

SURPRISE BILLING LEGISLATION IN MISSOURI (SENATE BILL 982)

The Missouri General Assembly and Governor Mike Parson signed into law legislation to protect patients against surprise billing. Highlights of the bill include the following.

OUT-OF-NETWORK BILLING (EFFECTIVE JANUARY 1, 2019)

- Legislation applies to a subset of patient encounters — “services delivered by an out-of-network practitioner in an in-network facility from the time the patient presents with an emergency medical condition until the time the patient is discharged.”
- Legislators focused on surprise billing stemming from unanticipated emergency treatment with no effective choice of provider.

ADJUDICATION PROCESS

- The practitioner submits claim within 180 days of date of service.
- Health insurer offers to pay a reasonable reimbursement rate within 45 days. If the practitioner participates in any of the insurer’s plans, the rate offered will be the highest in-network contracted commercial rate.
- If the practitioner declines, claims unresolved after a 60-day negotiation period are subject to arbitration.

ARBITRATION PROCESS

- The process can be initiated by either the insurer or practitioner.
- Arbitration can encompass multiple claims, but they must represent similar circumstances and services provided by the same practitioner.
- State insurance department randomly selects an arbitrator for each case using criteria established in state regulation.
- Arbitration costs are to be equally shared.
Arbitrator determines a fair payment rate that is between 120 percent of the Medicare allowed amount and the 70th percentile of the usual and customary rate. The decision may consider the practitioner’s training, education, experience, circumstances and complexity of the case, and average contracted rate for comparable services.
- Arbitrator’s final decision is binding on all parties.

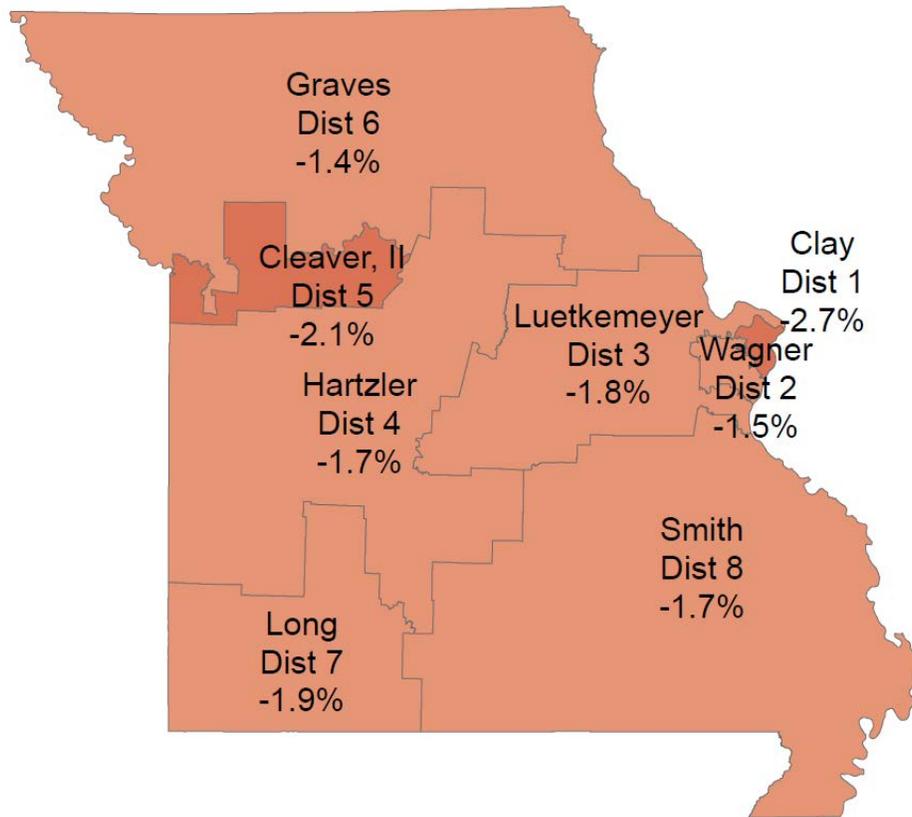
PATIENT PROTECTIONS

- A practitioner cannot bill the patient more than what the patient would have paid if the service was provided by an in-network health care professional.
 - Cost-sharing obligations are established by agreement or arbitration.
 - In-network deductibles and out-of-pocket maximums apply to unanticipated out-of-network claims.
- The patient is not required to participate in the arbitration process.

MEDICARE PAYMENT ISSUES

ENACTED AND PROPOSED LEGISLATIVE AND REGULATORY PAYMENT REDUCTIONS

Percent Reduction in 2019 Medicare Hospital Payment From Implemented Cuts



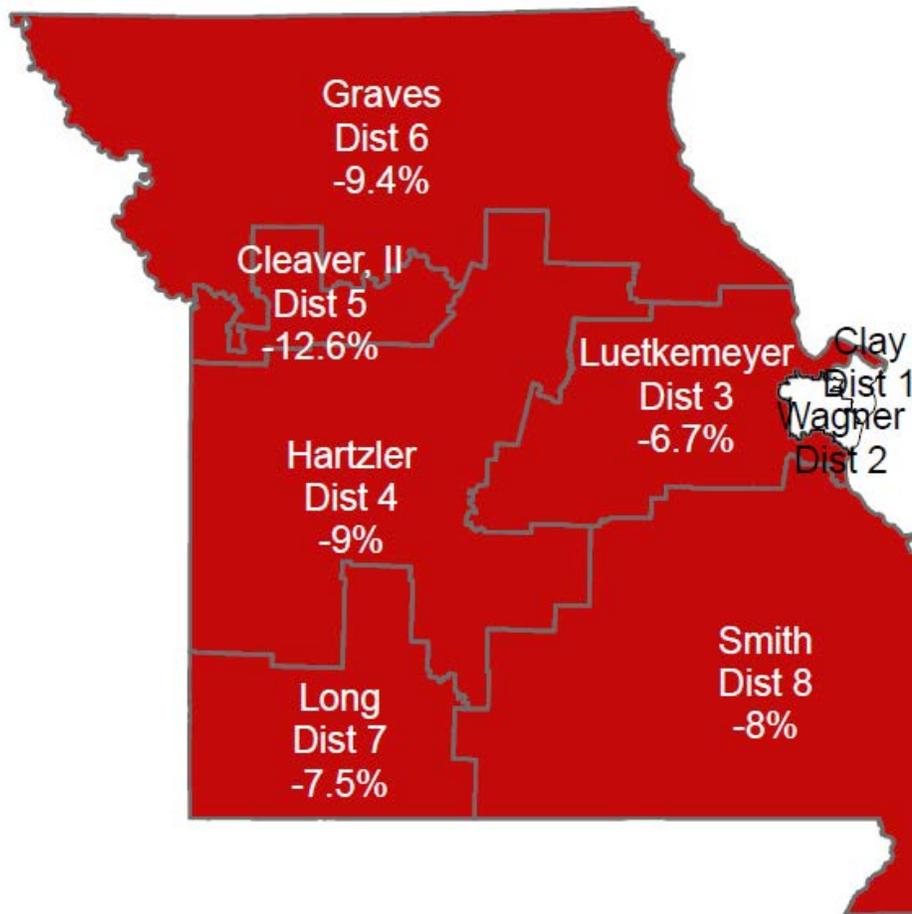
- In 2019, hospitals are receiving \$407 million less in Medicare payments than if these cuts were not enacted.
- More than 77 percent primarily are defined by federal legislation.
- Twenty-three percent primarily are defined by the Centers for Medicare & Medicaid Services.

Both Congress and CMS continue proposing more payment reductions, which include reductions to indirect medical education reductions, the elimination of the sole community hospital program, marketbasket reductions, further reducing Medicare bad debt reimbursement rates, sequestration extensions, repeal of the Medicare disproportionate share uncompensated care pool and continuing site neutrality payment reductions. If Congress and CMS implement these payment reductions, hospital operating revenues would decrease an estimated \$497 million, or 2.3 percent, in 2019.

CRITICAL ACCESS HOSPITALS

The critical access hospital payment mechanism is essential to ensuring access to patients in rural areas of the state. Although Congress is not actively seeking to eliminate the program, it is important to acknowledge the effect of the payment mechanism. If Congress were to end the CAH program, 34 hospitals in Missouri would receive \$89 million less in Medicare reimbursement per year. This amounts to an 8.8 percent reduction in Medicare payments. Since the average CAH operating margin was 0.4 percent in 2017, ending the CAH program would be devastating to rural hospitals.

Potential Reduction in Critical Access Hospital Payments



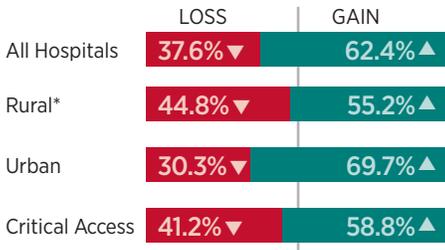
DECLINING MEDICARE PAYMENTS

MedPAC recently acknowledged that Medicare inpatient and outpatient margins continue to decrease significantly. In 2017, the aggregate Medicare margin declined to -9.9 percent. Those who MedPAC deems as highly efficient providers are realizing -2 percent Medicare margins. MedPAC further projects that the aggregated Medicare margin will decrease to -11 percent in 2019. As Congress and CMS continue to place further payment reductions on hospitals, commercial payment rates are the only source that can make up for these reductions. MHA encourages Congress to provide stability to the Medicare payment structure and find ways to reform the Medicare system without reducing overall payment rates.

Profile of Missouri Hospitals

▶ Operating Margins

Percent of hospitals operating at a loss/gain.

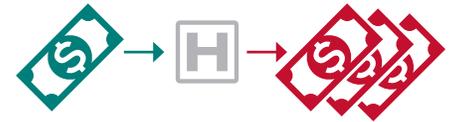


▶ Business Mix

31:1
outpatient vs.
inpatient

For every inpatient discharge, hospitals treat 31 outpatients.

▶ Uncompensated Care



For every **\$1 in profit**, hospitals spend **\$3.33 in community benefit**.

Annual Licensing Survey. Excludes those that did not complete the ALS, children's and VA hospitals.

Background

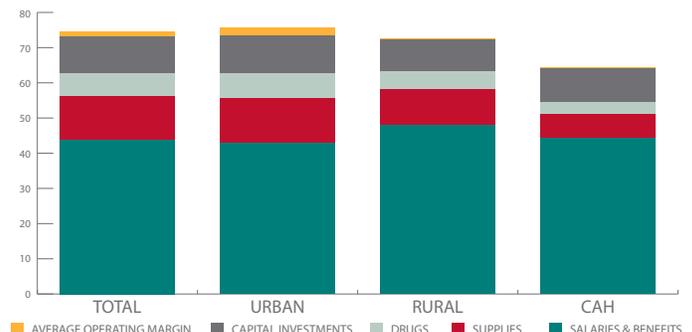
143

MHA-member hospitals

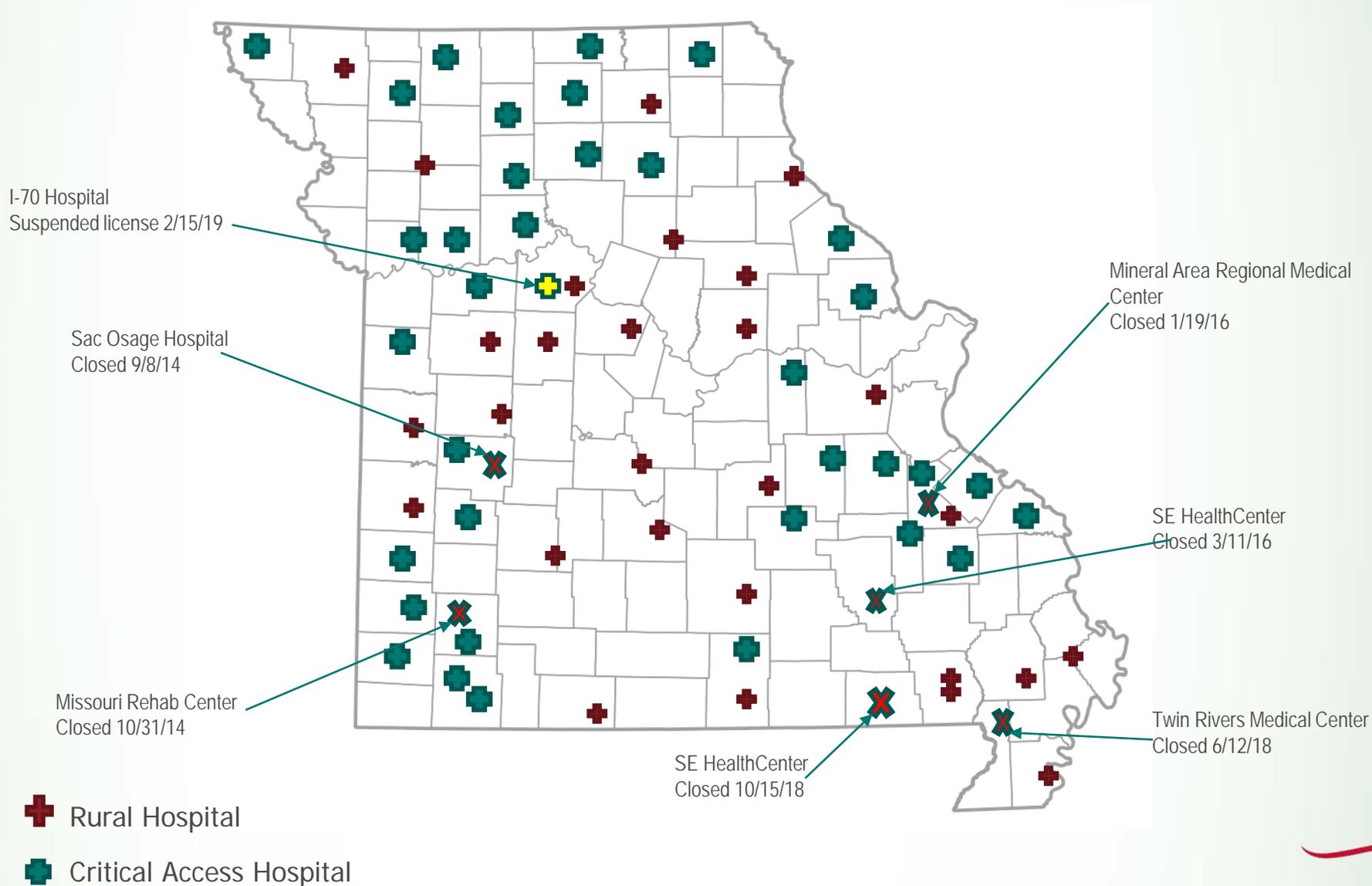
- **71** Medicare acute inpatient prospective payment system hospitals
- **36** critical access hospitals
- **5** federal military or veterans hospitals
- **15** psychiatric hospitals
- **6** long-term, acute-care hospitals
- **5** rehabilitation hospitals
- **32** for-profit organizations
- **111** tax-exempt organizations
- **69** private, not-for-profit organizations
- **31** state or local governmental acute-care hospitals

Where does Missouri hospital money go?

	TOTAL	URBAN	RURAL	CAH
SALARIES & BENEFITS	43.8%	42.9%	48%	44.2%
SUPPLIES	12.4%	12.8%	10.2%	7.0
DRUGS	6.6%	7.0%	4.9%	3.2%
CAPITAL INVESTMENTS	10.4%	10.7%	9.2%	9.7%
AVERAGE OPERATING MARGIN	1.3%	2.3%	0.4%	0.4%



Hospital Closures and Voluntary Suspension of License Since 2014



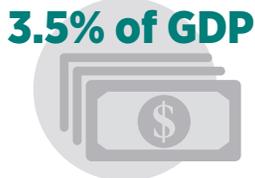
Opioid Abuse Initiatives

ADDRESSING THE OPIOID CRISIS IN MISSOURI

Since 2015, MHA has actively addressed the opioid crisis through research and initiatives to prevent, treat and support recovery throughout all Missouri communities. MHA's 2019 initiatives to reduce opioid use disorder focus on education, expansion and evaluation.

Key Points

The total economic cost of the opioid epidemic in the U.S. **was estimated at \$684.6 billion in 2017.**



This was **3.5 percent of the nation's total GDP** of nearly \$19.5 trillion in 2017. This suggests a 35.8 percent increase over the 2015 CEA estimate of \$504 billion. The increase was primarily driven by a **46 percent increase in opioid overdose deaths between 2015 and 2017.**



These estimates suggest **opioid use disorder and overdose deaths cost the U.S. nearly \$1.9 billion every day.** This equates to \$78 million per hour, \$1.3 million per minute, or **\$21,700 every second of every day during 2017.**



147% more deaths in the last decade

The opioid overdose mortality rate in the U.S. has more than doubled throughout the last ten years. In 2008, 5.9 Americans died from an opioid overdose per 100,000 residents. By 2017 the rate had grown to 14.6, **a 10-year, 147 percent increase.**

Education

Education offerings have been supported through the SAMHSA Opioid State Targeted Response Grant and MHA.

2019 education highlights include:

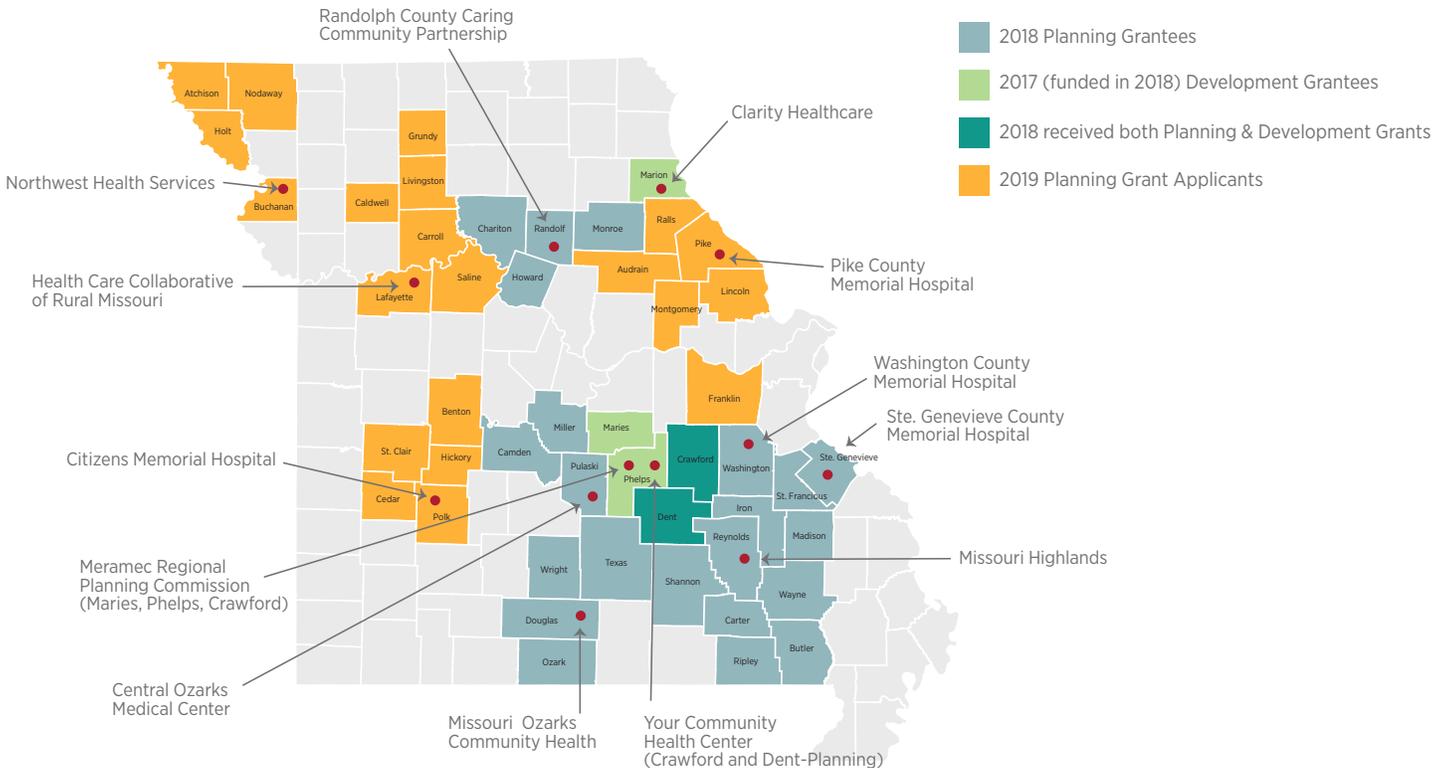
- ▶ Gateway Healthcare Compliance Conference – 100 participants
- ▶ The MHA 2nd Annual Opioid Summit: Clinical Care of Perinatal Women with Substance Use Disorder and Newborns with Neonatal Abstinence Syndrome - 125 clinician participants
- ▶ HHS and SAMHSA regional technical expert panel
- ▶ April Webinar series:
 - Prevention - 215 registered
 - Treatment - 175 registered
 - Recovery - 169 registered

Expansion to Mothers and Children

Action: MHA has convened more than 50 Missouri clinicians to address OUD in women of childbearing age and the increase in maternal mortality. This learning and action network has provided the initial structure for Missouri to formally participate in the American College of Obstetricians and Gynecologists Alliance for Innovation on Maternal Health. **Priorities include:**

- ▶ Identify and disseminate best practices
- ▶ Collect data to better understand maternal mortality
- ▶ Understand and address connections between maternal mortality, substance use disorder, mental and behavioral health needs

Opioid Abuse Initiatives | ADDRESSING THE OPIOID CRISIS IN MISSOURI



Expansion of OUD Services into Rural Communities

▶ To address the rural opioid crisis, the Health and Human Services Health Resources and Services Administration has community-based grant funding available. MHA staff actively contribute expertise to the statewide technical assistance team to support the HRSA Rural Community Opioid Response Program grants. In 2018, 24 Missouri counties were awarded planning grants and now are eligible for three-year, \$1 million implementation grants. In addition, new Missouri counties now are eligible for initial planning grants.

Expansion of the Medication-First Model

Action: The Engaging Patients in Care Coordination (EPICC) medication-first model initiates buprenorphine treatment in the emergency department for patients with actual or risk of opioid overdose. Concurrently to medication, patients are connected to community-based treatment through a peer recovery coach often prior to leaving the emergency department. This program is supported through the SAMHSA Opioid STR and the State Opioid Response grants.

- ▶ St. Louis – launched and expanding
- ▶ Columbia – launched and expanding
- ▶ Kansas City – launch spring 2019
- ▶ Springfield – launch summer 2019

Challenge: The need for OUD services and effective medication-first model expansion has capped out available funding through the STR and SOR grants. MHA and other state partners are actively seeking other funding sources to continue the expansion of the EPICC program throughout Missouri.

Evaluation

▶ Longitudinal evaluation of this program will begin this spring with collection of patient-specific treatment encounters through a new HIDi data portal. This portal, once fully operational will have the capacity to collect OUD treatment encounter data across multiple Missouri programs serving patients with OUD.

Workplace Violence Mitigation Efforts



- S** – Safe culture of zero violence
- A** – Approaches to safe care and resiliency
- F** – Facts to drive decisions
- E** – Educate using evidence and best practices
- R** – Regulatory reform to support safe workplaces

MHA’s S.A.F.E.R. initiative provides a framework for a coordinated effort to improve the safety and quality of care.

WORKPLACE VIOLENCE DATA COLLECTION

Beginning in April, MHA will be collecting quarterly data from member hospitals through the HIDI quality portal to quantify the prevalence of workplace violence.

SAVE THE DATES!

In June, MHA will be hosting three regional workshops focused on developing, implementing and sustaining effective workplace violence programs for hospitals and outpatient clinics. Interdisciplinary teams from each facility will be encouraged to attend the full day program. Workshop detail and registration information will be forthcoming.

June 10 – Blue Springs, Mo.

June 12 – Springfield, Mo.

June 14 – Chesterfield, Mo.

In October 2018, language about safety in health care facilities was introduced by Senators Blunt (R-Mo.) and Jerry Moran (R-Kan.) into the Department of Health and Human Services’ appropriations bill. This addition *direct(ed) the Department to work with the Department of Labor to provide a report to the Committees on Appropriations in the House of Representatives and the Senate 180 days after enactment on how they can collaborate to provide protections and support safe environments for health care workers, patients, families and visitors.*

Before the release of the anticipated report in late March, MHA has relaunched its workplace violence and safety initiative by providing new public-facing resources to help hospitals promote consistent patient and visitor behavior expectations. Using the theme, “Healing Happens Here,” these resources outline expected visitor behavior and can be co-branded for use throughout the hospital.



Early data from the 2019 MHA Preparedness and Safety Survey (n-132) reveal positive trends, compared to the previous year, (n-123) to prevent workplace violence in Missouri hospitals as noted with the following highlights.

What methods does your facility use to staff security personnel?	Number of Hospitals	
	2018	2019
Employ as hospital personnel	72	82
Use contract agency, other than jurisdictional public safety	16	13
A formal relationship with jurisdictional public safety: off-duty	10	8
A formal relationship with jurisdictional public safety: on-duty	3	2
Do not employ security personnel	42	42

Does your hospital provide dedicated security officers in your emergency department 24/7?	2018	2019
Yes	26	40
No	97	92

Does your hospital have a formal program to employ verbal de-escalation and safe patient handling during an encounter?	2018	2019
Yes	87	97
No	36	35

Does your hospital include security personnel as part of the formal care team?	2018	2019
Yes	26	50
No	97	82

Does your hospital use a community-policing model?	2018	2019
Yes	63	73
No	60	59

Are security events shared with your senior leadership team?	2018	2019
Yes	121	122
No	2	10



In December 2018, Gov. Mike Parson held a [rural health summit](#) in Bolivar, Mo., that addressed a multitude of issues that are of great magnitude for rural Missourians. A number of the issues touched on expanded opportunities to improve rural health policy and delivery. As a result, [#ReimagineRuralHealth](#) explores 10 rural health issues that were raised at the summit and proposes policy options that should be considered to address them.

10 Rural Health Issues

1. [Expand Access to Behavioral Health Services](#) | [Fact Sheet](#)
2. [Expand Access to Primary Care Providers](#) | [Fact Sheet](#)
3. [Increase Access to Care for Substance Use Disorder](#) | [Fact Sheet](#)
4. [Ensure Access to Quality Health Care](#)

5. [Allow and Encourage Innovative Payment Models](#)
6. [Collaborate to Identify and Address Social Determinants of Health](#) | [Fact Sheet](#)
7. [Expand Telehealth and Telemedicine](#) | [Fact Sheet](#)
8. [Advocate for Improved Infrastructure](#) | [Fact Sheet](#)
9. [Support Emergency Services](#) | [Fact Sheet](#)
10. [Empower Partnerships](#)

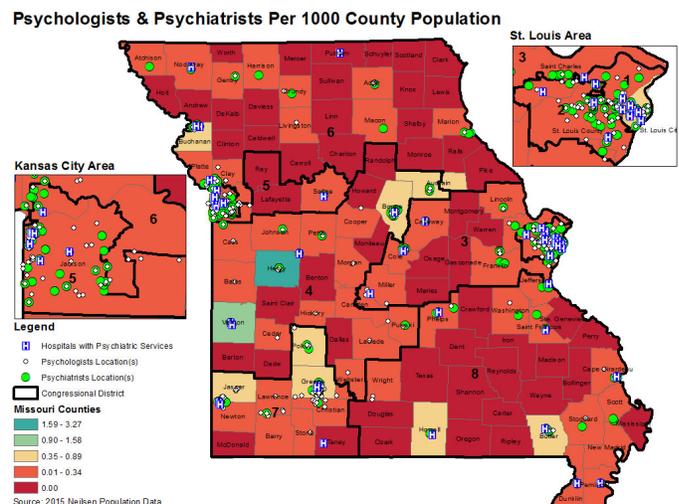


1. Expand Access to Behavioral Health Services

The Parson administration has made workforce investment a priority. Few workforce sectors have as much opportunity for growth and long-term stability as health care. Behavioral health providers are in especially high demand as rural Missouri has an [acute shortage](#). Nearly all of rural Missouri is a Health Professional Shortage Area for [Mental Health](#), leading to patient boarding in hospital emergency departments and inpatient care. Behavioral health clinicians who agree to practice in these areas can participate in loan repayment assistance programs through the [National Health Service Corps](#). In addition, Missouri should examine behavioral health programs to identify and eliminate any barriers for those who wish to practice in rural areas.

Missouri could expand access to rural behavioral health services through [better integrated](#) primary care services. The Substance Abuse and Mental Health Services Administration has partnered with the Health Resources and Services Administration to produce [resources](#) for rural providers, in addition to federal [funding](#) for innovative training programs.

The state could access federal Medicaid funding to support behavioral health through [state waivers authorized](#) by the Trump administration. Pursuing waivers in these areas would increase the state's capacity to deliver high quality behavioral health services in areas of greatest need.



Stronger partnerships between Community Mental Health Centers, rural primary and acute care providers, and Federally Qualified Health Centers would improve the capacity of health care providers to treat behavioral health problems locally. Better integration of community-based outpatient care could expand opportunities for rural Missourians to receive behavioral health care close to home.

Rural areas also could benefit from greater use of hotlines, better support of family caregivers, and education and outreach resources.



2. Expand Access to Primary Care Providers

A primary health care system with the capacity to ensure that individuals receive the care they need, manage chronic conditions and live healthy lives is essential. The Parson administration is committed to building a better Medicaid program and a more efficient health care system. The foundation of that effort must be [improved primary care access](#) and performance. Six rural Missouri counties lack a PCP, and 71 lack obstetrics coverage. And, there's a large [disparity in the number of primary care physicians](#) between urban and rural communities. These disparities are evident in access to oral health services, and pharmaceuticals and pharmacist consulting, as well.

As people age, their need for health care services increases. By 2030, more than 25 percent of Missourians will be over age 65. Research shows that 90 percent want to age in place. A series of challenges exist for the state's rural health care system – 46 percent of Medicare beneficiaries are located in rural areas of the state, and there's an increased demand for care, a primary care practitioner shortage, an aging workforce and worsening health status. In addition, the [closure of six rural hospitals](#) since 2014 further strains the system.

The following are multiple approaches to address the primary care shortage.

- Increase the number of available residency slots. Missouri's medical school enrollment increased by 10.6 percent from 2006 to 2016, but residency slots have not kept pace.

Six Missouri counties lack a primary care physician, and 71 lack obstetrics coverage. In addition, six rural hospitals have closed in Missouri since 2014.

- Increase the use of nurse practitioners and physician assistants by removing barriers that prevent them from utilizing their education and training in their practice. The majority of nurse practitioners are trained in primary care. [Researchers](#) estimate that 60 percent of preventive care services can be performed by such health professionals.
- Continue to support the University of Missouri-Columbia School of Medicine’s [Rural Track Pipeline Program](#) to promote rural medical training in undergraduate and medical student education.
- Develop stronger recruiting and retention programs through scholarship and student loan repayment programs, like the state’s [Primary Care Resource Initiative for Missouri](#) or the [National Health Service Corps](#), and, more importantly, create opportunities for rural communities to “grow their own” [health care talent](#) through [career pathways](#).
- Integrate clinical pharmacists as [members](#) of the primary health care team, optimizing health outcomes by ensuring safe and effective use of medications. The American Society of Health System Pharmacists has had a position on the use of pharmacists in primary care since [1999](#).



3. Increase Access to Care for Substance Use Disorder

The [opioid and substance abuse crisis](#) is one of the greatest public health threats facing Missouri. [Overdose deaths now exceed traffic-related fatalities](#) in Missouri. Changes in state policy, and targeted investment in intervention and recovery, could help curb the high toll on rural communities, which tend to be disproportionately impacted by this epidemic.

The Parson administration voiced support for enacting a statewide prescription drug monitoring system during the 100th Missouri General Assembly. Missouri is the only state in the country without a state-legislated PDMP. As a result, the state is missing federal funding opportunities to assist health care providers in their ability to identify and treat patients with, or at risk of developing, opioid use disorder. The benefit of a robust PDMP has been established by the Centers for Disease Control and Prevention as a tool to prevent multiple prescriptions, and thus reduce the risk of OUD. More than 80 percent of Missourians and 90 percent of providers are covered by the St. Louis County Department of Public Health’s PDMP system. Unfortunately, there still are more than 50 — primarily rural — counties and

municipalities outside of the PDMP network.

Medicaid reimbursement generally is not available for nonelderly adults cared for in inpatient psychiatric facilities, or “Institutions of Mental Disease.” However, the Trump administration extended the opportunity for states to apply for waivers that would include lifting the “IMD exclusion” to allow states to expand treatment options and capacity for Medicaid participants with [opioid addiction](#) or conditions of [serious mental illness](#)/serious emotional disturbance. Pursuing waivers in these areas would increase the state’s capacity to deliver high quality behavioral health services in areas of greatest need.

Providing evidence-based OUD treatment to low-income, uninsured women of childbearing age with substance use disorder prior to pregnancy could reduce the medical and societal costs associated with neonatal abstinence syndrome. Through a [federal waiver](#), Medicaid coverage could be expanded for substance abuse treatment without new state revenue. The initiative could use cost avoidance for NAS-related care to redirect spending for substance abuse treatment. This would reduce state and federal spending in other areas as well, including foster care, and create a cumulative savings of approximately \$14.5 million throughout a decade.

Beginning in 2019, federal funding will be available to assist rural communities planning to implement OUD prevention, treatment and recovery-oriented systems to reduce opioid misuse and overdoses. The grants provide communities an opportunity to conduct in-depth gap analysis, identify workforce shortages in the behavioral health field and construct a strategic plan to position applicants to receive additional implementation funding in August of 2019. A coalition of organizations, including the Missouri Rural Health Association, Missouri State Office of Rural Health, Missouri Primary Care Association, Missouri Department of Mental Health, Missouri-USDA Rural Development and the Missouri Hospital Association, formed the Missouri Rural Community Opioid Response Team to assist applicants and align statewide efforts.

In September 2018, seven Missouri communities [were awarded](#) grants through the Rural Community Opioid Response Program — the greatest number of awards for any single state. In November 2018, HRSA announced a second round of the RCORP one-year planning grants. The funding will allow the RCORT to support additional rural communities through the application process and assist them in aligning their efforts with opioid crisis efforts statewide.



4. Ensure Access to Quality Health Care

Gov. Parson chose Citizens Memorial Hospital in Bolivar, Mo., to hold his [Rural Health Summit](#). The hospital, recently honored with its third Missouri Quality Award, is an excellent example of how rural care isn't a choice between distance and quality.

Nonetheless, health care in rural Missouri is challenged by fewer resources per capita, an older population and, for some regions, less healthy behaviors. Exacerbating this problem is the fact that [six rural hospitals](#) have closed in the past four years, creating greater distances for rural residents. For example, after the closure of a hospital in Kennett, Mo., area residents are anticipated to travel more than [1 million additional miles](#) to receive hospital care.

Although health status in rural Missouri may be among the lower rankings across Missouri, the quality of care provided to rural residents meets and sometimes surpasses other regions of the state and country. Care provided in Missouri's rural hospitals was among the reasons MHA [was selected](#) as the 2018 American Hospital Association Dick Davidson Award Recipient for Leadership in Quality.

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Hospitals also are employing innovative approaches to community health, care coordination

and population health. An example is the community paramedicine program. The program trains paramedics and emergency medical technicians to operate in expanded roles in support of primary care. The program is designed to reduce emergency room visits, readmissions and preventable hospitalizations. Adhering to a standardized curriculum, first responders improve access to prevention, disease management and primary care. Federal innovation grants and private payers are exploring expanded use of this new care delivery model. However, of the nine community paramedic programs in Missouri, only two serve rural communities in Higginsville and Farmington. Expansion of this program — and others such as community health workers — build on Missouri’s nationally recognized health-home model, known as the [Primary Care Health Home Initiative](#).

The state also could examine incenting partnerships between health care providers and schools to develop school-based health centers. These programs have the potential to have positive effects for [children with asthma](#) and other chronic conditions.

Helping all citizens who are eligible for Medicaid assistance get enrolled and remain enrolled ensures health care providers will be paid for the care they deliver, but also opens the door to treatment for citizens with chronic conditions, as well as regular screenings for children and pregnant women. Simplifying eligibility processes and reducing barriers to coverage improves access to care and lowers state administrative costs. The state could enhance its administrative effectiveness through strategic partnerships with local health care providers and social services organizations that have regular contact with Medicaid-eligible citizens.

Long-term care services and support for seniors and people with disabilities will be important with the aging population. Ensuring access to home- and community-based services, and empowering rural communities to help design programs that meet their needs, will be essential.

In addition to effective enrollment, looking at creative and innovative ways to reduce the uninsured rates in rural Missouri could help provide needed financial stability. Many health care providers are struggling financially for a variety of reasons, including the extra debt load they carry for uncompensated care. Six rural hospitals have closed in Missouri throughout the past four years, and 47.1 percent of rural hospitals in the state operated with a negative margin in 2016. In 2017, Missouri’s uninsured rate was 9.1 percent — with higher rates in the rural parts of the state.



5. Allow and Encourage Innovative Payment Models

Missouri's new [director](#) of the MO HealthNet Division, Todd Richardson, has been charged with evaluating the state's Medicaid program to determine how to reduce costs and increase value. One option is to identify opportunities for innovation.

Traditionally, health care providers have been paid set fees for discrete services rendered, and hospitals paid for inpatient care on a per diem basis. These volume-based services are inflexible and offer no opportunity for health care providers to adapt their approach to new, value-based approaches for delivering care to their patients and communities.

Expansion of Missouri's nationally recognized [Primary Care Health Home Initiative](#) has the potential to improve health outcomes, incent rural providers to remain in rural communities, and save scarce rural health care funding by directing the focus of care on prevention and wellness. The program doubles down on rural communities by allowing these dollars to stay local. Missouri's health home program is showing [positive results](#) in Missouri's rural communities.

The key to success of the Primary Care Health Home program and other provider-led initiatives is that with local control and funding, the initiatives permit great flexibility, allowing hospitals and other providers to offer programs that meet individual community needs. And with further creative thinking and design, they could permit nontraditional services that may be critical to improving patient care, which would not be reimbursable under a traditional "fee-for-service" system.

Exploration of Accountable Care Organizations also may show promising results for some rural communities, although changes are being made in the program that forces hospitals to [assume more risk](#). This may make ACOs less feasible for rural hospitals.

Missouri has been a national leader in using nontraditional funding sources to finance its Medicaid program. Strong partnerships between the state and hospitals, nursing facilities, pharmacists and emergency transportation providers have allowed [Medicaid provider taxes](#) to flourish and generate billions to support Missouri's health care safety net. Maximizing allowable Medicaid provider tax opportunities and creatively tapping local government health care resources to earn the federal Medicaid match can provide opportunities to finance rural health system innovations without burdening the state's general revenue budget.



6. Collaborate to Identify and Address Social Determinants of Health

Health care only is one component of maintaining good health. Rural Missourians face increasingly constrained access to health-enabling amenities such as nutritious food, recreation and gainful employment. These social determinants of health are defined as “the conditions in which people are born, grow, live, work and age.” The multidimensional nature of SDOH reach far beyond poverty and require a systemwide approach to effectively moderate their effects on health outcomes. The criteria used to identify SDOH include factors that have a defined association with health, exist before the delivery of care, are not determined by the quality of care received and are not readily modifiable by health care providers.

Addressing the root causes of these community-based problems will require coordinated federal, state, local and private resource allocation. Resources should be delivered to the most at-risk populations and communities to improve outcomes and ensure returns on investment are maximized. The most at-risk populations and communities in rural Missouri can be defined as those with the highest rates of social complexity, or SDOH.

Limited health and social resources can be targeted using social and health-related data. Researchers can identify the highest risk rural [ZIP codes](#), and through diagnostic coding, identify the most [at-risk patients](#) residing within those communities, with increasing accuracy. With this information, the Parson administration could engage stakeholders to target and coordinate resources from the departments of Health and Senior Services, Social Services, Mental Health, Economic Development, Labor, and others to improve community resources and more effectively improve health — individually and communitywide.



exploreMOhealth is designed to help stakeholders assess the health of their communities. This tool allows visitors to explore hyperlocal health data to better understand the factors that can influence health outcomes.



7. Expand Telehealth and Telemedicine

Missouri has made significant progress on [telehealth](#) since the release of [MHA's report](#) in 2017. Enacted in 2018, [House Bill 1617](#) rescinded many clauses that restricted the use of telemedicine. Now, Missouri's Medicaid-enrolled providers can deliver services through telemedicine any time they can provide the same level of service as an in-person encounter and the service is within the scope of services offered by the provider, without any geographic restrictions.

The [Missouri Telehealth Network](#) also is leading the way with the innovative [Show-Me ECHO](#) program, an educational resource that shares the expertise of health care professionals from academic settings with providers located in rural areas that would not otherwise have access to continuing clinical education.

Although Missouri has been a national leader in expanding its reach for telehealth services, it could benefit from an examination of its current programs, including constraints on their use. Through participation in [interstate medical licensure compacts](#), physicians could more easily become licensed in multiple states.

New federal support for telehealth was [recently adopted](#) as part of the farm bill, including new funding for distance learning and substance abuse telehealth programs. Missouri must prepare to take full advantage of these resources when the programs are launched and funding becomes available.



8. Advocate for Improved Infrastructure

Gov. Parson has championed investment in infrastructure. The state's newly formed [Broadband Development Office](#) is leading the way by connecting stakeholders and aligning efforts to improve broadband coverage. The challenges to rural infrastructure are significant and have implications for rural health. The expansion of broadband internet to rural communities remains a [challenge](#), as 22 percent of Missourians still lack access to high-speed internet. Missouri must continue to find [funding](#) to provide high-speed internet access for the "last mile" in rural Missouri. Expanded broadband benefits more than just health care. Today's agricultural producers, and current and future economic development opportunities, rely on high-speed internet services. Both the [Missouri Farm Bureau](#) and the [Missouri Chamber of Commerce and Industry](#) have included expansion

of broadband services in their strategic initiatives.

Expansion of broadband internet services benefits the health of rural Missourians and provides opportunities for continuing education and financial prosperity. In addition to providing valuable internet services, the [expansion of broadband](#) creates job opportunities for local communities. Establishment of high-speed internet services will enable new health technologies, such as remote home monitoring and direct to provider services, that will [increase access](#) to health services.

Public transportation in rural areas can be sparse, and for rural residents with special needs, it can be nonexistent. Access to transportation is essential to maintaining the health of rural Missourians. Support for innovative models like [HealthTran](#) should be part of Missouri's policy. Access to care and transportation can allow rural residents to age in place — strengthening individual health and supporting connected families and communities.

Missouri's [poor roads](#), and the greater distances to care for rural residents, complicate access to care. Rural hospital closures, which can lead to other health care providers leaving the community, exacerbate travel to care.

Finally, Missouri's rural health care infrastructure — access to hospitals, physician services, and [pharmacy](#) and [dental](#) health — is in jeopardy. When these health care providers leave, they create [medical deserts](#) in rural parts of the state.



9. Support Emergency Services

Rural residents are at a [higher risk](#) of traumatic injury, including unintentional injuries from vehicle accidents, falls, drug overdoses, fires and drownings, than urban residents. Moreover, farmers use machinery that can expose them to crushing injuries that can require trauma care. Access to robust emergency services is essential to support lifesaving care.

There is limited access to specialized emergency care in rural Missouri. Outside of the Kansas City and St. Louis metropolitan areas, there are two designated trauma centers north of Interstate 70 — Northeast Regional Medical Center in Kirksville, a level III center, and Mosaic Life Care in St. Joseph, a level II center. In southeastern Missouri, Saint Francis Medical Center in Cape Girardeau, a level III center, is the only designated trauma center. Missouri's pediatric trauma centers are in metropolitan areas. Accordingly, rural residents often must rely on high-

cost air ambulance transport or extended ground ambulance trips.

Outside of metropolitan areas, there are only two designated trauma centers north of I-70, and only one designated trauma center in southeastern Missouri.

The state's Time Critical Diagnosis [program](#) sets standards for emergency care of stroke, STEMI (a type of heart attack) and trauma throughout Missouri. Responding to a 2018 legislative discussion of TCD funding, legislators and the Parson administration reiterated their strong support for maintaining the TCD program. Providers and policymakers are collaborating to explore possible TCD enhancements.

A number of health care coalitions — collaborative networks of health care organizations and their public and private sector response partners — have been created throughout the state to coordinate emergency care during disasters. These coalitions were formed using federal emergency preparedness funding. There is

opportunity to align the parallel, established systems of preparedness and response with day-to-day care delivery. For example, interoperable platforms between EMS and emergency departments should include notice of a mass casualty incident or the routing of a trauma patient to the most appropriate facility.

In Missouri, 95 counties have a Crisis Intervention Team Council — a collaboration of law enforcement and behavioral health community partners dedicated to helping individuals in crisis by implementing the Missouri Model of CIT. Statewide adoption of the CIT model by all Missouri counties would benefit health providers, law enforcement and other stakeholders in some of Missouri's most rural counties.



10. Empower Partnerships

Vibrant communities are characterized by organizations collaborating for the betterment of all its citizens. Several rural Missouri communities currently participate in [Communities of Excellence 2026](#), a program that promotes collaboration among key sectors of the community, and [Healthy Places for Healthy People](#), a program that joins community leaders and health care partners to create walkable, healthy, economically vibrant downtowns and neighborhoods that can improve health, protect the environment and support economic growth.

Both the [Health Resources and Services Administration](#) and the [U.S. Department of](#)

[Agriculture](#) offer assistance to organizations working to develop stronger rural partnerships. Small communities may lack the resources to produce the data and create the narrative necessary for submitting a grant application. The state’s Office of Primary Care and Rural Health should be funded to bolster support of rural communities hoping to compete for federal funding.

Health-related resources and assets are available throughout rural Missouri at health clinics — including FQHCs and [rural health clinics](#) — and through the state’s [cooperative extension](#) programs. Better integration of these resources — with collaborative efforts targeting primary care and health improvement — could extend wellness deeper into rural communities.

I'm looking for:



“A key part of our efforts to improve Missouri’s workforce and infrastructure is improving our citizens’ health and health care by developing better access to providers and hospitals, especially in our rural areas.”

– Missouri Governor Mike Parson





HIDI HealthStats

Statistics and Analysis From the Hospital Industry Data Institute

APRIL 2019 ■ Miles Away, Worlds Apart: Assessing Community Health Needs with exploreMOhealth

exploreMOhealth

The Missouri ZIP Health Rankings data included on exploreMOhealth.org were updated on April 1 to reflect the most recent information on the health and social well-being of populations living in 940 Missouri ZIP codes. The updated data were generated by Missouri hospitals between fiscal years 2016 and 2018, and by the 2017 American Community Survey of the U.S. Census Bureau.

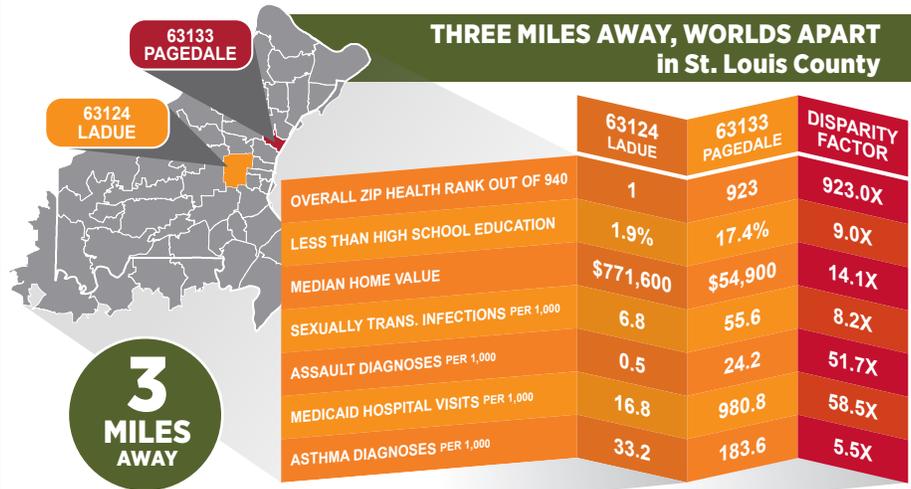
In addition to updating the timeframe, several new measures were added to the dataset, including hospital utilization for opioid misuse, dental caries and 13 prevention quality indicators on preventable inpatient admissions.

Combining health factors and outcomes, the state's healthiest ZIP code during the 2016-2018 study period was 63124 in the St. Louis County neighborhood of Ladue. At the opposite end of the distribution was 63955 near Oxly, Mo., in southeastern Ripley County, which ranked 940th. New data for 940 Missouri ZIP codes now is available at exploreMOhealth.org.



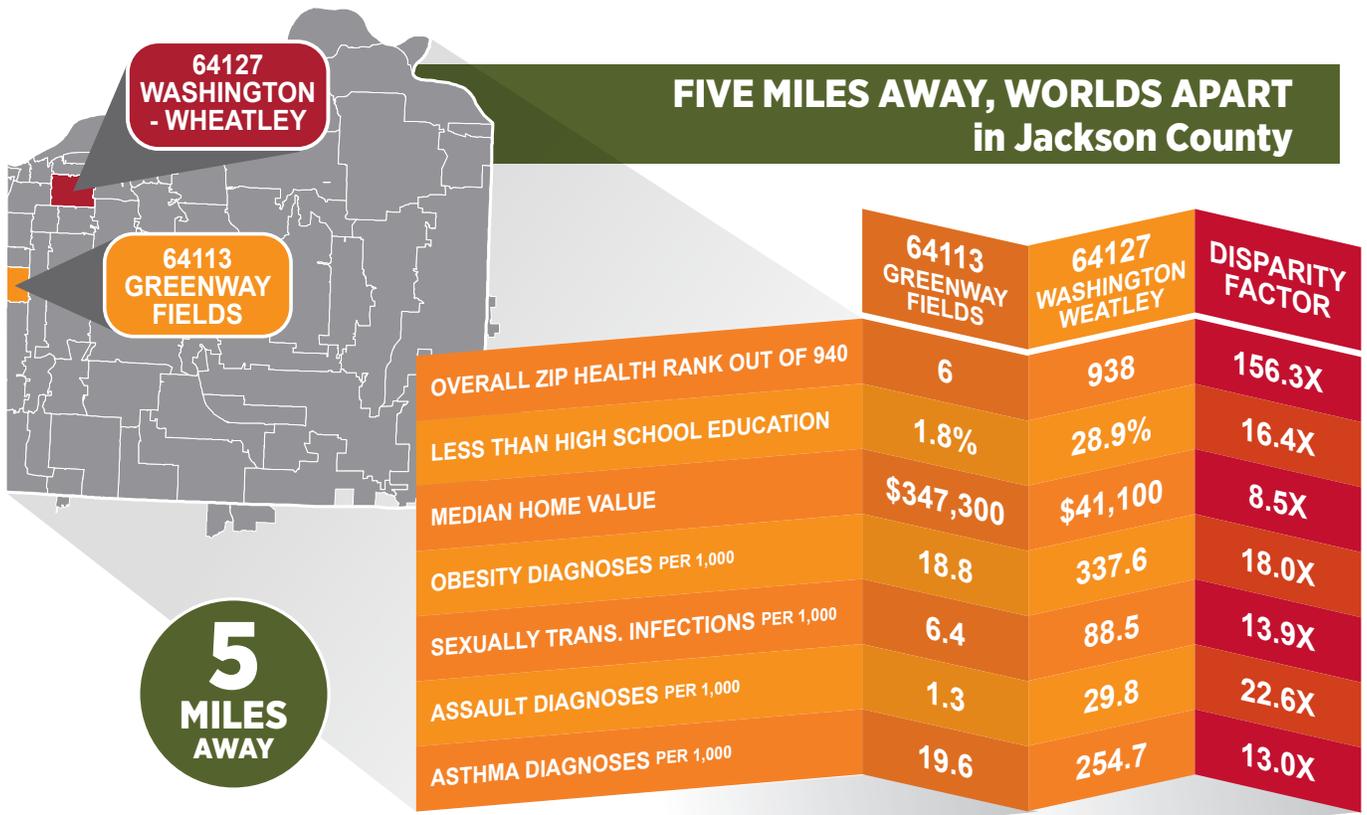
Background

The places where we live, work, learn and play affect our health. Examples throughout this brief show that communities often are separated by a distance of a few miles, but they can be worlds apart in terms of upstream health factors that result in downstream health outcomes, such as poor quality of life and premature mortality. The more that is known about these places, the better hospitals, clinicians and community-based partners can identify and address the influence of these factors on health. Assessing hundreds of community health and social factors within counties across Missouri is a powerful strategy for optimizing the allocation of scarce resources to maximize the effectiveness of community health improvement efforts.



In March 2018, the Missouri Hospital Association and Missouri Foundation for Health released [exploreMOhealth](http://exploreMOhealth.org), a community health needs assessment platform developed through a partnership with the University of Missouri's Center for Applied Research and Engagement Systems. The platform was designed to assist community health stakeholders in the development of impactful CHNAs using two rich sources of health-related data that are unique to Missouri — the Missouri County-Level Study from MFH, and the Missouri ZIP Health Rankings from the Hospital Industry Data Institute and Washington University School of Medicine.

Since its launch, [exploreMOhealth](http://exploreMOhealth.org) has been queried 12,000 times by 8,600 individual users, resulting in nearly 40,000 page views. Community health stakeholders from a variety of disciplines — hospitals, regional health commissions, local public health and community action organizations — are using the site to gain hyperlocal insights on the health and social well-being of their communities.



About the Data

The Missouri County-level Study is a periodic survey of the health-related behaviors and attitudes of Missourians aged 18 and older. The survey design is based on questionnaires and methods employed by the Behavioral Risk Factor Surveillance System of the U.S. Centers for Disease Control and Prevention.ⁱⁱ

The most recent CLS survey was conducted during 2016 and produced detailed health-related information from approximately 52,000 Missouri adults who were randomly selected to participate in the study via telephone interview. Administered by the University of Missouri Health and Behavioral Risk Research Center, the interviews generated data on the county-specific prevalence of behavioral risk factors, existing medical conditions, environmental health factors and preventive practices.

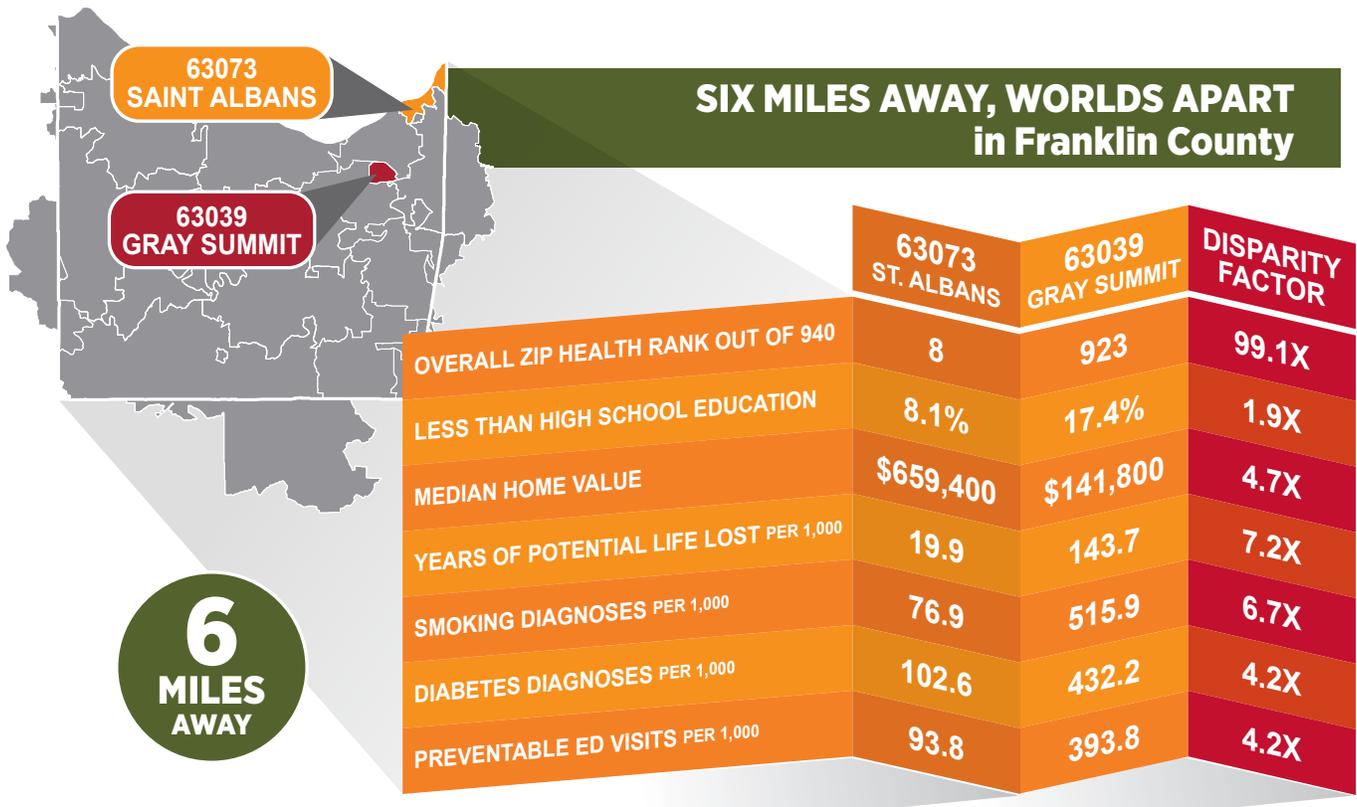
The information gathered from residents of all 114 Missouri counties and the

“We know that health and the factors that support health are not evenly – or randomly – distributed throughout a region. Even areas a small distance apart can differ significantly in terms of outcomes. That is why having access to ZIP code-level data is so important for community health promotion and action to address equity.”ⁱ – Jason Q. Purnell, Ph.D., Associate Professor at Washington University and For the Sake of All project leader

City of St. Louis is intended to assist community health stakeholders and researchers identify variation in health priorities and correlates at the county level. The study is funded by MFH and conducted in collaboration with the Missouri Department of Health and Senior Services.

The Missouri ZIP Health Rankings are designed to assist hospitals and community health stakeholders identify high-risk communities within counties to optimize the effectiveness

of community health improvement interventions. Developed through a partnership between researchers at HIDI, Washington University School of Medicine and BJC HealthCare, ZHR provide a unique approach to measuring community health at the ZIP code level using hospital discharge and American Community Survey data applied to the County Health Rankings model of population health.ⁱⁱⁱ The project was funded by The Robert Wood Johnson Foundation through a 2015 County Health Rankings Research



Grant award. The research team was guided by advisory committee members from academia, local public health agencies, hospital community benefit specialists and philanthropic organizations. Findings of the original study were presented at the annual meeting of the American Public Health Association and published in the *Journal of Public Health Management and Practice*.^{iv}

The methodological approach for ZHR is based on fitting hospital discharge and social factor data to each of the CHR domains and subdomains. The health outcomes domain consists of two subdomains, including quality of life (morbidity) and length of life (mortality). The health factors domain that contributes to differences in morbidity and mortality consist of four subdomains, including health behaviors, social determinants, clinical care and environmental factors.

“The Missouri ZIP Health Rankings project has been focused from its beginning on addressing the needs of people in Missouri who are working to improve the health of our communities. It’s been important for us to hear directly from our advisory group and others about what kinds of information they need to move their work forward.” – Elna Nagasako, M.D., Ph.D., MPH, Associate Professor at Washington University School of Medicine, Senior Consultant for Access & Equity at BJC HealthCare, and Principal Investigator of the Missouri ZIP Health Rankings Project

Hospital discharge data are compiled throughout a three-year study period, and counts of selected diagnoses are aggregated at the ZIP code level for each subdomain. The counts then are calculated as rates of the affected population group for each measure evaluated and then standardized in deviations from mean. Rates for each ZIP code and indicator are subjected to a re-identification risk assessment and top-coded (i.e. winsorized) if tolerance thresholds are exceeded.

Principal components analysis is used to derive ranked indices for each ZIP code in Missouri with respect to each CHR domain and subdomain. The ZIP code-level scores are reapportioned to the county level to account for overlapping ZIP code and county boundaries, and compared to CHR results for validity. The ZHR data include more than 100 indicators on health factors and outcomes for each Missouri ZIP code with representative data.

exploreMOhealth Case Studies

BJC HealthCare

BJC HealthCare: Health happens where we live, work, learn and play. Social factors such as race, income, education and geographic area of residence are linked to patients' health outcomes, and access to healthy food, transportation and housing impact patients' ability to stay healthy.

One use for data on social factors and health outcomes is for identifying areas with high clinical and social needs. In maps of central and eastern Missouri, there is considerable variation in health factors and outcomes. Even within a given county, there can be tremendous variation across different neighborhoods, making access to both county and subcounty data important for understanding community needs. An integrated analysis that combines social factor data with clinical data

allows for a better understanding of community social and health challenges, and facilitates targeting interventions to the areas with greatest need. Karley King, BJC Community Benefit Program Manager, served on the advisory board of the Missouri ZIP Health Rankings project during its development and notes that she provides [exploreMOhealth](#) as a resource to individual hospitals to help them in their planning work.

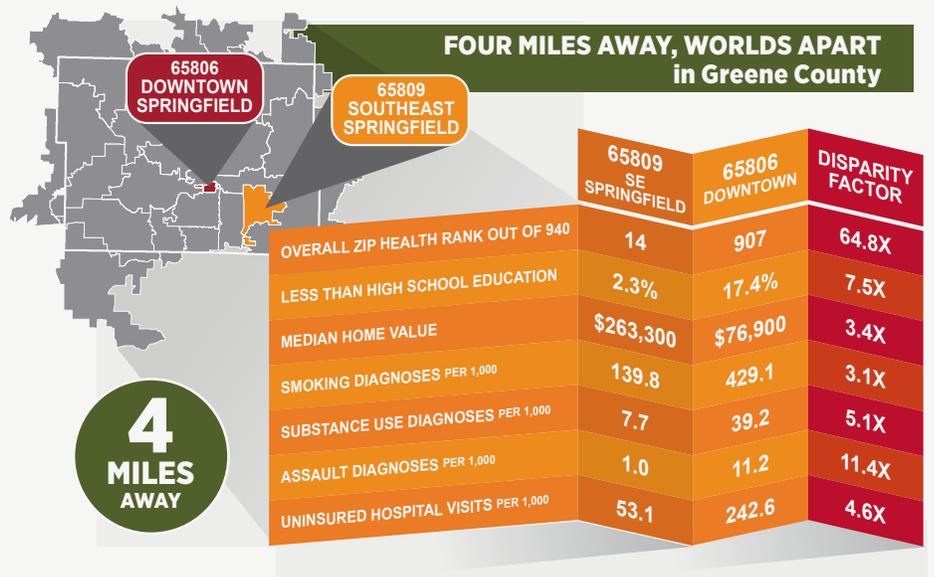
Secondly, as health care payment and accountability models shift from payment for activities to payment for value, it becomes essential to evaluate key contributors to these outcomes. Incorporation of social factor data allows a more complete picture of the factors influencing patient outcomes, experience and utilization. "As metrics such as readmissions have illustrated, understanding factors 'outside the walls' of the hospital and the quality of care experienced by different groups of

patients are becoming essential aspects of measuring high quality care," says Dr. Elna Nagasako, Senior Consultant for Access & Equity.

Finally, an important use for these types of data is to help providers working with individual patients to better understand the challenges patients are facing and to help connect patients to resources. Adrianna Webb-Hudson, social worker at Christian Hospital, used maps from [exploreMOhealth](#) to help design a presentation to share information on social determinants of health with other care managers at her hospital. "At the end of the day, it's about meeting patients where they are and sitting down with them to help them overcome the obstacles they may be facing," says Webb-Hudson. Being able to map data related to food insecurity, housing and emergency department use helped her visualize the challenges faced by her patients at the community level.



Carroll County Memorial Hospital: Improving health in Carroll County is a community effort that takes time, effort, resources, and most importantly, everyone involved. CCMH continuously strives to meet the needs of the communities we serve. By completing our community health needs assessment, we are able to identify the priority areas of concern. Utilizing the [exploreMOhealth](#) platform and ZIP Health Rankings, we have had the opportunity to gain access to unique data that expands on existing targeted information. Combining primary and secondary data, we are able to gain a better understanding of the health challenges that face our community. Through this process,



CCMH recognized factors both inside and outside of the medical system that influence the overall health of the citizens in our service area.

To close the gap, CCMH began a population health management journey in late 2016. Since then, the program has evolved from one registered nurse

offering only annual wellness visits to three RNs offering wellness visits in addition to chronic and transitional care management. Each program focuses on the best care for the patient while engaging the patient's care team. "One of the greatest assets of this program is a full care team for our patients," said Dr. Andy Horine, CCMH Chief Medical

Information Officer. “This starts with the folks who answer the phone and includes each provider’s nurse, as well as population health nurses, pharmacists, dietitians, nurse practitioners, physician assistants and physicians.”

Patients who participate in the transitional care management program benefit from medical assistance while transitioning safely and confidently from CCMH back to their home. The CCMH Population Health Team assists with coordinating follow-up appointments, ensuring medication adherence, and providing answers to any cumbersome questions that patients and their families may encounter. The program also provides access to a population health nurse who assists in coordinating care with a patient’s primary care provider for as much as one month after discharge. The chronic care management program

is designed to be a longer commitment to our patients who have two or more chronic conditions. CCM is offered to facilitate the best care for our patients by encouraging the patient and the patient’s care team to formulate individual goals, resulting in a higher success rate of goal achievement.

The Population Health Department also focuses on reducing inappropriate utilization and overutilization of the emergency department. Through education and bringing awareness of available community assistance to the forefront, this effort has successfully enabled noncompliant patients to thrive. This progress was achieved through the review and understanding of social determinants and engaging the patient’s care team to focus on all aspects of health care needs for the patient. The population health management program at CCMH

has provided a foundation for this designated patient population to meet care gaps and other measures that ensure patients are getting the care they deserve, while in many cases, avoiding hospitalization or emergency care. It has served as a great benefit to our rural health clinic patients by identifying chronic conditions earlier, setting in place a proactive care management system, and reducing noncompliance and expenses to the patient and health care system.

Going hand-in-hand with our mission, “We are dedicated to the health and well-being of all we serve,” CCMH prides itself in offering our patients exceptional programs based on advanced data analytics. We are able to achieve more accurate results with the information gained from [exploreMOhealth](#) and ZIP Health Rankings.



St. Louis Regional Health Commission:

As part of its mission to increase access to care while also improving the health

of uninsured citizens of St. Louis City and County, the St. Louis Regional Health Commission produces an annual “Access to Care” data book. The data book provides a comprehensive review of communitywide progress toward strengthening the health care system in the region through the careful analysis of operating statistics from primary, specialty, behavioral health and emergency care safety net health care provider institutions. In addition to providing a comprehensive review of the health care system within the region, this data book also aims to provide a more robust picture of access within the St. Louis region.

In 2018, RHC released *Geography Matters: The Impact of Regionality on Safety Net Access Trends in St. Louis* as a supplement to the 2017 Access to Care Data Book.^{viii} This issue brief was developed to highlight geographic access trends among safety net patients based on ZIP code

of residence and the location of safety net organizations where patients access service, and to highlight geographic gaps and potential targets for future safety net expansion. Key findings from the issue brief include the following:

- The areas with the highest unmet needs for safety net services appear to be North St. Louis County and South St. Louis City.
- The [exploreMOhealth](#) data indicate that North St. Louis County, North St. Louis City and South St. Louis City have the worst health outcomes in the region and some of the worst in Missouri.
- Central and West St. Louis County have relatively low rates of uninsured individuals and some of the best health outcomes in the state.
- General trends show gaps in safety net primary care service for North

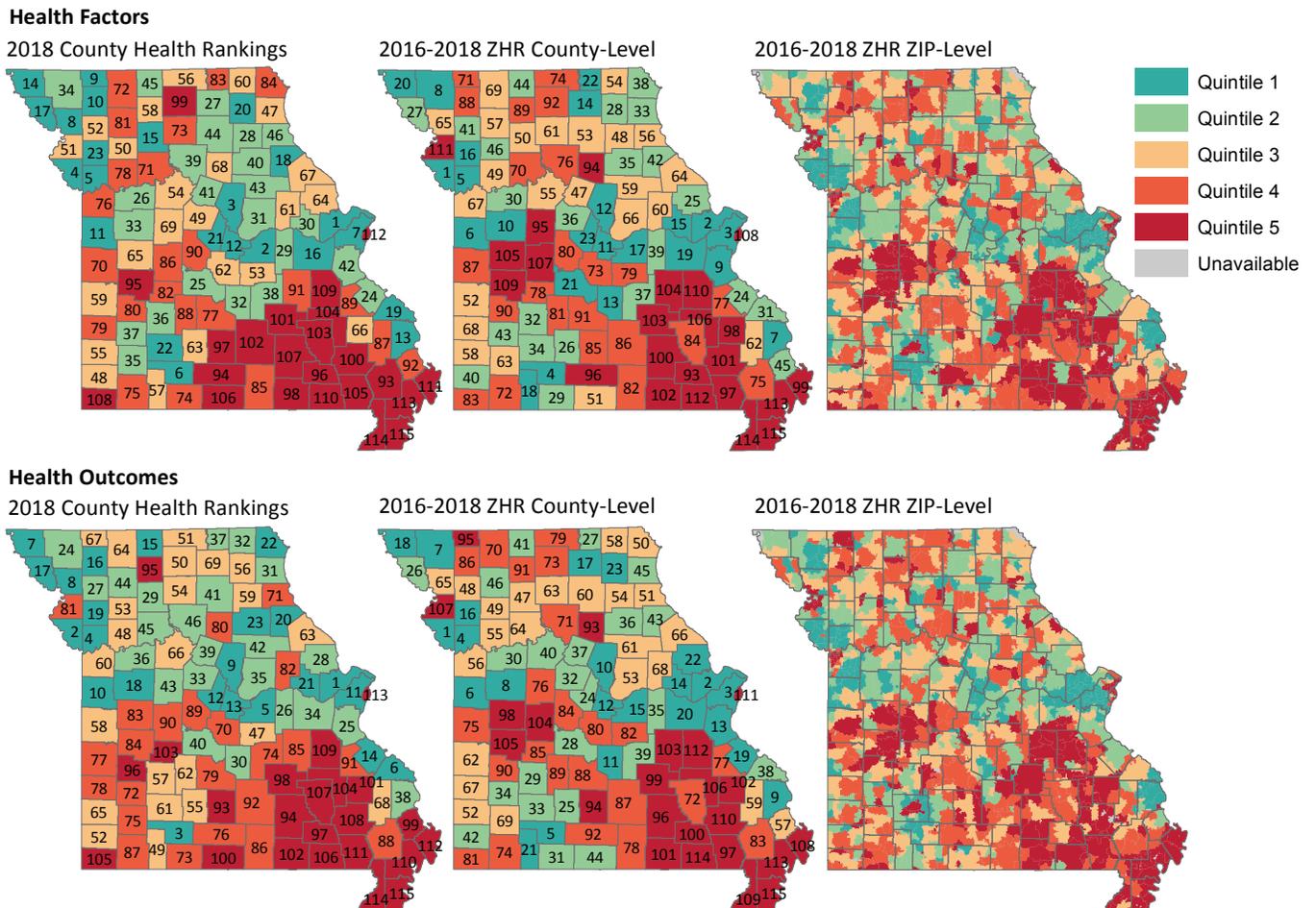
St. Louis County and South St. Louis City. In the future, more exploration of the access patterns in South St. Louis County may be warranted.

- General trends show high emergency care usage rates for uninsured individuals living in North St. Louis County and North St. Louis City.
- While an area of high need, North St. Louis City seems to be saturated with safety net access points at this time.

Building upon the key findings from the Geography Matters issue brief, RHC will continue creating spaces for continued dialogue around “access” in hopes to capture the lived experiences of those most affected, while also co-creating actionable steps that aim to address barriers that historically have prevented patients from accessing health care. To learn about RHC and its ongoing efforts to improve access, visit <http://www.stlrhc.org>.

“This is as close to the fabled unicorn of datasets that a local public health agency could access.” – Kelley K. Vollmer, Director of the Jefferson County Health Department

Figure 1: Missouri ZIP Health Rankings Compared to the Robert Wood Johnson Foundation's County Health Rankings



2016-2018 Missouri ZIP Health Ranking Results

The updated 2016-2018 ZHR data are based on more than 40 million inpatient, outpatient and emergency department claims for Missouri residents with discharge dates between Oct. 1, 2015, and Sept. 30, 2018. In addition to hospital claims data, the updated ZHR data draw from five-year estimates from the 2017 American Community Survey of the U.S. Census Bureau.^v The claims data were scanned for arrays of diagnostic and other administrative codes to identify instances of included health factors

and health outcomes, calculated as rates of the population of each ZIP code denominated by ACS data, standardized and used in regression-weighted principal components analysis to derive index scores for each domain and subdomain as described above.

Figure 1 includes maps of health factor and health outcome quintiles and ranks from the 2018 CHR data^{vi} compared to the 2016-2018 ZHR data at both the county and ZIP code levels. The ZIP code-level results were reapportioned to the county level using MABLE GeoCorr to compare the ZHR results

with the 2018 CHR data.^{viii} Across all 114 Missouri counties and City of St. Louis, the health factors domain of the two rankings systems shared a Pearson's correlation coefficient of 0.805, with 65 percent of the variance in the ZIP-derived scores being explained by the CHR scores. For health outcomes, the correlation was 0.831 with an R² value of 0.69 (Figure 2).

Evaluating agreement across quintiles between the ZHR and CHR measures resulted in 47 percent of Missouri counties falling in the same quintile for the health factors domain, and 86 percent were within one quintile

Figure 2: Country-Level Agreement Between 2018 County Health Rankings and 2016-2018 Missouri ZIP Health Rankings

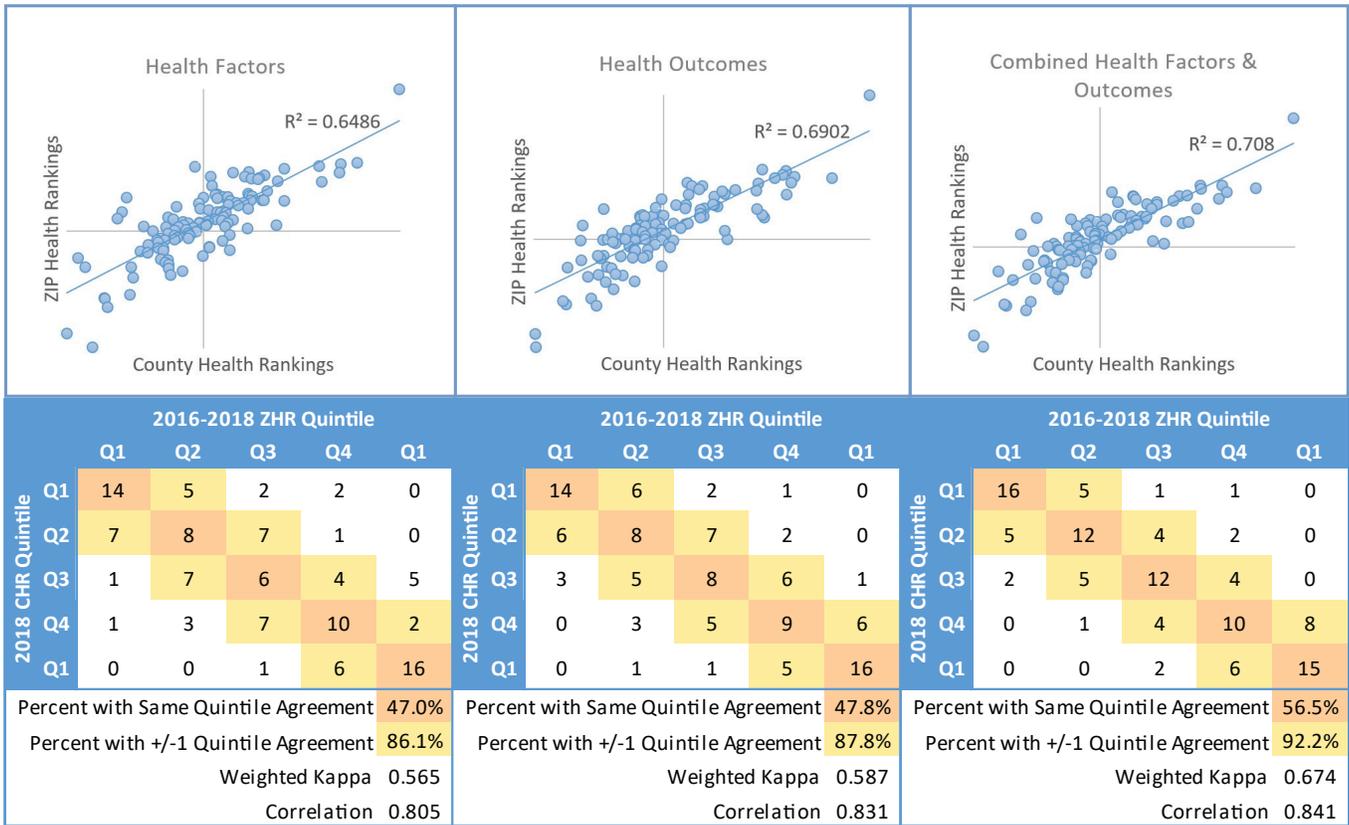
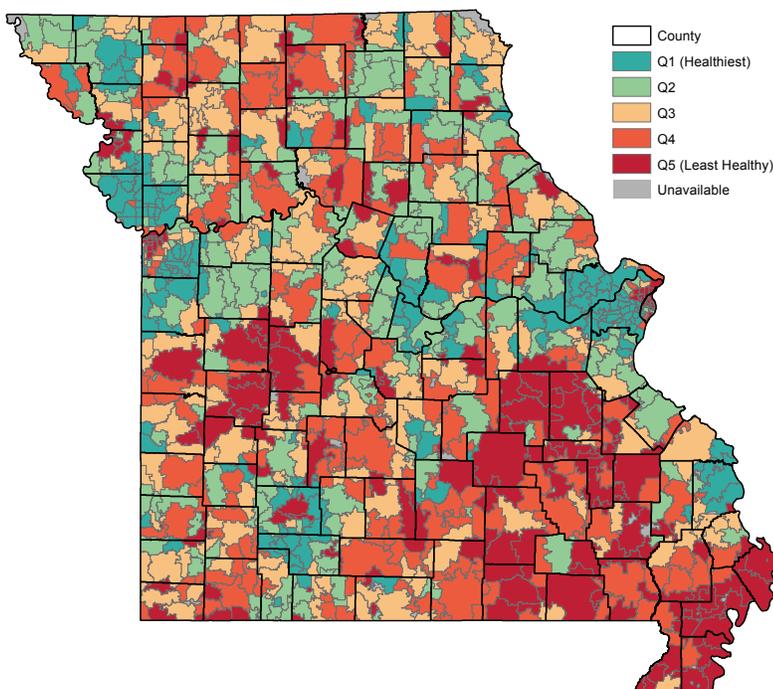


Figure 3: 2016-2018 Overall Missouri ZIP Health Rankings, Combined Health Factors and Health Outcomes



in each measurement construct. For the health outcomes domain, 47.8 percent of counties were in the same quintile, according to both the CHR and ZHR measures, while 87.8 percent were within one quintile (Figure 2).

Overall health rankings were calculated with the mean index scores of the health factors and health outcomes domains. The combined rankings featured the strongest agreement and linear association between the 2018 CHR and reapportioned 2016-2018 ZHR data, with a correlation coefficient of 0.841, 56.5 percent of counties being ranked in the same quintile and 92.2 percent ranked within one quintile (Figure 2). Figure 3 shows the overall ZIP health rankings for 2016-2018 distributed by quintiles for 940 Missouri ZIP codes with sufficient data during the study period.

Table 1: Top- and Bottom-Five Ranked ZIP Codes in Missouri: 2016-2018 ZIP Health Rankings

ZIP Code and County	Health Factors	Health Outcomes	Overall
63124, Ladue in St. Louis Co.	1	1	1
63005, Chesterfield in St. Louis Co.	2	2	2
63131, Des Peres in St. Louis Co.	3	3	3
64165, KC-Woodland Creek in Jackson Co.	4	4	4
63105, Clayton in St. Louis Co.	5	5	5
64128, KC-Palestine East in Jackson Co.	936	936	936
64120, KC-Northeast Industrial in Jackson Co.	938	933	937
64127, KC-Washington-Weatley in Jackson Co.	939	938	938
64125, KC-Sheffield in Jackson Co.	940	939	939
63955, Oxyly in Ripley Co.	937	940	940

Conclusion

Location has a profound influence on health. The ability to examine targeted health data for a specific county, and the ZIP codes included therein, enables health care providers and other community stakeholders to identify issues and take action to help create and sustain a healthier Missouri. [exploreMOhealth](#) is designed to facilitate the exploration of unique hyperlocal health data for a better understanding of the factors influencing outcomes across Missouri communities. Table 1 includes the five most- and least-healthy ZIP codes identified in the latest Missouri ZIP Health Rankings. For more insights into the health factors and health outcomes driving the results for these, and all ZIP codes in Missouri, visit [exploreMOhealth.org](#). Questions, comments and feedback on the site or data are welcome at exploreMOhealth@mhnet.com.

Acknowledgements

For their contributions to this research brief, the authors are extremely grateful for the case studies provided by Dr. Elna Nagasako of Washington University and BJC HealthCare, Dr. Jenny Carter of Carroll County Memorial Hospital, and Rikki Takeyama Menn of the St. Louis Regional Health Commission. The authors also are grateful for the Missouri Foundation for Health for their continued commitment to improving the health of Missouri and their partnership in [exploreMOhealth](#).

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The Economic Cost of the Opioid Crisis in the U.S. A State-by-State Comparison

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Missouri Hospital Association

Executive Summary

At the closing 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.¹

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. 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.” 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. More recently, CDC released 2017 data that found 47,576 opioid-related deaths in the U.S. Since the CEA study was published, based on 2015 CDC data, **the number of opioid-related deaths in the U.S. grew from 32,493 to 47,576 — an increase of more than 15,000 deaths, or 46 percent in a two-year period.**

The CDC data also reveal significant variation in the severity of the opioid crisis between individual states. Using CEA methods and updated CDC mortality data, this policy brief estimates the economic burden of the opioid epidemic at the state-level during 2017.

Key Findings

The total economic cost of the opioid epidemic in the U.S. **was estimated at \$684.6 billion in 2017.** This was **3.5 percent of the nation's total GDP** of nearly \$19.5 trillion in 2017. This suggests a 35.8 percent increase over the 2015 CEA estimate of \$504 billion. The increase was primarily driven by a **46 percent increase in opioid overdose deaths between 2015 and 2017.**

3.5% of GDP



These estimates suggest **opioid use disorder and overdose deaths cost the U.S. nearly \$1.9 billion every day.** This equates to \$78 million per hour, \$1.3 million per minute, or **\$21,700 every second of every day during 2017.**

Costs associated with overdose deaths accounted for 93 percent of the total economic burden of opioid use disorder. **More than 130 Americans died each day** from an opioid overdose during 2017.



The **economic cost of the 47,576 opioid overdose deaths in the U.S. were estimated at \$634 billion,** while costs associated with **non-fatal opioid use disorder totaled \$50.5 billion** in 2017.

The opioid overdose mortality rate in the U.S. has more than doubled throughout the last ten years. In 2008, 5.9 Americans died from an opioid overdose per 100,000 residents. By 2017 the rate had grown to 14.6, **a ten-year, 147 percent increase.**

147% more deaths in the last decade



The rate of opioid overdose deaths per 100,000 across states ranges from 3.1 in Nebraska to 47.3 in West Virginia, a **15.3-fold difference.**

Background

The opioid crisis in the U.S. has gained considerable attention in recent years. In October 2017, President 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 more than 47,500 lives in 2017. However, critics have 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 White House 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, as well as increased spending on health care, social services 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.

Additionally, the fiscal year 2019 budget request for the National Institute on Drug Abuse to carry out section 301 and title IV of the Public Health Service Act was \$1.14 billion. This was six percent higher than the Institute’s 2017 budget authority, indicating the increased funding outpaced inflation by just three percentage points during the same period.^{viii}

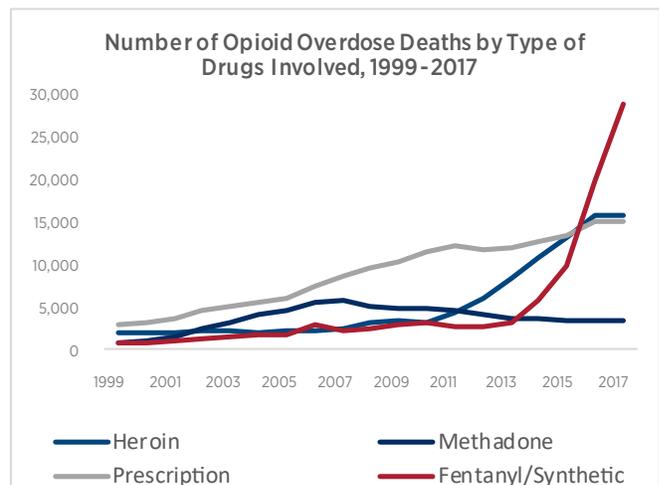
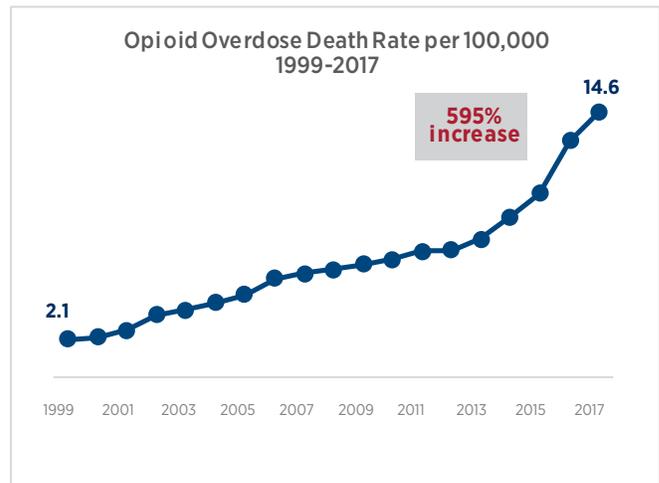
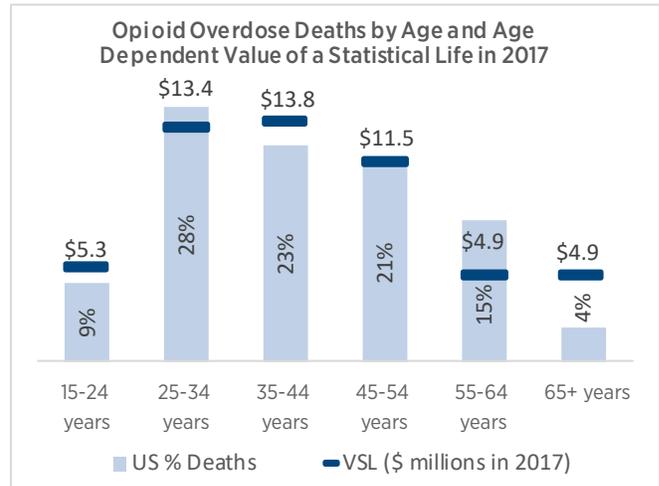
Concurrently, new mortality data from the CDC show that the **rate of opioid overdose deaths in the U.S. grew more between 2015 and 2017 than any other two-year period since reporting began in 1999** (Figure 1, middle panel).^{iv}

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 CDC mortality data from 2017. The CEA methodology accounts for two types of costs attributable to opioid use disorder: *fatality costs* are those associated with premature mortality, and *non-fatality costs* are those associated with surviving opioid dependent individuals 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

Figure 1: Opioid Overdose Deaths in the U.S. 1999 to 2017



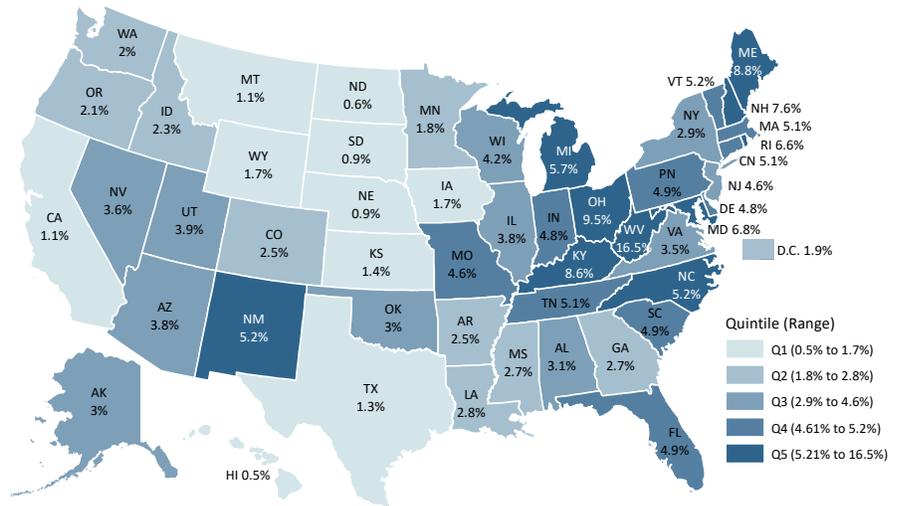
are underreported by 24 percent in the U.S.^{ix} Federal agencies commonly base cost-benefit analyses on VSL measures that are designed to estimate the monetary value of the expected benefits of fatality risk-reduction associated with proposed policy and legislative changes.

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).^x The VSL estimates were adjusted for inflation in this analysis using the consumer price index for all urban consumers to reflect the societal costs of premature opioid-related deaths in 2017 dollars.^{xi}

The top panel of Figure 1 contains the age distribution of opioid overdose deaths in the U.S. during 2017, 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. The majority of opioid overdose deaths in the U.S. occur among prime-aged individuals with higher estimated VSLs.

Our estimated opioid-related fatality cost in the U.S. totaled \$634 billion in 2017. Compared to the CEA's fatality cost estimate of \$431.7 billion in 2015, our estimate marked a 46.9 percent increase, which is largely explained by the 46 percent increase in opioid overdose deaths and 3.4 percent inflation in the U.S. between 2015 and 2017.

Figure 2: Economic Cost of Opioid Use Disorder in the United States as a Percent of State GDP in 2017

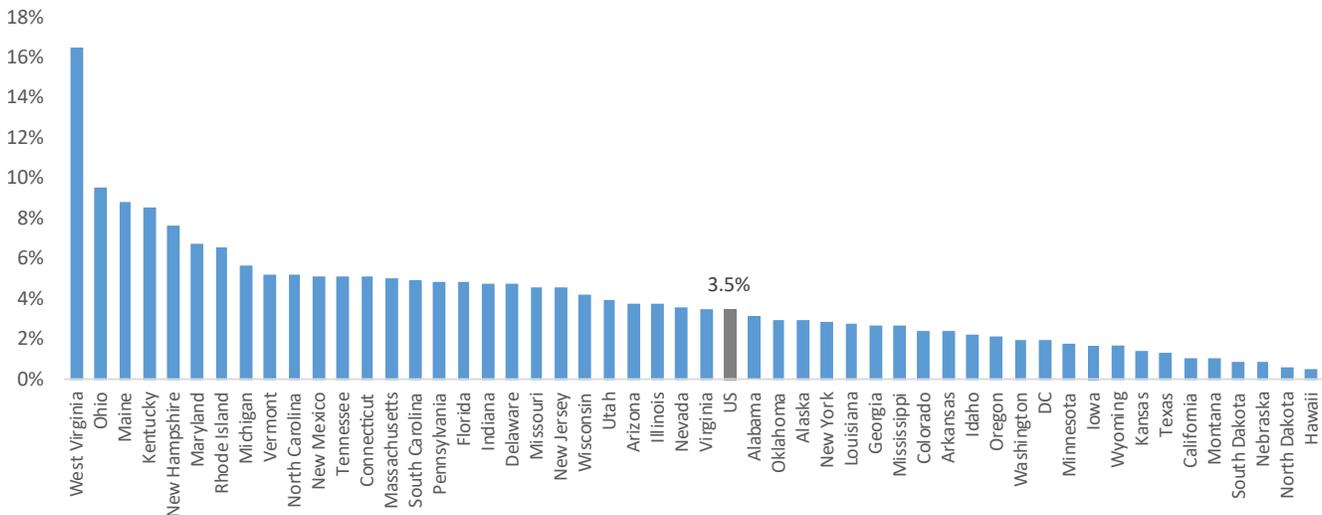


Source: Hospital Industry Data Institute analysis of CEA methods applied to 2017 data from the CDC, BEA, BLS and SAMHSA

Non-fatality costs were derived in the CEA methodology with the total number of individuals diagnosed with opioid use disorder in the U.S. (2.4 million in 2015^{xii}) 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.^{xiii}

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 with pain reliever use disorder^{xiv} between

Figure 3: Economic Cost of Opioid Use Disorder by State as a Percent of GDP in 2017



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.

2016 and 2017 were used to estimate non-fatality costs. These survey-generated data are reported at the state-level by the Substance Abuse and Mental Health Services Administration. The total number of American adults diagnosed with pain reliever use disorder between 2016 and 2017 was 1,599,960.^{xv} This was the most significant departure from the CEA study, which included the larger number of individuals with either prescription or illicit opioid use disorder.

Compared to the 2.4 million individuals with any opioid use disorder used by the CEA, our non-fatality cost estimates are conservatively biased downward by roughly 800,000 individuals, however the non-fatality 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 opioid use disorder for inflation to reflect 2017 dollars, **our estimated non-fatality cost of opioid use disorder in the U.S. totaled \$50.5 billion in 2017**, compared to the CEA's estimate of \$72.3 billion in 2015.

The total economic cost of opioid use disorder and overdose deaths was estimated by this analysis to be \$684.6 billion in 2017, or 3.5 percent of the national GDP of \$19.5 trillion during the year.^{xvi} This was 36 percent higher than the CEA's estimate of \$504 billion in 2015.

Table 1: 2017 Economic Cost of Opioids as a Percent of U.S. GDP by Sector

Industry	2017 GDP (in billions)	\$684.6b Opioid Cost (percent GDP)
Gross domestic product	\$19,485	3.5%
Agriculture, forestry, fishing, and hunting	\$169	404.5%
Mining, quarrying, and oil and gas extraction	\$269	254.9%
Utilities	\$307	222.6%
Construction	\$781	87.6%
Manufacturing	\$2,180	31.4%
Wholesale trade	\$1,174	58.3%
Retail trade	\$1,087	63.0%
Transportation and warehousing	\$609	112.5%
Information	\$1,051	65.2%
Finance, insurance, real estate, rental, and leasing	\$4,057	16.9%
Professional and business services	\$2,426	28.2%
Educational services, health care, and social assistance	\$1,700	40.3%
Arts, entertainment, recreation, accommodation, and food services	\$805	85.1%
Other services, except government	\$416	164.5%
Government	\$2,454	27.9%

Total Economic Cost of Opioid Use Disorder in the U.S.:
\$684,586,969,782

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

Findings

A wide range of variation in the economic burden of opioid use disorder was detected between states during 2017. The total economic costs of fatal and non-fatal opioid use disorder ranged from a maximum of \$61.5 billion in Ohio to a minimum of \$311 million in North Dakota. Evaluated as a percent of state GDP, the range was a minimum of 0.5 percent in Hawaii to a maximum of 16.5 percent in West Virginia (Figure 3).

Evaluated as a percent of GDP, the states most affected by the opioid epidemic were regionalized in New England, Maryland, North Carolina and New Mexico, as well as the rust belt states of West Virginia, Kentucky, Ohio and Michigan. **In terms of equivalence, the total opioid burden in 2017 was 1.2 times the nation's total economic activity generated by the 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 agriculture, transportation and other non-governmental services (Table 1).

Conclusion

While there have been significant advances made in the U.S. to combat the opioid epidemic, these estimates suggest additional resources are needed to minimize the societal cost of opioid use disorder. With additional barriers to procuring prescription opioids, an increase of illicit opioid substitution is likely for some individuals with preexisting opioid use disorder. This could cause opioid-related mortality to increase in the short term.^{xvii} Advancements in detection have defined the scope of this epidemic, heightening the need for increased availability of prevention and treatment necessary to reverse its societal impact. Considering the recent proliferation of illicit opiates and other narcotics cut with highly potent synthetic opioids such as fentanyl, this substitution effect may dampen the positive impact of public health responses to curb the availability of prescription opioids. **The number of deaths involving synthetic opioids in the U.S. nearly tripled between 2015 and 2017, and now they are the most prevalent type of drug present in opioid overdose deaths** (Figure 1 bottom panel).

A 2017 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.”^{xviii} Effectively moderating 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.

“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

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- ⁱⁱ Kochanek KD, Murphy SL, Xu JQ, 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
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- 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>
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- ^{xiv} Note: Pain Reliever Use Disorder is defined as meeting criteria for pain reliever dependence or abuse. Dependence or abuse is based on definitions found in the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV).
- ^{xv} U.S. Substance Abuse and Mental Health Services Administration. (2017). National Survey on Drug Use and Health: Comparison of 2016 and 2017. Available at <https://www.samhsa.gov/data/report/2016-2017-nsduh-state-prevalence-estimates>
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Rates of Suicidality Following Psychiatric Hospitalizations for Children in Missouri

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Background

A June 2016 report from the Hospital Industry Data Institute highlighted some of the devastating effects of the increasing demand for mental health services amid an increasingly constrained supply of such services in Missouri. Among those effects, the report found that hospital utilization for **suicide ideation among children and adolescents in Missouri had grown nearly 900 percent** during the previous decade.ⁱ Suicide among children and adolescents continues to be an escalating public health crisis in the U.S.ⁱⁱ A wide array of factors are considered by experts to be contributing to this trend, including social media, cyberbullying, increased use of antidepressants and lack of access to specialized mental health care.ⁱⁱⁱ The incidence of suicidality — defined as suicide ideation or attempt — is far more prevalent than the rate of completed suicide among children and adolescents. Research shows that for every adolescent suicide, there are between 50 and 100 additional children who have attempted suicide.^{iv}

The problem of child and adolescent suicide is acutely pervasive in Missouri. **It is the second-leading cause of death in the state among children ages 5 to 19.**^v At 6.4 suicide deaths per 100,000 children in this age group, Missouri had the 11th-highest rate of child and adolescent suicide in the country during 2017.^{vi} In addition, the rate of child and adolescent suicide is growing more rapidly in Missouri compared to the country as a whole. Between 2003 and 2017, the rate of suicide for children and adolescents increased from 2.8 to 6.4 in Missouri, a relative increase of 129 percent (Figure 1).

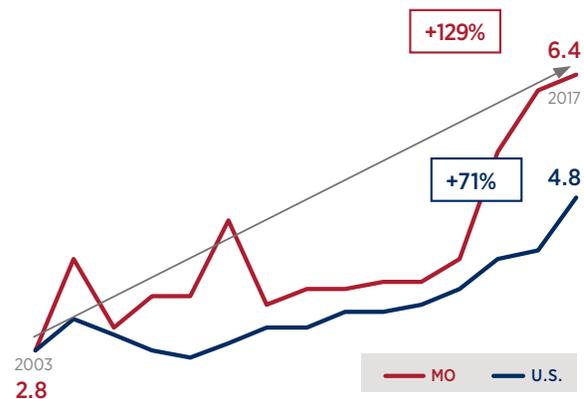
Nationally, the rate of child and adolescent suicide increased from 2.8 to 4.8 per 100,000 during the same period, an increase of 71 percent — this was 57 percentage points less than the rate of growth in Missouri.

One potential driver of the disparities in child and adolescent suicide observed in Missouri is the shortage of mental health providers specializing in behavioral care for children.

According to the Health Resources and Services Administration, 96.5 percent of Missouri counties (111 out of 115) are designated as geographic Mental Health Professional Shortage Areas. With the exception of Clay County north of Kansas City, every county in the state has either a geographic area or medical facility with a shortage of mental health professionals.^{vii} Taken as a whole, there are 22 percent fewer psychiatrists and 14 percent fewer psychologists practicing in Missouri compared to the national average, and a geographically contiguous swath of counties without any practicing psychiatrists or psychologists stretches from the state's northern-to-southern and eastern-to-western borders.^{viii}

Compounding issues related to shortages of mental health professionals in the state are reports of Medicaid managed care organizations imposing aggressive utilization reviews when certifying inpatient psychiatric hospital admissions and continued stays that result in payment of care that is far below national averages and commercial payers. As a result, psychiatric hospitals in Missouri feel pressure to prematurely discharge patients that may not be completely stable, or risk treating these patients with no reimbursement for that care.

Figure 1: 15-Year Trend in Suicides per 100,000 Children Ages 5 to 19



Source: Author's Analysis of CDC WONDER data

A network of eight Missouri hospitals and health systems formed in 2016 to evaluate disparities in authorized services for behavioral care that they provide to children and adolescents with Medicaid managed care compared to fee-for-service.^{ix} The network compiled a variety of data on observed differences in care authorized for children with Medicaid fee-for-service and individual Medicaid managed care organizations. The network's most recent data found that MCOs account for the majority of child and adolescent psychiatric admissions, and they deny

Key Findings

A network of Missouri hospitals that provide inpatient psychiatric services for children and adolescents presented data raising serious concerns over **Medicaid managed care organizations refusing authorization and denying payment** for levels of care required to treat and stabilize patients before discharge.

The average length of stay at psychiatric hospitals for children and adolescents with **Medicaid managed care coverage is 7.3 days**. For patients covered by **Medicaid fee-for-service, the average duration is 12.5 days** — a difference of 5.2 days, or 71 percent — which can be critical time needed to stabilize the child or adolescent before discharge back into the community.

The 60-day suicidality rate following a psychiatric hospitalization nearly doubled for children and adolescents with insurance coverage that shifted from Medicaid FFS to Medicaid MCO following statewide expansion of managed care in May 2017.

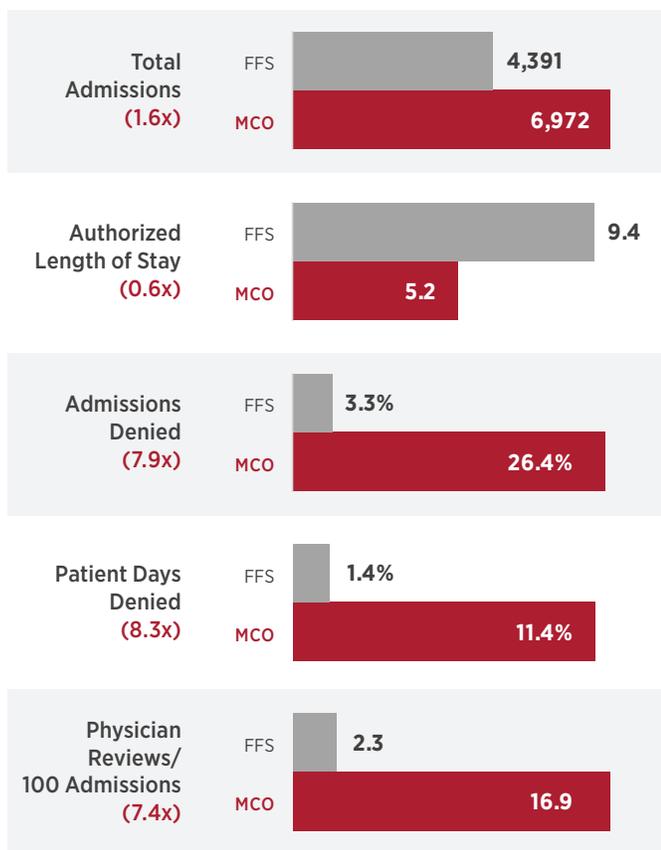
After adjusting for differences in psychiatric complexity and other risk factors, it is estimated that **the switch from Medicaid FFS to Medicaid MCO in May 2017 induced nearly 200 additional hospital visits** by Missouri children and adolescents for suicide attempt or ideation within 90 days of discharge from a psychiatric hospital.

According to the Health Resources and Services Administration, 96.5 percent of Missouri counties (111 out of 115) are designated as geographic Mental Health Professional Shortage Areas. With the exception of Clay County north of Kansas City, every county in the state has either a geographic area or medical facility with a shortage of mental health professionals.

claims for more than one out of four admissions following discharge — **this is 7.9 times the denial rate of Medicaid FFS**. In addition, Medicaid MCOs refuse reimbursement for 11.4 percent of the total patient days during approved hospitalizations, and they require psychiatrists to spend significantly more time with added administrative burden justifying prescribed levels of care to physicians employed by the health plans (Figure 2).

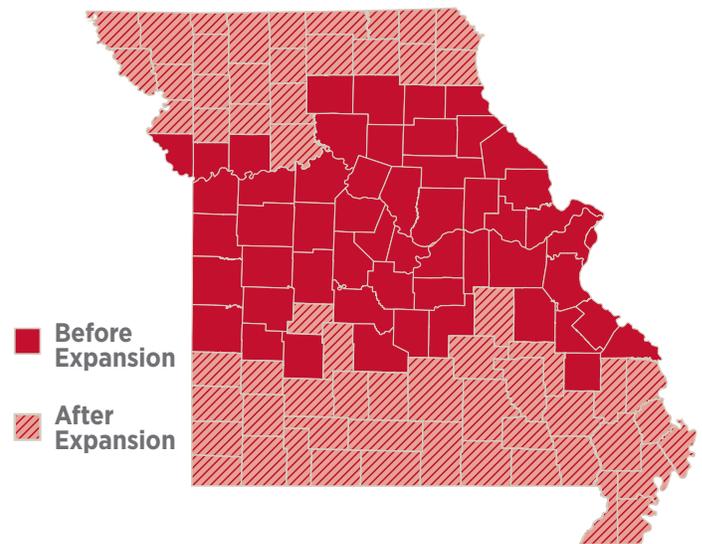
The profound differences in the levels of care authorized by Medicaid MCOs raise serious concerns on the financial sustainability of treatment for their beneficiaries, and more importantly, on the potential for adverse health outcomes for children with Medicaid managed care coverage.

Figure 2: Disparities in Authorized Services for Child and Adolescent Psychiatric Patients with Medicaid Fee-For-Service and Managed Care



Source: Children's Medicaid Managed Care Parity Network, January 2017 - August 2018

Figure 3: Expansion of Medicaid Managed Care in Missouri



In May 2017, the Missouri General Assembly expanded the Medicaid MCO service area from 54 counties encompassing the Interstate 70 corridor to statewide coverage (Figure 3). This resulted in 240,000 individuals, primarily women and children in the expansion counties, who shifted from traditional Medicaid to managed care from one of three for-profit corporations.^x

The expansion of Medicaid managed care in 2017 presented a unique opportunity to close the evidence gap^{xi} using a robust, controlled quasi-experimental research design.

Quasi-experimental studies are commonly used to evaluate pre-post impacts of interventions or policy shifts on treatment groups large enough to be prohibitive to randomized controlled designs.^{xii} In this case, hospital utilization data are becoming available to evaluate differences in health outcomes for children who were switched from Medicaid FFS to MCO coverage in May 2017. Children and adolescents under age 20 constitute approximately two-thirds of the population eligible for Medicaid managed care in Missouri.^{xiii} This implies that more than 160,000 children were shifted to Medicaid MCO coverage following statewide expansion. Among them were 2,152 children ages 5 to 19 who experienced an inpatient psychiatric hospitalization with Medicaid FFS coverage before, and Medicaid MCO coverage after, May 1, 2017.

continued on Page 4 ▶

| Opportunities for States to Address Child and Adolescent Suicidality

◀ Innovating on Child-Centered Care Coordination

On Feb. 8, 2019, the Center for Medicare & Medicaid Innovation announced a new component of the larger national effort to reduce the effect of opioid use disorder. The Integrated Care for Kids Model provides \$128 million in funding for upstream approaches designed to improve access, early identification and treatment, and care coordination for the behavioral and physical health needs of children with Medicaid or CHIP. The InCK Model requires the involvement of the state Medicaid agency; however, other HIPAA-covered entities can serve as the lead organization for the funding opportunity. The InCK Model will provide as much as \$16 million in funding during a seven-year performance period to eight successful applicants. Applications are due on June 10, 2019.^{xvii}

◀ 21st Century Approach to Tackling Barriers to Care in IMDs

In a Nov. 13, 2018, letter to state Medicaid directors, the Centers for Medicare & Medicaid Services announced a new demonstration opportunity under Section 12003 of the 21st Century Cures Act aimed at improving outcomes for children with behavioral health needs. The initiative allows for enhanced federal financial participation for pilot projects designed to reduce barriers to accessing mental health services, among other efforts. This includes matching federal funds for care delivered to Medicaid beneficiaries in Institutions for Mental Diseases. IMD services to treat nonelderly adults and children in noninpatient, short-term residential psychiatric treatment programs currently are excluded from reimbursement from Medicaid, which largely is seen as a significant barrier in accessing behavioral health care. By focusing on the coordination of transitional care from IMDs to community-based

providers, the demonstration is designed to prevent ED use and boarding, hospital readmissions, discharge prior to stabilization, and increasing rates of suicide. States are encouraged to submit applications through the Section 1115(a) demonstration proposal process.^{xviii}

◀ A New Look at Old Authorizations

In the same SMD letter, CMS described several options for states to improve outcomes for children with behavioral health needs under existing Medicaid authorities. Strategies include advanced detection and treatment, care coordination, and school-based access to mental health services. Many of these services are reimbursable under home health state plans, and the Early and Periodic Screening, Diagnostic and Treatment benefit. In addition, developing mental health referral networks to digitally connect providers with schools, hospitals and others could be billed as an administrative expense, and additional funding for referral networks could be available through the Medicaid Information Technology Architecture 3.0. States also can use existing authorities under MITA 3.0 to receive enhanced matching funds for telehealth networks to expand access to care.^{xviii}

◀ Legislating Access to Care

Senate Bill 10 currently is making its way to the Texas Senate floor. The bill came out of committee with unanimous approval on Feb. 12, 2019. The legislation would provide \$100 million in funding during a two-year period to improve access to coordinated mental health care for children and adolescents by creating regional mental health hubs across the state, including a Child Psychiatry Access Network, investing in telehealth and underwriting medical residencies in psychiatry.^{xix}

◀ Incentivizing Early Screening and Treatment

According to the Medicaid and CHIP Payment and Access Commission, nearly half of all Medicaid spending is for beneficiaries with behavioral health comorbidities.^{xx} This provides a powerful incentive for states to diagnose and treat children with behavioral health needs as early as possible before they result in complex physical health needs. In 2014, Minnesota began publicly posting the rates of provider screening for child and adolescent depression. During the inaugural year, 45 percent of pediatric patients were screened using one of 11 standardized measures. During the second year, the rate increased to 70 percent. The Oregon Medicaid program uses a similar quality reporting approach and incentive funding to reward top performing provider organizations for early screening and treatment of child and adolescent depression. Since implementation, statewide screening rates increased 34 percent.^{xxi}

The aim of this policy brief is to explore the relationship between insurance status and suicidality rates for children and adolescents in Missouri following an inpatient psychiatric hospitalization. Emphasis is given to differences for children and adolescents with Medicaid FFS compared to MCO coverage, particularly to those who were switched from Medicaid FFS to MCO coverage in May 2017.

Data and Methods

Observed and risk-adjusted suicidality rates for children and adolescents within 30, 60 and 90 days of discharge from a Missouri psychiatric hospital were evaluated using hospital claims data between Oct. 1, 2015, and June 30, 2018. The study cohort was defined as Missouri residents between ages 5 and 19 with an inpatient admission at a psychiatric hospital during the study period. This criteria resulted in 21,362 index admissions for 13,213 individual children and adolescents.

Instances of suicidality during the defined intervals following discharge from an index admission were detected using all inpatient and emergency department records for children and adolescents included in the study cohort using master patient identification code linkages. During the study period, the cohort accounted for 75,486 hospitalizations and ED visits for any reason at all acute and specialty hospitals in Missouri. The inpatient and ED claims data for the study cohort were flagged for instances of suicide attempt or ideation based on the presence of related diagnosis codes at any position on the discharge record.^{xiv}

Index admissions were categorized by insurance status — Medicaid FFS, Medicaid MCO or other payer — using the expected primary payer codes included on the claims. Patients who churned from Medicaid FFS coverage to Medicaid MCO coverage were identified as having FFS coverage before, and MCO coverage following, statewide expansion of Medicaid managed care in May 2017. This “MCO Expansion” cohort was used in pre-post analyses of suicidality rates before and after expansion to estimate the effect of the policy change for child and adolescent behavioral health patients affected by a shift in Medicaid coverage.

Summary statistics were tabulated to evaluate differences across payer and principal diagnosis categories associated with individual patients during the study period. Factors evaluated included demographic characteristics, social and behavioral risk factors, and clinical and psychological comorbidities (Table 1). Principal diagnosis categories were grouped using three-digit ICD-10 codes to observe differences in suicidality rates and average length of stay by payer and primary reason for hospitalization for each of the 21,362 index admissions identified during the study period.

Risk-adjusted suicidality rates were estimated using hierarchical generalized logistic regression. The models were specified to account for risk at both the patient and payer levels. At the patient level, individual predictors included the reason for the index hospitalization in addition to demographic, clinical, behavioral and social characteristics of the child or adolescent. The patient-level risk factors (model fixed effects) were used to derive predicted rates,

Names and other distinguishing characteristics, including the specific details of each case, have been altered to prevent patient identification. ▼

Sarah was a teen in crisis. Last year, she was admitted to a network hospital from the local juvenile detention center. She had a history of threatening her coworkers with violence and had recently been found with a weapon on the job. Upon admission, she was evaluated by a board-certified psychiatrist with specialization in child and adolescent psychiatry. The evaluation found that she was suffering from delusions and paranoia, which resulted in a formal diagnosis of psychosis. A psychotropic medication regimen was initiated, and Sarah responded well.

Sarah’s Medicaid managed care plan notified the hospital of two authorized days of inpatient care, and following that, referred her case to a peer-to-peer review with the attending psychiatrist. The MCO physician refused to authorize any additional days, questioned Sarah’s diagnosis as well as the results of standardized tests and risk assessments conducted by the hospital’s care team, and concluded she should be treated in an outpatient setting.

Based on their direct observation of Sarah and her test results, the treatment team felt that early discharge posed an extreme risk to her safety and potentially that of others. Despite no source of payment, Sarah remained at the hospital for an additional seven days of stabilization, at which point it was both safe and clinically appropriate to discharge her home with outpatient care.

or risk-adjusted suicidality rates holding the child’s insurance coverage constant. Payer-level risk was estimated using model random effects for index admissions with Medicaid FFS, Medicaid MCO or other expected primary payer, in addition to MCO expansion beneficiaries both before and after May 1, 2017, to provide risk-adjusted rates of suicidality pre- and post-expansion. The payer-level risk factors were used to derive expected rates, or risk-adjusted suicidality rates by insurance coverage holding patient-level risk factors constant.

Risk-adjusted excess suicidality ratios were calculated as the predicted over the expected rates for each payer category. A ratio below one indicates lower-than-expected suicidality. Conversely, a ratio over one indicates higher-than-expected suicidality after controlling for the child’s risk factors and insurance coverage. The number of excess or prevented events (instances of suicide attempt or ideation during the defined interval following discharge) was estimated by scaling the difference between the risk-adjusted suicidality ratio and one by the observed number with suicide ideation or attempt during the study period.

Table 1: Characteristics of Pediatric and Adolescent Psychiatric Patients by Payer: Missouri Residents Ages 5 to 19 with an Inpatient Hospitalization at a Psychiatric Facility Between October 2015 and June 2018

		MCO EXPANSION*	MEDICAID FFS	MEDICAID MCO	OTHER PAYER	TOTAL
Demographic Factors	Unique Patients	2,152	2,261	4,714	4,802	13,213
	Average Age	13.5	13.3	13.3	14.8	13.9
	Race: White	86.2%	79.8%	79.0%	85.6%	81.3%
	Race: Black	15.5%	18.3%	17.4%	9.4%	14.3%
	Race: Other	17.6%	18.7%	17.3%	12.5%	15.4%
	Male	46.9%	53.4%	48.8%	41.4%	46.7%
Behavioral Risk Factors	Tobacco Use	30.1%	22.8%	18.2%	19.9%	18.9%
	Obese	28.2%	26.3%	17.1%	14.9%	16.7%
	Alcohol Use	7.5%	7.6%	5.5%	8.2%	6.8%
	Substance Use	4.2%	2.8%	2.4%	3.0%	2.6%
	Opioid Use	3.5%	2.5%	2.0%	3.3%	2.5%
Social Risk Factors	Social Determinant of Health Diagnosis	69.2%	69.6%	54.1%	45.2%	51.7%
	SDOH – Family-Related	56.9%	59.3%	43.3%	32.8%	40.4%
	SDOH – Psychosocial-Related	33.5%	26.8%	20.2%	17.0%	18.9%
	SDOH – Noncompliance-Related	10.2%	7.1%	6.8%	5.8%	6.0%
	SDOH – Socioeconomic-Related	3.1%	2.0%	1.4%	1.3%	1.4%
	SDOH – Housing-Related	3.3%	2.3%	1.3%	1.0%	1.3%
Clinical Comorbidities	Asthma	30.6%	22.1%	21.2%	15.8%	18.6%
	Heart Disease	19.0%	11.8%	12.1%	10.0%	10.7%
	Diabetes	5.9%	4.0%	3.2%	2.6%	2.9%
	Hypertension	4.7%	3.8%	2.6%	2.3%	2.5%
	Liver Disease	2.9%	1.8%	1.5%	1.2%	1.4%
	Kidney Disease	2.3%	1.6%	1.3%	1.3%	1.3%
Psychological Comorbidities	ADHD & Conduct Disorders	69.6%	70.8%	55.6%	39.2%	50.3%
	Suicidality (Attempt or Ideation)	56.1%	44.4%	46.9%	56.2%	48.8%
	Major Depression (Chronic)	47.2%	42.7%	38.6%	51.7%	43.6%
	Major Depression (Acute)	55.8%	41.1%	41.0%	40.6%	39.7%
	Stress Disorders	59.8%	57.4%	42.4%	30.4%	38.8%
	OCD, Anxiety and Phobia	44.9%	35.8%	33.0%	40.8%	35.7%
	Mood Disorders	49.8%	47.6%	39.0%	25.1%	33.5%
	Bipolar-Manic	42.4%	36.5%	29.1%	25.7%	26.8%
	Other Psychiatric Disorders	41.6%	38.5%	27.0%	18.2%	23.9%
	Other Child Psychiatric Disorders	16.7%	16.3%	7.3%	5.8%	7.7%
	Personality Disorders	11.4%	8.8%	7.3%	8.9%	7.6%
	Delusions and Psychoses	5.6%	4.7%	4.5%	3.0%	3.7%
	Schizophrenia	6.5%	4.6%	3.9%	3.0%	3.4%

* Indicates patients that were covered by Medicaid FFS before, and Medicaid MCO after, May 1, 2017, when statewide expansion of the Medicaid managed care program took place in Missouri.

Results

Suicidality rates within 30, 60 and 90 days of discharge for children and adolescents hospitalized at a psychiatric facility varied widely by the primary reason for hospitalization. Figure 4 shows that 21 percent of children and adolescents hospitalized for schizophrenia experience a rehospitalization or ED visit for suicide ideation or attempt within 90 days of discharge. The least prevalent rates of suicidality were found among child and adolescent patients hospitalized for stress disorders.

Average length of stay similarly varied widely depending on the reason for the hospitalization, as well as the child's insurance coverage. Index admissions for affective disorders are associated with the longest duration; however at 18 days, children and adolescents with Medicaid FFS were hospitalized twice as long on average compared to children with Medicaid MCO coverage (Figure 5). Children and adolescents hospitalized for acute episode of major depression had the shortest duration psychiatric hospital stays. Validating the data generated by the Children's Medicaid Managed Care Parity Network (see Figure 2), patients with Medicaid MCO coverage had significantly shorter hospital stays compared to children and adolescents with Medicaid FFS, regardless of the reason for hospitalization (Figure 5).

Across all payers, the most common cause of psychiatric hospitalization for child and adolescent patients in Missouri were episodes of chronic major depression, which accounted for 29 percent of all index admissions during the study period. Hospitalization for chronic major depression was particularly prevalent for non-Medicaid patients, while mood disorders were the leading cause of hospitalization for both the Medicaid MCO expansion and FFS cohorts. At 1 percent of all index admissions, schizophrenia was the least prevalent reason for hospitalization for Missouri children and adolescents during the study period (Table 2).

Figure 4: Suicidality Rates Following Pediatric and Adolescent Psychiatric Hospitalizations by Principal Diagnosis Category: October 2015 – June 2018

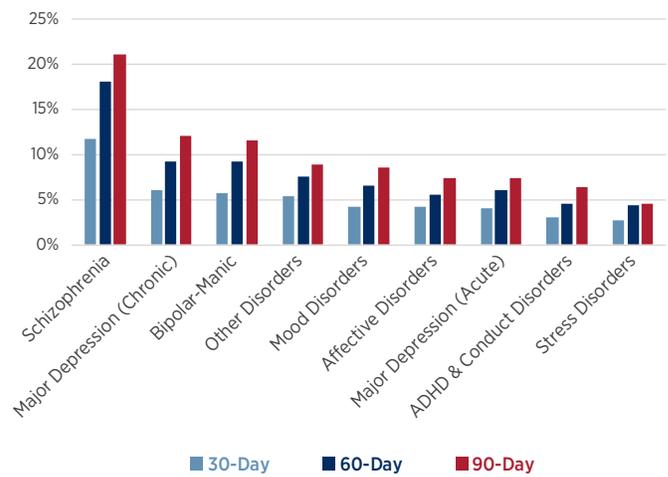
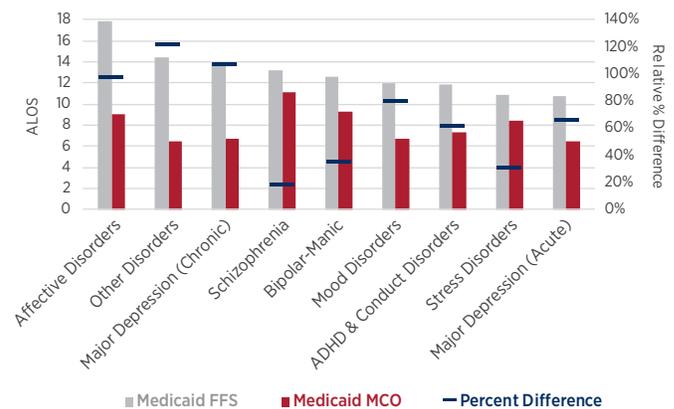


Figure 5: Average Length of Stay for Medicaid Pediatric and Adolescent Psychiatric Hospitalizations by Principal Diagnosis Category: October 2015 - June 2018



Names and other distinguishing characteristics, including the specific details of each case, have been altered to prevent patient identification. ▼

John was admitted to a network hospital through a community crisis assessment referral. He had recently lost his father in an auto accident and was being bullied at school for wearing worn clothes and shoes. The community intervention was triggered when John confided to a friend that he intended to hang himself in his closet.

John's initial evaluation at the hospital indicated extremely high risk of suicide or self-harm. He wasn't on any medications for depression, struggled with impulse control and did not have access to outpatient care. In addition, his community recently experienced several suicides. The hospital immediately started John on psychotropic medications in addition to individual, group and family therapy.

John's Medicaid MCO notified the hospital that he was authorized for two days of inpatient care, and the peer-to-peer review process with the MCO physician upheld this decision. Because of John's risk, lack of outpatient care and the amount of time needed to monitor his response to new medications, the hospital care team kept John for an additional three days without reimbursement from his health plan.

Table 2: Distribution of Pediatric and Adolescent Psychiatric Hospitalizations by Principal Diagnosis Category, Payer, Length of Stay and Suicidality Rates: October 2015 - June 2018

	MCO EXPANSION*	MEDICAID FFS	MEDICAID MCO	OTHER PAYER	TOTAL
Major Depression (Chronic)	23.1%	21.8%	25.9%	40.8%	29.0%
Mood Disorders	23.8%	26.4%	24.0%	16.0%	22.0%
Bipolar-Manic	19.5%	12.2%	13.8%	15.0%	15.3%
Major Depression (Acute)	8.9%	8.8%	10.8%	12.0%	10.4%
Affective Disorders	10.2%	10.1%	10.3%	4.9%	8.6%
ADHD & Conduct Disorders	7.1%	10.4%	6.4%	2.9%	6.2%
Other Disorders	3.4%	3.9%	3.9%	4.0%	3.8%
Stress Disorders	2.9%	5.8%	3.9%	3.2%	3.7%
Schizophrenia	1.0%	0.7%	0.9%	1.1%	1.0%
Total Hospitalizations	5,091	3,331	6,566	6,374	21,362
Average Length of Stay	13.0	12.5	7.3	10.6	10.5
30-Day Suicidality Rate	7.0%	4.0%	4.7%	4.1%	5.0%
60-Day Suicidality Rate	10.4%	6.2%	7.4%	6.2%	7.6%
90-Day Suicidality Rate	13.3%	7.8%	9.5%	7.8%	9.6%

* Indicates patients that were covered by Medicaid FFS before, and Medicaid MCO after, May 1, 2017, when statewide expansion of the Medicaid managed care program took place in Missouri.

Overall, observed suicidality rates in 30, 60 and 90 days following discharge from a psychiatric hospital were 5.0, 7.6 and 9.6 percent, respectively. The Medicaid MCO expansion cohort had the highest observed rates during the study period; however, this included periods of coverage by both Medicaid FFS and MCOs. Among the mutually exclusive insurance categories, children with Medicaid MCO coverage had both the highest observed rates of suicidality and shortest average length of stay at 7.3 days compared to 10.5 days for all index admissions (Table 2).

With Medicaid FFS coverage, during the six quarters leading up to the statewide expansion of Medicaid managed care in May 2017, the MCO expansion cohort experienced suicidality rates similar to the larger population. Following expansion, with Medicaid MCO coverage, the same group of patients experienced significantly higher rates of suicidality across each of the defined intervals (Figure 6). This also coincided with a sharp decline in the average length of stay for these patients. Table 3 shows a 16 percent decrease in the average duration of hospitalization for these children and adolescents, in tandem with increased suicidality rates in order of magnitude ranging from 81.7 to 93.2 percent following statewide Medicaid managed care expansion.

Figure 6: Quarterly Suicidality Rates Following Pediatric and Adolescent Psychiatric Hospitalizations for MCO Expansion Patients Before and After May 1, 2017

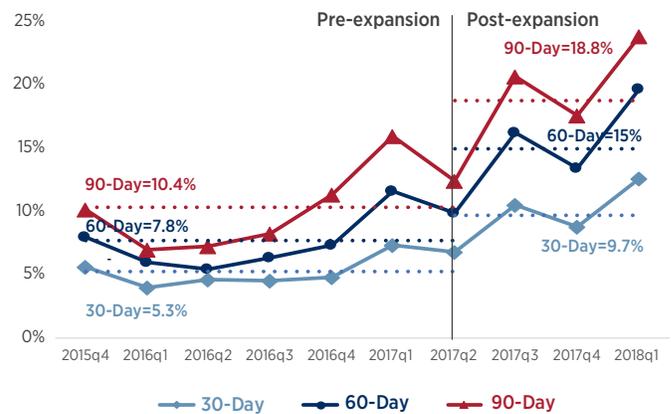


Table 3: Difference in Average Length of Stay and Suicidality Rates Following Pediatric and Adolescent Psychiatric Hospitalizations for MCO Expansion Patients Pre- and Post-May 1, 2017

	BEFORE EXPANSION OF MCO COVERAGE	AFTER EXPANSION OF MCO COVERAGE	RELATIVE PERCENT DIFFERENCE
Average Length of Stay	13.91	11.68	-16.0%
30-Day Suicidality Rate	5.3%	9.7%	83.5%
60-Day Suicidality Rate	7.8%	15.0%	93.2%
90-Day Suicidality Rate	10.4%	18.8%	81.7%
Total Hospitalizations	3,070	2,021	*

* For discharges between Oct. 1, 2015, and June 30, 2018. Because the data cover 19 months before the statewide expansion of the Medicaid managed care program and 14 months after, the relative percent difference for total psychiatric hospitalizations is not reported.

While the observed differences in length of stay and suicidality for children and adolescents with Medicaid FFS and MCO coverage are significant, they do not fully account for potential variation in the risk characteristics of the patients, which might explain all or part of the observed differences between the two groups. For example, children and adolescents with higher suicidality rates might have higher levels of psychological complexity, which would explain the higher rates.

To account for these and other differences for patients across insurance coverage groups, a multilevel risk-adjusted model was fit to the data to estimate the defined interval suicidality rates to assist in drawing inferential comparisons on performance by payer, holding patient risk and insurance type constant. The model was designed to account for multiple dimensions of risk, including patient’s demographics, reason for hospitalization, and whether the child or adolescent experienced a diagnosis for clinical, behavioral or social risk factors during the study period. Table 4 includes the model results for each defined interval. The number of observations, or index admissions, decreases with each interval due to the last 30, 60 or 90 days of the study period being omitted to fully account for suicidality events for each interval following discharge from a psychiatric hospitalization.

In general, the reason for hospitalization was not significantly associated with increased risk of suicidality with the exception of two disorders in the 60- and 90-day models. All else equal, schizophrenia was found to significantly increase the risk of suicidality (OR = 1.92-1.93, P = 0.005-0.008), while hospitalization for stress disorders significantly decreased the risk (OR = 0.53-0.58, P = 0.004-0.019). Heart disease, hypertension, asthma and obesity were found to be significantly associated with higher risk of suicidality across each of the defined interval models. Longer length of stay also was associated with a reduced risk of suicidality across all three models, with at least 95 percent confidence. Perhaps unsurprisingly, the strongest predictors of suicidality within 30, 60 and 90 days of discharge for children and adolescents with an inpatient psychiatric hospitalization were social determinants of health. The SDOH flags were assigned using arrays of ICD-10 codes that have demonstrated significant predictive ability in previous health outcomes modeling.^{xv, xvi}



Names and other distinguishing characteristics, including the specific details of each case, have been altered to prevent patient identification. ▼

Max was a third grader admitted to a network hospital for stabbing himself and his siblings with a small screwdriver. He had a history of physical and sexual abuse, and he had been hospitalized several times during the previous year for increasing aggression and self-harm.

In the hospital, Max was stabilized throughout the course of eight days with individual, group and milieu therapy, in addition to medications to control his impulsivity. The hospital care team also worked with his father and outpatient care team to build Max’s coping skills.

After Max was discharged, the hospital learned that his Medicaid MCO would only cover the first three days of his stay. Further inpatient authorization required a peer-to-peer review with a plan physician; however, none were available because the third day of Max’s stay happened to fall on a weekend.

Table 4: Model Results for Suicidality Following Pediatric and Adolescent Psychiatric Hospitalizations

		30-DAY		60-DAY		90-DAY	
		ODDS RATIO	P-VALUE	ODDS RATIO	P-VALUE	ODDS RATIO	P-VALUE
Demographic Factors	Length of Stay	0.996	0.050	0.996	0.015	0.996	0.008
	Age	0.983	0.215	0.987	0.281	0.982	0.097
	Male	1.016	0.826	0.924	0.200	0.877	0.019
	Race: White	1.023	0.850	1.197	0.093	1.182	0.085
	Race: Black	1.115	0.455	1.244	0.084	1.199	0.115
Reason for Hospitalization (Pri. Diagnosis Category)	Major Depression (Acute)	0.892	0.565	0.881	0.459	0.895	0.493
	ADHD & Conduct Disorders	0.605	0.033	0.626	0.019	0.749	0.112
	Affective Disorder	0.825	0.349	0.788	0.182	0.893	0.490
	Bipolar-Manic	0.791	0.200	0.917	0.584	0.995	0.971
	Major Depression (Chronic)	1.057	0.752	1.111	0.488	1.257	0.108
	Mood Disorders	0.756	0.124	0.851	0.304	0.945	0.700
	Schizophrenia	1.587	0.107	1.917	0.008	1.925	0.005
	Stress Disorders	0.534	0.024	0.581	0.019	0.527	0.004
History of Clinical Comorbidities	Diabetes	1.122	0.393	1.244	0.055	1.370	0.003
	Heart Disease	1.401	<.0001	1.320	0.000	1.336	<.0001
	Hypertension	1.865	<.0001	1.502	0.001	1.345	0.008
	Asthma	1.225	0.006	1.280	<.0001	1.235	0.000
	Liver Disease	0.987	0.944	1.001	0.995	1.283	0.088
	Kidney Disease	0.612	0.017	0.662	0.017	0.768	0.088
History of Behavioral Risk Factors	Substance Use	0.984	0.926	0.966	0.818	0.937	0.639
	Alcohol Use	0.996	0.972	1.079	0.436	1.162	0.094
	Tobacco Use	1.109	0.215	1.116	0.119	1.119	0.083
	Obese	1.428	<.0001	1.374	<.0001	1.371	<.0001
History of Social Risk Factors	SDOH - Family-Related	1.748	<.0001	1.833	<.0001	1.798	<.0001
	SDOH - Housing-Related	1.775	0.000	1.695	0.000	1.683	<.0001
	SDOH - Psychosocial-Related	2.744	<.0001	2.626	<.0001	2.649	<.0001
	SDOH - Socioeconomic-Related	1.401	0.028	1.572	0.001	1.573	0.000
	SDOH - Noncompliance-Related	1.538	<.0001	1.516	<.0001	1.550	<.0001
Number of Observations		20,848		20,193		19,500	
C-Statistic		0.735		0.733		0.734	

Table 5 presents the risk-adjusted comparisons of 30-, 60- and 90-day suicidality rates by insurance coverage following discharge from a psychiatric hospitalization for Missouri children and adolescents. Holding included risk factors and payer constant, patients with Medicaid FFS and other insurance coverage had lower-than-expected risk-adjusted rates of suicidality during each of the defined intervals following hospitalization. The opposite held true for children and adolescents with Medicaid MCO coverage. The rates of suicidality for patients with Medicaid MCOs were estimated to be between 6.8 and 11 percent higher than expected after accounting for patient- and payer-level risk.

The difference was more pronounced for children and adolescents who were shifted from Medicaid FFS to Medicaid MCO coverage following statewide expansion in May 2017. Before the policy change, under Medicaid FFS coverage, these children and adolescents had 24 to 27 percent lower-than-expected rates of suicidality. Following expansion, under Medicaid MCO coverage, the same patients experienced 40 to 42 percent higher-than-expected rates of suicidality following discharge from a psychiatric hospital (Table 5).

Table 5: Risk-Adjusted Suicidality Rates and Excess or Prevented Number of Occurrences by Payer

		MCO EXPANSION PATIENTS*		MEDICAID FFS PATIENTS	MEDICAID MCO PATIENTS	OTHER PAYER PATIENTS
		BEFORE EXPANSION	AFTER EXPANSION			
30-Day Suicidality	Number with Suicide Ideation or Attempt	163	185	128	300	257
	Total Hospitalizations	3,070	2,021	3,331	6,566	6,374
	Observed Suicidality Rate	5.3%	9.7%	4.0%	4.7%	4.1%
	Predicted Suicidality Rate	5.4%	9.4%	4.0%	4.6%	4.1%
	Expected Suicidality Rate	7.2%	6.7%	4.6%	4.3%	4.2%
	Excess Suicidality Ratio	0.758	1.402	0.879	1.068	0.992
	Risk-Adjusted Suicidality Rate	3.8%	6.9%	4.4%	5.3%	4.9%
	Estimated Excess (Prevented) Events	(40)	74	(15)	21	(2)
60-Day Suicidality	Number with Suicide Ideation or Attempt	238	263	193	460	372
	Total Hospitalizations	3,070	2,021	3,331	6,566	6,374
	Observed Suicidality Rate	7.8%	15.0%	6.2%	7.4%	6.2%
	Predicted Suicidality Rate	7.9%	14.6%	6.2%	7.4%	6.2%
	Expected Suicidality Rate	10.8%	10.2%	7.0%	6.6%	6.5%
	Excess Suicidality Ratio	0.732	1.424	0.893	1.110	0.952
	Risk-Adjusted Suicidality Rate	5.5%	10.8%	6.7%	8.4%	7.2%
	Estimated Excess (Prevented) Events	(64)	111	(21)	51	(18)
90-Day Suicidality	Number with Suicide Ideation or Attempt	318	301	237	568	456
	Total Hospitalizations	3,070	2,021	3,331	6,566	6,374
	Observed Suicidality Rate	10.4%	18.8%	7.8%	9.5%	7.8%
	Predicted Suicidality Rate	10.5%	18.2%	7.9%	9.4%	7.9%
	Expected Suicidality Rate	13.7%	13.0%	8.9%	8.5%	8.4%
	Excess Suicidality Ratio	0.764	1.399	0.889	1.096	0.940
	Risk-Adjusted Suicidality Rate	7.4%	13.5%	8.6%	10.6%	9.1%
	Estimated Excess (Prevented) Events	(75)	120	(26)	55	(27)

* Indicates patients that were covered by Medicaid FFS before, and Medicaid MCO after, May 1, 2017, when statewide expansion of the Medicaid managed care program took place in Missouri.

Taking these differences into account, it is estimated that the shift to Medicaid MCO coverage induced 114 additional hospitalizations or ED visits for suicide ideation or attempt within 30 days, 175 additional events within 60 days, and 195 additional events within 90 days of discharge from a psychiatric hospitalization (Figure 6).

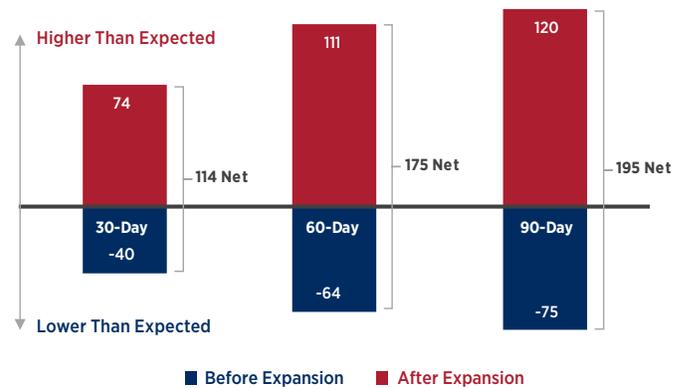
Conclusion

The findings presented in this policy brief pose difficult questions for elected and appointed policymakers in Missouri.

At the same time, the findings validate concerns long raised by the Missouri Children’s Medicaid Managed Care Parity Network of hospitals that for years raised concerns on the potential consequences of denied care before stabilization for children and adolescents.

The paucity of specialized mental health care in Missouri makes it particularly difficult for these children and their families to obtain needed services. After navigating an already difficult system to secure the care needed, they should not be subjected to discharge before achieving stabilization and health. **The data and findings presented in this policy brief suggest an association between insurance coverage and suicidality rates for children and adolescents in Missouri following psychiatric hospitalizations.** Additional research and careful examination is needed to identify the causal pathways that result in these disparities.

Figure 6: Estimated Excess Suicidality Events Following Pediatric and Adolescent Psychiatric Hospitalizations for MCO Expansion Patients Before and After May 1, 2017



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