GIS STRATEGIES
for Addressing Substance Misuse

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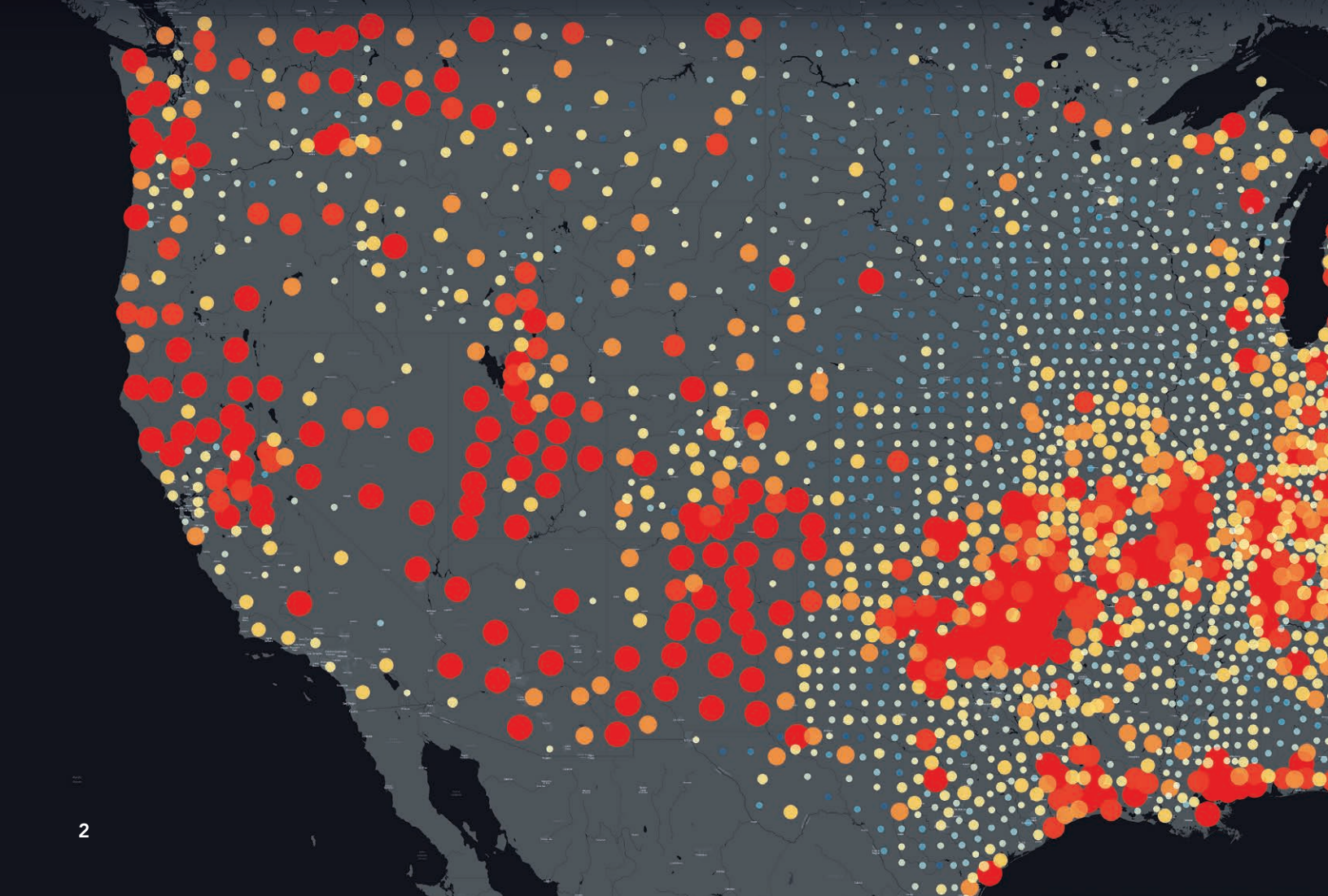
RESPONDING TO
SUBSTANCE USE DISORDERS IN CRISIS MODE

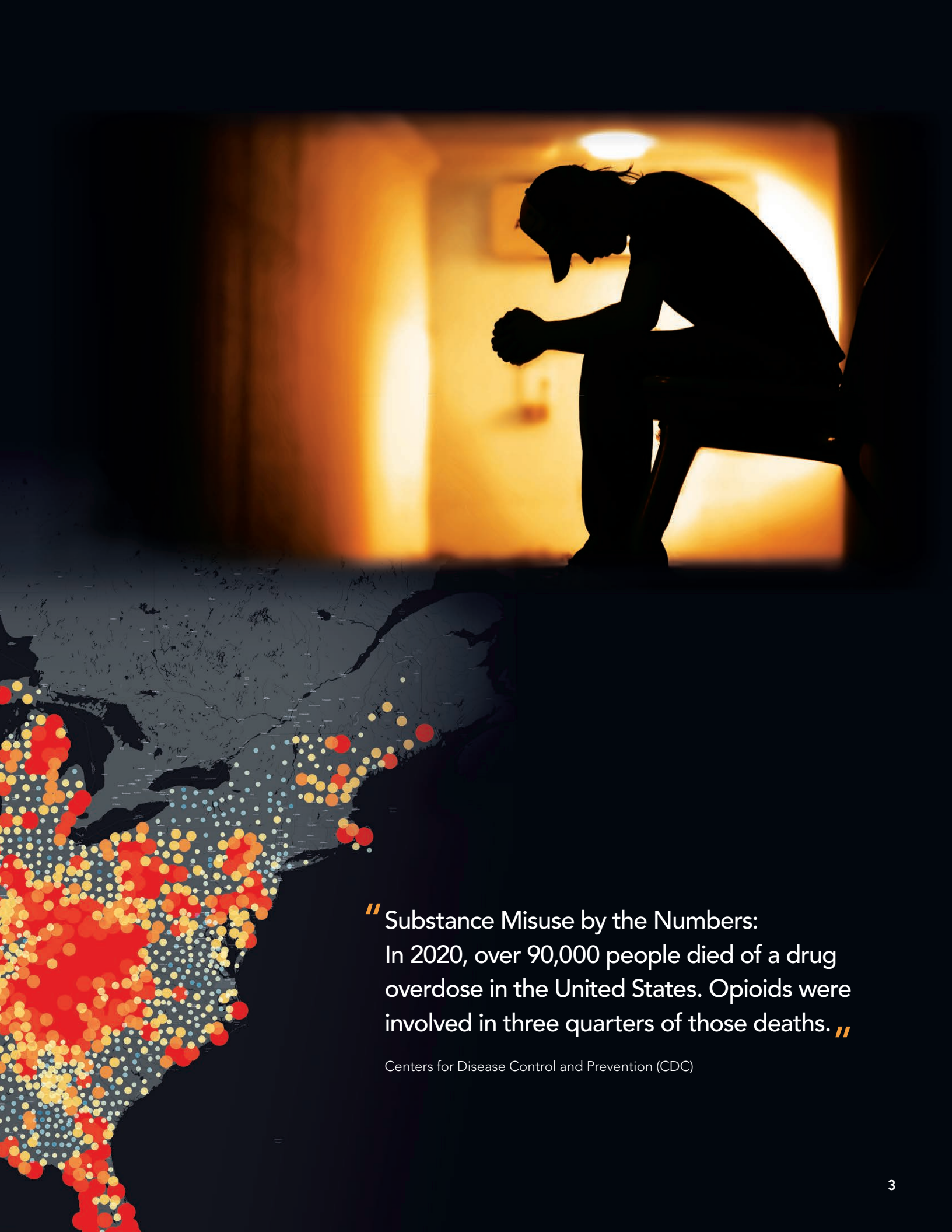
A complex issue such as substance misuse leaves many government leaders unsure of where to start. A geographic information system (GIS) framework provides understanding and a path forward.

Substance use disorders (SUDs) plague our communities. It's a rural problem, an urban problem, a youth problem, and a mental health problem. But what if there was a proven approach to understand, track, and analyze SUDs and place resources and services where they will make a difference?

As SUDs reach the level of a public health emergency, government agencies are working to raise awareness around and combat SUDs. Many governments have integrated GIS technology into their strategies to provide education, prevention, response, and treatment options in their communities. GIS is also allowing stakeholders to address potential root factors that may lead someone to substance misuse, such as poverty, mental illness, or environmental influences. By applying a geographic lens, datasets that are not commonly viewed together are opening new discussions and pinpointing specific neighborhoods that are more adversely affected.

GIS allows organizations to effectively understand the crisis and deploy resources using a geographic approach. Esri, the global market leader in GIS, develops the most advanced solutions that have helped governments address community issues and improve workflows for decades. Knowing where people in your community are experiencing substance use disorders and where best to allocate resources or plan outreach are keys to success.





"Substance Misuse by the Numbers:
In 2020, over 90,000 people died of a drug overdose in the United States. Opioids were involved in three quarters of those deaths."

Centers for Disease Control and Prevention (CDC)

ADDRESSING HUMANS IN CRISIS

The role of GIS in battling social inequities—such as substance misuse, homelessness, or lack of access to mental health care—should be similar to its role in response to natural disasters such as wildfires, hurricanes, or disease outbreaks.

Real-time information must be accurately gathered in the field, collected in a central place, and analyzed to inform effective resource allocation and decision-making. With GIS, stakeholders can make better decisions, and policy makers can better adjust methods and tactics to keep a community moving forward. There are six pillars for resolving a crisis in real time: organize data, collect new data, communicate findings, deploy tactics and allocate resources, inform decision-makers, and educate others.

1 Organize Your Data

Identifying all the variables that can drive someone toward drug misuse leads to a framework of understanding. Before directing or creating any new resources, it's critical to understand what's happening in your community today. While substance misuse is a nationwide problem, the causes and symptoms are heavily localized. Whether it's a lack of access to health care, mental counseling, or other community support systems, it's imperative that agencies determine where resources are needed within their community before they begin applying tactics.

GIS allows community leaders to gain an accurate picture of how and where overdoses and overprescribing are occurring in comparison to the accessibility to health care in these areas. Public health officials, human services, law enforcement, and volunteers can gather information from disparate data sources, geotag that information, and then combine it in a single dynamic map to understand the effects.

2 Collect New Data in Real Time

Moving from static data to a data-driven policy approach requires collecting and organizing authoritative information. In addition to data that is already collected, many organizations will find it necessary to create more data to inform their efforts. Using mobile data collection tools, staff can easily collect additional field data, such as overdose information, populations experiencing homelessness, and not-for-profit programs, to build a more complete picture of their community and its available resources.

3 Communicate Your Findings

Collaboration between programs and agencies reduces redundancies and improves overall efficiencies. As data is collected and analyzed, the information can be placed into an operations dashboard. Real-time dashboards provide a comprehensive view into data drawn from GIS, emergency management systems, social services, law enforcement, and public health departments.

Staff at all levels can continually track changing situations and events as well as the success of prevention and response tactics to ensure ongoing success.

4 Deploy Tactics and Allocate Resources

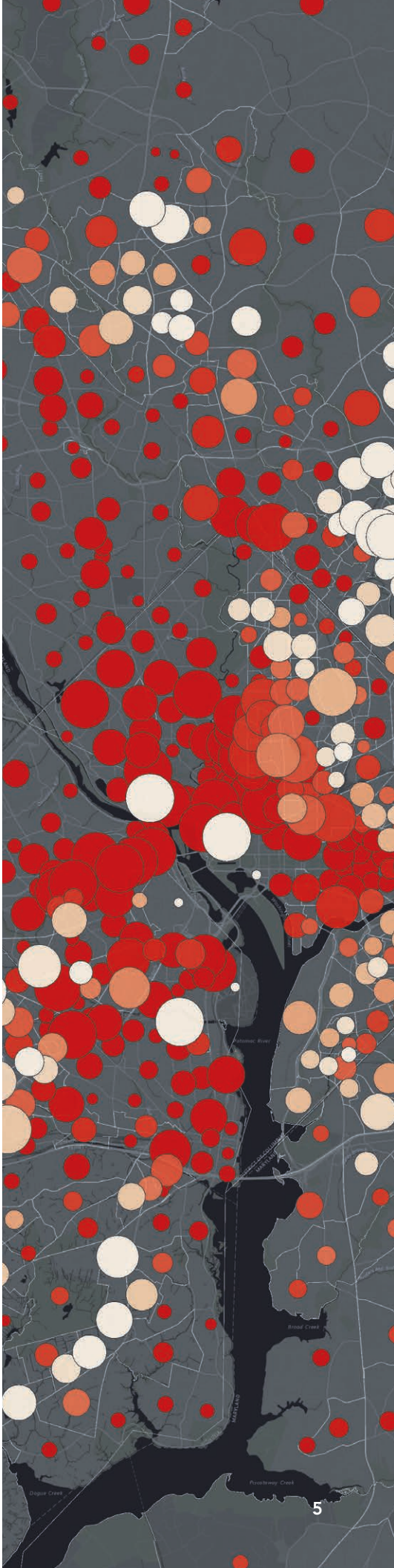
With a comprehensive understanding of conditions, staff can use GIS to quickly decide on a course of action. Optimizing and allocating resources based on need and location maximizes their impact. For instance, with all the information on a single map, they can quickly identify areas where activities are concentrated; where current resources are located; and where to add clinics, medical services, drug drop-off boxes, and other resources.

5 Inform Decision-Makers

GIS is an excellent tool to provide briefings to elected officials, government executives, and other stakeholders. Dashboards present information on current conditions, resource allocation, and progress of tactics so that swift decisions can be made in real time.

6 Educate the Public and Constituents

This health crisis and what is being done about it are important for the public to understand. GIS lets organizations combine authoritative maps and data with narrative text, images, and multimedia content to illustrate the crisis. They can better understand the health risks and effect on neighborhoods as well as better realize why and how funding and assistance are being applied to address substance misuse.



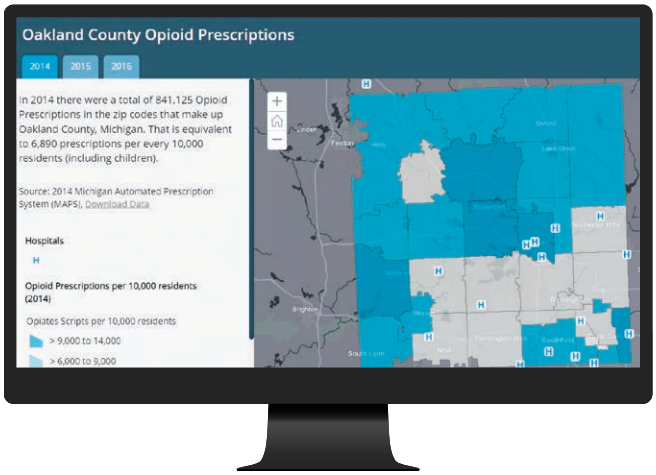
GIS IN ACTION

Health organizations everywhere are acknowledging the power of GIS technology to address substance misuse in their communities. These organizations are able to not only map where substance misuse hot spots are throughout their communities but also deploy location-based solutions to these areas. Learn more on how organizations leverage location intelligence to ultimately help individuals suffering from substance use disorders before it is too late.

HARM REDUCTION

Oakland County Health Division, Michigan

In 2016, almost 750,000 opioid prescriptions were filled in Oakland County. That's equivalent to 6,035 prescriptions per every 10,000 residents (including children). In that same year, 165 people died from opioid-related deaths. The Oakland County Health Division had a plan to combat these alarming statistics. The Oakland County Sheriff's Department had a program called Operation Medicine Cabinet in place to provide locations for people to bring medications for disposal. The health division used GIS to map those locations for residents, as well as deaths related to opioid abuse, as part of a larger opioid open data initiative. Since then, the division has expanded the number of resources it highlights in online maps to include addiction prevention, recovery programs, and treatment centers. It is also working on an alternative treatments map, which will be crowdsourced from the community.



To inform these maps, the division partnered with several other organizations in Oakland County, including law enforcement, pharmacists, schools, local judges, and other county agencies. This partnership not only allows the division to access necessary data for opioid maps but also enables partners to gain a variety of perspectives on which maps would be useful for current and future health crises. Moreover, the health division uses the partnership to raise awareness in the community and even push more resources into local areas by having partners use those maps in their own efforts.

To further empower these partners, the division is currently working on elevating its data access. While public-facing data can only be presented on city, village, or township levels to ensure privacy compliance, partners such as drug enforcement agencies could access more granular information if the appropriate access controls are in place. The division is creating an internal, secure login system to that end.

For Oakland County, GIS has been a key factor in quelling the opioid epidemic, and its role is only growing. "GIS has really expanded our view on public health. We tend to live in the world of charts and line graphs, and GIS has really been able to show the intensity and the location. Now, we're at a point where we're taking out these maps and showing them to our partners who are the people on the ground," said Trisha Zizumbo, public health education supervisor, Oakland County Health Division.

COMMUNITY ENGAGEMENT

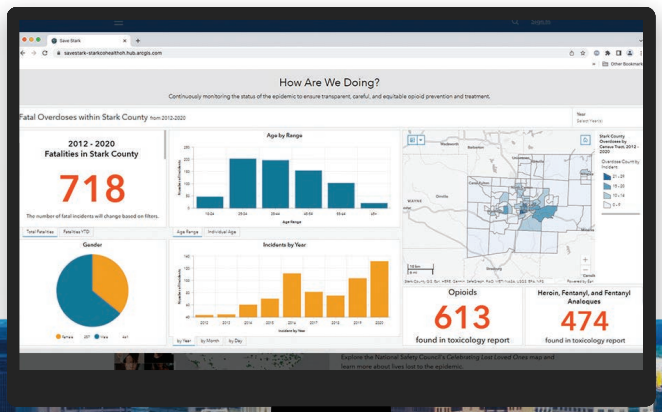
Stark County Health Department, Ohio

At the height of the pandemic, a rural community in northeast Ohio was experiencing the highest number of opioid-related deaths on record. Ohio's Stark County Health Department was understaffed, struggled with limited resources, and faced with keeping its residents safe amid the COVID-19 pandemic. Both health crises were now impacting and compounding the other.

As response times were becoming even more critical due to the pandemic, the health department team leveraged GIS technology to set up COVID-19 contact tracing, and later, equitable vaccination distribution, which also included mobile vaccination clinics to expand access into vulnerable communities. Seeing how the power of location intelligence created these targeted solutions for the pandemic, Stark County applied this geographic approach to combat the opioid epidemic that was still severely claiming lives throughout the community.

The county then launched the Opioid Epidemic Outreach solution, a set of preconfigured applications and maps that allowed the county to quickly index local prevention and treatment resources. The health department then launched Save Stark, a public information site created using ArcGIS® Hub℠. The site enabled county staff to communicate the severity of the epidemic in the community; promote resources available to those in need; and share real-time data and resources they receive from local health organizations, emergency management, and local nonprofit organizations.

"The Opioid Epidemic Outreach solution allowed us to combat this issue from all angles, which is exactly what we needed. It was so easy to use that other counties are now reaching out and looking to set up their own hub site," said Jorian Krob, Stark County Health Department GIS specialist.



Stark County staff wanted to provide a variety of resources that the public could easily find and utilize in their surrounding areas. Utilizing maps and analysis, they aligned the hub site around three major focus areas:

Prevention

- To prevent unused medications from being misused, Stark County used the Opioid Resource Inventory app to map drug drop-off locations, where community members could search by address or zoom in to an area on the map to find locations near them.
- Preventing addiction is difficult once you have already started taking opioids, so the county built an alternative pain management locator, where community members can find facilities near them that offer alternatives to opioids.

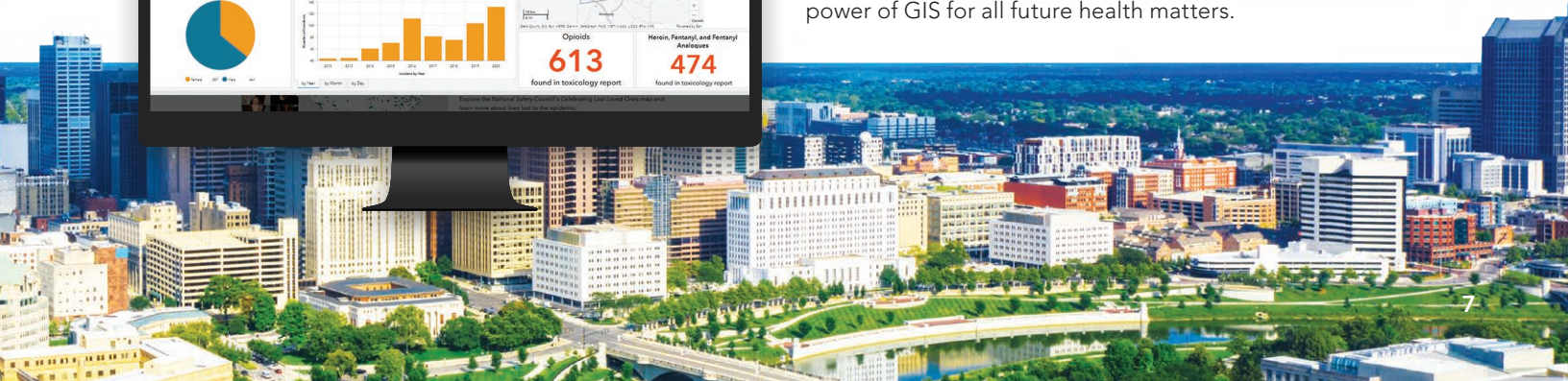
Treatment and Recovery

- In an attempt to connect those in need with available resources near them, Stark County used the Opioid Resource Inventory app to map treatment and support centers.

Harm Reduction

- Focused on minimizing the harmful effects of drug misuse, Stark County created a locator to find naloxone, an important tool in reversing overdoses and saving lives. Community members can type in their address to find facilities or providers that carry naloxone near them.

Complex issues like the opioid epidemic do not have easy solutions unless GIS is involved. Stark County was able to inventory prevention and treatment resources, communicate the severity of the epidemic, and promote resources available to those in need—all with the Opioid Epidemic Outreach solution. County staff were able to also use GIS to find opioid overdose patterns and then tailor their solutions to the trends they were seeing and collaborate internally with other staff to effectively apply these solutions. Stark County's geographic approach allowed staff to effortlessly collaborate between internal teams and develop GIS tools to effectively improve public health. Moving forward, they hope to leverage the power of GIS for all future health matters.



Puerto Rico Department of Health

To tackle the opioid crisis, the Puerto Rico Department of Health is emphasizing a geographic approach to address the epidemic and allocate resources to where they are needed most. By securing Centers for Disease Control and Prevention (CDC) funding through the Overdose Data to Action project, the department was able to design and implement syndromic drug misuse surveillance using GIS technology, setting an example for others to follow.

Organizing Data to Create Targeted Solutions

Puerto Rico's opioid misuse response centers on collecting and monitoring data of overdose survivors. Rather than tracking overdose deaths, the Puerto Rico Department of Health aims to focus on preventing deaths by allocating additional resources. To understand what is taking place at the neighborhood level, the department needed to collect data but realized that there was no streamlined process for drug misuse data collection.

To modernize its approach, the department turned to ArcGIS Survey123 and created the Puerto Rico Overdose Surveillance System to collect this data in a standardized way. It deployed a form-centric solution, which allows the collection of data via web or mobile devices, even when disconnected from the internet. Staff from the department and cooperating agencies can go into neighborhoods to collect data in real time and upload it to one central location. Because the state government could not combat this crisis on its own, the department partnered with local nonprofit organizations and community clinics and is looking to collaborate with several other local government agencies across the islands as well.

"It has been very challenging to work with local nonprofit organizations, the public health department, and other state departments within Puerto Rico due to this lack of a standardized data collection process," said Francisco Negrón Alemón GIS programmer, Puerto Rico Department of Health. "But this solution has made this much easier and possible."

Through these unique collaborations, the department can gain greater insight into this problem and keep track of the combined efforts with the use of GIS technology.

Access to the field data collected using ArcGIS Survey123 allows nongovernmental organizations (NGOs) to continually track changing community dynamics and eventually monitor the success of their prevention and response tactics to ensure ongoing success. For the department, this initiative has a unique perspective due to its bottom-up nature, which presents a significant opportunity to learn from the experience and needs of the community. This collected data enables the development of guides to design, plan, and implement responsive, effective social programs.

What's Next

The Puerto Rico Department of Health hopes to expand its collaboration efforts to include local governments, hospitals, and emergency responders across the islands to allow for better data integration. Information can then be used to influence public policy, leading to administrative legislation that can address the crisis in Puerto Rico. With more partnerships, the department is also looking to create a public-facing dashboard, the Puerto Rico Opioid Dashboard, that will contain collected data so more agencies can utilize the information to better respond to the epidemic.

Using GIS, the Puerto Rico Department of Health can develop strategies that will effectively reach more people with substance use disorders and provide them with the care and resources they need.

The role of geography and GIS is obvious during many community emergencies, like wildfires, hurricanes, or floods. It is no different when it comes to health emergencies like substance misuse and the opioid crisis. Integrating health data with geographic information gives health professionals an understanding of where, when, and why the health crisis is occurring and who it is impacting. It also lays the foundation for effective policy making and decision-making.

With GIS, health organizations can quickly understand and begin addressing substance use disorders in their own communities. In the same way that they rely on mapping to inform responses to natural disasters, responders can use real-time visual data to effectively combat this drug crisis—and save countless lives.

"Identifying opioid overdose hot spots within Hamilton County, Tennessee allowed us to better understand the local epidemic and where to target interventions."

Dr. Rebecca Martin
Emergency Medical Physician
Erlanger Health System

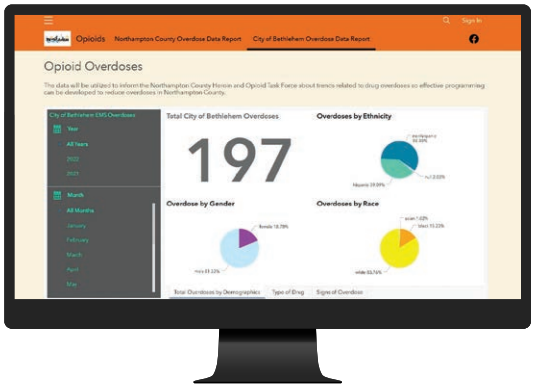
CORE GIS TECHNOLOGY
TO ADDRESS HUMANS IN CRISIS

Health organizations can leverage multiple GIS applications to effectively address substance misuse. Whether agencies are trying to provide decision-making tools to leaders or improve data analysis, GIS has a pivotal role to play. This collection of GIS applications and tools can be used by health organizations to identify at-risk communities and increase awareness of available services.

ArcGIS Hub

Influence Opinion, Explore Locations, and Highlight Trends That Matter

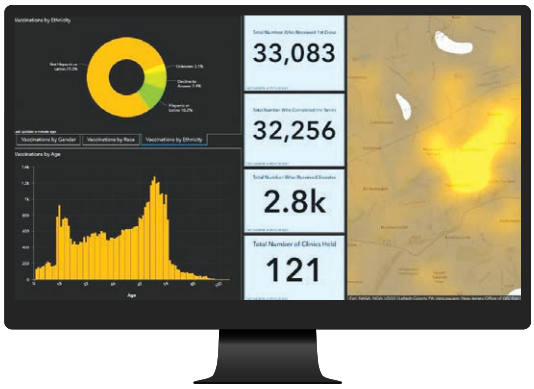
Transform how you engage and collaborate with your community with an easy-to-configure community engagement platform that organizes people, data, and tools through information-driven initiatives. With ArcGIS Hub, organizations can leverage their existing data and technology and work together with internal and external stakeholders to track progress, improve outcomes, and create vibrant communities.



ArcGIS Dashboards

Understand Performance and Keep Decision-Makers Better Informed

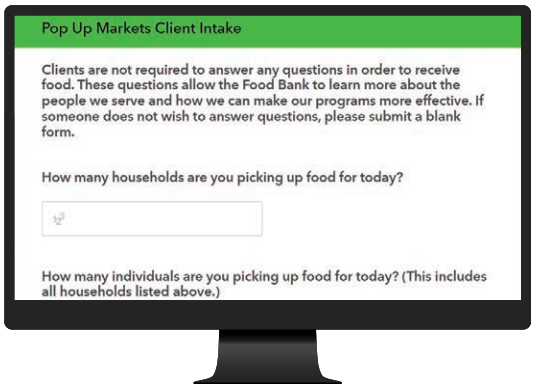
From tracking opioid overdoses to obtaining demographics of individuals impacted by the crisis to mapping hot spots, ArcGIS Dashboards allows you to view data and analytics in real time on a single screen. Dashboards makes it easy to share all this information to decision-makers and stakeholders.



ArcGIS Survey123

Collect and Analyze Data in the Field

Replace unreliable paper-based data collection with a trustworthy digital solution that fits the needs of all health personnel. With ArcGIS Survey123, easily collect data and create smart forms when connected to or disconnected from the internet. Analyze results in real time and upload data securely for further analysis.



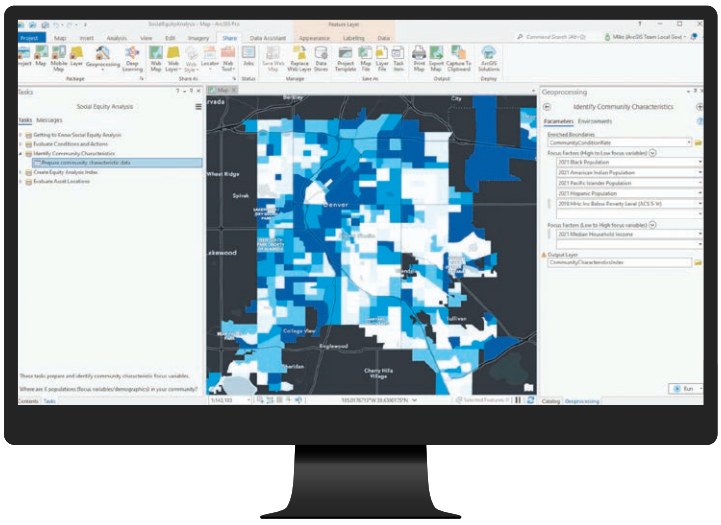
ArcGIS SOLUTIONS
TO ADDRESS HUMANS IN CRISIS

Opioid Epidemic Outreach Solution

The Opioid Epidemic Outreach solution delivers a set of capabilities that help you inventory prevention and treatment resources, communicate the severity of the epidemic, and promote resources that are available to those in need.

Social Equity Analysis Solution

The Social Equity Analysis solution can be used to understand community characteristics, analyze community conditions and actions, and generate an equity analysis index. The index can be used to educate internal and external stakeholders to determine how their actions are impacting their communities' access to care and needs.



For more information on addressing humans in crisis, please visit **go.esri.com/HumansInCrisis** or scan the QR code to get started today.

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Esri, the global market leader in geographic information system (GIS) software, location intelligence, and mapping, helps customers unlock the full potential of data to improve operational and business results.

Founded in 1969 in Redlands, California, USA, Esri software is deployed in more than 350,000 organizations globally and in over 200,000 institutions in the Americas, Asia and the Pacific, Europe, Africa, and the Middle East. Esri has partners and local distributors in over 100 countries on six continents, including Fortune 500 companies, government agencies, nonprofits, and universities. With its pioneering commitment to geospatial information technology, Esri engineers the most innovative solutions for digital transformation, the Internet of Things (IoT), and advanced analytics.

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