STIMULANT-RELATED VULNERABILITY IN IDAHO: AN EPIDEMIOLOGICAL ASSESSMENT

April 2025

Olivia M. Lewis, Shikhar Shrestha, and Thomas J. Stopka

THE DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, TUFTS UNIVERSITY SCHOOL OF MEDICINE, IN COLLABORATION WITH THE IDAHO DEPARTMENT OF HEALTH AND WELFARE

STUDY TEAM

OLIVIA M LEWIS, BA

ASSISTANT RESEARCHER

DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, TUFTS UNIVERSITY SCHOOL OF MEDICINE

SHIKHAR SHRESTHA, MS, PHD

ASSISTANT PROFESSOR

DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, TUFTS UNIVERSITY SCHOOL OF MEDICINE

THOMAS J STOPKA, PHD, MHS

PROFESSOR

DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, TUFTS UNIVERSITY SCHOOL OF MEDICINE

FOR QUESTIONS ABOUT THIS REPORT, CONTACT:

Thomas J. Stopka, PhD, MHS

Professor

Department of Public Health and Community Medicine

Tufts University School of Medicine

Thomas.stopka@tufts.edu

617-636-2110

RECOMMENDED CITATION: Lewis O, Shrestha S, and Stopka TJ. April 7, 2025. Stimulant-Related Vulnerability in Idaho: An Epidemiological Assessment. Department of Public Health and Community Medicine, Tufts University School of Medicine.

Tufts UNIVERSITY | SCHOOL OF MEDICINE Public Health

IDAHO DEPARTMENT OF HEALTH & WELFARE

ACKNOWLEDGEMENTS

The Tufts team would like to thank the following individuals for their contributions to this vulnerability assessment:

Tiffany Prochaska

Karyn Kershaw

Natalie Bodine

Adam Ernst

Andrew Lahren

Joe Pollard

Rosie Andueza

Megan Hartigan

TABLE OF CONTENTS

FIGURES

TABLES

APPENDIX

GLOSSARY OF TERMS

CDC: Centers for Disease Control and Prevention

ED: Emergency department

GIS: Geographic information system

HCV: Hepatitis C virus

HIV: Human immunodeficiency virus

IDHW: Idaho Department of Health and Welfare

PDMP: Prescription drug monitoring program

PWUD: People who use drugs

SAMHSA: Substance abuse and mental health services administration

SSP: Syringe services programs

SVI: Social vulnerability index

EXECUTIVE SUMMARY

Stimulant-related overdose is an increasingly important public health issue in the U.S. Across the nation, polydrug use, particularly concomitant use of stimulants and opioids, is becoming more prevalent.[1] Concurrent use of stimulants and opioids greatly increases risk of fatal overdose.[2–4] Stimulant-related mortality in Idaho has been rising since 2019, and methamphetamine/amphetamine-related crime rates have increased since 2020.[5,6] There is no current evidence-based medication available for stimulant use disorder; currently supported treatment options include cognitive-behavioral therapy and community management/motivational incentives, as well as motivational interviewing and community reinforcement methods.[7] Programs to mitigate stimulant use include a statewide prescription drug monitoring program (PDMP), outlawing the sale and use of illegal stimulants, and increasing the availability of medical treatment for substance use disorders (such as making substance-related inpatient care reimbursable by Medicaid and expanding crisis stabilization services throughout the state) and acute stimulant-related emergencies.[8–16]

To ascertain vulnerability to stimulant-related overdose across Idaho, we partnered with the Idaho Department of Health and Welfare (IDHW) to identify the counties that had the highest susceptibility to stimulant-related harms. Based off of our team's prior experience conducting opioid and alcohol-related vulnerability reports, we adopted a statistical model which was originally developed by Michelle Van Handel to identify jurisdictions at high risk of human immunodeficiency virus (HIV) and related infectious diseases.[17–21] We used fatal stimulant-related overdose rates as our outcome measure, and rates of drug-related crimes, chronic hepatitis C viral (HCV) infections, and stimulant-related emergency department (ED) visits as our core indicators of vulnerability. We used the social vulnerability index (SVI) from the Centers for Disease Control and Prevention (CDC) at the county level from 2018-2022 as a covariate to broadly account for sociodemographic factors. We used bivariate regressions to identify core measures and covariates significantly associated with stimulant-related overdose death rates. We then constructed multivariable models to calculate variable-specific coefficients, which were ultimately used as weights. After weighting each variable by its coefficient, we summed the values to calculate county-specific vulnerability scores.

In addition to our statistical methods for obtaining vulnerability scores, we used a geographic information system (GIS) to create descriptive maps of our outcome measure (i.e., stimulant-related overdose mortality rate), all core measures, and covariates. We mapped vulnerability scores juxtaposed with treatment centers and tribal lands boundaries to assess additional layers of vulnerability not accounted for in our statistical analyses. To determine geographic access to treatment, we generated 30- and 60-minute drive-time buffers around centers that provided cognitive-behavioral therapy and/or contingency management/motivational incentive programs. We created contextual maps depicting population density, urban/rural scores, and additional exploratory and descriptive measures to assist in the interpretation of our findings.

We found that Shoshone, Clearwater, Lewis, Idaho, Owyhee, Gooding, Lincoln, and Bannock Counties were the most vulnerable to stimulant-related overdose deaths in Idaho. Rates of drug-related crimes and chronic HCV infections, as well as SVI, were significantly associated with stimulant-related overdose death rates at the county level. Large swaths of rural

Idaho were more than a two-hour round-trip driving to the nearest treatment center, and many high-vulnerability counties had only one or a few treatment centers within reasonable driving time. Nez Perce, Fort Hall, and Duck Valley Reservations had geographic overlaps with high-vulnerability counties.

Based on our findings, we recommend targeting public health interventions in high-vulnerability counties and communities. Increasing access to contingency management/motivational incentive programs and cognitive-behavioral therapy through telehealth options and addressing stigma is vital, as well as continuing to expand harm reduction programs such as naloxone distribution to reverse fatal overdoses involving opioids and stimulants. We hope that this report can help provide a reference point for targeted interventions to reduce stimulant-related harm throughout the state.

BACKGROUND

Stimulants are a set of substances (e.g., cocaine, methamphetamine), which, upon consumption, excite the central nervous system, triggering faster breathing, increased heart rate, and alertness.[22] While stimulants such as methamphetamine and cocaine are illegal, other stimulants (e.g., amphetamine salts, lisdexamfetamine, methylphenidate) are prescribed to treat conditions like attention deficit hyperactivity disorder (ADHD).[22] Illicit stimulant use, along with opioids, dramatically increases the risk of fatal overdose; there is also evidence to suggest associations with stroke, cardiovascular conditions, infectious diseases related to injection drug use, mental health conditions, and violence.[3,23–28] Contingency management/motivational incentives, which provide rewards for achieving measurable goals such as negative drug tests, are one treatment option which has been shown to increase likelihood of abstaining from stimulant use; cognitive behavioral therapy is another supported option, as well as motivational interviewing and community reinforcement methods.[7,29–32] Stimulant-related deaths have risen across the United States as polydrug use has become more prevalent, increasing risk of fatal overdose.[1,4,33–35]

In Idaho, stimulant-related morbidity and mortality have become increasingly urgent issues to address. Stimulant-related mortality in Idaho was slightly lower than that of the U.S. in 2022 (7.5 deaths per 100,000 population compared to 10.4 at the national level) but has steadily increased since 2019; in 2023, rates reached 8.81 deaths per 100,000 in Idaho, an 18.5% increase from the year prior.[1,36] In 2019, the most recent year for which data were available for national stimulant prescription rates, there were 25.5 prescriptions per 100 residents in Idaho, far higher than the national average of 6.1.[8,37] Since then, stimulant prescription rates in Idaho reached 36.2 per 100 population in 2023.[9]

Laws, public health resources, and funding efforts have been directed at reducing stimulant-related overdose rates in the state. Idaho has implemented a PDMP to curb unnecessary prescribing of potentially harmful substances, such as stimulants, opioids, and benzodiazepines.[8] In addition, manufacturing and delivering controlled substances (such as methamphetamine and cocaine) is a felony, and using these stimulants in public is illegal.[10–12] However, people are granted legal immunity from charges related to use or possession in the case of a medical emergency to encourage people to seek help for an acute drug-related crisis.[13] Furthermore, the state has put a limit on the sale of pseudoephedrine products (classified as stimulants), requiring the use of a locked case when selling in a public place, limiting the amount that can be purchased within 30 days to nine grams, and requiring a photo ID for purchase.[38] There have been numerous Medicaid waivers approved during the COVID-19 pandemic in Idaho, including Section 115 and 1915c waivers, as well as the 1115 Behavioral Health Transformation waiver, to increase accessibility of treatment by covering costs for providers and facilities previously considered out-of-network (e.g., carceral settings), supporting the implementation of care in home and community-based settings, and improving existing healthcare systems designed to support those with substance use disorders.[14,15,39]

Various jurisdictional-level assessments have determined vulnerability to infectious diseases and opioid overdose deaths and assessed gaps in access to treatment across a multitude of U.S. states, including Idaho, Wyoming, and Indiana.[17,20,40,41] All assessments used an outcome measure, core indicators of vulnerability, and covariates to create a jurisdictional-level (e.g., county) vulnerability index for their health outcome of interest. Our team recently completed two county-level vulnerability assessments in Idaho, analyzing susceptibility to opioid-related overdoses and alcohol-related harms, respectively.[18,19] In addition to creating a county-level

vulnerability index for each report, we also created descriptive maps of significant vulnerability indicators and mapped geographic access to substance use treatment to pinpoint geospatial target areas for interventions and funding.

To date, there have been no known assessments to determine vulnerability to stimulant-related deaths for the state of Idaho. Our project aims to fill this gap by adapting the statistical framework developed by Van Handel et. al (2016) and modified by our team, which we utilized in our prior opioid overdose and alcohol-related vulnerability assessments, to identify counties at high risk of stimulant-related overdose in Idaho.[17,20] We used statistical analyses to calculate an overall vulnerability score at the county level, geospatial mapping of relevant indicators by county, and the mapping of treatment locations to determine which counties were most at-risk to harm from stimulant use. We aimed to provide relevant findings to facilitate data-informed selection and implementation of public health and clinical interventions to lower the risk of stimulant-related overdose in high-vulnerability regions of Idaho.

METHODS

DATA

We obtained stimulant-related data from the IDHW, including measures used as indicators in our vulnerability index calculations. IDHW colleagues also connected us to other state departments in Idaho to obtain demographic and health-related data as a part of our collaborative effort to conduct county-level vulnerability assessments. Based on the literature on comorbidities of stimulant use disorder, we considered a variety of measures.[3] During our biweekly meetings with public health experts from IDHW between September 2024 and April 2025, we finalized the selection of outcome measures, core indicators, and covariates.

We used stimulant-related overdose death rates as our outcome measure and rates of nonfatal stimulant-related ED visits, chronic HCV infections, and drug-related crimes as core indicators deemed to be associated with stimulant-related risks. Instead of multiple socioeconomic and demographic covariates, we elected to use the CDC's SVI as a comprehensive measure of these factors, which indicate susceptibility to health risks such as stimulant-related overdose in our statistical analyses, consistent with our approach for our alcohol-related vulnerability assessment.[19] We compiled all data for our outcome and core measures at the county level (N=44), aggregated across a three-year period (2020-2022), and calculated annual average rates. We used population data from the IDHW as denominators for rate calculations per capita.

Table 1: Data Measures and Sources

Outcome variable	**Unit or Rate**	**Year(s)**	**Source**
Stimulant-related overdose deaths*	Per 100,000 Population	2020-2022	Idaho Bureau of Vital Records & Health Statistics, Idaho Dept. of Public Health
Core variables			
Non-fatal suspected stimulant overdose emergency department (ED) visits†	Per 10,000 ED visits	2020-2022	ESSENCE, NSSP Biosense Platform
Drug-related crimes‡	Per 100,000 population	2020-2022	Idaho State Police
Chronic Hepatitis C viral infections, adults 18-34 years of age	Per 100,000 population	2020-2022	Division of Public Health, Epidemiology Section, IDHW
Covariates			
Social Vulnerability Index	0-1	2018-2022	Centers for Disease Control and Prevention; U.S. Census American Community Survey
Other			
Substance use disorder treatment centers that provide cognitive-behavioral therapy and contingency management/motivational incentives	Street-level address	2025	Substance Abuse and Mental Health Services Administration

High Intensity Drug Trafficking Areas (HIDTA)	Counties	2013	Oregon-Idaho HIDTA
Amphetamines seized	Dosage Units; Dosage Units per 100,000 Population	2020-2022	Idaho State Police Uniform Crime Reporting
Social Vulnerability Index themes	0-1	2018-2022	Centers for Disease Control and Prevention; U.S. Census American Community Survey
Population density	People per square mile	2018-2022 5-Year Estimates	U.S. Census American Community Survey
Tribal lands boundaries		2020	Idaho Department of Health and Welfare
Health Professional Shortage Area (HPSA) Scores	Counties	Updated October 2023	Health Resources and Services Administration
HPSA Facilities	Longitude (X) and Latitude (Y) coordinates	Updated October 2023	Health Resources and Services Administration
Urban/Rural Classification	Counties	2013	Centers for Disease Control and Prevention, National Center for Health Statistics
National forest administrative boundaries		2024	United States Department of Agriculture, Forest Service

*****Location for stimulant-related overdose deaths was determined by county of residence at time of death.

†Location for stimulant-related ED visits was determined by county where the incident occurred.

‡Defined as arrests for drug-related equipment and/or drug/narcotics violations.

DESCRIPTIVE MAPPING

We mapped all variables at the county level, dividing counties into five equal groups (quintiles) into which the Idaho population could be divided according to the distribution of values for specific variables; the counties with the highest rates were in the top quintile, and the lowest rates in the bottom quintile. To protect anonymity and avoid misrepresenting local realities due to unstable rates, we applied suppression rules to counties that had rates calculated with a non-zero total less than five (e.g., counts of 1-4). In addition to mapping the variables used in our statistical analyses, we developed Health Professional Shortage Area (HPSA) maps based on county-level scores to visualize areas in need of increased access to primary care. We also geocoded HPSA facilities by type (e.g., correctional facilities, rural health clinics) using the ArcGIS online geocoder (version 3.3.0, Esri, Redlands, CA), allowing us to map

the street-level addresses of facilities to further contextualize geographic access to healthcare. We mapped High-Intensity Drug Trafficking Area (HIDTA)-designated counties to identify the counties with high levels of drug-related activity, including trafficking and distribution. We created maps of SVI themes at the county level to assess vulnerability to drug-related harms based on racial/ethnic makeup, transportation availability, household characteristics, and socioeconomic status. We overlaid tribal land boundaries on our vulnerability score map to determine overlap with high-vulnerability counties. We also mapped population density, urban/rural classification, and key landmarks/national forest boundaries to describe the underlying landscape and contextualize our results.

To assess access to treatment services for stimulant use disorders, we used the ArcGIS online geocoding system to geocode and map the address-level locations of centers which provided cognitive behavioral therapy and contingency management/motivational incentives. Contingency management/motivational incentives can work to treat stimulant use disorders by providing rewards for hitting certain milestones such as not using stimulants (i.e., a negative drug test) and regular attendance at therapy sessions.[7] Cognitive-behavioral therapy can help treat stimulant use disorders by helping patients gain profound self-awareness surrounding their thoughts, beliefs, and circumstances and develop tools to manage their disorder and any co-occurring mental health conditions.[7] Both forms of treatment are proven to be effective at reducing stimulant use and related risky behaviors, such as unprotected sex or sharing used drug equipment.[7] Using the ArcGIS Pro network analysis tool, we generated 30- and 60-minute drive-time service areas around treatment centers that provided cognitive-behavioral therapy and contingency management/motivational incentives to identify areas with limited geographic access. We chose cutoffs of 30 and 60 minutes based on realistic travel times to treatment as determined by the IDHW, which are consistent with our past two assessments and informed by literature on average drive-times to substance use disorder treatment in Idaho.[18,19,21,42,43]

VULNERABILITY SCORES AND RANKING

We tested all core indicators and covariates for associations with our outcome measure, stimulant-related death rates, using bivariate regressions. We included all core indicators and covariates significant at the $p<0.2$ in the final vulnerability model. To weigh each variable by the strength and direction of their relationship with our outcome measure, we multiplied each variable by their correlation coefficient obtained from multivariable regressions. We then summed all weighted variables at the county level to create a vulnerability score. We organized all counties into quintiles based on their vulnerability score, with those in the top quintile having the highest vulnerability to stimulant-related overdose deaths and those in the bottom quintile having the lowest vulnerability. We conducted all statistical analyses using Python version 3.11 (Python Software Foundation, Wilmington, DE) and Stata 17 (StataCorp. 2021. Stata Statistical Software: Release 17. College Station, TX: StataCorp LLC). The Tufts Health Sciences Institutional Review Board reviewed and approved our project as non-human subjects research.

RESULTS

DESCRIPTIVE MAPPING

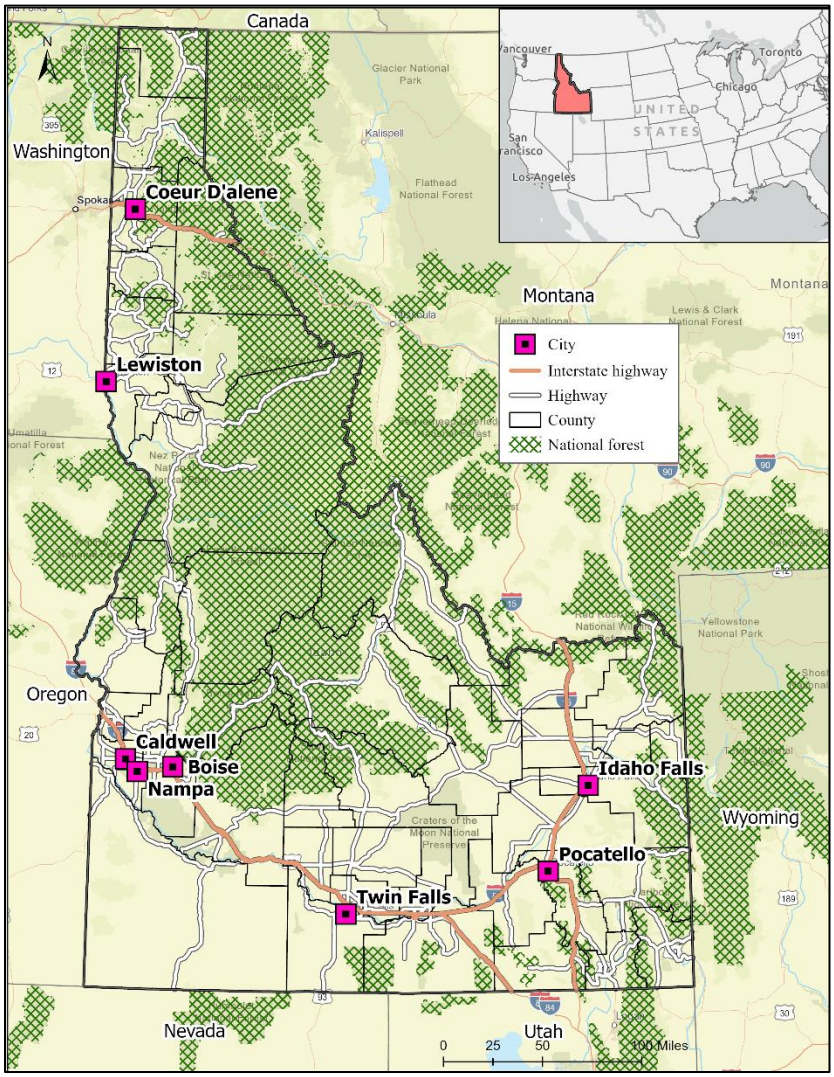


Figure 1: Geographic Features of Idaho, 2025

Idaho is a western state with lots of land covered by national forests (Figure 1). Interstate highways 84, 86, and 15 meander through southern Idaho, connecting various large cities that stretch west to east, from Oregon to Montana, and south into Utah. I-90 cuts through north Idaho and Coeur D'Alene, running from the western border with Washington to the eastern border with Montana. A series of state highways stretch through rural areas and connect the northern and southern regions of the state.

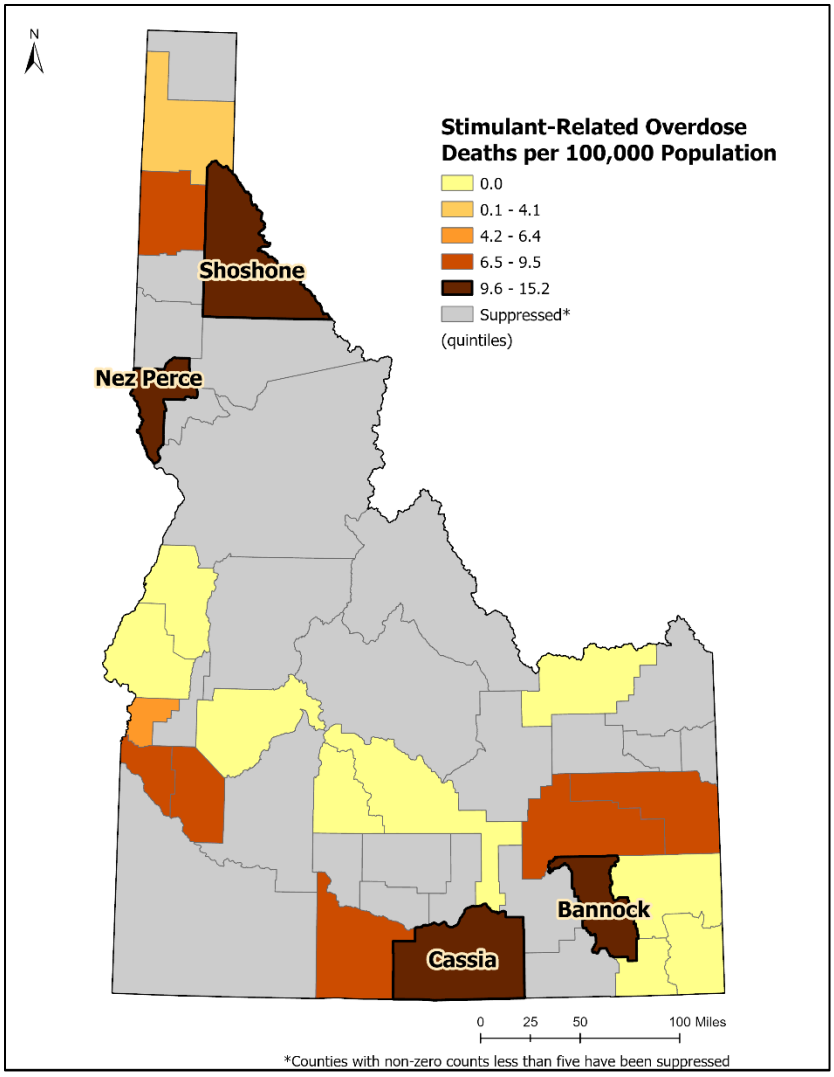


Figure 2: Stimulant-Related Overdose Deaths per 100,000 Population, Idaho Counties, 2020-2022

Stimulant-related overdose deaths ranged from 0 to 15.2 deaths per 100,000 population throughout Idaho counties (Figure 2). Many counties had zero stimulant-related overdose deaths or very few (between one and four deaths) from 2020-2022. The counties with the highest rates of stimulant-related overdose deaths were Shoshone, Nez Perce, Cassia, and Bannock.

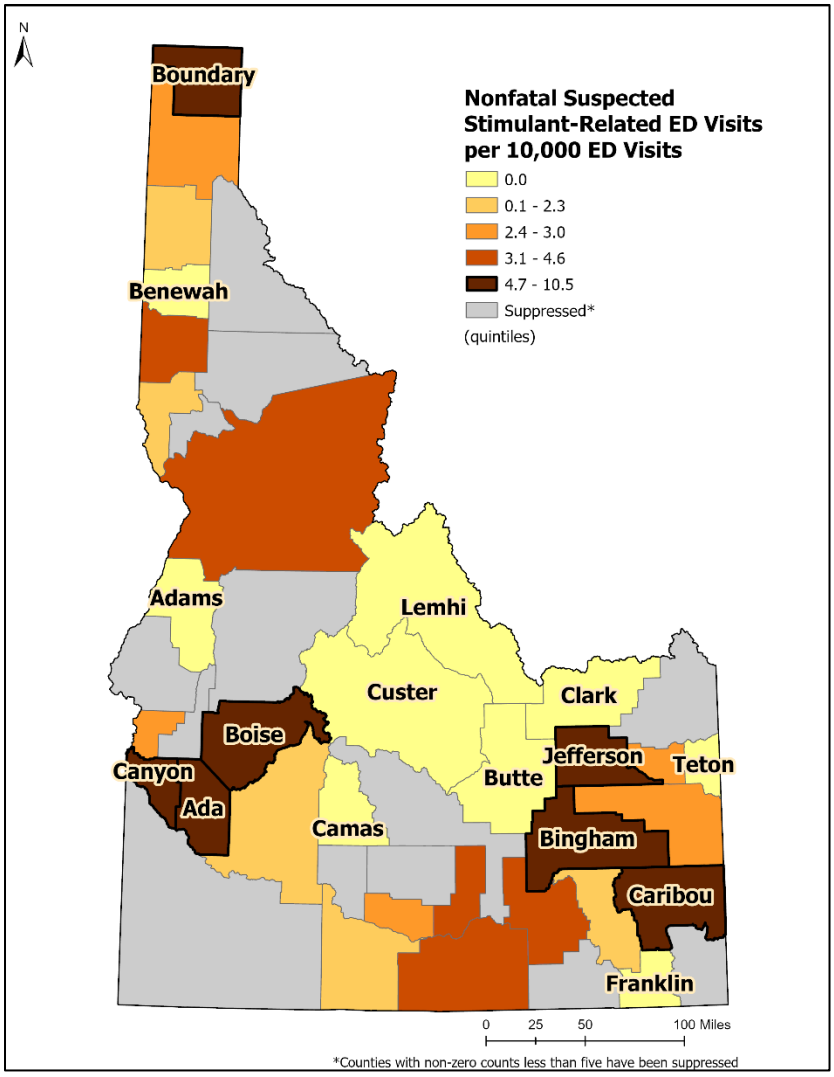


Figure 3: Nonfatal Suspected Stimulant-Related Emergency Department (ED) Visits per 10,000 ED Visits, Idaho Counties, 2020-2022

Boundary, Canyon, Ada, Boise, Jefferson, Bingham, and Caribou Counties had the highest rates of stimulant-related ED visits from 2020-2022 (Figure 3). These counties encompass three regions of the state; the adjacent Jefferson, Bingham, and Caribou Counties are located in the southeastern region of the state, while Boise, Ada, and Canyon Counties are grouped near the western border with Oregon. Boundary County stands alone in the north, bordering Canada. The region spanning Lemhi, Custer, Clark, and Butte Counties in rural central Idaho had very low rates of stimulant-related ED visits (Appendix 1).

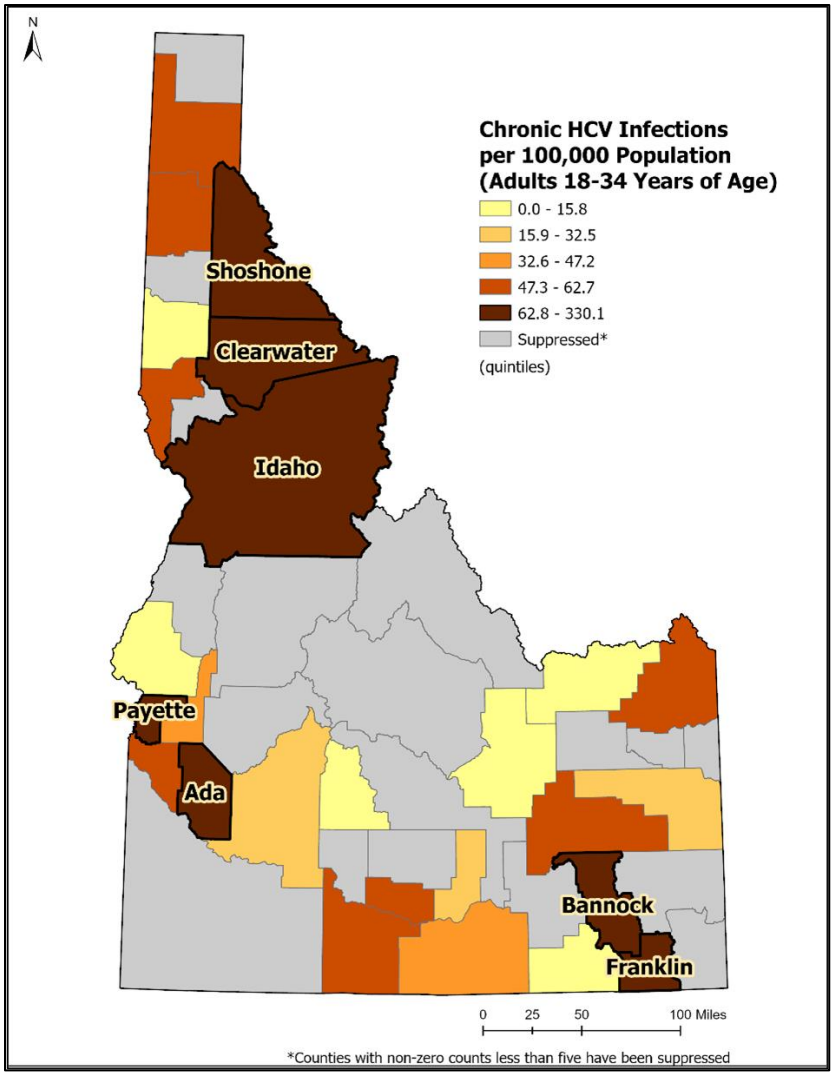


Figure 4: Chronic Hepatitis C Viral (HCV) Infections per 100,000 Adults 18-34 Years of Age, Idaho Counties, 2020-2022

Rates of chronic HCV infections in Idahoans between the ages of 18-34 varied across the state from 0 to 330 infections per 100,000 residents in 2020-2022 (Figure 4). While Shoshone, Idaho, Payette, Ada, Bannock, and Franklin had high infection rates (over 62.8 per 100,000), Clearwater had the highest by far at 330.1 per 100,000. Many counties in central Idaho had very low numbers of infections (1-4) between 2020 and 2022, where rates were suppressed.

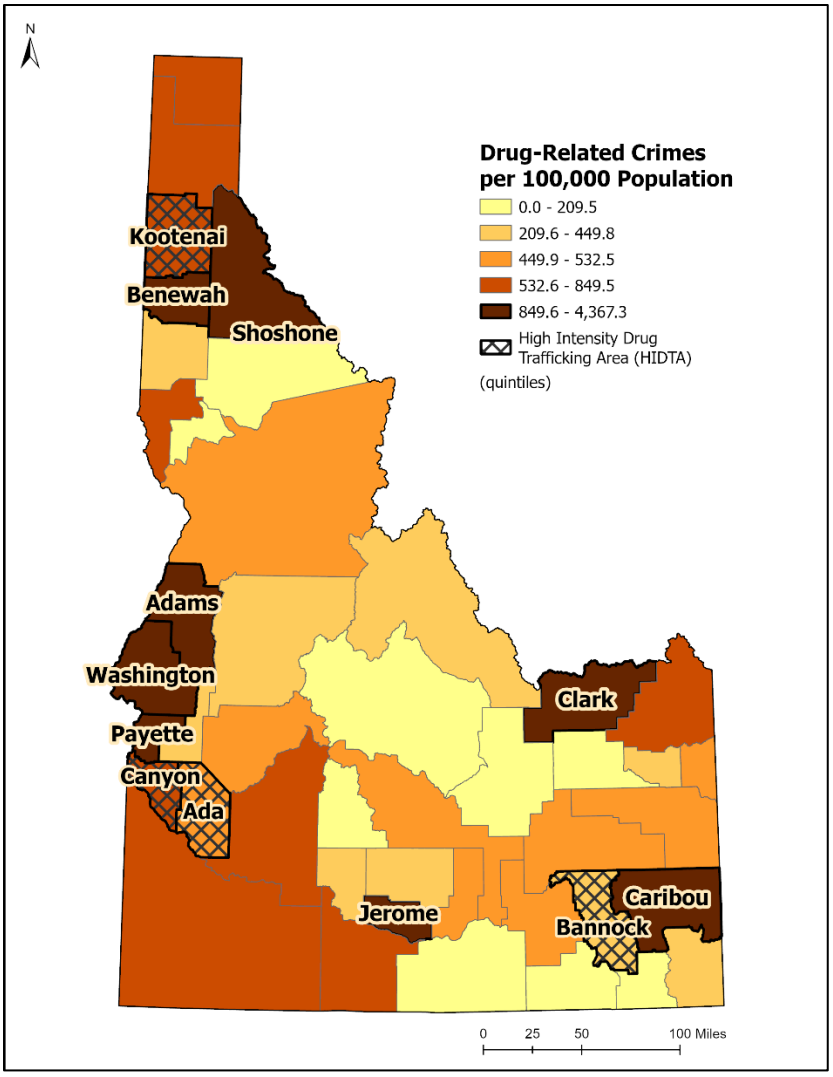


Figure 5: Drug-Related Crimes per 100,000 Population, Idaho Counties, 2020-2022

Drug-related crime rates were highest in Benewah, Shoshone, Adams, Washington, Payette, Jerome, Clark, and Caribou Counties (Figure 5). All of these counties, except Jerome, bordered another state. None of the counties with the highest drug-related crime rates are HIDTA-designated counties, but Canyon and Kootenai Counties had drug-related crime rates in the second highest quintile rank. In addition, several counties in the panhandle and southwestern corner of the state also had high rates of drug-related crimes.

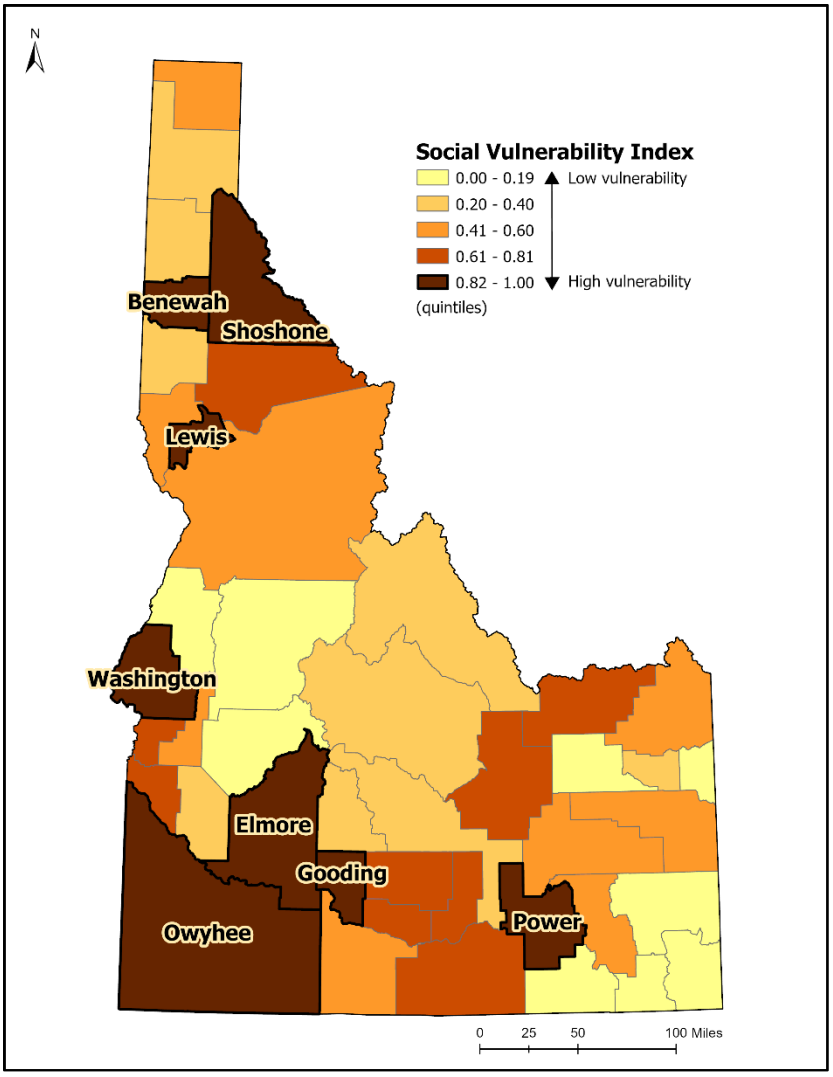


Figure 6: Social Vulnerability Index (SVI), Idaho Counties, 2018-2022

Benewah, Shoshone, Lewis, Washington, Owyhee, Elmore, Gooding, and Power had the highest SVI scores of all Idaho counties from 2018 to 2022 (Figure 6). These are rural counties with low population densities, with the exception of Lewis County (Appendix 1).

STATISTICAL ANALYSES

Table 2: Descriptive Statistics and Bivariate Regressions

Variable	Mean (SD)	Median	Beta-coefficient	p-value
Outcome Measure				
Stimulant related overdose deaths per 100,000 population	5.5 (4.43)	5.2	-	-
Core Variables				
Stimulant related ED Visits per 10,000 Visits	3.0 (2.66)	2.6	-0.19	0.456
Drug-related crimes per 100,000 population	625.1 (677.99)	490.5	-0.001	**0.115**
Chronic HCV infections per 100,000 adults aged 18-24 Years	46.7 (51.45)	41.4	0.04	**0.001**
Covariates				
Social Vulnerability Index (SVI; 0-1)	0.499 (0.299)	0.50	3.70	**0.102**

The mean rate of stimulant-related overdose deaths across Idaho counties was 5.5 deaths per 100,000 population from 2020-2022 (Table 2). The mean number of stimulant-related ED visits per 100,000 was even lower, at 3.0 per 100,000. While the mean number of drug-related crimes per 100,000 was 625.1, the median was 490.5, indicating that a few counties had high drug-related crime rates. The mean chronic HCV infection rate across Idaho counties was 46.7 per 100,000.

Of all core measures, drug-related crimes per 100,000 population and chronic HCV infections per 100,000 population were significantly associated with stimulant-related death rates at the county level. SVI scores were also significantly associated with rates of stimulant-related overdose deaths. Rates of stimulant-related ED visits were not significantly associated with stimulant-related overdose death rates in our bivariate model.

Table 3: Multivariable Model

Variable	Beta-coefficient	p-value
Drug-related crimes per 100,000 population	-0.001	0.113
Chronic HCV infections per 100,000 adults aged 18-24 Years	0.035	**0.005**
Social Vulnerability Index (SVI, 0-1)	3.52	**0.087**

In the multivariable model, rates of chronic HCV infections were significantly associated with stimulant-related overdose death rates at the county level. Drug-related crime rates and SVI remained non-significant or marginally significant.

MAPS OF STIMULANT-RELATED VULNERABILITY

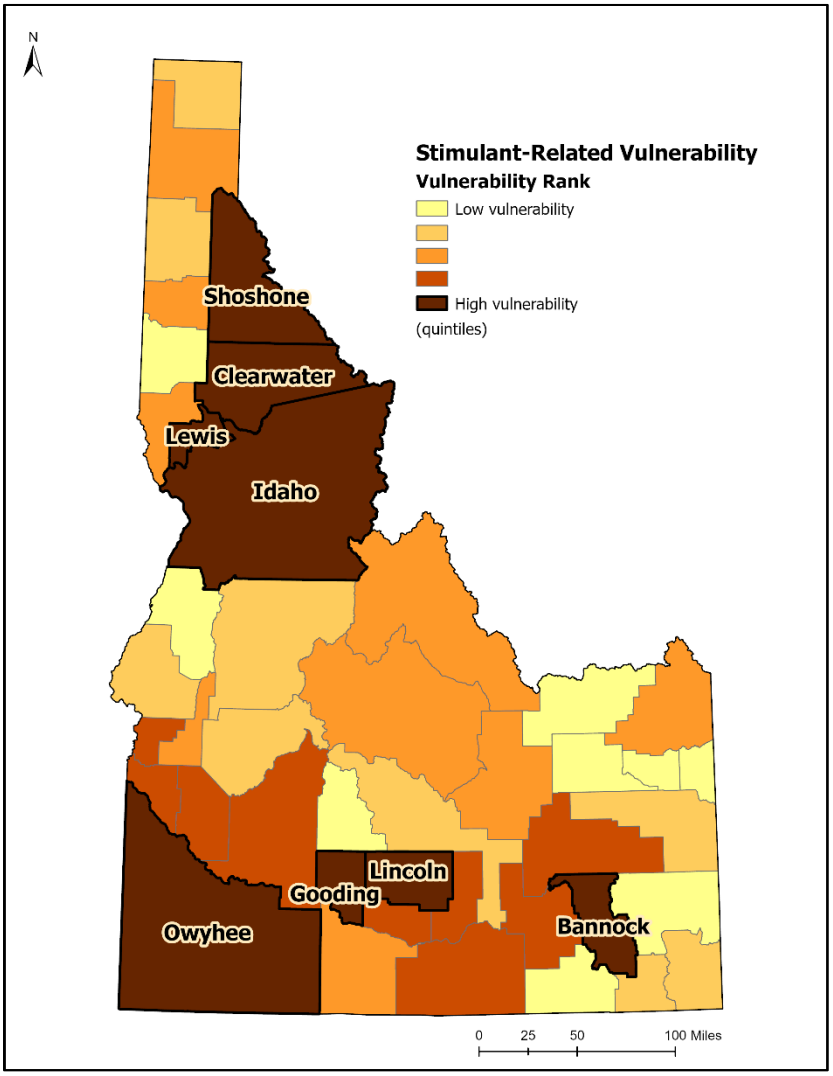


Figure 7: Stimulant-Related Vulnerability Rankings, Idaho Counties, 2020-2022

Based on our vulnerability rankings considering a range of risk factors, Shoshone, Clearwater, Lewis, Idaho, Owyhee, Gooding, Lincoln, and Bannock Counties had the highest vulnerability to stimulant-related overdose deaths from 2020 to 2022 (Figure 7). Shoshone and Bannock Counties were in the top quintile rank for stimulant-related overdose death rates (Figure 2). In fact, Shoshone County was in the top quintile rank for every vulnerability measure except stimulant-related ED visits, where it was suppressed due to low counts (Figures 2-6). Bannock, a HIDTA-designated county, had high rates of chronic HCV infections, as did Clearwater and Idaho Counties (Figures 4 and 5). Bannock County also had one of the highest rates of overdose deaths involving both a stimulant and an opioid (Appendix 2). Owyhee, Shoshone, and Gooding were all in the top quintile rank for SVI scores (Figure 6).

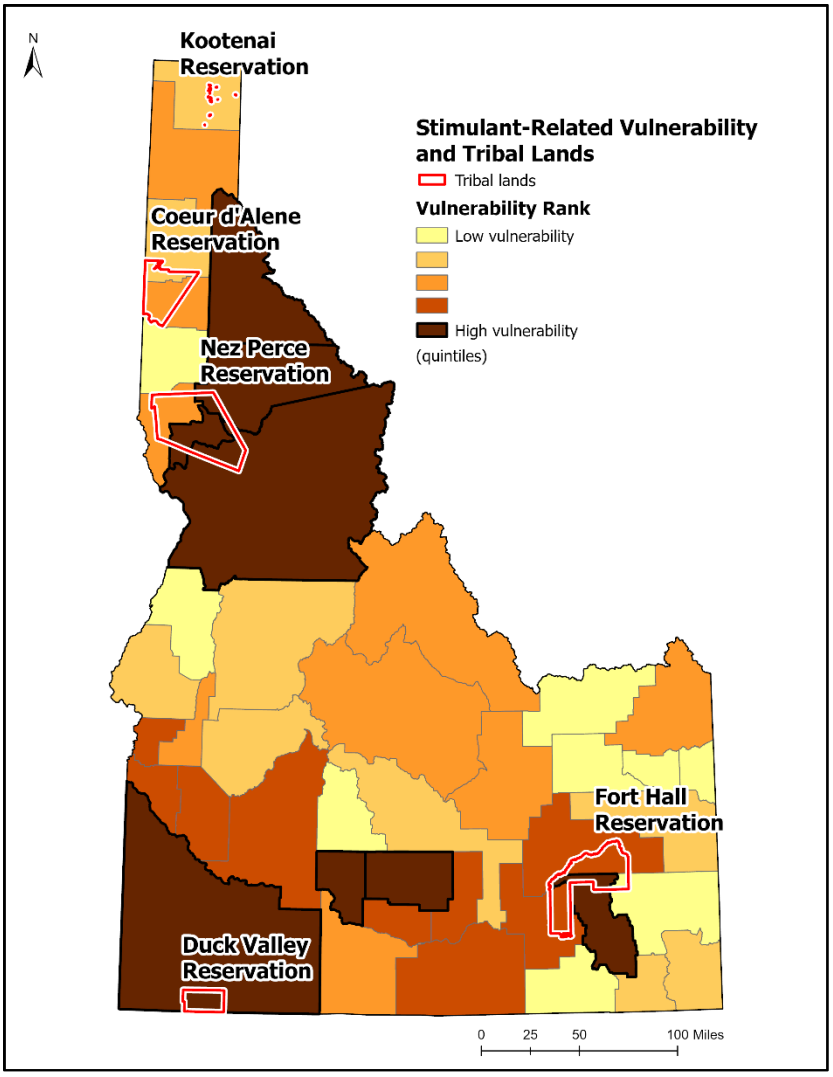


Figure 8: Stimulant-Related Vulnerability Scores and Tribal Lands, Idaho Counties, 2020-2022

When overlaying tribal land boundaries, Nez Perce, Fort Hall, and Duck Valley Reservations intersect high-vulnerability counties (Figure 8). Nez Perce overlaps with two counties in the top quintile rank for stimulant-related vulnerability, while Fort Hall also crosses over multiple counties in the top two quintile ranks. The northern section of Duck Valley resides within Owyhee County, a high-vulnerability county, while the southern portion of the tribal land crossed over into the state of Nevada (Figure 1).

GEOGRAPHIC ACCESS TO STIMULANT-RELATED TREATMENT

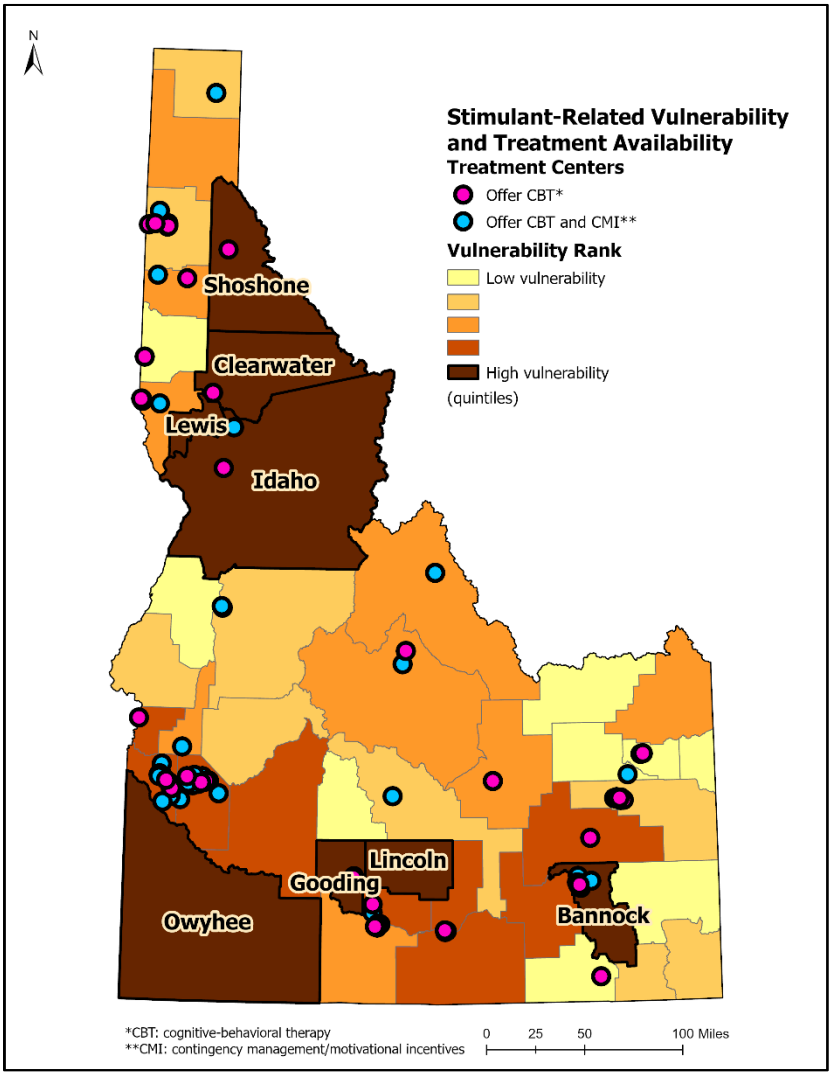


Figure 9: Stimulant-Related Vulnerability Scores (2020-2022) and Treatment Centers (2025), Idaho Counties

Treatment centers that offered cognitive-behavioral therapy and/or contingency management/motivational incentives were located throughout the state but mainly concentrated in urban areas (Figures 1 and 9). Except for Bannock County, most high-vulnerability counties had limited treatment options. Owyhee and Lincoln Counties had no treatment centers.

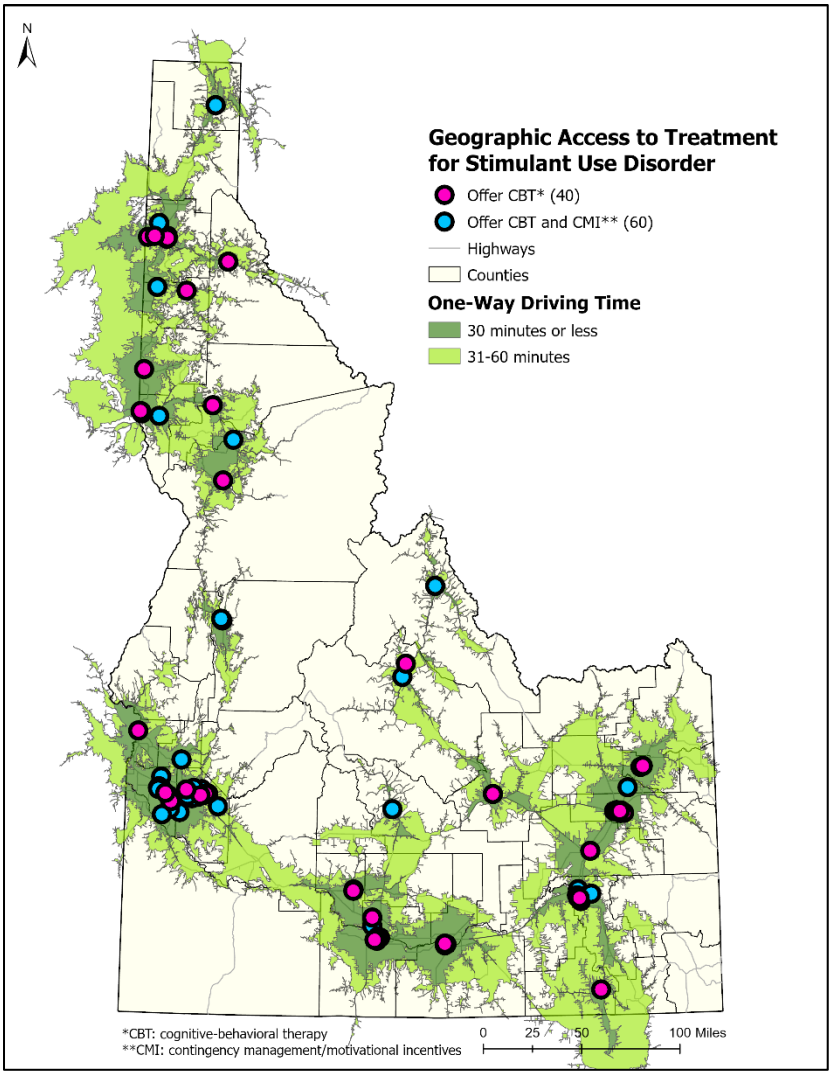


Figure 10: Geographic Access to Treatment for Stimulant Use Disorder, Idaho, 2025

Geographic access to treatment centers that offered cognitive-behavioral therapy and/or contingency management/motivational incentives was widespread throughout urban areas of the state and regions connected by interstate and major highways (Figure 7). The majority of treatment centers (60) that offered cognitive-behavioral therapy also offered contingency management/motivational incentives. There were only a few centers that offered these services in rural central Idaho, and many residents of that region would need to travel more than two-hours round-trip to access care. In addition, large swaths of counties in northern Idaho, such as Boundary, Clearwater, and Shoshone, were further than a two-hour round-trip drive to the nearest treatment center.

DISCUSSION

Through our stimulant-focused vulnerability assessment, we found that Shoshone, Clearwater, Lewis, Idaho, Owyhee, Gooding, Lincoln, and Bannock Counties had the highest levels of stimulant-related overdose vulnerability. These are a mix of urban and rural counties, with some being sparsely populated and others containing major metropolitan centers. In addition, we found that chronic HCV infection rates, drug-related crime rates, and SVI scores were significantly associated with stimulant-related overdose mortality rates at the county level. Treatment centers that offered cognitive-behavioral therapy and contingency management/motivational incentives were primarily located within urban areas and along interstate highways. Large regions of rural, high-vulnerability counties were further than a two-hour drive round-trip to treatment options. Additionally, three of five tribal lands in Idaho overlapped with one or multiple high-vulnerability counties.

Among the counties identified as highly vulnerable to stimulant-related overdose, Shoshone, Clearwater, Lewis, Idaho, and Gooding were rural, while Bannock, Lewis, and Owyhee were more densely populated or urban. Bannock County, classified as urban, had one of the highest fatal overdose rates involving both stimulants and opioids. Owyhee was classified as a "medium metro" county under the CDC's urban-rural index but had sparse population density throughout much of the county. Overall, stimulant use tended to be more prevalent in rural areas; co-use of opioids and stimulants is more likely in rural and remote regions.[44–47] In multiple studies interviewing people who use drugs (PWUD) in rural communities, participants cited methamphetamine as being easily accessible in terms of cost and availability.[48–50] This viewpoint is corroborated by the 2023 Oregon-Idaho HIDTA Drug Threat Assessment, which found methamphetamine to be the second most dangerous drug threat to Idaho, behind fentanyl.[51] Economic stress, physical exhaustion from manual labor, desires to be more aware and active throughout the day, interpersonal dynamics amongst drug users, and the use of methamphetamine to reduce dependence on heroin or other substances have been cited as reasons for stimulant use and co-use with opioids among PWUD in rural areas.[48–50]

Chronic HCV infection rates were a significant predictor of fatal stimulant-related overdose rates at the county level. Chronic HCV infections affect the liver, increasing the risk of liver cancer and cirrhosis.[52] PWUD who share drug equipment to use or inject stimulants, opioids, or other drugs are at high risk of HCV transmission.[3,28,53,54] Syringe services programs (SSPs) are harm reduction facilities that offer sterile injection equipment, providing safe disposal of used syringes, as well as naloxone for overdose reversal, counseling, and referrals to other treatment options for those with substance use disorders. SSPs are evidence-based interventions with demonstrated effectiveness in reducing HIV infections and injection-related risks, especially when offered alongside additional treatment options.[55] In July of 2024, an Idaho law that rescinded the legality of SSPs in Idaho went into effect, reducing the availability of important harm reduction services that can reduce blood-borne disease transmission, as well as overdoses.[56]

Drug-related crime rates were also significantly associated with stimulant-related overdose mortality rates. Associations between drug-related crime and stimulant-related overdose deaths are more difficult to explain. A growing body of literature points to associations between law enforcement drug seizures and subsequent overdose-related risks in local communities.[57–59] While many of these prior studies have focused on opioid-related seizures, the same may hold true for stimulant-related drug seizures. The associations imply that, in the case of opioid seizures, increased enforcement of drug-related laws may be having the unplanned

effect of increasing risk of overdose for PWUD. One qualitative study interviewing people who use opioids in Rhode Island found that consistently buying from one dealer is a harm reduction method to decrease risk of contamination with unwanted dangerous substances like fentanyl.[60] This highlights a potential explanation for this association: when people's normal drug supply is interrupted and they buy from an unfamiliar dealer, they may be unaware that their drugs are adulterated and more potent than usual, increasing risk of fatal overdose. More research on this topic as it pertains to stimulant-related seizures and overdose mortality is needed to further unpack this association.

SVI was also associated with fatal stimulant-related overdose rates. Numerous racial and ethnic groups are at higher risk of stimulant-related mortality; from 2007-2019, deaths involving both stimulants and opioids increased drastically in non-Hispanic Black populations compared to non-Hispanic white populations.[61] Hispanic and Asian communities also face increasing vulnerability to overdoses involving concurrent stimulant and opioid use.[61] Younger age, Medicaid enrollment status, poverty, and rurality are additional risk factors associated with stimulant use.[47,61,62] Additional groups at higher risk for stimulant use include men who have sex with men and sex workers.[3]

While rates of chronic HCV infections, drug-related crimes, and SVI scores were significantly associated with stimulant-related overdose death rates, stimulant-related ED visit rates were not. In Idaho, stimulant-related overdose death rates have increased from 2019-2023, while rates of stimulant-related ED visits have been dropping since 2020.[36] There are likely multiple contributing factors influencing this pattern. One factor could be that increased lethality of using stimulant and opioids together could be contributing to increasing fatal overdose death rates while nonfatal overdose death rates drop.[4,33–35]

We also identified overlaps between tribal lands and high-vulnerability counties. A study assessing methamphetamine use in the Native American community found that the prevalence of use was almost four times higher among American Indian and Alaska Native residents compared to the general U.S. population.[63] In 2020, the drug overdose death rate for American Indian and Alaska Native residents in Idaho was on par with that of the general population, and was even close to the drug overdose death rate for all U.S. residents.[64] Stimulants were involved in 19% of all drug-related overdose deaths among American Indians and Alaska Native residents in the state from 2013-2020.[64] These findings highlight the need for interventions to reduce risk of stimulant-related overdose, as well as treatment programs for people with stimulant use disorders.

We observed that cognitive-behavioral therapy and contingency management/motivational incentive programs were relatively accessible (geographically) in urban areas and along interstate and major highways; however, rural regions faced drive-times of over two hours round trip to centers that offered these services. Many high-vulnerability counties also had sparse geographic access to these treatment options. A study interviewing people who use stimulants about their participation in treatment found low utilization amongst people who use stimulants in rural areas.[65] Multiple qualitative studies investigating perceptions of treatment for PWUD found that stigma surrounding mental health and substance use disorders is an impediment to treatment for PWUD living in rural areas.[66–69] Additionally, a qualitative study interviewing PWUD in Oregon found a desire to have an available medication to treat stimulant use disorder, such as methadone, buprenorphine, and suboxone for opioid use disorder.[50] Recent changes in policies regarding telehealth could potentially alleviate the challenges

associated with access to care in rural areas, however, increased awareness and outreach will be necessary to improve the uptake of these services.[70,71]

LIMITATIONS

While the findings of our vulnerability assessments are critical, we need to consider several limitations when evaluating the results of our report. Since our analysis was at the county level, we had a relatively small sample size (N=44), which could have influenced associations between core indicators and covariates, as well as our outcome measure. In addition, many counties had low counts, even after aggregating over a three-year period, which could have contributed to unstable estimates of county-level rates. We obtained and geocoded the street addresses for substance use disorder treatment centers that provided cognitive-behavioral therapy and contingency management/motivational incentives from SAMHSA, which only lists providers who opt in for inclusion in the data; this could exclude any providers who chose not to be listed. HIV and acute HCV infections are key indicators of recent bloodborne infectious diseases related to stimulant use and injection drug use in general; however, there were very low counts of HIV and acute HCV infections at the county level. Therefore, we had to exclude HIV from our analyses and use chronic HCV infections as an indicator of infectious bloodborne disease related to stimulant use.

RECOMMENDATIONS

Based on our findings, we recommend the following strategies:

- *Targeted resource allocation*: Targeting responses and distributing resources in Shoshone, Clearwater, Lewis, Idaho, Owyhee, Gooding, Lincoln, and Bannock Counties will ensure that programs are distributed in the regions with highest need for interventions to reduce stimulant-related harms. Expanding resources for the communities that are most affected by stimulant use, including Hispanic, non-Hispanic Black, non-Hispanic Asian, and American Indian and Alaska Native subpopulations, communities with low socioeconomic status, and young adults, would also help combat stimulant-related overdose and transmission of bloodborne infectious diseases in populations at higher risk.

- *Increase accessibility to treatment for stimulant use disorder:* Contingency management/motivational incentives and cognitive-behavioral therapy are evidence-based interventions that are effective in treating stimulant use disorder.[29] Telehealth could be a viable option for expanding access to substance use disorder treatment in rural areas where geographic access to treatment options is low. Studies analyzing cognitive-behavioral therapy delivered via telemedicine during the COVID-19 pandemic have demonstrated promising results for treating substance use disorders.[31,72] Since contingency management/motivational incentives involve group therapy, there are challenges to converting them into a virtual form; however, there has been demonstrated interest among patients and providers in developing a virtual option for said programs.[32] Expansion of telemedicine should also focus on increasing availability of phones or computers as well as internet access, which can be a barrier to effective utilization of telehealth in rural regions.[73] To maximize the effectiveness and utilization of cognitive-behavioral therapy and contingency management/motivational incentives to address stimulant use disorder, stigma among people seeking treatment for substance use disorders, particularly in rural areas, must be addressed. While shared stigmatized beliefs around substance use treatment can be difficult to change, partnering with prominent community leaders and organizations, such as churches and local community-based agencies, can be a venue for prompting transformative conversations about mental health and substance use.[74]

- *Expand harm reduction resources:* Naloxone, or Narcan, is a life-saving medication which can be used to reverse opioid-related overdoses, including those involving both opioids and stimulants.[75] Given the increase in polydrug use nationwide and subsequent heightened risk of fatal overdose, naloxone is important to distribute to prevent fatal opioid-related overdoses involving stimulants.[1,4,33–35] In 2022, there were 25,467 naloxone kits distributed throughout Idaho.[76] In addition, from 2021 to 2022, reported opioid overdose reversals increased by 152% in Idaho.[76] Bannock County, which had a high rate of deaths involving opioids and stimulants, received one of the highest number of naloxone kits of all counties in 2022.[76] It is vital to continue using this momentum to increase access to harm reduction resources. In addition, in the absence of SSPs, public health and harm reduction education is essential, aimed at reducing the sharing of injection equipment, while emphasizing safe discard, with the goal of HCV and HIV prevention.

CONCLUSION

In conclusion, we identified Shoshone, Clearwater, Lewis, Idaho, Owyhee, Gooding, Lincoln, and Bannock Counties to be highly vulnerable to stimulant-related overdose deaths. Many of these counties are rural and had limited geographic access to treatment. Chronic HCV infection rates, drug-related crime rates, and SVI scores were significantly associated with stimulant-related overdose mortality rates at the county level. Expanding access to evidence-based forms of treatment for stimulant use, including cognitive-behavioral therapy and contingency management/motivational incentives, should be prioritized to reduce risk of stimulant-related overdose. Additional harm reduction efforts should focus on increasing the availability of overdose prevention and naloxone distribution to prevent overdoses stemming from polydrug use, as well as use of sterile injection equipment and decreased sharing of injection-related equipment.

REFERENCES

1. Spencer M, Garnett M, Miniño A. *Drug Overdose Deaths in the United States, 2002-2022*. National Center for Health Statistics (U.S.); 2023. doi:10.15620/cdc:135849

2. Al-Tayyib A, Koester S, Langegger S, Raville L. Heroin and Methamphetamine Injection: An Emerging Drug Use Pattern. *Subst Use Misuse*. 2017;52(8):1051-1058. doi:10.1080/10826084.2016.1271432

3. Farrell M, Martin NK, Stockings E, et al. Responding to global stimulant use: challenges and opportunities. *The Lancet*. 2019;394(10209):1652-1667. doi:10.1016/S0140-6736(19)32230-5

4. Ciccarone D. The rise of illicit fentanyls, stimulants and the fourth wave of the opioid overdose crisis. *Curr Opin Psychiatry*. 2021;34(4):344-350. doi:10.1097/YCO.0000000000000717

5. Drug Overdose Prevention Program | Idaho. Accessed December 13, 2024. https://www.gethealthy.dhw.idaho.gov/drug-overdose-dashboard

6. Idaho Office of Drug Policy. State Epidemiological Outcomes Workgroup (SEOW) Data Dashboard. Accessed September 10, 2024. https://odp.idaho.gov/state-epidemiological-outcomes-workgroup-seow/

7. Substance Abuse and Mental Health Services Administration. Treatment of Stimulant Use Disorders.

8. Idaho Office of Justice Programs. Prescription Drug Monitoring Program: Idaho State Profile | Office of Justice Programs. Accessed December 1, 2023. https://www.ojp.gov/ncjrs/virtual-library/abstracts/prescription-drug-monitoring-program-idaho-state-profile

9. PDMP Statistics Dashboard | Division of Occupational and Professional Licenses. Accessed March 21, 2024. https://dopl.idaho.gov/bop/bop-pdmp-dashboard/

10. Section 37-2732 – Idaho State Legislature. Accessed January 26, 2024. https://legislature.idaho.gov/statutesrules/idstat/Title37/T37CH27/SECT37-2732/

11. Section 37-2732B – Idaho State Legislature. Accessed January 26, 2024. https://legislature.idaho.gov/statutesrules/idstat/Title37/T37CH27/SECT37-2732B/

12. Section 37-2732C – Idaho State Legislature. Accessed January 26, 2024. https://legislature.idaho.gov/statutesrules/idstat/Title37/T37CH27/SECT37-2732C/

13. Section 37-2739C – Idaho State Legislature. Accessed January 26, 2024. https://legislature.idaho.gov/statutesrules/idstat/title37/t37ch27/sect37-2739c/

14. Department of Health and Human Services, Center for Medicare and Medicaid Services. Section 1135 Waiver Flexibilities - Idaho Coronavirus Disease 2019 | Medicaid. Accessed November 21, 2023. https://www.medicaid.gov/state-resource-center/disaster-response-toolkit/federal-disaster-resources/entry/54065

15. Idaho Department of Health and Welfare. Idaho Behavioral Health Transformation Waiver. Accessed December 5, 2023. https://healthandwelfare.idaho.gov/providers/behavioral-health-providers/idaho-behavioral-health-transformation-waiver

16. Medicaid.gov. Home & Community-Based Services 1915(c). Accessed December 5, 2023. https://www.medicaid.gov/medicaid/home-community-based-services/home-community-based-services-authorities/home-community-based-services-1915c/index.html

17. Van Handel MM, Rose CE, Hallisey EJ, et al. County-Level Vulnerability Assessment for Rapid Dissemination of HIV or HCV Infections Among Persons Who Inject Drugs, United States. *JAIDS J Acquir Immune Defic Syndr*. 2016;73(3):323-331. doi:10.1097/QAI.0000000000001098

18. Lewis OM, Shrestha S, Stopka TJ. Opioid-Related Overdose Vulnerability in Idaho: An Epidemiological Assessment. Published online 2024.

19. Lewis OM, Shrestha S, Stopka TJ. Alcohol-Related Vulnerability in Idaho: An Epidemiological Assessment. Published online 2024.

20. Shrestha S, Bayly R, Pustz J, et al. Methods for jurisdictional vulnerability assessment of opioid-related outcomes. *Prev Med*. 2023;170:107490. doi:10.1016/j.ypmed.2023.107490

21. Bayly R, Shrestha S, Sawyer J, Feng W, Lingwall C, Stopka TJ. *Opioid Overdose Vulnerability in Idaho: A Mixed Methods Assessment.*; 2021.

22. Idaho Office of Drug Policy. Stimulants. Accessed January 26, 2024. https://odp.idaho.gov/stimulants/

23. Butler AJ, Rehm J, Fischer B. Health outcomes associated with crack-cocaine use: Systematic review and meta-analyses. *Drug Alcohol Depend*. 2017;180:401-416. doi:10.1016/j.drugalcdep.2017.08.036

24. Sordo L, Indave BI, Barrio G, Degenhardt L, De La Fuente L, Bravo MJ. Cocaine use and risk of stroke: A systematic review. *Drug Alcohol Depend*. 2014;142:1-13. doi:10.1016/j.drugalcdep.2014.06.041

25. Pilowsky D, Wu LT. Co-occurring amphetamine use and associated medical and psychiatric comorbidity among opioid-dependent adults: results from the Clinical Trials Network. *Subst Abuse Rehabil*. Published online July 2011:133. doi:10.2147/SAR.S20895

26. Influence of different drugs on HIV risk in people who inject: systematic review and meta-analysis - Tavitian-Exley - 2015 - Addiction - Wiley Online Library. Accessed February 4, 2025. https://onlinelibrary.wiley.com/doi/full/10.1111/add.12846

27. McKetin R, Leung J, Stockings E, et al. Mental health outcomes associated with the use of amphetamines: A systematic review and meta-analysis. *eClinicalMedicine*. 2019;16:81-97. doi:10.1016/j.eclinm.2019.09.014

28. Scheinmann R, Hagan H, Lelutiu-Weinberger C, et al. Non-injection drug use and Hepatitis C Virus: A systematic review. *Drug Alcohol Depend*. 2007;89(1):1-12. doi:10.1016/j.drugalcdep.2006.11.014

29. Rawson RA, Huber A, McCann M, et al. A comparison of contingency management and cognitive-behavioral approaches during methadone maintenance treatment for cocaine dependence. *Arch Gen Psychiatry*. 2002;59(9):817-824. doi:10.1001/archpsyc.59.9.817

30. Zastepa E, Sun JC, Clune J, Mathew N. Adaptation of contingency management for stimulant use disorder during the COVID-19 pandemic. *J Subst Abuse Treat*. 2020;118:108102. doi:10.1016/j.jsat.2020.108102

31. Gregory Jr. VL, Wilkerson DA, Wolfe-Taylor SN, Miller BL, Lipsey AD. Digital cognitive-behavioral therapy for substance use: systematic review and meta-analysis of randomized controlled trials. *Am J Drug Alcohol Abuse*. 2024;50(6):771-785. doi:10.1080/00952990.2024.2400934

32. Parent SC, Peavy KM, Tyutyunnyk D, et al. Lessons learned from statewide contingency management rollouts addressing stimulant use in the Northwestern United States. *Prev Med*. 2023;176:107614. doi:10.1016/j.ypmed.2023.107614

33. Mattson CL, Tanz LJ, Quinn K, Kariisa M, Patel P, Davis NL. Trends and Geographic Patterns in Drug and Synthetic Opioid Overdose Deaths — United States, 2013–2019. *MMWR Morb Mortal Wkly Rep*. 2021;70(6):202-207. doi:10.15585/mmwr.mm7006a4

34. Timko C, Han X, Woodhead E, Shelley A, Cucciare MA. Polysubstance Use by Stimulant Users: Health Outcomes Over Three Years. *J Stud Alcohol Drugs*. 2018;79(5):799-807. doi:10.15288/jsad.2018.79.799

35. Palis H, Xavier C, Dobrer S, et al. Concurrent use of opioids and stimulants and risk of fatal overdose: A cohort study. *BMC Public Health*. 2022;22(1):2084. doi:10.1186/s12889-022-14506-w

36. Drug Overdose Prevention Program | Idaho. Accessed January 26, 2024. https://www.gethealthy.dhw.idaho.gov/drug-overdose-dashboard

37. Board AR, Guy G, Jones CM, Hoots B. Trends in stimulant dispensing by age, sex, state of residence, and prescriber specialty — United States, 2014–2019. *Drug Alcohol Depend*. 2020;217:108297. doi:10.1016/j.drugalcdep.2020.108297

38. HOUSE BILL NO. 530 – Idaho State Legislature. Accessed January 26, 2024. https://legislature.idaho.gov/sessioninfo/2006/legislation/H0530/#sop

39. Home & Community Based Services 1915(i) | Medicaid. Accessed May 7, 2024. https://www.medicaid.gov/medicaid/home-community-based-services/home-community-based-services-authorities/home-community-based-services-1915i/index.html

40. Sawyer JL, Shrestha S, Pustz JC, et al. Characterizing opioid-involved overdose risk in local communities: An opioid overdose vulnerability assessment across Indiana, 2017. *Prev Med Rep*. 2021;24:101538. doi:10.1016/j.pmedr.2021.101538

41. Pustz J, Shrestha S, Newsky S, et al. Opioid-Involved Overdose Vulnerability in Wyoming: Measuring Risk in a Rural Environment. *Subst Use Misuse*. 2022;57(11):1720-1731. doi:10.1080/10826084.2022.2112229

42. Amiri S, Hirchak K, McDonell MG, Denney JT, Buchwald D, Amram O. Access to medication-assisted treatment in the United States: Comparison of travel time to opioid treatment programs and office-based buprenorphine treatment. *Drug Alcohol Depend*. 2021;224:108727. doi:10.1016/j.drugalcdep.2021.108727

43. Kleinman RA. Comparison of Driving Times to Opioid Treatment Programs and Pharmacies in the US. *JAMA Psychiatry*. 2020;77(11):1163. doi:10.1001/jamapsychiatry.2020.1624

44. Korthuis PT, Cook RR, Foot CA, et al. Association of Methamphetamine and Opioid Use With Nonfatal Overdose in Rural Communities. *JAMA Netw Open*. 2022;5(8):e2226544. doi:10.1001/jamanetworkopen.2022.26544

45. Strickland JC, Stoops WW, Dunn KE, Smith KE, Havens JR. The continued rise of methamphetamine use among people who use heroin in the United States. *Drug Alcohol Depend*. 2021;225:108750. doi:10.1016/j.drugalcdep.2021.108750

46. Shearer RD, Howell BA, Bart G, Winkelman TNA. Substance use patterns and health profiles among US adults who use opioids, methamphetamine, or both, 2015-2018. *Drug Alcohol Depend*. 2020;214:108162. doi:10.1016/j.drugalcdep.2020.108162

47. Jones CM, Compton WM, Mustaquim D. Patterns and Characteristics of Methamphetamine Use Among Adults — United States, 2015–2018. *MMWR Morb Mortal Wkly Rep*. 2020;69(12):317-323. doi:10.15585/mmwr.mm6912a1

48. Fredericksen RJ, Baker R, Sibley A, et al. Motivation and context of concurrent stimulant and opioid use among persons who use drugs in the rural United States: a multi-site qualitative inquiry. *Harm Reduct J*. 2024;21(1):74. doi:10.1186/s12954-024-00986-z

49. Hansen ER, Carvalho S, McDonald M, Havens JR. A qualitative examination of recent increases in methamphetamine use in a cohort of rural people who use drugs. *Drug Alcohol Depend*. 2021;229:109145. doi:10.1016/j.drugalcdep.2021.109145

50. Lopez AM, Dhatt Z, Howe M, et al. Co-use of methamphetamine and opioids among people in treatment in Oregon: A qualitative examination of interrelated structural, community, and individual-level factors. *Int J Drug Policy*. 2021;91:103098. doi:10.1016/j.drugpo.2020.103098

51. Oregon-Idaho HIDTA Investigative Support Center. *Oregon-Idaho HIDTA 2023 Drug Threat Assessment*.; 2022. Accessed April 7, 2025. https://oridhidta.org/reports

52. Hepatitis C - Symptoms and causes - Mayo Clinic. Accessed March 10, 2025. https://www.mayoclinic.org/diseases-conditions/hepatitis-c/symptoms-causes/syc-20354278

53. Estadt AT, Kline D, Miller WC, et al. Differences in hepatitis C virus (HCV) testing and treatment by opioid, stimulant, and polysubstance use among people who use drugs in rural U.S. communities. *Harm Reduct J*. 2024;21(1):214. doi:10.1186/s12954-024-01131-6

54. Mateu-Gelabert P, Sabounchi NS, Guarino H, et al. Hepatitis C virus risk among young people who inject drugs. *Front Public Health*. 2022;10:835836. doi:10.3389/fpubh.2022.835836

55. Aspinall EJ, Nambiar D, Goldberg DJ, et al. Are needle and syringe programmes associated with a reduction in HIV transmission among people who inject drugs: a systematic review and meta-analysis. *Int J Epidemiol*. 2014;43(1):235-248. doi:10.1093/ije/dyt243

56. HOUSE BILL 617 – Idaho State Legislature. Accessed March 10, 2025. https://legislature.idaho.gov/sessioninfo/2024/legislation/h0617/

57. Kral AH, Humphrey JL, Schwab C, Lambdin BH, Ray B. Law Enforcement Drug Seizures and Opioid-Involved Overdose Mortality. *JAMA Netw Open*. 2025;8(3):e251158. doi:10.1001/jamanetworkopen.2025.1158

58. Cano M, Timmons P, Hooten M, Sweeney K, Oh S. A scoping review of law enforcement drug seizures and overdose mortality in the United States. *Int J Drug Policy*. 2024;124:104321. doi:10.1016/j.drugpo.2024.104321

59. Humphrey JL, Schwab C, Richardson NJ, Lambdin BH, Kral AH, Ray B. Overdose as a complex contagion: modelling the community spread of overdose events following law enforcement efforts to disrupt the drug market. *J Epidemiol Community Health*. 2025;79(2):147-152. doi:10.1136/jech-2024-222263

60. Carroll JJ, Rich JD, Green TC. The protective effect of trusted dealers against opioid overdose in the U.S. *Int J Drug Policy*. 2020;78:102695. doi:10.1016/j.drugpo.2020.102695

61. Townsend T, Kline D, Rivera-Aguirre A, et al. Racial/Ethnic and Geographic Trends in Combined Stimulant/Opioid Overdoses, 2007–2019. *Am J Epidemiol*. 2022;191(4):599-612. doi:10.1093/aje/kwab290

62. Hendricks B, Sokos G, Kimble W, et al. Clinical and demographic factors associated with stimulant use disorder in a rural heart failure population. *Drug Alcohol Depend*. 2021;229:109060. doi:10.1016/j.drugalcdep.2021.109060

63. Coughlin LN, Lin L (Allison), Jannausch M, Ilgen MA, Bonar EE. Methamphetamine use among American Indians and Alaska Natives in the United States. *Drug Alcohol Depend*. 2021;227:108921. doi:10.1016/j.drugalcdep.2021.108921

64. Northwest Portland Area Indian Health Board. *American Indian and Alaska Native Opioid and Drug Overdose Data Brief*.; 2020. Accessed May 30, 2024. https://www.npaihb.org/wp-content/uploads/2024/02/Idaho-AIAN-Drug-Overdose-Mortality-Brief_Updated-2.pdf

65. Cucciare MA, Ounpraseuth ST, Curran GM, Booth BM. Predictors of Substance Use Disorder and Mental Health Treatment Use Among Rural Adults using Stimulants over Three Years. *Subst Abuse*. 2019;40(3):363-370. doi:10.1080/08897077.2018.1547809

66. Browne T, Priester MA, Clone S, Iachini A, DeHart D, Hock R. Barriers and Facilitators to Substance Use Treatment in the Rural South: A Qualitative Study. *J Rural Health*. 2016;32(1):92-101. doi:10.1111/jrh.12129

67. Brenes GA, Danhauer SC, Lyles MF, Hogan PE, Miller ME. Barriers to Mental Health Treatment in Rural Older Adults. *Am J Geriatr Psychiatry*. 2015;23(11):1172-1178. doi:10.1016/j.jagp.2015.06.002

68. Stopka TJ, Estadt AT, Leichtling G, et al. Barriers to opioid use disorder treatment among people who use drugs in the rural United States: A qualitative, multi-site study. *Soc Sci Med*. 2024;346:116660. doi:10.1016/j.socscimed.2024.116660

69. Fredericksen RJ, Mixson LS, Estadt AT, et al. Barriers to retention in inpatient and residential drug treatment among persons who use opioids and/or injection drugs living in the rural U.S. *J Subst Use Addict Treat*. 2024;165:209453. doi:10.1016/j.josat.2024.209453

70. Department of Health and Human Services, Center for Medicare and Medicaid Services. Telehealth policy updates. Accessed March 22, 2025. https://telehealth.hhs.gov/providers/telehealth-policy/telehealth-policy-updates

71. Forster SE, Torres TM, Steinhauer SR, Forman SD. Telehealth-Based Contingency Management Targeting Stimulant Abstinence: A Case Series From the COVID-19 Pandemic. *J Stud Alcohol Drugs*. 2024;85(1):26-31. doi:10.15288/jsad.23-00016

72. Edinoff AN, Kaufman SE, Chauncy TM, et al. Addiction and COVID: Issues, Challenges, and New Telehealth Approaches. *Psychiatry Int*. 2022;3(2):169-180. doi:10.3390/psychiatryint3020014

73. Button D, Levander XA, Cook RR, et al. Substance use disorder treatment and technology access among people who use drugs in rural areas of the United States: A cross-sectional survey. *J Rural Health*. 2023;39(4):772-779. doi:10.1111/jrh.12737

74. Ashworth M, Thunström L, Clancy GL, Thompson RA, Johnson D, Fletcher E. Addressing rural and non-rural substance use disorder stigma: Evidence from a national randomized controlled trial. *Addict Behav Rep*. 2024;19:100541. doi:10.1016/j.abrep.2024.100541

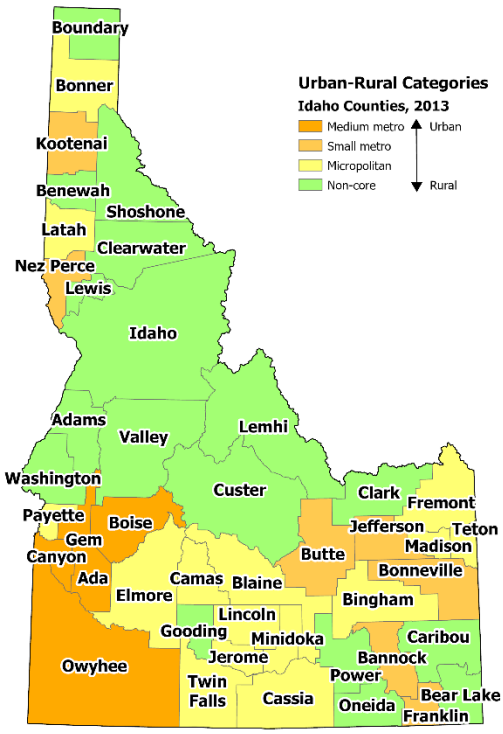
75. Naloxone DrugFacts | National Institute on Drug Abuse (NIDA). Accessed March 13, 2025. https://nida.nih.gov/publications/drugfacts/naloxone

76. Benedict K. *2022 Naloxone Distribution Report*. Idaho Harm Reduction Project

APPENDIX

A

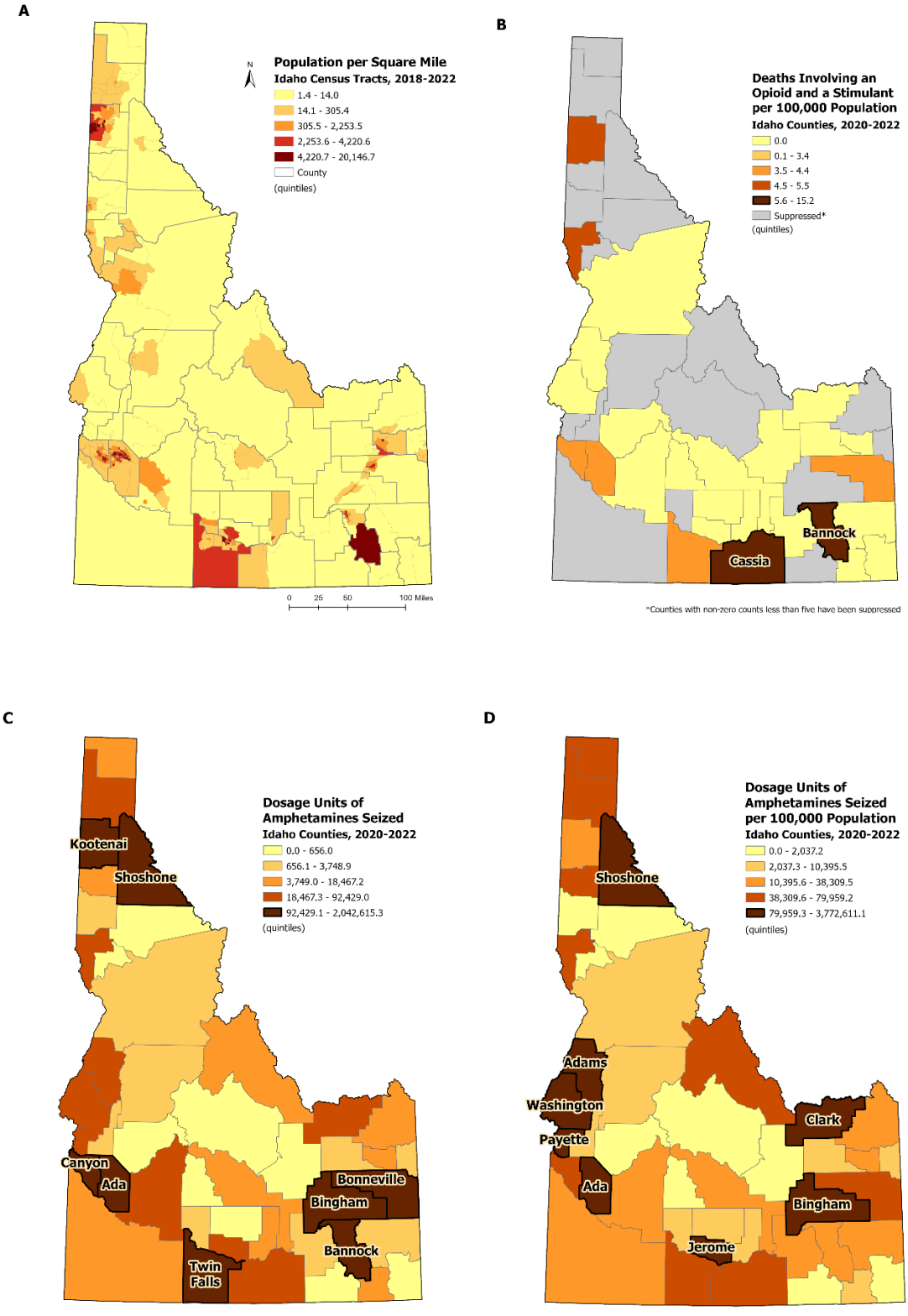
B



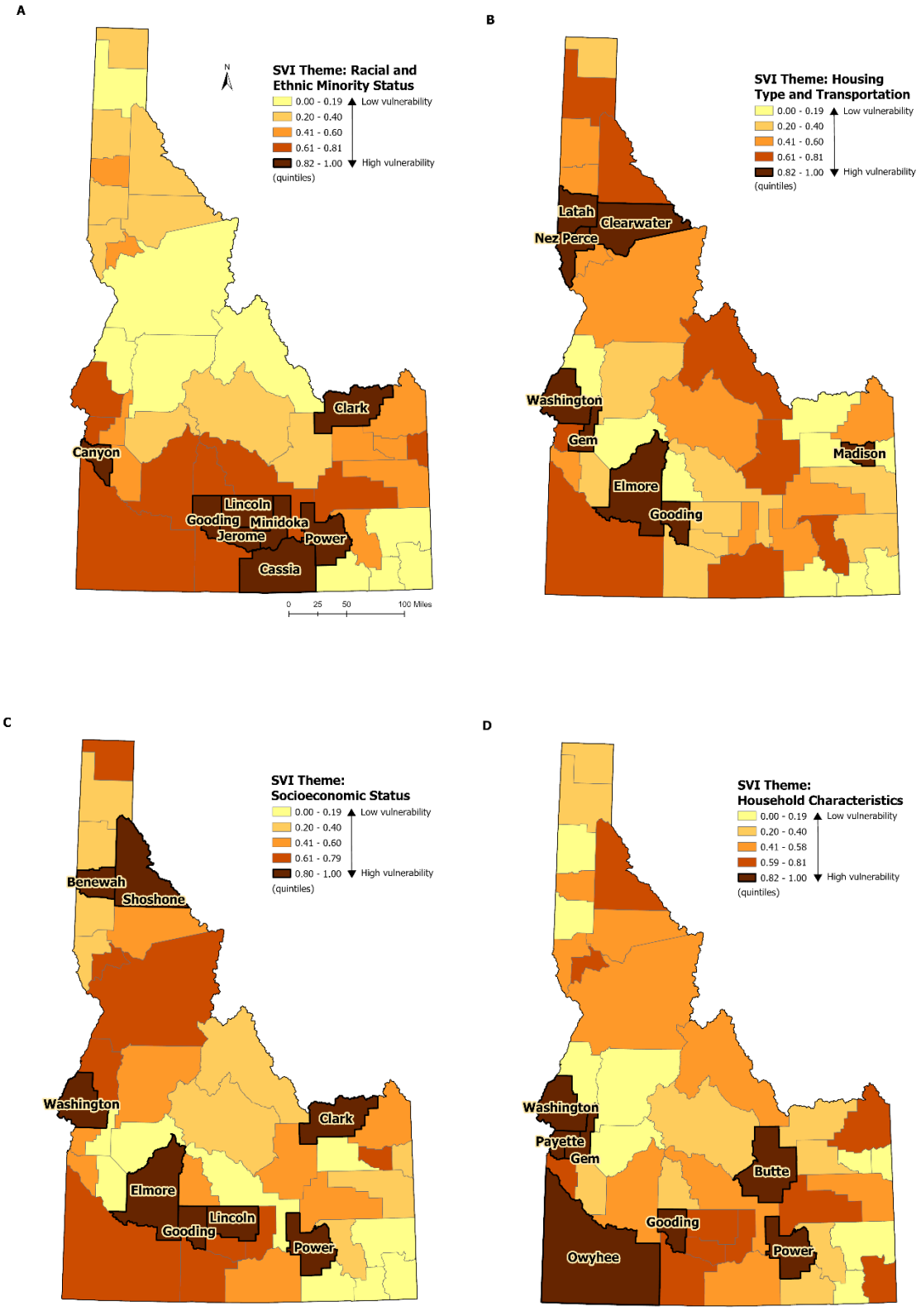
C

Least Vulnerable				Most Vulnerable
Clark	Bear Lake	Bonner	Jerome	Owyhee
Caribou	Valley	Lemhi	Payette	Shoshone
Oneida	Boise	Butte	Canyon	Lincoln
Jefferson	Blaine	Custer	Minidoka	Gooding
Adams	Bonneville	Benewah	Power	Idaho
Teton	Boundary	Gem	Elmore	Bannock
Madison	Kootenai	Nez Perce	Bingham	Lewis
Camas	Washington	Twin Falls	Cassia	Clearwater
Latah	Franklin	Fremont	Ada	

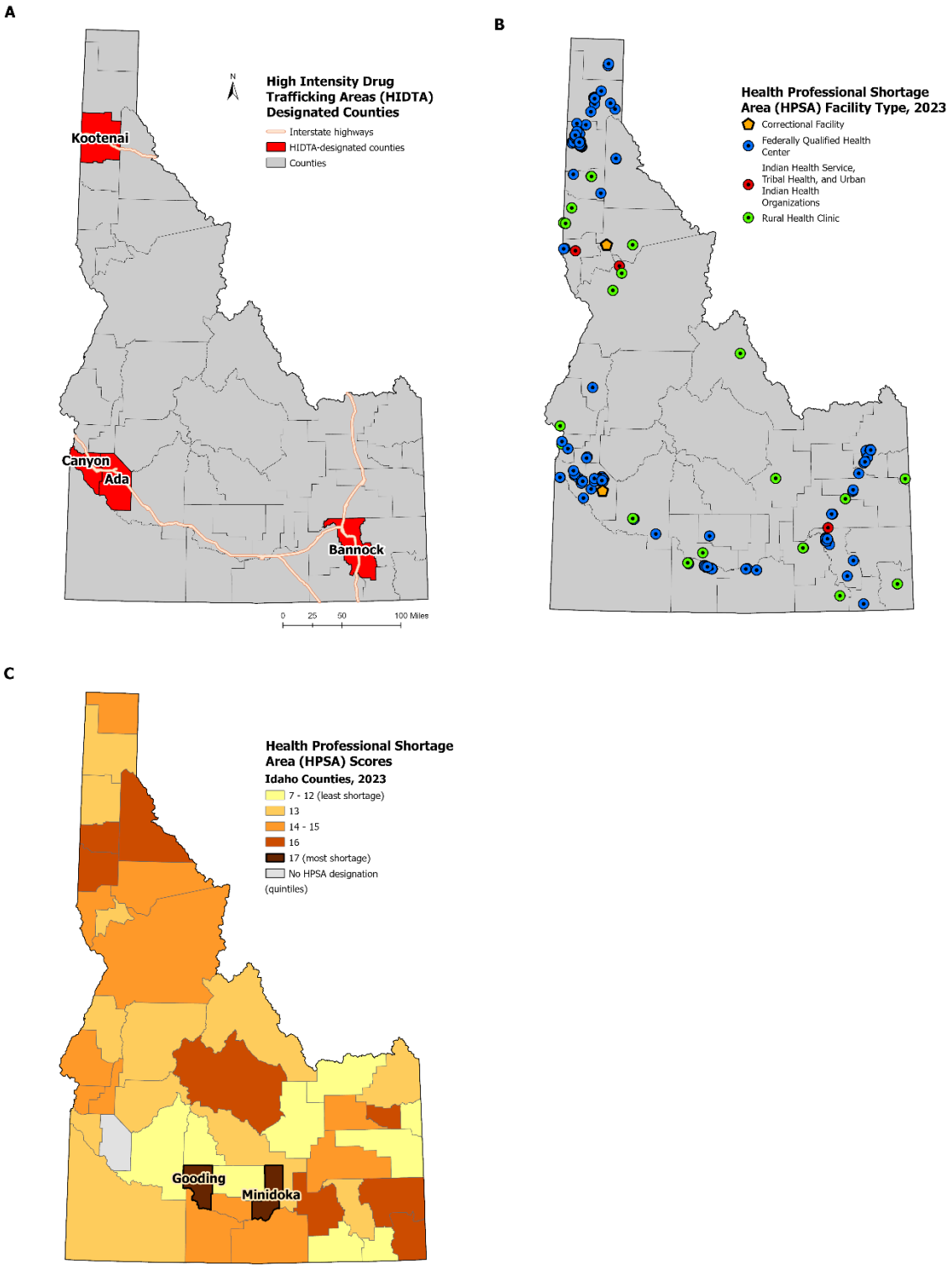
Appendix 1: County Names (A), Urban-Rural Index (B), and Counties by Vulnerability Ranking (C)



Appendix 2: Population Density (A), Deaths Involving Opioids and Stimulants (B), and Drug Seizures (C, D)



Appendix 3: SVI Themes, Idaho Counties, 2018-2022



Appendix 4: HIDTA- Designated Counties (A), HPSA Facilities (B), and HPSA Scores (C)