Missouri Opioid Overdose and Bloodborne Infection Vulnerability Assessments

2020

Prepared by
Missouri Department of Health and Senior Services,
Bureau of Reportable Disease Informatics

Assisted by
Bureau of HIV, STD, and Hepatitis
Bureau of Health Care Analysis and Data Dissemination
Bureau of Epidemiology and Vital Statistics
Section for Disease Prevention

Missouri
DHSS
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and Senior Services

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Section for Disease Prevention

Division of Community and Public Health

Missouri Department of Health and Senior Services

This report is accessible via the internet at:

http://health.mo.gov/data/opioids/assessments.php

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The following Missouri Department of Health and Senior Services staff contributed to these assessments:

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Executive Summary

The Missouri Department of Health and Senior Services, Bureau of Reportable Disease Informatics, with funding from the Centers for Disease Control and Prevention's (CDC's) National Center for HIV/AIDS (human immunodeficiency virus/acquired immunodeficiency syndrome), Viral Hepatitis, STD (sexually transmitted disease), and TB (tuberculosis) Prevention (NCHHSTP), conducted county-level vulnerability assessments for 1) opioid overdoses and 2) bloodborne infections in collaboration with an internal workgroup composed of staff from multiple units. This workgroup, in consultation with CDC staff, developed a methodology and selected indicators within two categories – individual outcomes and community factors. The 23 lowest ranked counties were considered to be at greatest risk for each outcome. *It is important to note that a ranking outside of the 23 more vulnerable counties does not indicate that a county is not at risk for that outcome.* There was considerable overlap in the counties identified as more vulnerable by each assessment, which are listed in bold font in the tables below. Data for all counties are included in the Appendices so that the results of these assessments may be used statewide rather than in only the more vulnerable counties. Stakeholder meetings were held to gather community-level feedback on the assessments.

More Vulnerable to Opioid Overdoses	More Vulnerable to Bloodborne Infections
Bates*	Barry
Benton	**Butler**
Butler	**Crawford***
Crawford*	Dent
Dent	**Dunklin**
Dunklin	Greene
Iron*	Henry
Jefferson	Howell
Maries	**Iron***
Marion	Jefferson
Mississippi	Madison*
New Madrid	**Marion**
Phelps	**Mississippi**
Polk	**Phelps**
Pulaski	**Ripley***
Ripley*	**St. Francois***
St. Clair	**St. Louis City**
St. Francois*	Stone
St. Louis City	**Taney**
Taney	**Warren**
Warren	**Washington***
Washington*	**Wayne***
Wayne*	Wright*

*This county was also identified as vulnerable to rapid dissemination of HIV/hepatitis C virus (HCV) infection among persons who inject drugs (PWID) in a National Vulnerability Assessment prepared by the CDC.[1]

Abbreviations Used in This Report

ACES = Adverse Childhood Experiences

AIDS = Acquired Immunodeficiency Syndrome (stage 4 HIV)

BEMS = Bureau of Emergency Medical Services

BEVS = Bureau of Epidemiology and Vital Statistics

BHCADD = Bureau of Health Care Analysis and Data Dissemination

BHSH = Bureau of HIV, STD, and Hepatitis

BRDI = Bureau of Reportable Disease Informatics

CDC = Centers for Disease Control and Prevention

CSTE = Council of State and Territorial Epidemiologists

DESE = Missouri Department of Elementary and Secondary Education

DHSS = Missouri Department of Health and Senior Services

eHARS = enhanced HIV/AIDS Reporting System

EMS = Emergency Medical Services

ER = Emergency Room

ESSENCE = Electronic Syndromic Surveillance for the Early Notification of Community-based Epidemics

HBV = Hepatitis B Virus

HCV = Hepatitis C Virus

HIV = Human Immunodeficiency Virus

IDU = Injection Drug Use

LPHA = Local Public Health Agency

NAS = Neonatal Abstinence Syndrome

NCHHSTP = National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention

PAS = Patient Abstract System

PDMP = Prescription Drug Monitoring Program

PWID = Persons Who Inject Drugs

SPHL = Missouri State Public Health Laboratory

SSP = Syringe Services Program

STD = Sexually Transmitted Disease

SUDT = Substance Use Disorder Treatment

TB = Tuberculosis

WebSurv = Missouri's Communicable Disease Registry

Introduction

Opioid misuse is a growing problem in Missouri as well as throughout the nation. In 2017, 1 out of every 65 deaths in Missouri was due to an opioid overdose.[2] From 2001 to 2015, Missouri resident opioid-related inpatient hospitalizations more than doubled, from 5,332 visits to 11,119 visits. Opioid-related emergency room (ER) visits increased just over 2.5 times (from 4,344 to 11,259) in the same time period. The number of ER visits due to heroin in particular grew during this time. In 2001, heroin accounted for only 3.9 percent of all opioid-related ER cases, but that figure had increased to 38.6 percent by 2016.[3]

Opioid misuse via injection is a risk factor for several bloodborne conditions, including HIV, hepatitis B virus (HBV), and hepatitis C virus (HCV). In fact, intravenous opioid use is the leading risk factor for hepatitis C. [4,5] Outbreaks of bloodborne diseases due to needle sharing related to opioid misuse and misuse of other drugs have been reported in other states.[6,7] In addition, recent outbreaks of hepatitis A have been found among people who use drugs, including opioids.[8] Missouri has also seen a rise in neonatal abstinence syndrome (NAS) hospital discharges as the opioid epidemic has grown. From 2010 to 2016, the number of Missouri NAS hospital discharges grew 5.5 times (from 426 discharges to 2,342 discharges).[9]

The Missouri Department of Health and Senior Services (DHSS), local public health agencies (LPHAs), and partners are responding to the epidemic, but these organizations have limited resources. The ability to accurately describe and measure the epidemic is critical for utilizing those available resources and providing effective responses. The *County-level Vulnerability Assessment for Rapid Dissemination of HIV or HCV Infections Among Persons Who Inject Drugs, United States* is a helpful resource.[10] (For the remainder of this report, this document will be referred to as the "National Vulnerability Assessment.") This assessment identified 13 Missouri counties as vulnerable to bloodborne infection outbreaks among people who inject drugs (PWID): Bates, Cedar, Crawford, Hickory, Iron, Madison, Ozark, Reynolds, Ripley, St. Francois, Washington, Wayne, and Wright. All of these counties are relatively rural. Yet multiple types of data (mortality, inpatient hospitalization, ER visit, communicable disease, etc.) indicate that other areas of the state are impacted as well.

Please note: Throughout this document, graphics specific to the opioid overdose assessment are presented in orange, while graphics specific to the bloodborne infection assessment are presented in blue. Graphics representing data utilized in both assessments are presented in yellow.

Background and Purpose of the Missouri Vulnerability Assessments Project

During the summer of 2018, the CDC utilized the Cooperative Agreement for Emergency Response: Public Health Crisis Response – CDC-RFA-TP18-1802 mechanism to award Opioid Crisis Supplemental Funding to jurisdictions impacted by the opioid overdose epidemic. On August 31, 2018, Missouri was one of the states notified that it would receive one year of funding under this award for a project from the CDC's NCHHSTP. This project requires awardees to develop and disseminate jurisdiction-level vulnerability assessments that identify subregional (e.g., county, census tract) areas at high risk for i) opioid overdoses and ii) bloodborne infections (i.e., HIV, hepatitis C, hepatitis B) associated with nonsterile drug injection. Missouri is utilizing this opportunity to create a state-specific vulnerability assessment methodology.

The overall purpose of the project is that awardees use the findings from the assessments to develop plans that strategically allocate prevention and intervention services and distribute findings to key stakeholders in formats that support action. This will allow the use of the assessments' findings to target services that will maximally reduce risk of overdoses and risk of bloodborne infection spread through nonsterile drug injection.[11]

The Opioid Crisis Supplemental Funding was awarded for the period from September 1, 2018, through August 31, 2019. Therefore, the vulnerability assessments, the plan for allocating prevention and intervention services, and all related activities were required to be completed during this timeframe. On June 27, 2019, CDC notified DHSS that a 90-day no cost extension to the project was granted to all awardees. The award and project end date were extended until November 30, 2019. On November 5, 2019, CDC notified DHSS that a further 120-day no cost extension to the project was granted to all awardees. The award and project end date were further extended until March 29, 2020.

Development of Missouri's Vulnerability Assessments

The NCHHSTP portion of Missouri's opioid crisis funding was assigned to the Bureau of Reportable Disease Informatics (BRDI). Upon receipt of the award, BRDI assembled an internal working group of stakeholders from DHSS. This workgroup includes representatives from BRDI; the Bureau of HIV, STD, and Hepatitis (BHSH); the Bureau of Health Care Analysis and Data Dissemination (BHCADD); the Bureau of Epidemiology and Vital Statistics (BEVS); and the Section for Disease Prevention. This workgroup met frequently, often weekly, throughout the project period to select indicators, develop a state-specific methodology, and refine the vulnerability assessments based on additional feedback received.

Staff from these units were selected to participate based on their knowledge and experience related to the opioid epidemic, bloodborne outbreaks, and related data. BHCADD manages Missouri's Enhanced State Opioid Overdose Surveillance grant and staff were able to draw upon knowledge of the opioid epidemic they had gained from that project. This unit also manages the death portion of Missouri's vital statistics program and hospital/ER data through the Patient Abstract System (PAS). BRDI manages Missouri's communicable disease registry (WebSurv), the enhanced HIV/AIDS Reporting System (eHARS), and the state's syndromic surveillance system (ESSENCE – Electronic Syndromic Surveillance for the Early Notification of Community-based Epidemics). BRDI creates annual epidemiologic profiles of HIV and viral hepatitis. Furthermore, BHCADD, BEVS, and BRDI staff include several research analysts and epidemiology specialists with experience performing data analysis, creating maps, and writing reports. These staff are also familiar with external resources such as the U.S. Census Bureau website. BHSH provides prevention, education, and access to care information for individuals impacted by HIV/AIDS, STDs, and hepatitis.

The internal workgroup reviewed previously created resources such as CDC's National Vulnerability Assessment and internal DHSS documents that utilized ranking methodologies, such as the Primary Care Needs Assessment 2015.[12] As part of the grant activities, CDC offered guidance on the project and arranged several conference calls and webinars to share examples from other states as well as CDC, such as the Social Vulnerability Index.[13]

Stakeholder Feedback

One of the CDC's project requirements was that DHSS organize a new or engage an existing stakeholder group to provide input on the vulnerability assessments' design, support development of data use agreements, and inform the use of the assessments' findings to target services that will maximally reduce risk of overdoses and risk of bloodborne infection spread through nonsterile drug injection. DHSS made several attempts to gain stakeholder feedback throughout the project period and will continue to solicit feedback after the vulnerability assessments are published and the project period ends.

- DHSS staff from a variety of programs participated on the internal workgroup and provided state-level program feedback.
- DHSS partnered with six LPHAs, one in each HIV Care Region. (A map of the HIV Care Regions and a table listing information about the stakeholder meetings are shown on page 8.) Each of these LPHA partners collaborated with DHSS to arrange a small stakeholder meeting in their HIV Care Region. DHSS contracted with a facilitator to run the meetings, while the LPHA determined and made arrangements for the meeting location and developed the list of invitees. These meetings provided community-level feedback from a variety of types of stakeholders. Some of the strongest and most consistent feedback received across all sessions is briefly noted below.
  - o Individual outcome indicators should be weighted more heavily than community factor indicators. The individual outcome indicators provide information on what has been happening recently and is likely to continue happening in the next few years. The community factor indicators should be included but should not receive as much weight because they are difficult to change. Stakeholders also expressed that overdoses are affecting all populations so social determinants may not be as relevant as they are for other public health concerns. Based on this feedback and suggestions from stakeholders regarding how much additional weight would be appropriate, the sum of the individual outcome indicators in each assessment is now multiplied by three (3).
  - o A mental health indicator should be included in the individual outcome portion of the methodology.
  - o Overdose death data should reflect both the individual's county of residence and the county of record, which is the location where the individual is pronounced dead and is considered a proxy for location of death. Based on this feedback, the counties were ranked for overdose deaths by county of residence and also ranked for overdose deaths by county of record. These ranks were summed, and the sums were then ranked. This final rank is included as the rank for overdose deaths in both assessments. A table showing the ranks by county of residence and county of record is provided at the end of Appendix A. Data for both county of residence and county of record are provided in the tables in Appendix B.

- Indicators based on access to care and treatment providers should not be included. Stakeholders were concerned that health care access does not equal health care utilization or health care need. Further detail about the discussion regarding provider access is available in Appendix D. Some stakeholders did comment that more deaths may occur among populations farther from hospitals due to lack of timely treatment.
- DHSS staff plan to attend events to promote the assessments document after it is published and will gather additional feedback at that time. The specific events have not yet been determined.
- Readers of this document are encouraged to continue to provide feedback by contacting DHSS. Although it may not be possible to make changes once the document is published, this feedback will inform any future versions of the assessments. Feedback and questions about the document can be directed to the Bureau of Reportable Disease Informatics, PO Box 570, Jefferson City, MO 65102.

MISSOURI HIV CARE REGIONS

NORTHWEST HIV CARE REGION
CENTRAL HIV CARE REGION
ST. LOUIS HIV CARE REGION
SOUTHEAST HIV CARE REGION
SOUTHWEST HIV CARE REGION
KANSAS CITY HIV CARE REGION

Vulnerability Assessment Stakeholder Meetings

Date	Location	Host	HIV Care Region
April 16, 2019	Columbia/Boone County Department of Public Health and Human Services	Columbia/Boone County Department of Public Health and Human Services	Central
April 24, 2019	Osage Center, Cape Girardeau	Cape Girardeau County Public Health Center	Southeast
May 2, 2019	St. Louis County Department of Public Health, Berkeley	St. Louis County Department of Public Health	St. Louis Metro
June 13, 2019	Clay County Public Health Center, Liberty	Clay County Public Health Center	Kansas City Metro
June 20, 2019	Remington Nature Center, St. Joseph	City of St. Joseph Health Department	Northwest
June 25, 2019	Lake Springfield Boathouse, Springfield	Springfield-Greene County Health Department	Southwest

Indicators

Multiple data sources and health indicators were considered for inclusion in these assessments. These indicators were discussed by the internal workgroup, and extensive feedback was gathered from the stakeholder meetings. Selected indictors were assigned to one of two overarching categories: individual outcomes and community factors. The indicators in each category are listed below, and the *italicized* text within brackets ([]) next to each indicator notes whether the indicator was included in the opioid overdose assessment, the bloodborne infection assessment, or both assessments. Each indicator provides a slightly different perspective on the status of opioid overdoses and bloodborne infections in the state of Missouri.

The individual outcomes category attempts to measure the current level of substance use and bloodborne infection in each county in Missouri. Individual outcome indicators include:

- Drug overdose deaths – [*Both Assessments*]
- Opioid misuse ER visits – [*Both Assessments*]
- Drug-related arrests – [*Both Assessments*]
- Opioid-related substance use disorder treatment (SUDT) admissions – [*Opioid Overdose Assessment*]
- Self-reported frequent (>14 per month) poor mental health days [*Opioid Overdose Assessment*]
- Bloodborne illnesses (HIV, acute and chronic hepatitis B, and acute and chronic hepatitis C) – [*Bloodborne Infection Assessment*]
- Hepatitis C among ages 18 to 40 – [*Bloodborne Infection Assessment*]
- Injection drug use (IDU) among persons receiving SUDT – [*Bloodborne Infection Assessment*]

The community factors category examines the resources or other socioeconomic factors that may influence individual outcomes and impact access to care for substance use disorders and bloodborne infections. They include:

- Lack of a high school education – [*Both Assessments*]
- Median income – [*Both Assessments*]
- Poverty – [*Both Assessments*]
- Unemployment – [*Both Assessments*]
- Uninsured – [*Both Assessments*]

The tables below list the individual outcomes and community factors indicators used in each assessment. Indicators used in both assessments are printed in bold.

Opioid Overdose Vulnerability Assessment Indicators

Individual Outcomes	Community Factors
Drug Overdose Deaths†‡	**Lack of a High School Education†**
Opioid Misuse ER Visits	**Median Income†‡**
Opioid-related Substance Use Disorder Treatment (SUDT) Admissions	**Poverty†**
Drug-related Arrests	**Unemployment†‡**
Self-reported Frequent (>14 Per Month) Poor Mental Health Days	**Uninsured†**

Bloodborne Infection Vulnerability Assessment Indicators

Individual Outcomes	Community Factors
Drug Overdose Deaths†‡	**Lack of a High School Education†**
Bloodborne Illnesses (HIV, Acute and Chronic Hepatitis B, and Acute and Chronic Hepatitis C)	**Median Income†‡**
Hepatitis C Among Ages 18 to 40	**Poverty†**
Opioid Misuse ER Visits	**Unemployment†‡**
IDU Among Persons Receiving SUDT	**Uninsured†**
Drug-related Arrests	

† These indicators were considered for the National Vulnerability Assessment.
‡ Analysis completed for the National Vulnerability Assessment found these indicators to be more strongly associated with acute HCV infection, which was considered a proxy for unsafe IDU.[14]

County-level rates for each indicator are provided in Appendix B. Data sources, data years, and notes for each indicator are provided in Appendix C. A list of other indicators considered but not included is provided in Appendix D.

Ranking Methodology

The State of Missouri is composed of 114 counties and the City of St. Louis, which is an independent city that functions as its own county. (Throughout this report, the City of St. Louis will be specified as "St. Louis City," St. Louis County will be noted as simply "St. Louis," and "115 counties" will be used to indicate that St. Louis City was included along with the other Missouri counties.) For each indicator included in these assessments, the counties and St. Louis City were assigned a ranking from 1-115 based on their rates. The Excel rank formula was used to determine the rank position for each indicator. Rankings for each indicator for each county are found in Appendix A. Rates for each indicator for each county are found in Appendix B.

For some indicators, such as median income, the highest rate or value is better, indicating potentially less vulnerability. For other indicators, such as poverty or bloodborne illnesses, the lowest rate or value is better, potentially showing less vulnerability. This report is structured so that a rank of 1 always indicates a better outcome or more resources, and therefore less vulnerability, regardless of whether the actual indicator value is the highest or lowest. A rank of 115 always indicates a worse health outcome or fewer resources and greater vulnerability. Tied counties were all assigned the same rank number.

Since ranks in these assessments are based strictly off the rate values, they do not necessarily indicate any statistically significant difference between the rates in two different counties. Statistically significant difference could only be determined by running a statistical significance test. Statistical significance tests are performed to determine whether the difference between two rates is probably the result of chance factors or if it is meaningful. Statistical significance tests were not performed for these assessments.

After the counties were ranked for each indicator, the individual outcome indicator ranks were summed for each county and multiplied by three (3) to put more emphasis on these measures. (Please refer to page 6 for more information about the reason for this multiplier.) This result was added to the sum of the ranks of the community factor indicators. The combined sums for each county were then ranked, and Excel match formulas were used to assign a quintile rank to each county. Quintile ranks provide a general idea of how a particular county compares to the rest of the counties in Missouri. A quintile is one-fifth of a ranked list. Since there are 115 Missouri counties, 23 are included in each quintile unless a tie occurred. A quintile ranking of 5 therefore indicates that a county is among those considered to be more vulnerable.[15]

Final Ranks and Corresponding Quintile Ranks

Final Ranks	Quintile Ranks	Vulnerability Level
1-23	1	
24-46	2	
47-69	3	
70-92	4	
93-115	5	More vulnerable

DHSS determined that only the counties ranked within quintile 5 on each assessment would be considered more vulnerable. The primary factor for the designation of only quintile 5 as vulnerable for the purposes of this project is that CDC expects DHSS to perform targeted outreach to each county identified as more vulnerable in these assessments. As this was initially planned to be a one-year project and the vulnerability assessments had to be completed before those counties could be identified, DHSS determined that limiting the definition of "more vulnerable" to quintile 5 in each assessment would result in a number of counties that could reasonably be targeted before the end of the project period. Since there are two assessments, this definition of more vulnerable could have returned up to 46 counties (23 from each assessment) that would need to be targeted within the last few months of the grant period. Since there was considerable overlap between the assessments, only 30 counties were actually identified as more vulnerable in at least one of the assessments.

However, this does **not** mean that the counties ranked in quintiles 1-4 are not considered vulnerable and do not need to better target services in order to decrease or prevent the impact of opioid overdoses and bloodborne infections in their communities. DHSS recognizes that all counties in Missouri are impacted by the opioid epidemic, and this is supported by national data. For 2016 and 2017, Missouri's overdose death rate of 22.4 per 100,000 population exceeded the national rate (which includes Washington, D.C.) of 20.6, ranking Missouri at 21st among these jurisdictions. For this reason, DHSS is including data for all 115 counties in this document so that each can utilize the assessment findings to better target services in their areas. As DHSS works with the more vulnerable counties, strategies may be developed that can be shared across the state.

This ranking methodology was selected for this project for a few different reasons.

- The Opioid Crisis Supplemental Funding was initially awarded for only one year. Therefore, activities had to start quickly and progress at a rapid pace. Development of the plan to target services and other project activities required completion of the vulnerability assessments before these related activities could be finalized. One advantage of this ranking methodology is that it could be developed fairly quickly.

- This ranking methodology is fairly simple and intuitive, which offered two advantages.
  - Various DHSS staff could contribute to the project even if they did not have advanced statistical training.
  - The methodology is easier for stakeholders with a variety of levels of statistical expertise to understand and use.
- This ranking methodology is flexible. As DHSS gathers feedback from stakeholders or identifies other potential indicators for inclusion, the structure can be easily modified.

As with any methodology, there are also disadvantages to using this model.

- As previously stated, the model does not utilize any sort of statistical significance testing to determine if there are meaningful differences between counties. It is possible that a county ranked in Quintile 1 may not have meaningfully different rates from a county ranked in a lower quintile.
- This method did not utilize any regression testing to measure the association between an indicator and the outcomes of opioid overdoses or bloodborne infections. Instead, DHSS staff referred to the National Vulnerability Assessment and guidance from CDC for assistance in selecting relevant indicators. For future versions of these assessments, DHSS would like to perform additional statistical modeling and compare the results to the current results.
- Any methodology that ranks all 115 counties requires that all, or nearly all, counties have comparable data available for each indicator. Otherwise, the ranks would be skewed by the missing or inconsistent information. DHSS considered several indicators that were not selected for inclusion in the assessments because reliable data were not available statewide from a centralized source. More information on indicators that were considered but not selected for inclusion in the assessments is available in Appendix D. Although these sources were not used in the assessments, counties are encouraged to utilize them in their local efforts if reliable data are available to them.
- Any methodology that ranks all 115 counties also requires that all, or nearly all, counties have reliable rates. Rates are considered reliable if they are based on at least 20 events (e.g., 20 deaths, 20 cases of bloodborne illness, etc.). If a county has a small number of events, a small increase or decrease in the number of cases from year to year could cause the rate to fluctuate dramatically. This could cause the county to be ranked much higher or lower depending on the time period selected for the ranking. DHSS attempted to minimize the effects of small numbers and the related unreliable rates by combining multiple years of data when possible. However, there were some indicators that were not included because rates for many counties remained unreliable even when multiple years were used. More information on indicators that were considered but not selected for inclusion in the assessments is available in Appendix D.
- Data at the county-level may mask areas of vulnerability within counties. For example, if a particular county has areas of extremely high vulnerability but also areas that are

much less vulnerable, the county-level data will average these areas. As a result, a county that may have an area of extremely high need may not have been considered an overall more vulnerable county in these assessments. For future versions of these assessments, DHSS would like to investigate the possibility of providing analysis of sub-county geographic levels.

Statistical Notes

- Counts of 1 to 4 events are suppressed for confidentiality reasons.
- Rates based on counts of 1 to 19 events for an indicator are considered to be unreliable due to small numbers.[16] Unreliable rates are rates based on fewer than 20 events. They can be common for small population areas, such as certain counties, or for low-frequency events, such as cause-specific deaths or birth defects.
- When appropriate, multiple years of data were combined for indicators with unreliable rates for a large number of counties. If the use of data from one specified year is not required, combining multiple years of data can often generate a reliable rate. Similarly, data from several counties can be combined to create a reliable regional rate. In this report, multiple years of data were combined for some indicators with unreliable rates for a large number of counties. Where that was not possible, the data were suppressed and it was indicated in the table that the rate was unreliable.
- Data years vary by indicator. The most recent data available from each source were utilized in these rankings, and the frequency of updates varies by source. Because of the different data years involved, the internal workgroup decided to use the year of publication in the document title.
- Crude rates were used for all indicators unless otherwise indicated. Crude rates are calculated by dividing the total number of cases in a given time period by the total number of persons in the population and multiplying by a constant. A constant is a multiple of 10, such as 100 (for percentages), 1,000, 10,000, or 100,000. The constant used may vary by data source.
- County-level rankings for each indicator, final ranks, and quintile ranks are provided in Appendix A.
- Rates for each indicator and counts for some indicators are provided in Appendix B.
- Data sources, data years, and data notes for each indicator are provided in Appendix C.
- Resident means the person was a resident of Missouri at the time of the event in question. Some data sources collect both residence as well as a county of record (proxy for the location of the event). For example, data in BHCADD death records are reported by both resident status and county of record). If a Missouri resident dies or is treated in a hospital in another state, that event would be recorded as a Missouri resident death or hospitalization but would not appear in Missouri data under county of record. Missouri receives vital records and hospital data from most of its border states. Additional information on use of resident or recorded data is provided for specific indicators in Appendix C.
- For bloodborne disease indicators (e.g., HIV, hepatitis B, hepatitis C), data for persons diagnosed in Missouri correctional facilities are not included in the county-level data. These individuals, especially those in the state prison system, are often incarcerated in a different location than their residence (and likely location of infection) prior to imprisonment. Inclusion of these cases in the county data would distort the picture of

the epidemics in those areas. Individuals diagnosed at federal correctional facilities in Missouri are not included in the disease indicators.

Findings – Opioid Overdose Vulnerability Assessment

The counties identified as more vulnerable to opioid overdoses are listed in the table below and shown on the map on the following page.

More Vulnerable Counties for Opioid Overdoses

Rank	County
115	Crawford*
114	St. Louis City
113	Mississippi
112	Dent
111	Iron*
110	St. Francois*
109	Dunklin
108	Washington*
107	Ripley*
106	New Madrid
105	Wayne*
103	Butler
103	Taney
102	Phelps
101	Maries
100	Jefferson
99	Pulaski
98	Benton
97	St. Clair
96	Marion
95	Bates*
94	Polk
93	Warren

*The National Vulnerability Assessment identified these counties as most vulnerable to rapid dissemination of HIV/HCV among PWID.[17]

Missouri Opioid Overdose Vulnerability Assessment

Quintiles (with associated ranks)
- 1 (1 - 23)
- 2 (24 - 46)
- 3 (47 - 69)
- 4 (70 - 92)
- 5 (93 - 115) = More vulnerable
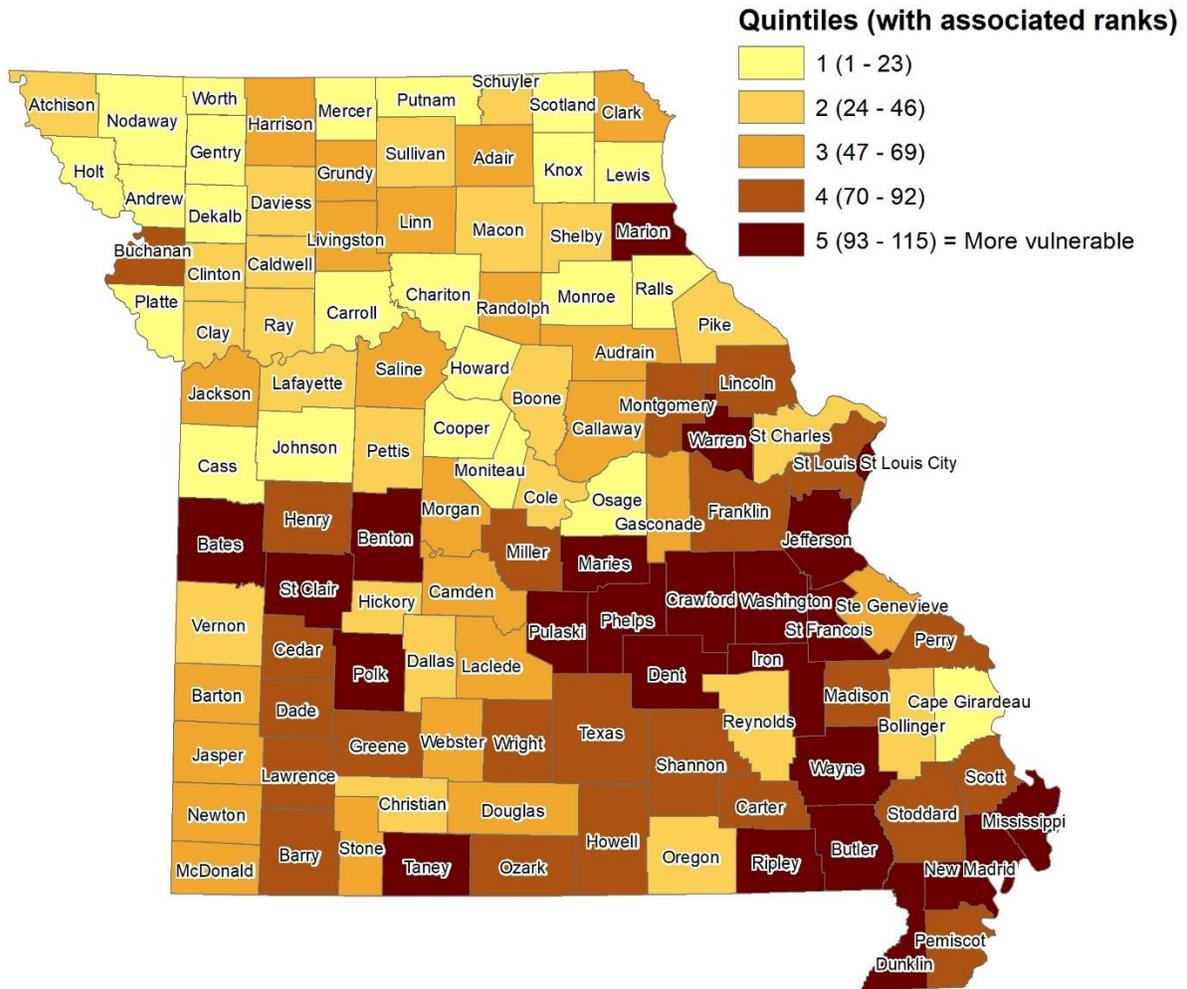
Findings – Bloodborne Infection Vulnerability Assessment

The counties identified as more vulnerable to bloodborne infections are listed in the table below and shown on the map on the following page.

More Vulnerable Counties for Bloodborne Infections

Rank	County
115	Crawford*
114	St. Louis City
113	Butler
112	St. Francois*
111	Mississippi
110	Taney
109	Iron*
108	Dent
107	Phelps
106	Wayne*
105	Marion
104	Washington*
103	Dunklin
102	Ripley*
101	Warren
100	Greene
99	Howell
98	Wright*
97	Jefferson
96	Madison*
95	Stone
94	Henry
93	Barry

*The National Vulnerability Assessment identified these counties as most vulnerable to rapid dissemination of HIV/HCV among PWID.[18]

Missouri Bloodborne Infection Vulnerability Assessment

Quintiles (with associated ranks)

- 1 (1 - 23)
- 2 (24 - 46)
- 3 (47 - 69)
- 4 (70 - 92)
- 5 (93 - 115) = More vulnerable
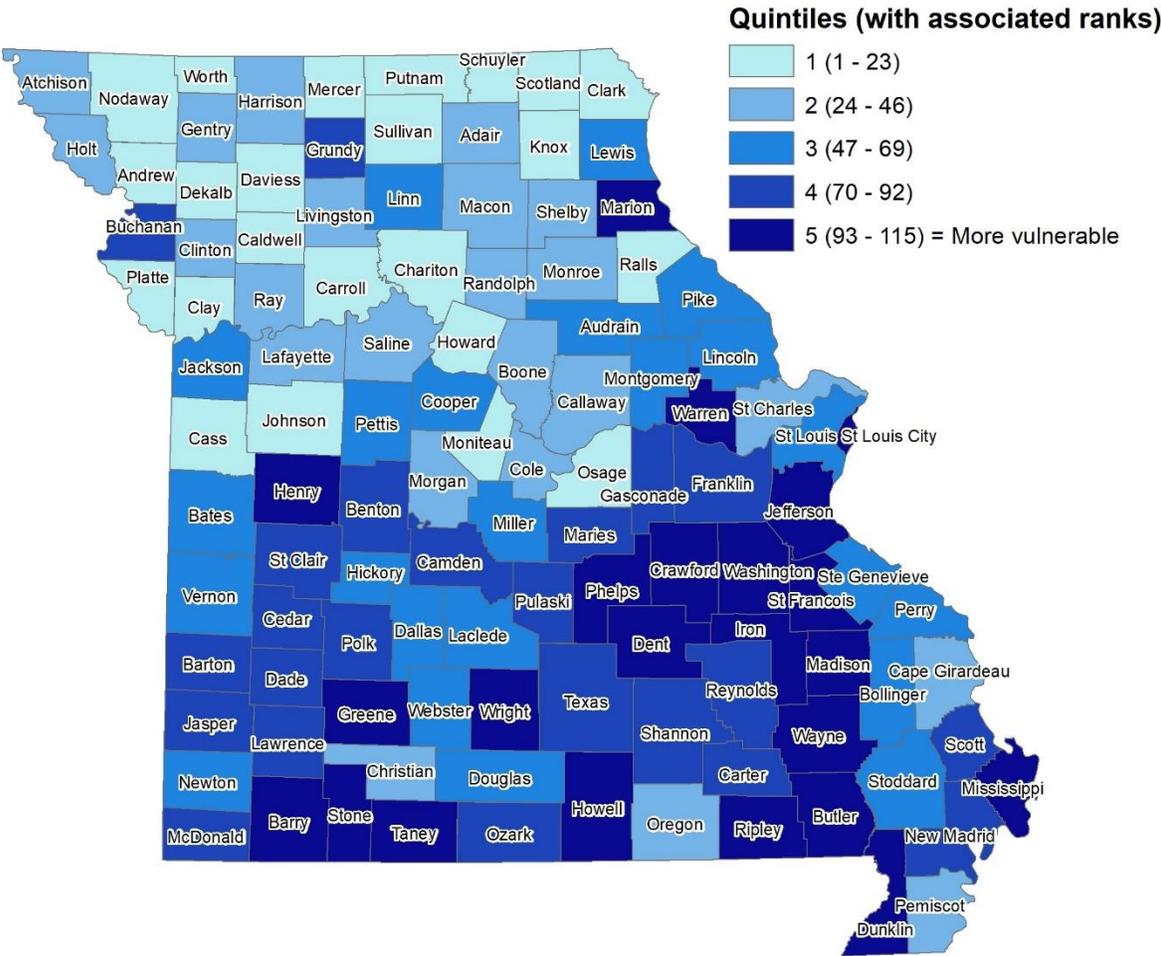
Comparison of the Opioid Overdose and Bloodborne Infection Vulnerability Assessments

The opioid overdose and bloodborne infection assessments were calculated separately, but several counties were identified as more vulnerable in both assessments.

Opioid Overdose
Bates*
Benton
Maries
New Madrid
Polk
Pulaski
St. Clair

Butler
Crawford*
Dent
Dunklin
Iron*
Jefferson
Marion
Mississippi
Phelps
Ripley*
St. Francois*
St. Louis City
Taney
Warren
Washington*
Wayne*

Bloodborne Infection
Barry
Greene
Henry
Howell
Madison*
Stone
Wright*
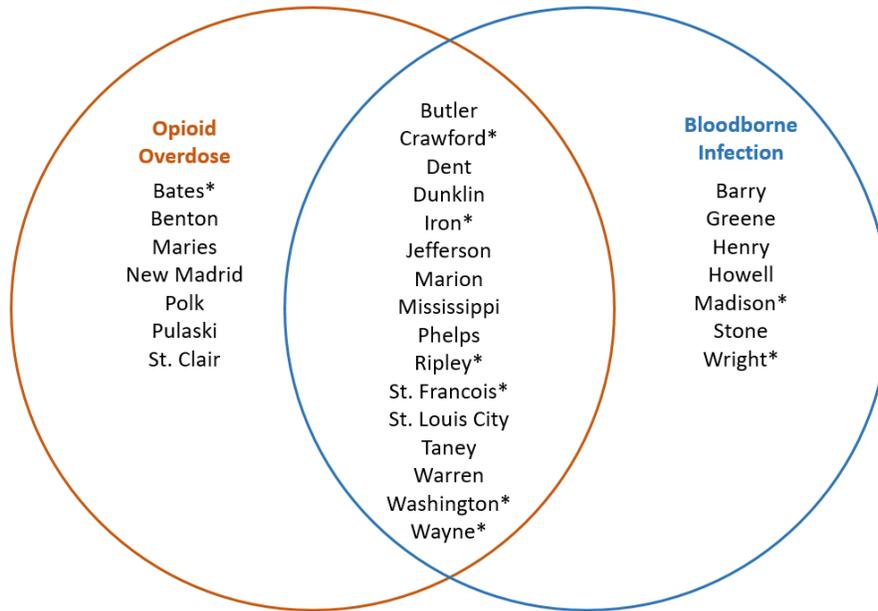
In both assessments, a majority of the counties identified as more vulnerable are located in the southern half of the state. Many of these counties are rural (Barry, Benton, Crawford, Dent, Henry, Iron, Madison, Maries, Mississippi, New Madrid, Ripley, St. Clair, Wayne, and Wright), but several counties from the St. Louis Metropolitan Statistical Area are included, such as St. Louis City and Jefferson, Warren, and Washington Counties. Bates County (Kansas City) as well as Polk and Greene Counties (Springfield-Branson) are other metropolitan statistical area counties identified. Multiple counties in Micropolitan Statistical Areas were represented in at least one of the assessments, including Butler (Poplar Bluff), Dunklin (Kennett), Howell (West Plains), Marion (Hannibal), Phelps (Rolla), Pulaski (Fort Leonard Wood), St. Francois (Farmington), and Stone and Taney (Branson).[19]

Many of the more vulnerable counties have in common high percentages of the population with less than a high school education, high poverty and unemployment rates, and low median incomes. However, some counties that ranked relatively well on the community factor indicators were identified as more vulnerable. For example, Jefferson County was ranked 6th for median income and 11th for poverty but was still identified as more vulnerable to both opioid overdoses and bloodborne infections, which impact individuals from all populations and demographic groups.

*The National Vulnerability Assessment identified these counties as most vulnerable to rapid dissemination of HIV/HCV among PWID.[20]

Comparison of the Missouri and National Vulnerability Assessments

The quintile rankings from the two Missouri assessments are shown in the table below for each of the 13 Missouri counties identified in the National Vulnerability Assessment as vulnerable to rapid dissemination of HIV/HCV among PWID. Six of these counties (Crawford, Iron, Ripley, St. Francois, Washington, and Wayne) were also identified as more vulnerable to both opioid overdoses and bloodborne infections in the Missouri assessments. Bates County was identified as more vulnerable to opioid overdoses but not bloodborne infections, while Madison and Wright were identified as more vulnerable to bloodborne infections but not opioid overdoses. Four of the counties identified in the National Vulnerability Assessment (Cedar, Hickory, Ozark, and Reynolds) were not identified in either of the more vulnerable quintiles in the Missouri assessments. Cedar and Ozark Counties ranked in the 4th quintile on both assessments. Reynolds County ranked in the 4th quintile for bloodborne infections and the 2nd quintile for opioid overdoses. Hickory County ranked in the 2nd quintile for opioid overdoses and the 3rd quintile for bloodborne infections. These difference are likely due to the different indicators and methodologies used.

Counties Identified in the National Vulnerability Assessment	Missouri Opioid Overdose Vulnerability Assessment Quintile Ranking	Missouri Bloodborne Infection Vulnerability Assessment Quintile Ranking
Bates	5	3
Cedar	4	4
Crawford	5	5
Hickory	2	3
Iron	5	5
Madison	4	5
Ozark	4	4
Reynolds	2	4
Ripley	5	5
St. Francois	5	5
Washington	5	5
Wayne	5	5
Wright	4	5

The following counties were identified as higher risk in at least one of the Missouri vulnerability assessments but were not included in the list of higher risk counties from the National Vulnerability Assessment.

Counties Identified in the Missouri Vulnerability Assessments and Not Identified in the National Vulnerability Assessment	Opioid Overdose Vulnerability Assessment	Bloodborne Infection Vulnerability Assessment
Barry		✓
Benton	✓	
Butler	✓	✓
Dent	✓	✓
Dunklin	✓	✓
Greene		✓
Henry		✓
Howell		✓
Jefferson	✓	✓
Maries	✓	
Marion	✓	✓
Mississippi	✓	✓
New Madrid	✓	
Phelps	✓	✓
Polk	✓	
Pulaski	✓	
St. Clair	✓	
St. Louis City	✓	✓
Stone		✓
Taney	✓	✓
Warren	✓	✓

Appendix A – Vulnerability Assessment Indicator Ranks and Results

The following tables provide the county-level ranks (from 1 to 115) for each of the indicators in the individual outcomes and community factors categories. The sum of the ranks for the individual outcome indicators is multiplied by three, while the sum of the ranks for the community factor indicators is not given any additional weight. The three columns in the final section of the table provide the sum of the two categories, the rank position of this sum (from 1 to 115), and the quintile ranking (from 1 to 5) used to determine the list of more vulnerable counties (i.e., the counties in quintile 5).

The Drug Overdose Death ranks that are shown in the opioid overdose (orange) and bloodborne infection (blue) tables incorporate both the county of residence and county of record ranks. These separate drug overdose death ranks are provided in a third (yellow) table.

Counties identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment are indicated with an asterisk (*) behind the county name.

Missouri Opioid Overdose Vulnerability Assessment Indicator Ranks and Results

	Opioid Overdose Vulnerability Assessment Indicator Ranks														
	Individual Outcomes						Community Factors						Results		
County	Drug Overdose Deaths†	Opioid Misuse ER Visits	Opioid-related SUDT	Drug-related Arrests	Self-reported Frequent (>14 Per Month) Poor Mental Health Days	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
Adair	68	19	52	51	86	828	17	89	110	52	13	281	1,109	52	3
Andrew	61	23	34	45	45	624	13	10	6	22	7	58	682	14	1
Atchison	87	29	1	106	47	810	24	40	17	17	42	140	950	36	2
Audrain	24	40	87	59	65	825	71	48	53	88	49	309	1,134	55	3
Barry	46	90	78	16	61	873	93	80	88	95	97	453	1,326	77	4
Barton	74	106	55	8	29	816	52	76	92	49	48	317	1,133	53	3
Bates*	88	71	84	115	69	1,281	67	38	32	46	38	221	1,502	95	5
Benton	69	81	60	73	95	1,134	74	101	77	110	65	427	1,561	98	5
Bollinger	42	25	68	65	22	666	101	79	82	45	39	346	1,012	40	2
Boone	62	78	58	52	21	813	3	19	78	25	9	134	947	35	2
Buchanan	44	97	93	50	98	1,146	36	30	61	55	41	223	1,369	83	4
Butler	88	94	103	94	25	1,212	87	91	95	105	60	438	1,650	103	5
Caldwell	29	26	1	88	69	639	23	44	29	14	28	138	777	25	2
Callaway	59	82	71	76	65	1,059	64	17	18	24	22	145	1,204	64	3
Camden	93	64	76	43	37	939	31	26	65	95	76	293	1,232	69	3
Cape Girardeau	66	31	81	10	9	591	19	29	66	47	18	179	770	23	1
Carroll	13	11	1	17	40	246	66	51	72	100	45	334	580	9	1
Carter	72	22	1	105	115	945	104	92	34	78	109	417	1,362	81	4
Cass	60	64	42	47	4	651	8	4	7	39	12	70	721	18	1

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment

†See Combined Rank for Drug Overdose Deaths table on pages 35-38.

ER = Emergency Room; SUDT = Substance Use Disorder Treatment

See Appendix C for information on data years, data sources, etc.

	Individual Outcomes						Community Factors						Results		
County	Drug Overdose Deaths†	Opioid Misuse ER Visits	Opioid-related SUDT	Drug-related Arrests	Self-reported Frequent (>14 Per Month) Poor Mental Health Days	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
Cedar*	24	77	53	27	86	801	81	98	97	114	84	474	1,275	71	4
Chariton	1	2	1	9	25	114	32	54	31	13	8	138	252	2	1
Christian	49	60	45	68	53	825	10	12	9	47	36	114	939	33	2
Clark	64	14	1	113	75	801	70	41	39	30	83	263	1,064	47	3
Clay	66	53	59	39	75	876	5	3	5	25	15	53	929	30	2
Clinton	99	32	1	103	43	834	6	8	12	14	35	75	909	29	2
Cole	57	71	86	56	12	846	12	15	20	25	25	97	943	34	2
Cooper	8	16	37	93	25	537	29	34	13	41	19	136	673	13	1
Crawford*	113	108	111	112	101	1,635	110	95	83	115	100	503	2,138	115	5
Dade	23	96	1	114	61	885	50	86	99	106	88	429	1,314	75	4
Dallas	17	75	1	25	53	513	95	73	43	94	112	417	930	31	2
Daviess	33	9	1	85	50	534	75	37	27	9	105	253	787	26	2
DeKalb	10	11	1	36	37	285	56	35	19	5	11	126	411	4	1
Dent	100	103	112	32	108	1,365	102	88	91	86	106	473	1,838	112	5
Douglas	14	5	41	110	41	633	100	108	90	81	92	471	1,104	50	3
Dunklin	84	53	70	101	105	1,239	115	110	111	78	90	504	1,743	109	5
Franklin	112	112	105	26	47	1,206	48	16	10	39	14	127	1,333	79	4
Gasconade	104	101	109	12	41	1,101	51	24	15	5	5	100	1,201	62	3
Gentry	79	67	1	4	16	501	26	50	70	17	33	196	697	17	1
Greene	111	99	88	46	61	1,215	11	55	76	41	53	236	1,451	91	4
Grundy	105	83	1	24	69	846	59	77	88	11	95	330	1,176	60	3

Opioid Overdose Vulnerability Assessment Indicator Ranks

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment
†See Combined Rank for Drug Overdose Deaths table on pages 35-38.
ER = Emergency Room; SUDT = Substance Use Disorder Treatment
See Appendix C for information on data years, data sources, etc.

	Individual Outcomes						Community Factors						Results		
County	Drug Overdose Deaths†	Opioid Misuse ER Visits	Opioid-related SUDT	Drug-related Arrests	Self-reported Frequent (>14 Per Month) Poor Mental Health Days	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
Harrison	31	66	61	67	45	810	73	59	71	3	78	284	1,094	49	3
Henry	57	80	40	87	93	1,071	43	78	93	77	54	345	1,416	87	4
Hickory*	108	58	1	14	3	552	83	105	101	109	94	492	1,044	46	2
Holt	1	93	1	104	13	636	14	49	15	22	29	129	765	22	1
Howard	6	7	62	72	43	570	37	27	48	30	17	159	729	19	1
Howell	39	73	57	98	93	1,080	68	103	99	41	59	370	1,450	90	4
Iron*	109	113	96	6	108	1,296	98	97	93	103	87	478	1,774	111	5
Jackson	83	62	82	37	56	960	21	25	44	55	64	209	1,169	59	3
Jasper	30	86	66	33	82	891	55	39	61	52	68	275	1,166	58	3
Jefferson	113	110	108	44	114	1,467	38	6	11	74	21	150	1,617	100	5
Johnson	18	23	47	48	32	504	9	23	47	78	31	188	692	16	1
Knox	36	11	1	42	5	285	63	83	85	58	111	400	685	15	1
Laclede	41	44	39	70	80	822	85	61	66	91	63	366	1,188	61	3
Lafayette	40	50	44	86	56	828	30	18	21	52	26	147	975	37	2
Lawrence	76	88	73	23	61	963	90	67	58	69	74	358	1,321	76	4
Lewis	53	1	54	89	7	612	34	32	37	1	46	150	762	20	1
Lincoln	98	107	97	19	85	1,218	42	7	27	71	20	167	1,385	85	4
Linn	16	56	46	97	90	915	41	68	49	2	58	218	1,133	53	3
Livingston	91	42	43	58	58	876	57	36	69	5	61	228	1,104	50	3
Macon	21	32	1	77	35	498	46	85	57	88	44	320	818	27	2

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment
†See Combined Rank for Drug Overdose Deaths table on pages 35-38.
ER = Emergency Room; SUDT = Substance Use Disorder Treatment
See Appendix C for information on data years, data sources, etc.

	Individual Outcomes						Community Factors						Results		
County	Drug Overdose Deaths†	Opioid Misuse ER Visits	Opioid-related SUDT	Drug-related Arrests	Self-reported Frequent (>14 Per Month) Poor Mental Health Days	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
Madison*	81	91	80	7	68	981	97	94	79	58	56	384	1,365	82	4
Maries	85	62	92	78	99	1,248	78	65	80	91	72	386	1,634	101	5
Marion	95	95	98	99	24	1,233	35	47	72	74	50	278	1,511	96	5
McDonald	47	35	35	29	91	711	106	75	81	69	110	441	1,152	57	3
Mercer	1	44	101	1	13	480	44	52	66	9	113	284	764	21	1
Miller	19	37	72	108	103	1,017	61	72	49	82	47	311	1,328	78	4
Mississippi	92	50	89	100	112	1,329	114	111	115	112	101	553	1,882	113	5
Moniteau	1	8	1	74	28	336	80	22	14	55	86	257	593	11	1
Monroe	26	55	1	66	6	462	16	64	26	28	62	196	658	12	1
Montgomery	76	100	1	82	65	972	76	57	46	58	37	274	1,246	70	4
Morgan	28	26	30	53	92	687	107	104	109	86	114	520	1,207	65	3
New Madrid	96	14	75	96	101	1,146	111	107	104	107	103	532	1,678	106	5
Newton	79	60	64	49	79	993	54	33	25	49	73	234	1,227	68	3
Nodaway	15	3	32	15	15	240	7	74	97	35	24	237	477	7	1
Oregon	55	29	1	21	73	537	79	112	107	41	102	441	978	38	2
Osage	9	21	1	13	2	138	22	14	2	3	3	44	182	1	1
Ozark*	27	5	90	92	86	900	72	113	112	101	77	475	1,375	84	4
Pemiscot	37	58	56	30	108	867	113	109	113	113	82	530	1,397	86	4
Perry	76	85	95	80	75	1,233	33	13	4	17	2	69	1,302	73	4
Pettis	48	73	51	63	1	708	82	56	60	58	71	327	1,035	42	2

Opioid Overdose Vulnerability Assessment Indicator Ranks

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment

†See Combined Rank for Drug Overdose Deaths table on pages 35-38.

ER = Emergency Room; SUDT = Substance Use Disorder Treatment

See Appendix C for information on data years, data sources, etc.

	Individual Outcomes						Community Factors						Results		
County	Drug Overdose Deaths†	Opioid Misuse ER Visits	Opioid-related SUDT	Drug-related Arrests	Self-reported Frequent (>14 Per Month) Poor Mental Health Days	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
Phelps	103	105	113	102	18	1,323	62	66	87	71	30	316	1,639	102	5
Pike	44	98	36	31	55	792	84	43	36	36	52	251	1,043	44	2
Platte	53	35	31	11	7	411	1	2	3	16	6	28	439	6	1
Polk	102	76	69	75	89	1,233	49	45	33	58	67	252	1,485	94	5
Pulaski	96	84	107	84	83	1,362	18	20	21	104	43	206	1,568	99	5
Putnam	1	3	1	5	22	96	20	96	56	63	79	314	410	3	1
Ralls	51	19	1	35	17	369	25	28	29	28	16	126	495	8	1
Randolph	11	69	74	83	75	936	65	46	49	67	40	267	1,203	63	3
Ray	55	78	38	95	20	858	39	9	42	49	27	166	1,024	41	2
Reynolds*	71	44	1	60	36	636	109	81	61	90	66	407	1,043	44	2
Ripley*	75	88	50	79	113	1,215	105	106	102	85	80	478	1,693	107	5
Saline	42	26	49	109	50	828	77	70	61	30	23	261	1,089	48	3
Schuyler	32	17	1	20	72	426	40	87	72	65	85	349	775	24	2
Scotland	12	34	1	18	10	225	103	58	53	30	115	359	584	10	1
Scott	93	50	91	71	58	1,089	86	69	84	65	55	359	1,448	89	4
Shannon	21	37	65	111	29	789	92	115	114	98	104	523	1,312	74	4
Shelby	34	18	1	90	103	738	15	62	41	36	89	243	981	39	2
St. Charles	90	101	79	38	34	1,026	2	1	1	11	1	16	1,042	43	2
St. Clair	7	56	67	107	106	1,029	96	102	96	95	96	485	1,514	97	5
St. Francois*	109	114	114	64	80	1,443	89	60	40	74	51	314	1,757	110	5

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment
†See Combined Rank for Drug Overdose Deaths table on pages 35-38.
ER = Emergency Room; SUDT = Substance Use Disorder Treatment
See Appendix C for information on data years, data sources, etc.

Opioid Overdose Vulnerability Assessment Indicator Ranks

	Individual Outcomes						Community Factors						Results		
County	Drug Overdose Deaths†	Opioid Misuse ER Visits	Opioid-related SUDT	Drug-related Arrests	Self-reported Frequent (>14 Per Month) Poor Mental Health Days	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
St. Louis	105	109	94	54	33	1,185	4	5	8	63	10	90	1,275	71	4
St. Louis City	115	115	115	61	96	1,506	69	90	105	107	69	440	1,946	114	5
Ste. Genevieve	65	87	104	40	31	981	53	21	52	30	4	160	1,141	56	3
Stoddard	49	44	85	34	107	957	94	82	55	82	70	383	1,340	80	4
Stone	69	67	63	57	58	942	58	53	21	91	57	280	1,222	67	3
Sullivan	19	39	102	2	18	540	88	63	44	5	93	293	833	28	2
Taney	86	103	110	62	73	1,302	28	84	58	71	107	348	1,650	103	5
Texas	63	42	83	41	97	978	91	99	107	82	98	477	1,455	92	4
Vernon	52	70	48	22	37	687	27	71	37	17	91	243	930	31	2
Warren	100	111	99	69	50	1,287	45	11	21	67	34	178	1,465	93	5
Washington*	107	91	106	3	111	1,254	108	93	85	111	81	478	1,732	108	5
Wayne*	73	44	100	91	84	1,176	112	100	102	98	75	487	1,663	105	5
Webster	82	40	77	55	47	903	60	42	72	36	99	309	1,212	66	3
Worth	35	10	1	28	11	255	47	31	35	17	32	162	417	5	1
Wright*	37	49	33	81	100	900	99	114	105	101	108	527	1,427	88	4

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment

†See Combined Rank for Drug Overdose Deaths table on pages 35-38.

ER = Emergency Room; SUDT = Substance Use Disorder Treatment

See Appendix C for information on data years, data sources, etc.

Missouri Bloodborne Infection Vulnerability Assessment Indicator Ranks and Results

	Individual Outcomes						Community Factors						Results		
County	Drug Overdose Deaths†	Bloodborne Illnesses (HIV, HBV, HCV)	HCV Among Ages 18 to 40	Opioid Misuse ER Visits	IDU Among Persons Receiving SUDT	Drug-related Arrests	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
Adair	68	18	20	19	102	51	834	17	89	110	52	13	281	1,115	37	2
Andrew	61	52	48	23	1	45	690	13	10	6	22	7	58	748	16	1
Atchison	87	29	9	29	1	106	783	24	40	17	17	42	140	923	27	2
Audrain	24	28	102	40	83	59	1,008	71	48	53	88	49	309	1,317	54	3
Barry	46	102	90	90	74	16	1,254	93	80	88	95	97	453	1,707	93	5
Barton	74	86	85	106	60	8	1,257	52	76	92	49	48	317	1,574	80	4
Bates*	88	45	27	71	58	115	1,212	67	38	32	46	38	221	1,433	68	3
Benton	69	85	65	81	31	73	1,212	74	101	77	110	65	427	1,639	85	4
Bollinger	42	42	60	25	63	65	891	101	79	82	45	39	346	1,237	48	3
Boone	62	60	17	78	43	52	936	3	19	78	25	9	134	1,070	36	2
Buchanan	44	109	92	97	93	50	1,455	36	30	61	55	41	223	1,678	89	4
Butler	88	114	104	94	111	94	1,815	87	91	95	105	60	438	2,253	113	5
Caldwell	29	32	1	26	1	88	531	23	44	29	14	28	138	669	11	1
Callaway	59	35	42	82	57	76	1,053	64	17	18	24	22	145	1,198	44	2
Camden	93	58	66	64	82	43	1,218	31	26	65	95	76	293	1,511	72	4
Cape Girardeau	66	39	50	31	66	10	786	19	29	66	47	18	179	965	28	2
Carroll	13	14	33	11	1	17	267	66	51	72	100	45	334	601	8	1
Carter	72	113	105	22	1	105	1,254	104	92	34	78	109	417	1,671	88	4
Cass	60	36	25	64	36	47	804	8	4	7	39	12	70	874	21	1
Cedar*	24	96	94	77	89	27	1,221	81	98	97	114	84	474	1,695	91	4

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment

†See Combined Rank for Drug Overdose Deaths table on pages 35-38.

ER = Emergency Room; HBV = Hepatitis B Virus; HCV = Hepatitis C Virus; HIV = Human Immunodeficiency Virus; IDU = Injection Drug Use; SUDT = Substance Use Disorder Treatment

See Appendix C for information on data years, data sources, etc.

| Bloodborne Infection Vulnerability Assessment Indicator Ranks | | | | | | | | | | | | | | | |
| | Individual Outcomes | | | | | | | Community Factors | | | | | | Results | | |
County	Drug Overdose Deaths†	Bloodborne Illnesses (HIV, HBV, HCV)	HCV Among Ages 18 to 40	Opioid Misuse ER Visits	IDU Among Persons Receiving SUDT	Drug-related Arrests	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
Chariton	1	3	21	2	1	9	111	32	54	31	13	8	138	249	2	1
Christian	49	38	49	60	30	68	882	10	12	9	47	36	114	996	30	2
Clark	64	5	7	14	1	113	612	70	41	39	30	83	263	875	22	1
Clay	66	30	11	53	39	39	714	5	3	5	25	15	53	767	18	1
Clinton	99	8	12	32	68	103	966	6	8	12	14	35	75	1,041	33	2
Cole	57	59	58	71	62	56	1,089	12	15	20	25	25	97	1,185	43	2
Cooper	8	92	108	16	53	93	1,110	29	34	13	41	19	136	1,246	49	3
Crawford*	113	112	113	108	103	112	1,983	110	95	83	115	100	503	2,486	115	5
Dade	23	91	100	96	1	114	1,275	50	86	99	106	88	429	1,704	92	4
Dallas	17	98	97	75	1	25	939	95	73	43	94	112	417	1,356	58	3
Daviess	33	16	28	9	41	85	636	75	37	27	9	105	253	889	23	1
DeKalb	10	15	110	11	1	36	549	56	35	19	5	11	126	675	12	1
Dent	100	81	106	103	113	32	1,605	102	88	91	86	106	473	2,078	108	5
Douglas	14	50	83	5	32	110	882	100	108	90	81	92	471	1,353	57	3
Dunklin	84	72	56	53	106	101	1,416	115	110	111	78	90	504	1,920	103	5
Franklin	112	66	84	112	88	26	1,464	48	16	10	39	14	127	1,591	81	4
Gasconade	104	77	80	101	101	12	1,425	51	24	15	5	5	100	1,525	74	4
Gentry	79	57	46	67	55	4	924	26	50	70	17	33	196	1,120	38	2
Greene	111	104	82	99	96	46	1,614	11	55	76	41	53	236	1,850	100	5
Grundy	105	68	68	83	51	24	1,197	59	77	88	11	95	330	1,527	75	4

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment
†See Combined Rank for Drug Overdose Deaths table on pages 35-38.
ER = Emergency Room; HBV = Hepatitis B Virus; HCV = Hepatitis C Virus; HIV = Human Immunodeficiency Virus; IDU = Injection Drug Use; SUDT = Substance Use Disorder Treatment
See Appendix C for information on data years, data sources, etc.

	Individual Outcomes						Community Factors						Results		
County	Drug Overdose Deaths†	Bloodborne Illnesses (HIV, HBV, HCV)	HCV Among Ages 18 to 40	Opioid Misuse ER Visits	IDU Among Persons Receiving SUDT	Drug-related Arrests	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
Harrison	31	11	6	66	48	67	687	73	59	71	3	78	284	971	29	2
Henry	57	87	72	80	77	87	1,380	43	78	93	77	54	345	1,725	94	5
Hickory*	108	61	63	58	1	14	915	83	105	101	109	94	492	1,407	63	3
Holt	1	53	61	93	1	104	939	14	49	15	22	29	129	1,068	35	2
Howard	6	6	4	7	1	72	288	37	27	48	30	17	159	447	4	1
Howell	39	110	103	73	61	98	1,452	68	103	99	41	59	370	1,822	99	5
Iron*	109	103	107	113	104	6	1,626	98	97	93	103	87	478	2,104	109	5
Jackson	83	101	35	62	52	37	1,110	21	25	44	55	64	209	1,319	55	3
Jasper	30	100	79	86	90	33	1,254	55	39	61	52	68	275	1,529	76	4
Jefferson	113	76	86	110	105	44	1,602	38	6	11	74	21	150	1,752	97	5
Johnson	18	12	8	23	35	48	432	9	23	47	78	31	188	620	10	1
Knox	36	10	18	11	1	42	354	63	83	85	58	111	400	754	17	1
Laclede	41	54	69	44	71	70	1,047	85	61	66	91	63	366	1,413	64	3
Lafayette	40	27	22	50	33	86	774	30	18	21	52	26	147	921	26	2
Lawrence	76	80	88	88	72	23	1,281	90	67	58	69	74	358	1,639	85	4
Lewis	53	74	98	1	56	89	1,113	34	32	37	1	46	150	1,263	50	3
Lincoln	98	55	57	107	84	19	1,260	42	7	27	71	20	167	1,427	67	3
Linn	16	67	36	56	87	97	1,077	41	68	49	2	58	218	1,295	53	3
Livingston	91	13	75	42	40	58	957	57	36	69	5	61	228	1,185	42	2
Macon	21	34	26	32	44	77	702	46	85	57	88	44	320	1,022	32	2

Bloodborne Infection Vulnerability Assessment Indicator Ranks

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment

†See Combined Rank for Drug Overdose Deaths table on pages 35-38.

ER = Emergency Room; HBV = Hepatitis B Virus; HCV = Hepatitis C Virus; HIV = Human Immunodeficiency Virus; IDU = Injection Drug Use; SUDT = Substance Use Disorder Treatment

See Appendix C for information on data years, data sources, etc.

	Individual Outcomes							Community Factors						Results		
Bloodborne Infection Vulnerability Assessment Indicator Ranks																
County	Drug Overdose Deaths†	Bloodborne Illnesses (HIV, HBV, HCV)	HCV Among Ages 18 to 40	Opioid Misuse ER Visits	IDU Among Persons Receiving SUDT	Drug-related Arrests	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
Madison*	81	89	93	91	92	7	1,359	97	94	79	58	56	384	1,743	96	5
Maries	85	40	45	62	79	78	1,167	78	65	80	91	72	386	1,553	78	4
Marion	95	90	73	95	109	99	1,683	35	47	72	74	50	278	1,961	105	5
McDonald	47	107	91	35	75	29	1,152	106	75	81	69	110	441	1,593	83	4
Mercer	1	1	1	44	98	1	438	44	52	66	9	113	284	722	15	1
Miller	19	19	38	37	86	108	921	61	72	49	82	47	311	1,232	47	3
Mississippi	92	79	109	50	108	100	1,614	114	111	115	112	101	553	2,167	111	5
Moniteau	1	21	43	8	1	74	444	80	22	14	55	86	257	701	14	1
Monroe	26	47	39	55	1	66	702	16	64	26	28	62	196	898	25	2
Montgomery	76	24	51	100	37	82	1,110	76	57	46	58	37	274	1,384	61	3
Morgan	28	31	40	26	27	53	615	107	104	109	86	114	520	1,135	40	2
New Madrid	96	64	55	14	28	96	1,059	111	107	104	107	103	532	1,591	81	4
Newton	79	83	53	60	64	49	1,164	54	33	25	49	73	234	1,398	62	3
Nodaway	15	9	23	3	29	15	282	7	74	97	35	24	237	519	7	1
Oregon	55	51	67	29	34	21	771	79	112	107	41	102	441	1,212	45	2
Osage	9	4	16	21	1	13	192	22	14	2	3	3	44	236	1	1
Ozark*	27	95	101	5	38	92	1,074	72	113	112	101	77	475	1,549	77	4
Pemiscot	37	44	5	58	54	30	684	113	109	113	113	82	530	1,214	46	2
Perry	76	63	76	85	76	80	1,368	33	13	4	17	2	69	1,437	69	3
Pettis	48	48	34	73	46	63	936	82	56	60	58	71	327	1,263	50	3

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†See Combined Rank for Drug Overdose Deaths table on pages 35-38.

ER = Emergency Room; HBV = Hepatitis B Virus; HCV = Hepatitis C Virus; HIV = Human Immunodeficiency Virus; IDU = Injection Drug Use; SUDT = Substance Use Disorder Treatment

See Appendix C for information on data years, data sources, etc.

	Bloodborne Infection Vulnerability Assessment Indicator Ranks															
	Individual Outcomes							Community Factors						Results		
County	Drug Overdose Deaths†	Bloodborne Illnesses (HIV, HBV, HCV)	HCV Among Ages 18 to 40	Opioid Misuse ER Visits	IDU Among Persons Receiving SUDT	Drug-related Arrests	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
Phelps	103	73	70	105	110	102	1,689	62	66	87	71	30	316	2,005	107	5
Pike	44	62	89	98	47	31	1,113	84	43	36	36	52	251	1,364	59	3
Platte	53	23	15	35	26	11	489	1	2	3	16	6	28	517	6	1
Polk	102	69	64	76	85	75	1,413	49	45	33	58	67	252	1,665	87	4
Pulaski	96	46	29	84	94	84	1,299	18	20	21	104	43	206	1,505	71	4
Putnam	1	20	32	3	1	5	186	20	96	56	63	79	314	500	5	1
Ralls	51	78	59	19	1	35	729	25	28	29	28	16	126	855	20	1
Randolph	11	33	13	69	80	83	867	65	46	49	67	40	267	1,134	39	2
Ray	55	25	14	78	59	95	978	39	9	42	49	27	166	1,144	41	2
Reynolds*	71	97	96	44	1	60	1,107	109	81	61	90	66	407	1,514	73	4
Ripley*	75	84	81	88	65	79	1,416	105	106	102	85	80	478	1,894	102	5
Saline	42	22	19	26	45	109	789	77	70	61	30	23	261	1,050	34	2
Schuyler	32	7	10	17	1	20	261	40	87	72	65	85	349	610	9	1
Scotland	12	17	30	34	1	18	336	103	58	53	30	115	359	695	13	1
Scott	93	82	47	50	99	71	1,326	86	69	84	65	55	359	1,685	90	4
Shannon	21	75	77	37	1	111	966	92	115	114	98	104	523	1,489	70	4
Shelby	34	37	37	18	1	90	651	15	62	41	36	89	243	894	24	2
St. Charles	90	26	31	101	42	38	984	2	1	1	11	1	16	1,000	31	2
St. Clair	7	94	41	56	73	107	1,134	96	102	96	95	96	485	1,619	84	4
St. Francois*	109	108	112	114	114	64	1,863	89	60	40	74	51	314	2,177	112	5

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†See Combined Rank for Drug Overdose Deaths table on pages 35-38.

ER = Emergency Room; HBV = Hepatitis B Virus; HCV = Hepatitis C Virus; HIV = Human Immunodeficiency Virus; IDU = Injection Drug Use; SUDT = Substance Use Disorder Treatment

See Appendix C for information on data years, data sources, etc.

	Individual Outcomes						Community Factors						Results		
County	Drug Overdose Deaths†	Bloodborne Illnesses (HIV, HBV, HCV)	HCV Among Ages 18 to 40	Opioid Misuse ER Visits	IDU Among Persons Receiving SUDT	Drug-related Arrests	Individual Outcomes Sum x 3	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured	Community Factors Sum	Sum of Categories	Sum Rank Position	Quintile
St. Louis	105	65	44	109	49	54	1,278	4	5	8	63	10	90	1,368	60	3
St. Louis City	115	115	87	115	112	61	1,815	69	90	105	107	69	440	2,255	114	5
Ste. Genevieve	65	43	62	87	100	40	1,191	53	21	52	30	4	160	1,351	56	3
Stoddard	49	70	52	44	97	34	1,038	94	82	55	82	70	383	1,421	65	3
Stone	69	106	115	67	70	57	1,452	58	53	21	91	57	280	1,732	95	5
Sullivan	19	49	24	39	50	2	549	88	63	44	5	93	293	842	19	1
Taney	86	111	111	103	115	62	1,764	28	84	58	71	107	348	2,112	110	5
Texas	63	71	78	42	69	41	1,092	91	99	107	82	98	477	1,569	79	4
Vernon	52	41	54	70	107	22	1,038	27	71	37	17	91	243	1,281	52	3
Warren	100	93	95	111	91	69	1,677	45	11	21	67	34	178	1,855	101	5
Washington*	107	99	99	91	95	3	1,482	108	93	85	111	81	478	1,960	104	5
Wayne*	73	105	114	44	78	91	1,515	112	100	102	98	75	487	2,002	106	5
Webster	82	56	71	40	67	55	1,113	60	42	72	36	99	309	1,422	66	3
Worth	35	2	1	10	1	28	231	47	31	35	17	32	162	393	3	1
Wright*	37	88	74	49	81	81	1,230	99	114	105	101	108	527	1,757	98	5

Bloodborne Infection Vulnerability Assessment Indicator Ranks

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment
†See Combined Rank for Drug Overdose Deaths table on pages 35-38.
ER = Emergency Room; HBV = Hepatitis B Virus; HCV = Hepatitis C Virus; HIV = Human Immunodeficiency Virus; IDU = Injection Drug Use; SUDT = Substance Use Disorder Treatment
See Appendix C for information on data years, data sources, etc.

Combined Drug Overdose Death Ranks for Opioid Overdose and Bloodborne Infection Vulnerability Assessments

County	Combined Rank for Drug Overdose Deaths			
	Residence County Rank	Recorded County Rank	Sum of Individual Ranks	Combined Drug Overdose Deaths Rank
Adair	71	70	141	68
Andrew	58	66	124	61
Atchison	80	91	171	87
Audrain	16	37	53	24
Barry	54	36	90	46
Barton	70	81	151	74
Bates*	92	80	172	88
Benton	66	76	142	69
Bollinger	41	40	81	42
Boone	47	79	126	62
Buchanan	35	50	85	44
Butler	74	98	172	88
Caldwell	43	16	59	29
Callaway	62	56	118	59
Camden	78	105	183	93
Cape Girardeau	50	89	139	66
Carroll	15	17	32	13
Carter	68	77	145	72
Cass	57	62	119	60
Cedar*	22	31	53	24
Chariton	1	1	2	1
Christian	51	43	94	49
Clark	61	72	133	64
Clay	64	75	139	66
Clinton	106	86	192	99
Cole	52	61	113	57
Cooper	7	10	17	8
Crawford*	111	114	225	113
Dade	31	21	52	23
Dallas	27	11	38	17

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment

See Appendix C for information on data years, data sources, etc.

	Combined Rank for Drug Overdose Deaths			
County	Residence County Rank	Recorded County Rank	Sum of Individual Ranks	Combined Drug Overdose Deaths Rank
Daviess	48	19	67	33
DeKalb	10	13	23	10
Dent	98	100	198	100
Douglas	9	24	33	14
Dunklin	76	88	164	84
Franklin	110	112	222	112
Gasconade	102	102	204	104
Gentry	103	53	156	79
Greene	108	113	221	111
Grundy	97	110	207	105
Harrison	24	39	63	31
Henry	49	64	113	57
Hickory*	113	99	212	108
Holt	1	1	2	1
Howard	13	1	14	6
Howell	34	41	75	39
Iron*	112	104	216	109
Jackson	73	90	163	83
Jasper	33	29	62	30
Jefferson	114	111	225	113
Johnson	18	23	41	18
Knox	30	42	72	36
Laclede	32	48	80	41
Lafayette	45	32	77	40
Lawrence	81	74	155	76
Lewis	55	52	107	53
Lincoln	105	84	189	98
Linn	20	15	35	16
Livingston	84	96	180	91
Macon	21	27	48	21
Madison*	79	78	157	81

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment

See Appendix C for information on data years, data sources, etc.

	Combined Rank for Drug Overdose Deaths			
County	Residence County Rank	Recorded County Rank	Sum of Individual Ranks	Combined Drug Overdose Deaths Rank
Maries	93	73	166	85
Marion	89	95	184	95
McDonald	56	35	91	47
Mercer	1	1	2	1
Miller	26	18	44	19
Mississippi	100	82	182	92
Moniteau	1	1	2	1
Monroe	17	38	55	26
Montgomery	95	60	155	76
Morgan	29	28	57	28
New Madrid	87	101	188	96
Newton	59	97	156	79
Nodaway	12	22	34	15
Oregon	65	47	112	55
Osage	8	12	20	9
Ozark*	23	33	56	27
Pemiscot	25	49	74	37
Perry	72	83	155	76
Pettis	38	54	92	48
Phelps	96	106	202	103
Pike	39	46	85	44
Platte	44	63	107	53
Polk	90	109	199	102
Pulaski	101	87	188	96
Putnam	1	1	2	1
Ralls	53	51	104	51
Randolph	11	14	25	11
Ray	67	45	112	55
Reynolds*	88	55	143	71
Ripley*	82	71	153	75
Saline	37	44	81	42

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment
See Appendix C for information on data years, data sources, etc.

County	Combined Rank for Drug Overdose Deaths			
	Residence County Rank	Recorded County Rank	Sum of Individual Ranks	Combined Drug Overdose Deaths Rank
Schuyler	63	1	64	32
Scotland	1	30	31	12
Scott	91	92	183	93
Shannon	28	20	48	21
Shelby	42	26	68	34
St. Charles	86	93	179	90
St. Clair	14	1	15	7
St. Francois*	109	107	216	109
St. Louis	99	108	207	105
St. Louis City	115	115	230	115
Ste. Genevieve	77	57	134	65
Stoddard	36	58	94	49
Stone	75	67	142	69
Sullivan	19	25	44	19
Taney	83	85	168	86
Texas	60	69	129	63
Vernon	46	59	105	52
Warren	104	94	198	100
Washington*	107	103	210	107
Wayne*	85	65	150	73
Webster	94	68	162	82
Worth	69	1	70	35
Wright*	40	34	74	37

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See Appendix C for information on data years, data sources, etc.

Appendix B – Vulnerability Assessment Indicator Counts and Rates

Tables showing the counts and rates for the indicators included in each vulnerability assessment are provided on the following pages. Counts for indicators from the Missouri County-Level Study and the American Community Survey are not provided because they are estimates and not counts of actual events.

Counties identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment are indicated with an asterisk (*) behind the county name.

Counts of 1-4 for indicators that represent data on individuals are suppressed for privacy reasons. These cells are shaded in black. Rates based on counts of 1-19 are considered unreliable and are shaded in gray.

Missouri Opioid Overdose Vulnerability Assessment Indicators: Counts and Rates

	Opioid Overdose Vulnerability Assessment Indicators															
	Individual Outcomes												Community Factors			
County	Count: Drug OD Deaths by Residence County	Rate: Drug OD Deaths by Residence County	Count: Drug OD Deaths by County of Record	Rate: Drug OD Deaths by County of Record	Count: Opioid Misuse ER Visits	Rate: Opioid Misuse ER Visits	Count: Opioid-related SUDT	Rate: Opioid-related SUDT	Count: Drug-related Arrests	Rate: Drug-related Arrests	Rate: Self-reported Frequent Poor Mental Health Days	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured
Adair	13	17.1	11	14.5	30	0.39	12	47.3	169	666.0	15.9	9.5	$38,750	26.2	5.5	8.0
Andrew	7	13.4	7	13.4	24	0.46	5	28.5	110	626.6	13.1	8.7	$56,658	9.0	4.2	7.0
Atchison	■	18.9	■	18.9	8	0.50	0	0.0	80	1,516.6	13.2	10.4	$45,259	12.1	4.1	10.7
Audrain	■	3.9	6	7.7	47	0.60	22	85.8	196	764.4	14.2	15.3	$44,056	16.7	7.4	11.4
Barry	14	13.1	8	7.5	126	1.18	26	72.9	150	420.5	14.1	18.4	$40,638	20.5	8.0	16.3
Barton	6	16.8	6	16.8	60	1.68	6	50.6	38	320.7	11.5	12.7	$41,184	20.9	5.4	11.4
Bates*	11	22.4	8	16.3	42	0.85	13	79.6	435	2,663.2	14.4	14.2	$45,605	14.3	5.2	10.2
Benton	9	15.9	9	15.9	55	0.97	11	57.7	169	886.0	17.1	15.5	$35,097	18.6	9.7	12.7
Bollinger	■	10.9	■	8.2	17	0.47	8	65.0	101	820.7	10.7	20.2	$40,791	19.9	5.1	10.4
Boone	61	11.5	86	16.2	481	0.91	99	55.5	1,234	692.2	10.6	6.5	$52,005	18.7	4.4	7.4
Buchanan	27	10.1	26	9.7	334	1.25	97	108.9	587	659.1	17.7	11.7	$48,652	17.3	5.7	10.5
Butler	23	17.9	27	21.0	155	1.21	62	145.3	515	1,207.1	11.3	16.5	$37,878	21.6	9.2	12.3
Caldwell	■	11.0	■	3.7	13	0.48	0	0.0	98	1,076.9	14.4	10.3	$44,975	13.3	3.8	9.4
Callaway	20	14.8	15	11.1	132	0.98	30	66.6	413	917.1	14.2	14.0	$53,180	12.3	4.3	8.9
Camden	25	18.6	32	23.8	102	0.76	32	70.1	268	587.3	12.4	11.2	$50,496	17.5	8.0	14.0
Cape Girardeau	30	12.7	44	18.7	120	0.51	60	76.8	271	346.7	8.5	9.7	$49,554	17.7	5.3	8.6
Carroll	■	3.7	■	3.7	9	0.34	0	0.0	37	420.6	12.5	14.2	$43,583	18.4	8.2	11.0

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Shading: Rates based on counts of 1 to 19 are considered unreliable and are shaded in gray. Counts of 1 to 4 are suppressed due to confidentiality concerns and are shaded in black.

ER = Emergency Room; OD = Overdose; SUDT = Substance Use Disorder Treatment

See Appendix C for information on data years, data sources, etc.

Opioid Overdose Vulnerability Assessment Indicators

County	Count: Drug OD Deaths by Residence County	Rate: Drug OD Deaths by Residence County	Count: Drug OD Deaths by County of Record	Rate: Drug OD Deaths by County of Record	Count: Opioid Misuse ER Visits	Rate: Opioid Misuse ER Visits	Count: Opioid-related SUDT	Rate: Opioid-related SUDT	Count: Drug-related Arrests	Rate: Drug-related Arrests	Rate: Self-reported Frequent Poor Mental Health Days	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured
		Individual Outcomes											**Community Factors**			
Carter	■	16.1	■	16.1	8	0.43	0	0.0	90	1,458.9	23.1	20.6	$37,875	14.5	6.9	19.2
Cass	41	13.3	37	12.0	234	0.76	40	38.6	653	629.6	6.8	7.6	$65,352	9.5	4.9	7.6
Cedar*	■	7.1	■	7.1	38	0.90	7	49.7	68	483.2	15.9	16.2	$35,930	22.6	11.2	14.7
Chariton	0	0.0	0	0.0	■	0.18	0	0.0	24	320.9	11.3	11.5	$43,186	14.2	3.7	7.2
Christian	33	13.0	22	8.7	188	0.74	35	41.0	722	845.1	13.4	8.3	$55,761	10.4	5.3	9.8
Clark	■	14.8	■	14.8	7	0.35	0	0.0	140	2,082.4	14.8	14.6	$45,216	15.3	4.6	14.6
Clay	109	15.2	114	15.9	496	0.69	135	55.6	1,387	571.1	14.8	7.1	$65,675	8.9	4.4	8.3
Clinton	16	25.9	11	17.8	32	0.52	0	0.0	293	1,425.5	13.0	7.3	$57,591	11.0	3.8	9.6
Cole	30	13.0	27	11.7	195	0.85	63	82.1	575	749.6	9.5	8.6	$54,216	12.6	4.4	9.3
Cooper	■	1.9	■	1.9	19	0.36	6	34.0	210	1,190.2	11.3	11.2	$46,547	11.2	5.0	8.6
Crawford*	24	32.9	28	38.4	136	1.86	53	219.9	500	2,074.5	18.3	23.3	$37,171	20.0	11.6	16.6
Dade	■	8.8	■	4.4	28	1.23	0	0.0	171	2,253.6	14.1	12.4	$38,880	22.9	9.3	15.1
Dallas	■	8.1	■	2.0	43	0.87	0	0.0	79	473.8	13.4	18.8	$41,441	15.7	7.8	20.4
Daviess	■	12.1	■	4.0	7	0.28	0	0.0	82	980.7	13.3	15.7	$45,707	13.2	3.5	18.1
DeKalb	■	2.6	■	2.6	13	0.34	0	0.0	69	548.1	12.4	12.9	$46,517	12.5	3.4	7.5
Dent	11	23.7	10	21.5	73	1.57	37	239.0	83	536.2	19.6	20.4	$38,829	20.8	7.3	18.2
Douglas	■	2.5	■	5.0	10	0.25	5	37.6	241	1,812.0	12.8	19.6	$33,003	20.6	7.0	15.3
Dunklin	17	18.6	17	18.6	63	0.69	20	66.4	381	1,265.0	19.1	25.7	$32,348	26.6	6.9	15.1

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ER = Emergency Room; OD = Overdose; SUDT = Substance Use Disorder Treatment

See Appendix C for information on data years, data sources, etc.

Opioid Overdose Vulnerability Assessment Indicators

County	Count: Drug OD Deaths by Residence County	Rate: Drug OD Deaths by Residence County	Count: Drug OD Deaths by County of Record	Rate: Drug OD Deaths by County of Record	Count: Opioid Misuse ER Visits	Rate: Opioid Misuse ER Visits	Count: Opioid-related SUDT	Rate: Opioid-related SUDT	Count: Drug-related Arrests	Rate: Drug-related Arrests	Rate: Self-reported Frequent Poor Mental Health Days	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured
					Individual Outcomes							Community Factors				
Franklin	96	31.1	88	28.5	712	2.31	155	150.0	499	482.9	13.2	12.3	$53,849	10.6	4.9	8.2
Gasconade	11	24.8	10	22.5	67	1.51	30	203.7	53	359.9	12.8	12.4	$50,687	12.0	3.4	6.4
Gentry	5	25.0	■	10.0	16	0.80	0	0.0	13	195.0	10.0	11.0	$43,777	18.1	4.1	9.5
Greene	244	28.2	298	34.4	1,229	1.42	272	93.9	1,819	627.7	14.1	8.5	$43,175	18.5	5.0	11.7
Grundy	7	23.2	8	26.5	30	0.99	0	0.0	46	462.4	14.4	13.2	$41,092	20.5	3.6	16.0
Harrison	■	7.8	■	7.8	20	0.78	5	58.7	71	832.9	13.1	15.5	$42,889	18.3	3.3	14.2
Henry	8	12.3	8	12.3	62	0.95	8	36.8	228	1,049.8	16.9	12.1	$41,089	21.2	6.7	11.9
Hickory*	10	35.8	6	21.5	20	0.72	0	0.0	37	390.5	6.7	16.4	$34,746	23.3	9.6	15.8
Holt	0	0.0	0	0.0	16	1.20	0	0.0	64	1,450.3	9.6	8.8	$43,981	12.0	4.2	9.4
Howard	■	3.3	0	0.0	8	0.26	6	59.2	89	877.8	13.0	11.7	$50,356	16.4	4.6	8.5
Howell	12	10.0	10	8.3	103	0.86	22	54.9	494	1,231.8	16.9	14.3	$34,984	22.9	5.0	12.3
Iron*	10	32.9	7	23.0	102	3.36	12	117.3	24	234.7	19.6	19.3	$36,457	21.2	8.6	14.9
Jackson	367	17.7	389	18.7	1,557	0.75	537	76.8	3,910	559.5	13.9	10.1	$50,652	15.9	5.7	12.6
Jasper	35	9.8	24	6.7	377	1.05	75	62.4	652	542.4	15.4	12.9	$45,328	17.3	5.5	13.1
Jefferson	250	37.2	187	27.8	1,395	2.08	390	174.3	1,382	617.5	21.6	11.8	$60,765	10.9	6.5	8.9
Johnson	8	4.9	8	4.9	75	0.46	23	42.7	346	642.0	11.8	8.0	$50,689	16.2	6.9	9.4
Knox	■	8.5	■	8.5	■	0.34	0	0.0	23	578.3	7.4	13.7	$39,674	20.2	5.8	19.9
Laclede	10	9.4	10	9.4	67	0.63	13	36.7	307	866.2	15.3	16.5	$42,646	17.7	7.7	12.5
Lafayette	11	11.2	7	7.1	67	0.68	13	39.8	341	1,044.7	13.9	11.2	$52,557	12.8	5.5	9.3
Lawrence	22	19.1	18	15.7	131	1.14	26	67.6	172	447.5	14.1	17.0	$41,673	17.1	6.2	14.0

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Opioid Overdose Vulnerability Assessment Indicators

County	Individual Outcomes											Community Factors				
	Count: Drug OD Deaths by Residence County	Rate: Drug OD Deaths by Residence County	Count: Drug OD Deaths by County of Record	Rate: Drug OD Deaths by County of Record	Count: Opioid Misuse ER Visits	Rate: Opioid Misuse ER Visits	Count: Opioid-related SUDT	Rate: Opioid-related SUDT	Count: Drug-related Arrests	Rate: Drug-related Arrests	Rate: Self-reported Frequent Poor Mental Health Days	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured
Lewis	■	13.2	■	9.9	■	0.07	5	50.2	109	1,093.6	8.3	11.6	$47,148	15.2	2.9	11.2
Lincoln	43	25.9	29	17.5	298	1.79	70	124.6	243	432.5	15.7	12.1	$58,603	13.2	6.3	8.8
Linn	■	5.5	■	2.7	26	0.71	5	41.0	150	1,230.1	16.5	11.9	$41,652	16.5	3.2	12.2
Livingston	9	19.8	9	19.8	28	0.62	6	39.5	115	757.9	14	13.0	$45,929	17.9	3.4	12.4
Macon	■	6.6	■	6.6	24	0.52	0	0.0	141	924.5	12.2	12.2	$38,903	17.0	7.4	10.9
Madison*	7	18.9	6	16.2	44	1.19	9	73.5	32	261.4	14.3	18.9	$37,484	18.8	5.8	12.0
Maries	6	22.5	■	15.0	20	0.75	9	101.5	82	924.8	17.9	16.1	$41,715	18.9	7.7	13.6
Marion	19	22.0	17	19.7	105	1.22	36	125.7	357	1,246.8	10.9	11.7	$44,098	18.4	6.5	11.5
McDonald	9	13.2	5	7.3	38	0.56	7	30.7	113	495.0	16.6	21.5	$41,207	19.0	6.2	19.4
Mercer	0	0.0	0	0.0	7	0.63	5	135.9	■	81.6	9.6	12.1	$43,314	17.7	3.5	21.0
Miller	6	7.9	■	4.0	43	0.57	17	67.4	437	1,732.2	18.8	13.6	$41,461	16.5	7.1	11.3
Mississippi	10	24.1	7	16.9	28	0.68	13	95.7	170	1,251.3	20.3	25.7	$32,212	31.7	10.0	16.7
Moniteau	0	0.0	0	0.0	13	0.27	0	0.0	147	915.1	11.4	16.2	$50,897	11.9	5.7	14.9
Monroe	■	3.9	■	7.8	18	0.70	0	0.0	71	824.4	8.2	9.2	$42,011	13.0	4.5	12.5
Montgomery	8	23.0	■	11.5	52	1.50	0	0.0	110	961.7	14.2	15.8	$43,094	16.1	5.8	9.9
Morgan	5	8.3	■	6.6	29	0.48	5	24.8	142	704.9	16.7	22.6	$34,776	25.5	7.3	24.3
New Madrid	11	20.5	12	22.3	19	0.35	12	68.3	216	1,228.5	18.3	24.1	$33,846	24.1	9.4	17.8
Newton	24	13.7	36	20.5	130	0.74	35	60.0	379	650.2	15.2	12.9	$46,723	12.9	5.4	13.6
Nodaway	■	2.9	■	4.4	14	0.21	6	26.7	90	400.5	9.7	7.4	$41,370	22.6	4.7	9.2
Oregon	5	15.5	■	9.3	16	0.50	0	0.0	47	445.2	14.7	16.2	$32,070	25.3	5.0	17.6

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Opioid Overdose Vulnerability Assessment Indicators

County	Individual Outcomes											Community Factors				
	Count: Drug OD Deaths by Residence County	Rate: Drug OD Deaths by Residence County	Count: Drug OD Deaths by County of Record	Rate: Drug OD Deaths by County of Record	Count: Opioid Misuse ER Visits	Rate: Opioid Misuse ER Visits	Count: Opioid-related SUDT	Rate: Opioid-related SUDT	Count: Drug-related Arrests	Rate: Drug-related Arrests	Rate: Self-reported Frequent Poor Mental Health Days	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured
Osage	■	2.4	■	2.4	17	0.42	0	0.0	51	373.3	6.4	10.2	$54,503	6.8	3.3	6.0
Ozark*	■	7.2	■	7.2	7	0.25	9	98.0	107	1,164.8	15.9	15.4	$32,021	27.6	8.4	14.2
Pemiscot	■	7.8	5	9.7	37	0.72	9	53.5	88	523.0	19.6	25.6	$32,468	28.5	10.7	14.5
Perry	10	17.3	10	17.3	59	1.02	22	114.4	179	931.1	14.8	11.6	$54,935	8.2	4.1	5.9
Pettis	13	10.2	13	10.2	109	0.86	20	47.0	338	794.2	5.6	16.2	$43,097	17.2	5.8	13.3
Phelps	31	23.1	32	23.9	214	1.60	111	248.1	572	1,278.4	10.2	13.6	$41,681	20.4	6.3	9.4
Pike	6	10.8	5	9.0	70	1.26	6	32.3	99	533.2	13.7	16.4	$45,112	15.1	4.8	11.6
Platte	33	11.2	36	12.2	165	0.56	27	26.7	351	346.9	8.3	4.8	$74,199	7.2	4.0	6.8
Polk	21	22.3	23	24.4	84	0.89	21	66.1	291	915.3	16.0	12.4	$44,805	14.4	5.8	13.0
Pulaski	39	24.7	29	18.4	158	1.00	84	161.4	506	972.0	15.5	9.5	$51,137	12.8	8.8	10.8
Putnam	0	0.0	0	0.0	■	0.21	0	0.0	10	207.9	10.7	10.1	$37,028	16.9	5.9	14.3
Ralls	■	13.1	■	9.8	12	0.39	0	0.0	56	547.7	10.1	10.8	$50,161	13.3	4.5	8.4
Randolph	■	2.7	■	2.7	62	0.83	17	68.1	240	962.1	14.8	14.1	$44,754	16.5	6.1	10.4
Ray	11	16.1	6	8.8	62	0.91	8	35.0	279	1,220.7	10.4	11.8	$57,270	15.6	5.4	9.3
Reynolds*	■	20.9	■	10.4	12	0.63	0	0.0	48	764.9	12.3	23.2	$40,265	17.3	7.6	12.8
Ripley*	8	19.4	6	14.6	47	1.14	6	44.2	126	928.9	20.8	21.3	$33,849	23.4	7.2	14.5
Saline	7	10.2	6	8.7	33	0.48	10	44.1	395	1,743.2	13.3	15.9	$41,567	17.3	4.6	9.0
Schuyler	■	15.0	0	0.0	5	0.37	0	0.0	20	443.7	14.6	11.8	$38,848	18.4	6.0	14.8
Scotland	0	0.0	■	6.8	8	0.54	0	0.0	21	423.1	8.7	20.6	$42,939	16.7	4.6	31.2
Scott	26	22.4	22	18.9	79	0.68	38	98.6	334	866.6	14.0	16.5	$41,628	20.1	6.0	12.0

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Opioid Overdose Vulnerability Assessment Indicators

County	Individual Outcomes											Community Factors				
	Count: Drug OD Deaths by Residence County	Rate: Drug OD Deaths by Residence County	Count: Drug OD Deaths by County of Record	Rate: Drug OD Deaths by County of Record	Count: Opioid Misuse ER Visits	Rate: Opioid Misuse ER Visits	Count: Opioid-related SUDT	Rate: Opioid-related SUDT	Count: Drug-related Arrests	Rate: Drug-related Arrests	Rate: Self-reported Frequent Poor Mental Health Days	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured
Shannon	■	8.1	■	4.1	14	0.57	5	60.6	151	1,830.5	11.5	18.1	$31,202	30.5	8.1	17.9
Shelby	■	11.0	■	5.5	7	0.38	0	0.0	66	1,096.2	18.8	9.0	$42,593	15.5	4.8	15.1
St. Charles	240	20.5	223	19.0	1,769	1.51	289	73.1	2,213	559.5	12.0	5.5	$78,380	5.7	3.6	5.5
St. Clair	■	3.6	0	0.0	20	0.71	6	64.1	142	1,516.8	19.2	18.9	$35,066	22.2	8.0	16.1
St. Francois*	58	29.0	48	24.0	720	3.60	184	275.8	541	811.0	15.3	16.8	$42,873	15.4	6.5	11.6
St. Louis	718	23.9	725	24.2	5,892	1.96	1,088	109.2	7,135	715.8	11.9	6.8	$62,931	9.8	5.9	7.4
St. Louis City	517	55.3	717	76.6	4,906	5.24	1,516	491.2	2,373	768.9	17.5	14.3	$38,664	25.0	9.4	13.2
Ste. Genevieve	10	18.6	6	11.2	57	1.06	26	145.7	102	571.7	11.7	12.7	$50,959	16.6	4.6	6.4
Stoddard	9	10.1	10	11.3	56	0.63	24	81.7	160	544.8	19.5	18.6	$40,076	16.8	7.1	13.2
Stone	17	18.1	13	13.9	75	0.80	19	59.9	239	754.0	14.0	13.2	$43,292	12.8	7.7	12.1
Sullivan	■	5.3	■	5.3	11	0.58	9	144.5	8	128.4	10.2	16.7	$42,034	15.9	3.4	15.7
Taney	32	19.4	29	17.6	258	1.57	115	207.7	439	793.1	14.7	11.1	$39,661	17.1	6.3	18.7
Texas	11	14.2	11	14.2	48	0.62	20	77.7	148	575.1	17.6	17.7	$35,571	25.3	7.1	16.4
Vernon	7	11.3	7	11.3	52	0.84	9	44.0	91	445.3	12.4	11.1	$41,479	15.2	4.1	15.2
Warren	26	25.6	20	19.7	232	2.28	45	130.9	293	852.4	13.3	12.1	$56,193	12.8	6.1	9.6
Washington*	21	28.1	17	22.8	89	1.19	40	159.9	44	175.8	20.1	23.0	$37,810	20.2	9.9	14.5
Wayne*	8	20.1	5	12.6	25	0.63	18	135.4	146	1,098.1	15.6	24.6	$35,135	23.4	8.1	14.0
Webster	26	22.8	16	14.0	69	0.60	28	72.4	281	726.8	13.2	13.3	$45,185	18.4	4.8	16.6
Worth	■	16.3	0	0.0	■	0.33	0	0.0	10	486.1	9.3	12.3	$48,214	15.0	4.1	9.4
Wright*	6	10.9	■	7.3	37	0.67	5	27.3	176	960.1	18.1	19.6	$31,290	25.0	8.4	19.1

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Missouri Bloodborne Infection Vulnerability Assessment Indicators: Counts and Rates

	Bloodborne Infection Vulnerability Assessment Indicators																		
	Individual Outcomes														Community Factors				
County	Count: Drug OD Deaths by Residence County	Rate: Drug OD Deaths by Residence County	Count: Drug OD Deaths by County of Record	Rate: Drug OD Deaths by County of Record	Count: HIV, HBV, HCV	Rate: HIV, HBV, HCV	Count: HCV Among Ages 18 to 40	Rate: HCV Among Ages 18 to 40	Count: Opioid Misuse ER Visits	Rate: Opioid Misuse ER Visits	Count: IDU Among SUDT Recipients	Rate: IDU Among SUDT Recipients	Count: Drug-related Arrests	Rate: Drug-related Arrests	Lack of a High School Education	Median Income	Poverty	Unemployment	Uninsured
Adair	13	17.1	11	14.5	31	40.7	13	39.4	30	0.39	46	181.3	169	666.0	9.5	$38,750	26.2	5.5	8.0
Andrew	7	13.4	7	13.4	34	65.1	11	81.1	24	0.46	0	0.0	110	626.6	8.7	$56,658	9.0	4.2	7.0
Atchison	■	18.9	■	18.9	8	50.4	■	27.4	8	0.50	0	0.0	80	1,516.6	10.4	$45,259	12.1	4.1	10.7
Audrain	■	3.9	6	7.7	39	50.2	46	202.2	47	0.60	33	128.7	196	764.4	15.3	$44,056	16.7	7.4	11.4
Barry	14	13.1	8	7.5	126	117.5	44	165.5	126	1.18	42	117.8	150	420.5	18.4	$40,638	20.5	8.0	16.3
Barton	6	16.8	6	16.8	35	98.2	14	156.4	60	1.68	11	92.8	38	320.7	12.7	$41,184	20.9	5.4	11.4
Bates*	11	22.4	8	16.3	30	61.0	6	48.0	42	0.85	15	91.8	435	2,663.2	14.2	$45,605	14.3	5.2	10.2
Benton	9	15.9	9	15.9	55	97.2	11	106.4	55	0.97	8	41.9	169	886.0	15.5	$35,097	18.6	9.7	12.7
Bollinger	■	10.9	■	8.2	21	57.5	9	99.9	17	0.47	12	97.5	101	820.7	20.2	$40,791	19.9	5.1	10.4
Boone	61	11.5	86	16.2	377	71.2	84	37.3	481	0.91	111	62.3	1,234	692.2	6.5	$52,005	18.7	4.4	7.4
Buchanan	27	10.1	26	9.7	372	139.3	145	172.2	334	1.25	131	147.1	587	659.1	11.7	$48,652	17.3	5.7	10.5
Butler	23	17.9	27	21.0	240	187.0	75	215.0	155	1.21	103	241.4	515	1,207.1	16.5	$37,878	21.6	9.2	12.3
Caldwell	■	11.0	■	3.7	14	51.5	0	0.0	13	0.48	0	0.0	98	1,076.9	10.3	$44,975	13.3	3.8	9.4
Callaway	20	14.8	15	11.1	71	52.6	30	69.7	132	0.98	41	91.0	413	917.1	14.0	$53,180	12.3	4.3	8.9
Camden	25	18.6	32	23.8	94	70.0	31	109.6	102	0.76	58	127.1	268	587.3	11.2	$50,496	17.5	8.0	14.0
Cape Girardeau	30	12.7	44	18.7	132	56.0	65	82.0	120	0.51	85	108.7	271	346.7	9.7	$49,554	17.7	5.3	8.6
Carroll	■	3.7	■	3.7	10	37.5	■	60.8	9	0.34	0	0.0	37	420.6	14.2	$43,583	18.4	8.2	11.0

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Bloodborne Infection Vulnerability Assessment Indicators

County	Individual Outcomes														Community Factors				
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Carter	■	16.1	■	16.1	34	182.8	10	215.4	8	0.43	0	0.0	90	1,458.9	20.6	$37,875	14.5	6.9	19.2
Cass	41	13.3	37	12.0	166	53.9	36	43.2	234	0.76	54	52.1	653	629.6	7.6	$65,352	9.5	4.9	7.6
Cedar*	■	7.1	■	7.1	46	109.5	17	180.4	38	0.90	20	142.1	68	483.2	16.2	$35,930	22.6	11.2	14.7
Chariton	0	0.0	0	0.0	■	17.7	■	39.4	■	0.18	0	0.0	24	320.9	11.5	$43,186	14.2	3.7	7.2
Christian	33	13.0	22	8.7	140	55.3	59	81.6	188	0.74	35	41.0	722	845.1	8.3	$55,761	10.4	5.3	9.8
Clark	■	14.8	■	14.8	6	29.6	■	20.7	7	0.35	0	0.0	140	2,082.4	14.6	$45,216	15.3	4.6	14.6
Clay	109	15.2	114	15.9	362	50.4	68	30.7	496	0.69	136	56.0	1,387	571.1	7.1	$65,675	8.9	4.4	8.3
Clinton	16	25.9	11	17.8	19	30.8	5	31.5	32	0.52	23	111.9	293	1,425.5	7.3	$57,591	11.0	3.8	9.6
Cole	30	13.0	27	11.7	161	70.0	65	93.2	195	0.85	74	96.5	575	749.6	8.6	$54,216	12.6	4.4	9.3
Cooper	■	1.9	■	1.9	54	101.9	43	265.8	19	0.36	15	85.0	210	1,190.2	11.2	$46,547	11.2	5.0	8.6
Crawford*	24	32.9	28	38.4	123	168.7	66	352.8	136	1.86	44	182.6	500	2,074.5	23.3	$37,171	20.0	11.6	16.6
Dade	■	8.8	■	4.4	23	100.8	10	195.0	28	1.23	0	0.0	171	2,253.6	12.4	$38,880	22.9	9.3	15.1
Dallas	■	8.1	■	2.0	56	113.1	22	186.2	43	0.87	0	0.0	79	473.8	18.8	$41,441	15.7	7.8	20.4
Daviess	■	12.1	■	4.0	10	40.3	■	50.1	7	0.28	5	59.8	82	980.7	15.7	$45,707	13.2	3.5	18.1
DeKalb	■	2.6	■	2.6	15	39.6	35	276.5	13	0.34	0	0.0	69	548.1	12.9	$46,517	12.5	3.4	7.5
Dent	11	23.7	10	21.5	43	92.6	24	215.7	73	1.57	47	303.6	83	536.2	20.4	$38,829	20.8	7.3	18.2
Douglas	■	2.5	■	5.0	26	64.9	13	148.1	10	0.25	6	45.1	241	1,812.0	19.6	$33,003	20.6	7.0	15.3
Dunklin	17	18.6	17	18.6	77	84.1	21	88.4	63	0.69	57	189.2	381	1,265.0	25.7	$32,348	26.6	6.9	15.1

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Bloodborne Infection Vulnerability Assessment Indicators

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Franklin	96	31.1	88	28.5	236	76.5	124	149.7	712	2.31	145	140.3	499	482.9	12.3	$53,849	10.6	4.9	8.2
Gasconade	11	24.8	10	22.5	40	90.1	15	144.1	67	1.51	25	169.8	53	359.9	12.4	$50,687	12.0	3.4	6.4
Gentry	5	25.0		10.0	14	69.9		79.1	16	0.80	6	90.0	13	195.0	11.0	$43,777	18.1	4.1	9.5
Greene	244	28.2	298	34.4	1,169	134.9	444	145.8	1,229	1.42	443	152.9	1,819	627.7	8.5	$43,175	18.5	5.0	11.7
Grundy	7	23.2	8	26.5	24	79.4	9	113.8	30	0.99	8	80.4	46	462.4	13.2	$41,092	20.5	3.6	16.0
Harrison		7.8		7.8	9	35.0		16.4	20	0.78	6	70.4	71	832.9	15.5	$42,889	18.3	3.3	14.2
Henry	8	12.3	8	12.3	64	98.4	20	125.8	62	0.95	26	119.7	228	1,049.8	12.1	$41,089	21.2	6.7	11.9
Hickory*	10	35.8	6	21.5	20	71.6	5	103.0	20	0.72	0	0.0	37	390.5	16.4	$34,746	23.3	9.6	15.8
Holt	0	0.0	0	0.0	9	67.4		101.9	16	1.20	0	0.0	64	1,450.3	8.8	$43,981	12.0	4.2	9.4
Howard		3.3	0	0.0	9	29.7		11.1	8	0.26	0	0.0	89	877.8	11.7	$50,356	16.4	4.6	8.5
Howell	12	10.0	10	8.3	172	142.8	67	210.7	103	0.86	38	94.8	494	1,231.8	14.3	$34,984	22.9	5.0	12.3
Iron*	10	32.9	7	23.0	40	131.7	19	255.7	102	3.36	19	185.8	24	234.7	19.3	$36,457	21.2	8.6	14.9
Jackson	367	17.7	389	18.7	2,412	116.1	434	66.2	1,557	0.75	590	84.4	3,910	559.5	10.1	$50,652	15.9	5.7	12.6
Jasper	35	9.8	24	6.7	415	115.9	158	141.8	377	1.05	171	142.2	652	542.4	12.9	$45,328	17.3	5.5	13.1
Jefferson	250	37.2	187	27.8	604	89.9	300	156.4	1,395	2.08	419	187.2	1,382	617.5	11.8	$60,765	10.9	6.5	8.9
Johnson	8	4.9	8	4.9	58	35.8	17	25.2	75	0.46	27	50.1	346	642.0	8.0	$50,689	16.2	6.9	9.4
Knox		8.5		8.5		33.8		37.5		0.34	0	0.0	23	578.3	13.7	$39,674	20.2	5.8	19.9
Laclede	10	9.4	10	9.4	72	67.7	33	117.3	67	0.63	41	115.7	307	866.2	16.5	$42,646	17.7	7.7	12.5
Lafayette	11	11.2	7	7.1	49	50.0	10	39.4	67	0.68	15	46.0	341	1,044.7	11.2	$52,557	12.8	5.5	9.3
Lawrence	22	19.1	18	15.7	106	92.2	48	162.0	131	1.14	45	117.1	172	447.5	17.0	$41,673	17.1	6.2	14.0

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Lewis	■	13.2	■	9.9	27	89.1	17	189.8	■	0.07	9	90.3	109	1,093.6	11.6	$47,148	15.2	2.9	11.2
Lincoln	43	25.9	29	17.5	113	68.0	44	91.3	298	1.79	76	135.3	243	432.5	12.1	$58,603	13.2	6.3	8.8
Linn	■	5.5	■	2.7	29	79.1	6	66.3	26	0.71	17	139.4	150	1,230.1	11.9	$41,652	16.5	3.2	12.2
Livingston	9	19.8	9	19.8	17	37.4	17	129.4	28	0.62	9	59.3	115	757.9	13.0	$45,929	17.9	3.4	12.4
Macon	■	6.6	■	6.6	24	52.5	5	46.1	24	0.52	10	65.6	141	924.5	12.2	$38,903	17.0	7.4	10.9
Madison*	7	18.9	6	16.2	37	99.7	17	175.4	44	1.19	18	147.0	32	261.4	18.9	$37,484	18.8	5.8	12.0
Maries	6	22.5	■	15.0	15	56.2	5	76.9	20	0.75	11	124.1	82	924.8	16.1	$41,715	18.9	7.7	13.6
Marion	19	22.0	17	19.7	87	100.7	31	126.7	105	1.22	64	223.5	357	1,246.8	11.7	$44,098	18.4	6.5	11.5
McDonald	9	13.2	5	7.3	93	136.6	31	168.6	38	0.56	27	118.3	113	495.0	21.5	$41,207	19.0	6.2	19.4
Mercer	0	0.0	0	0.0	■	9.0	0	0.0	7	0.63	6	163.1	■	81.6	12.1	$43,314	17.7	3.5	21.0
Miller	6	7.9	■	4.0	31	41.0	13	66.5	43	0.57	35	138.7	437	1,732.2	13.6	$41,461	16.5	7.1	11.3
Mississippi	10	24.1	7	16.9	38	91.7	33	266.0	28	0.68	28	206.1	170	1,251.3	25.7	$32,212	31.7	10.0	16.7
Moniteau	0	0.0	0	0.0	21	43.7	10	71.1	13	0.27	0	0.0	147	915.1	16.2	$50,897	11.9	5.7	14.9
Monroe	■	3.9	■	7.8	16	62.1	■	66.7	18	0.70	0	0.0	71	824.4	9.2	$42,011	13.0	4.5	12.5
Montgomery	8	23.0	■	11.5	16	46.0	7	83.2	52	1.50	6	52.5	110	961.7	15.8	$43,094	16.1	5.8	9.9
Morgan	5	8.3	■	6.6	31	51.2	9	67.1	29	0.48	5	24.8	142	704.9	22.6	$34,776	25.5	7.3	24.3
New Madrid	11	20.5	12	22.3	41	76.3	12	85.5	19	0.35	5	28.4	216	1,228.5	24.1	$33,846	24.1	9.4	17.8
Newton	24	13.7	36	20.5	166	94.5	40	84.7	130	0.74	57	97.8	379	650.2	12.9	$46,723	12.9	5.4	13.6
Nodaway	■	2.9	■	4.4	21	30.9	13	42.4	14	0.21	7	31.1	90	400.5	7.4	$41,370	22.6	4.7	9.2
Oregon	5	15.5	■	9.3	21	65.0	8	112.5	16	0.50	5	47.4	47	445.2	16.2	$32,070	25.3	5.0	17.6

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Osage	■	2.4	■	2.4	12	29.3	■	36.3	17	0.42	0	0.0	51	373.3	10.2	$54,503	6.8	3.3	6.0
Ozark*	■	7.2	■	7.2	29	104.2	11	198.6	7	0.25	5	54.4	107	1,164.8	15.4	$32,021	27.6	8.4	14.2
Pemiscot	■	7.8	5	9.7	31	60.3	■	14.2	37	0.72	15	89.1	88	523.0	25.6	$32,468	28.5	10.7	14.5
Perry	10	17.3	10	17.3	43	74.5	20	129.7	59	1.02	23	119.6	179	931.1	11.6	$54,935	8.2	4.1	5.9
Pettis	13	10.2	13	10.2	80	63.0	24	65.1	109	0.86	29	68.1	338	794.2	16.2	$43,097	17.2	5.8	13.3
Phelps	31	23.1	32	23.9	115	85.7	56	118.0	214	1.60	105	234.7	572	1,278.4	13.6	$41,681	20.4	6.3	9.4
Pike	6	10.8	5	9.0	41	74.1	27	164.7	70	1.26	13	70.0	99	533.2	16.4	$45,112	15.1	4.8	11.6
Platte	33	11.2	36	12.2	133	45.0	32	36.1	165	0.56	25	24.7	351	346.9	4.8	$74,199	7.2	4.0	6.8
Polk	21	22.3	23	24.4	75	79.5	30	106.2	84	0.89	44	138.4	291	915.3	12.4	$44,805	14.4	5.8	13.0
Pulaski	39	24.7	29	18.4	98	62.1	39	50.8	158	1.00	77	147.9	506	972.0	9.5	$51,137	12.8	8.8	10.8
Putnam	0	0.0	0	0.0	6	41.3	■	60.5	■	0.21	0	0.0	10	207.9	10.1	$37,028	16.9	5.9	14.3
Ralls	■	13.1	■	9.8	28	91.4	7	96.0	12	0.39	0	0.0	56	547.7	10.8	$50,161	13.3	4.5	8.4
Randolph	■	2.7	■	2.7	39	52.0	8	34.3	62	0.83	31	124.3	240	962.1	14.1	$44,754	16.5	6.1	10.4
Ray	11	16.1	6	8.8	32	46.8	6	34.3	62	0.91	21	91.9	279	1,220.7	11.8	$57,270	15.6	5.4	9.3
Reynolds*	■	20.9	■	10.4	21	109.6	8	185.7	12	0.63	0	0.0	48	764.9	23.2	$40,265	17.3	7.6	12.8
Ripley*	8	19.4	6	14.6	39	94.7	15	144.9	47	1.14	14	103.2	126	928.9	21.3	$33,849	23.4	7.2	14.5
Saline	7	10.2	6	8.7	31	45.0	8	38.4	33	0.48	15	66.2	395	1,743.2	15.9	$41,567	17.3	4.6	9.0
Schuyler	■	15.0	0	0.0	■	30.0	■	29.6	5	0.37	0	0.0	20	443.7	11.8	$38,848	18.4	6.0	14.8
Scotland	0	0.0	■	6.8	6	40.7	■	53.0	8	0.54	0	0.0	21	423.1	20.6	$42,939	16.7	4.6	31.2
Scott	26	22.4	22	18.9	108	92.9	26	80.8	79	0.68	64	166.1	334	866.6	16.5	$41,628	20.1	6.0	12.0

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Shannon	■	8.1	■	4.1	22	89.2	8	137.1	14	0.57	0	0.0	151	1,830.5	18.1	$31,202	30.5	8.1	17.9
Shelby	■	11.0	■	5.5	10	54.9	■	66.4	7	0.38	0	0.0	66	1,096.2	9.0	$42,593	15.5	4.8	15.1
St. Charles	240	20.5	223	19.0	550	46.9	211	60.3	1,769	1.51	240	60.7	2,213	559.5	5.5	$78,380	5.7	3.6	5.5
St. Clair	■	3.6	0	0.0	29	103.3	■	67.5	20	0.71	11	117.5	142	1,516.8	18.9	$35,066	22.2	8.0	16.1
St. Francois*	58	29.0	48	24.0	277	138.6	191	305.7	720	3.60	205	307.3	541	811.0	16.8	$42,873	15.4	6.5	11.6
St. Louis	718	23.9	725	24.2	2,290	76.4	633	73.7	5,892	1.96	703	70.5	7,135	715.8	6.8	$62,931	9.8	5.9	7.4
St. Louis City	517	55.3	717	76.6	2,364	252.6	573	160.8	4,906	5.24	859	278.3	2,373	768.9	14.3	$38,664	25.0	9.4	13.2
Ste. Genevieve	10	18.6	6	11.2	31	57.6	14	102.7	57	1.06	30	168.1	102	571.7	12.7	$50,959	16.6	4.6	6.4
Stoddard	9	10.1	10	11.3	71	79.9	20	84.6	56	0.63	47	160.0	160	544.8	18.6	$40,076	16.8	7.1	13.2
Stone	17	18.1	13	13.9	127	135.6	68	375.3	75	0.80	36	113.6	239	754.0	13.2	$43,292	12.8	7.7	12.1
Sullivan	■	5.3	■	5.3	12	63.7	■	42.5	11	0.58	5	80.3	8	128.4	16.7	$42,034	15.9	3.4	15.7
Taney	32	19.4	29	17.6	256	155.5	128	277.6	258	1.57	185	334.2	439	793.1	11.1	$39,661	17.1	6.3	18.7
Texas	11	14.2	11	14.2	62	80.3	29	141.2	48	0.62	29	112.7	148	575.1	17.7	$35,571	25.3	7.1	16.4
Vernon	7	11.3	7	11.3	35	56.5	14	85.0	52	0.84	40	195.7	91	445.3	11.1	$41,479	15.2	4.1	15.2
Warren	26	25.6	20	19.7	105	103.3	49	183.6	232	2.28	50	145.5	293	852.4	12.1	$56,193	12.8	6.1	9.6
Washington*	21	28.1	17	22.8	86	115.2	39	194.2	89	1.19	38	151.9	44	175.8	23.0	$37,810	20.2	9.9	14.5
Wayne*	8	20.1	5	12.6	54	135.5	33	366.2	25	0.63	16	120.3	146	1,098.1	24.6	$35,135	23.4	8.1	14.0
Webster	26	22.8	16	14.0	79	69.1	39	125.8	69	0.60	43	111.2	281	726.8	13.3	$45,185	18.4	4.8	16.6
Worth	■	16.3	0	0.0	■	16.3	0	0	■	0.33	0	0.0	10	486.1	12.3	$48,214	15.0	4.1	9.4
Wright*	6	10.9	■	7.3	54	98.4	17	127.9	37	0.67	23	125.5	176	960.1	19.6	$31,290	25.0	8.4	19.1

*Identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment

Shading: Rates based on counts of 1 to 19 are considered unreliable and are shaded in gray. Counts of 1 to 4 are suppressed due to confidentiality concerns and are shaded in black.

ER = Emergency Room; HBV = Hepatitis B Virus; HCV = Hepatitis C Virus; HIV = Human Immunodeficiency Virus; IDU = Injection Drug Use; OD = Overdose; SUDT = Substance Use Disorder Treatment

See Appendix C for information on data years, data sources, etc.

Appendix C – Data Sources and Notes for the Vulnerability Assessment Indicators

The following pages provide information on the data sources for each indicator utilized in the vulnerability assessments. Additional notes on the indicators are also provided. The indicators in each category are listed below, and the *italicized* text within brackets ([]) next to each indicator notes whether the indicator was included in the opioid overdose assessment, the bloodborne infection assessment, or both assessments.

Individual Outcome Indicators

- Drug Overdose Deaths†‡ – [*Both Assessments*]
- Opioid Misuse Emergency Room (ER) Visits – [*Both Assessments*]
- Opioid-related Substance Use Disorder Treatment (SUDT) Admissions – [*Opioid Overdose Assessment*]
- Drug-related Arrests – [*Both Assessments*]
- Self-reported Frequent (>14 Per Month) Poor Mental Health Days – [*Opioid Overdose Assessment*]
- Bloodborne Illnesses (HIV, Acute and Chronic Hepatitis B, and Acute and Chronic Hepatitis C) – [*Bloodborne Infection Assessment*]
- Hepatitis C Among Ages 18 to 40 – [*Bloodborne Infection Assessment*]
- Injection Drug Use (IDU) Among Persons Receiving Substance Use Disorder Treatment (SUDT) – [*Bloodborne Infection Assessment*]

Community Factor Indicators

- Lack of a High School Education† – [*Both Assessments*]
- Median Income†‡ – [*Both Assessments*]
- Poverty† – [*Both Assessments*]
- Unemployment†‡ – [*Both Assessments*]
- Uninsured† – [*Both Assessments*]

For additional questions regarding definitions, etc., please consult the data source.

† These indicators were considered for the National Vulnerability Assessment.
‡ Analysis completed for the National Vulnerability Assessment found these indicators to be more strongly associated with acute hepatitis C virus infection, which was considered a proxy for unsafe injection drug use.[21]

Drug Overdose Deaths – [*Both Assessments*]

Drug overdose death rates are used in the opioid overdose assessment as a measure of the direct impact of the opioid epidemic. They are also used in the bloodborne infection assessment because the National Vulnerability Assessment found drug overdose deaths to be one of the variables that best predicted acute HCV infection.

- This indicator includes deaths from all forms of overdoses, not just opioids. Suicides are included. Some counties may have underreported opioid overdose death numbers if specific drugs involved in the death are not listed on coroner/medical examiner reports or death certificates. Some counties do not have the resources to test all overdose deaths for type of drug. In addition, there is a risk of contamination of other, non-opioid drugs with opioids such as fentanyl. Therefore, counties with high overdose rates for other types of drugs could also be at risk of an opioid outbreak due to cross-contamination. Overdose deaths may occur as a result of any form of drug use (e.g., injection, smoking, pill, etc.).

- Death certificates include both county of residence and county of record, which is the location where the individual was pronounced dead and is used as a proxy for location of death. County of residence is more typically used in statistical analyses, but feedback from stakeholders indicated the need to include death rate information for both county of residence and county of record. Internal workgroup members analyzed the data and found that the death rates by county of residence and county of record were similar for most counties. However, a few counties had much higher death rates based on the county of record. This may indicate that persons are traveling to those areas to use substances and those areas may need to invest in more resources such as first responders, naloxone, etc., in order to provide critical response treatment. However, the county of residence in those situations may also need to provide resources to address substance use, such as prevention, treatment, etc. Thus, both rates are utilized in the assessments to create a Combined Drug Overdose Deaths indicator. The rank for this combined indicator is calculated by ranking the sum of the individual Drug Overdose Deaths by Residence County and Drug Overdose Deaths by County of Record indicators. Using this combined rank allows both the residence county and the county of record to be represented in the assessments while avoiding the double emphasis on deaths that would have occurred if both indicators had been utilized separately.

- Overdose death rates are based on Missouri BHCADD death certificate data. Data from 2015 to 2017 are utilized to reduce small numbers and increase stability. Rates are calculated using population data from 2015-2017 and are reported per 100,000 population.

Opioid Misuse Emergency Room (ER) Visits – [*Both Assessments*]

- Opioid misuse ER visit rates may help indicate where future opioid overdose deaths could occur. However, persons who are revived with naloxone may refuse to be transported to the ER, in which case this indicator would underrepresent the number of opioid overdoses.[22]
- Opioid misuse ER visit rates include all forms of opioid abuse. This indicator is included in the opioid overdose assessment as a measure of the direct impact of the opioid epidemic. Although this indicator includes deaths from all forms of opioid overdoses, it is also used in the bloodborne infection assessment as a proxy measure for injection drug use.
- Opioid misuse ER visit rates are calculated from BHCADD PAS data from 2015 to 2017 and population data from 2015-2017. They are reported per 1,000 population.

Opioid-related Substance Use Disorder Treatment (SUDT) Admissions – [*Opioid Overdose Assessment*]

- Opioid-related SUDT rates are based on Missouri Department of Mental Health data from July 1, 2016, to July 1, 2017, and population data from 2017. They are reported per 100,000 population. These data are available at: https://seow.dmh.mo.gov/TREATMENTADA/TREATMENTADAIndicators.aspx?PATH=Indicators&SID=NEW.
- Opioid-related SUDT rates help measure the level at which residents access treatment for opioid-related substance use and may also indicate the level of opioid-related drug use in a particular county. Data are included for all forms of use (e.g., injection, pills, snorting, etc.) For this assessment, this indicator includes the "Analgesic, Except Heroin or Methadone," "Heroin," and "Non-Prescribed Methadone" Primary Substance Problem categories from the Missouri Department of Mental Health, Missouri Behavioral Health Data.

Drug-related Arrests – [*Both Assessments*]

- Drug-related arrest rates help measure the level of drug use and its impact in a particular county. One limitation is that these data are based on the location of the arrest rather than the individual's residence county. This differs from most of the other indicators in these assessments, which are based on county of residence.
- Drug-related arrest rates were calculated using Missouri Department of Mental Health data from July 1, 2016, to July 1, 2017, and population data from 2017. They are reported per 100,000 population.
- Drug-related arrest data were obtained from //dmh.mo.gov/ada/mobhew/profileindex.html. As of November 27, 2019, this web address was no longer functional, but the data included in this report can be

obtained from the Substance Use and Mental Health Indicators Profiles for each county by selecting counties from the map at https://dmh.mo.gov/alcohol-drug/county.

- For the National Vulnerability Assessment, CDC found drug-related arrests to be highly associated with counties most vulnerable to rapid dissemination of HIV/HCV among PWID.[23]

Self-reported Frequent (>14 Per Month) Poor Mental Health Days [*Opioid Overdose Assessment*]

- "More than one in four adults living with serious mental health problems also has a substance use problem. Substance use problems occur more frequently with certain mental health problems, including depression, anxiety disorders, schizophrenia, [and] personality disorders."[24]
- Data on self-reported frequent (>14 per month) poor mental health days were obtained from the Missouri County-Level Study. In 2016, this survey included the following question: "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?" Possible responses included a Number of days, "None," "Don't know/Not sure," and "Refused."[25] More information on the Missouri County-level Study can be obtained from https://health.mo.gov/data/cls/index.php.
- The self-reported frequent poor mental health days indicator is a prevalence estimate of the percent of the adult population reporting greater than 14 poor mental health days per month.[26]
- A study comparing self-reported mental health status with substance use found a relationship between the two for U.S. respondents. For example, those "who reported problems with anxiety were 50% less likely to be abstinent from alcohol and drugs in the 30 days prior to the five year follow up interview compared to those who did not report anxiety symptoms."[27]

Bloodborne Illnesses – [*Bloodborne Infection Assessment*]

- Acute and chronic hepatitis B, acute and chronic hepatitis C, HIV, and AIDS (stage 4 HIV) numbers and rates are combined to create a single indicator due to small cell sizes for many counties. They include years 2016 to 2018.
- The bloodborne illnesses indicator measures the direct impact of the diseases on the county.
- CDC used acute and chronic hepatitis C rates as a proxy measure for injection drug use in the National Vulnerability Assessment.[28]
- Numerator data were provided by BRDI. Data for hepatitis B and C are from the Missouri WebSurv 2017 dataset, while data for HIV and AIDS (stage 4 HIV) are from the eHARS 2017 dataset. Population data are from 2017. Rates are reported per 100,000 population.

- Acute and chronic hepatitis B, acute and chronic hepatitis C, HIV, and AIDS (stage 4 HIV) are reportable conditions under the Missouri Code of State Regulations, 19 CSR 20-20.020, which is available at https://www.sos.mo.gov/cmsimages/adrules/csr/current/19csr/19c20-20.pdf. A list of reportable conditions is also available at https://health.mo.gov/living/healthcondiseases/communicable/communicabledisease/pdf/reportablediseaselist2.pdf.

HCV Among Ages 18 to 40 – [*Bloodborne Infection Assessment*]

- "Adults under 40 have the highest rate of new infections, largely because of the opioid crisis."[29] CDC used acute and chronic hepatitis C rates as a proxy measure for injection drug use in the National Vulnerability Assessment.[30]
- The population of individuals among ages 18 to 40 known to be infected with HCV is also included in the Bloodborne Illnesses indicator (which includes HIV, acute and chronic hepatitis B, and acute and chronic hepatitis C among all ages). Members of the internal workgroup discussed the effective double counting of this population in the bloodborne infection assessment with the CDC project team for the vulnerability assessment work as well as staff from BHSH. Both groups agreed that the extra emphasis on this population was warranted. (There were too few cases of HIV and HBV to report these conditions as separate indicators.)
- Numerator data were provided by BRDI from the Missouri WebSurv 2017 dataset. Population data are from 2017. Rates are reported per 100,000 population.

Injection Drug Use Among Persons Receiving Substance Use Disorder Treatment (SUDT) – [*Bloodborne Infection Assessment*]

- Data on the number of persons who enter SUDT and report they use injection drugs helps to measure the level of injection drug use activity. It may also help measure the level of drug use in a particular county. It is recognized that this indicator likely captures only a portion, perhaps only a small portion, of the population that engages in injection drug behavior due to limited access to treatment or unwillingness to seek treatment. This measure was used in the bloodborne infection assessment as it is the injection form of drug use that primarily creates a risk for transmission of hepatitis and HIV. This indicator includes all persons who reported injection drug use regardless of the type of drug used (i.e., opioids or other types of drugs).
- Persons who inject drugs and are in SUDT rates are based on Missouri Department of Mental Health data from July 1, 2016, to July 1, 2017, and population data from 2017. They are reported per 100,000 population.
- Data are available at: https://seow.dmh.mo.gov/TREATMENTADA/TREATMENTADAIndicators.aspx?PATH=Indicators&SID=NEW.

Lack of a High School Education – [*Both Assessments*]

- Persons who do not graduate from high school reduce their future economic opportunities for both obtaining jobs and earning higher salaries. "Based on recent data from the U.S. Bureau of Labor Statistics, high school dropouts are nearly three times more likely to be unemployed than college graduates. Even when employed, high school dropouts earn about $8,000 a year less than high school graduates and approximately $26,500 a year less than college graduates, based on calculations by the Alliance for Excellent Education."[31] This may limit their ability to pay for goods and services related to health and understand health-related information.[32] "In the United States, the gradient in health outcomes by education attainment has steepened over the last four decades in all regions of the United States, producing a larger gap in health status between Americans with high and low education."[33]
- Percentages of the population with less than a high school education were obtained from the U.S. Census Bureau, American Community Survey 5-year estimates 2013-2017.

Median Income – [*Both Assessments*]

- Median income represents the mid-point of income in a county. Half of the incomes in the county fall above the median income while the other half fall below it.[34]
- A study by the Health Care Cost Institute found in an analysis of 1,500 counties "that employed adults (over the age of 18) living in counties with lower median incomes had greater rates of long-term opioid use (having filled at least 6 prescriptions for opioids) compared to employed adults in higher income counties… In the lowest median income counties ($30k or less), 4.9% of the employed adult population were long-term opioid users, with some counties having rates as high as 15.8%. In contrast, just 1.3% of the same population in the highest median income counties ($100k or more) were long-term opioid users and the highest rate in these counties was 2.3%."[35]
- Low median income may be, but is not always, correlated with unemployment. People may work full time or more than full time but not receive a wage high enough to cover basic living expenses, particularly in areas where the cost of living is high. A study by the Economic Policy Institute found that in many parts of the nation, median family income is much lower than the amount needed "to attain an adequate – but modest – standard of living."[36] "Low-income counties tend to have much in common. They are largely rural and have relatively weak job markets. They also tend to have low average life expectancies and declining populations."[37]
- In the National Vulnerability Assessment, CDC found mean income to be highly associated with vulnerability to an outbreak of hepatitis C or HIV infection related to injection drugs.[38] The internal workgroup decided to use median income rather than mean, or average, income because a few high incomes in a county may raise the mean income but typically have less impact on median income.

- Median income levels by county were obtained from the U.S. Census Bureau, American Community Survey 5-year estimates 2013-2017.

Poverty – [*Both Assessments*]

- "Residents of impoverished neighborhoods or communities are at increased risk for mental illness, chronic disease, higher mortality, and lower life expectancy. Some population groups living in poverty may have more adverse health outcomes than others."[39] Poverty may limit a person's ability to pay for a variety of goods and services related to health, such as fees related to medical visits, healthy foods, and medications.
- Poverty rates represent the estimated percentage of residents living in poverty.
- Poverty rates by county were obtained from the U.S. Census Bureau, American Community Survey 5-year estimates 2013-2017.

Unemployment – [*Both Assessments*]

- Unemployment may have several negative consequences on health. "A 2009 Pennsylvania study found that unemployed workers died more than a year earlier than average… The longer the unemployment goes on, the more severe the health consequences, with increased depression and other health issues worsening over time."[40] Unemployment and substance use may be related. Substance use disorders may make it difficult for an individual to find and keep employment, but without employment-related insurance benefits, it may be difficult for an individual to afford treatment.[41]
- For the National Vulnerability Assessment, CDC found unemployment to be an indicator highly associated with vulnerability to an outbreak of hepatitis C or HIV infection related to injection drug use.[42]
- Unemployment rates by county were obtained from the U.S. Census Bureau, American Community Survey 5-year estimates 2013-2017. They are reported as percentages.

Uninsured – [*Both Assessments*]

- "Uninsured adults are far more likely than those with insurance to postpone health care or forgo it altogether. The consequences can be severe, particularly when preventable conditions or chronic diseases go undetected… Studies repeatedly demonstrate that the uninsured are less likely than those with insurance to receive preventive care and services for major health conditions and chronic diseases… [T]hey are more likely to be hospitalized for avoidable health problems and to experience declines in their overall health. When they are hospitalized, uninsured people receive fewer diagnostic and therapeutic services and also have higher mortality rates than those with insurance… High uninsured rates also contribute to rural hospital closures, leaving individuals living in rural areas at an even greater disadvantage to accessing care."[43]

- Uninsured rates represent the estimated percentage of residents under age 65 without health insurance.
- Uninsured rates were obtained from the U.S. Census Bureau, American Community Survey 5-year estimates, 2013-2017.

Appendix D – Other Indicators Considered for Inclusion in the Vulnerability Assessments

Many other indicators were considered for inclusion in the vulnerability assessments based on suggestions from internal workgroup members and/or stakeholders. Although these indicators were not used in the final vulnerability assessments, communities are encouraged to use them if reliable data are available at the local level. While it is beyond the scope of this document and the timeframe for this project to add information for every single indicator mentioned during the creation of this document, several are listed below as potential data sources for use at the local level. Further information on each indicator is provided in the following pages. For additional questions regarding definitions, etc., please consult the data source.

- Adverse Childhood Experiences (ACEs)/Child Trauma
- Buprenorphine Prescribing Potential†‡
- Deaths from Opioid Overdose by Residence County and by County of Record
- Demographic Groups (e.g., Age, Ethnicity, Race, Sex)†‡
- Drug Courts
- Drug Incarcerations
- Drug-related Crash Fatalities and Injuries
- Emergency Medical Services (EMS) Data on Opioid Overdoses
- Emergency Room Visits
    - All Overdose ER Visits
    - Opioid Overdose ER Visits
    - Syndromic Surveillance
        - Opioid ER Visits
        - All Overdose ER Visits
- Geographic Determinants
    - Population Density Per Square Mile†
    - Metropolitan Statistical Area Status
    - Urban/Rural Status†
- Health Care and Other Care Providers
    - Credentialed Substance Use Treatment Professionals
    - Dentists
    - Mental Health Providers†
    - Primary Care Physicians
    - Other Care Providers
        - Advanced Practice Nurses
        - Chiropractors
        - Massage Therapists
- Hepatitis C Virus Rapid Testing
- Highway/Interstate Access
- HIV and HCV Co-infection
- HIV and HCV Viral Loads
- HIV Testing
- Homelessness
- Households with Vehicle Access†
- Naloxone
    - Order Tracking
    - Trainings
- Neonatal Abstinence Syndrome (NAS)
- Prescription Drug Data
    - IQVIA Prescription Data
    - Missouri Department of Health and Senior Services
    - St. Louis County Prescription Drug Monitoring Program (PDMP)
- School Discipline
- Stimulant Drugs
- Syphilis
- Syringe Services Programs (SSPs)/Needle Exchange Programs
- Urgent Care Facilities
    - Non-retail Urgent Care Facilities†
    - Retail Urgent Care Facilities
- Workplace Deaths Due to Overdoses

† These indicators were considered for the National Vulnerability Assessment.
‡ Analysis completed for the National Vulnerability Assessment found these indicators to be more strongly associated with acute HCV infection, which was considered a proxy for unsafe injection drug use.[44]

Adverse Childhood Experiences (ACEs)/Child Trauma

- "Adverse Childhood Experiences, or ACES, are potentially traumatic events that occur in childhood (0-17 years) such as experiencing violence, abuse, or neglect; witnessing violence in the home; and having a family member attempt or die by suicide. Also included are aspects of the child's environment that can undermine their sense of safety, stability, and bonding such as growing up in a household with substance misuse, mental health problems, or instability due to parental separation or incarceration of a parent, sibling, or other member of the household."[45]
- "A landmark study in the 1990s found a significant relationship between the number of ACEs a person experienced and a variety of negative outcomes in adulthood, including poor physical and mental health, substance abuse, and risky behaviors."[46]
- Within the timeframe of the project, DHSS was unable to identify a source of ACEs data for all counties across the state. State-level data are available from sources such as America's Health Rankings (https://www.americashealthrankings.org/).

Buprenorphine Prescribing Potential and Utilization

- Data on the number of patients for whom physicians can prescribe buprenorphine as well as utilization of that service are other measures of health care access and usage and may indicate the level of drug use in an area. These data are usually reported by the number of waivers per 10,000 persons.
- CDC included this indicator in the National Vulnerability Assessment.[47]
- CDC assisted Missouri in obtaining the quantity of physician waivers from the Drug Enforcement Administration's Registration Data. As of July 5, 2019, Missouri had 44 counties without physicians who could prescribe buprenorphine. This indicator was not incorporated into the ranking methodology due to the large number of counties with 0 waivers.

Deaths from Opioid Overdose by Residence County and County of Record

- Opioid overdose death rates by residence and by county of record (location where the individual was pronounced dead and used as a proxy for location of death) are measures of the direct impact of the opioid epidemic. They include all forms of opioid drug use.
- Opioid overdose death rates are available from BHCADD death certificate data.
- Although highly relevant, opioid overdose death data were not used in the assessments for two primary reasons.
  - The numbers were small for many counties. For the 2015-2017 time period, when reporting by residence, 50 counties reported 0 deaths. For the same time period when reporting by county of record, 27 counties reported 0 deaths.
  - Many opioid overdoses are likely coded as other types of overdoses. For example, in a review of drug and opioid-involved overdose deaths in the U.S. from 2013-2017, it was found that "specific types of drugs involved were not

included on 15% of drug overdose death certificates in 2016 and 12% in 2017" and that "because heroin and morphine are metabolized similarly, some heroin deaths might have been misclassified as morphine deaths."[48]

Demographic Groups

- Types of demographics include race, age, gender, etc.
- Understanding the demographics of a vulnerable population can help the health care and public health communities determine priority groups for targeting of prevention and intervention efforts.
- Race/ethnicity was considered for the National Vulnerability Assessment and CDC included Percent White Alone, Not Hispanic.[63] The counties identified as vulnerable to rapid dissemination of HIV/HCV among PWID by the National Vulnerability Assessment were primarily rural. However, Missouri is experiencing large numbers of opioid overdoses and bloodborne infections in metropolitan areas with greater racial diversity. Analysis of Missouri data has shown that racial groups other than whites are also at risk for these conditions. The opioid epidemic affects all racial groups.
- Stakeholders suggested the use of age during multiple meetings. In order to use age as an indicator in the assessments, some method of ranking counties by age would be required. Suggestions included ranking by average age, percentage of the population in a certain age group, etc. However, stakeholders reported different ages as most affected in different regions, and a single optimal measure was not identified.
- Demographic data are available from the U.S. Census Bureau or BHCADD.

Drug Courts

- Multiple stakeholders mentioned drug courts as an important aspect of response to overdoses in their communities.
- "Drug courts help participants recover from use disorder with the aim of reducing future criminal activity. As an alternative to incarceration, drug courts reduce the burden and costs of repeatedly processing low-level, non-violent offenders through the nation's courts, jails, and prisons while providing offenders an opportunity to receive treatment and education. Drug court participants are required to abstain from substance use, to be accountable for their behavior and to fulfil the legal responsibilities of the offenses they have committed."[49]
- Data on drug courts were not incorporated into the vulnerability assessments due to the difficulty in determining how to rank counties on this data in the current methodology.

Drug Incarcerations

- Some stakeholders suggested the use of drug incarcerations rather than drug arrests.
- According to the Bureau of Justice Statistics, the "incarcerated population is the population of inmates confined in a prison or jail. This may also include halfway houses,

boot camps, weekend programs, and other facilities in which individuals are locked up overnight."[50]

- Missouri incarceration data are maintained by the Missouri Department of Corrections.

Drug-related Crash Fatalities and Injuries

- Drug-related crash fatalities and drug-related crash injuries are a measure of the impact of drug use behavior on a community. One limitation with these data is that the location of an event may not be the same location as an individual's residence county.
- This indicator was not used in the vulnerability assessments because the specific type of drug use involved could not be determined. The forms used to collect this information have checkboxes for whether the officer thinks alcohol or drugs were involved in the crash. That is the only detail available. Furthermore, the numbers were very small in most counties. For 2016 data, 83 counties reported 0 fatalities and 35 counties reported 0 injuries.
- Drug-related crash fatalities and crash injury data are available from the Missouri Department of Mental Health.

Emergency Medical Services (EMS) Data on Opioid Overdoses

- The Bureau of Emergency Medical Services (BEMS) within the Missouri DHSS collects data on EMS overdose-related 911 calls.
- Currently, none of the collected data clearly identify an event as related to an opioid overdose. Data are only collected as to the impression that a situation is a poisoning/overdose. Calls may be due to other substances that are non-opioids or other prescription medications.
- Naloxone is typically administered when a person is unresponsive. If Naloxone alone is administered and the person revives, it can be concluded that the individual overdosed on an opioid. However, other medications are also typically administered by EMS when a person is unresponsive. Thus, it is often not possible to differentiate if it was the Naloxone to which the patient responded in order to determine that an opioid overdose occurred.
- EMS data were not included in the vulnerability assessments primarily due to the fact that currently reporting is widespread but voluntary. Therefore, consistent data are not yet available statewide. Without statewide data, a ranking of all counties would not be valid.

Emergency Room Visits

- All Overdose ER Visits
  - Overdose ER visits include not only opioid overdoses but methamphetamines and other categories of drugs and was not included because the more specific opioid misuse ER visits indicator was utilized.

- o Overdose ER visit data are available from the PAS data managed by BHCADD.
- Opioid Overdose ER Visits
    - o Opioid overdose ER visits is another measure of a health outcome directly related to the opioid epidemic. These ER visits may be due to any type of opioid drug use (e.g., injection, pills, etc.).
    - o Opioid overdose ER visits are available from BHCADD's PAS.
    - o This indicator was not used in the vulnerability assessments due to small numbers in many counties. (Five counties had 0 cases and 31 counties had suppressed data for 2016-2017.) However, the expanded category of opioid misuse was utilized.
- Syndromic Surveillance Opioid and All Overdose ER Visits
    - o Another source of data on ER visits due to overdoses is ESSENCE, a syndromic surveillance system used to detect public health events such as influenza outbreaks or bioterrorism attacks. Hospitals provide chief complaint data in near real-time to this system. (Some hospitals also provide discharge diagnosis codes.) Missouri ESSENCE is managed by BRDI.
    - o Because ESSENCE is a syndromic surveillance system that mainly utilizes chief complaints rather than diagnoses, there are challenges involved in determining which visits are due to opioid overdoses. Some symptoms of opioid overdose (e.g., respiratory suppression, nausea) are general and difficult to separate from other types of events. In addition, even if the chief complaint for the visit is overdose, the type of drug is often not known until further evaluation and testing is completed.
    - o National and state efforts are underway to improve syndromic surveillance reporting and analysis of overdose data so these indicators could potentially be utilized in future updates of the vulnerability assessments.

Geographic Determinants: Population Density Per Square Mile, Metropolitan Statistical Area Status, and Urban/Rural Status

- CDC analyzed both population density and urban/rural status for the National Vulnerability Assessment. Metropolitan Statistical Area Status was suggested during workgroup discussions.
- The internal workgroup considered utilizing one of these indicators. However, Missouri has high rates of opioid overdoses and bloodborne infections in both rural (low population density) and urban (high population density) areas and across different types of statistical areas. Therefore, it was difficult to determine how to rank counties for vulnerability based on these indicators. The workgroup discussed the possibility of creating separate vulnerability assessments for counties within the same category in the future.

- Information on population density and metropolitan statistical areas is available from the U.S. Census Bureau. Urban/rural status definitions may vary. A definition is available from the U.S. Census Bureau. A different definition is used by DHSS in the *Health in Rural Missouri* reports available at https://health.mo.gov/living/families/ruralhealth/publications.php.

Health Care and Other Care Providers

- Multiple indicators based on various types of care and treatment providers were considered for the assessments. Both the internal workgroup members and stakeholder participants in feedback sessions indicated concern that health care access indicators could be confounding and even misleading.
    - Provider-to-population ratios are somewhat problematic to calculate. The original calculation utilized for a draft version of the assessments that was shared with stakeholders at six feedback sessions simply divided each county's population by the number of providers. Stakeholders from counties with more provider resources expressed concern about this calculation. Many providers serve clients from multiple counties, and this was not accounted for in that calculation. This gave the impression that some counties had adequate or even excess resources when in fact the stakeholders reported that their resources were strained due to serving a much larger population than that of their own county. This also impacted the rankings so that counties with more resources were shown as less vulnerable, although many of those had extremely high rates of overdose deaths and bloodborne infections.
    - Analysis of the data revealed that some of the counties with higher provider-to-population ratios had very low rates of some more direct indicators of the opioid overdose epidemic, such overdose deaths, while other counties had very high rates. The high rates of providers in counties with high rates of overdose deaths may indicate that services in that area are responding to a high need that may not be fully met even with the amount of services available.
    - Stakeholders expressed concern that health care access does not equal health care utilization or health care need.
- Credentialed Substance Use Treatment Professionals
    - The rate of credentialed substance use treatment professionals may help assess the availability of substance use treatment in each county. Greater availability of these professionals may indicate more resources and an ability to provide treatment, which may contribute to lower rates of substance use and reduce the probability of opioid overdoses.

- o Credentialed substance use treatment professionals data are from the Missouri Credentialing Board's current 2018 database records, which were provided to DHSS by request.
- Dentists
  - o Dentist-to-population rates or ratios indicate the availability of dental care and are another measure of access to health care. "The health of the mouth and surrounding craniofacial (skull and face) structures is central to a person's overall health and well-being."[51] "Research findings have pointed to possible associations between chronic oral infections and diabetes, heart and lung diseases, stroke, and low-birth-weight, premature births," as well as other negative health outcomes.[52] "Most healthy adults should visit a dentist at least once per year. During this visit, a dentist or dental hygienist will examine the teeth and gums, look for broken or damaged teeth, and will look for signs of oral cancer. Additionally, teeth will be cleaned to remove plaque and tartar in order to prevent tooth decay. Dental professionals often educate patients about proper brushing and flossing techniques, good dietary practices, avoiding tobacco products, and ways to avoid injuring teeth and gums."[53] Thus, regular dental exams are another form of health screening and provide a way to prevent poor health outcomes or treat them before they become severe.
  - o According to the 2015 National Survey on Drug Use and Health, "most people … who misused [opioid] medications reported doing so to relieve physical pain."[54] Persons who do not have access to dental care may be at a higher risk of experiencing dental pain.
  - o Dentist provider-to-population data are available from the County Health Rankings (www.countyhealthrankings.org).
- Mental Health Providers
  - o There may be a relationship between mental health disorders and opioid use, as the "16% of Americans who have mental health disorders receive over half of all opioids prescribed in the United States."[55] Thus, lack of adequate mental health care could also have implications for opioid misuse.
  - o The internal workgroup attempted to find data on mental health providers but had some difficulty. Data were gathered from a few different sources.
  - o Mental health provider-to-population rates or ratios by county are available from the County Health Rankings (http://www.countyhealthrankings.org/).
- Primary Care Physicians
  - o Primary Care Physician-to-population rates or ratios measure access to health care resources for assistance with substance use issues as well as treatment and prevention of bloodborne infections, among other health conditions. According to the 2015 National Survey on Drug Use and Health,

"most people … who misused [opioid] medications reported doing so to relieve physical pain."[56] Persons who do not have access to adequate health care may be more at risk for experiencing physical pain.

- o Primary Care Physician population-to-provider ratios or rates are available from the County Health Rankings (www.countyhealthrankings.org).
- o Some stakeholders noted that much of the population of interest may not use primary care providers.

- Other Care Providers: Advanced Practice Nurses, Chiropractors, Massage Therapists, etc.
  - o Provider-to-population rates or ratios can be used to measure access to various types of other health care providers.
  - o The numbers of advanced practice nurses and several other types of care providers are available from the Missouri Division of Professional Registration (https://pr.mo.gov/).

Hepatitis C Virus Rapid Testing

- This data source is administered by BHSH and includes total rapid HCV tests, total positive rapid HCV tests, total rapid HCV tests with persons reporting injection drug use, and total number of persons who are positive for HCV and report injection drug use.
- Data from this source were not included in the assessments because they are only available for counties with sites funded through BHSH programs. As a result, data were limited. Thirty-three Missouri counties did not have any rapid testing done through this program. Forty-five counties had no positive rapid HCV testing results. Of the counties performing rapid HCV testing through this program, 23 did not report any persons reporting injection drug use and 47 counties did not report any persons who were both injecting drugs and positive for HCV for the time period from January 1, 2018, through August 31, 2018.

Highway/Interstate Access

- Access to an interstate was analyzed for the National Vulnerability Assessment.[57]
- The internal workgroup reviewed data for Missouri and learned that the state has 33,884 miles of roadways, making it the seventh-largest state highway system in the United States.[58] Analysis of Missouri data revealed that all but seven counties in the state have state or interstate highways running through or within five miles of the border of the county.[59]

HIV and HCV Co-infection

- BRDI maintains HIV information in the eHARS database and HCV information in the WebSurv database.
- HIV and HCV co-infection data were not included due to small numbers. In 2017, there were 96 Missouri counties reporting no cases of HIV and HCV co-infection.

HIV and HCV Viral Loads

- Stakeholder meeting participants suggested including the number and/or rate of elevated viral loads for individuals infected with HIV and HCV, as counties with a higher rate of high viral loads may have a greater risk of transmission of these bloodborne infections.
- Subject matter experts in BRDI recommended taking additional time to develop guidelines for use of these data before including them in vulnerability assessments or other analyses. For example, "elevated viral loads" would need to be defined for each disease. Furthermore, viral load information is only provided when an individual is receiving medical care. Individuals who are in medical care are working to reduce their viral loads and therefore in theory would be a less "risky" population than individuals who are not in care. Viral loads are not provided for individuals who are not in care, meaning that the "riskier" population would not be represented by the data, which could be misleading.
- BRDI publishes HIV continuum of care reports that show gaps in linkage to care, retention in care, and viral suppression. These reports are available at https://health.mo.gov/data/hivstdaids/data.php.

HIV Testing

- The HIV testing data source includes the total number of HIV tests performed by DHSS-funded HIV testing sites, the number of positive HIV tests results, and the number of positive HIV test results for persons who report injection drug use. This data source is administered by BRDI.
- These data were not included in the vulnerability assessments due to several limitations including:
  - These tests represent only DHSS-funded HIV testing; therefore, the testing is not indicative of testing done throughout the state. DHSS-funded sites include 1) testing sites in high prevalence areas contracted by DHSS to perform targeted testing, 2) testing sites in high prevalence areas contracted by DHSS to perform opt out HIV screening in healthcare facilities, and 3) testing sites (including LPHAs) conducting HIV screening who submit blood specimens to the Missouri State Public Health Laboratory (SPHL). These sites are not contracted by DHSS, but their tests are funded by DHSS since they are submitted to the SPHL free of charge. If these results are included in the vulnerability assessments, results may be skewed based on availability of testing. The DHSS-contracted testing sites are required to do a certain amount of testing; therefore, the availability of testing will be more prevalent in those areas. In counties without a DHSS-contracted testing site, people may be more likely to visit a private provider. DHSS does not receive information on tests ordered by private providers unless they are positive.

o The patient's county of residence is self-reported by the client and therefore may not be accurate. Approximately 50% of clients tested only receive free rapid tests (finger sticks) so there are no provisions to ensure client residency (e.g., billing, etc.). HIV testing data are typically analyzed based on the testing location as opposed to the client residence.

o Client county of residence is not a required field for DHSS-contracted sites conducting HIV screening in high morbidity areas (e.g., ERs, urgent care facilities, family planning clinics). These sites (called expanded testing sites) account for over 30% of DHSS-funded HIV testing, resulting in a large portion of tests which may not have a client county of residence.

Homelessness

- Stakeholders suggested the use of Missouri Department of Elementary and Secondary (DESE) Education data regarding homeless students. After discussion, the internal workgroup concluded that this measure of homelessness does not represent the entire population.
- DESE data may be accessed from https://apps.dese.mo.gov/MCDS/home.aspx.

Households with Vehicle Access

- Percent of households with vehicle access was analyzed for the National Vulnerability Assessment.
- The internal workgroup discussed this indicator but did not reach clear consensus on how it could be used. Missouri's population is diverse. Residents of metropolitan areas have more access to mass transit options and may not need vehicle access, but those counties would appear to be more vulnerable based on this indicator.

Naloxone Order Tracking and Naloxone Trainings

- BEMS also tracks data on naloxone orders requested by EMS units and trainings on naloxone administration.
- Reporting of this information is voluntary and may be incomplete. Therefore, consistent data are not yet available statewide. Without statewide data, a ranking of all counties would not be valid.

Neonatal Abstinence Syndrome

- "Neonatal abstinence syndrome (NAS) is a withdrawal syndrome that can occur in newborns exposed to certain substances, including opioids, during pregnancy."[60] Data on NAS could indicate areas with higher rates of substance use by pregnant women.
- Data on NAS was not included in the vulnerability assessments due to lack of a consistent definition for reporting. A Missouri DHSS staff member has participated in a national Council of State and Territorial Epidemiologists (CSTE) workgroup attempting to

better define this condition. CSTE position papers are available at https://www.cste.org/page/PositionStatements.

- Missouri data on NAS are managed by BHCADD.

Prescription Drugs

- Multiple stakeholders requested inclusion of prescription drug data.
- The internal workgroup was unable to obtain data from the DHSS statewide prescription drug monitoring program (PDMP) due to data sharing and use restrictions. Some data are available from the St. Louis County PDMP. However, not all counties have chosen to participate, and the lack of statewide data made this a difficult measure to incorporate into the vulnerability assessment methodology. Information on the St. Louis County PDMP is available at https://www.stlouisco.com/Health-and-Wellness/PDMP.
- CDC provides opioid prescribing rate maps which show "the geographic distribution in the United States, at both state and county levels, of retail opioid prescriptions dispensed per 100 persons per year from 2006–2017." Additional information as well as links to the maps can be obtained from https://www.cdc.gov/overdose-prevention/?CDC_AAref_Val=https://www.cdc.gov/drugoverdose/maps/rxrate-maps.html.
- The internal workgroup had concerns about including these data in the assessments. The numerator in the calculation is the "total number of opioid prescriptions dispensed in a given year, state, or county, as appropriate." Some counties are centers for health care services. These counties may be providing more prescriptions due to the availability of specialty services, such as orthopedics. In addition, best practice indicates that physicians should prescribe a minimal dosage of pain medication and provide an additional prescription at a later time if a patient needs a longer duration of pain treatment. This practice raises the prescribing rate even if physicians are treating patients appropriately.

School Discipline

- Stakeholders suggested inclusion of Department of Elementary and Secondary Education (DESE) data regarding disciplinary action. However, stakeholders also expressed concern that these data may not be collected consistently across schools and that there may not be a relationship between all types of school discipline incidents and the issues of opioid overdoses and bloodborne infections.
- DESE data may be accessed from: https://apps.dese.mo.gov/MCDS/home.aspx.

Stimulant Drugs

- Stimulant drugs "with abuse potential include both illicit drugs, such as methamphetamine and ecstasy, as well as prescription stimulants. Prescription stimulants, which are drugs used to treat conditions such as attention deficit

hyperactivity disorder (ADHD) or depression, can also be misused… Cocaine is also a stimulant drug…"[61]

- In the current vulnerability assessments, stimulant drugs are included in any data focused on all overdoses. Stimulant drugs did not receive a specific emphasis in this version of the vulnerability assessments due to the focus on opioids in the grant funding this project. However, stimulant drug use may also be of concern in many Missouri communities.
- The opioid drug fentanyl may be mixed with other illicit drugs, including stimulants. "Fentanyl is approximately 50 times as potent as heroin. Fentanyl and fentanyl analogs are being mixed into counterfeit opioid pills, heroin, cocaine, and methamphetamine. Illicitly-manufactured fentanyl (IMF), which is illegal, non-pharmaceutical fentanyl, is likely contributing to deaths involving these other substances. People who only use non-opioid drugs are more likely to overdose if they are exposed to drugs mixed with opioids, including fentanyl. This fentanyl contamination of other drugs may contribute to increased risk for overdose as those misusing other drugs can be exposed to drug products that vary in potency, including some extremely strong products."[62]
- Data on various types of stimulant indicators will in general be available from the same data sources listed for opioids. For example, deaths from stimulant use will be available from death certificate data managed by BHCADD.

Syphilis

- Syphilis data are maintained in the BRDI WebSurv database. Syphilis is a reportable condition and is required to be reported under 19 CSR 20-20.020 (https://www.sos.mo.gov/cmsimages/adrules/csr/current/19csr/19c20-20.pdf.)
- This indicator was not included in the Missouri vulnerability assessments due to small numbers. (In 2017, there were 57 Missouri counties reporting zero cases of syphilis.)
- Counties with larger numbers of syphilis cases may want to consider this indicator when evaluating risk of overdoses and bloodborne infections in their jurisdictions. CDC recently completed an analysis of syphilis data and found that "a substantial percentage of heterosexual syphilis transmission is occurring among persons who use … drugs."[63] Syphilis may also be associated with HIV as some of the risk factors are the same and "the genital sores caused by syphilis make it easier to transmit and acquire HIV infection sexually. There is an estimated 2- to 5-fold increased risk of acquiring HIV if exposed to that infection when syphilis is present, and studies have also shown that syphilis will increase the viral load of someone who is already HIV infected."[64]

Syringe Services Programs/Needle Exchange Programs

- "Syringe services programs (SSPs) are community-based prevention programs that can provide a range of services, including linkage to substance use disorder treatment; access to and disposal of sterile syringes and injection equipment; and vaccination, testing, and linkage to care and treatment for infectious diseases. SSPs protect the

public and first responders by facilitating the safe disposal of used needles and syringes. Providing testing, counseling, and sterile injection supplies also helps prevent outbreaks of other diseases."[65]

- Multiple stakeholders suggested including data on SSPs. However, SSPs are not currently legal in the state of Missouri. "There are a number of statutes in Missouri that preempt the administration of syringe services programs. Missouri Revised Statute Chapters 195 and 579 prohibit the possession of drug paraphernalia and controlled substances, including residue that could be present in paraphernalia. CSR § 195.010 (k) defines drug paraphernalia to include syringes, needles, or objects used for injecting controlled substances. Missouri Revised Statute Chapters 195 and 579 also prohibit the sale or distribution of syringes or needles if intended for the use of controlled substances."[66]

Urgent Care Facilities: Non-retail and Retail

- Data on non-retail and retail urgent care facilities are available from the Homeland Security Infrastructure Program Gold Database. Homeland Security collects information on infrastructure to prepare for mass casualty events.
- CDC reviewed urgent care facilities as an indicator when conducting the National Vulnerability Assessment.[67]
- These indicators were not included in the Missouri vulnerability assessments because many Missouri counties do not have these types of facilities.

Workplace Deaths Due to Overdoses

- The National Institute for Occupational Safety and Health reports that 4% of workplace deaths in the U.S. are related to overdoses.[68]
- According to BHCADD, 4 out of 94 Missouri resident workplace deaths (4.3%) in 2016 were related to overdoses, while 3 out of the 94 workplace deaths (3.2%) were related to opioid overdoses. The following year, 9 out of 112 Missouri resident workplace deaths (8.0%) were overdose related, with 7 of the 112 workplace deaths (6.3%) related to opioid overdoses.[69]
- Due to the small number of workplace deaths due to overdoses, the data were not utilized in the vulnerability assessments. Most counties did not have an overdose death in the workplace.

Endnotes

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