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Data Modernization in Public Health

What is it and Why Now?

Background

Public health departments continue to rely on sluggish, manual processes such as paper documentation and phone calls. Current systems are siloed, causing inefficient workflows while making data collection and associated decisions difficult. In addition, they lack the necessary security and analytics to ensure the safety of those they serve.

COVID-19 exposed these weaknesses in our nation's current public health - particularly in the area of emergency preparedness. The silver lining is that the pandemic brought these issues into the spotlight, creating the push for change through initiatives such as:

- The Data Modernization Initiative (DMI) from the Centers for Disease Control and Prevention (CDC)
- Senators proposing bipartisan legislation to bolster pandemic preparedness and response
- The unleashing of a great deal of private and public funding for Public Health organizations to undergo these changes and improve their resiliency.

According to a survey from Ernst & Young LLP (EY US), more than 8 in 10 of the decision-makers surveyed said advances in data and data technology will make them more optimistic than they had ever been about what public health can achieve.

> *"After the disruption of COVID-19, public health will never be the same – but the future is still unclear. From the politicization of pandemic interventions to pre-existing operational challenges, today's public health leaders face both extrinsic and intrinsic obstacles. These must be addressed today to adequately prepare for tomorrow's anticipated and unexpected public health emergencies."*
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> *- EY - 21 Jun 2022*

What is DMI?

While public health has made great progress, there is still a long way to go. Community collaboration and connectedness are key when ensuring that public health infrastructure is in place for both infectious and/or non-infectious threats.

Change is needed—and the CDC is at the forefront of innovative, strategic initiatives. According to the CDC, the DMI is how our nation will move from siloed and brittle public health data systems to connected, resilient, adaptable, and sustainable 'response-ready' systems that can help us solve problems before they happen and reduce the harm caused when they do occur. The DMI is the core of a national effort to create a more modern, integrated, and live data and surveillance system.

The CDC's DMI Strategic Implementation Plan outlines the following goals, or ultimate outcomes, for Public Health. This is an effort to modernize core data and surveillance infrastructure across the federal and state public health landscape:

- Rapidly identifying and effectively mitigating emerging threats
- Sourcing trusted data to promote evidence-based behaviors, interventions, and solutions to protect health
- Giving every American an equal opportunity to attain the highest level of health possible
- Having the right information at the right time to make decisions
- Being better prepared for, and protected from, all types of public health threats

All players and stakeholders, whether private or public, government or community-level, will need to play a role in facilitating these changes to create more robust, sustainable, and cohesive public health programs.

DMI Implementation Plan

CDC's implementation Strategy lays out a clear set of priorities and objectives that will lead to specific desired outcomes, including response-ready systems, a common operating picture that brings data together to inform action across public health, a highly skilled workforce, strong partnerships, and effective governance. For the period of FY22-26, CDC will focus on the following five priorities to achieve DMI outcomes:

Outlined below is an overview of how the CDC is focusing on building the right foundation (Phase 1) and accelerating data into action to create a system (Phase 2) that will improve the health of all people. Aztute Precision Public Health solution provides underpinning for these two phases of the DMI and complements the remaining three phases.

For more information, visit:
https://www.cdc.gov/surveillance/pdfs/319521-AE_DMI-Snapshot_clean_032422c_508pass.pdf

1 Build the right foundation

Provide a secure, scalable foundation with appropriate automated data sources to enable timely and complete data sharing, break down silos, and reduce burden on data providers. This includes building the right foundation to strengthen and unify critical infrastructure for a response-ready public health ecosystem.

2 Accelerate data into action

Faster, more interoperable data provides high quality information that leads to knowledge and provides a more real-time, complete picture to improve decision-making and protect health

3 Develop a state-of-the-art workforce

Identify, recruit, and retain critical workforce in health IT, data science, and cybersecurity specialists to be stewards of larger quantities of data and tools to generate meaningful public health insights

4 Support + extend partnerships

Engage with state, territorial, local, and tribal partners to ensure transparency and address policy challenges, and create new strategic partnerships to solve problems

5 Manage change and governance

Support new ways of thinking and working by providing the necessary structure to support modernization and aid adoption of unified technology, data, and data products

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1 Building the right foundation

Real-time Data Collection

The CDC created new pathways for surveillance data to flow seamlessly between jurisdictions and CDC, collected more demographic data, and increased the number of laboratories and health departments who are connected

Cloud-based Services

The CDC moved more of its data securely into the cloud to streamline the way they process, store, visualize, and share it.

Automation

The CDC automated more data from critical sources like electronic health records and death certificates to allow hospitals and other data providers to begin "turning off their fax machines."

State and local capabilities

The CDC answered state, local, tribal, and territorial needs through a mix of funding and technical support, and by identifying dedicated data modernization leads in every jurisdiction.

2 Accelerating data into action

Deeper Insights

Health Equity > The CDC continued bridging the gap between the data we have now and the data we need to fully understand and address the drivers of health disparities.

Fast and secure connections

Interoperability > The CDC continued working toward shared data standards, such as FHIR, that connect previously disconnected data systems and created hubs for rapid, bidirectional data exchange.

Sharing more

Open Data > The CDC provided more data directly to the public and to researchers for faster insights on COVID-19, health equity and other priorities.

Flexibility for the future

Scalable Emergency Response > The CDC increased the use of systems that can be rapidly scaled-up when needed, so that the same system can be used for 300 or 3 million cases.

How is Aztute Supporting DMI?

Policies and programs driven by accurate data collection and analysis lead to the ability to positively impact health factors and programs, ultimately leading to improved health outcomes, length, and quality of life!

Most public health agencies have already invested in some technologies such as websites, google spreadsheets, EHR, ERP, state-provided systems, dashboards, CMS, and more. It is often difficult to string together disparate tools to meet the key requirements related to data privacy, security, scalability, and the high degree of interoperability that must form the backbone of any public health solution stack. Investing in the public sector means not only investing in new, community-facing technologies but also leveraging existing technologies.

With the right tools, such as the Aztute Precision Public Health Solution, addressing public health threats can be greatly improved and make us better prepared for future crises. Under the model described here, the technology implementation can be categorized into four main domains: detection, response, recovery, and prevention. A common theme across all domains is a data platform that integrates data from the community and provides timely and relevant insights to public health stakeholders in real-time, allowing improved coordination and proactive responses. The cyclical nature of the proposed model attempts to capture the need for an adaptive, recurring, and continuously improving public health response.

Various solutions connect public health agencies with communities, businesses, and healthcare systems to detect, prevent, respond to, and recover from public health emergencies—supporting all aspects of the DMI.

DETECT

RESPOND

PREVENT

RECOVER

Detect

Aztute's solution helps detect threats, outbreaks and other emerging health issues in the community through collection and monitoring of data collected from the community.

Without Data Modernization
- Fax machines
- Spreadsheets
- Siloed systems
- Paper-based forms

With Data Modernization
- Use of mobile devices and other smart technologies to capture and monitor data collected directly from the community.
- Integration of 3rd party data and interoperability with external systems.
- Targeted testing and surveillance tools.
- Automated Detection: via rules-based algorithms to detect abnormal patterns or changes
- Customized, Online Community Needs Assessments leveraging Social Determinants of Health (SDOH) data.

Respond

It helps respond quickly by using public health tools (case management), making data-driven decisions and implementing policies in collaboration with community partners with accuracy and speed.

Without Data Modernization
- Websites
- Email
- Flyers
- Verbal communication
- Paper-based disparate systems
- Spreadsheets

With Data Modernization
- Realtime, Secure Collaboration with Community partners & stakeholders
- Targeted Communications such as generation and distribution of established policies, protocols, guidelines and evidence-based content
- Multi-channel Content Distribution - emails, text alerts, apps, online chat, websites, kiosks
- Automated Non-Pharmaceutical Intervention (NPI) tools for Contact Tracing, Case Management, Surveillance, and Quarantine Management

Recover

Through data, research and community collaboration, it helps identify systemic causes and apply appropriate interventions as part of recovery and long-term health improvement of the community.

Without Data Modernization
- Phone calls
- In-person meetings
- Traveling on-site
- Paper-based documentation

With Data Modernization
- Online referrals to other agencies and providers
- Telehealth Counseling
- Automated distribution of targeted content
- Customizable Inspection and Compliance tools

Prevent

Using predictive analytics, policy enforcement and evidence-based health education helps in the prevention of communicable diseases, wellness, chronic diseases, and mental health crises.
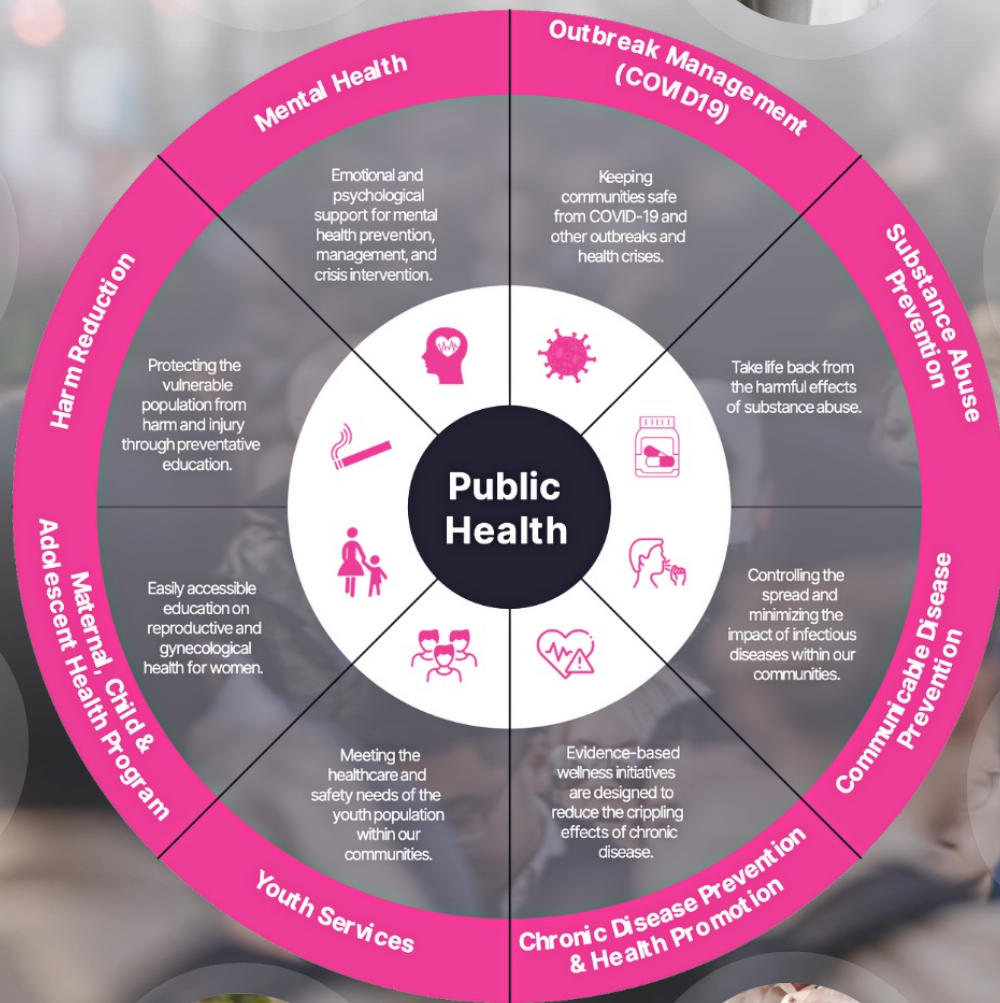
Without Data Modernization
- Reactive
- Flyers
- Training
- Bulletins

With Data Modernization
- Preventative
- Powerful predictive analytics engine to prepare for and proactively respond to emerging health crisis.
- Delivery of evidence-based health education and content to promote good health
- Target populations or areas based on SDOH analysis

Re-Imagining Public Health with Data Modernization

Public Health

Mental Health
Emotional and psychological support for mental health prevention, management, and crisis intervention.

Outbreak Management (COVID19)
Keeping communities safe from COVID-19 and other outbreaks and health crises.

Harm Reduction
Protecting the vulnerable population from harm and injury through preventative education.

Substance Abuse Prevention
Take life back from the harmful effects of substance abuse.

Maternal, Child & Adolescent Health Program
Easily accessible education on reproductive and gynecological health for women.

Communicable Disease Prevention
Controlling the spread and minimizing the impact of infectious diseases within our communities.

Youth Services
Meeting the healthcare and safety needs of the youth population within our communities.

Chronic Disease Prevention & Health Promotion
Evidence-based wellness initiatives are designed to reduce the crippling effects of chronic disease.

Examples of DMI

DMI should be at the core of every public health program- providing a 360-degree view of the community with instant access to data to make data-driven decisions. Examples include:

- Controlling disease outbreaks and the spread of other diseases requires rapid response through detection and early response. Data collected for COVID-19 and other communicable diseases can be easily centralized, so reporting results to local and state health authorities can be done with just a click of a button to reduce reporting timelines, reduce cost of data collection and be better prepared for external threats.

- Supporting Community Health Assessment (CHA), which requires collecting primary data directly from community residents to hear the community's voice. By automating, standardizing and simplifying data collection for the CHA, public health agencies can better identify areas of need throughout the community and help implement. Community Health Improvement Plans (CHIP).

- Creating an environment for promoting community collaboration to combat mental health disorders and substance abuse—which are on the rise throughout our communities and across the globe.

- Providing complete access to the most trusted, expertly vetted educational resources based on individual needs.

- Supporting wellness initiatives designed to reduce the crippling effects of chronic disease through empowering individuals and communities to choose healthy behaviors.
- To empower women, children, and families— giving them autonomy and power over their health.

- Providing easily accessible resources on reproductive and gynecological health for women as well as developmental screening tools and milestone guides for infants and children—allowing for early identification and intervention when needed.

- Supporting public health initiatives across diverse communities– whether it is understanding the challenges of the youth or providing oral health support to the elderly or underserved—all are provided with education and resources.

Having an accurate snapshot of a community's health is key in determining what populations are most vulnerable and how to appropriately allocate resources. DMI is the right approach to building resiliency and responsiveness in public health to keep communities safe and healthy. For more information on DMI, visit https://www.cdc.gov/surveillance/data-modernization/index.html.

Data Sources

Data is critical when it comes to understanding the health of a community and disproportionately affected populations. Collecting, monitoring, and analyzing data on health itself, along with factors that influence it, helps identify threats, patterns, and emerging issues. Data is obtained by working with the community to understand its health status, needs, assets, key influences, and narrative. This is done by collaborating and facilitating the sharing of data with community partners and stakeholders. Data is collected via survey forms, branded apps, and kiosks that are extended to the community, schools, and non-profit and for-profit sectors.

These can include but are not limited to, healthcare systems, nursing homes, schools, community centers, and more. As an example, surveyors conducting a community health assessment will need access to hospitalizations, cancer statistics, and more for their reports. With a data integration system in place, this information can be sent securely and quickly. Public health greatly benefits from integrating external data sources (state/local/health systems, data pipelines, etc.) with existing systems (EMR/population health/care coordination/immunization systems, contact tracing) using standard protocols such as FHIR, HL7, and more.
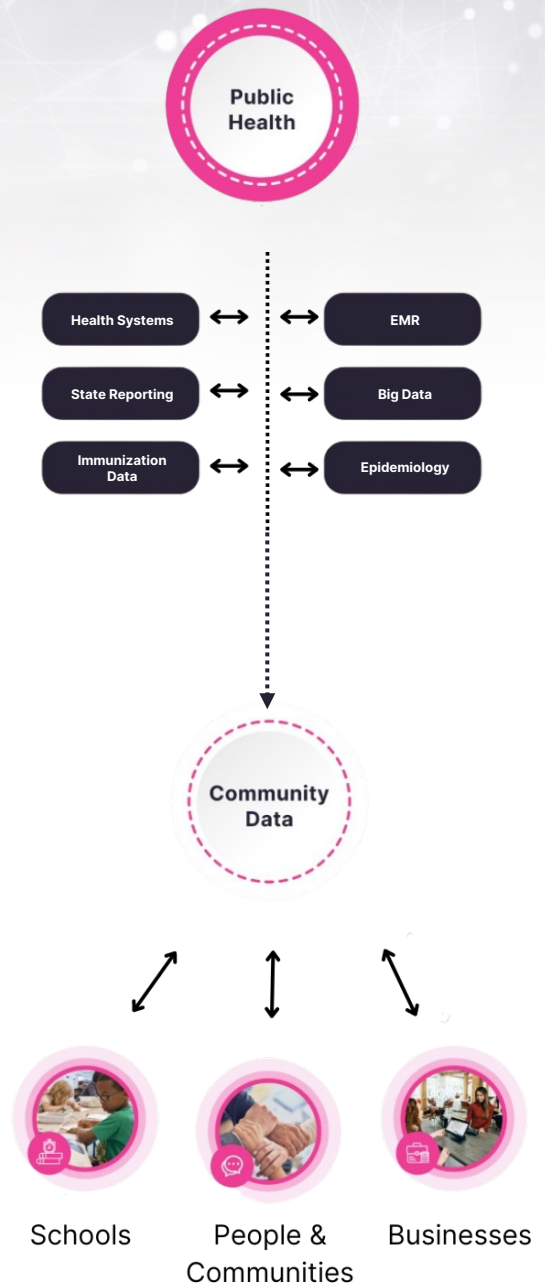
Big Data – Bring it on!

Public health addresses widespread, population-level issues that affect Americans from every walk of life, in all parts of the country.

Aztute provides a data collection and management system that simplifies the labor-intensive processes required from public health agencies when bringing all pieces of data from the community together. Understanding the "bigger picture" is more feasible with technologies that capture a continuous flow of accurate data. Putting these in place can provide a "link" to "big data" visualization- with the intention of having the right framework in place to push for policy change and other wellness-promoting activities.

Having data points on wastewater surveillance, searches for cough and cold medicine, purchases of fever-reducing medication, school absenteeism, traffic, ridership on public transportation, and more, for example, can positively impact the status of public health in this country and around the globe. Prioritizing the step-by-step process to get there is key.

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Public Health

Health Systems ↔ ↔ EMR

State Reporting ↔ ↔ Big Data

Immunization Data ↔ ↔ Epidemiology

Community Data

Schools   People & Communities   Businesses

Funding for Better Public Health

Many agencies want to modernize -but just don't have the time, resources, or funds to do so. Fortunately, a great deal of private and public funding has now become available for Public Health systems to utilize and undergo this process:

- The Data Modernization-COVID supplemental award, funded through the ELC Cooperative Agreement awarded $200 million to 64 public health jurisdictions for a two-year program that will support data modernization efforts in different areas.

- On June 23, 2022, the CDC announced Strengthening U.S. Public Health Infrastructure, Workforce, and Data Systems, a new, flexible funding opportunity that will provide nearly $4 billion over five years to improve critical public health infrastructure to health departments across the country.

- Under several Acts (CARES, ARP & COVID Relief) passed by the U.S. Congress, over $200 billion has been allocated to public health and schools to help recover from the COVID-19 pandemic. This includes addressing the resulting physical and mental health crises and building resiliency for any potential future crises.

These are just some of the funding opportunities available for the different levels of public health agencies, and there are certainly more to come.

$200 Billion

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To improve public health infrastructure across the country (Flexible funding opportunity announced in June 2022 by the CDC to strengthen U.S. public health infrastructure, workforce, and data systems)

Reference: https://www2.ed.gov/about/offices/list/ope/arp.html

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To improve public health infrastructure across the country (Flexible funding opportunity announced in June 2022 by the CDC to strengthen U.S. public health infrastructure, workforce, and data systems)

Reference: https://www.naco.org/blog/cdc-announces-4-billion-funding-public-health-workforce-infrastructure-and-data-systems

$200 million
64 public health jurisdictions

Over two years to support data modernization efforts (COVID supplemental award, funded through ELC Cooperative Agreement)

Reference: https://www.cdc.gov/csels/dmi-support/accelerating_data_modernization_in_public_health_departments.html

References

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3. ARP: American Rescue Plan (HEERF III)
https://www2.ed.gov/about/offices/list/ope/arp.html

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https://www.ey.com/en_us/news/2022/06/ey-us-survey-us-public-health-officials-agree-digital-transformation-can-help-prepare-for-future-crises-but-lack-consensus-on-next-steps

5. HEALTH WORKFORCE, INFRASTRUCTURE AND DATA SYSTEMS
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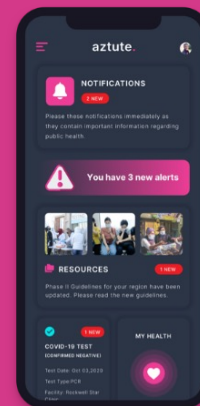6. Senators propose bipartisan legislation to bolster pandemic preparedness and examine US Covid-19 response
https://www.cnn.com/2022/01/25/politics/covid-19-bill-us-response-origins/index.html

7. For more information on DMI, visit https://www.cdc.gov/surveillance/data-modernization/index.html.

About Aztute

Aztute's mission is to leverage data-driven decision-making to save lives and help the economy recover quickly from public health crises. Our digital SaaS public health platform is based on a precision public healthcare framework that connects public health agencies with their communities, businesses, and healthcare systems to detect, prevent, respond, and recover from such crises.

Built on Microsoft Cloud for Healthcare, the Aztute platform leverages AI-driven insights to help predict risk, drive data-driven decisions, and accelerate responses. Our secured Command Center helps public agencies through active monitoring, surveillance, compliance, communication, and collaboration, driving safe and rapid recovery from public health crises.

Built on Microsoft Cloud for Healthcare

Microsoft