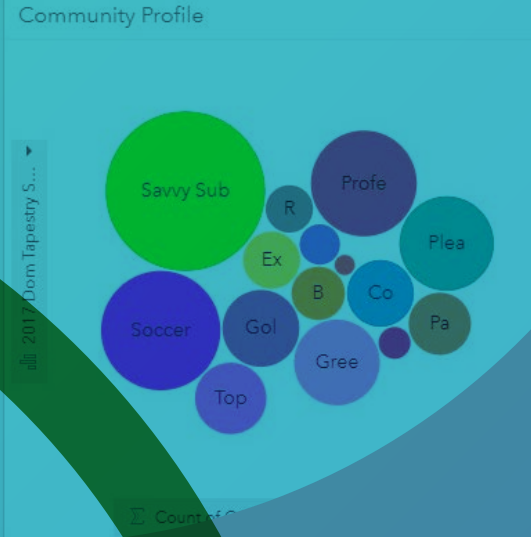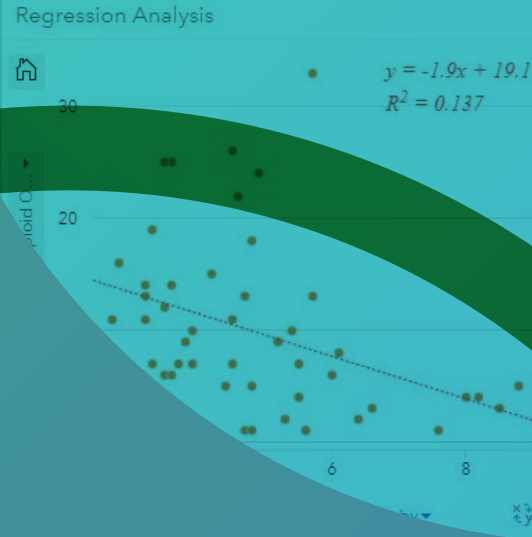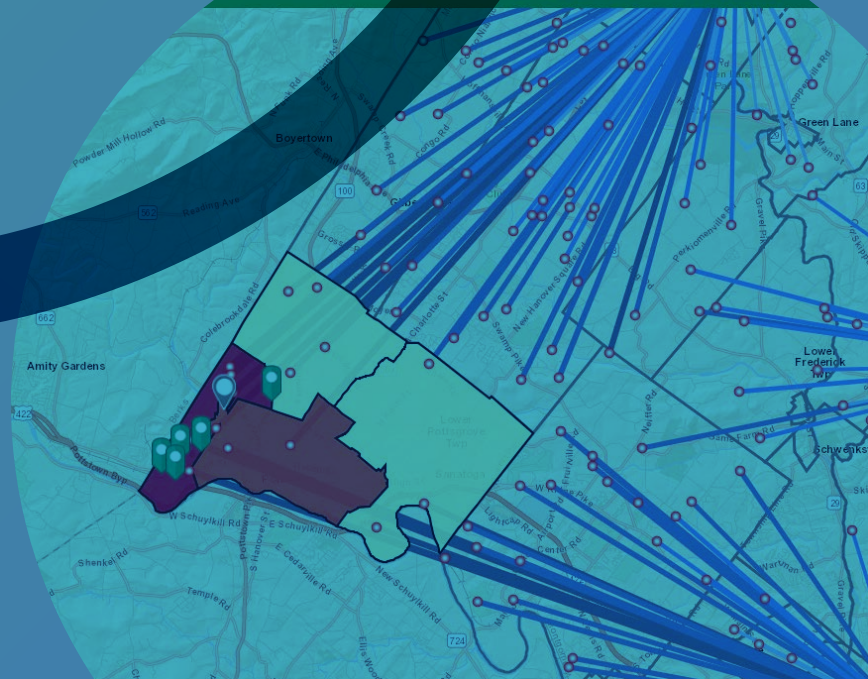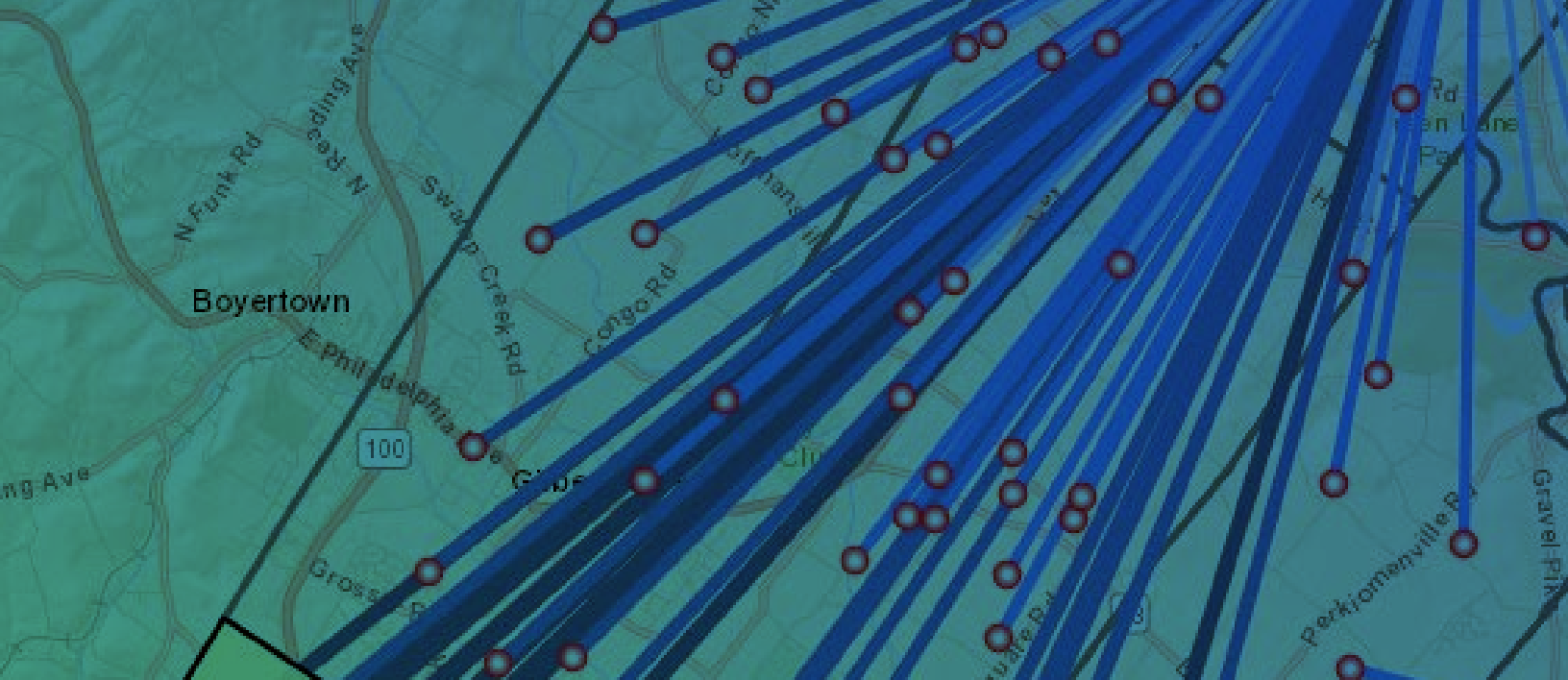Industry Perspective

Moving Toward Health Equity Through GIS

Community and location play a role in a person's health. Access to health not only impacts the person but the entire community. The truth is that where you live (and have lived) affects how healthy you are, and how healthy you can be.

Introduction

Imagine the following community: Parks and greenspaces dot the landscape, and safe sidewalks connect neighborhoods. Grocery stores full of healthy food are abundant, and there is affordable transportation linking the community to medical hubs and treatment centers. Bike lanes traverse the landscape, and the housing is safe and accessible.

Now imagine a different kind of community: There may be no sidewalks or greenspaces. There isn't accessible public transportation. Perhaps violent crime is more prevalent in this community, as well as opioid use, and the housing is in disrepair.

When looked at from those perspectives, it becomes clear: Community and location play a role in a person's health. Access to health not only impacts the person but the entire community. The truth is that where you live (and have lived) affects how healthy you are, and how healthy you can be.

Geographic information systems, or GIS, can help community leaders and organizations – from policymakers to nonprofits to health professionals and more – understand what health inequities exist in their communities by mapping, analyzing and presenting this data in order to create change at all levels.

To better understand the part GIS plays in helping communities move toward health equity for all residents, GovLoop partnered with Esri, a leader in GIS, and HERE Technologies, the Open Location Platform company, for this industry perspective. In the following pages, we'll learn what GIS is and why it should matter to all governments, how to achieve inter-departmental collaboration and move to working with nonprofits and leaders in the community and how you can use GIS to amplify your strategy and make the most of limited resources when combating health inequities. This report was informed by Esri thought leaders and government experts in the health arena.

Moving Toward Health Equity With GIS

Many factors play into health equity: access to healthy foods, access to quality healthcare, jobs, community support and social determinants of health, among others. The opioid and homelessness epidemics are two examples of health issues that are at the forefront of the complex challenges many communities are facing, and often overlap with the same populations and feed off each other, amplifying each underlying problem.

Overcoming these challenges requires inter-departmental collaboration and working with nonprofits and leaders in the community. Given the number of stakeholders and emotions inherent with these issues, being able to visualize and make data-driven decisions is essential.

The American Public Health Association defines health equity as such:

> By health equity, **we mean everyone has the opportunity to attain their highest level of health.**
>
> **How do we move toward health equity?**
> We value all people equally. We optimize the conditions in which people are born, grow, live, work, learn and age. We work with other sectors to address the factors that influence health, including employment, housing, education, health care, public safety and food access.

All communities aspire to be desirable and thriving places where people want to live, work, play, visit and prosper. And achieving health equity for all residents is a priority in achieving a healthy, livable and smart community.

But for a community to address inequity, it must first have a strong understanding of where it stands. How much inequity exists already in your community? Where is homelessness highest, and where is housing most expensive? Where is the access to care? Can people get transportation to essential resources easily or not?

Determining these factors to help communities move toward health equity is where GIS comes in.

Geography is helping organizations and communities everywhere better understand and improve human health. From examining environments to mapping resident data, GIS technology is being used to face today's changing world and advance health and human services across the country.

A location-based strategy can help create that approach to data collection and analysis. Knowing where your health inequities exist and where best to allocate your resources are keys to success. Organizations can use this six-step framework to integrate GIS into their tactics and ensure they are addressing health inequities from all sides.

With these six steps, communities can start understanding what health inequities exist in their communities, where they are located, what might be causing them and start to look at ways to overcome these crises of health inequity.

1 ORGANIZE EXISTING DATA. Before directing or creating any new resources, it's critical to understand what's happening in your community today. While health inequity is a nationwide problem, the causes and symptoms are heavily localized. Whether it's a lack of adequate housing options, treatment centers or other health support systems, it's imperative that agencies determine what resources are lacking within their community before they begin applying tactics.

2 COLLECT NEW DATA IN REAL TIME. Using Esri mobile solutions, staff or volunteers can easily collect additional data from the field, and additional enriched data from Esri, such as age, salary, health outbreaks, drug addiction rates and health center locations to build a more complete picture of their community.

3 COMMUNICATE YOUR FINDINGS. Collaboration between groups in the community and agencies reduces redundancies and improves overall efficiencies. As data is collected and analyzed, the information can be placed into an operational dashboard. Staff at all levels must continually track changing community dynamics as well as the success of their prevention and response tactics to ensure ongoing success.
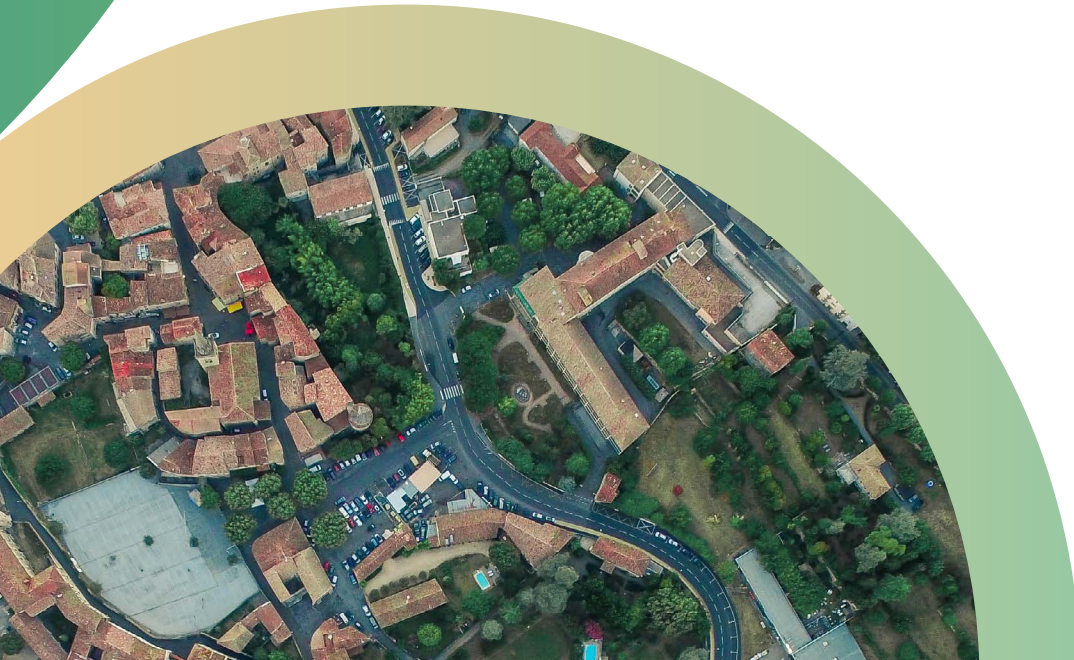
4 DEPLOY TACTICS AND ALLOCATE RESOURCES. Once a full view of community-specific health is created, staff can use maps to quickly decide on a course of action. Optimizing and allocating resources based on need and location maximizes limited resources.
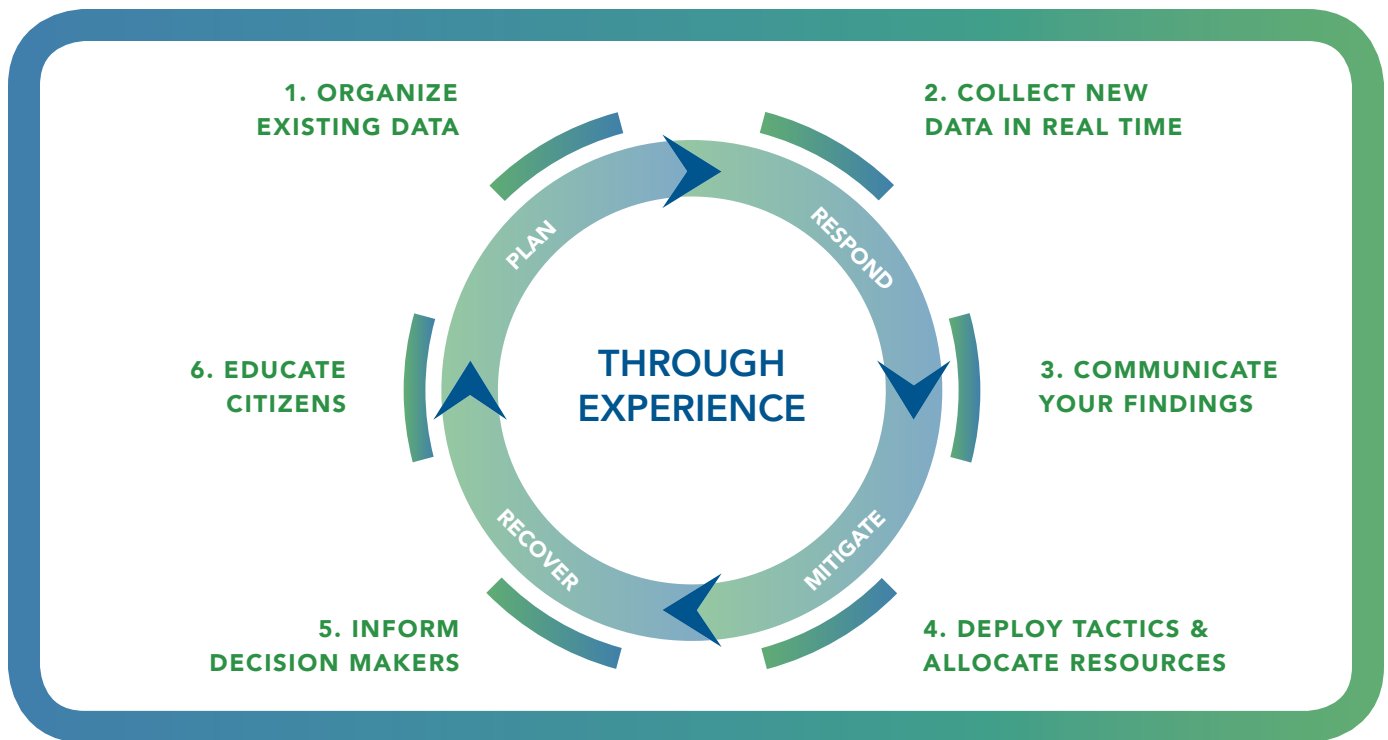
5 INFORM DECISION-MAKERS. GIS is an excellent tool for public relations managers to provide briefings to elected officials and government executives. Esri's Operations Dashboard for ArcGIS can be used to present information on the state of the crisis, financial allocation based on communities and progress of tactics so that swift decisions can be made in real time.

6 EDUCATE CITIZENS. Understanding the state of their communities' health inequities and what is being done about the issue is important for the public to understand. Esri Story Maps can provide a context that is easy to understand and relatable to where your constituents work, live and play. Story Maps let organizations combine authoritative maps and data with narrative text, images and multimedia content to paint a picture of health inequities.

1. ORGANIZE EXISTING DATA

2. COLLECT NEW DATA IN REAL TIME

3. COMMUNICATE YOUR FINDINGS

4. DEPLOY TACTICS & ALLOCATE RESOURCES

5. INFORM DECISION MAKERS

6. EDUCATE CITIZENS

PLAN

RESPOND

MITIGATE

RECOVER

THROUGH EXPERIENCE

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Finally, communities need to take one final step in achieving health equity: They should stop looking at individual tactics and create an organized effort and strategy in which they apply analysis and data to the development of programs and policy right away.

What does that mean? That insight without immediate action is not enough. Iterative policymaking — addressing issues in real time — is the next shift governments need to make. An example? Dekalb County, Georgia, was the first county in the nation to geocode its homeless populations in real time and to locate unsheltered people who were eligible for housing assistance. This helped the county identify those in need down to the street level and better allocate resources.

Those who are using GIS to address health inequities today are finding success by collecting and analyzing disparate data sets to reveal new insight, taking advantage of readily available applications and dashboards to improve situational awareness and operational tactics, and shifting to iterative policymaking to address issues in real time.

Tools For Moving Toward Health Equity

There are aspects of health inequity in every community, and many of these issues could be addressed with the use of spatial exploration and analysis. In particular, Esri Solutions for Health and Human Services can move your efforts toward achieving health equity in communities.

ARCGIS COMMUNITY ANALYST: Community Analyst allows you to view and analyze demographic, lifestyle, public and third-party sources of data to better understand the overall community questions and make better policy decisions. With Community Analyst you can understand and compare communities more deeply and on a factual level. By using the thousands of variables available, you can analyze specific locations, geographic areas or custom regions you create on the map, then relay critical information and analysis to others via maps and reports. With Community Analyst, organizations can determine how and where they should provide food, shelter, transportation and medical and emotional support.

INSIGHTS FOR ARCGIS ONLINE: This tool offers the opportunity to bring in multiple — potentially disparate — data sets and start exploring the data to see how patterns are revealed that you then need to do a deeper analysis on. Insights for ArcGIS offers a data analytics workbench where you can explore spatial and non-spatial data, answer questions you didn't know to ask and quickly deliver powerful results.

ARCGIS PRO: Beyond reporting requirements for access, you can use ArcGIS software to broadly consider healthcare accessibility. For example, with accessibility, you could buffer distances from bus stops to pre-qualify members for vouchers if they live too far away. In another example, you could promote community resource centers (CRCs) to members who live within five miles matching a certain criteria, such as over the age of 65, diabetic, etc. In a third example, you could look for concentrations of members with health conditions to find good locations to add behavioral health providers to medical clinics, creating a one-stop shop for care. With direct access to your data and a full suite of spatial analysis tools, there is no limit to the types of questions you can ask. ArcGIS pro has several hundred analytical tools that will allow users to do just about any kind of analysis they can think of to understand the root causes of any health inequities that are coming up in their communities, and then plan their response.

HERE Technologies & ESRI

HERE Technologies is a source of map data for the qualitative and high-quality street network data set used for geocoding, routing and mapping functions – functions that are fundamental to spatial analysis within the health industry.

Access to global geospatial content from HERE that's fresh and accurate means ArcGIS users, partners and developers will be able to create new and innovative solutions. The partnership also gives Esri access to real-time and predictive traffic data from HERE, which can then be used with the ArcGIS platform to give users the information needed to decide everything from whether building a new road is viable to developing services where precise ETA times are critical.

Finally, HERE also provides a comprehensive suite of traffic products that can be integrated into ArcGIS. Traffic data and driving time is critical for elements of spatial analysis. For example, think about a use case where you need to find out how many healthcare providers are within 10 minutes of your location in traffic. That information could be discovered using HERE data, offering powerful new insights to your community and its health accessibility.

Using GIS to Improve Health Equity

At its very core, the objective of delivering sustainable health equity suggests that all people have equal access to opportunities that enable them to lead healthy lives. Health inequities occur when access to resources are limited by social, economic or environmental conditions. GIS can and is being used to ensure that our citizens live healthy and happy lives. GIS provides data that can be used as a benchmark to improve the accessibility of health, provide insights through data analysis on course-correcting gaps in service levels and keep health providers and constituents connected and informed.

One area where GIS is providing unprecedented support in course-correcting health inequities is in reducing the impacts of opioid addiction in homeless populations. Esri's ArcGIS Solutions for Health Equity can be employed to understand where to increase access to care for homeless populations affected by the opioid epidemic. In particular, GIS users can determine how accessible treatment resource locations are to those who need them. This same set of analysis and tools can be used to determine how accessible any form of treatment and services are across a community.

Take, for example, the need to answer the question: **How accessible are treatment resources to a homeless population impacted by the opioid epidemic in your community?**

Locating low-access areas in a community involves understanding your population. Using drive- and walk-time analysis, you can view areas of need. For example, by mapping areas where clinics are and overlaying the residents who need treatment, you can visualize where some members of the community don't have reasonable access, depending on circumstances.

Understanding where there are gaps is a good starting point, but you will need to dig deeper to understand the target demographic and the data that is being used. You can see if there are spikes in days where overdoses are happening, locations that have higher proportions or incidences and a better understanding for an outreach strategy. Having these different variables visualized together can help make better decisions and ultimately help those in need.
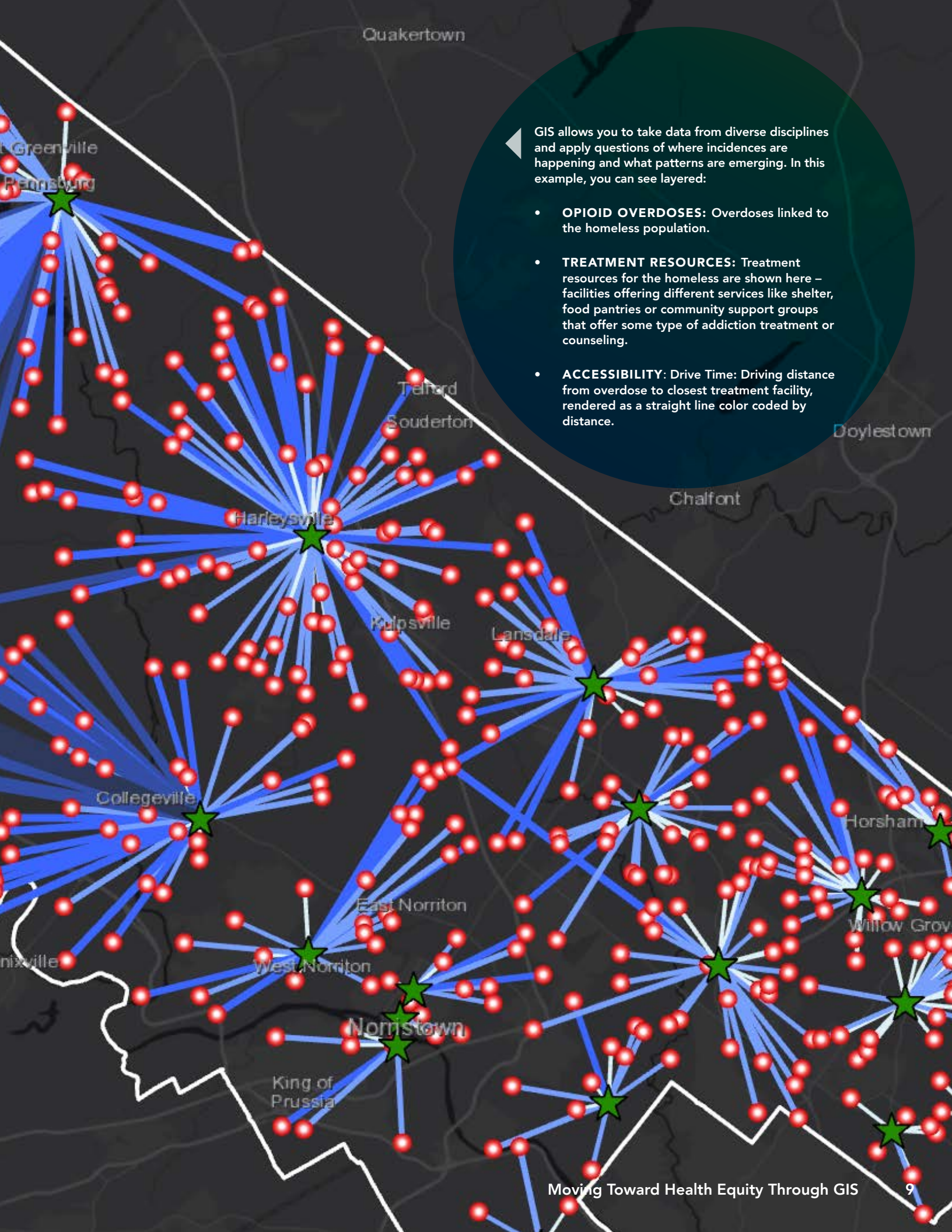
GIS allows you to take data from diverse disciplines and apply questions of where incidences are happening and what patterns are emerging. In this example, you can see layered:

- **OPIOID OVERDOSES:** Overdoses linked to the homeless population.

- **TREATMENT RESOURCES:** Treatment resources for the homeless are shown here – facilities offering different services like shelter, food pantries or community support groups that offer some type of addiction treatment or counseling.

- **ACCESSIBILITY**: Drive Time: Driving distance from overdose to closest treatment facility, rendered as a straight line color coded by distance.

$$y = -1.9x + 19.1$$
$$R^2 = 0.137$$
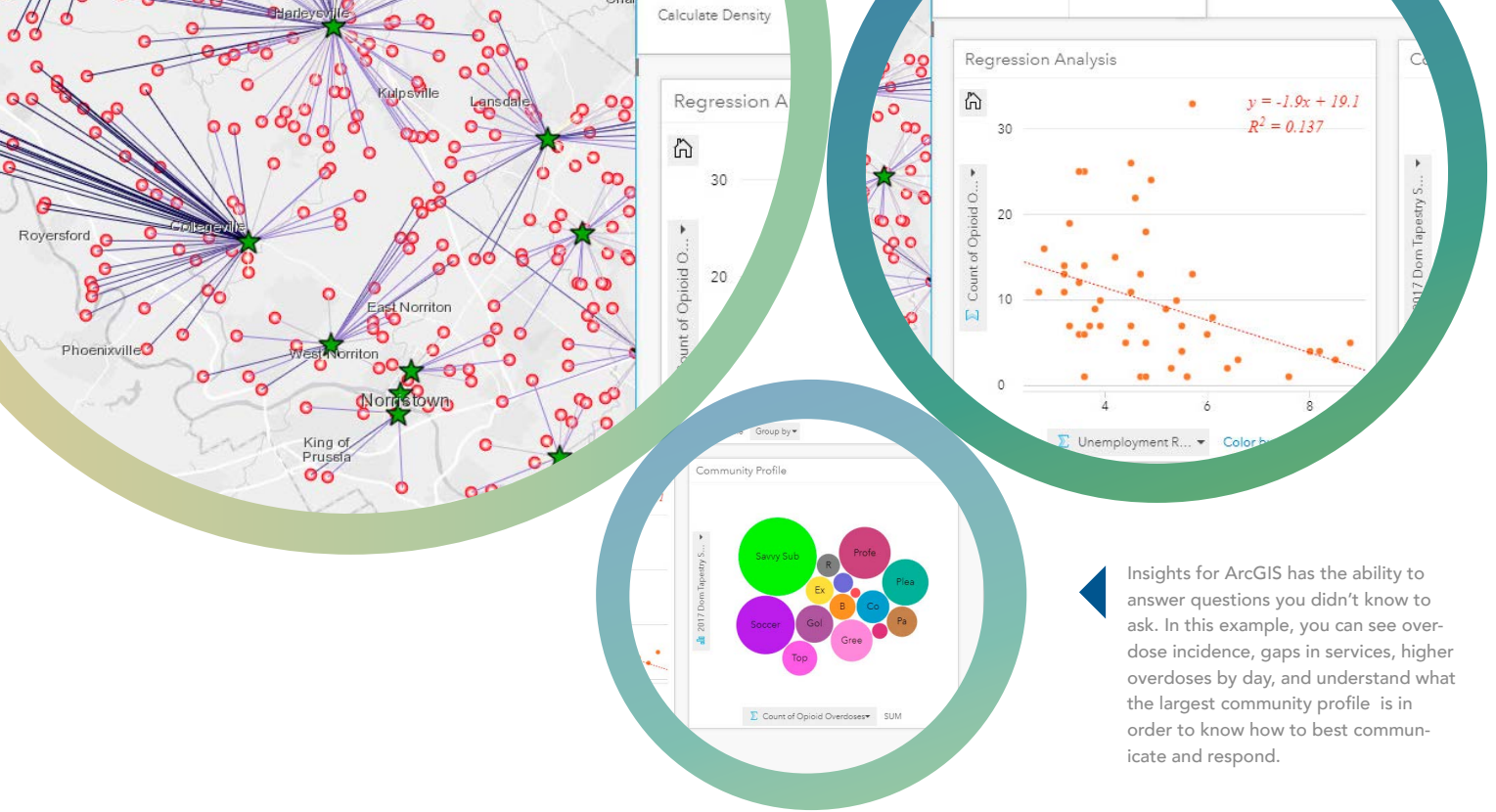
Insights for ArcGIS has the ability to answer questions you didn't know to ask. In this example, you can see overdose incidence, gaps in services, higher overdoses by day, and understand what the largest community profile is in order to know how to best communicate and respond.

Develop Targeted and Collaborative Intervention Strategy

Once gaps have been identified and you have a better understanding of the community, you will want to decide where to either place new resources or identify partners within the community to connect with. Using GIS, you can take the areas that have gaps, add criteria (like overdose data) and demographic data, and identify an area to place the resource that best fits your criteria.

So what's next?

After analysis uncovers an access issue, a community needs to take the next step to solve the underlying problems. Most teams have multiple people working on these issues, and ArcGIS fosters collaboration by allowing individuals to share the data with other stakeholders.

There are aspects of health inequity in every community, and some of these issues could be addressed with the use of spatial exploration and analysis. These issues are impacting all different aspects of the community and not just one targeted demographic.

Fortunately, ArcGIS is on the rise with agencies and health organizations. The use of GIS is becoming more predominant given the different data sets organizations need to use and integrate in order to analyze these underlying problems. GIS allows you to bridge knowledge gaps and explore data patterns and trends. And with access to geospatial content from HERE means ArcGIS users can create new and innovative solutions to meet their biggest challenges.

ArcGIS Community Analyst can help optimize your resource allocation decisions. Within this example, you can see the areas that have been identified that have gaps and also where possible resources could be placed based off of the analysis.

Conclusion

Health care professionals are faced with growing challenges in delivering health equity across their communities. Armed with GIS data and analytical tools, health professionals can make a significant impact in better understanding their communities' needs. The Science of Where connects people's locations to the areas needing improved access to services. GIS is helping build communities with the right amenities and allocating resources. With increased use of GIS, communities can help improve access to care and treat populations at high risk for health complications, ultimately giving members of a community a better chance for a healthier life.

About Esri

When Esri was founded in 1969, we realized even then that geographic information system (GIS) technology could make a difference in society. Working with others who shared this passion, we were encouraged by the vast possibilities of GIS.

Today our confidence in GIS is built on the belief that geography matters - it connects our many cultures and societies and influences our way of life. GIS leverage geographic insight to ensure better communication and collaboration. Explore our website to discover how our customers have obtained the geographic advantage by using Esri software to address social, economic, business, and environmental concerns at local, regional, national, and global scales. We hope you will be inspired to join the Esri community in using GIS to create a better world.

For more information, visit go.esri.com/HealthEquityStrategy and @esri_health.

About HERE Technologies

HERE, the Open Location Platform company, enables people, businesses and cities to harness the power of location. By making sense of the world through the lens of location we empower our customers to achieve better outcomes – from helping a city manage its infrastructure or a business optimize its assets to guiding drivers to their destination safely.

To learn more about HERE, including our new generation of cloud-based location platform services, visit 360.here.com and here.com.

About GovLoop

GovLoop's mission is to "connect government to improve government." We aim to inspire public-sector professionals by serving as the knowledge network for government. GovLoop connects more than 270,000 members, fostering cross-government collaboration, solving common problems and advancing government careers. GovLoop is headquartered in Washington, D.C., with a team of dedicated professionals who share a commitment to connect and improve government.

For more information about this report, please reach out to info@govloop.com.
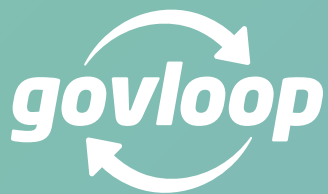
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