Opioid Data Initiative

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Abstract

Opioid use disorder is a major public health and public safety crisis in communities across the U.S. Many local jurisdictions have begun using data to more effectively and efficiently target resources and expertise, while also forming multidisciplinary partnerships to improve coordination of response efforts. This study examined how local jurisdictions use data at the policy, operational, and program assessment levels, and explored potential barriers and promising practices to facilitate data sharing among stakeholders. The study team developed and administered an online survey and conducted semi-structured interviews with stakeholders from 11 jurisdictions. Our findings indicate that data-driven approaches to fighting the opioid epidemic are common and used primarily to improve situational awareness and understanding of the epidemic, target resources effectively, and destigmatize opioid use disorder. Key barriers to sharing data among stakeholders include concerns about the timeliness and accuracy of data, resource constraints, and legal protections on sharing health-related information.

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Executive Summary

Substance use disorders, especially those involving the misuse of opioids, represent a major public health and public safety crisis for communities across the U.S. In 2016, roughly two-thirds of people (over 42,000) who died of drug overdoses in the U.S. had opioids in their system. Increased use of highly potent synthetic opioids, such as fentanyl, has fueled the steady rise in overdose rates since 2013.

States and local communities are using data-driven approaches to better understand the size and scope of the epidemic, identify populations at risk, and improve the effectiveness and efficiency of their response efforts. Working with nearly a dozen jurisdictions around the country, we examined the role that data plays in formulating policy, guiding operational practice, and evaluating progress achieved in fighting the epidemic. We also examined the extent to which opioid-related data is shared among diverse stakeholders in local jurisdictions, the barriers or challenges to sharing data, and promising practices to overcome these challenges.

We found that in most jurisdictions, stakeholders use data to inform much of what they know about this crisis and the actions they take to respond. This is done at the agency or organizational level as well as the community level. To support the latter, all communities we worked with have established multidisciplinary partnerships to bring together diverse perspectives and expertise, leverage resources, and facilitate data sharing. These partnerships have been instrumental in raising awareness about the epidemic and spurring creative and evidence-guided interventions.

We also found that much of the data or information that is currently shared among stakeholders is in the form of aggregated data resulting from internal analyses that individual agencies or organizations perform. The biggest barrier to sharing data, especially non-aggregate data, is concern about legal protections on health-related data and the protection of patient confidentiality. Other key barriers to using data more effectively include concerns over the accuracy and timeliness of data, resource constraints, and the lack of available tools or software to support data integration.

The jurisdictions we worked with uniformly recognize the value in using data to help them operate in a more informed, effective, and efficient manner. In many instances, data is used not only to guide discussions about opioid addiction, but also to inform decision-making. Most jurisdictions also recognize that more can be done in terms of better integrating data into a continuous process of evaluation to ensure that opioid response policies and operations are achieving their desired outcomes.

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Introduction

> *"When you don't have data that leads to rational analysis, then what you're left with is confusion, and confusion leads to fear, and that will lead to irrational consequences."*
>
> *Daniel Ciccarone*

The United States is currently in the grip of an unprecedented drug epidemic. In 2016—the most recent year for which complete data are available—63,632 people died of drug poisoning, or about 175 people every day.[i] This represents an increase of 21% over 2015, with overdoses involving synthetic opioids, such as fentanyl, rising 100% during the period.[ii] Based on estimates of over 70,000 overdose deaths in 2017, the problem appears to be worsening.[iii] While sobering, these data almost certainly underestimate the actual toll of the epidemic due in part to incomplete and inconsistent reporting on death certificates[iv] and a lack of accounting for deaths from other causes with direct or indirect links to substance misuse. In addition, for every fatal overdose there are numerous non-fatal overdoses that leave their own indelible mark on survivors' families, friends, and the communities in which they live.

A key driver of the epidemic has been a remarkable surge in the misuse of opioids—a class of powerful drugs such as codeine, morphine, oxycodone, and hydrocodone that are commonly used to treat chronic pain.[1] The surge began in the 1990s, when a combination of factors led to a significant increase in opioid prescriptions. Those factors included a push to recognize pain as a "fifth vital sign;" aggressive marketing and deceptive practices by drug companies to downplay the addictive potential of opioids; and a medical provider community that was largely uneducated and poorly trained in how to assess pain, when to prescribe opioids, and how to recognize the potential signs of misuse and addiction. Between 1999 and 2012, the volume of opioids prescribed in the U.S. increased by more than 400%, such that by 2012,

[1] According to the National Institute on Drug Abuse, misuse occurs when opioids are taken in a manner or dose other than prescribed; used by someone other than the prescription holder, even if for a legitimate medical complaint such as pain; or when taken to feel euphoric (i.e., to get high)

enough opioids were dispensed to provide every adult in the U.S. with a one-month supply of pills.[v] As greater quantities of opioids became available, rates of opioid-related overdose skyrocketed. Between 1999 and 2015, the number of annual opioid-related fatal overdoses quadrupled.[vi] Approximately two-thirds of those who died (i.e., over 42,000 people) from an overdose in 2016 had opioids in their system.[vii]

The role of prescription opioids in fueling the nation's drug epidemic is just one example of how this epidemic differs from previous drug epidemics in the U.S. While the crack cocaine epidemic of the 1980s and early 1990s disproportionately affected minorities and those living in urban areas, opioid misuse and rates of overdose have been more pronounced among Caucasians (though overdose rates increased across all races between 2015 and 2016). In addition, the epidemic has extended into urban, suburban, and rural areas, and affected all socioeconomic classes. Although no area of the country has been spared, certain regions have been particularly hard hit, such as Appalachia, the Northeast, and the Ohio Valley. Despite the general pervasiveness of the epidemic, its causes and impacts vary across jurisdictions.

Researchers have described the epidemic as evolving in three waves. The first wave primarily involved the misuse of legally prescribed opioids. Around 2010, a second wave began marked by a shift from prescription opioids to heroin. Finally, around 2013 a third wave began involving the misuse of highly potent synthetic opioids, such as fentanyl.[viii] Not surprisingly, these changes were driven by greater availability and easier access to cheap drugs, as well as a desire for a stronger, more euphoric high. Fentanyl, for example, is estimated to be 80 times more potent than morphine and hundreds of times more potent than heroin.[ix] Drug surveillance data currently show increasing use of fentanyl with cocaine and other psychostimulants.[x] This may signal the next evolution in what many now refer to as a polysubstance epidemic.

As the crisis has deepened, response approaches have also evolved. There is greater awareness and focus now on addressing opioid use disorder (and all substance use disorders) foremost as a public health issue rather than a criminal justice issue. Trying to "arrest our way out of" the crisis can lead to a continual cycle of arrest, prosecution, jail, release, and re-arrest, which consumes substantial resources while providing little deterrence or benefit to those afflicted by addiction. There is growing recognition that people with substance use disorder have a chronic disease and should be treated accordingly. As a result, law enforcement, working in collaboration with other public and private sector entities, has implemented novel approaches (e.g., pre-arrest diversion programs) to assist low-level drug offenders in getting the treatment they need. Such approaches reflect a paradigm shift in law enforcement's role in fighting drug misuse and highlight the importance (in fact, the necessity) of multidisciplinary collaboration in addressing such a highly complex issue.

Finally, the current drug epidemic is unique for the simple fact that it is happening at a time when access to data is unprecedented both in terms of the amount of data that is available and the speed at which data are generated. In addition, technological

advances offer more ways than ever before to collect, analyze, visualize, and share data. This presents tremendous opportunities for those responding to the epidemic. Access to data can provide decision-makers and operators with deeper insight into the scope and causes of the epidemic, promote efficient use of resources, facilitate collaboration among stakeholders, and improve assessments of policies and operational effectiveness. However, the volume and availability of data also presents challenges. If not well managed, too much data can lead to indecision or confusion and reinforce stovepiped thinking or activity.

The need for enhanced multidisciplinary collaboration and the potential to unlock critical insights through data analytics and open sharing of data were primary factors behind this study.

Project Purpose

CNA initiated a self-funded research project and engaged select jurisdictions across the country to examine how data are being used to drive solutions—both at the strategic and operational levels—to the opioid epidemic. The goal of this effort is to help jurisdictions harness the full potential of a data-driven response approach that more effectively and efficiently targets resources and expertise to fight the epidemic. To achieve this goal, the project team identified the following primary objectives:

1. Increase awareness of how local jurisdictions use data to inform opioid response policy and operations;

2. Identify potential opportunities to improve data utilization, to include leveraging new sources of data or analysis and visualization techniques;

3. Identify barriers to openly sharing opioid-related data among community stakeholders, as well as best practices to overcome these barriers and expand access to data;

4. Improve collaboration across disciplines and between government, private sector, and non-governmental partners.

In addition to describing the existing state of data utilization and data sharing at the local level, we sought to identify opportunities to grow and enhance data-driven response efforts. This report highlights key findings from our research and provides guidance to help communities enhance the use of data and facilitate data sharing within and potentially across jurisdictions.

Methodology

Our approach involved working directly with stakeholders from local jurisdictions geographically distributed around the country, encompassing urban, suburban, and rural areas. We identified potential participants by conducting an open-source literature review to find examples of local public or private sector entities using innovative data practices to address the opioid epidemic. In addition, we developed a list of jurisdictions currently being supported by CNA under the Bureau of Justice Assistance (BJA) Strategies for Policing Innovation (SPI) initiative. This convenience sample included law enforcement agencies that were geographically distributed and with which we had existing relationships.

To assist with recruitment, we developed a fact sheet that provided an overview of the project, outlined our research approach, highlighted potential benefits of participation, and established baseline expectations for jurisdictions' involvement (see Appendix A). We sent the fact sheet to all jurisdictions upon requesting their support. We successfully recruited 11 jurisdictions to participate in the project (Figure 1).

Figure 1. Jurisdictions participating in CNA's Opioid Data Initiative

Our study focused on understanding the extent to which data are shared between the many public and private sector entities with a role in fighting the opioid epidemic.

Therefore, we asked participating agencies to identify other key stakeholders they typically work with and recruited them to participate. We focused primarily on public health and substance use disorder treatment and social services providers. We asked each jurisdiction to identify a lead agency to serve as the main point of contact with the project team.

Working with stakeholders in each jurisdiction, we sought to answer the following research questions:

- How are local jurisdictions currently using data to inform opioid response policies and operations, and what potential opportunities exist to more effectively use available data?
- What gaps in opioid-related data exist?
- What are the primary barriers to sharing data across government agencies and with non-governmental and private sector partners?
- What promising practices can be used to overcome these barriers?
- How are jurisdictions measuring the impact of their efforts to incorporate data into response policies and operations?

We engaged stakeholders through the following mechanisms to gather information and solicit their perspectives.

- We developed and administered a web-based survey using the Checkbox® survey tool (Appendix B). The intent of the survey was to establish a baseline understanding of the opioid epidemic in each jurisdiction, as well as what data agencies collect, what types of analyses they conduct using these data, how the results of those analyses are used, and what data sharing efforts are in place across agencies.[2]
- We conducted stakeholder interviews in each jurisdiction to clarify responses to the survey and explore key issues related to data utilization and sharing. We facilitated the discussions in accordance with an interview guide that we provided to participants ahead of time (Appendix C). We used a semi-structured technique that allowed interviewers to explore specific threads of discussion in more or less detail depending on the perceived value to the project, or to explore new topic areas not identified in the initial

[2] We did not collect specific opioid-related data from the sites; rather, we sought information on how participants use the data they possess and share it with others to enhance response collaboration.

list of questions. Questions were grouped into three general categories: 1) development and maturation of opioid data efforts; 2) community partnerships and data sharing; and 3) lessons learned and future goals/direction. The interviews lasted, on average, between 30 and 60 minutes. If necessary, follow-up interviews were conducted to clarify specific points or elaborate on a particular issue.

- We held conference calls with all jurisdictions to discuss study progress and to exchange ideas and promising practices. These calls were conducted on a monthly basis. We structured the calls to promote peer-to-peer learning and we invited two jurisdictions to present information about their opioid data efforts on each call. We encouraged participants to discuss aspects of their data efforts that were innovative or to highlight a promising practice used to overcome a barrier or challenge to working with or sharing data.

The project team performed basic descriptive statistics on data collected through the baseline survey. For qualitative information collected during the interviews, the team reviewed and coded the notes into the following broad categories:

- Data collection and analysis processes
- Data collection and analysis uses and best practices
- Data collection and analysis gaps and challenges
- Data sharing and collaboration best practices
- Data sharing and collaboration gaps and challenges
- Data program implementation

The information gathered from interviews was coded into the above listed categories and sub-categories and analyzed using NVivo qualitative data analysis software. Based on the results of this analysis, we identified common themes that emerged from the interviews. These themes are discussed in the next section of this report and provide the overarching structure of the operational framework for jurisdictions who are seeking to use data more effectively and efficiently in fighting the opioid epidemic.

Findings

In this section, we discuss the findings from our survey, interviews with participating jurisdictions, and open-source research. We also highlight key lessons learned to help other jurisdictions develop, implement, sustain, and improve data sharing and the use of data analytics.

Defining the current state of the epidemic

Although final data have not been released, preliminary estimates indicate that approximately 72,000 people in the U.S. died of a drug overdose in 2017.[xi] This represents an increase of almost 14% over 2016 and continues a disturbing upward trend in annual fatal drug overdoses. The misuse of opioids—either in prescription or illicit form—is the primary factor driving this epidemic. Opioids are involved in approximately two-thirds of fatal overdoses, as well as tens of thousands more non-fatal overdoses and hospital emergency department visits. Between July 2016 and September 2017, hospital emergency department visits for opioid overdose rose by 30% in all parts of the United States, with increases observed for both sexes and across all age groups.[xii]

> For every *prescription* painkiller death, there are 10 treatment admissions for abuse and 32 emergency department visits for misuse or abuse.
>
> *Source: Centers for Disease Control and Prevention. "Policy Impact: Prescription Painkiller Overdoses." November 1, 2011.*

Research indicates that increasing use of illicitly manufactured fentanyl and fentanyl analogs is behind the steady rise in opioid-related overdose fatalities since 2013.[xiii] For example, synthetic opioids, led by fentanyl, emerged in 2016 as the leading cause of opioid-related overdose deaths.[xiv] When we asked participating jurisdictions to self-assess the severity of the epidemic in their community, most respondents (70%) characterized ***prescription*** opioid misuse in their community as "somewhat severe."[3]

[3] "Somewhat severe" was defined as moderate levels and/or moderate increase in the key indicators your jurisdiction uses to characterize the severity of misuse of opioids.

Examining trends in prescription opioid misuse over the past two years, 77% of respondents noted the severity of prescription opioid misuse has remained either unchanged or gotten worse. Three jurisdictions reported that prescription opioid misuse has actually improved over the past two years.

In contrast, when asked about ***illicit*** opioid use (which includes heroin, illicitly manufactured fentanyl, and other illicit synthetic opioids), half of the respondents characterized the problem as "very severe." Similar to nationally reported data, the vast majority of respondents (85%) stated that illicit opioid use has been a worsening problem in their community over the past two years.

Key stakeholders

Traditionally, two disciplines immediately come to mind when considering an issue like substance misuse—public health and law enforcement. Public health collects and analyses data to determine the size and scope of the issue and designs, implements, and evaluates intervention strategies. Law enforcement focuses on prohibiting illegal drugs from entering the market, disrupting the distribution and sale of drugs, and arresting drug users. The complexity of the opioid epidemic has redefined, in some respects, the roles of these two disciplines in fighting substance misuse. Importantly, it has also expanded the perspective of who are the key stakeholders.

When asked to define key stakeholders in their respective communities, jurisdictions participating in our study provided a diverse list of public and private sector entities, including, but not limited to, the following:

- ✓ Public health
- ✓ Local law enforcement
- ✓ Fire and Emergency Medical Services (EMS) providers
- ✓ Hospitals or health systems
- ✓ Private physician practices/ local or regional coalitions
- ✓ Behavioral and mental health providers
- ✓ Office of the district attorney
- ✓ Local court/judicial services
- ✓ Medical examiner or coroner
- ✓ Department of corrections
- ✓ Pharmacies
- ✓ Federal agencies (e.g., DEA)
- ✓ Treatment and rehabilitation service providers
- ✓ School systems
- ✓ Universities
- ✓ Legislators

The responses were noteworthy not only for the broad range of stakeholders that were identified, but also for their consistency across jurisdictions. This reveals a common view among communities that complex issues such as opioid misuse and opioid misuse disorder require comprehensive and multifaceted solutions. For example, nearly all of our respondents cited their local district attorney's office as a key partner in fighting the opioid epidemic. This is because the district attorney's office must be onboard to implement diversion programs—which prioritize getting

drug users into treatment over prosecution—and approve their use on a case by case basis. In addition, hospitals were universally considered key partners. Information on overdose patients treated in emergency departments helps fill in gaps for overdose cases that might not otherwise get reported to police or EMS (e.g., if a friend takes an overdose victim to the hospital).

Corrections agencies were another commonly cited key partner, since research shows that people with substance use disorders who are recently released from incarceration are at increased risk for overdosing.[xv] By working with corrections agencies to identify high-risk individuals before they are released, proactive steps can be taken to improve re-entry assistance, such as ensuring the continuation of treatment, supplying Naloxone in case of an overdose, conducting periodic welfare checks, or developing a plan to facilitate access to other support services.

Additional partners included local and state child and family services agencies, harm reduction agencies, community advocacy groups, people with substance use disorders who are in recovery, and community residents. Because the impacts of addiction often extend to those closest to people with substance use disorders, especially family members and children, working with child and family services can promote access to vital support services. Several participants noted that working with people in recovery can have a profound impact on destigmatizing the epidemic and offer insight into how people become addicted and the barriers to treatment and long-term recovery. They can also serve as a resource for peer-to-peer guidance and support to those in treatment. Community residents can be key partners as well, especially for jurisdictions that are very resource-constrained. Mohave County, Arizona, leverages community members to increase manpower by donating time for events and offering peer support. They also enlist community members who may have been personally affected by the epidemic to share their stories with others in the community. This helps reduce stigma and convey the reality of the epidemic in a personal and meaningful way.

> Project CARE (Child Assessment and Response Evaluation) is a public-private partnership in Lowell, Massachusetts, designed to provide rapid intervention services to children who are affected by overdose. The program is voluntary, but those who participate gain access to a variety of services, such as counseling and mental health services and clothing, food, and housing support. The goal is to help children cope with trauma, build resiliency, and decrease the likelihood that substance misuse will be transferred from one generation to the next.

Each of the stakeholders noted above brings expertise in one or more aspects of the epidemic (e.g., awareness and prevention, treatment, prosecution, recovery), and collects and analyzes different types of data to support their work. Below, we discuss

the types of data these stakeholders collect and how they glean insights through data analysis to inform decision-making, allocate resources, and measure progress.

Types of data collected

Using data to inform organizational strategy, set priorities, and support an evidence-based approach to operations is not new for most of the key stakeholders involved in the opioid crisis. For example, most law enforcement agencies operate fairly robust data programs to examine, among other things, patterns of crime. These efforts have evolved from the Compare Statistics (CompStat) initiative popularized more than two decades ago. In public health, epidemiologists have long used data to study disease at the population level, including identifying risk factors, tracking transmission, and monitoring the effectiveness of interventions.

In this section, we examine the various types of opioid-related data that jurisdictional stakeholders collect, analyze, and interpret. We explore how these stakeholders turn data into information and information into knowledge and action at the strategic, operational, and evaluation levels.

The following data were most commonly collected by stakeholders participating in our survey and interviews:

- Fatal and non-fatal overdose data, including the dates, times, and geographic locations of overdose calls for service;
- Naloxone administrations and/or overdose reversals;
- Death certificate data, including toxicology reports;
- Criminal history information, including prior drug- and alcohol-related arrests; criminal convictions; and other interactions with law enforcement;
- Opioid-related hospital and treatment center admissions;
- Prescription Drug Monitoring Program (PDMP) data[4] and other prescription drug dispensation data;
- Needle exchange and prescription drop box data;

[4] PDMPs are state-run databases used to analyze prescription and dispensing of controlled prescription drugs, including opioids. These programs can be housed within various departments and agencies, such as public health-related agencies, law enforcement agencies, state boards of pharmacies, or professional licensing agencies. *Source:* Centers for Disease Control and Prevention. "What States Need to Know about PDMPs." Accessed August 26, 2018 at: https://www.cdc.gov/drugoverdose/pdmp/states.html.

- Drug seizures, including location, quantity and type(s) of narcotics seized;
- Outreach follow-up to overdose victims;
- Opioid usage, including where users acquire opioids, users' addresses, where usage occurs, and when and how users started using;
- Results of forensic laboratory analyses on drugs recovered by police[xvi]; and
- Information from overdose victims' cell phones[xvii]

In addition, participants noted the value and importance of collecting data directly from opioid users. This can be accomplished through surveys, interviews (including post-arrest and following non-fatal overdoses), and monitoring user chat forums on the dark web. For example, police in Cedar Rapids, Iowa, developed a standardized questionnaire for interviews with users to better understand what led them to start using opioids in the first place, how their addiction has impacted their lives, how they are obtaining opioids, and to identify barriers to addiction treatment and recovery (e.g., unavailability of appropriate treatment options, or being part of a high-risk social network).

> Anonymized drug purchases via the "drug web" have fueled the opioid epidemic. However, the dark web can also provide a treasure trove of data for those fighting the epidemic. For example, drug buyers frequently post to user forums and message boards. Data from these forums can offer insight into user preferences or common challenges to accessing treatment. It can also be used to alert officials to "bad batches" of drugs hitting the street.

Jurisdictions have also developed ways to enhance data collection through crowd-sourcing. The Madison and Dane County, Wisconsin, public health department modified its website to allow individual community members, in addition to neighborhood associations and police and other government departments, to provide data on where they are finding used syringes or witnessing opioid-related activity. For strategies like this to be effective, there must be a robust communications plan in place to raise awareness about the reporting mechanism and how to use it.

Applying analytical findings

Analysis is the process of transforming data into information and information into knowledge and insight. We found that stakeholders analyze the data they collect on multiple levels—to guide strategy and policy, to inform operations, and to assess the effectiveness of their work. Below, we examine how jurisdictions use analysis at each of these levels.

Strategic or policy level

A common reason why jurisdictions collect and analyze opioid-related data is to gain better awareness of the prevalence, scope, and magnitude of opioid misuse in their communities. Jurisdictions use data, for example, to understand what types of opioids (e.g., prescription, illicit, and/or illicit synthetic opioids) are most commonly used and misused, to quantify the level of opioid misuse and whether it is worsening or improving, and to determine whether specific segments of the population are disproportionately affected by opioids. For example, public health officials in Madison and Dane County, Wisconsin, reported using data to explore potential inequities on a variety of racial and other demographic factors. Through an internal review process, they identify potential inequities and then work with other community stakeholders to determine why these inequities exist and how best to address them.

Jurisdictions commonly use analysis to identify and characterize trends in the data, and use this information to guide their response strategy. The use of predictive modeling, for example, has become popular.[xviii] Researchers in Indianapolis, Indiana, used a Bayesian modeling technique to predict how the epidemic would likely evolve along a range of sociodemographic variables. Likewise, Massachusetts public health workers use predictive modeling to identify especially high-risk populations and to determine which treatments are best suited for which individuals.[xix]

Evidence of a trend in opioid-related data often leads to important policy changes. In Cedar Rapids, Iowa, and Madison, Wisconsin, upward trends in overdose data led to the development of a new policy requiring police officers to begin carrying Naloxone. Similarly, after data revealed an uptick in opioid misuse among residents of long-term care facilities, public health officials in Madison and Dane County, Wisconsin, looked into creating a new policy that would provide Naloxone to the staff at long-term care facilities.

Another strategic use of data analysis is to support agency planning and budgeting processes. For example, one finding from a data mapping effort by police in Madison, Wisconsin, was that a significant portion of overdoses was occurring in public areas (e.g., parks). Based on this insight, they were able to secure sufficient funding in their budget to provide Naloxone to businesses located near the hotspot areas. In addition, jurisdictions use insights gleaned through data analysis to apply for funding through grants and other external funding mechanisms.

We also found jurisdictions applying innovative approaches to analyze data in ways that can directly affect policymaking and strategy. Two examples of such approaches are highlighted below.

- **Social network analysis:** This technique involves mapping the relationships between members of a network to identify those individuals responsible for a

disproportionate level of opioid-related problems, and to assess their and others' degree of connectedness. This technique has been used by police in Cedar Rapids, Iowa, and is currently being planned for implementation in Marion, Iowa, where it will help police visualize the epidemic from a regional perspective, map areas that are most affected by the epidemic, and identify clusters of overdoses for specific intervention and enforcement strategies.

- **Life span analysis:** Police in Lowell, Massachusetts, are using opioid-related data to conduct life span analysis to better understand opioid usage patterns, including why users started taking opioids. Among the variables being examined are users' criminal histories, educational background, and health-related data—particularly whether they have previously overdosed. This type of analysis is useful in identifying gaps in existing systems and services, as well as critical points of intervention over a user's lifespan.

> Life span approaches are also commonly used in the field of public health. This area of study can help develop a more holistic picture of the potential factors associated with addiction, and spotlight critical points along a person's life span for targeted intervention.

Operational level

At an operations level, jurisdictions use data to improve their prevention, treatment, and victim services efforts by identifying the types of opioid-focused services needed (e.g., Naloxone distribution, medication-assisted treatment or other forms of treatment, re-entry services, syringe and prescription drug drop boxes), and locations within the community where they are most needed. In a resource-constrained environment, data analysis can help to ensure jurisdictions use available resources as efficiency and effectively as possible.

One important way that all jurisdictions use analysis is to map the locations of opioid-related incidents (e.g., overdoses, arrests, seizures). Mapping is a powerful tool to visualize geographic differences in how the problem is manifesting and where it is most concentrated. Mapping has long been used by public health and law enforcement to identify "hot spots" for crime or disease outbreaks.[5]

[5] Hot spots are geographic areas where activities are concentrated and usually account for a disproportionate amount of impact for a particular problem.

For the opioid epidemic, mapping is most commonly used to determine where overdoses occur. For example, are people overdosing in public spaces or at private residences? Is a particular neighborhood being affected worse than others? Using mapping to determine the answers to questions like these is just the first step in trying to understand the root causes at play. Jurisdictions often overlay many different variables, such as income, disability status, or unemployment to determine whether these factors correlate to areas experiencing higher rates of overdose. This is important for allocating resources, designing effective intervention strategies, destigmatizing the disease, and refuting myths about the epidemic.

NORC at the University of Chicago has developed a visualization tool that shows opioid-related mortality data for over 400 counties in Appalachia. Other county-level variables, such as household income, race/ethnicity, educational attainment, disability status, and unemployment rates can be overlaid on the map to identify potential correlations. NORC is in the process of expanding this nationwide. The tool can be accessed at: http://www.norc.org/Research/Projects/Pages/appalachian-overdose-mapping-tool.aspx:

The following are examples of how jurisdictions are using mapping to support their responses to the opioid epidemic:

- Determine locations for prescription drug "drop boxes" so individuals have a safe way to discard unused or unwanted prescription medications;
- Determine locations for priority distribution of Naloxone;
- Examine availability of treatment or harm reduction services in areas that are disproportionately affected by the epidemic, and inform decisions about the placement of new treatment or harm reduction facilities;
- Target education, public messaging, and outreach efforts; and
- Dispel myths about the epidemic.

Some jurisdictions use intelligence mapping to identify where they face—and where they will likely face—particular types of opioid-related problems. For example, do certain parts of the jurisdiction experience a greater problem with prescription or illicit opioids? Personnel in these jurisdictions overlay multiple datasets, including fatal and non-fatal overdose data, provision of harm reduction and social services, needle exchanges, and Naloxone distribution, to inform their mapping efforts. The High Intensity Drug Trafficking Areas (HIDTA) program in Baltimore, Maryland, and Washington, DC, uses an app called OD Map to map in real time where overdoses are occurring and forecast where opioid overdose spikes are likely to occur.[xx]

In addition, jurisdictions analyze data on opioid seizures and overdoses to identify bad batches of drugs (i.e., particularly lethal opioid formulations, such as illicitly

manufactured fentanyl or carfentanil), and deliver public messaging to alert potential users of the bad batches. Another way that data analysis is used is in determining which types of educational and awareness training is most useful. Public health officials in Madison and Dane County, Wisconsin, created an overdose prevention video that has been incorporated into annual staff training so all staff will have access to Naloxone and ongoing training about how to use it. The video has also been used to train recovery coaches in the community.

Evaluation level

In light of resource constraints within most communities, strategies, policies, and operational practices to combat the opioid crisis should be continuously evaluated to determine their effectiveness. This data-driven feedback loop helps to ensure that organizational resources are being put to good use.

While nearly all participants recognized the importance of using data for evaluation purposes, most participants admitted their organizations are not to the point yet of having reliable and repeatable processes in place to support this use of the data. Several participants noted that their agencies are developing plans and protocols for using data in this manner. An example where this is currently being done involves analyzing data to determine whether access to Naloxone has resulted in fewer deaths from overdose. One of the challenges agencies continue to face is in evaluating the cost-benefit tradeoff of various opioid-related policies or operational practices.

> Government entities often partner with local universities to support objective, data-driven evaluations of opioid response initiatives. Police in Lake County, Illinois, have teamed with Rosalind Franklin University of Medicine and Science to evaluate the agency's Law Enforcement Assisted Diversion Program.

Multidisciplinary partnerships

The opioid crisis can present in different ways to different stakeholders (e.g., spike in crime, increase in cases of child abuse or neglect). Often, stakeholders focus on a narrow band of the potential data available to them—data that directly affects their day-to-day mission. Without a forum for these stakeholders to come together, share data, and jointly examine the various issues contributing to complex problems like substance misuse and substance use disorders, each stakeholder's perspective is limited to their area of expertise and they miss out on the big picture of what is happening in the community.

Fortunately, all participating jurisdictions have developed multidisciplinary groups at the community level to facilitate data sharing and the exchange of ideas on how best to tackle the problem of opioid misuse. In this section, we describe the nature of these partnerships, discuss how they typically function, and highlight the benefits and key challenges to sharing data among members.

How are partnerships structured?

We found that community partnerships developed to address the opioid epidemic may be called by various names, including alliances, taskforces, steering committees, or coalitions. Despite the different names, the focus of these partnerships is fairly consistent—to problem solve through multidisciplinary collaboration and sharing of information. In most instances, the partnerships evolved from existing relationships among stakeholders (e.g., law enforcement and prosecutors), and then expanded over time to engage new partners, such as medical providers or harm reduction entities. The formality of these partnerships varies across jurisdictions. Some are guided by detailed Memorandum of Understanding (MOU) or Agreement (MOA) between the members. Most, however, are less formal in nature, due in part to the extensive time that it can take to draft and approve an MOU or MOA. One important exception to this is when two or more agencies desire to share data, especially non-aggregate data. In these instances, formal data sharing agreements are the norm and explicitly detail the policies and procedures for how the partners will share, analyze, report, and protect data. This is necessary to establish common expectations, ensure data quality and confidentiality, and hold participants accountable.

> Police in Burlington, Vermont, participate in the Chittenden County Opioid Alliance (CCOA). The CCOA has four "action teams," each with a specific focus area and mission, as well as goals. Areas of focus include:
> - Community level prevention
> - Treatment access and recovery support
> - Working recovery
> - CommunityStat rapid intervention

Nearly all participants reported having agreed upon goals and desired outcomes for the partnership, which is critical to focusing effort and resources. One jurisdiction emphasized the importance of the partnership's goals aligning as much as feasible with agency-specific goals so that stakeholders feel their own priorities are reflected in the larger group's work. The following are example goals:

- Example goal: Help people struggling with substance use disorders access treatment. Secondary goals include examining trends and behaviors, confirming or refuting assumptions or anecdotal information, and eliminating the stigma of the disease.
- Example goal: Reduce deaths due to opioid overdose.

A theme among these examples is the desire to affect change through action (i.e., get people into treatment; reduce overdose deaths; eliminate stigma). One of the ways community partnerships try to promote action is by organizing their efforts around specific topic areas within the broader context of the epidemic. This focuses smaller sub-groups of members in the direction of identifying actionable steps versus simply talking about the issues. Sub-groups may form around a variety of topic areas, such as prevention, adolescent use, medication-assisted treatment, or recovery services. Sub-groups can also serve as forums for partners to think *prospectively* about what type(s) of data should be collected and analyzed and to identify potential new sources for data. For example, in Lowell, Massachusetts, a sub-committee was formed to bring together data analysts from different agencies to determine how to organize and share data without violating privacy or confidentiality regulations (e.g., HIPAA), understand the strengths and limitations of available data, and identify ways to effectively communicate the results of analyses, especially to people who are not savvy in data analysis.

> The Onondaga County Health Department in Syracuse, New York, co-leads a community-wide drug task force with involvement from several sectors including law enforcement, healthcare, and education. In addition to raising awareness about the opioid crisis, they have raised awareness about related issues, such as higher rates of hepatitis C infection. In collaboration with the task force, a local sharp needles and drug disposal boxes (SNADD) program was created, providing residents with a safe way to dispose of medications and used needles.

There is typically a formal schedule of meetings for stakeholders, which is facilitated according to a pre-established agenda. This helps to ensure that members' time is used productively and prevents group discussions from wandering off topic. Active facilitation also helps prevent one or a small group of members from dominating the discussion, thus giving all members an opportunity to contribute their perspectives or opinions on an issue. The vast majority of the jurisdictions we interviewed stated that community partnership meetings are held on a monthly basis and typically in person as this supports relationship-building among members.

Data management and integration

Multidisciplinary partnerships add value by bringing diverse stakeholders together to share information and their different perspectives on the opioid epidemic in order to develop a comprehensive understanding of the relevant issues. Then, by working together, stakeholders can identify, implement, and evaluate holistic solutions that address key factors contributing to the problem. This only happens if stakeholders can develop trusting relationships and share information openly with each other in ways that promote collaboration and action.

Sharing data or information can take a variety of forms, such as sharing aggregated data, sharing the results of analyses, or sharing disaggregated raw data. Among the participants we interviewed, most noted that community partnerships are used primarily to share aggregated data or high-level analytical findings. This is due mainly to concerns about protecting personally identifiable information. Participants emphasized the benefits of collecting and managing data in a common platform or records management system (RMS). Creating a so-called "one stop shop" for data with a user-friendly interface eases the burden on stakeholders and encourages them to openly share the data they collect with others. In addition, having a central data repository that is supported by common terminology, data definitions, and rules of use improves data quality, which is often a major concern. Participants noted the importance of labeling and categorizing data consistently to enable extraction of specific pieces or sub-elements of data (e.g., disaggregating fatal and non-fatal overdoses). It is important to establish upfront how data elements will be catalogued, reported, and managed since each stakeholder group may have a slightly different way of operating depending on their area of focus.

> Police in Madison, Wisconsin, use a shared system with their partners. The partners have access to some police data and police have access to some of the partner data. They develop quarterly and monthly summaries and release these summaries to the mayor, county public health, and post them on their website to promote transparency.

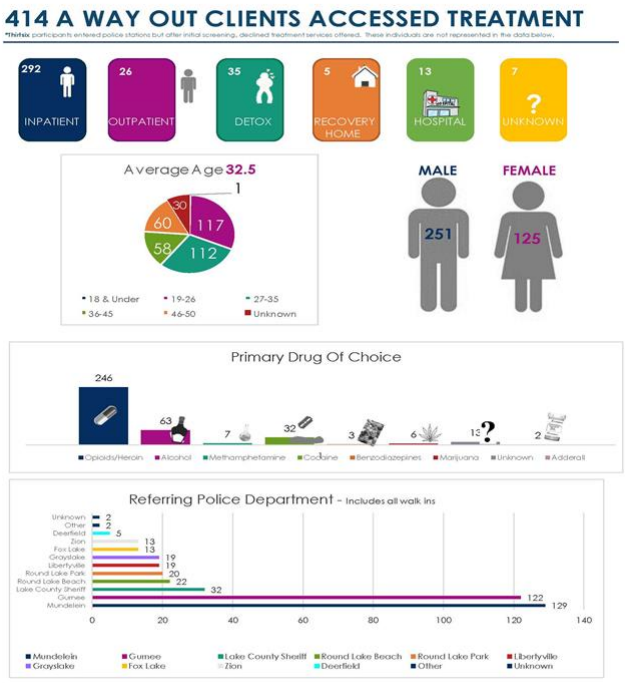
Data visualization and presentation

Jurisdictions present data a variety of ways depending on what the data is being used for and who the audience is. Commonly cited ways for visualizing data include bar graphs or charts, data tables, narrative summaries, geospatial maps, heat maps, and trend lines. For individuals who might not be particularly data savvy, bar graphs and charts are often preferred as they are fairly easy to interpret. Heat maps showing the locations where certain activity is concentrated in a geographical area (e.g., calls for overdose response) are also very popular. Narrative summaries can provide a wealth of information, particularly contextual information that may be missing from a chart, but they are more time-consuming to develop. Thus, narrative summaries are used most commonly to apply for funding, such as grants.

> Jurisdictions usually create single variable maps (e.g., location of overdoses). However, most are working towards creating maps that overlay multiple variables to gain deeper insight into potential interactions among different factors (e.g., overlay overdose location data with harm reduction and social services location data).

As noted earlier, community partnerships are often focused on taking action to stop

the epidemic. Therefore, showing a pie chart or trend line, although informative, may not be sufficient to get stakeholders to a place where they are ready to act. As one of the participants stated, it is important to explore the data more deeply and examine root-causes or potential alternative explanations by asking questions. For example, in Burlington, Vermont, there was a sudden yet sizeable reduction one month in patient enrollment in methadone clinics and researchers wanted to understand why this occurred. After examining the data, they found that the reduction coincided with a period where the clinic lost several members of its staff. By examining the data, they determined it was not that people struggling with opioid use disorder had stopped seeking help or were going elsewhere to obtain it; the clinic simply did not have enough resources to enroll as many patients.



The graphic above has been used in Lake County, IL to show the impact of a law enforcement-assisted pre-arrest diversion program.

Another way that data can be presented is through storytelling. This is often how the loved ones of people with substance use disorders, or those in recovery themselves, find their role in supporting community-wide efforts. Storytelling can be a powerful way to make the issues more relatable on an individual level. In so doing, storytelling has also proven highly effective in reducing the stigma around opioid use disorder.

In addition to the above methods, making data available to the public is an effective way to dispel myths and demonstrate the actions community agencies are taking to address the problem. It can also attract relevant partners that provide capabilities or access to data potentially useful to other stakeholders. In Indianapolis,

Public health officials in Mohave County, Arizona, indicated that stigma is a major problem within their small, rural population. By allowing residents to share their stories with other community members, they have been able to reduce stigma and draw attention to the non-discriminate nature of addiction.

Indiana, data were made publically available through a university offered data sharing service in hopes that students would access the data and create useful visualizations.

Common themes and lessons learned

In this section, we discuss broad themes and lessons learned that emerged over the course of our research. We hope this information will be useful to other jurisdictions as they implement multidisciplinary partnerships and work to improve data sharing and data analytics in fighting the opioid epidemic.

Overall, we observed that jurisdictions recognize the importance of analyzing data to inform decision-making and deploy resources efficiently. The stakeholders we spoke with, which were primarily local law enforcement, public health, and social services providers, have procedures in place to collect and analyze data in support of their internal operations. The biggest challenges they face internally tend to center around resource availability—having skilled and trained staff with sufficient time to analyze and interpret the data. Responsibility for doing this often falls to someone who has several other competing obligations within the agency or organization. So while they use data to support their operations, there was a sense among participants that more could be done with the data, particularly in terms of informing policy and strategic decision-making and evaluating program effectiveness.

The opioid epidemic has also highlighted the need for and value of sharing data and insights gleaned through data analysis *externally* with other public and private sector stakeholders. Multidisciplinary partnerships have become a fixture over the past few years in jurisdictions to facilitate information sharing. Presently, these partnerships serve mainly as forums for participants to report out the results of their analyses rather than to share raw data with each other. However, based on our discussions it appears that many partnerships are moving towards enhanced data integration given an increasing focus on affecting change at the operational and tactical levels.

Whether looking at the value data has on an organization's internal operations or its ability to coordinate with external partners, several common themes emerged around data accuracy, timeliness, integration, and confidentiality. We highlight these themes below.

Data limitations

Participants noted several issues that contribute to challenges or gaps in collecting opioid-related data, including the following:

- Absence of reliable data on overdoses that are not reported to police or EMS (perhaps because a friend administered Naloxone);
- Lack of reliable data when Naloxone is administered on how many doses were used and when and where the "save" occurred;
- Lack of timely access to Prescription Drug Monitoring Program (PDMP) data;
- Lack of timely access to hospital overdose data; and
- Lack of timely access to reports from medical examiners/coroners.

These issues raise concerns about both the accuracy of opioid data that is collected and the timeliness with which opioid data is shared between entities. Each concern is discussed in more detail below.

Data accuracy

It is widely recognized that several types of opioid-related data are likely under- or over-reported, thus skewing the true magnitude and scope of the epidemic. However, most jurisdictions do not have a good understanding of just how significant an issue this is. By far, the largest concern among jurisdictions we interviewed had to do with the lack of good visibility on non-fatal overdoses. Current data on overdoses come primarily from police or first responders who respond to suspected overdose cases, from hospital emergency departments that treat victims of overdose, or from case reports by a medical examiner or coroner. While those numbers certainly paint a very troubling picture, many additional overdose cases go unreported. This is due in part to the availability of the overdose reversal drug Naloxone, which does not require a prescription and may be administered by anyone. Thus, its use in saving someone from an overdose can go unreported, resulting in an underreporting of overdoses. How often this occurs is hard to say.

Additionally, many jurisdictions have instructed first responders (e.g., fire/EMS and law enforcement) to administer Naloxone to anyone who is non-responsive on the presumption that they may have overdosed. This means it could be used for something entirely unrelated to an opioid overdose, thus leading to an over-counting of actual overdoses. While there are ways to mitigate this issue, such as cross-checking data against hospital emergency data or findings from toxicology tests, significant time delays in obtaining these data undercut the usefulness of these verification techniques.

> A common misperception is that all Naloxone administered was for an overdose. In some jurisdictions, the policy is to administer Naloxone to anyone who is unresponsive. Additional assessment or testing at hospitals, therefore, is needed to confirm whether someone truly did experience a drug overdose.

Other potential reasons why opioid-related deaths are likely underestimated include the following:[xxi,xxii]

- Variation across jurisdictions and states at autopsy in terms of the substances tested for, the circumstances under which tests are performed, and the reporting of toxicology results.[6]
- Attributing deaths to another cause even though opioid use may have been a contributing factor (e.g., motor vehicle accident caused by someone under the influence of opioids, or death attributed to pneumonia despite toxicology results showing high levels of opioids present in the deceased).
- Guidelines mandating that a death can only be classified as an overdose if the toxicology report finds a certain level of opioids in the bloodstream, but drug levels can drop rapidly following death.

One study found that opioid deaths may be underreported at the national level by up to 24% due to state-to-state variations in completing death certificates.[xxiii]

Data timeliness

Most participants noted that opioid-related data often is not available in a timeframe that makes it useful for real-time (or near real-time) decision-making. It is common, for example, for as much as a year or more of time to pass between when certain data are collected and when they are reported. The most significant challenges we found concerned hospital data and medical examiner data.

Hospitals and community-based health clinics can be a potentially valuable source of data to supplement the data collected by EMS, police, or other first responders. As one locality put it, "Having EMS and Fire data is great, but it is telling us what the initial encounter was perceived as [rather than the more accurate hospital data]." However, most of the localities we spoke with do not have a system that quickly captures real-time data from hospitals. Rather, hospital data gets reported to state health agencies, where it is de-identified and aggregated before being made available to local entities. In some instances, this can mean as long as a year or more has passed between when the data were initially collected (i.e., when a patient presented to the hospital or clinic for treatment) and when they are reported. Moreover, because of the aggregate nature of the data, it can be difficult for local personnel to get an accurate view of what is happening within their community. Given the

[6] A CDC review found that 17% (2015) and 15% (2016) of drug overdose death certificates did not include the specific types of drugs involved, and the percentage of death certificates with at least one drug specified varied widely by state in 2016.

evolving nature of this epidemic, this significant lag time and inability to drill down to local trends degrades the usefulness of the data from an operational standpoint.

Medical examiner reports provide a potentially rich source of data on individuals who have died from an overdose. This includes determining through toxicology tests what types of drugs contributed to the person's death. However, in many localities it can take a year or more for the medical examiner office to release the final report on fatalities from opioid overdose because of substantial case backlogs. This tends to be principally a resourcing issue, with insufficient capacity within the system to handle the case load in a timely manner.

By the time these data finally get to those who need them, they are already outdated and of limited operational value.

Data integration

Based on our discussions, there appears to be significant opportunity for localities to better structure, align, and integrate their data collection and analysis efforts. As noted earlier, individual agencies and organizations collect and analyze data, and may even report out the results of those analyses to other agencies through existing community partnerships. However, datasets from the diverse range of stakeholders affected by the epidemic are rarely integrated and openly available to support more comprehensive analysis.

Our discussion revealed two primary concerns that inhibit the ability to integrate datasets from the various agencies: 1) legal concerns over protecting sensitive personal information; and 2) lack of resources to integrate datasets.

Protecting sensitive personal information

It can be difficult for localities to find a balance between integrating datasets across agencies and protecting individuals' privacy. Most localities we spoke with highlighted compliance with HIPAA and CFR 42 as the primary roadblocks for sharing information across agencies. "People would often prefer to be safe rather than sorry, and share too little rather than too much."

Strategies and lessons learned for ensuring compliance with state and federal health information privacy regulations:

- Understand and educate partners on the legal framework established by each agency to operate within state and federal regulations. Different attorneys have their own interpretation of what can and cannot be shared under state and federal regulations. This baseline needs to be well understood as it will form the basis for what information can and cannot be shared and how agencies can share that data.

- Establish legal agreements between agencies for sharing protected data. Interestingly, while most of the localities we spoke with have established community partnerships to support information sharing, many of them have come together informally or grown out of other partnerships. Consequently, they lack some of the formality needed to establish the legal framework needed to integrate data. For example, most localities do not have formal data use agreements that define the parameters for how agencies can legally share information. An effort by the Maryland Overdose Prevention Council to integrate opioid data across multiple agencies cited the drafting of MOUs as a critical step to developing their data integration capability.[xxiv]

- Develop and use consent forms to gather information from victims of non-fatal overdoses. However, the legal approval process for their use can be time consuming so planning for this upfront is important. Localities were less clear about the application of HIPAA requirements for overdose fatalities. The Maryland Department of Health and Mental Hygiene determined that individual-level data from overdose fatalities "originated from autopsy records, not medical records, and therefore was not in violation of" federal and state regulations.[xxv]

Resource constraints

Localities repeatedly indicated that limited funding and personnel constrain their ability to establish effective data integration mechanisms. For instance, few localities have dedicated staff focused specifically on opioid data collection and analysis. More often, public health agencies task an epidemiologist with examining opioid data on top of other duties. The same is true for law enforcement crime analysts. In addition, localities noted that while a lot of federal funding is being made available for opioid-related work, it is going mainly towards human services (e.g., treatment) support and not necessarily to support data collection and analysis efforts.

Nearly all jurisdictions we interviewed reported that identifying software to support data management and integration was a significant and time-consuming challenge. Legacy information technology systems in most jurisdictions are old and outdated. Most jurisdictions expressed the desire for a data integration system that would automate data input from all agencies into one database. Having this sort of "one stop shop" available and ensuring it was kept up-to-date would allow closer to real-time access for partner agencies to analyze and visualize the data and identify trends as they are happening. However, however, securing the approval and capital to modernize data systems can be very difficult. Furthermore, even if you have the requisite funding and approval, stakeholders must first define and agree upon the system requirements before identifying the optimal technological solution. The requirements should drive the technological solution, not the other way around.

Keys to building and sustaining successful partnerships

The first and perhaps most important factor, as highlighted earlier, is having a clear understanding of what the jurisdiction hopes to achieve through the partnership, as defined by a set of agreed upon goals and desired outcomes. This has to be done at the outset or else it will be difficult to keep stakeholders engaged, measure progress or the inherent benefit of the partnership, or to "sell" the value of the partnership to political leaders or stakeholders with many interests competing for their time.

Participants we interviewed universally emphasized the importance of obtaining buy-in from agency or organizational leadership early on in the process of building and implementing community partnerships. Commitment from leadership often becomes the catalyst for broader support across the agency or organization as it conveys an unmistakable sense of importance to the effort. This is critical in maintaining focus and momentum among the rank and file, especially given the competing demands on individual's time. Additionally, leadership support provides the authority necessary to take action (e.g., institute new procedures to facilitate data sharing).

In addition to organizational leadership involvement, participants noted the value in having community leaders engaged. This could be a mayor, city manager or someone else within the community who is well respected and has clout. Ideally, this person will be an active *champion* of the partnership. A champion at this political level is needed to help galvanize interest and support among diverse stakeholders, ensure the effort is properly resourced, and provide the platform for disseminating key messages to the larger community.

Identify a local champion who:

- Understands and believes in the goals of the partnership
- Has significant visibility and influence in the community
- Can hold people accountable
- Fosters an inclusive and collaborative environment

There must be open and honest dialogue between participating organizations. In some instances, potential collaborators may not be accustomed to working together. For example, police in one jurisdiction noted that a harm reduction services provider had advised people when giving out Naloxone against calling 911 during a possible overdose so police would not come and arrest those involved, which the police would not usually do. Advice such as this can propagate misinformation and distrust and keep agencies further in the dark about the true scope of the epidemic. Local police officials contacted the harm reduction provider to dispel the myth that police will automatically arrest people involved in an overdose. The ability to engage in this type of honest dialogue will ultimately lead to better service provision for those most in need. Similarly, open channels of communication are also important in facilitating stakeholder collaboration outside of scheduled meetings. A sudden spike in overdoses, for

example, may require rapid coordination and intervention among stakeholders through mechanisms other than formal meetings.

Partnerships often thrive when there is direct engagement with residents in the community. This can help personalize the issues surrounding drug abuse; provide feedback on which intervention strategies work, which do not, and why; and ensure ongoing dialogue to help stakeholders better understand residents' priorities. It also promotes a sense of accountability and transparency in the partnership's work.

> A Community Engagement Board in Redondo Beach, California, ensures that the concerns and perspectives of residents are heard. The board includes people with substance use disorders who are in recovery, who offer unique perspectives on what public safety officials can do in order to gain people's trust and have a positive impact.

And while partnerships may be used to tackle operational issues, participants should also maintain a strategic outlook. One jurisdiction stated that they do this by holding an annual half-day retreat to focus more strategically on challenges the community is facing and how those challenges are evolving or may potentially evolve over time. This reinforces the need to think proactively about the issues rather than maintain a reactive posture. As community partnerships continue to grow and evolve, it will be increasingly important to think prospectively about the types of analyses members want to conduct, the types of data necessary to support those analyses, and appropriate sources for those data.

Appendix A: Opioid Data Initiative Fact Sheet

Opioid Data Initiative

Project Overview

CNA is initiating a self-funded research project to engage select communities in developing a framework to promote open sharing and analysis of data pertinent to the opioid epidemic. The goal of this effort is to help communities harness the full potential of a data-driven response approach that more effectively and efficiently targets resources and expertise to fight the epidemic. To achieve this goal, the project team has identified the following primary objectives:

1. Increase awareness of how local jurisdictions use data to inform opioid response policy and operations;
2. Identify potential opportunities to improve data utilization, to include leveraging new sources of data or analysis and visualization techniques;
3. Identify barriers to openly sharing opioid-related data among community stakeholders, as well as best practices to overcome these barriers and expand access to data;
4. Improve collaboration across disciplines and between government, private sector, and non-governmental partners.

Research Approach

CNA is seeking to work with approximately 8 to 12 local jurisdictions that are geographically distributed around the country and encompass urban, suburban, and rural areas. In collaboration with jurisdictional stakeholders, CNA will examine the following research questions:

- How are local jurisdictions currently using data to inform opioid response policy and operations, and what potential opportunities exist to use available data more effectively?
- What gaps in opioid-related data exist?
- What are the primary barriers to sharing data across government agencies and with non-governmental and private sector partners?
- What best practices can be used to break down these barriers?
- How are jurisdictions measuring the impact of their efforts to incorporate data into response policy and operations?

The results of our work will support development of an operational framework to help communities enhance the use of data and facilitate data sharing within and potentially across jurisdictions. We will also develop case studies highlighting common challenges and promising practices related to data collection, analysis, visualization, and sharing.

Benefits of Participation

By participating in the project, jurisdictions will:

- ✓ Build and strengthen relationships with a diverse network of stakeholders within their community and with other participating jurisdictions;
- ✓ Gain a deeper understanding of the barriers to sharing opioid-related data, and strategies to overcome these barriers;
- ✓ Learn from the strategies and tactics employed by other jurisdictions to collect and analyze relevant data; and
- ✓ Highlight the extensive efforts stakeholders within their jurisdiction have undertaken to help their communities turn the tide on this epidemic.

Participation Request

CNA is seeking your jurisdiction's participation in this project. Each participating jurisdiction will be asked to identify a lead agency (or agencies) to serve as the primary point(s) of contact with the CNA team. Ideally, this agency(ies) will have primary responsibility for leading jurisdictional efforts to address the opioid crisis and can also

serve as a convener of other community stakeholders.

The CNA team envisions working with each jurisdiction through a variety of methods to gather information and solicit stakeholders' perspectives, such as:

- Completing a short, web-based survey to help the CNA team describe current data collection and analysis efforts;
- Participating in group and individual interviews to explore key issues related to data utilization and sharing;
- Participating in monthly conference calls with all jurisdictions involved in the project to discuss study progress and exchange ideas and promising practices;
- Reviewing and providing feedback on draft work products.

Next Steps

In early 2018, CNA will conduct a virtual kickoff meeting with all participating jurisdictions to discuss the project goals and objectives and review our proposed approach. We will then develop and administer a web-based survey to establish the "as is" picture of data utilization at the local level, and schedule a series of stakeholder interviews to further explore and provide context to the information gleaned from the survey.

About CNA

CNA, a not-for-profit organization, has a 75-year history of supporting our nation through the application of objective, evidence-based research and analysis. Our public health and criminal justice research practices regularly examine complex issues that require cross-disciplinary collaboration and innovative solutions. CNA's work is deeply rooted in the field of operations research, ensuring the insights we bring directly impact the day-to-day operations of our clients. For additional information about CNA, please visit our website at: www.cna.org.

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Appendix B: Baseline Assessment

APPENDIX B. DATA COLLECTION TOOL - AGENCY ASSESMENT

Respondent Name: _____

Respondent Agency: _____

Jurisdiction: _____

- ☐ Burlington, Vermont
- ☐ Lowell, Massachusetts
- ☐ Cambridge, Massachusetts
- ☐ Lake County, Illinois
- ☐ Marion, Iowa
- ☐ Mohave County, Arizona
- ☐ Little Rock, Arkansas
- ☐ Indianapolis, Indiana
- ☐ City of Redondo Beach, California
- ☐ Onondaga County, New York
- ☐ Other (please specify): _____

1. Using the drop-down menu, please identify the key stakeholders (public and private sector) you currently work with to address the opioid epidemic in your jurisdiction?

   - ☐ Public health
   - ☐ Law enforcement
   - ☐ Hospitals or health systems
   - ☐ Other medical (e.g., private physician practices, local/regional healthcare coalition)
   - ☐ Behavioral health providers
   - ☐ Drug treatment/recovery providers
   - ☐ Fire/EMS
   - ☐ Local court/judicial services
   - ☐ Office of District Attorney (local prosecutor)
   - ☐ Corrections
   - ☐ Other (please specify): _____
   - ☐ Other (please specify): _____
   - ☐ Other (please specify): _____

   Is there a formal mechanism in place to facilitate coordination among them (e.g., regular meetings, regular conference calls, public forums, etc.)?

   No Yes (please explain)

2. From your position within your organization, how would you characterize your jurisdiction's current use of data to address the opioid abuse epidemic?

    - o 4 – fully developed/mature (fully integrated data collection and analysis processes established; raw data and/or analytical findings shared among stakeholders and used to inform policy or operational practices to address the issue)
    - o 3 – moderately developed (robust data collection and analysis efforts; partner agencies identified but not fully integrated in data collection and analysis; analyses are primarily descriptive)
    - o 2 – emerging (data requirements identified; data collection and analysis activities are irregular and/or compartmentalized in individual agencies)
    - o 1 – non-existent/ad hoc (very little data collected)

    Based on your professional experience, is there anything particularly innovative or unique about how your jurisdiction is using data to address the opioid crisis?

    - o No Yes (If yes, please explain) _____

3. How severe of a problem is the misuse and abuse of ***prescription*** opioids (oxycodone, hydrocodone, morphine, etc.) in your jurisdiction?

    - o 3 – very severe (high levels and/or significant increase in the key indicators your jurisdiction or agency uses to characterize the severity of misuse and abuse of opioids (prescription or illicit) in your jurisdiction – e.g., number of opioid-related overdoses, treatment center admissions/readmissions, or arrests
    - o 2 – somewhat severe (moderate levels and/or moderate increase in the key indicators your jurisdiction uses to characterize the severity of misuse and abuse of opioids (prescription or illicit) in your jurisdiction
    - o 1 – not severe (low levels and/or small increase in the key indicators your jurisdiction uses to characterize the severity of misuse and abuse of opioids (prescription or illicit) in your jurisdiction
    - o Don't know – (do not regularly collect/analyze data or lack confidence in the quality of available data)

4. Based on your professional experience, over the past two years, is the misuse and abuse of ***prescription*** opioids in your jurisdiction:

    - o Improving
    - o Worsening
    - o Unchanged
    - o Don't know

5. How severe of a problem is the misuse and abuse of ***illicit*** (e.g., heroin) or ***synthetic*** (e.g., fentanyl, carfentanil) opioids in your jurisdiction?
    - o 3 – very severe (high levels and/or significant increase in the key indicators your jurisdiction or agency uses to characterize the severity of misuse and abuse of opioids (prescription or illicit) in your jurisdiction – e.g., number of opioid-related overdoses, treatment center admissions/readmissions, or arrests
    - o 2 – somewhat severe (moderate levels and/or moderate increase in the key indicators your jurisdiction uses to characterize the severity of misuse and abuse of opioids (prescription or illicit) in your jurisdiction
    - o 1 – not severe (low levels and/or small increase in the key indicators your jurisdiction uses to characterize the severity of misuse and abuse of opioids (prescription or illicit) in your jurisdiction
    - o Don't know – (do not regularly collect/analyze data or lack confidence in the quality of available data)

6. Based on your professional experience, over the past two years, is the misuse and abuse of ***illicit*** (e.g., heroin) or ***synthetic*** (e.g., fentanyl, carfentanil) opioids in your jurisdiction:
    - o Improving
    - o Worsening
    - o Unchanged
    - o Don't know

7. What types of data are collected within the jurisdiction, specifically for studying and monitoring opioid issues in your jurisdiction? Please list the primary source(s) for each type of data, as well as how frequently (drop-down menu w/ daily, weekly, biweekly, monthly, semi-annually, annually) this data is collected.
    - o [Data type], [primary sources], [collection frequency drop-down]

8. Please briefly describe the types of analyses (historical trend analyses, mapping, etc.) currently being conducted?
    - o 7a. With what frequency (the assessment tool will contains a drop-down menu with the following options: daily, weekly, biweekly, monthly, semi-annually, annually, sporadically)? _____
    - o 7b. Please briefly describe how the results of those analyses are being used (e.g., to define or characterize the problem, assess policy options, inform operations and tactics, evaluate performance): _____

9. What are the primary ways in which the data analyzed in your jurisdiction is displayed for descriptive or analysis purposes?
    - ☐ Single variable geospatial maps (e.g., locations of overdose deaths or naloxone administrations)
    - ☐ Multivariable geospatial maps (e.g., overdose death data overlaid with arrest data)
    - ☐ Trend lines
    - ☐ Data tables
    - ☐ Narrative summaries
    - ☐ Other (please specify): _____
    - ☐ Other (please specify): _____

10. Please describe any significant challenges your jurisdictions has experienced over the past two years regarding:
    - Collecting opioid-related data: _____
    - Analyzing opioid-related data: _____
    - Sharing opioid-related data: _____
    - Integrating data into decision making: _____

11. From your position in your agency, where is there potential within your jurisdiction to enhance data practices (the assessment tool will contain a drop-down menu with the following options: data reporting, collection, analysis, sharing, integration into decision-making)?
    - 10a. Please explain your answer: _____

Appendix C: Interview Guide

Draft Interview Questionnaire

The following topic areas and questions are intended to serve as a general guide for interviews conducted by CNA with jurisdictions participating in CNA's Opioid Data Initiative. The interviews will be conducted in a semi-structured format, allowing the interviewer to explore specific threads of discussion in more or less detail depending on the perceived value to the project, or to explore new topic areas of discussion not identified in this list of questions.

Development and Maturation of Opioid Data Programs

1. Can you briefly describe the extent to which your agency has used data to help you:
    a. Understand the magnitude and complexity of the problem in your jurisdiction?
    b. Develop and implement opioid-related policies?
    c. Inform strategic decisions, such as funding or resource allocation?
    d. Inform operational practices and/or training?
    e. Assess the effectiveness of specific policies or operational practices?
    f. Is there anything not captured in the list above that you're using data to help you with?

2. Are there certain types of data that your agency currently doesn't collect or have access to that you would like to have? If so, please explain.
    a. How would having access to the data be useful to you?
    b. What are the barriers to gaining access to these data?

3. How does your agency currently resource the collection, reporting, and analysis of opioid-related data (e.g., is there a dedicated staff member?)
    a. What have you found to be most effective in terms of communicating the results of your data analyses (e.g., narratives, GIS maps, other visuals)?
    b. If there were no barriers (budget, data sharing rules, etc.), are there specific types of analyses or innovative data visualization products that you would like to implement?

4. How does your agency assess the value of its data program (i.e., how do you know whether you're getting sufficient benefit to justify the costs that go into operating a data program)?
    a. What have been the main challenges or barriers to deriving optimal value from your data program?
    b. What's been most successful for you in overcoming those challenges or barriers?

Community Partnerships and Data Sharing

5. In the online assessment you highlighted the key partners and stakeholders with whom you work. Can you elaborate on how these partnerships developed and have evolved over time?
    a. Have these relationships been formalized through common goals and objectives?
    b. Have MOUs/MOAs been established?

6. Can you provide examples of direct benefit/value resulting from these collaborations?

7. Can you discuss the extent to which you share opioid-related data with your partners (e.g., are you sharing raw data, aggregate data, results from your internal analysis)?

8. What have been the most difficult challenges to working with and openly sharing data with your partners? [*Consider things like common rules or standards for collecting and sharing data, data integrity and reliability, differences in terminology, common structures or templates for reporting and sharing data, etc.*]
    a. What have you found to be successful strategies for overcoming those barriers?

9. Where do you see opportunities to get more out of these partnerships and what's preventing you from getting there?

Lessons Learned and Future Goals/Direction

10. What has been most important in successfully evolving your agency's data program from where you started to where it is now?
    a. What's needed to further advance your agency's use of data to address this epidemic (i.e., to take it to the next level)?

11. What lessons have you learned along the way that you might offer as advice to others trying to build, expand, or maintain coalitions with other partners in their community? *[For example, are there certain partners you think are essential to be at the table? Or partners you wouldn't have thought about initially, but who have turned out to be very helpful? How often is it important to meet? How important is it to have clearly defined goals, etc.]*

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