Dallas County's award-winning approach modernizes public health disease surveillance to meet pandemic demands

CSTE Stories FROM THE Field

CONTRIBUTOR: *Philip Huang, MD, MPH, Director/Health Authority, Dallas County Health and Human Services*

CATEGORY: **Enterprise Approach to Data Systems Modernization**

To combat the COVID-19 pandemic, Dallas County Health and Human Services (DCHHS) employed a variety of enterprise level software solutions to manage and automate a huge increase in data volume without sacrificing data quality, conduct large-scale contact tracing to understand and control spread, and improve disease investigation workflows and data visualizations to reduce the burden placed on public health professionals. Click here for more information on this activity.

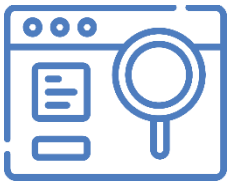
DCHHS is a public health department responsible for providing public health and social services that protect the health and well-being of over 2.6 million people in Dallas County, Texas. To combat the COVID-19 pandemic, DCHHS employed a variety of enterprise level software solutions to manage and automate a huge increase in data volume without sacrificing data quality, conduct large-scale contact tracing to understand and control spread, and improve disease investigation workflows and data visualizations to reduce the burden placed on public health professionals. It serves as an exemplary and important foundation for data modernization efforts to address other important public health conditions. Dallas County Health and Human Services (DCHHS) has been recognized as a 2023 Healthcare Information and Management Systems Society (HIMSS) Public Health Davies Award recipient.

The "What"

DCHHS serves a diverse county of 2.6 million people. The volume and variety of data generated and processed during the COVID-19 pandemic put immense strains on existing public health data systems, also imposing an increased manual burden on disease investigators as they conducted large-scale contact tracing. The COVID-19 pandemic exposed existing gaps in public health disease surveillance and investigation infrastructure and posed new challenges for public health data systems. The COVID-19 pandemic revealed how public health data infrastructure had previously been neglected, causing DCHHS to conduct a necessary review of outdated systems and technology. The impact of these systems on data quality and timeliness was quickly evident and needed to be addressed rapidly to allow DCHHS to provide data necessary to make important and potentially costly public health policy decisions. In addition, as the pandemic continued, the impact on the workforce was evident – public health staff were overwhelmed and attrition increased, furthering the burden placed on others. These challenges exposed the impact of the system on routine disease surveillance and showed the need for improvements for future preparedness as well.

In Dallas, three critical needs were identified: management of increase in data volume without sacrificing data quality, ability to conduct large-scale investigation and contact tracing to understand and control spread and improve disease investigation workflows to reduce the burden placed on public health professionals. To address these needs, Dallas County Health and Human Services (DCHHS) worked with Accenture and employed trusted enterprise-level software, including Salesforce, Informatica MDM, MuleSoft, Rhapsody, and Power BI. All these technologies were brought together to craft a seamless solution with streamlined user experience. These tools are adaptable and scalable, improving Dallas County's long-term preparedness to address future threats more readily. As industry-leading technologies, they also provide Dallas County security and peace of mind when it comes to data security.

Data from the Disease Surveillance and Investigation system during the COVID-19 pandemic were critical for monitoring disease trends and were provided as inputs to inform policy decision-making about interventions to reduce transmission. Data was also used for improving neighborhood-level visibility to identify at-risk areas – including those with higher burden of COVID-19 incidence and areas with lower rates of vaccination. Consequently, this system was pivotal to effectively reducing COVID-19 transmission in Dallas County, resulting in decreased rates of hospitalization and mortality related to COVID-19. This system has also proven applicability beyond COVID-19, as it was employed to address the recent Mpox outbreak. Similarly, the system allowed Dallas County to rapidly begin tracking Mpox cases and contacts in Dallas County, providing the ability to identify potential at-risk populations and deploy appropriate public health campaigns. The ability to quickly spin up this surveillance capability allowed officials to rapidly contain the situation.



The "So What"

Currently, the system can process millions of data points, with the ability to expand the capacity even further. Data feeds are currently refreshed nightly with the ability to increase frequency based on the need, providing near real-time data for analysis, reporting, and decision making. To address the long lag time due to manual data entry, the new system was developed with the capability to ingest, validate, clean, match existing records, and merge data automatically, based on business rules developed by DCHHS. Not only does this provide more rapid availability of data for investigation, but it also provides electronic queues for workload management and tracking, and customer relationship management (CRM) tools for automated communication. From all this information, the system creates a single, complete, comprehensive person-based data source for all relevant public health information.

Implementation of the Dallas County Disease Surveillance and Investigation System has enabled Dallas County Health and Human Services to successfully manage the high volume demands during the COVID-19 Pandemic related to data ingestion, disease investigation, contact tracing (including standing up a system to accommodate hundreds of contact tracers), data reporting and visualization, CRM communication, and state and Centers for Disease Control and Prevention (CDC) reporting requirements. The system was expanded to address local needs related to the Mpox epidemic, including automated patient symptom monitoring, showcasing its ability to enhance DCHHS preparedness and response. It is also currently being expanded to accommodate all reportable conditions, and the future state will accommodate other data sources (including Homeless Management Information System data, emergency response data and other social service data) and address other public health issues of importance such as chronic disease, opioid overdoses, and other conditions, providing a comprehensive view of public health. A proof-of-concept rapid deployment for any new emergent conditions was demonstrated for Ebola and Marburg Virus, with recent epidemics seen in West Africa. Timely and accurate data for COVID-19 were critical for local policy decision-making related to workplace closures, masking recommendations, etc. Obtaining accurate granular data were also critical for addressing health equity issues in the community to facilitate identification areas of higher need, and targeting of community outreach activities related to testing, vaccine administration, education, and other efforts to reduce health disparities.

The "Now What"

In 2022, Dallas County expanded the system capabilities to address immediate response needs regarding Mpox and the Ebola outbreak in Uganda (monitoring returning travelers). The system has been further expanded to cover over 130 reportable conditions and is scheduled to include all reportable conditions and sexually transmitted infections by July 2024. Rapid deployment proof-of-concept was demonstrated with development of a template for all requirements needed for adding a new condition. This was tested for Ebola and Marburg Virus and the conditions were added within one two-week sprint.

Implementation of the Dallas Disease Surveillance and Investigation System has been critical to address equity and access issues through enabling the capability of providing granular COVID-19 data to identify census block-level analysis to identify highest priority areas with greatest burden and highest need for targeting of outreach and community vaccination efforts.

DCHHS's partner, the Parkland Center for Clinical Innovation (PCCI), has developed a community vulnerability dashboard that facilitates simplified access to a comprehensive summary of social determinant information for any specific address, census block, census tract or zip code. This summary is being incorporated into the Disease Investigation platform to provide this associated information for any individual location address.

Key contributors to this project include Rachel Oldham (Corbin), Raza Syed, Dr. Saad Zaheer, Dr. Dongyoung Shin, Samantha Groppell, Vanessa Gerstner, Diana Chavelas, Luis Vazquez.

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