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The Continuing Rise of the Opioid Epidemic in Appalachian Regions: A Public Health Analysis of Regional Programs and Potential Solutions

By

Holly Bevins Frye

An Undergraduate Thesis Submitted in Partial Fulfillment of the Requirements for the University Honors Scholars Program

Honors College

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Table of Contents

Abstract

The purpose of this study is to closely analyze opioid overdose response efforts on county, state, and federal levels in designated Appalachian regions in order to better understand program methodology standards that ensure success in combating the opioid epidemic in Appalachia. The research scope of the study involved comparison of existing data from county reports, government agencies, and response effort outlines to best identify program qualities that most decreased rates of opioid usage by indicators such as declines in opioid overdose deaths, drug distribution per capita, deaths attributing to synthetic opioid overdose, and decline in neonatal abstinence syndrome births. All data sources used are publicly available and contain de-identifiable population health information. During research on this topic, how to define the opioid epidemic, identification of root causes, and existing response effort methodology were addressed. While difficult to define, the opioid epidemic refers to a public health crisis in which Appalachian individuals are dying due to opioid overdose at an alarming and disproportionate rate as compared to the rest of the country. This opioid crisis has many social and economic causes, as well as occurrences that jumpstart a quick decline. The existing response methods of county, state, and federal programs are expensive and hard to implement with limited success. There are also many facets to addressing the opioid epidemic including government initiatives, federal or state agencies, non-profit agencies, educational facilities, public health initiatives, and faith-based organizations. While the complexity of response efforts can be beneficial to have many options for addressing the issue, it can also quickly muddle the most effective methods to success. The most notable programs that saw a quick decline in overdose death rates included those that coordinated between multiple types of entities such as schools, health departments, and correctional departments; as well as those offering harm reduction programs such as

naloxone distribution. Other successful programs included re-training and re-education both with regional providers on appropriate opioid prescriptions and with the community on proper use, handling, and disposal of opioids. The most effective methods to reduce health disparities relating to the opioid epidemic in the Appalachian region are extensive collaboration, re-education, and harm reduction across the communities most deeply affected by the crisis. Any future response efforts should address these key success indicators.

Acknowledgements

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I would also like to thank my thesis reader and academic advisor, Dr. Taylor Dula. Dr. Dula has constantly been a mentor throughout my experience in the College of Public Health at East Tennessee State University. Her assistance, not only in the creation of my senior thesis, but in gaining experiences throughout my academic career, have been fundamental in creating an undergraduate profile that I am truly proud of.

Lastly, I would like to thank Dr. Karen Kornweibel. Dr. Kornweibel served as my honors advisor for the majority of my undergraduate collegiate career, and the pursuit of an honors thesis would not have been possible without the funding and opportunities she provided. The program she built within the honors college will continue to provide students the best educational experiences possible.

Background

Purpose

The purpose of this qualitative research study is to analyze existing data from established regional program reports that combat the opioid epidemic in the Appalachian region, in order to better understand program standards that ensure success. By compiling and analyzing pre-existing data to determine what methodology has worked best to combat the opioid epidemic, indicators such as decline in drug distribution per capita, decline in opioid overdose, deaths attributing to synthetic opioid overdose, and decline in neonatal abstinence syndrome births can be established. In conclusion, the purpose of this qualitative study is to closely analyze opioid response efforts in designated Appalachian regions in order to answer the research questions: 1) What approaches have worked best in combating the opioid epidemic? 2) What approaches should be implemented in any future potential solutions?

Research Scope

In this study, the topics of opioid misuse, abuse, and overdose are discussed thoroughly in reference to defining the issue, identifying root causes, comparing available data, observing methodology, and recognizing aspects of case studies surrounding success or failure of combatting the growing epidemic in Appalachian regions. The study strictly observes second-hand data from regional reports of 423 Appalachian counties across thirteen states: Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia. The research involves comparing county, state, and federal efforts to decrease opioid overdoses; and data from county reports showing a decline in opioid overdose after the programs were implemented. The sources of information for the study are all publicly available reports as well as journals that contribute to

the methodology of regional programs across the Appalachian counties, including reports from governmental agencies that disclose de-identified population health information pertaining to opioid use and effects. No information or conclusions made from this study are generalizable in any manner.

Potential limitations to this study include geographic limitations, as both national and Appalachian efforts to combating opioid usage was observed. This study may also contain data limitations, as the second-hand data gathered may not be accurate to the realities of regional operations. The data also may not be statistically representative of the entire region. Lastly, the study may have incurred a time limitation, as the conduction of this research endured approximately only one year.

Identification of Key Terms

High Intensity Drug Trafficking Areas (HIDTA): HIDTAs are locations determined to be critical drug trafficking regions of the United States. To be considered a HIDTA, an area must meet criteria including: acting as a significant center of illegal drug production, importation, or distribution; local law enforcement agencies have committed resources towards the growing issues; there is a harmful impact on the community due to drug-related activities; and federal resources are necessary to adequately address the drug-related issues (*HIDTA*, n.d.).

Opioid Use Disorder (OUD): A substance use disorder characterized by problematic patterns of opioid use causing significant impairment or distress based on specific criteria including unsuccessful efforts to control use and use resulting in failure to fulfill obligations (*Disease of the Week - Opioid Use Disorder*, 2022).

Substance Use Disorder (SUD): Chronic diseases characterized by problematic patterns of use of a substance or substances (drugs or alcohol) that lead to impairments in health, social

function, and control, causing symptoms of cognitive, behavioral and physiological nature (*Disease of the Week - Substance Use Disorders (SUDs)*, 2022).

Neonatal Abstinence Syndrome (NAS): A withdrawal syndrome occurring in newborns that have been exposed to substances, including opioids, in utero (*Neonatal Abstinence Syndrome | CDC*, 2019).

Adverse Childhood Experiences (ACE): Events that occur in childhood (0-17 years) that can undermine one's sense of safety and stability such as experiencing abuse, witnessing violence, exposure to suicide, and exposure to substance abuse. ACEs are linked to aspects of life including chronic health, mental illness, education, and job opportunities (*Fast Facts: Preventing Adverse Childhood Experiences |Violence Prevention|Injury Center|CDC*, n.d.).

Substance Abuse and Mental Health Services Administration (SAMHSA): The agency within the United States Department of Health and Human Services leading public health response efforts to substance abuse across the United States (*About Us*, n.d.).

Prescription Drug Monitoring Programs (PDMP): An electronic database that tracks prescriptions of opioids and other controlled substances in a state with the intention of providing health authorities information about patient prescription behaviors (*Prescription Drug Monitoring Programs (PDMPs) | Drug Overdose | CDC Injury Center*, n.d.).

Literature Review

Part 1: Defining the Opioid Epidemic

While the opioid epidemic in Appalachian regions is not a phenomenon with one singular definition, the realities of detriment taken place has made it an undeniable public health disparity. The opioid epidemic in Appalachian regions refers to a public health crisis in which Appalachian individuals are disproportionately dying due to legal and illegal opioids compared to the rest of the country. In the same nature that the opioid epidemic is hard to define, Appalachia is a concept that has never obtained one singular, “correct” definition. For the purposes of this study, Appalachia refers to the 423 counties across thirteen states served by the Appalachian Regional Commission, including Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia ("Appalachian Counties Served,” 2021).

Opioid related deaths have drastically increased across the country in recent years, as the highest recorded number of opioid-related overdose deaths in the United States occurred in 2020-2021 (Young et al., 2023). In 2000, Appalachian regions were roughly equal to the rest of the country in opioid overdose deaths, but since 2017, the death rate for opioid overdoses was disproportionate by 72% (National Organization of Counties, 2019). In 2014 and 2015, three of the five states with the highest drug overdose death rates were Kentucky, Ohio, and West Virginia (Schalkoff et al., 2020). In a 2017 county analysis, most counties identified as “vulnerable” to HIV outbreaks were rural and heavily concentrated in Appalachia, with the most densely vulnerable counties being in Tennessee, Kentucky, West Virginia, and Ohio (Schalkoff et al., 2020). Even moreso, central Appalachia, including regions of Kentucky, Tennessee, Virginia, and West Virginia, has felt the effect of the opioid epidemic to a greater degree than the rest of

the country. Studies have noted that urban area overdose rates more often involve heroin or cocaine, while Appalachian overdose rates primarily involve prescription opioids, in particular hydrocodone, oxycodone, and methadone (Schalkoff et al., 2020).

A notable aspect of the Appalachian opioid epidemic involves demographic groups most at-risk for related health disparities. Young white men are one demographic group that are reported to have the greatest risks for fatal and non-fatal overdoses in rural areas (Schalkoff et al., 2020). This specific population was also found to be mostly low income with lower levels of education and employment (Schalkoff et al., 2020). Other at-risk populations in Appalachia identified from common correlates included chronic pain patients and patients reporting mental health issues such as depression, anxiety, and post-traumatic stress disorder (Schalkoff et al., 2020). The opioid epidemic decreases the quality of life and life expectancy in Appalachian regions, but also puts tremendous stress on the United States economy, as it was estimated that the cost of heroin use disorder was around 51 billion dollars in 2015 (Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost], 2020).

Furthermore, Appalachia has a classification of a High Intensity Drug Trafficking Area (HIDTA). This classification was introduced in a 1988 Congressional program in which HIDTA are classified as “significant centers of illegal drug production, manufacturing, importation, or distribution,” causing the region to have a unique convergence of economic instability, differing cultural norms, and a successful illegal drug industry, in turn “having a significant harmful impact on the area” (Schalkoff et al., 2020).

Research from the Centers for Disease Control and Prevention and other federal agencies indicate the opioid epidemic has progressed in three waves, as seen in Figure 1.1. The waves of the national opioid crisis began in the mid 1990s, with the first wave hitting nationally around

1996 with the expanded use of prescription opioids (Congressional Budget Office, 2022). Before then, opioids were prescribed sparingly and were generally only used for acute pain such as surgery or injury. With the volume of prescription opioids rising, prescription opioids were also increasingly used for non-medical, recreational use and distributed through illegal means.

The second wave of the national opioid crisis began around 2010, characterized by the use of several illicitly manufactured substances, including heroin (Congressional Budget Office, 2022). The third, overlapping wave, began around 2013 characterized by the increased use of fentanyl and other completely synthetic lab-made drugs (Congressional Budget Office, 2022). Some experts speculate about a fourth emerging wave characterized by the combination of manufactured opioids and psychostimulants such as cocaine and methamphetamines (Congressional Budget Office, 2022).

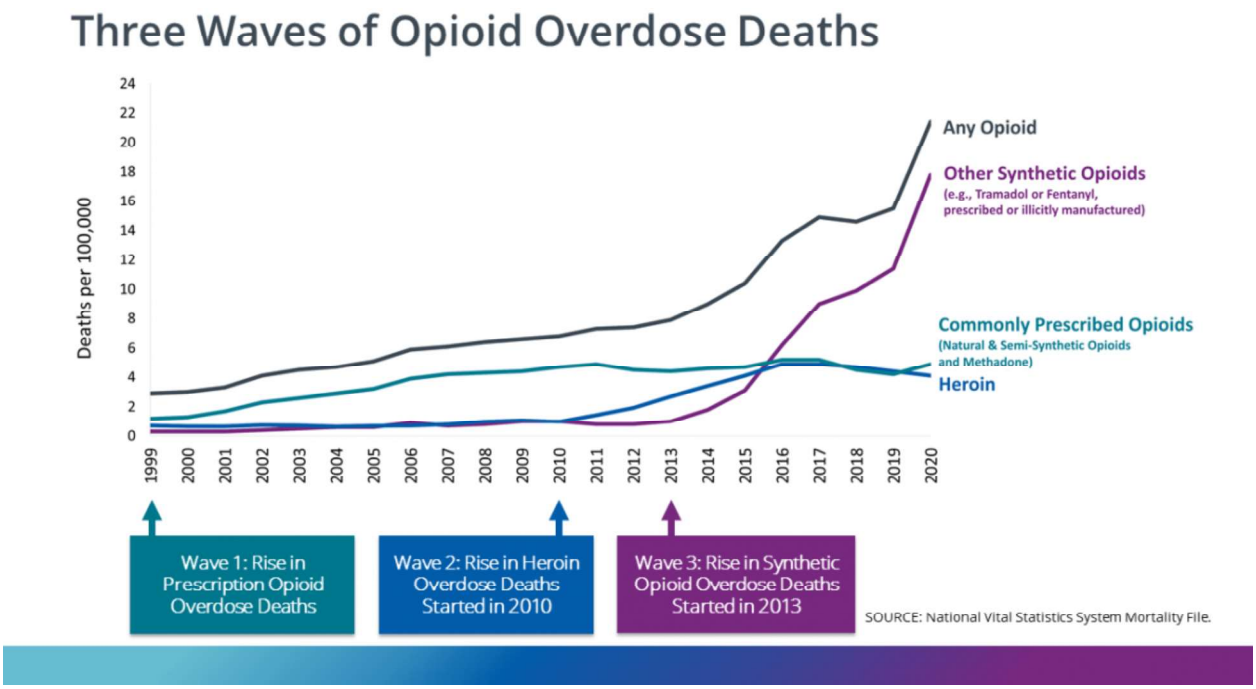

Figure 1.1 The Rise of Overdose Deaths in Three Waves (*Understanding the Opioid Overdose Epidemic | Opioids | CDC*, n.d.)

Part 2: Identifying Root Causes

The desperate realities of many Appalachian communities makes these regions a perfect breeding ground for the budding opioid crisis. The blend of low education, poor health, high poverty, and homelessness, combined with the loss of region-wide industries allows an inevitable illegal drug industry to flourish.

One well established root cause of the opioid epidemic is the growth of the prescription painkiller industry in the 1990s. In 2001, the Joint Commission on the Accreditation of Healthcare Organizations pushed for pain to be the "fifth vital sign" and began supporting health service organizations in treating pain densely and quickly (Schalkoff et al., 2020). The new standards established by the Joint Commission regarded pain control as a patients' rights issue (Congressional Budget Office, 2022). The push for medical practitioners to more heavily rely on opioids to treat both acute and chronic pain propelled a growing industry by 2000 (National Organization of Counties, 2019). During this time, pharmaceutical companies engaged in aggressive marketing tactics towards providers, and intense funding allowed new opioid products to emerge, including extended-release oxycodone (Schalkoff et al., 2020).

Another aspect contributing to increased volumes of opioid prescriptions in the early 2000s includes changes in incentives affecting the way providers were assessed and reimbursed (Congressional Budget Office, 2022). The guidelines issued by the Federation of State Medical Boards encouraged the use of opioids for chronic pain. This influenced the Hospital Value Based Purchasing Program, which rewards hospitals for providing high quality care, to incorporate surveys including questions about patient satisfaction with pain management in 2010, potentially pressuring providers to overprescribe opioids to avoid low patient satisfaction scores (Congressional Budget Office, 2022). Efforts to break down barriers to patient pain control

resulted in the unintended consequence of increased opioid use. One of these efforts included insurance companies and retail pharmacies charging less for higher quantity prescriptions in an effort to lower the number of opioid refill requests (Congressional Budget Office, 2022). The sheer volume of opioid prescriptions, in addition to a lack of regulatory practices, led to a dangerous combination of low patient monitoring, prescription abuse, and easily available addictive narcotics. This nationwide industry disproportionately impacted the Appalachian region, as the opioid prescription rates were 45% higher than the remainder of the country in 2017, enhancing the abundant availability of opioids in the region (National Organization of Counties, 2019).

The disproportionate nature of the opioid epidemic in the Appalachian region compared to the rest of the nation can be credited to socioeconomic indicators. While no one indicator can be said to be the cause of the epidemic, factors such as poverty, poor health, accessibility to care, lower education levels, and changes in the labor force have created an environment for the opioid epidemic to flourish. (National Organization of Counties, 2019). Beyond the realities of the surrounding environment, Appalachia is full of at risk populations for drug usage and overdose. The Appalachian history of low socioeconomic populations have only contributed to the growing opioid industry. Appalachia has also struggled with alcohol and substance abuse issues for generations, creating a cycle of illicit moonshine and marijuana production that is difficult to break (Schalkoff et al., 2020).

As the opioid epidemic flourished, the U.S. energy market drastically transformed as technological advances emerged in natural gas production (Metcalf & Wang, 2020). As changes in demand for natural gas energy sources emerged, there was a 34% fall in coal-related employment (Metcalf & Wang, 2020). The financial dependance of rural regions on the coal

industry as a source of income and community flourishment debilitated entire states when President Obama initiated climate change programs as part of his administrative agenda. While these programs were well intentioned, there was no plan in place for the regions that depended on coal for not only income, but community culture and heritage. It is widely asserted that there is an association between the Appalachian opioid epidemic and the worsening economic climate (Metcalf & Wang, 2020). The quick dissolution of the coal industry has pushed individuals to turn to an illegal opioid industry to earn income, feed their family, or feed the loss of community felt. One case study in Logan, West Virginia researched the relation of energy transitions and opioid use in coal-dominated cities. Logan County was the fourth largest coal producing county of West Virginia in 2021 and the first county in opioid-related mortality rates (Young et al., 2023). After the quick dissolution of the coal industry, Appalachian regions, especially those in Kentucky, Tennessee, Virginia, and West Virginia of central Appalachia, have suffered broad economic distress in the past decade. The decline in coal production in pursuit of low carbon energy transitions has continued to contribute to high unemployment and poverty rates, and lower per capita income (Young et al., 2023). However, it is important to note that some research indicates that the relation of the Appalachian opioid epidemic and the worsening economic climate is contributed by the increase of county-wide opioid prescriptions arising from workplace injuries in the mines (Metcalf & Wang, 2020).

Other factors contributing to the opioid crisis include changes in the demand and availability of the opioid market, as demonstrated in Figure 2.1. Initially, the excess of prescription opioids streamlined recreational use and illegal distribution. However, as access to prescription opioids lessened, the demand for synthetic opioid alternatives, such as potent and illegal forms of fentanyl and heroin, saw an increase (National Organization of Counties, 2019).

This type of fentanyl is relatively low in price, with high potency in small amounts, making it easier to transport without detection (Congressional Budget Office, 2022). There are also increased demands for recreationally used opioids as a result of economic and social deterioration, especially after COVID-19 isolation periods (Congressional Budget Office, 2022).

Figure 2.2 demonstrates the root causes of the opioid epidemic in Appalachian regions as discussed throughout this section. The disproportionate nature of the Appalchian opioid epidemic can be credited to circumstances of the Joint Commission, the Push for Pain Control, Industry Dissolutions, and Changes in the Opioid Markets.

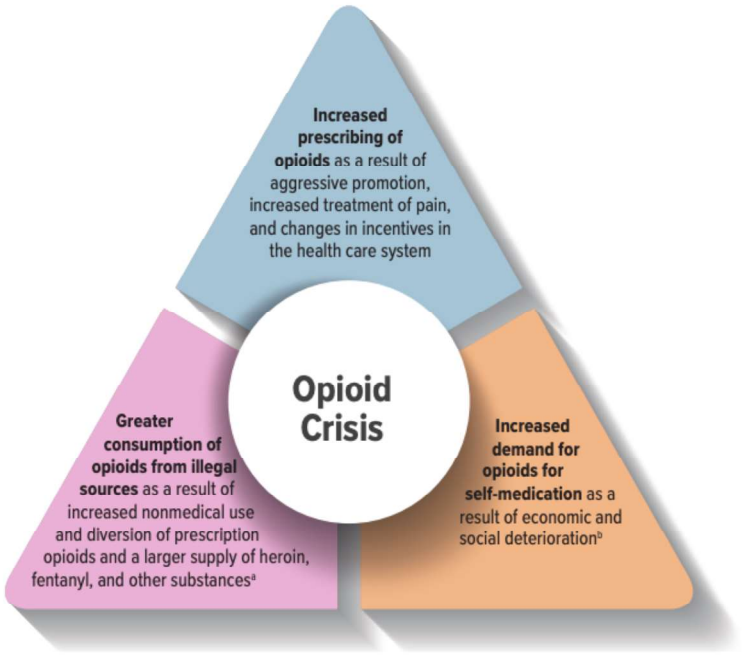

Figure 2.1 Contributing Factors to the Opioid Crisis (Congressional Budget Office, 2022)

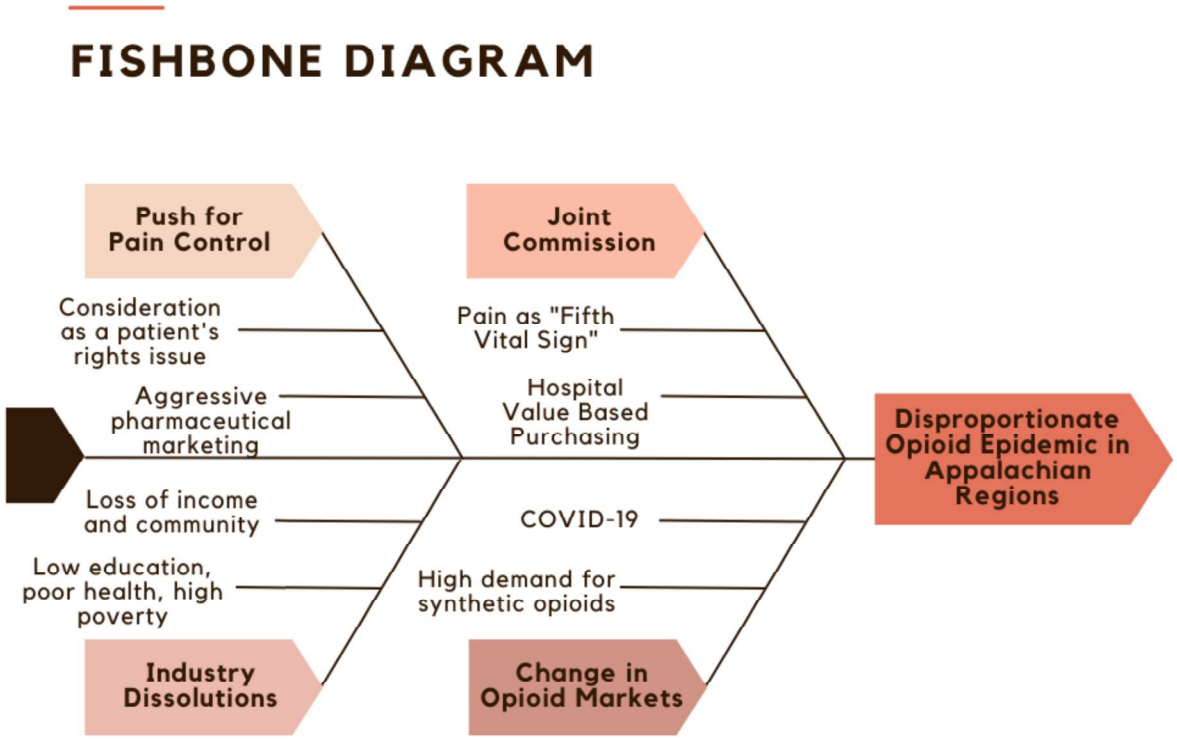

Figure 2.2 Fishbone Diagram outlining discussed root causes for the rising opioid epidemic in Appalachian regions.

Part 3: Existing Response Efforts Methodology in the Local Setting

In 2010, various national response efforts arose from the U.S. Drug Enforcement Agency (DEA) and the American Pain Society to reduce opioid prescription rates, however as access to prescription opioids lessened, the demand for synthetic opioid alternatives rose such as potent and illegal forms of fentanyl and heroin (National Organization of Counties, 2019).

County governments are at the forefront of taking steps of national efforts to reduce the effects of the opioid epidemic. Appalachian counties deal with greater costs in relation to opioid overdoses,

in addition to having fewer resources. Counties allocate money in a multitude of ways towards relief efforts through funding treatment and healthcare, justice and public safety, and health and human services. In 2015, the average cost of an intensive care admission due to opioid overdose was $92,400 (National Organization of Counties, 2019). Counties operate 91% of all local jails, where 63% of inmates across the country have a substance abuse disorder (National Organization of Counties, 2019). Human services also contribute to county costs in relation to the opioid epidemic in that opioid abuse correlates with more severe and higher numbers of child welfare caseloads in counties.

The National Organization of Counties outlines five existing methodologies from different county case studies that have been successful in reducing the opioid epidemic effects in their region. The first action plan outlined is by exercising strategic local leadership by being compassionate in local conversations surrounding opioids, forming Opioid Task forces through diverse stakeholders including faith-based organizations, and fostering intergovernmental cooperation (National Organization of Counties, 2019). These tactics can be seen in action through the case study surrounding Ross County, Ohio. Ross County initiated a “Hope Partnership Project” that coordinated between federal, state, and local agencies to address a community based action plan. Alongside these government agencies, Ross County coordinated with South Central Ohio Jobs and Family Services and the Alcohol Drug Addiction and Mental Health Board to implement a program that reimburses employers for drug testing, trains employers on employing individuals in recovery, and establishes a positive tone in information exchange within these interactions. Ross County has seen successful results from these tactics in that opioid overdose deaths declined from 44 to 33 percent in 2017 after the enactment of the Hope Partnership Project (National Organization of Counties, 2019). The most notable

recommendation from local leaders in Ross County is a unified, combined effort among stakeholders of the community.

The National Organization of Counties also outlines the second action plan to create and strengthen preventative and educational initiatives by specifying safe disposal sites for opioids, conducting community outreach within education systems, and leveraging data and technologies to target services provided (National Organization of Counties, 2019). These tactics are outlined through the case study surrounding the efforts of Allegany County, Maryland. The National Organization of Counties also emphasizes the importance of prevention in children through educational programs due to the multigenerational impact of poverty and substance abuse. By considering the social determinants of health of the region, the creation of a comprehensive plan to mitigate the opioid epidemic can be unique to local needs. Allegany County experienced a surge in opioid overdose deaths from 2013 to 2017, and quickly implemented an Opioid Overdose and Prevention Task Force made from coordinations between the public school system, sheriff, and health department (National Organization of Counties, 2019). The task force educates students about opioid misuse and has centralized all county information surrounding resources for people with opioid use disorder at a singular county website. Creating educational and preventative programs such as these have shown success, as overdose deaths fell 14% from 2016 to 2017 after the implementation of the program (National Organization of Counties, 2019).

The third action plan to reduce the opioid epidemic effects is to expand access to addiction treatments by increasing the availability and access to Naloxone, employing telemedicine solutions, and encouraging mental health treatments alongside addiction treatment. The success of expanding addiction treatment access can be seen in the case study following Wilkes County, North Carolina. In Wilkes County, 82% of people that died from overdose had

been prescribed that medication in 2009 (National Organization of Counties, 2019). A community based response effort emerged, including a Substance Abuse Task Force, which is a local coalition of healthcare providers and county officials to educate the community on proper handling, disposal, and utilization of prescribed controlled medications. This, in combination with the Chronic Pain Initiative from the Medicaid regional authority, trains primary care physicians to safely prescribe opioids created a huge community success in a short amount of time for the effort to reduce opioid epidemic effects. From 2009 to 2010, the county experienced a drop in overdose death rates by 42% and physician utilization of prescription monitoring programs rose 70% (National Organization of Counties, 2019).

The fourth action plan to reduce effects of the opioid epidemic is to implement a criminal justice response to illegal opioid sales and provide treatment to incarcerated individuals with opioid use disorders. The key actions of this plan include reducing the illicit supply of opioids, facilitating treatments and workforce training in jails, and connecting people in recovery to housing and employment opportunities (National Organization of Counties, 2019). A county in which these key actions and objectives were implemented was Campbell County, Tennessee. In Campbell County, the prescription rate was the third highest in the country in 2015 and the effects on the local jail and economy were detrimental (National Organization of Counties, 2019). However, the county implemented a program called the New Beginning, which connected formerly incarcerated individuals to a local employer to integrate them back into the community through basic needs and establishment of an income. The program also provides resources such as drug tests, mentor consultations, training, and coursework. The New Beginning program proved successful when 27 of the 92 participants in 2018 were able to finish the program and find a meaningful job placement within their community (National Organization of Counties,

2019). Holistically linking employment to recovery provides comprehensive services to individuals, as seen in the success of programs like New Beginning.

The last action step outlined by the National Association of Counties to reduce the effect of the opioid epidemic is to mitigate local economic impacts and consider new development strategies. Appalachian counties are not up to par with the rest of the country in total civilian labor force from 2000 forward. After the 2008 recession, Appalachian counties labor force dropped significantly and have since struggled to rise to the point of 2008, much less grow beyond that level like the rest of the country (National Organization of Counties, 2019). Because of this, their action plan to consider new economic development strategies may be the most important. The National Organization of Counties recommends beginning this objective by key actions such as collaborating with education facilities and businesses to align education and training with shifting workforce needs.

Another key action is to leverage a county's specific strengths to attract and retain high-quality businesses, and help those businesses learn how to work with individuals in recovery. The last key action is to reinforce safety net services whilst expanding education and employment opportunities to families experiencing cyclical poverty. In a few different counties in West Virginia including McDowell and Mingo Counties, a coalfield development corporation was implemented to lessen the effects still felt from the opioid epidemic (National Organization of Counties, 2019). West Virginia counties were disproportionately affected by the dissemination of the coal industry around 2008, leaving residents unemployed, addicted, and injured for a decade (National Organization of Counties, 2019). However, the Coalfield Development Corporation actively trains unemployed and underemployed individuals in various social enterprises. They also accept referrals from treatment programs, and received a 2 million dollar

grant from the Appalachian Regional Commission to invest in different industries within the region. The Coalfield Development Corporation has proven successful in its 83% graduation rate, five new businesses, and 60 on the job training positions (National Organization of Counties, 2019).

County leaders taking steps, like the action plan laid out by the National Organization of Counties, would start the beginning seeds of combating the opioid epidemic and its effects in Appalachian regions. The effectiveness of county strategies discussed is demonstrated in Figure 3.1. Federally, the government could fund such programs to be led by county officials. Certain aspects of these programs have significantly helped the realities of the opioid epidemic in their respective counties, thus identifying certain weaknesses in the county and creating programs tailored to them are just as important in the efforts towards the epidemic as providing funding and resources.

Part 4: Existing Response Efforts Methodology in the State Setting

There are many different techniques used by state governments in the Appalachian region towards opioid epidemic prevention strategies. Many of these include committees or programs implementing research based strategies on a yearly or bi-yearly basis.

In Ohio, current strategies towards prevention of the opioid epidemic within the state include identification of OUD, abuse deterrent formulations, safe disposal programs, provider education and monitoring, Medicaid expansion for treatment, naloxone distribution, and prescription drug monitoring programs (Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost], 2020). The Ohio Attorney General, Dave Yost, has implemented prevention strategies including the Scientific Committee on Opioid Prevention and Education (SCOPE). The SCOPE Committee has met monthly since June 2019, identifying

three target states of examination for further implementation: professional education, opioid storage and disposal methods, and a behavioral economic approach towards addressing the SUD and OUD crisis with a target population being young adults attending career centers and technical schools (Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost], 2020). For the first target state, professional education, the committee has recommended that all academic healthcare programs be surveyed to gauge the level of SUD and OUD in curriculum, including adverse childhood experiences (ACE) and the development of SUD (Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost], 2020). This development would also include continuing education and human resource training requirements. The first target area suggests the implementation of an Ohio Attorney General's Gold Medal Training Group for healthcare systems that effectively obtain the threshold for SUD and OUD education. The second target area outlined suggests state support in efforts to decrease opioid prescription rates, as well as the exploration of prescription limitations in electronic health records for opioids. Also, the second target states the importance of counseling patients using opioids on safe disposal and storage and the promotion of safe disposal sites (Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost], 2020). Lastly, the third target area focuses on using a behavioral economic approach to address the SUD crisis. This target state employs two recommendations: building a knowledge-based education program surrounding economic and behavioral aspects, such as social norms and loss aversion rather than the typical awareness program like Drug Abuse Resistance Education (DARE). The second recommendation from SCOPE is to implement training programs involving motivational and cognitive behavioral research such as

psychoeducation and coping skills training (Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost], 2020).

Another state implementing public health campaigns towards the prevention of the opioid epidemic includes Kentucky's UNSHAME program, implemented by Kentucky Opioid Response Effort (KORE) and funded by the Commonwealth of Kentucky's Cabinet for Health and Family Services Department for Behavioral Health, Development, and Intellectual Disabilities (*Home*, n.d.-b). UNSHAME Kentucky is a state-wide campaign designed to destigmatize OUD through education and patient/community testimonials, run by Shatterproof, a national nonprofit committed to ending the addiction crisis in the United States (*Home*, n.d.-b). The three main objectives of UNSHAME are to increase knowledge about OUD and recovery, improve attitudes towards those experiencing OUD, and develop Kentuckians' understanding of OUD (*Home*, n.d.-b). KORE response efforts surround the expansion and sustainment of equitable recovery-oriented systems of care to end the opioid epidemic. The program is federally funded by the Substance Abuse and Mental Health Services Administration (SAMHSA), and supports agencies in the establishment or expansion of Recovery Community Centers throughout Kentucky (Kentucky Opioid Response Effort, 2021). The guiding principles of service expansion outlined by KORE help to implement their harm reduction, prevention, treatment, and recovery plans; including availability statewide, accessibility, equitability, person-centered, culturally appropriate, evidence-based, and quality (Kentucky Opioid Response Effort, 2021). These principles guide the program to reduce harm while building personal, family, and community capital. Their harm reduction plan includes naloxone distribution, syringe service programs, safety at home, and opioid stewardship (Kentucky Opioid Response Effort, 2021). The prevention methods used by the program include regional collaboration specialists, youth

empowerment specialists, and youth mental health first aid. KORE's treatment plan includes medications for opioid use disorder including methadone and buprenorphine, treatment access, integrated primary care and OUD treatment, family services, and quick response teams (Kentucky Opioid Response Effort, 2021). The recovery plan outlined includes aid to recovery community services, access to recovery through housing and mutual aid groups, reentry support, and employment services (Kentucky Opioid Response Effort, 2021). The stakeholders involved in the program are widespread, incorporating individuals from areas including judiciary, employers, students, providers, community peers, and welfare programs (Kentucky Opioid Response Effort, 2021).

As many of the states discussed, Tennessee state response efforts continue to reflect the evidence based methods outlined by the CDC. The Tennessee Department of Health Opioid Outbreak Strategic Map organizes the strategy developed to reduce the rising mortality resulting from overdose death, despite the significant decrease in opioid dispense rates (Tennessee Department of Health, 2017). The four vectors outlined in TDOH's strategic plan are prevention through education, wise data collection and use, regulation and enforcement, and partnership. The key objectives in prevention through education include actions such as increase public education, increase healthcare employers and workers education, decrease unintended pregnancies and NAS, and increase opportunities for health behavior by youth (Tennessee Department of Health, 2017). The key actions for the second pillar, wise data collection and use, are identifying prescribing patterns that lead to adverse outcomes by acquiring timely EMS and medical examiner data, using diverse data, and integrating Controlled Substance Monitoring Database with electronic health records. The third pillar, regulation and enforcement, focuses on further accelerating regulatory oversight of inappropriate prescribers. Lastly, the fourth pillar of

partnership focuses on promoting syringe service programs across the state by informing anti-drug coalitions and applying outbreak response methods to drug overdoses (Tennessee Department of Health, 2017).

The Tennessee Department of Health implements regional programs to be points of contact for training and education including Regional Overdose Prevention Specialists (ROPS) and Substance Use Prevention Coalitions. Regional Overdose Prevention Specialists are located throughout the state of Tennessee to provide training on opioid overdose prevention by the distribution of naloxone (Tennessee Department of Mental Health and Substance Abuse Services, 2023). ROPS individuals consist of nurses, paramedics, and Certified Peer Recovery Specialists. The three primary groups of focus that ROPS work with are First Responders, individuals at high risk of overdose, and stakeholder agencies that provide treatment, recovery, or community resources, while training interested community members (Tennessee Department of Mental Health and Substance Abuse Services, 2023). Materials for training communities involve harm reduction strategies, addressing stigma, and increasing public awareness. From the induction of ROPS in September 2017 to March 2023, a recorded 450,000 units of naloxone was distributed across Tennessee, and the Tennessee Department of Mental Health and Substance Abuse Services has recorded over 60,000 lives saved because of the naloxone distributed (Tennessee Department of Mental Health and Substance Abuse Services, 2023). Tennessee is the only state that reports continued decline in NAS births, as they dropped 30% from 2016 to 2019 (TN Department of Finance and Administration & Division of TennCare, n.d.). During the COVID-19 pandemic, there was a slight increase of 1% in NAS births from 2019 to 2020 causing a slight deviation from the two year decrease (Nyakeriga et al., 2020).

The use of Substance Use Prevention Coalitions are working across communities in Tennessee to reduce dependency on potentially harmful substances. The 46 coalitions are involved in events such as National Rx Take Back days to ensure access to resources across Tennessee (Jackson, 2020). Currently, 77% of Tennessee residents have access to coalitions in their counties, while over 38,000 residents received services from a coalition in 2020 (Jackson, 2020). The program uses SAMHSA's strategic prevention framework of Assessment, Capacity, Planning, Implementation, and Evaluation (Jackson, 2020). The state strategy effectiveness discussed, including the methods used in Ohio, Kentucky, and Tennessee is demonstrated in Figure 3.2.

Part 5: Existing Response Efforts Methodology in the Federal Setting

Many strategies implemented federally to combat the opioid epidemic are not specific to Appalchian regions, as the rest of the country is also experiencing an increase in opioid related deaths and overdoses. However, due to the disproportionate nature by which Appalachian counties are experiencing these health disparities, many federal programs focus on densely affected areas to determine strategies to disperse nationally. The federal Department of Health and Human Services work within their operational divisions to implement strategies that are data-driven to reduce opioid misuse. The strategies they implement often involve five elements including strengthening public health data analysis, advancing pain management practice, improving access to addiction and recovery support services, increasing the availability of Narcan, and supporting research of pain treatment and OUD (Johnson et al., 2018). Another facet of federal opioid response efforts is through the Substance Abuse and Mental Health Services Administration. While the Substance Abuse and Mental Health Services Administration (SAMHSA) was enacted in 1992, it has become a key resource in recent years toward

developing strategic plans of opioid response efforts. This tool is instrumental in identifying evidence-based practices and clinical practice guidelines, with reports often published concerning substance use treatment, prevention and recovery.

In 2016 and 2018, three major federal laws were enacted to combat the effects of the growing opioid crisis: the Comprehensive Addiction and Recovery Act of 2016 (CARA), the 21st Century Cures Act, and the Substance Use-Disorder Prevention that Promotes Opioid Recovery and Treatment for Patients and Communities Act (SUPPORT for Patients and Communities Act) (*Understanding the Opioid Overdose Epidemic | Opioids | CDC*, n.d.). These laws aimed to respond to the crisis by three separate mechanisms: by reducing the demand for opioids by treating OUD, by reducing the supply of opioids by limiting non-medical use of prescription opioids and synthetically manufactured opioids, and by reducing the harm of OUD by supporting the health of those suffering with OUD (Congressional Budget Office, 2022). Despite the SUPPORT for Patients and Communities Act of 2018, opioid overdose death rates rose 38% from 2019 to 2020 (*Understanding the Opioid Overdose Epidemic | Opioids | CDC*, n.d.). However, COVID-19 must be addressed during this time period, as the instances of great isolation have surely skewed any results considering the provisions of laws enacted shortly before the effects of COVID-19.

One strategy that has been federally implemented in an effort to combat the Opioid Epidemic specific to Appalachian regions is the Appalachian Regional Prescription Opioid Strike Force (ARPO). The ARPO Strike Force is a federal initiative designed to prosecute medical professionals involved in the illegal prescription and distribution of opioids based in Ft. Mitchell, Kentucky and Nashville, Tennessee (*ARPO Strike Force*, 2023). Since its 2018 inception, ARPO has charged 112 defendants for crimes involving illegal distribution of opioid

prescriptions, where it has been estimated that these individuals have issued over 115 million controlled substance pills collectively (*ARPO Strike Force*, 2023). The ARPO Strike Force also leads opioid enforcement initiatives under the U.S. Department of Justice, including the 2022 Opioid Enforcement Action. The 2022 Opioid Enforcement Action highlights the Justice Department's latest efforts in responding to the opioid epidemic, announcing that 12 medical professionals in eight federal districts were charged for their alleged involvement in unlawful distribution of opioids in May of 2022 (*Justice Department Announces Enforcement Action Charging 12 Medical*, 2022). Entities involved in the law enforcement action included the DEA, FBI, Kentucky and Ohio Medicaid Fraud Control Units, Tennessee Bureau of Investigation, and the U.S. Postal Inspection Service (*Justice Department Announces Enforcement Action Charging 12 Medical*, 2022).

In September of 2022, the Biden-Harris Administration outlined critical actions being taken to achieve beating the opioid crisis, a key pillar of their Unity Agenda (House, 2022). The key actions that the administration has outlined includes granting $1.5 billion dollars across all states and territories to address addiction, investing $104 million to expand substance abuse treatment and prevention in rural communities, investing $20.5 million to increase recovery support access, releasing new guidance to facilitate greater access to naloxone, additional funding to law enforcement officials in HIDTAs, supporting recovery ready workplaces through new guidance, and deploying financial sanctions to disrupt global drug trafficking operations (House, 2022). The prevention in rural communities key action is part of the Rural Communities Opioid Response Program (RCORP), which is an initiative designed to reduce the prevalence of substance use disorder and prevention of opioid related overdose deaths in rural communities. This funding is targeted throughout RCORP to provide treatment for opioid use disorder,

facilitate workforce training, and encourage communication education and outreach. These efforts have shown results, as the FDA approved the first over-the-counter non-prescription Naloxone spray on March 29, 2023 (Office of the Commissioner, 2023). Naloxone is a nasal spray medication that rapidly reverses opioid overdose symptoms and effects. This critical step by the U.S. Food and Drug Administration encourages reduction of drug overdose deaths driven primarily by illicit opioids. The FDA addresses the concerns of the overdose crisis by using their regulatory authority to facilitate access to Naloxone as a critical tool in addressing opioid overdoses (Office of the Commissioner, 2023). Harm reduction treatments such as naloxone distribution have been a tried method of overdose death prevention for many years. While some policy makers oppose harm reduction methods based on the notion that programs such as syringe exchange are not only unresolving to the root issue, but may even encourage the use of illicit drugs. However, while these laws do not necessarily reduce opioid consumption, it is important that individuals with OUD have access to medication-assisted treatments. Ohio's SCOPE found that Naloxone Access Laws lowered overdose mortality rates by around 10% (Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost], 2020).

Beyond federal laws that have been enacted, there are nationally used prevention methods attempted including price controls, monitoring programs, and abuse deterrent opioids. Price control methods focus on the economic strategies that can be implemented to reduce the opioid epidemic, based on the idea that a cheaper, easier access to opioids drives consumption. Based on yearly hospital counts of heroin overdoses, studies show that higher prices of drugs reduce consumption (Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost], 2020). The most popular monitoring program used nationally is the *Prescription Drug Monitoring Program* (PDMP), which allows providers to monitor the

prescription history of patients to determine proper treatment. While this program is nationally used, the dimensions of the program differ among states. One aspect of the program that differs in states include the requirement of providers to access patient prescription history prior to prescribing opioids (Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost], 2020). PDMP results suggest that requiring providers to access the PDMP prior to prescribing opioids can be an effective method to prevent opioid misuse (Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost], 2020). Lastly, abuse-deterrent opioids, such as the reformulation of OxyContin is a tried method of prevention; however, many suggest that the less appealing formulation led to a shift to a cheaper, more effective version: heroin (Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost], 2020).

The Centers for Disease Control and Prevention (CDC) has also contributed to national response efforts for the opioid epidemic, especially in gathering evidence-based data and implementing appropriate solutions. One method implemented from the CDC is the State Unintentional Drug Overdose Reporting System (SUDORS) partnered with the Overdose Data to Action (OD2A) program. These programs support 47 states in gathering data from death certificates and medical examiner reports to better inform state and local jurisdictions by guiding response efforts based on comprehensive information surrounding characteristics of drug overdose deaths. The three key goals of SUDORS is to better understand the circumstances of accidental overdose deaths, improve overdose data timeliness and accuracy, and to identify specific substances contributing to death as well as emerging trends (*CDC's State Unintentional Drug Overdose Reporting System (SUDORS) | Drug Overdose | CDC Injury Center*, n.d.). The CDC incorporates multiple data sources including elements of demographics, death location,

manner of death, significant conditions, date of death, overdose history, treatment of SUD, routes of administration and naloxone administration (*CDC's State Unintentional Drug Overdose Reporting System (SUDORS) | Drug Overdose | CDC Injury Center*, n.d.). The most notable aspect of the SUDORS system is the analysis to action trends. SUDORS data can be used for action in ways such as education to location-specific partners about circumstances and risk factors, alerting key stakeholders of emerging drug threats, informing prevention and response strategies using toxicology data, and evaluating the effectiveness of response efforts (*CDC's State Unintentional Drug Overdose Reporting System (SUDORS) | Drug Overdose | CDC Injury Center*, n.d.).

While federal efforts are widespread and complex, efforts are focused on research and evidence based implementation. As the opioid epidemic evolves and new waves emerge, ongoing research will be instrumental in predicting trends and finding the most effective solutions towards prevention, harm reduction, treatment, and recovery.

Methodology

The methodology of this study includes comparison of existing response effort programs, as well as analysis of success data to determine the most effective methods used in lowering the rates of opioid overdose deaths. The research involves comparing aspects of county, state, and federal efforts to decrease opioid overdoses; and data from government agency reports that disclose deidentified population health information pertaining to opioid use and effects showing any success (a decline in opioid overdose after the programs were implemented). Readers should interpret all findings with caution, as variables including population size and location are uncontrolled when determining effectiveness. Caution is especially encouraged based on interpreting comparisons across regions.

Results

Figure 3.1 Infographic showing the success rates of program implementation at the county level in North Carolina, Maryland, Tennessee, and West Virginia.

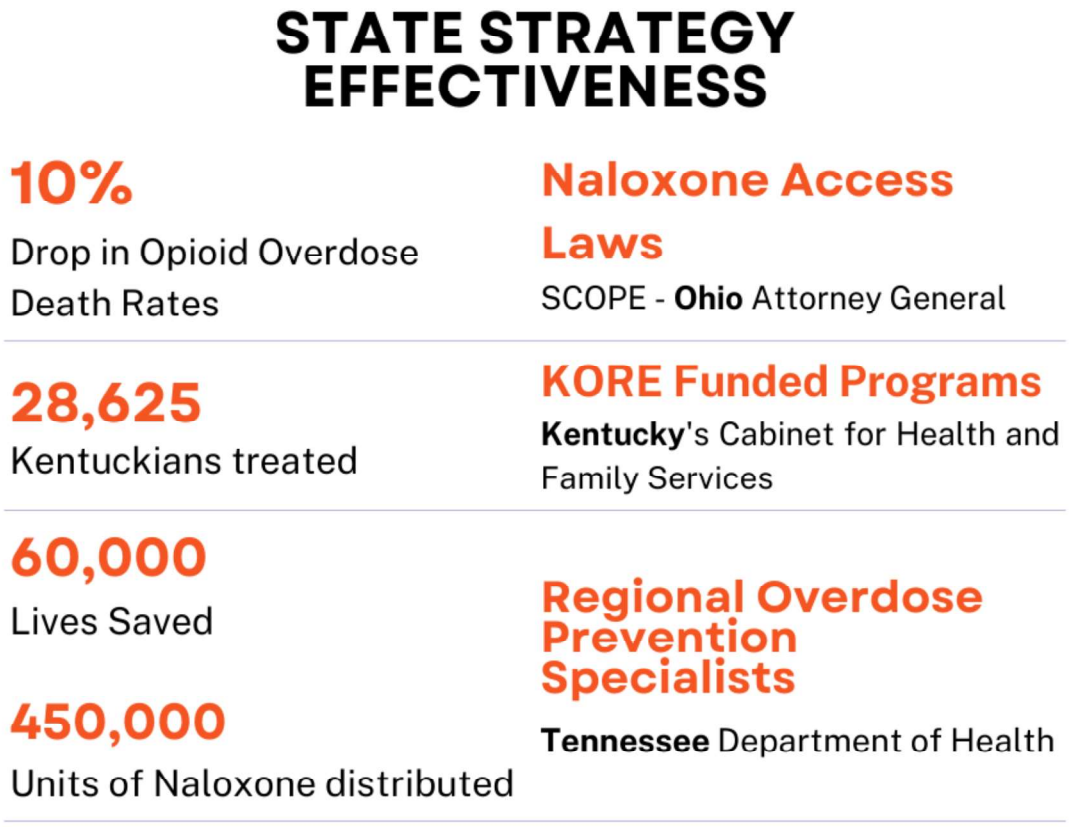

Figure 3.2 Infographic displaying data of success from state implemented programs of Ohio, Kentucky, and Tennessee.

Discussion

The existing methodology to combat the opioid epidemic comes in many different facets. The routes to response efforts can be through county or regional government initiatives, federal agencies, non-profit agencies, educational facilities, public health initiatives, faith based task forces, and countless others. While the complexities of response efforts can be beneficial to have many perspectives in addressing the issue, it also muddles the most effective methods in success. (National Organization of Counties, 2019).

One of the most substantial local strategies researched was the use of the Substance Abuse Task Force in conjunction with the Chronic Pain Initiative from the Regional Medicaid Authority in Wilkes County, North Carolina, which resulted in a 42% decrease in opioid overdose death rates in the county in one year. The key actions of these programs included increasing access to Naloxone, employing telemedicine options, and encouraging mental health solutions. A unique aspect of this case report included the coordination with the Chronic Pain Initiative from the Medicaid Regional Authority to retrain primary care physicians to safely prescribe opioids, where the use of prescription monitoring programs was increased 70% in that year. The distinct methodology used in this response effort strategy that distinguishes it from others is the use of both harm reduction and prevention strategies occuring at the same time. While the program sought to prevent providers from overprescribing through re-education and PDMPs, they were also increasing access to Naloxone through community based initiatives. The combination of these efforts can not only benefit the current situation in regards to opioid overdose mortality, but look to prevent the future rates of OUD and SUD in the area.

The Opioid Overdose and Prevention Task Force in Allegany County, Maryland produced a 14% decrease in opioid overdose mortality. The key actions of the local task force

included safe disposal sites and community education. Allegany County considered the social determinants of health of the region when implementing strategies to mitigate the opioid epidemic in their specific community. Coordinating efforts between the school system, sheriff's department, and health department, they were able to successfully educate students of opioid misuse and centralize resources to a singular county website. These efforts mostly focused on prevention of the opioid epidemic through community outreach and interrupting intergenerational impact. Another successful local strategy using extensive community outreach is Hope Partnership Project in Ross County, Ohio with an 11% decrease in opioid overdose mortality rates. The Hope Partnership Project focused on recovery tactics like community reimplementation by coordinating with Central Ohio Jobs and Family Services to reimburse employers for drug testing, train employers on employing individuals in recovery, and establishing a positive tone to employing individuals in recovery. The recommendation of a unified, combined effort among community stakeholders to help support reimplementation is a distinct feature of the program that allows a unique county strategy.

Support programs are another strategy that counties have implemented to contribute to recovery aspects of the opioid epidemic. In Campbell County, Tennessee, 29% of attendees graduated from the New Beginning Program, which connects formerly incarcerated individuals to local employers with the goal to integrate back into the community by establishing an income. This holistic characteristic of treatment is the program's unique approach to providing a solution to the rising opioid epidemic in Appalachian regions. Another graduation program used in McDowell and Mingo Counties in West Virginia is the Coalfield Development Corporation, as previously discussed. This program focuses on the support of unemployed individuals and individuals enrolled in treatment programs to invest in regional industries, showing success in an

83% graduation rate and 60 on the job training positions. The unique aspect of this type of county program is the treatment of community issues that in turn treats opioid related issues.

Potential solutions implemented by states also focus on prevention, harm reduction, treatment, and recovery strategies to alleviate the opioid epidemic in Appalachian regions. One method used in Tennessee, implementation of Regional Overdose Prevention Specialists, has been successful in that NAS births have declined 30% since their inception and over 60,000 lives saved by distribution of Naloxone across the state. This method also implemented both harm reduction and prevention strategies in conjunction with naloxone distribution and public awareness, making it distinctly effective. Kentucky's primary strategy, KORE, crucially addresses all four pillars of the opioid epidemic. KORE addresses harm reduction by implementing naloxone distribution, syringe service programs and at home opioid stewardship. Prevention is addressed by their use of regional collaboration specialists. Their treatment plans include access to medications for OUD and integrated primary care. Lastly, the recovery portion of the program plans to encourage access to recovery by housing, mutual aid groups, and reentry programs. By addressing all four pillars of opioid epidemic response efforts, individuals in every stage of OUD are supported by the efforts of the state. To date, 28,625 individuals have been served by these efforts. Figure 4.1 below outlines the most notable program characteristics to address all four pillars of potential solutions to the opioid epidemic in Appalachian regions.

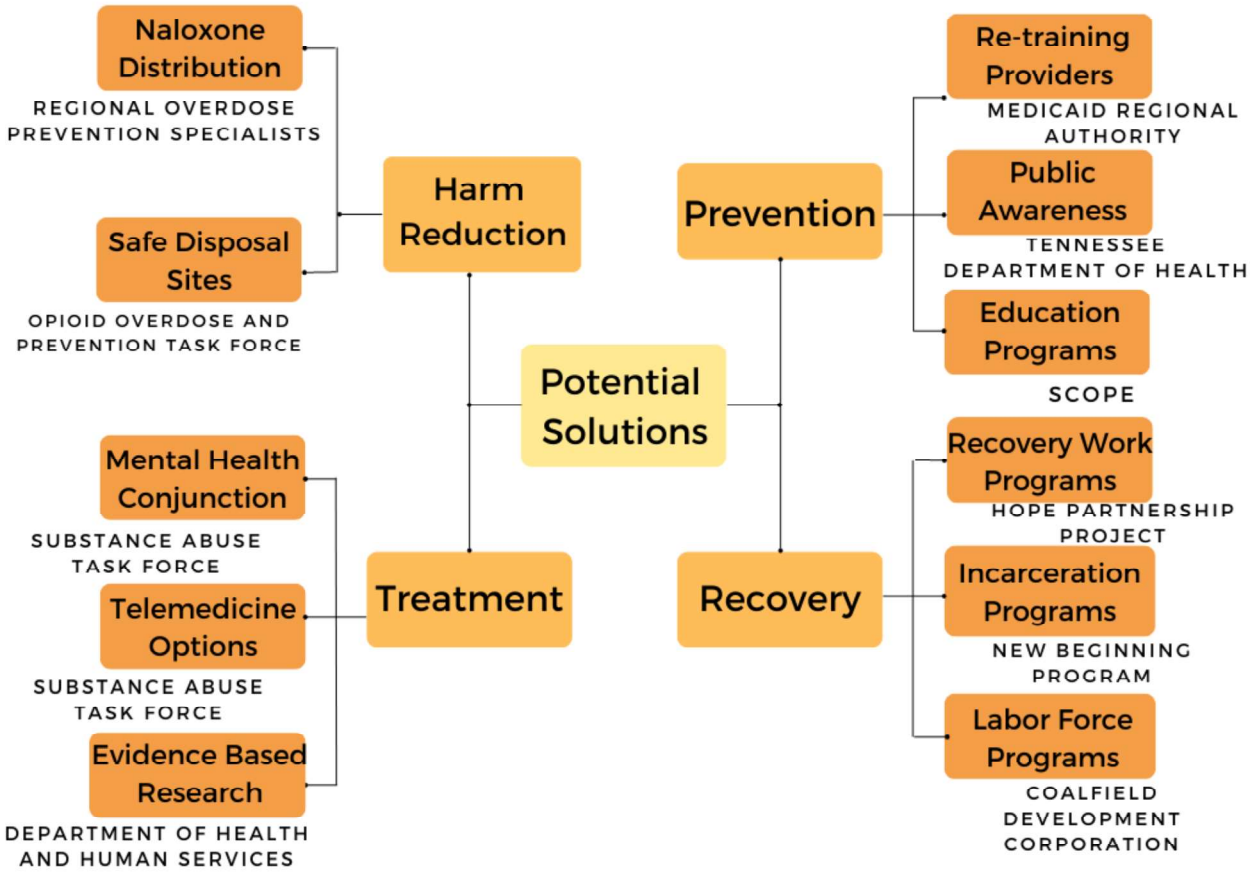

Figure 4.1 Outlined diagram of the most notable characteristics of local and state response efforts based on the four pillars of potential solutions to the opioid epidemic in Appalchian regions.

Federally, it is difficult to measure the success of efforts due to limited data access and the complexity of federal laws or forces. However, many of the state response efforts researched are funded and guided by the evidence based outlines of federal agencies such as SAMHSA. While outcomes are not generalizable, state efforts based on these guidelines can be a testament to the success of federal efforts.

Conclusion

The continuing rise of the opioid epidemic in Appalachian regions is a public health crisis in which the opioid overdose mortality of Appalchian regions is disproportionate to the rest of the country. The primary purpose of this research is to answer the questions: 1) What approaches have worked best in combating the opioid epidemic in Appalachian regions? 2) What approaches should be implemented in any future potential solutions? To do this, the research scope and methods of this study observe the thirteen states served by the Appalachian Regional Commission to compare county, state, and federal response efforts' success rates from publicly available reports. The Appalachian opioid epidemic is characterized by three waves of differing market demands. There are several root causes identified including a push for better pain control in the early 1990s, changes in the Joint Commission, dissolution of region-wide industries, and changes in the opioid markets. Research showed successful results of local and state response efforts based on the four pillars of response efforts: harm reduction, prevention, treatment, and recovery. The most notable program characteristics of harm reduction methods are naloxone distribution and safe disposal sites. The most notable aspects of prevention strategies include provider continuing education, education programs in schools, and public awareness. Effective treatment methodologies studied had aspects of mental health, telemedicine, and medication treatment for OUD. Lastly, successful recovery programs at the state and local level incorporated recovery work programs, incarceration programs, and labor force programs. While federally, it is difficult to obtain success rates, many of these state and local programs are funded and guided by federal agencies including SAMHSA, attesting to its effectiveness. Any readers should interpret these findings with caution due to regional overlap and uncontrolled populations.

References

About Us. (n.d.). SAMHSA. https://www.samhsa.gov/about-us

Appalachian Counties Served by ARC. Appalachian Regional Commission. (2021, November 19). Retrieved February 8, 2023, from https://www.arc.gov/appalachian-counties-served-by-arc/

ARPO Strike Force. (2023, February 7). https://www.justice.gov/criminal-fraud/arpo-strike-force

Centers for Disease Control and Prevention. (2022, June 9). *Evidence-based strategies for preventing opioid overdose: What's working in the United States*. Centers for Disease Control and Prevention. Retrieved February 10, 2023, from https://www.cdc.gov/drugoverdose/featured-topics/evidence-based-strategies.html

CDC's State Unintentional Drug Overdose Reporting System (SUDORS) | Drug Overdose | CDC Injury Center. (n.d.). https://www.cdc.gov/drugoverdose/fatal/sudors.html

Congressional Budget Office. (2022, September). *The Opioid Crisis and Federal Policy Responses*.

Disease of the Week - Opioid Use Disorder. (2022, August 30). Centers for Disease Control and Prevention. https://www.cdc.gov/dotw/opioid-use-disorder/index.html

Disease of the Week - Substance Use Disorders (SUDs). (2022, October 5). Centers for Disease Control and Prevention. https://www.cdc.gov/dotw/substance-use-disorders/index.html

Fast Facts: Preventing Adverse Childhood Experiences |Violence Prevention|Injury Center|CDC. (n.d.). https://www.cdc.gov/violenceprevention/aces/fastfact.html

The Governing Institute, "Confronting A Crisis: A Practical Guide for Policymakers to Mitigate the Opioid Epidemic," (2017), available at

www.governing.com/papers/Confronting-a-Crisis-A-Practical-Guide-for-Policymakers-to-Mitigate-the-OpioidEpidemic-81958.html

HIDTA. (n.d.). DEA. https://www.dea.gov/operations/hidta

Home. (n.d.-b). UNSHAME Kentucky. https://unshameky.org/

House, W. (2022, September 22). *FACT SHEET: Biden-Harris Administration Announces New Actions and Funding to Address the Overdose Epidemic and Support Recovery*. The White House. https://www.whitehouse.gov/briefing-room/statements-releases/2022/09/23/fact-sheet-biden-harris-administration-announces-new-actions-and-funding-to-address-the-overdose-epidemic-and-support-recovery/

Jackson, A. (2020). *Substance Use Prevention Coalitions*. https://www.tn.gov/behavioral-health/substance-abuse-services/prevention/anti-drug-coalition.html

Johnson, K. J., Jones, C. R., Compton, W. M., Baldwin, G. T., Fan, J. C., Mermin, J., & Bennett, J. (2018). Federal response to the opioid crisis. *Current Hiv/Aids Reports*, *15*(4), 293–301. https://doi.org/10.1007/s11904-018-0398-8

Justice Department Announces Enforcement Action Charging 12 Medical. (2022, May 5). https://www.justice.gov/opa/pr/justice-department-announces-enforcement-action-charging-12-medical-professionals-opioid

Kentucky Opioid Response Effort. (2021, August). *About KORE*.

Metcalf, G., & Wang, Q. (2020). *Abandoned by Coal, Swallowed by Opioids*. Milken Institute Review.

https://www.milkenreview.org/articles/abandoned-by-coal-swallowed-by-opioids#:~:text=A%20full%20account%20of%20the,opioid%20mortality%20by%201.92%20percent.

National Academies Press (US). (2017, July 13). *Evidence on Strategies for Addressing the Opioid Epidemic*. Pain Management and the Opioid Epidemic - NCBI Bookshelf. https://www.ncbi.nlm.nih.gov/books/NBK458653/

National Organization of Counties & Appalachian Regional Commission. (2019, May). *Opioids in Appalachia: The Role of Counties in Reversing a Regional Epidemic*. Retrieved January 12, 2023, from https://www.naco.org/sites/default/files/documents/Opioids-Full

Neonatal abstinence syndrome | CDC. (2019, January 10). Centers for Disease Control and Prevention. https://www.cdc.gov/pregnancy/features/public-health-reporting-of-NAS.html#:~:text=Neonatal%20abstinence%20syndrome%20(NAS)%20is,%2C%20including%20opioids%2C%20during%20pregnancy.

Nyakeriga, A., McDonald, M., & TN Department of Health. (2020). *Neonatal Abstinence Syndrome Surveillance Annual Report 2020*.

Office of the Commissioner & Office of the Commissioner. (2023, March 29). *FDA Approves First Over-the-Counter Naloxone Nasal Spray*. U.S. Food And Drug Administration. https://www.fda.gov/news-events/press-announcements/fda-approves-first-over-counter-naloxone-nasal-spray

Prescription Drug Monitoring Programs (PDMPs) | Drug Overdose | CDC Injury Center. (n.d.). https://www.cdc.gov/drugoverdose/pdmp/index.html

Schalkoff, C. A., Lancaster, K., Gaynes, B. N., Wang, V. W., Pence, B. W., Miller, W. R., & Go, V. F. (2020). The opioid and related drug epidemics in rural Appalachia: A systematic

review of populations affected, risk factors, and infectious diseases. *Substance Abuse*, *41*(1), 35–69. https://doi.org/10.1080/08897077.2019.1635555

Scientific Committee on Opioid Prevention and Education & Ohio Attorney General [Dave Yost]. (2020). *Prevention Techniques and Strategies Report*.

Tennessee Department of Health. (2017). *Opioid Outbreak Strategic Map*. https://www.tn.gov/content/dam/tn/health/documents/2017%20Opioid%20Strategic%20Map_Final.pdf

Tennessee Department of Mental Health and Substance Abuse Services. (2023). *Regional Overdose Prevention Specialists*. https://www.tn.gov/behavioral-health/substance-abuse-services/prevention/rops.html

TN Department of Finance and Administration & Division of TennCare. (n.d.). *Fiscal Year 2022-2023 Budget Hearing*. Retrieved April 10, 2023, from https://www.tn.gov/content/dam/tn/tenncare/documents/FY23RecommendedBudget.pdf

Understanding the Opioid Overdose Epidemic | Opioids | CDC. (n.d.). https://www.cdc.gov/opioids/basics/epidemic.html

Young, T., Baka, J., He, Z., Bhattacharyya, S., & Lei, Z. (2023). Mining, loss, and despair: Exploring energy transitions and opioid use in an Appalachian coal community. *Energy Research and Social Science*, *99*, 103046. https://doi.org/10.1016/j.erss.2023.103046