diabetes</i>	6,897	23.13	9,370	18.63
Males	3,624	26.81	5,003	23.20
Females	3,273	19.92	4,367	15.09
Under 15	4	0.09@	6	0.07@
15 to 24	21	0.69	37	0.62
25 to 44	243	4.61	330	2.82
45 to 64	1,697	27.73	2,539	22.05
65 and Over	4,932	123.17	6,458	102.97
<i>Kidney disease</i>	6,117	20.12	9,116	18.09
Males	3,002	23.23	4,494	22.22
Females	3,115	17.71	4,622	15.31
Under 15	7	0.16@	14	0.17@
15 to 24	9	0.29@	12	0.20@
25 to 44	82	1.56	167	1.43
45 to 64	751	12.27	1,427	12.39
65 and Over	5,268	131.56	7,496	119.52

EXHIBIT B

APPENDIX B – DEATH NUMBERS AND RATES BY CAUSE, GENDER AND AGE GROUP

2007-2017 Age-Adjusted Death Rates per 100,000 Population	Rural Number	Rural Rate	Urban Number	Urban Rate
<i>Pneumonia and influenza</i>	5,842	19.90	8,269	16.95
Males	2,658	22.20	3,753	20.17
Females	3,184	18.35	4,516	14.92
Under 15	40	0.92	48	0.57
15 to 24	23	0.74	23	0.38
25 to 44	123	2.32	189	1.63
45 to 64	658	10.72	920	8.04
65 and Over	4,998	129.56	7,089	119.52
<i>Suicide</i>	3,969	17.37	6,433	14.49
Males	3,233	28.39	4,999	23.65
Females	736	6.56	1,434	6.23
Under 15	30	0.69	59	0.70
15 to 24	464	15.01	842	13.91
25 to 44	1,316	24.85	2,178	18.80
45 to 64	1,411	22.99	2,435	21.27
65 and Over	748	19.39	919	15.49
<i>Alzheimer's disease</i>	8,969	30.02	13,273	26.93
Males	2,811	24.62	3,874	22.21
Females	6,158	33.14	9,399	29.46
Under 15	0	0.00	0	0.00
15 to 24	0	0.00	0	0.00
25 to 44	1	0.02@	2	0.02@
45 to 64	88	1.43	137	1.20
65 and Over	8,879	230.17	13,134	221.44

EXHIBIT B

APPENDIX B – DEATH NUMBERS AND RATES BY CAUSE, GENDER AND AGE GROUP

2009-2019 Age-Adjusted Death Rates per 100,000 Population	Rural Number	Rural Rate	Urban Number	Urban Rate
<i>Unintentional injury</i>	13,802	57.50	22,883	49.97
Males	8,604	74.55	14,138	67.63
Females	5,198	40.62	8,745	33.78
Under 15	631	14.64	797	9.46
15 to 24	1,398	45.75	2,045	34.08
25 to 44	3,456	65.62	6,287	53.81
45 to 64	3,602	58.86	5,922	51.44
65 and Over	4,715	117.75	7,830	124.85
<i>Opioid overdose*</i>	1,779	8.67	6,492	15.06
Males	1,108	10.75	4,360	20.73
Females	671	6.48	2,132	9.59
Under 15	9	0.21@	19	0.23@
15 to 24	195	6.38	741	12.35
25 to 44	960	18.23	3,333	28.53
45 to 64	567	9.27	2,216	19.25
65 and Over	48	1.20	183	2.92

Source: Death MICA

* Opioid overdose mortality data is derived using death certificate data and calculated by the Bureau of Health Care

Analysis and Data Dissemination. To be consistent with other reports where opioid overdose data is shared, we are including all manners opioid overdose deaths. However, about 90% of all opioid overdose deaths are accidental.

An @ following a rate indicates that the rate is based on fewer than 20 cases and is considered to be unstable.

GLOSSARY

Age-adjusted rates

Age-adjusted rates allow impartial comparisons to be made between groups with different age distributions. For example, a county with a higher percentage of elderly residents may have a higher rate of death than a county with a younger population. The same distortion can occur when races, genders, or time periods with different age structures are compared. Age adjustment controls for different age structures and makes the rates for different groups more comparable.

A standard population distribution is used to adjust death, hospitalization, ER visit, and other types of rates that typically vary with age. Age-adjusted rates are the rates that would have existed if the population under study had the same age distribution as the standard population. Therefore, they are summary measures adjusted for differences in age distributions.

The National Center for Health Statistics recommends that the U.S. 2000 standard population be used to calculate age-adjusted rates. All age-adjusted rates in this report were adjusted using the U.S. 2000 standard population. Age-adjusted rates published elsewhere, such as the Missouri Public Health Information Management System (MOPHIMS) or the annual Missouri Vital Statistics (MVS), may be slightly different from those found in this report due to changes in population estimates.

Correlation

A correlation is a relationship or connection between variables and how much they relate to one another. However, additional investigation is always needed before accepting that one variable causes or influences another. Adapted from <https://mysidewalk.com>.

Healthy People 2020

Healthy People 2020 objectives are health status targets for the entire U.S. Targets are set using baseline U.S. data. Objectives are organized into 42 topic areas, with Leading Health Indicators identified in 12 of these topic areas. Additional information about Healthy People 2020 is available at <http://www.healthypeople.gov/2020/default.aspx>.

Health Professional Shortage Area (HPSA)

HPSA is discussed at length starting on page 59.

Maternal and Child Health (MCH)

MCH refers to the health of both the mother and child, pre-conception and postpartum. Some focus areas encompassed by MCH are to reduce premature birth, low birth weight, infant mortality, and obesity among children and adolescents, while also ensuring coordination of care between mothers and their children. Additional MCH indicators can be found on the MOPHIMS suite of tools, located at <https://healthapps.dhss.mo.gov/MoPhims/MOPHIMSHome>.

Metropolitan Statistical Area (MSA)

A MSA consists of one or more counties that contain a city of 50,000 or more inhabitants, or contain a Census-Bureau-defined urbanized area and have a total population of at least 100,000. Examples include areas surrounding St. Joseph, Kansas City, Columbia, Jefferson City, Cape Girardeau, Joplin, and Springfield. Adapted from U.S. Census Bureau.

EXHIBIT B

Missouri's Behavioral Risk Factor Surveillance System (BRFSS)

The BRFSS is an ongoing telephone health survey of adults conducted in all 50 states and coordinated by the Centers for Disease Control and Prevention (CDC). The survey collects information on health conditions, behaviors, preventive practices, and access to health care. Thousands of Missourians participate in the survey each year. Households are randomly selected to participate. General questions about health and specific conditions such as asthma, access to health care, physical activity, and cancer screening are asked to participants. The BRFSS survey has significantly contributed to public health by tracking health behaviors and evaluating progress toward achieving national, state, and local public health goals. For more information, visit <https://health.mo.gov/data/brfss/index.php>.

Preventative Dental Care/Preventative Services Program (PSP)

Implemented by the Missouri Department of Health and Senior Services, PSP is focused on the oral health of school-aged children throughout Missouri. The PSP program provides oral health education and preventive services, including screening, an application of fluoride varnish twice a year to prevent tooth decay and a referral to a dental clinic if necessary.

Ranks

Rural and urban county ranks are reported in some sections of this report. This report is structured so that “1” always indicates the worst rate, regardless of whether the worst rate is the highest or lowest value.

Resident

This report provides data only for Missouri residents. Missouri residents are persons who resided in Missouri at the time of the event in question (birth, death, hospitalization, ER visit, etc.). Missouri receives vital records and hospital/ER data about Missouri residents from most of its border states, and these records are included in the Missouri resident data. For example, a record for a Missouri resident treated in a Kansas hospital would be reported as a Missouri resident hospitalization. Data in MOPHIMS, as well as in this report, are categorized by resident status. For instance, the record for an Adair County resident who visited the emergency room in Boone County would be counted in Adair County.

Social Determinants of Health (SDOH)

SDOH refer to lifestyle conditions that may cause barriers to being and staying healthy. These are place based factors that impact health, whether that place represents a physical location or where individuals fit within their social structure. Differences in health are much greater in communities with poor

SDOH, such as low income, unstable housing, or unsafe neighborhoods. By addressing and improving SDOH, individual and population health can improve, but health equity could also advance. For more information, visit <https://www.cdc.gov/socialdeterminants/about.html>.

Statistical Significance

Statistical significance tests are performed to determine whether the difference between 2 rates is probably the result of chance factors or if it is meaningful. All tests of statistical significance performed for this report were computed using 95% confidence intervals. In this report, the terms “statistically significant” or simply “significant” indicate that a significance test was performed.

Unreliable Rates

Unreliable rates are rates based on fewer than 20 events. Unreliable rates can be common for small population areas, such as certain counties, and for low-frequency events, such as cause-specific deaths or birth defects. If the use of data from one specified year is not required, data from several years can be combined to generate a reliable multi-year rate. Similarly, data from several counties can be combined to create a reliable regional rate. In this report, 11 years of data were combined to calculate cause-specific death rates and death rates by gender and age-group.

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Missouri Department of Health and Senior Services Office of Rural Health and Primary Care

P. O. Box 570
Jefferson City, MO 65102-0570
573.751.6219
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