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An Interconnected Approach to Equity-Centered, Data-Driven Public Health Work

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As part of the 2022 American Public Health Association Conference, Deloitte Consulting with the Deloitte Center for Government Insights developed an issue brief titled *Advancing Public Health Aims through Equity-Centered, Data-Driven Decision Making.* The brief highlights how the COVID-19 pandemic exacerbated existing challenges and inequities in our health systems, creating an urgent need for health equity data[1] to inform response efforts. While public health agency leaders made significant progress in equity-driven data capture, analysis, and policymaking during this time, there is still much to be done.

On May 11, 2023, the federal COVID-19 Public Health Emergency declaration ended, marking changes in funding and data collection and reporting requirements. We are shifting into a post-pandemic era with valuable lessons learned from COVID-19 that can be translated to not only future emergencies but also everyday public health responses. This paper further expands on how data-driven approaches, such as those adopted during the pandemic response, can advance health equity aims and build resilience in all public health work.

Background

The COVID-19 pandemic highlighted gaps in population-level disease monitoring, access to care, and the ability to disseminate information and interventions to systemically marginalized communities. These gaps further widened health disparities, especially among Black, Indigenous, and Latinx communities. Within months of the pandemic in the US, 40 million people lost their jobs, and 27 million people lost their health insurance, putting them at higher risk of infection and death.[i] While there is room for improvement in data collection and usage in the pandemic response, specifically around capturing and reporting data on racial disparities in COVID-19 incidence and mortality, there was nonetheless progress towards assembling, analyzing, and utilizing health equity data to drive response efforts.[ii] One primary example of success is how data was used to inform policy change and business decisions that established infrastructure and programs to increase equity in vaccine distribution.

However, widening racial inequities persist in healthcare. To allow all people the opportunity to lead healthy lives, it is essential to put equity at the center of our policies and programs. Centering equity means engaging the people and communities that are impacted by health inequities in framing problems, generating solutions, decision-making, and determining how to measure success. Public health leaders can continue momentum post COVID-19 towards advancing health equity by adopting a data-driven decision-making approach. For this approach to be effective, it should rely on interconnecting the assembly, analysis, and utilization of data, and building community capacity, involvement, and trust.

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[1] Health equity data is the combination of quantitative and qualitative elements that enable the examination of health differences between populations and their causes (CMS, 2023).

As outlined in our previously published issue brief, data-informed policy and programming relies on an interconnected approach (Figure 1): collection of quality data, tools and capabilities to analyze that data, and access to and use of that data by leaders to inform decisions. This approach promotes an ongoing use of data to measure the effectiveness of policies and programs, allowing leaders to act on that data with continuous improvements. The use of real-time data, which increased during the pandemic, can help policies and programs ensure their intended impact and allow for modifications when course correction is needed during implementation. Most importantly, at the foundation of this approach is community involvement and trust. People who live in the communities of focus should be engaged in each step so that responses are community voiced and centered. The CDC's guide for advancing health equity notes that involving community members in health initiatives can not only foster connectedness and trust but can also improve assessment factors, build the capacity of individuals to positively affect their community, and increase the sustainability of efforts.[iii]

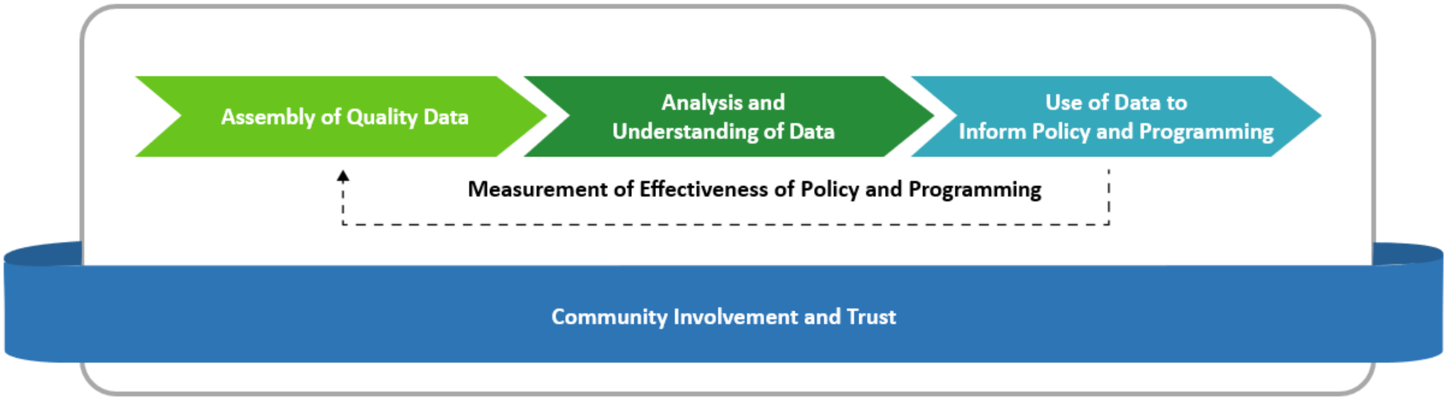


Figure 1: Interconnected Approach for Equity-Centered, Data-Driven Decision-Making

Lessons Learned from COVID-19 Response for Advancing Health Equity through Data-Driven Decision-Making

Responses to the COVID-19 pandemic demonstrated the importance of using an interconnected approach. These steps of the approach, highlighted in Figure 1, can also be applied in non-emergency public health settings to bolster resilience in public health work post-COVID-19.

1. Assembly of Quality Data

Incorporating equity into a public health agency's data strategy begins with a current state assessment. Reviewing existing data within systems at an agency can provide insight into current equity-based approaches, potential biases, and gaps in equity-centered data collection, integration, and analytics. Agencies need to consider the source of the data, whether the data could potentially contain discriminatory bias due to human input, and whether the data is a fair representation of the relevant population.

The first component of developing an equity-centered data strategy is considering how data are collected, such as by reviewing the fields present on forms and within data systems. According to the National Academies of Science, Engineering, and Medicine, data collection should be inclusive of people's identities, use precise terminology to create the granularity needed for the analysis to be undertaken, allow for self-identification where possible, and be collected for a specific goal.[iv]

How can demographic data collection be more inclusive?

Race and Ethnicity: At a minimum, race and ethnicity questions should use "Black or African American" as a category (rather than just "African American"), allow for a racial identification of "Hispanic", include "Middle Eastern/North African" as a standalone category instead of being grouped as 'White,' and allow for selection of two or more identities.

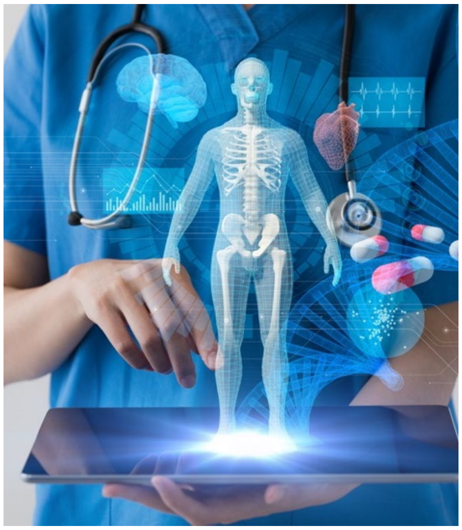
Sex, Gender Identity, and Sexual Orientation: The National Academies recommend using standardized, inclusive questions for a range of sex, gender, sexual orientation identities, including options for expressing uncertainty around sexual and gender identity (e.g., "Questioning").[v]

In addition to incorporating equity into how data are collected, agencies can determine gaps in their data that could be filled by other sources, such as other agencies, other levels of government, and provider networks. While the COVID-19 pandemic response brought forth increased information sharing between and across health care entities and public health agencies, American Health Information Management Association (AHIMA) researchers found that the complex nature of the collection, coding, use, and exchange of social determinant of health data requires more cross-sector coordination and investment.[vi] To improve data coordination, California is launching the Data Exchange Program in 2024, which is the first-ever statewide data sharing agreement. The goals of the program are promoting whole person care and ensuring the safe exchange of health information among health care entities, government agencies, and social service programs. The state is also running a DxF Grant Program for demonstrated Health Information Technology needs for organizations that will sign the statewide data-sharing agreement to meet the Data Exchange Framework requirements.[vii]

2. Analysis and Understanding of Data

In addition to incorporating equity into data collection, it is important to be mindful of how potential biases could be present in the analytical approach, algorithms, or usage of data. Predictive models in public health could be influenced by past inequities, and emerging research indicates technology and data algorithms can reinforce bias. For example, a vaccine uptake prediction model may be built on analysis of communities with historically low access to vaccines. Furthermore, given that race is often correlated with key medical outcomes or clinical decision making, these correlations can result in worse standards of care for people of color if biases are embedded in benchmarks for value-based payment models.

As generative artificial intelligence and machine learning become more prominent and applied in public health programming, equity considerations must be applied to artificial intelligence and machine learning development. Without acknowledging the potential for bias and specifically building and testing models that check for discriminatory bias and differential treatment, deeply rooted health and societal biases can be further spread, causing gaps in health equity to be amplified. Bias can be driven by drawing from over or under-representative data sets, inherent bias and/or lack of diversity among designers and developers, failing to account for existing bias in model's algorithms or parameters, or inadequately monitoring algorithms in real-world environments to identify errors. Since machine learning models learn from historically collected data, systemically marginalized communities are vulnerable to incorrect predictions or withholding of resources.[viii] Additional consequences include unchanged or worsened health outcomes, amplified or reinforced healthcare inequities, and increased costs stemming from failure to recognize needs.



To mitigate bias in health equity data analysis with artificial intelligence and machine learning models and algorithms, public health agencies need to include internal and external checks to ensure equitable application across populations and communities. Agencies can 1) implement a data strategy, including identifying potential limitations, by considering how equity is incorporated into the data collection process, training, and testing of artificial intelligence algorithms across different populations and geographies; 2) test algorithms and data in innovative ways, including use of individual knowledge, to account for the variability in outputs that occurs with new learning; and 3) monitor learning algorithms overtime to ensure they are operating as they should (i.e., not creating and/or using features with bias) with relevant metrics for success.[ix]

Public health agencies are strained to bolster the data-related skills of the existing workforce and identify new individuals with robust data management, analytic, and visualization skills. Deloitte provides technical assistance and data trainings to public health employees in our work with state partners, including trainings on how to use the data management and analytical tools we develop for them.

3. Use of Data to Inform Policy and Programming

Assembly and analysis of health equity data is critical, but to advance health equity, public health agencies and policymakers must act upon the insights and use them to drive decision-making. During the COVID-19 pandemic, this application of data was seen in many vaccine distribution and promotion efforts – data were used to inform where testing locations should be placed, how and where vaccines should be distributed, and programs to increase vaccination among higher risk populations. In everyday public health settings, decision-making can include developing new policies, adjusting existing policies that may hinder equity, establishing programs that meet community needs, or targeting programs to specific populations.

The following case study illustrates how vaccination programs, beyond COVID-19, can benefit from a tailored, data-driven approach.

- **Behavioral Analytics to Boost Vaccination:** Beginning in 2020, a number of federal health programs focused on increasing equity in adult immunization. The programs included funding and support to national, state, local, and community-level partners, who are prioritizing equity in vaccination access and uptake. Partners often have great relationships with community members, leaders, and organizations, but may not have access to big data and analytics to inform activities with a data-driven equity lens. Using HealthPrism's granular data along with relevant publicly available data sources, the Deloitte team has provided over 700 data analytics reports as well as over 150 hands-on technical assistance sessions to assist government-funded partners. Partners used the data to focus outreach efforts in areas where priority populations reside and to establish local partnerships in specific geographic areas experiencing the greatest disparities. This data also enabled partners to identify social/environment correlations for vaccine inequity, create and modify outreach materials in different languages most predominant in the communities, and host pop-up vaccination sites in communities with access barriers.

In addition to tailoring vaccination outreach efforts, the following case study illustrates how public health agencies can leverage social determinants of health data to target broader public health programs.

- **Reducing Disparities in Chronic Disease:** The Federal Health Agencies currently fund grant programs focused on reducing hypertension, illness, deaths, and health disparities. Our clients wanted to develop a data-driven approach to incorporate an equity focus throughout their programs that would assist grant recipients with prioritizing communities and tailoring strategies that address each community's unique needs and improve health outcomes. Using combinations of data including HealthPrism's granular data related to chronic disease along with relevant publicly available data sources, the Deloitte team worked to identify counties with the most challenging opportunity structures, greatest hypertension burden, and largest racial disparity in health outcomes. Using this data-driven technical assistance process, the project uncovered key social determinants of health factors and behavioral preferences for each community to inform program strategies that are equitable and culturally sensitive.

To create more equitable policies and programs, public health leaders should not only use equity-centered data but also incorporate feedback from communities the policies and programs will serve.

4. Community Involvement and Trust

Community involvement and community power is a critical component of data-informed public health decision-making to advance health equity aims. To address power dynamics that underscore systemic health and social inequities, public health agencies should fund community-based projects that are driven by the communities they intend to serve. These projects reallocate resources, skills, and power to communities most impacted by inequities. During the COVID-19 pandemic, community involvement was essential to vaccine uptake. This emphasis on community involvement can further encourage health behavior change for chronic and non-infectious diseases.

- **Engaging Communities for Preventative Health Outreach:** States often have limited access to granular data illuminating the barriers to care and outlook towards public health and healthcare to inform their communications strategies. A State Public Health Agency established a Targeted Community Engagement and Communications initiative to better meet the needs of historically marginalized populations across the state and mitigate the disparate harm caused by the COVID-19 pandemic. Deloitte applied its HealthPrism™ asset, which leverages machine learning techniques paired with behavioral science and public health expertise, to segment the state's population into 15 unique personas based on shared Drivers of Health (DOH) characteristics. This analysis provided a nuanced understanding of the social, environmental, economic, and behavioral influences on health access and health behavior. In parallel, the team created a supplemental research plan for the State Public Health Agency. This outlined an approach to conduct focus groups and surveys with state residents across the 15 personas. These qualitative findings will be used to both validate the quantitative segments and better understand the lived experience of people on the ground – from their perspectives on public health to the barriers they face engaging in preventive health behaviors (e.g., cancer screening). Ultimately, both deliverables will be used to inform more tailored communications and drive positive health behavior change in the state.

- **Building Community Power and Evaluation Capacity:** The Colorado Department of Public Health and Environment's Office of Health Equity administers the Health Disparities and Community Grant Program that awards grants to community organizations for projects aiming to reduce the risk of future disease and exacerbated health disparities in underrepresented populations by addressing social determinants of health. This program offers funding to grantees, which may include nascent or grassroots organizations, to support strategic planning, resource capacity building, and provision of technical assistance within the community and among other grassroots organizations. Grantee training and technical assistance can include building evaluation understanding and capacity for developing program evaluation plans. [x]

Looking Ahead: Incorporating a Health Equity Data-Driven Approach in Everyday Public Health Responses

The COVID-19 response taught us the importance of access to real-time data and its ability to enhance the effectiveness and equitability of public health efforts. It also taught us that the assembly of quality data, analysis and understanding of data, and use of and access to data must be interconnected. However, agencies need to mitigate bias in the collection, analysis, and application of data to avoid reinforcing inequities. To further advance health equity, the approach must go beyond interconnectedness of data assembly, analysis, and use and include building community capacity, involvement, and trust.

To continue equity-centered, data-informed decision making post-COVID-19 pandemic, sustainable funding is needed to bolster public health systems and responses. This is critical to ensuring public health agencies and leaders can implement the interconnected approach, measure effectiveness of programs, and incorporate community involvement throughout. If health equity data is not centered, inequities can be exacerbated. Public health agencies and leaders at all levels should continue to implement realistic solutions to make informed decisions and identify ways to best utilize available funding. By embracing the power of interconnected, equitable data processes, we can pave the way for healthier communities and a more inclusive future for public health work.

Contact Us: To learn more about equity-centered, data-driven decision-making contact

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