

HOW GIS SUPPORTS EFFECTIVE & EQUITABLE VACCINE DISTRIBUTION

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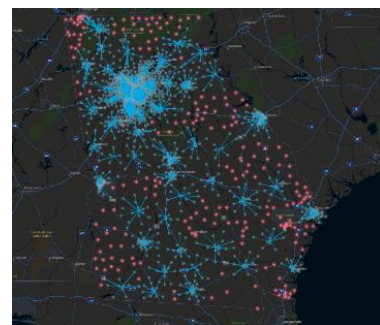
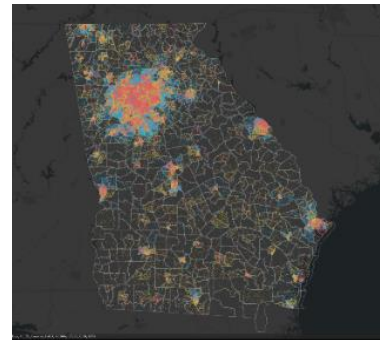
Introduction

Amidst the most-serious pandemic in a century, science and facts using modern technology, data, analytics and a coordinated approach have and will continue to help end this health and economic crisis. Chief among the objectives right now is the efficient and equitable distribution of COVID-19 vaccines. Siting critical points of vaccine distribution, getting people to the places to get the shots, and addressing vaccine hesitancy are all geographic challenges. Success in this crucial endeavor is heavily dependent on location intelligence. Esri, the global leader in geographic information systems (GIS) technology, is well positioned to help meet state vaccine distribution goals immediately. What follows provides insight into an impactful coordinated approach.

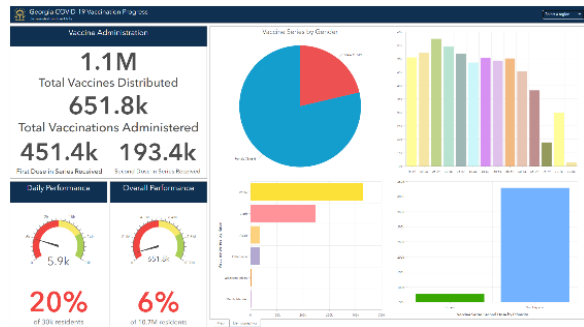
EXECUTE EFFECTIVE & EQUITABLE NATIONAL VACCINE STRATEGY

A geographic approach, with equity and accessibility at the center of vaccine distribution supports a streamlined process that gets doses into arms as fast as the vaccine can be manufactured. In short, Esri data, analysis and applications are critical to:

- **Map the population** based on total population numbers, population density, high risk population segments, vulnerabilities or any other metrics that can be interpreted as eligible for vaccine and at risk for COVID-19 infection and/or more severe disease. The state of Georgia example shows the original 3 population priority groups based on CDC guidance.
- **Measure accessibility** to current vaccination venues, such as a 30 minute drive-time or a 15 minute walk-time. In this example, the State of Georgia is able to provide 30 minute drive-time access to vaccine for 91% of its population (in blue). However, 9% of the population (in red) would have to travel further for vaccine.



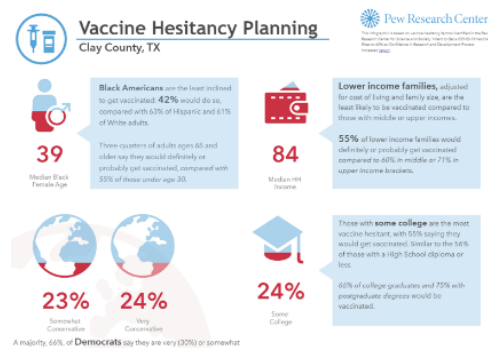
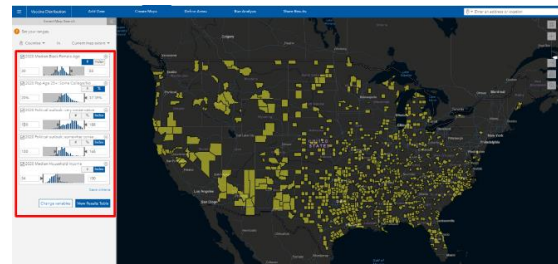
- **Outcome-based dashboards** provide insight into progress toward vaccination goals and herd immunity in consideration of demographic factors of age, race/ethnicity, and gender. At the same time, partial and full series dosing can be reviewed. All of this is location-enhanced so that any region or vaccine venue in the state can be dynamically explored and reviewed. Readily available information at regional and state levels enable immediate adjustments to vaccine supply chain and other key resources while locals build their capacity.



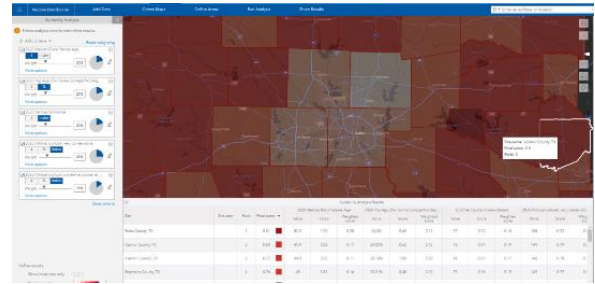
IDENTIFY & TARGET VACCINE HESITANCY

Urgency is critical in developing a national vaccine communication and education campaign that restores public trust in vaccines, especially in disproportionately affected and at-risk communities. Place matters, as does the use of maps, visualization and analysis to help inform an effective and equitable vaccine communications campaign. Esri technology and data are vital to:

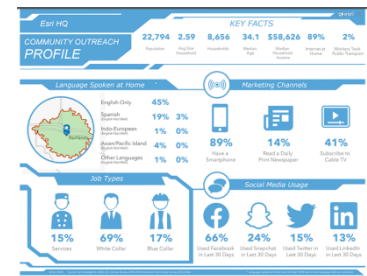
- Identify the **characteristics of hard to vaccinate populations** (e.g. gender, race/ethnicity, age, political party, education, etc.).
- **Prioritize** those populations that are most 'hesitant' and construct a model. Factors contributing to hesitancy can be filtered to identify target demographics, behaviors or attitudes, and easy to understand and interactive infographics can be automatically generated.



- **Configure audience characteristics** by county for more targeted and local outreach. Find communities where the same communications strategy could be reused ... build once, use many.



- Leverage location intelligence to **segment audience** and inform where outreach will be most effective (based on social media usage, job types, marketing profile, etc.)



- **Build interactive stories** with strong visualizations and messaging to educate, inspire, motivate, incent.

- **Measure vaccine uptake** in dashboards to determine if messages are reaching target audience and behavior is changing.



- **Assess** sentiment analysis and herd immunity threshold with third-party support and Partners.

- **Analyze customer behavior** leveraging market segmentation and using interactive data exploration tools. Use segments to understand factors which drive engagement and adjust outreach accordingly.



- Use **link analysis** to map the degree to which different segments react to different marketing channels such as email, coupons, web and mobile apps.
- **Foster partnerships** and share methodology and tools with jurisdictional partners for consistent reporting.

Ready to Act

Our organization has a longstanding history of serving as a significant partner in key federal, state and local government undertakings. Esri's cutting-edge COTS (commercial off-the-shelf) tools are being employed by HHS, CDC, FEMA, VA, and other key Federal agencies; all 50 states; a majority of U.S. counties; global health partner WHO and national and local Ministries of Health; and many leading healthcare providers and researchers. We stand ready to support government agencies as they tirelessly work to vaccinate the American public.

As we have demonstrated in this document, the Esri platform includes a range of software tools that are uniquely suited for implementing a successful vaccine strategy and tackling other crucial components of the COVID challenge. Our software facilitates equitable and rapid vaccine distribution by enabling geographic understanding of capacity, demand, vaccine hesitancy, and vaccine-induced immunity across disparate communities. Problems related to testing and vaccine access can be addressed with geospatial analysis capabilities. Our map-based dashboards provide crucial situational awareness for government officials and healthcare providers. And ArcGIS enables users to paint a clear picture of risk factors and racial and social inequities affecting how different populations are dealing with the pandemic.

Our platform is easily accessible as you get to work and begin to tackle a range of COVID-related challenges. We're ready to hit the ground running – let us help you achieve better health for the American people.

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