



Heart Failure (Damaged/Failing Heart) Saint Louis County, Missouri, 2016 – 2022

December 2024

Heart failure is a common condition in which the heart is unable to pump sufficient blood to supply the needs of the rest of the body.^{1,2} Heart failure gets progressively worse as damage to the heart tissue accumulates and is classified into stages based on disease progression.^{2,5} As the accumulated cardiac damage is mostly irreversible, treatment for heart failure patients focuses on the mitigation of symptoms and prevention of further disease progression.^{1,3} While early stages of heart failure may not cause symptoms or limitations to ordinary physical activity, later stages of the disease are likely to cause severe disability and symptoms that persist even at when at rest.¹ In the United States, the lifetime risk of heart failure is 24%. 33% of the US adult population is at risk for heart failure, and a further 24-34% have pre-heart failure.⁴ Risk factors for heart failure include coronary artery disease, high blood pressure, diabetes, smoking, heart valve problems, heart muscle problems present at birth, and heart muscle problems from infections or toxins.⁵

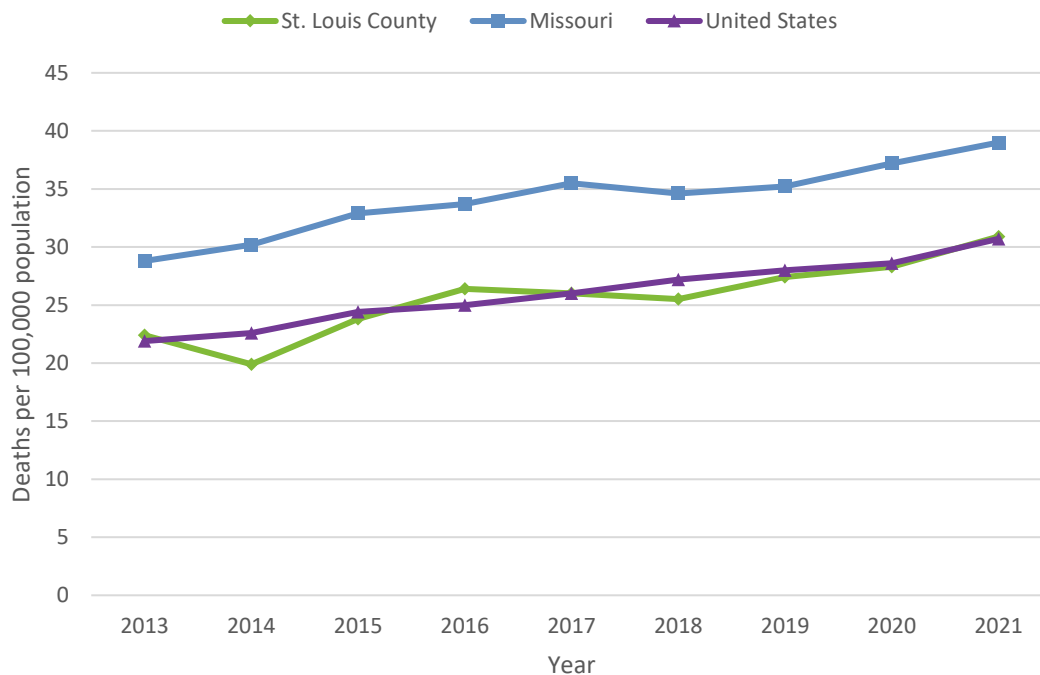
Key Findings:

1. From 2018 to 2022, Saint Louis County hospitals (both emergency and inpatient) treated an average of 5,464 cases of heart failure per year (a rate of 41.5 per 10,000 residents per year).
2. From 2018 to 2022, there were 434 deaths due to heart failure in the county per year, on average.
3. Heart failure mortality has increased over time.
4. The chance that a heart failure patient survives long enough to be discharged from the hospital has decreased slightly since 2017.
5. Black/African American residents had substantially higher heart failure hospitalization and mortality rates than the county average. Male residents had substantially higher heart failure hospitalization and mortality rates than female residents.
6. In 2016, most heart failure deaths occurred at nursing homes. By 2022, most heart failure deaths occurred at home.
7. Deaths and hospital visits due to heart failure were higher in the inner and outer North subregions than the county average.

Heart Failure Mortality

Since 2013, deaths due to heart failure have increased overall in Saint Louis County at a rate of 5% per year on average, as seen in **Figure 1**. The heart failure death rate in the County is lower than the rate in all of Missouri and is similar to the rate in the United States.

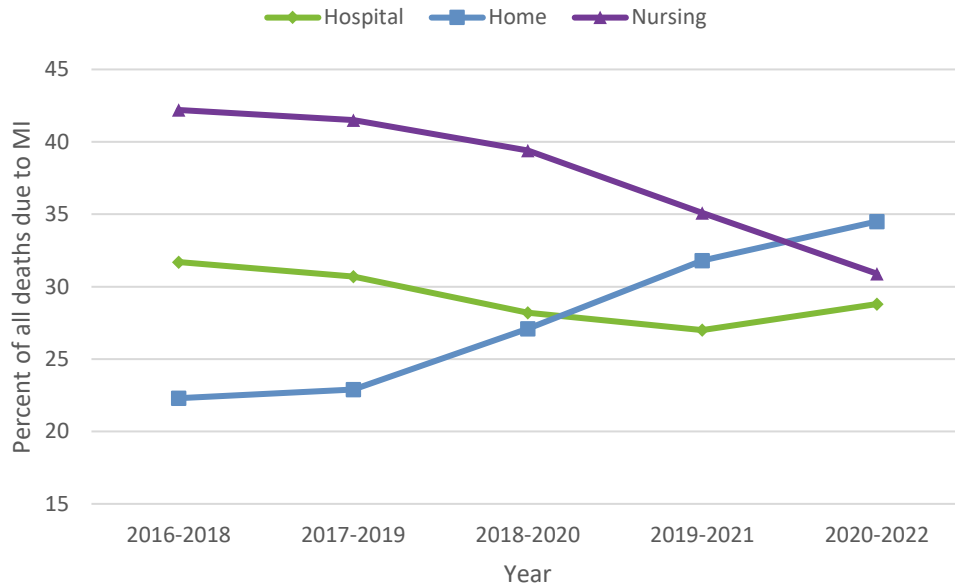
Figure 1. Age-adjusted heart failure mortality rates; Saint Louis County, Missouri, and United States, 2013 – 2021.



Cases included: ICD-10 Codes: I11.0, I13.0, I13.2, and I50. Data source for county rates: Missouri DHSS, Bureau of Vital Records, death certificate data. Data source for state and national rates: Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/ucd-icd10.html> on March 28, 2024. Data source for state and national rates in 2021: Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 2018-2021 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 2018-2021, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/ucd-icd10-expanded.html> on March 28, 2024.

As shown in **Figure 2**, nursing homes used to be the most common location for a death to occur, due to heart failure. However, since 2016, the proportion of heart failure deaths that occur in nursing homes has decreased. Since 2020, private homes have become the most common location for these deaths to occur. This is in line with a national trend in which homes are becoming the most common location for cardiovascular disease deaths.⁶

Figure 2. Deaths due to heart failures; place of death statistics; Saint Louis County, 2016 – 2022 (5 periods of 3-year rolling averages).

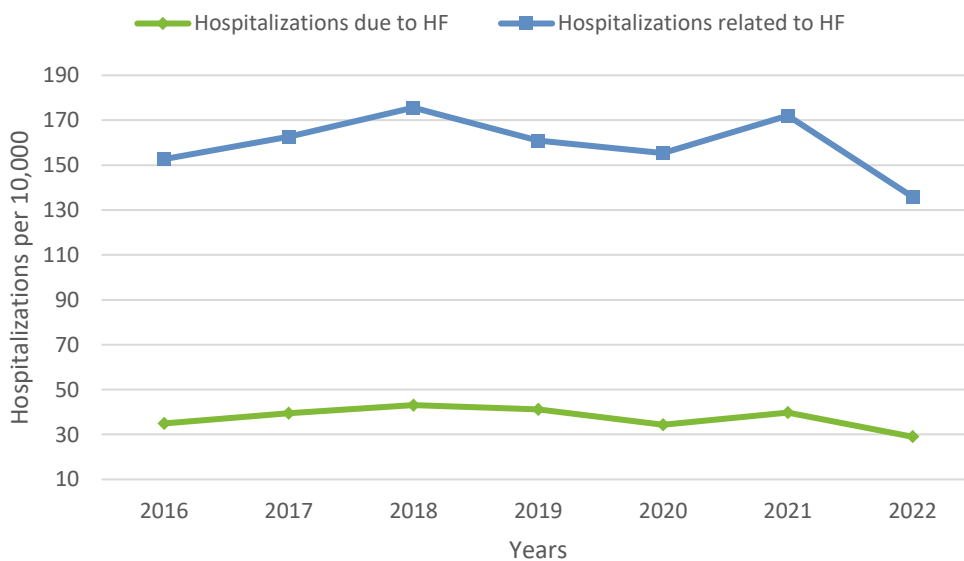


Source: Missouri DHSS, Bureau of Vital Records. Deaths due to heart failure (cause of death diagnostic codes: ICD10: I11.0, I13.0, I13.2, and I50) identified from vital statistics death certificate data. Rates were age-adjusted and used 3-year rolling averages to assist in identification of trends. Vital statistics also track deaths that happen at hospice facilities and other places (not shown in figure); these encompass less than 5% of all heart failure deaths.

Heart Failure Hospitalizations

Inpatient hospitalizations due to heart failure increased by 11% on average between 2016 and 2018 and decreased by 6.4% on average between 2018 and 2022. Hospitalizations related to heart failure have decreased slightly from 2016 to 2022 at a rate of 0.7% per year on average.

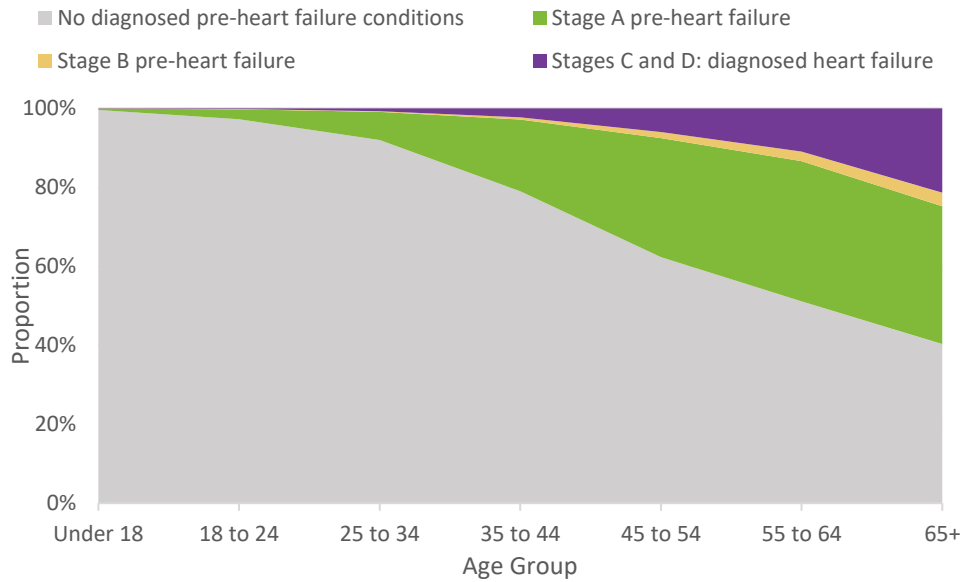
Figure 3. Hospitalizations due to heart failures or related complications; Saint Louis County, 2016 – 2022.



Source: Missouri DHSS, Bureau of Health Care Analysis and Data Dissemination, hospital discharge records.

Risk of heart failure increases with age. For patients who are 65 and older, approximately 60% of emergency room visits and inpatient hospitalizations involve a diagnosis of heart failure or evidence of high risk for developing heart failure (Figure 4).

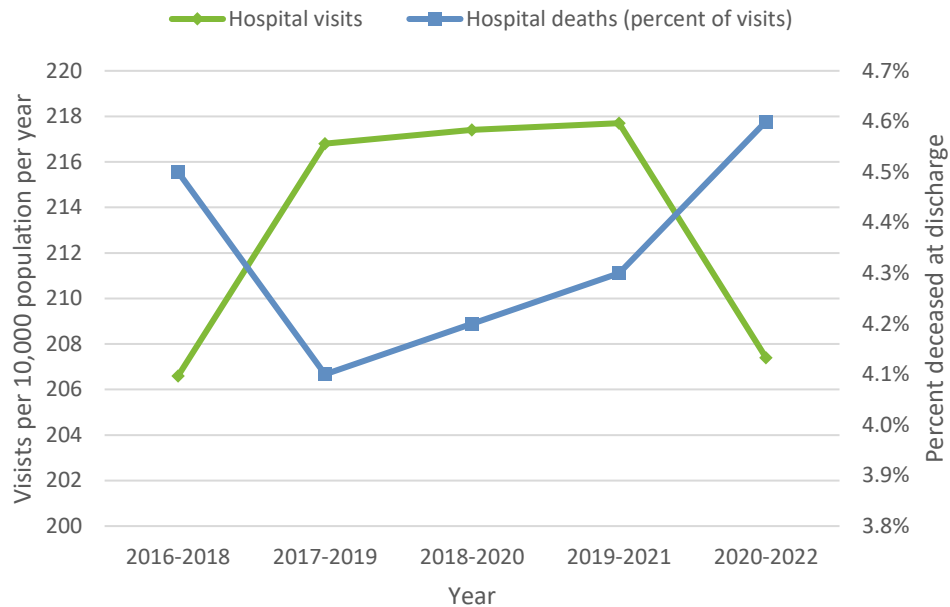
Figure 4. Heart failure as proportion of emergency room and inpatient visits by age group in Saint Louis County, 2018 – 2022.



Source: Missouri DHSS, Bureau of Health Care Analysis and Data Dissemination, hospital discharge records.

Figure 5 shows that the heart failure hospital visit rate, including inpatient hospitalizations and ED visits due to or related to heart failure, increased over time between 2016 and 2020, then decreased. The proportion of heart failure patients who die, however, has increased slightly but steadily since 2017.

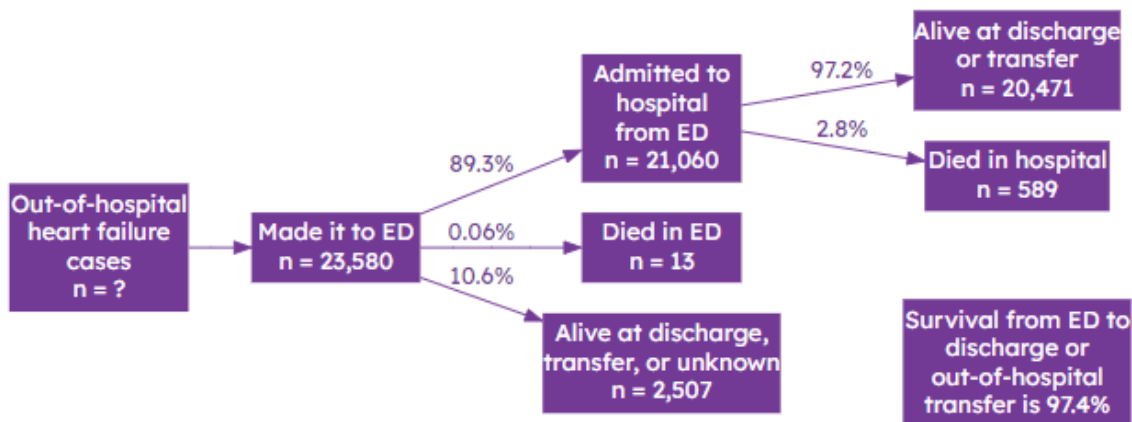
Figure 5. Heart failure hospital visit rate and percentage of in-hospital mortality for those patients; Saint Louis County, 2016 – 2022 (5 periods of 3-year rolling averages).



Source: Missouri DHSS, Bureau of Health Care Analysis and Data Dissemination, hospital discharge records. Cases were included by filtering all diagnosis codes, rather than only the primary diagnosis code.

The survival rate for those who experience heart failure and make it to a hospital is high, as seen in **Figure 6**. Of those who went to the emergency department for heart failure, 97.4% survived to discharge or were transferred out of the hospital.

Figure 6. Patient flow and disposition of out-of-hospital heart failure in Saint Louis County, 2018 – 2022.

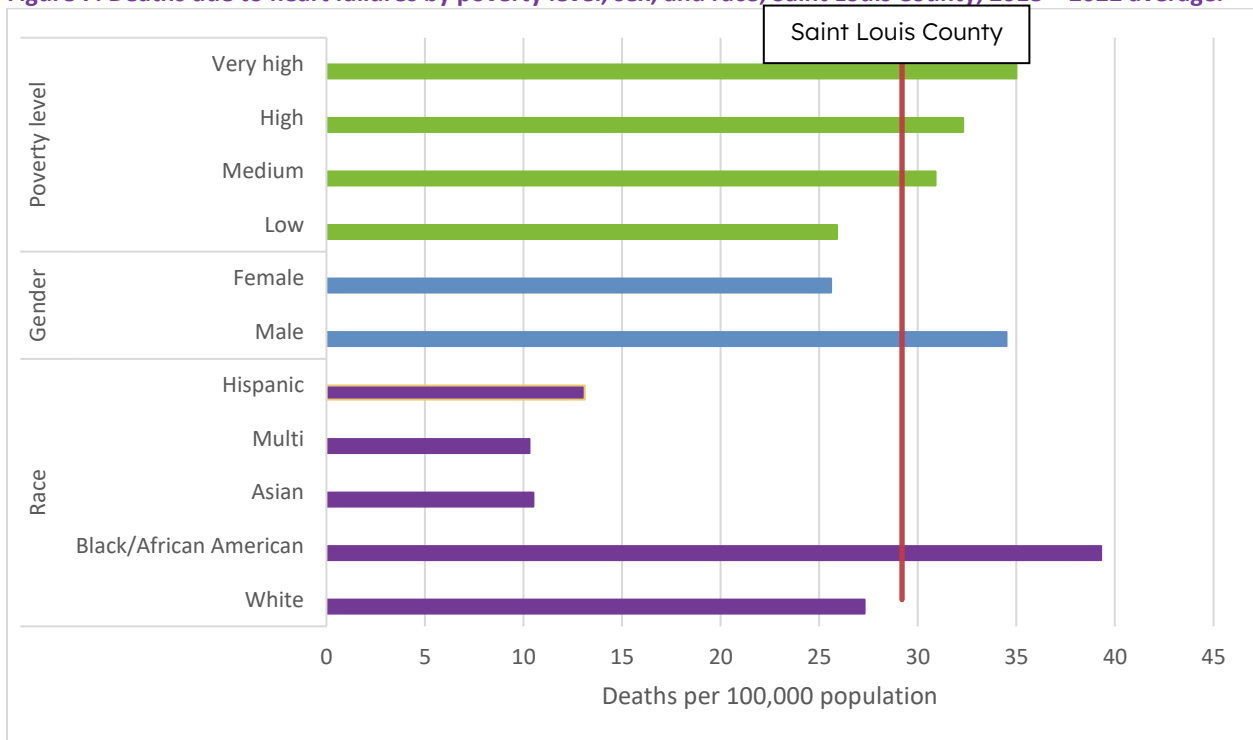


Source: Missouri DHSS, Bureau of Health Care Analysis and Data Dissemination, hospital discharge records. Cases include patients that were first seen at an emergency room and had heart failure as their principal diagnosis. Patients that were alive at discharge/transfer from ED (n = 2,507) and patients that were alive at discharge/transfer from inpatient care (n = 20,471) were the 97.4% that survived from ED admission to exiting the hospital.

Heart Failure Disparities

Significant disparities in heart failure morbidity and mortality persist in Saint Louis County. **Figure 7** shows heart failure mortality rates by several demographic and socioeconomic characteristics.

Figure 7. Deaths due to heart failures by poverty level, sex, and race; Saint Louis County, 2018 – 2022 average.

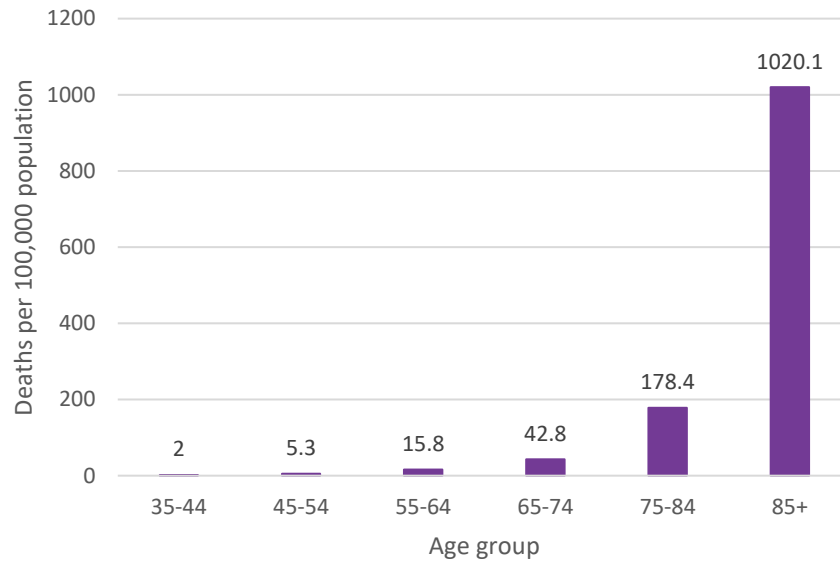


Source: Missouri DHSS, Bureau of Vital Records, death certificate data.

Heart failure mortality was higher in neighborhoods with high and very high poverty levels than in neighborhoods with low and medium poverty levels. Male county residents had a higher mortality rate than female residents. Multiracial residents had the lowest heart failure mortality, while Black/African American residents had the highest; that rate was 44% higher than the mortality rate for white residents.

Heart failure mortality increases with age, with adults aged 85 and over having the highest mortality rate, as seen in **Figure 8**.

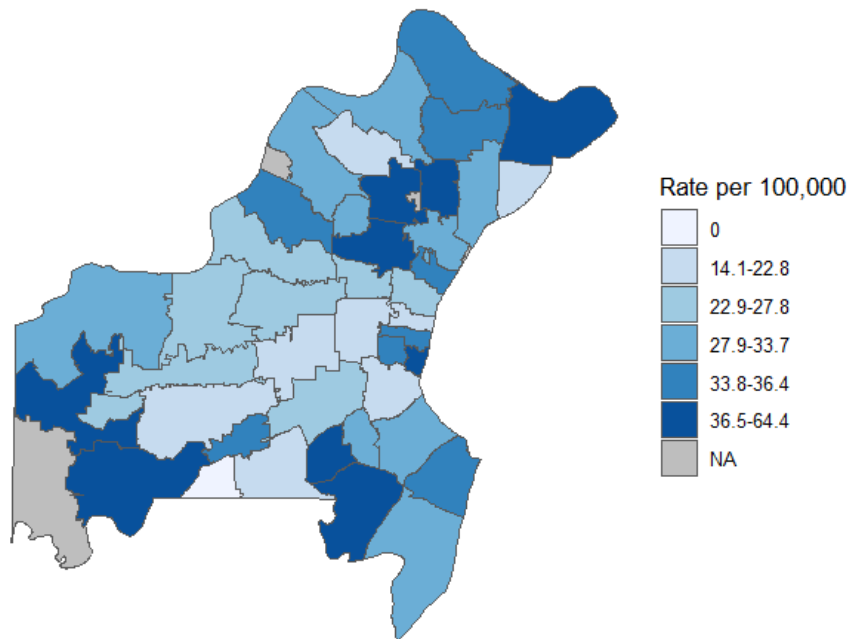
Figure 8. Deaths due to heart failure by age group; Saint Louis County, 2018 – 2022.



Source: Missouri DHSS, Bureau of Vital Records, death certificate data.

Heart failure mortality rates were generally lowest in the central region of the County, as seen in **Map 1**. There are areas of high mortality in North and West County.

Map 1. Deaths due to heart failures by zip code; Saint Louis County, 2018 – 2022.

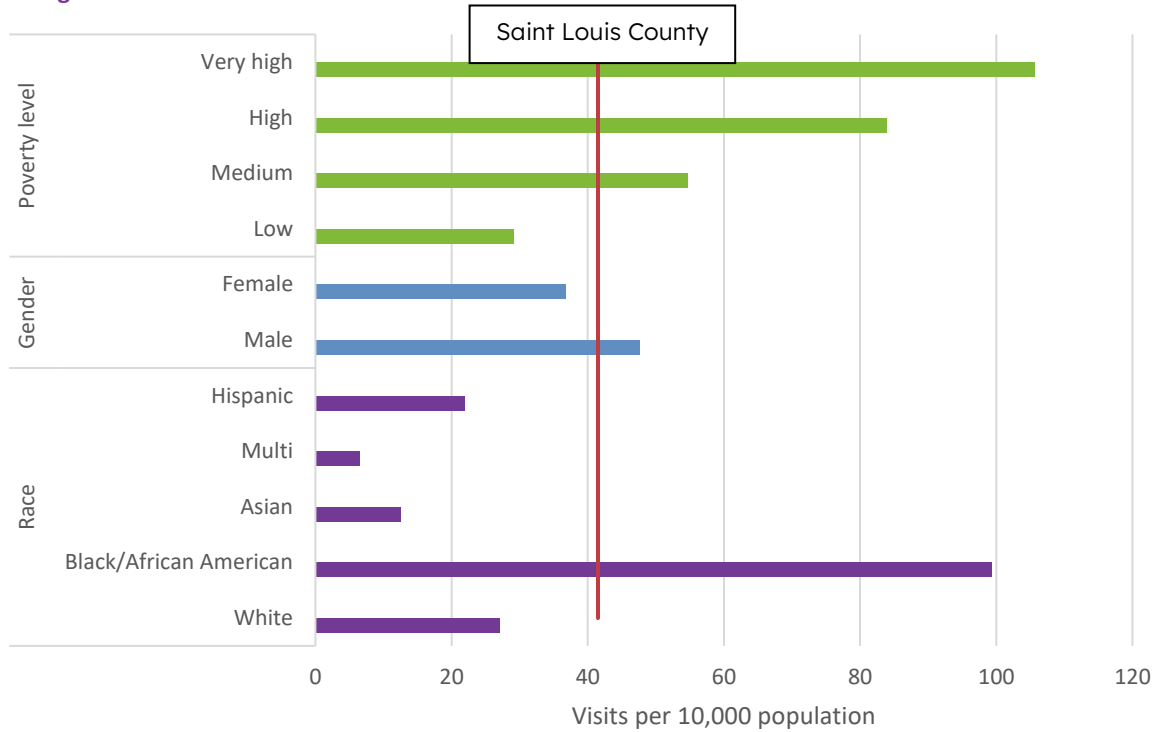


Source: Missouri DHSS, Bureau of Vital Records, death certificate data.

Figure 9 describes the breakdown of heart failure hospital visit rates by poverty level, sex, and race. These trends are similar to those of heart failure mortality. In particular, the hospital visit

rate among Black/African American residents was substantially higher than the rate among White residents – 99.4 per 10,000 compared to 27.1, which is 3.7 times as high.

Figure 9. Hospital visits due to heart failures by poverty level, sex, and race; Saint Louis County, 2018 – 2022 average.

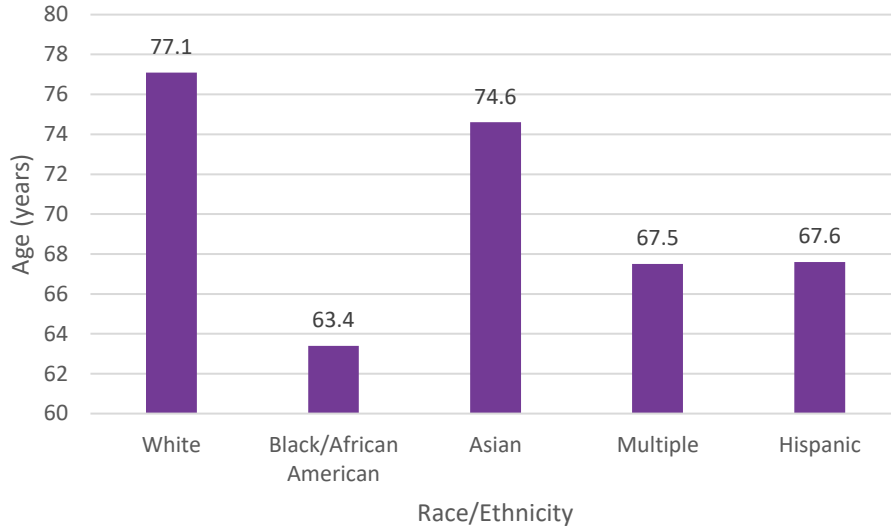


Source: Missouri DHSS, Bureau of Health Care Analysis and Data Dissemination, hospital discharge records.

Heart failure hospital visit rates were higher in neighborhoods with high and very high poverty levels than in neighborhoods with low and medium poverty levels. Male County residents visited the hospital for heart failure at a higher rate than female County residents.

Figure 10 shows the average age at hospital diagnosis of heart failure by race. Black/African American residents had the youngest average age at hospital diagnosis, while white residents had the oldest average age, a difference of almost 14 years.

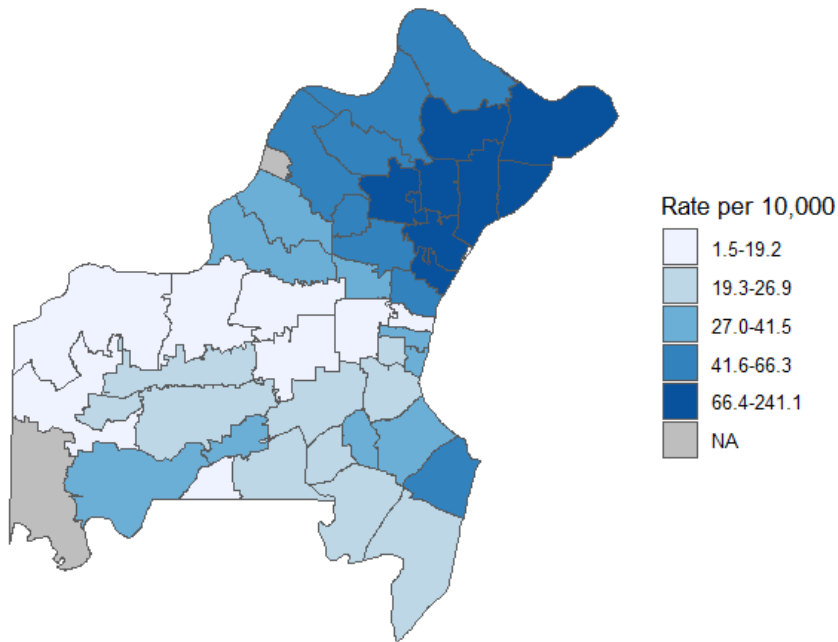
Figure 10. Mean age at hospital diagnosis of heart failure by race; Saint Louis County, 2018 – 2022.



Source: Missouri DHSS, Bureau of Health Care Analysis and Data Dissemination, hospital discharge records.

As shown in **Map 2**, heart failure hospital visit rates were also highest in zip codes located in North Saint Louis County, whereas rates were generally lowest in the West County sub-region.

Map 2. Hospital visits due to heart failures by zip code; Saint Louis County, 2018 – 2022.

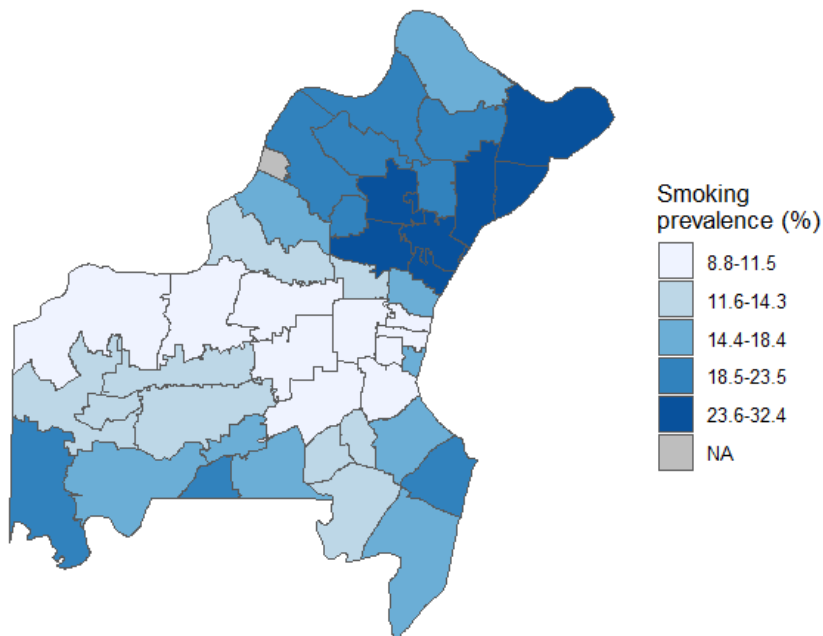


Source: Missouri DHSS, Bureau of Health Care Analysis and Data Dissemination, hospital discharge records.

Risk Factors for Heart Failure

Some risk factors for heart failure are outside of a person's control, like age and family history of heart failure. Other factors, like lifestyle habits, can be modified to lower the risk of heart failure. Unhealthy diet, smoking, heavy alcohol use, and lack of physical activity can raise a person's risk of heart failure. Obesity, high blood pressure, diabetes, sleep apnea, chronic kidney disease, and anemia can also raise the risk of heart failure.⁵ The following maps (**Maps 3, 4, 5, and 6**) show the prevalence of certain heart failure risk factors in Saint Louis County.

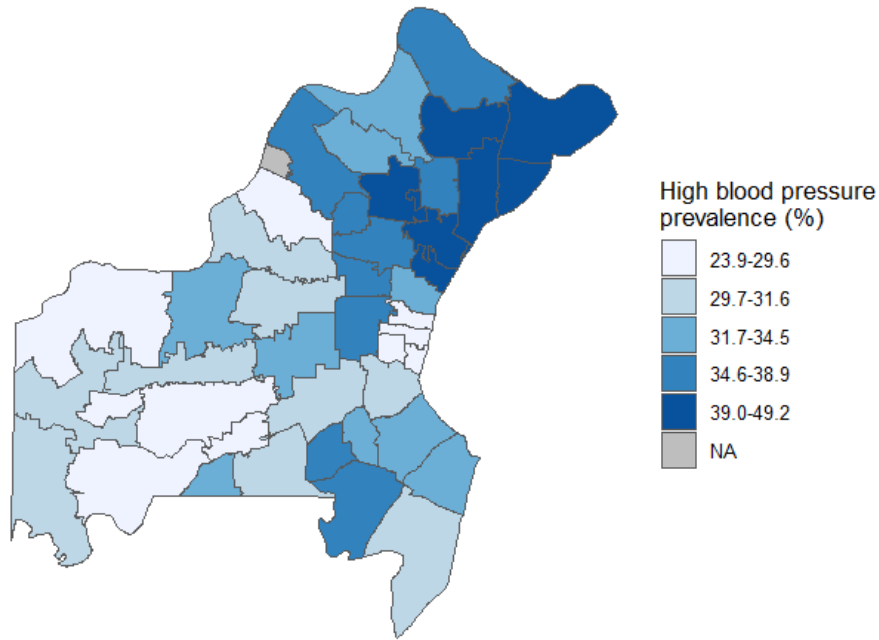
Map 3. Smoking prevalence among adults; Saint Louis County, 2021.



Source: CDC - PLACES

16.2 percent of adults in Saint Louis County were current smokers in 2021, but smoking prevalence reached 32 percent in some zip codes.⁷ Smoking prevalence was highest in North County and lowest in the west and central regions. There are many smoking cessation programs available to Saint Louis County residents. [Mercy Hospital](#) offers two: Mercy Road to Freedom and auriculotherapy treatment.⁸ St. Luke's Hospital also offers [a program](#) through their respiratory department.⁹ The American Lung Association's [Freedom From Smoking program](#) is available in several formats, including self-paced.¹⁰ [Missouri Tobacco Quit Services](#) can help smokers quit by offering counseling, practical information on how to quit, referrals to other cessation resources, and cessation medication, if eligible.¹¹ Visit any of these programs' websites for more information and to sign up.

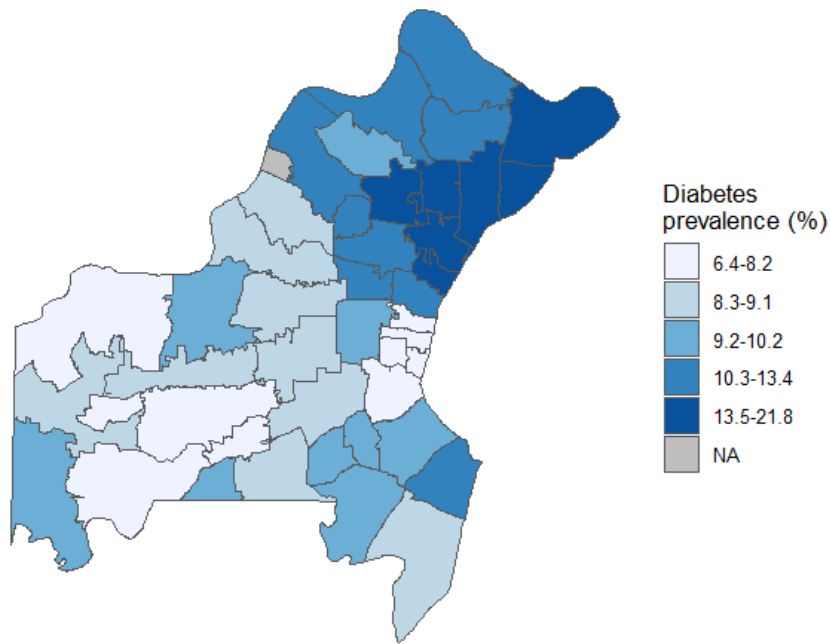
Map 4. High blood pressure prevalence among adults; Saint Louis County, 2021.



Source: CDC - PLACES

High blood pressure is common in Saint Louis County. One-third of all adults have high blood pressure, and in some zip codes, the prevalence increases to almost half of the adult population.⁷ St. Luke's Hospital offers [free heart health screenings](#) that can detect high blood pressure and connect people to heart health resources. The [Blood Pressure Self-Monitoring Program](#), available through the YMCA, helps adults with hypertension lower and manage their blood pressure.^{12, 13} Saint Louis County DPH also partners with St. Luke's Hospital to provide a chronic disease self-management class, which helps people gain self-confidence in controlling their chronic disease symptoms and learning how their health problems affect their lives.¹⁴ Visit these programs' websites for more information and to sign up.

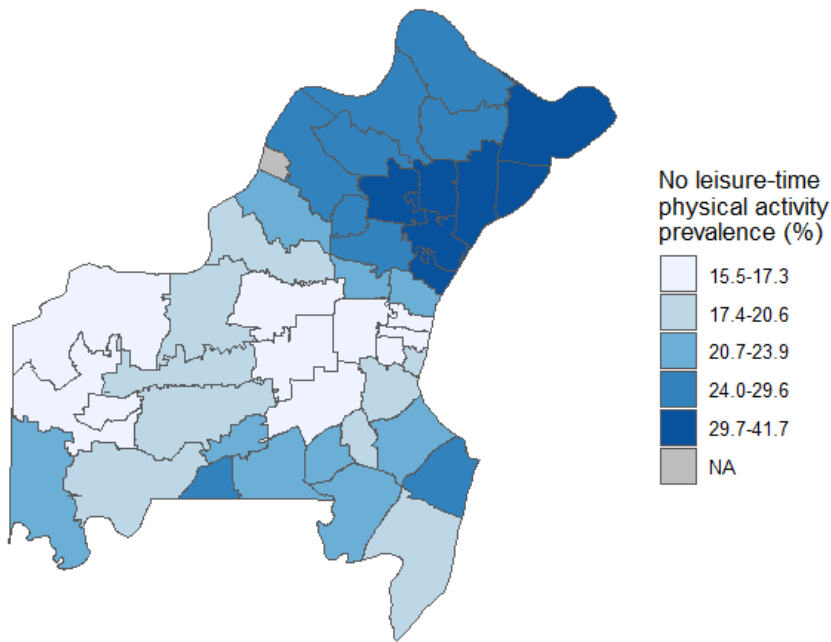
Map 5. Diabetes prevalence among adults; Saint Louis County, 2021.



Source: CDC - PLACES

Overall, 9.4 percent of adults in Saint Louis County have diabetes.⁷ Higher prevalence occurs in the north region of the county. There are many sources of diabetes prevention resources in the Saint Louis area. The National Diabetes Prevention Program is designed by the CDC to reduce risk of type 2 diabetes and improve overall health among people who have pre-diabetes or are at risk for type 2 diabetes, but don't already have diabetes. Saint Louis County DPH has partnered with local organizations to offer the program at local churches and recreation centers. Visit the Diabetes Prevention Program's [website](#) for more information and to sign up for the program.¹⁵ For individuals who have diabetes, diabetes self-management education and support (DSMES) programs teach how to manage diabetes by focusing on key self-care behaviors like healthy eating, monitoring blood sugar levels, and coping with diabetes and emotional well-being.¹⁶ Several local hospitals and health centers provide DSMES programs. Visit the American Diabetes Association's [website](#) to find a program.¹⁷

Map 6. No leisure-time physical activity among adults; Saint Louis County, 2021.



Source: CDC - PLACES

Nearly one quarter (23 percent) of adults in Saint Louis County report no leisure-time physical activity.⁷ Physical activity has many health benefits, including managing weight, reducing risk of cardiovascular disease and type 2 diabetes, strengthening bones and muscles, and increasing chances of living longer, among many others.¹⁸ However, many factors can prevent a person from achieving the recommended amount of physical activity, including individual factors like motivation, time, and self-efficacy. A lack of outdoor spaces and facilities, and a lack of social support, can also keep people from exercising.^{19, 20} Saint Louis County Parks and Recreation offers many programs and activities that encourage county residents to be active.²¹ Visit their website for more details.

Healthy People 2030

Healthy People provides 10-year, measurable public health objectives to help communities improve health and well-being. Healthy People tracks several objectives related to heart failure:

- Decrease the heart failure hospitalization rate among adults to 330.2 per 100,000 people.²² In 2022, the heart failure hospitalization rate among adults in Saint Louis County was 510.4 per 100,000. To meet the Healthy People 2030 goal, heart failure hospitalizations need to be reduced by 35%.
- Reduce current cigarette smoking in adults to 6.1%.²³ In 2021, 16.2% of adults aged 18 years and older were current smokers in Saint Louis County.⁷
- Reduce the proportion of adults who do no physical activity in their free time to 21.8%.²⁴ Saint Louis County is close to achieving this – as of 2021, 23% of adults did no leisure-time physical activity.⁷

Conclusion

Heart failure deaths have increased in Saint Louis County over time and hospitalizations have held steady. In addition, heart disease remains the number one cause of death in Saint Louis County.²⁵ Much more work is necessary to reverse these trends. Further, the burden of heart failure is distributed very unevenly across Saint Louis County residents. Black/African American residents are more likely to be hospitalized due to heart failure, experience heart failure at a younger age, and are more likely to die from heart failure than white County residents. Neighborhood poverty level and sex also affect heart failure outcomes, with male residents and people living in neighborhoods with high and very high levels of poverty more likely to experience and die from heart failure. In many cases heart failure is preventable, however.

The Saint Louis County Department of Public Health is committed to providing resources to help reduce heart disease in the community. In addition to the resources mentioned above, refer to the following page for a list of local and national heart disease resources.

Resources/Prevention for Heart Failure

- American Heart Association
www.heart.org
 - Heart Attack and Stroke - [Warning Signs](#)
 - Go Red for Women - [Factsheet](#)
 - Learn about CPR classes and resources: www.heart.org/cpr
 - Support Network (Heart Disease and Stroke): www.supportnetwork.heart.org
- Agency for Healthcare Research and Quality-Patient and Consumers Resources
<http://www.ahrq.gov/patients-consumers/index.html>
- Cardio Smart, American College of Cardiology
<https://www.cardiosmart.org>
- Center for Disease Control and Prevention- [Heart Disease Fact Sheet](#)
- Missouri Department of Health and Human Services (MDHSS)- Heart Disease
<http://health.mo.gov/living/healthcondiseases/chronic/heartdisease/index.php>
 - Wise Women Program, CDC, MDHSS
<http://health.mo.gov/living/healthcondiseases/chronic/wisewoman/>
- The Heart Foundation
<https://www.theheartfoundation.org/heart-disease-facts/links-to-resources/>
- Mended Heart Resources
<http://mendedhearts.org/resources>
- Million Hearts
<http://millionhearts.hhs.gov/>
- Patient Advocate Foundation: Matters of the Heart
<https://www.patientadvocate.org/matters-of-the-heart/>
- National Coalition for Women and Heart Disease
<http://www.womenheart.org/>

Methods

Hospital discharge and death records for years 2013 to 2022 were obtained from the Missouri Department of Health and Senior Services (DHSS), Bureau of Vital Statistics and the Bureau of Health Care Analysis & Data Dissemination. Patient Abstract System (PAS) records include discharge records of patients discharged from treatment within the state of Missouri. Population estimates were obtained from U.S. Census Bureau API and American Community Survey data collected by the United States Census Bureau for the years 2013 to 2022.

Age-adjusted rates for hospital data were calculated using SAS Analytics version 9.4 using county-level and tract-level population estimates from the American Community Survey. All rates were age-adjusted to census year 2000 age group distribution using the following age groups: 0-4, 5-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84 and 85+ years. Unless otherwise specified, population denominator estimates were drawn from American Community Survey data (ACS) using 5- year estimates for county-level overall rates and rates by race. Tract-level rates (those by geographic poverty) also used ACS 5-year population estimates with 2018-2022 estimates used for years 2018-2022 of numerator data. Neighborhood poverty level was based on 2018-2022 American Community Survey census-tract level poverty estimates. For 2018-2019, each 2010 census tract was assigned one of four categories of percent below federal poverty level: low (0 to < 10 percent); medium (10 to <20 percent); high (20 to <30 percent); and very high (30 to 100 percent). 2020 - 2022 rates used 2020 census tracts. Maps were made with R version 4.3. Zip code rates were categorized by quantiles; rates were suppressed in zip codes that contained too few observations to report reliable rates or protect confidentiality.

Hospital discharge records and vital records were restricted to residents of Saint Louis County, as identified by indicated residence census tract. Heart failure diagnoses and death data were identified using International Classification of Diseases, Tenth Revision (ICD-10) codes I11.0, I13.0, I13.2, and I50. Vital records data captures all deaths of Saint Louis County residents, whether they occurred within or outside of Saint Louis County. Unless otherwise specified, analyses of hospital records were restricted to discharge records from inpatient acute medical/surgical units/facilities, inpatient psychiatric units/facilities, inpatient physical rehabilitation unit/facilities, and outpatient emergency departments. As case identification was restricted to use of diagnostic codes, underestimation of counts and rates is expected.

Suggested Citation

Kelsey D, Hutti E, Adams C, & Wang E. Heart Failure Profile, Saint Louis County Missouri. Chronic Disease Epidemiology (CDE) Program profile. Division of Health Promotion and Public Health Research. Department of Public Health. Saint Louis County, MO. December 2024.

Chronic Disease Epidemiology Program

The Chronic Disease Epidemiology (CDE) program is responsible for analysis, interpretation, and presentation of health data related to chronic diseases and their risk factors. The CDE program supports the Saint Louis County Department of Public Health (DPH) by providing the following services:

- Develop study designs, questionnaires, and case definitions.
- Evaluate chronic disease programs.
- Locate or develop surveillance systems and analyze epidemiologic data sets.
- Provide county, state, and national comparison data.
- Interpret Saint Louis County chronic disease and risk factor data.
- Conduct epidemiologic investigations and special studies of chronic diseases and chronic disease risk factors of public health importance.
- Monitor Saint Louis County chronic disease trends.
- Provide scientific advice and technical assistance to community groups and outside partners with respect to surveillance and other epidemiology data expertise.
- Publish reports and web pages on chronic disease and risk factors.

For more information about the CDE program please contact us at:

chronicdisease.doh@stlouiscountymo.gov

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