HIDI HealthStats

Statistics and Analysis From the Hospital Industry Data Institute

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Key Findings

- The total economic cost of the opioid epidemic in Missouri was **$12.6 billion in 2016.** This was **4.2 percent of the state's total GDP of nearly $300 billion in 2016,** ranking 15th highest among 50 states and the District of Columbia. This was 1.3 times the state's total economic activity generated by the agriculture, mining and utilities sectors combined.
- These estimates suggest **opioid use disorder and overdose deaths cost the state $34.5 million every day.** This equates to $1.4 million per hour, $24 thousand per minute or **$399 every second of every day during 2016.**
- Costs associated with overdose deaths accounted for 96 percent of the total economic burden of opioid use disorder. **Nearly three Missourians died each day**

Key findings continue on Page 2.

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The Economic Cost of the Opioid Epidemic in Missouri

Executive Summary

At the close of 2017, new research and mortality data shed additional light on the growing severity of the opioid epidemic in the U.S. In November, the White House Council of Economic Advisors published a report investigating the economic burden attributable to opioid overdose deaths and individuals with opioid use disorder. By fully accounting for the economic value of lives lost to the epidemic, the CEA study estimated the burden of opioid use disorder and overdose deaths to be $504 billion, or 2.8 percent of gross domestic product in the U.S. during 2015. This far exceeded previous estimates.[i]

The following month, the U.S. Centers for Disease Control and Prevention released the final national mortality data for 2016, finding that life expectancy in the U.S. had actually fallen for the second consecutive year.[ii] An unprecedented trend for a developed nation, the latest mortality data support previous research suggesting Americans are living shorter lives because of opioid-related "deaths of despair."[iii] The CDC found that 67,265 Americans died from drug-induced causes in 2016, which were dominated by 41,918 opioid overdoses, marking a one-year, 29 percent increase from 2015.[iv]

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from an opioid overdose during 2016. With 921 total deaths, **the one-year increase over 2015 was 35 percent in Missouri** — six percentage points higher than the national increase of 29 percent.

- In 2016, the economic cost of the 921 **opioid overdose deaths in Missouri were estimated at $12.1 billion,** while costs associated with **nonfatal opioid use disorder totaled $519 million.**
- The **opioid overdose mortality rate in Missouri has nearly doubled throughout the last five years.** In 2012, the state experienced 8.5 opioid overdose deaths per 100,000 residents. By 2016 the rate had grown to 15.1, **a five-year, 78 percent increase.**
- The increase in opioid overdose deaths in Missouri during 2016 was driven primarily by the introduction of inexpensive, yet **highly potent synthetic opiates such as fentanyl.** The number of deaths involving synthetic opiates grew from 192 in 2015 to 448 in 2016, a **one-year, 133 percent increase.**

Every day during 2016, opioid use disorder and overdose deaths cost Missouri:

01 hours	01 minutes	01 seconds
$1.4 MIL per hour	**$24,000** per minute	**$399** per second

Using CEA methods and updated CDC mortality data, this research brief estimates the economic burden of the opioid epidemic at the state level, with an emphasis on Missouri during 2016.

Background

The opioid crisis in the U.S. has gained considerable attention in recent years. In October 2017, President Donald Trump declared opioid misuse a national public health emergency. Leveraging the Public Health Service Act, the declaration called for the Department of Health and Human Services, as well as other federal agencies, to prioritize interventions aimed at mediating the effects of the ongoing epidemic that claimed nearly 42,000 lives in 2016. However, critics suggested that the declaration in itself will produce limited results without sufficient funding, additional resources and greater attention to demand-side prevention strategies.[v, vi]

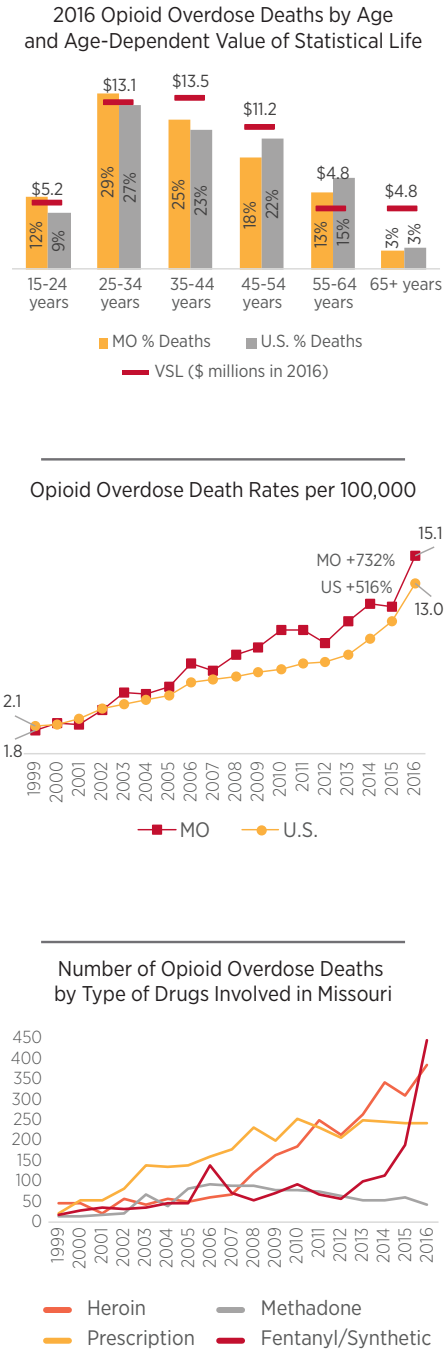
More recent research from the President's own Council of Economic Advisors validates calls for additional resources to combat the opioid epidemic. Accounting for the full economic costs of the crisis in terms of total societal welfare — lost lives and productivity, emotional strain, and increased spending on health care and criminal justice — the CEA study found that the opioid epidemic cost the U.S. $504 billion in 2015 alone.[i] By comparison, the president's request in fiscal year 2018 for drug treatment and prevention funding was $10.8 and $1.3 billion, respectively.[vii]

In light of the executive declaration on the opioid epidemic and the White House Council of Economic Advisors' finding that the crisis cost nearly 3 percent of GDP in 2015, the president's requested funding for drug prevention in 2018 was $200 million less than in 2017, and the requested funding for drug treatment was just 2 percent above the previous year. At the same time, new mortality data from the CDC show that the rate of opioid overdose deaths in the U.S. grew more between 2015 and 2016 than any other year since reporting began in 1999 (Figure 1, middle panel).[iv]

Data and Methods

This study aims to replicate the November 2017 CEA study of the economic burden of the opioid crisis at the state level using updated mortality data from 2016. The CEA methodology accounts for two

Figure 1: Opioid Overdose Statistics in the U.S. and Missouri: 1999 to 2016



types of costs attributable to opioid use disorder: *fatality costs* are those associated with premature mortality, and *nonfatality costs* are those associated with surviving individuals with opioid-use disorder that accrue from reduced productivity and increased consumption of health care and social services.

Fatality costs are derived by applying age-dependent estimates of the "Value of a Statistical Life" to the corresponding number of opioid overdose deaths for each age category from the CDC WONDER database, multiple cause of death files.[iv] Similar to the CEA, the number of deaths used in this analysis was adjusted to reflect new research indicating that opioid overdose deaths are underreported by 24 percent in the U.S.[viii] Federal agencies commonly base cost-benefit analyses on VSL measures that are designed to estimate the monetary value of the expected benefits of fatality risk-reduction associated with proposed policy and legislative changes.

The CEA's preferred VSL estimates draw from the work of Aldy and Viscusi (2008), which presented an empirically estimated range of $3.4 million for individuals over age 55, to $9.7 million for individuals aged 35 to 44 (in 2000 dollars).[ix] The VSL estimates were adjusted for inflation for this analysis using the consumer price index for all urban consumers to reflect the societal costs of premature opioid-related deaths in 2016 dollars.[x]

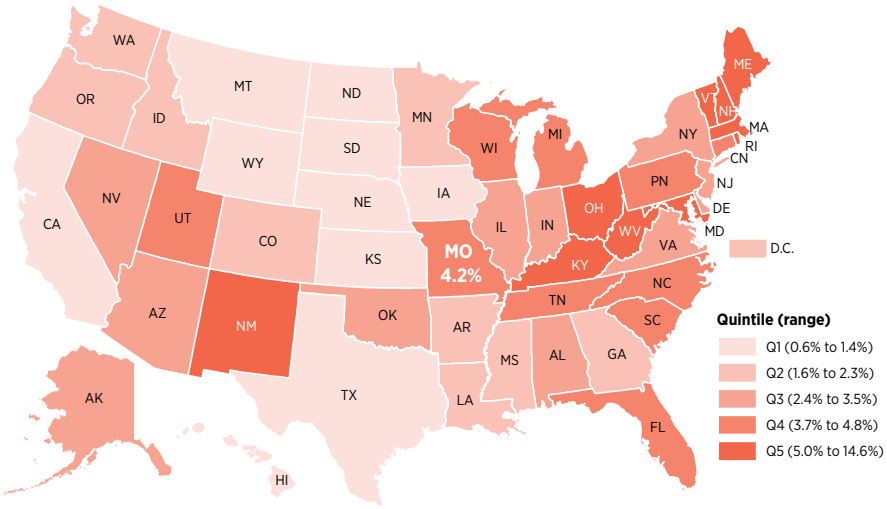
The top panel of Figure 1 illustrates the age distribution of opioid overdose deaths in Missouri and the U.S. in 2016, as well as the inflation-adjusted age-dependent VSL estimates used in this analysis. The lowest VSL was used in cases where the decedent's age was suppressed and for all opioid overdose deaths by individuals over age 55. In Missouri and nationally, the majority of opioid overdose deaths occur among prime-aged individuals with higher estimated VSLs.

Our estimated economic costs of opioid-related fatalities in the U.S. totaled $544 billion in 2016. Compared to the CEA's fatality cost estimate of $431.7 billion in 2015, our estimate marked a 26 percent increase, which is largely explained by the 29 percent increase in opioid overdose deaths and 1.3 percent inflation in the U.S. between 2015 and 2016.

Nonfatality costs were derived in the CEA methodology with the total number of individuals with opioid use disorder in the U.S. (2.4 million in 2015[xi]) scaled by estimates from Florence et al. (2016) that found the average cost associated with surviving individuals with prescription opioid use disorder to be approximately $30,000 per person in the form of reduced productivity, increased consumption of health care, law enforcement and social services.[xii]

Because one aim of this study was to estimate between-state variation in the economic burden of opioid use disorder, the total number of adults who reported using heroin between 2015 and 2016 were used to estimate nonfatality costs. These survey-generated data are reported at the state level by the Substance Abuse and Mental Health Services Administration. The total number

Figure 2: Economic Cost of Opioid Use Disorder in the United States as a Percent of State GDP in 2016



Source: Author's analysis of CEA methods applied to 2016 data from the CDC, BEA and SAMHSA.

of American adults reporting heroin use between 2015 and 2016 was 882,000.[xiii] This was the most significant departure from the CEA study, which included individuals with prescription and illicit opioid use disorder.

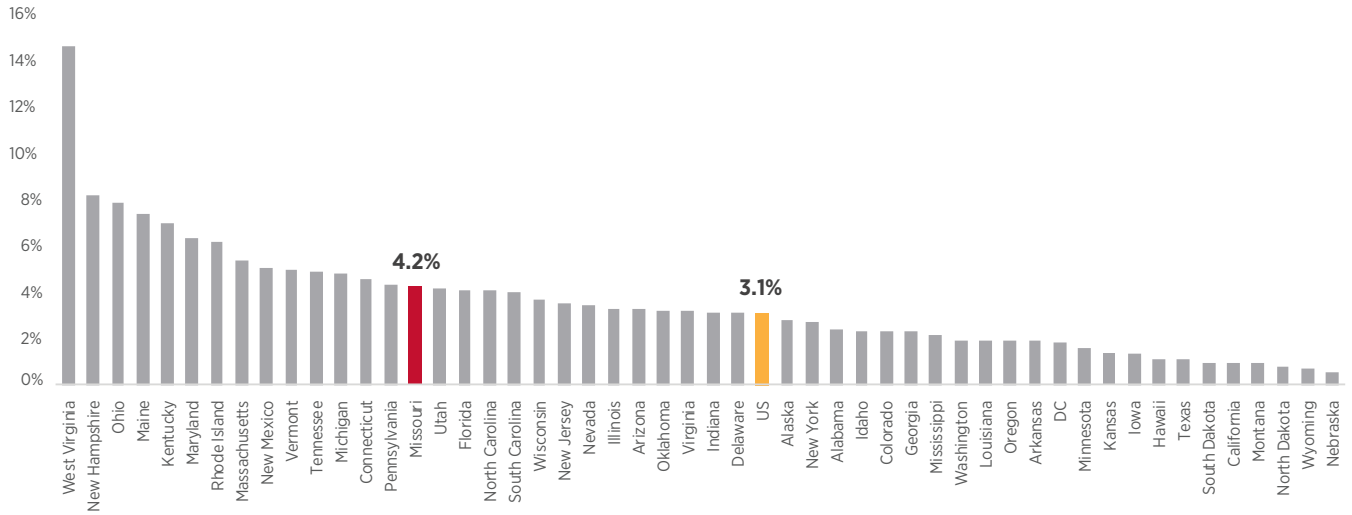
Compared to the 2.4 million individuals with any opioid use disorder used by the CEA, our nonfatality cost estimates are conservatively biased downward by roughly two-thirds; however, the nonfatality costs represented only 15 percent of the total economic costs of opioid use disorder in the CEA study. For these reasons, after adjusting the average per person cost associated with nonfatal opioid use disorder for inflation to reflect 2016 dollars, **our estimated nonfatality costs in the U.S. totaled $27.3 billion in 2016,** compared to the CEA's estimate of $72.3 billion in 2015.

The total economic cost of opioid use disorder and overdose deaths were estimated by this analysis to be $571.5 billion in 2016, or 3.1 percent of the national GDP of $18.5 trillion during the year.[xiv] This was 13 percent higher than the CEA's estimate of $504 billion in 2015.

Findings

A wide range of variation in the economic burden of opioid use disorder was detected between states during 2016. The total economic costs of fatal and nonfatal opioid use disorder ranged from a maximum of $572 billion in Ohio to a minimum of $285 million in

Figure 3: Economic Cost of Opioid Use Disorder by State as a Percent of GDP in 2016



Wyoming. Evaluated as a percent of state GDP, the range was a minimum of 0.56 percent in Nebraska and a staggering maximum of 14.6 percent in West Virginia (Figure 3).

Missouri is among the 23 states and Washington, D.C., that have statistically higher rates of drug-related overdose deaths compared to the rest of the nation.[xv] Additionally, at 35 percent, the state's increase in opioid overdose deaths between 2015 and 2016 was significantly higher than the national increase of 29 percent.

With 921 Missourians — primarily between the high VSL ages of 25 and 54 — dying from an opioid-related overdose in 2016, it is estimated that the total fatality-related economic costs for the state were $12.1 billion using the CEA methods. In addition, nearly 17,000 Missourians aged 18 and older reported heroin use between 2015 and 2016. Using the inflation-adjusted CEA marginal cost estimate of $30,916 per individual produced an estimated $519 million in nonfatal opioid-related costs in Missouri during 2016.

The combined economic burden of opioid use disorder and overdose deaths for Missouri in 2016 was estimated to be $12.63 billion using the CEA methods. This was 4.22 percent of the state's total GDP of $299 billion during 2016, placing Missouri in the fourth quintile nationally (Figure 2), and ranking 15th-highest among fifty states and the District of Columbia in terms of the total burden of opioid use disorder as a percent of overall economic activity (Figure 3).

Table 1: 2016 Economic Cost of Opioids as a Percent of Missouri GDP by Sector

Industry	2016 GDP (in billions)	$12.6 billion Opioid Cost (percent GDP)
All industry total	**$299.11**	**4.2%**
Private industries	**$263.29**	**4.8%**
Agriculture, forestry, fishing and hunting	$3.71	341%
Mining	$0.80	1578%
Utilities	$5.31	238%
Construction	$11.23	112%
Manufacturing	$40.53	31.2%
Durable goods manufacturing	$19.90	63.5%
Nondurable goods manufacturing	$20.63	61.2%
Wholesale trade	$19.37	65.2%
Retail trade	$18.53	68.1%
Transportation and warehousing	$10.40	121%
Information	$10.64	119%
Finance and insurance	$23.64	53.4%
Real estate and rental and leasing	$34.04	37.1%
Professional, scientific and technical services	$19.34	65.3%
Management of companies and enterprises	$8.87	142%
Administrative and waste management services	$8.97	141%
Educational services	$3.35	376%
Health care and social assistance	$25.53	49.5%
Arts, entertainment, and recreation	$3.63	348%
Accommodation and food services	$8.33	152%
Other services, except government	$7.07	179%
Government	**$35.82**	**35.2%**

Total Economic Cost of Opioid Use Disorder in Missouri:

$12,626,001,373

Source: U.S. Bureau of Economic Analysis, 2016 Gross Domestic Product (GDP) by State and author's replication of CEA, 2017 methods.

In terms of equivalence, Missouri's opioid burden was 1.3 times the state's total economic activity generated by the agriculture, mining and utilities sectors combined. In addition, the economic cost of the opioid crisis more than nets out contributions from entire sectors of the economy, such as construction, transportation, IT and services for accommodation or food (Table 1).

Missouri's opioid burden was greater than the state's total economic activity generated by the agriculture, mining and utilities sectors combined.

Conclusion

Recent tools provided to the public health and provider community will undoubtedly help to improve outcomes for Missourians with opioid use disorder and, more importantly, prevent opioid misuse altogether.

Counties and municipalities participating in the prescription drug monitoring program led by the St. Louis County Department of Public Health now cover approximately 80 percent of the state's population.

The state's provider community has endorsed and adopted evidence-based, best-practice prescribing and treatment guidelines.

New laws enable widespread administration of naloxone for opioid overdose victims, with Good Samaritan protections.

While there have been significant advances made in Missouri to combat the opioid epidemic, these data suggest additional resources are needed to minimize the societal cost of opioid use disorder in the state. With additional barriers to procuring prescription opioids, an increase of illicit opioid substitution is likely for some individuals with preexisting opioid use disorder in the short term. Considering the recent proliferation of heroin cut with highly potent synthetic opioids like fentanyl, this substitution effect will dampen the positive impact of the state's multiple aforementioned efforts to curb the availability of prescription opioids. The number of deaths involving synthetic opioids in Missouri more than doubled between 2015 and 2016, and now they are the most prevalent type of drug present in opioid overdose deaths (Figure 1 bottom panel).

Advancements in detection have defined the scope of this epidemic establishing the need for increased availability of prevention and treatment necessary to reverse this epidemic.

A recent letter published in the *Journal of the American Medical Association* stated that, "The epidemic of opioid misuse, overdose and death is a multifaceted crisis that requires partnership across sectors to respond with effective health care and public safety strategies."[xvi] Effectively mitigating the societal costs of the opioid crisis with a cross-sector interventional strategy will require additional resources and investment in prevention and treatment, yet according to this research the benefits should far outweigh the costs. And as posited in 1967 by Rev. Martin Luther King, "Budgets are moral documents."

"The epidemic of opioid misuse, overdose, and death is a multifaceted crisis that requires partnership across sectors to respond with effective health care and public safety strategies."

Journal of the American Medical Association[xvi]

Suggested Citation

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i The Council of Economic Advisers (2017, November). The underestimated cost of the opioid crisis. Available at https://www.whitehouse.gov

ii Kochanek, K.D., Murphy, S.L., Xu, J.Q. & Arias, E. (2017, December). Mortality in the United States, 2016. NCHS Data Brief, no 293. Hyattsville, MD: National Center for Health Statistics. Retrieved from https://www.cdc.gov/nchs/products/databriefs/db293.htm

iii Case, A. & Deaton, A. (2017, March). Mortality and morbidity in the 21st century. Retrieved from https://www.brookings.edu/wp-content/uploads/2017/03/6_casedeaton.pdf

iv Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2016 on CDC WONDER Online Database, released December, 2017. Data are from the Multiple Cause of Death Files, 1999-2016, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Retrieved from http://wonder.cdc.gov/mcd-icd10.html

Note: Opioid-related deaths were identified with ICD-10 Codes T40.0 (Opium), T40.1 (Heroin), T40.2 (Other opioids), T40.3 (Methadone) and T40.4 (Other synthetic narcotics).

v Lopez, G. (2017, October 26). Trump just declared a public health emergency to combat the opioid crisis. Here's what that will do. Vox. Retrieved from https://www.vox.com/policy-and-politics/2017/10/26/16552168/trump-opioid-epidemic-emergency

vi Frakt, A. (2017, November 27). Where is the prevention in the president's opioid report? *The New York Times*. Available at https://www.nytimes.com/2017/11/27/upshot/where-is-the-prevention-in-the-presidents-opioid-report.html?_r=0&src=twr

vii The National Drug Control Budget. FY 2018 Funding Highlights. (2017, May). Executive Office of the President of the United States. Available at https://www.whitehouse.gov/sites/whitehouse.gov/files/ondcp/Fact_Sheets/FY2018-Budget-Highlights.pdf

viii Ruhm, C. (2017). Geographic variation in opioid and heroin involved drug poisoning fatality rates. *American Journal of Preventive Medicine, 53*(6): 745-753.

ix Aldy, J. & Viscusi, W. (2008). Adjusting the value of a statistical life for age and cohort effects. *Review of Economics and Statistics 90*(3): 573-581. Retrieved from https://law.vanderbilt.edu/files/archive/279_Adjusting-VSL-for-Age-and-Cohort-Effects.pdf

x U.S. Bureau of Labor Statistics. CPI-All Urban Consumers (Current Series). Available at https://www.bls.gov/cpi/data.htm

xi U.S. Substance Abuse and Mental Health Services Administration. (2016). Key Substance Use and Mental Health Indicators in the United States: Results from the 2015 National Survey on Drug Use and Health. Available at https://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2016/NSDUH-FFR1-2016.htm

xii Florence, C., Zhou, C., Luo, F. & Xu, L. (2016). The economic burden of prescription opioid overdose, abuse, and dependence in the United States, 2013. *Medical Care, 54*(10): 901-906.

xiii U.S. Substance Abuse and Mental Health Services Administration. (2016). National Survey on Drug Use and Health: Comparison of 2014-2015 and 2015-2016 Population Percentages (50 States and the District of Columbia). Available at https://www.samhsa.gov/data/sites/default/files/NSDUHsaeShortTermCHG2016/NSDUHsaeShortTermCHG2016.pdf

xiv U.S. Bureau of Economic Analysis. Gross Domestic Product (GDP) by State. Available at https://www.bea.gov/iTable/index_regional.cfm

xv Hedegaard, H., Warner, M. & Miniño, A.M. (2017, December). Drug overdose deaths in the United States, 1999–2016. NCHS Data Brief, no 294. Hyattsville, MD: National Center for Health Statistics. Retrieved from https://www.cdc.gov/nchs/products/databriefs/db294.htm

xvi Schuchat, A., Houry, D. & Guy, G.P. (2017, August 1). New data on opioid use and prescribing in the United States. *JAMA. 318*(5):425-426. Available at https://jamanetwork.com/journals/jama/article-abstract/2643332?resultClick=1