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Equity Framework for Outbreak Response and Prevention in Healthcare Settings

A Comprehensive Guide for Local Health Departments

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For: Local Health Departments and Public Health Practitioners

Purpose: To equip Local Health Departments with strategies and tools for equitable outbreak response and prevention in healthcare settings.

Key Contents:

- Equity Framework for Outbreak Response and Prevention in Healthcare Settings
- Proposed Standardized Data and Metrics for Equity Indicators
- Sample Use Cases for Equity Framework Implementation
- Tailored Monitoring and Evaluation Strategies for Equity-focused Interventions
- Additional Considerations on Training and Capacity Building and Policy Advocacy for Equitable Health Services and Infrastructure

Questions? Contact us: infectiousdiseases@naccho.org

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Introduction and Purpose

The purpose of this guide is to equip Local Health Departments (LHDs) and public health practitioners with strategies and tools for equitable outbreak response and prevention in healthcare settings. This guide is intended for use by LHDs, public health officials, and practitioners involved in outbreak management and prevention.

This guide begins with an overview of health equity and its relevance to managing outbreaks in healthcare environments. It then introduces the Equity Framework that provides specific guidance on how LHDs can collaborate with healthcare facilities and the community to implement equity-focused outbreak response and prevention. The framework elaborates on how LHDs can gather and utilize equity data to inform decision-making during outbreak response and prevention activities and offers recommendations for developing targeted outbreak interventions through an equity lens. Four use cases are included to demonstrate how LHDs can effectively adapt and apply the framework.

Additional sections on monitoring and evaluation, training and capacity building, and policy and advocacy are also featured in this guide. For guidance on community engagement, strategic collaboration, data utilization, and community policy integration in outbreak response, please refer to the Strategic Collaboration Guide and the Data Utilization and Management Guide, which serve to enhance and extend the content of this guide.

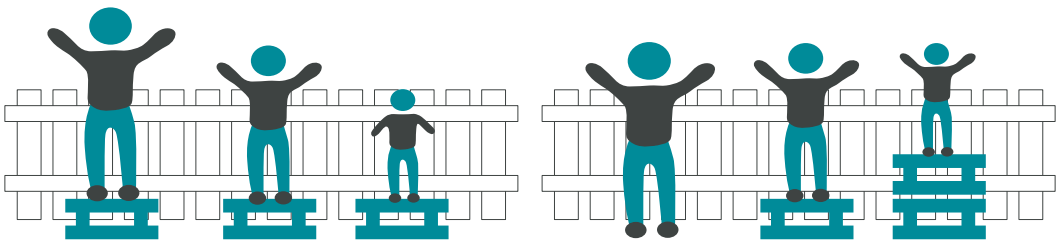
Background on Health Equity and its Applications to Outbreak Response and Prevention

Introduction to Health Equity

Health equity is defined by the Centers for Disease Control and Prevention (CDC) as "the state in which everyone has a fair and just opportunity to achieve their highest level of health." This involves addressing historical and contemporary injustices, overcoming barriers to healthcare access, and eliminating preventable health disparities.[1] Health equity is particularly relevant in the context of outbreak response, as vulnerable populations often experience disproportionate impacts during health crises. By focusing on health equity, public health programs can ensure that resources and interventions are distributed based on the unique needs of different groups, thereby reducing health disparities and improving overall health outcomes during outbreaks.

Equality involves providing the same level of support to all, whereas equity can be achieved by customizing the distribution of resources to meet the unique needs of different groups (Figure 1). The World Health Organization (WHO) states that equity requires the "fair distribution of benefits and burdens."[2] To advance health equity, public health programs can provide additional support to populations that are the most vulnerable.

Figure 1. Comparison of Equality and Equity



This illustration presents two scenarios with three individuals attempting to watch a baseball game over a fence. On the left, the concept of equality is depicted where each individual is given the same riser support regardless of the individual's initial height, resulting in only the tallest two people being able to see over the fence. On the right, the concept of equity is shown, where the riser supports vary in height and are distributed based on the different needs of the three individuals. With the equity approach, all three individuals are tall enough to have a clear view of the game.

Social Determinants of Health

Health equity efforts require recognizing that systemic and structural elements contribute to health inequities across populations based on social & structural determinants of health (SDOH). As defined by the CDC, SDOH are "non-medical factors that influence health outcomes."[3]
For example, individuals living in overcrowded housing conditions may be more likely to experience rapid transmission of infectious diseases due to close contact with others. Similarly, communities with limited access to healthcare services may have higher rates of untreated chronic conditions, making them more susceptible to severe outcomes during outbreaks. Economic instability can limit individuals' ability to afford preventive measures such as vaccines and personal protective equipment, further exacerbating health disparities during health emergencies.

Healthy People 2030 categorizes SDOH into five domains: Economic Stability, Education Access and Quality, Health Care Access and Quality, Neighborhood and Built Environment, and Social and Community Context (Figure 2).[4] These SDOH domains can act individually or collectively to influence health outcomes. The Health Care Access and Quality domain specifically focuses on factors related to people's ability to access timely and high-quality healthcare services. Other domains highlight the importance of conditions in people's environments, usually unrelated to healthcare delivery, that play an important role in improving people's health and reducing health disparities.[4]

Figure 2. Healthy People 2030 Social Determinants of Health (Adapted from US Department of Health and Human Services, Office of Disease Prevention and Health Promotion)[4]

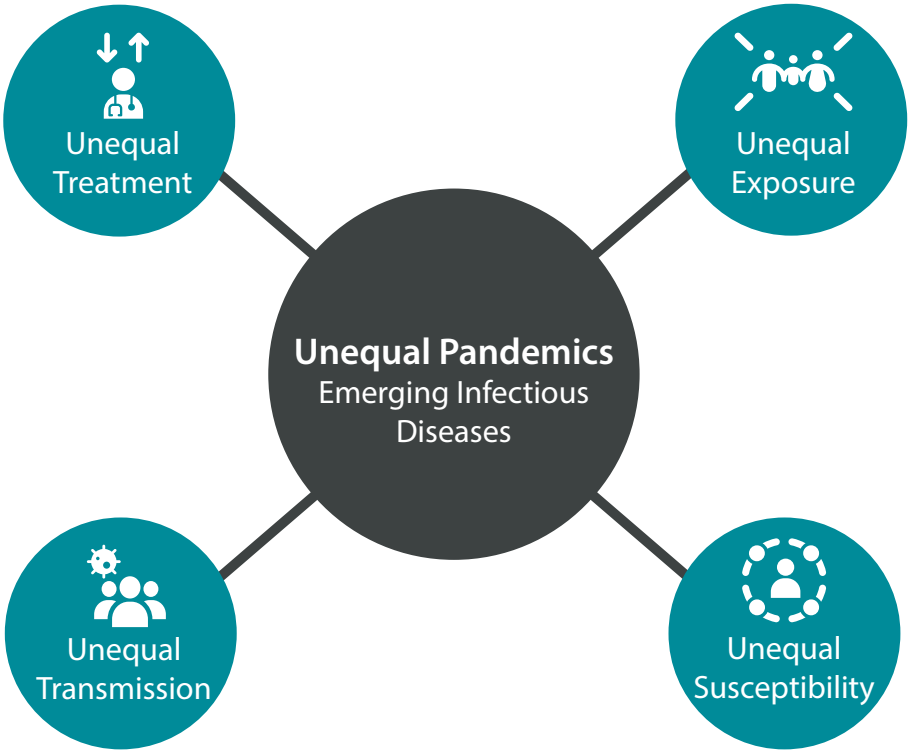
This diagram visually organizes the social determinants of health into five key domains. The five domains are presented in a circle and include Economic Stability, Education Access and Quality, Health Care Access and Quality, Neighborhood and Built Environment, and Social and Community Context. These domains represent the interconnected impact of social and environmental factors that contribute to individual and community health outcomes.

Understanding and Addressing Inequities During Outbreaks

Health inequities are particularly evident during outbreaks and pandemics. As illustrated by Dr. Clare Bambra in Figure 3, inequities can lead to unequal pandemics. Some groups within the population may experience disproportionate exposure to infection, transmission rates of disease, susceptibility to disease, and access to effective treatment compared to others.[5] As a result, the health of one population group may worsen significantly more than another population group during an infectious disease outbreak or pandemic.

Divergent health outcomes can include significant variation in morbidity, mortality, and the overall burden of disease that different groups of people might be subjected to during health crises. For instance, communities with limited access to quality healthcare, poorer living conditions, or higher rates of underlying health conditions may have higher infection rates and more severe health consequences during an outbreak.[6] People living in low-income communities may also be more likely to be essential workers, putting them at greater risk during a pandemic. These workers may have fewer options to protect their health due to lower wages, lack of benefits, and fewer worker protections.[6] Inequities in outbreak response and intervention can further exacerbate these disparities.

Figure 3. Pathways to Inequalities in Emerging Infectious Diseases Pandemics (Adapted from Bambra 2022)[5]



The illustration focuses on the theme of Unequal Pandemics and hypothesizes "four main pathways linking inequality and infectious disease." These four pathways are "unequal exposure, unequal transmission, unequal susceptibility, unequal treatment." [5]

The development of an equity-focused approach in outbreak response and prevention can work to explicitly address these inequities through targeted public health interventions. This approach is not only helpful for prioritizing and managing the immediate challenges of a health crisis, but it is also important for building a public health infrastructure that upholds the principles of health equity.

An equity-focused approach in outbreak response and prevention works to address the disparities that have led to divergent health outcomes among populations disproportionately affected during outbreaks such as those with lower socio-economic status, racial and ethnic minorities, and communities with limited healthcare resources (e.g., health insurance, access to healthcare facilities), who may be at greater risk for severe health outcomes.[6] Recognizing and addressing the needs of vulnerable populations is crucial for equitable outbreak and pandemic response as detailed in the two examples below:

- The COVID-19 pandemic highlighted the critical role of equity in outbreak responses, revealing significant disparities in infection and mortality rates across racial and ethnic groups. Communities with high SDOH risk factors such as low household income and living in overcrowded households were associated with limited access to healthcare services and disproportionate rates of COVID-19.[7] Targeted interventions, such as deploying mobile testing units in underserved areas or implementing tailored health messaging to specific communities, can be crucial in addressing disparities and promoting a more equitable public health response.[8]
- During the H1N1 influenza outbreak, pregnant women were identified as having higher rates of hospitalization and death.[9] Recognizing these disparities early in the outbreak led to prioritized vaccination campaigns and healthcare services for this high-risk group.

By integrating an understanding of health inequities into outbreak planning and response strategies, LHDs and public health professionals can effectively address health disparities.

An Equity-Focused Approach for LHD Outbreak Response and Prevention in Healthcare Settings

LHDs play a critical role in addressing outbreaks in healthcare settings. A healthcare setting refers to any location where health services and functions are delivered, including hospitals, clinics, nursing homes, and long-term care facilities. Outbreaks in healthcare settings may be due to healthcare-associated infections (HAIs), but they may also include outbreaks occurring within the community where healthcare facilities are treating community-acquired cases.

As illustrated in Figure 4, LHDs are responsible for investigating infections and outbreaks that occur in healthcare and community settings, collecting and analyzing surveillance data to identify outbreaks of HAIs to target prevention efforts, and providing education and training on infection prevention and control practices. Additionally, LHDs collaborate with healthcare facilities, community organizations, and other stakeholders to develop and implement comprehensive strategies for HAI prevention and control. LHDs also work to identify resources, gaps, needs and additional opportunities to address HAIs in the community.[10]

Figure 4. The Role of Local Public Health (Adapted from National Association of County and City Health Officials)[10]

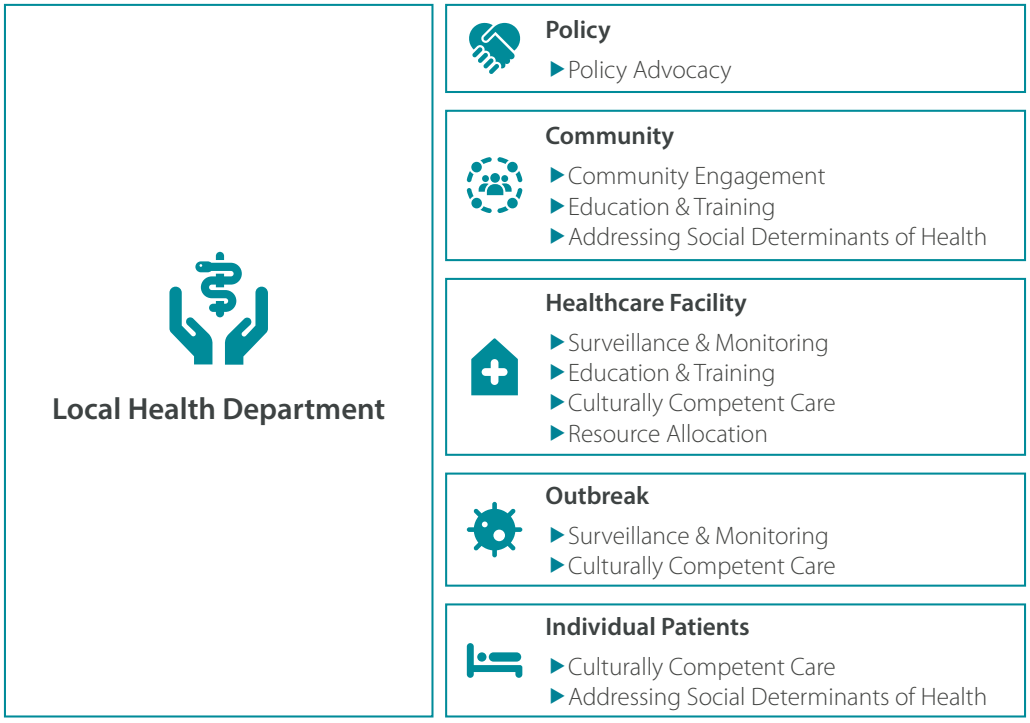
As the frontline of public health and a trusted provider and facilitator of community healthcare, LHDs can play a diverse and vital role in HAI prevention and response. From infection prevention and control to antibiotic stewardship, local public health is protecting communities against HAIs through collaboration, innovation and communication. In particular, LHDs can:

- **Investigate infections and outbreaks that occur in healthcare and community settings, identify risk factors for infection, and make recommendations to reduce risk and monitor compliance.**
- **Collect and analyze surveillance data to identify outbreaks of HAIs, establish trends, target prevention efforts, and support policy development.**
- **Convene healthcare providers and other local partners to identify strategies to prevent infections, share best practices, provide education on HAIs and judicious use of antimicrobials, and coordinate to strategically maximize existing resources.**
- **Connect with state HAI programs to understand and coordinate with state surveillance and prevention efforts, and collaborate where possible to strengthen existing activities.**
- **Leverage their position in the community to work across healthcare facilities to facilitate responses to HAIs and emerging multidrug-resistant organisms (MDROs) and halt their spread.**
- **Model infection control standards and antibiotic stewardship principles in clinics within public health departments.**
- **Identify resources, gaps, needs, and additional opportunities to address HAIs community-wide.**

This figure outlines the multifaceted role of LHDs in the management and prevention of HAIs. It details a set of key actions LHDs undertake, including the investigation of infections, collection and analysis of surveillance data, coordination with healthcare providers, and engagement with state programs for comprehensive surveillance and response. Additional roles encompass leveraging community positions to address HAIs, promoting infection control and stewardship standards, and identifying resources to fill gaps in HAI management.

Figure 5 details a structured view of how LHDs can incorporate an equity lens into outbreak response and prevention at various levels: individual patient, outbreak, healthcare facility, community, and policy. This approach ensures that strategies are not only responsive to the immediate challenges of an outbreak, but that they are also considerate of the systemic health inequities that impact different population groups during an outbreak. LHDs can then operationalize equity in practical, targeted, and measurable ways.

Figure 5. Levels of Local Health Department Action for Equity in Outbreak Response and Prevention



This illustration depicts the levels at which LHDs operate to ensure an equity-focused outbreak response and prevention in healthcare settings. It highlights specific actions taken at the levels of individual patient care, outbreak containment, healthcare facility operations, community support, and policy development.

Equity-Focused Approaches for Data Collection and Surveillance

LHDs can incorporate equity into their data collection and surveillance role by utilizing simple, low-cost tools like surveys or existing public health and healthcare data. This approach allows LHDs to better understand patient demographics, help identify SDOH, and assess other healthcare quality factors to determine which population groups are at greatest risk for experiencing unequal exposure, transmission, susceptibility, or treatment.[5] Understanding the disparities occurring across and within healthcare facilities will help LHDs to develop targeted interventions.

Leveraging Partnerships for Equity-Focused Strategies

LHDs can collaborate with healthcare and community partners to ensure an equity-focused approach in outbreak response and prevention work. By using equity data to inform decisions and engaging in these partnerships, LHDs can develop targeted outbreak interventions responsive to the needs of the specific community, healthcare facility, and patient groups.

For example, LHDs can prioritize distribution of resources, like vaccines and personal protective equipment, to the healthcare facilities with patients at highest risk. Interventions may also include providing infection control training to healthcare facility staff or setting up temporary testing sites in facilities with limited resources and staff. Additionally, LHDs can deploy mobile health units to reach facilities in underserved areas, ensuring accessibility to vital health services.

LHDs can also use collected demographic information and work with healthcare partners to extend their reach and enhance the effectiveness of public health messaging. By engaging trusted leaders and organizations within the healthcare community, LHDs can tailor their communication strategies to resonate with diverse patient populations, fostering trust and compliance with public health recommendations. This collaborative approach not only improves health outcomes but also promotes health equity within healthcare settings.

Case Studies and Literature Findings Supporting Equity-Focused Strategies during Outbreak Response and Prevention in Healthcare Settings

Real-world evidence from various studies provides compelling insights into how equity-focused strategies are important in order to mitigate the spread of infections and advance health equity. These case studies and literature findings, drawn from healthcare settings, reveal how LHDs can leverage data to identify disparities across specific population groups, and how LHDs can consider targeted outbreak response and prevention strategies to address health inequities.

These case studies highlight the important role of incorporating equity in LHDs' outbreak response and prevention within healthcare settings. By addressing present disparities and understanding their root causes, LHDs can create more effective and justly distributed interventions, ensuring equitable health outcomes for patients in healthcare facilities.

1 Social Vulnerability Index and Resource Shortages

- **Summary:** Research by LeRose et al. pinpointed the increased risk in Michigan skilled nursing facilities (SNFs) within high Social Vulnerability Index (SVI) regions during the COVID-19 pandemic. They found that facilities in higher SVI quartiles experienced greater personal protective equipment (PPE) shortages and increased rates COVID-19 cases and deaths.[11]
- **Proposed Application:** LHDs can gather data on community-level variables such as SVI scores in combination with facility-level data such as access to PPE. The use of SVI data can help LHDs to identify and allocate resources efficiently to nursing homes in high-risk areas, and combining different levels of data can enhance targeted interventions and lead to a substantial decrease in infection rates.

2 Racial and Ethnic Disparities in Hospital-Acquired Infections

- **Summary:** A study by Jeon et al. discovered disparities in community-acquired urinary tract infections (UTIs) and community-acquired blood stream infections (BSIs) in non-Hispanic black patients and Hispanic patients compared to non-Hispanic white patients when presenting to a New York hospital. The study also found increased rates of healthcare-associated BSIs among hospitalized Hispanic patients compared to their non-Hispanic white counterparts.[12] The analysis determined that the difference in community-acquired infection rates was attributed to "multiple present-on-admission factors, admission through the ER, neighborhood income levels, and comorbid conditions" while the difference in healthcare-associated BSI rates may be due to admission through the emergency room.[12]
- **Proposed Application:** The disparity in UTI and BSI rates emphasizes the importance of addressing SDOH and pre-hospitalization factors. By assessing community-level factors such as socioeconomic status and pre-existing health conditions alongside facility-level data on infection rates, LHDs can develop an equity-focused approach to outbreak response and prevention. The authors recommend that more intervention studies on the non-medical determinants of health are needed. In addition, public health programs can consider community-level policies (e.g., county wide masking requirements) to reduce health disparities.

3 Facility CMS Quality Ratings and Outbreak Vulnerability

- **Summary:** Bui DP et al's analysis showcased that nursing homes with higher CMS Overall Ratings (indicating higher quality) had significantly lower odds of experiencing COVID-19 outbreaks.[13]
- **Proposed Application:** Focusing on facility-level variables like CMS Overall Ratings can help LHDs prioritize which facilities require enhanced infection prevention and control interventions, additional resources, and targeted infection control trainings.

4 Vaccination of Healthcare Workers and Influenza Prevention

- **Summary:** A rapid evidence appraisal conducted by Jenkin et al. reviewed studies from around the world and found that healthcare worker vaccine coverage was associated with reductions in all-cause mortality and influenza-like illness (ILI).[14]
- **Proposed Application:** Focusing on facility-level variables like healthcare worker vaccination will help LHDs prioritize healthcare settings where patients are at higher risk of exposure. LHDs can support vaccination campaigns within healthcare facilities to increase the vaccination rate in healthcare workers.

5 Staffing Ratios on HAI Rates

- **Summary:** An analysis by Cimiotti et al. focusing on Pennsylvania hospitals found that lower nurse staffing ratios and higher nurse burnout were associated with increased rates of urinary tract infections and surgical site infections.[15]
- **Proposed Application:** Focusing on facility-level variables like nurse staffing ratios will help LHDs prioritize healthcare settings where patients are at higher risk of infection. This case study also illustrates the necessity of systemic changes within healthcare settings to improve patient care and reduce HAIs, such as policy changes to set minimum staffing requirements.[16, 17]

6 The Impact of Community-Level and Facility-Level Metrics

- **Summary:** In response to the need for a more targeted approach to supporting healthcare facilities, Chicago Department of Public Health in Illinois combined socio-economic indicators, census profiles, and public health data to create a comprehensive "Health Equity Index." This "Health Equity Index" incorporated six socio-economic indicators significant to public health along with Census Profiles, National Healthcare Safety Network (NHSN) outcome data, and facility level data, such as "infection prevention to bed ratios," to develop a scoring system.[18]
- **Proposed Application:** LHDs can create a scoring system using multiple community and facility level metrics to rank and prioritize which healthcare facilities and patient groups are at highest risk of adverse outcomes. LHDs can then make a targeted plan to provide support to these facilities based on the metrics collected.

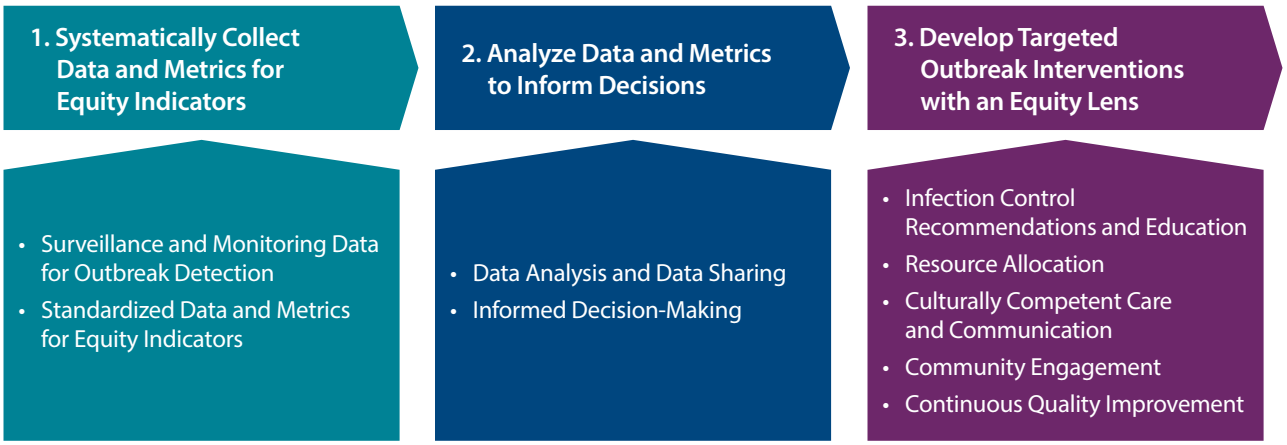
Equity Framework for Outbreak Response and Prevention in Healthcare Settings

Introduction to the Framework

The Equity Framework for Outbreak Response and Prevention in Healthcare Settings (Figure 6) offers guidance for how LHDs can work with healthcare facilities and the community towards implementing equity-focused outbreak response and prevention interventions. The Equity Framework is divided into three steps:

- In the first step, LHDs systematically collect data and metrics for equity indicators. Surveillance and monitoring systems are utilized in conjunction with standardized data and metrics to provide information necessary for LHDs to examine equity indicators at the community, facility, and individual levels. This information is important for identify health disparities across different patient populations and healthcare settings, and it will also serve as the foundation for informed decision-making in subsequent outbreak response and prevention efforts.
- The second step of the framework involves analyzing the data and metrics to guide decision-making processes. This helps ensure that LHD outbreak response and prevention efforts are tailored to address the unique needs of diverse patient populations across and within healthcare facilities.
- In the final step of the framework, LHDs develop targeted outbreak response interventions with an equity lens. More detailed considerations on interventions ranging from infection control recommendations to community engagement strategies are provided below.

Figure 6. Equity Framework for Outbreak Response and Prevention in Healthcare Settings



This framework outlines a three-step process for LHDs focused on equitable outbreak response and prevention in healthcare settings. In step one, LHDs systematically collect data and metrics for equity indicators. In step two, LHDs analyze data and metrics to inform decisions. The final step outlines how LHDs can develop interventions with an equity lens, incorporating infection control recommendations, resource allocation, culturally competent care, community engagement, and continuous quality improvement.

1. Systematically Collect Data and Metrics for Equity Indicators

- **Surveillance and Monitoring Data for Outbreak Detection**
  - Establish surveillance systems to detect outbreaks in healthcare settings
  - Monitor outbreak prevention efforts, readiness, and response capacity in healthcare settings
- **Standardized Data and Metrics for Equity Indicators**
  - Collect qualitative and quantitative data and metrics related to equity indicators at the community, facility, and outbreak levels (See "Proposed Standardized Metrics for Equity Framework" for suggested considerations)

2. Analyze Data and Metrics to Inform Decisions

- **Data Analysis and Data Sharing**
  - Analyze and compare collected data and metrics for equity indicators to identify health disparities across different patient populations and healthcare settings
- **Informed Decision Making**
  - Use data and metrics for equity indicators to decide which healthcare facilities and patient populations to prioritize in outbreak response
  - Use data and metrics for equity indicators to inform decisions for targeted interventions
  - Disseminate findings to outbreak response partners to raise awareness of existing inequities

3. Develop Targeted Outbreak Interventions with an Equity Lens

- **Infection Control Recommendations and Education**
  - Conduct investigation to identify risk factors for exposure, transmission, and adverse outcomes, following guidelines from the CDC Infection Control Assessment and Response (ICAR) tools
  - Make recommendations to healthcare facility and provide education based on findings from equity indicators and investigation findings to mitigate further transmission and spread
  - Provide targeted infection control training to healthcare facility staff during outbreak response and prevention (i.e., culturally competent/language specific training for healthcare staff)
- **Resource Allocation**
  - Direct resources such as educational materials, healthcare services, and preventive measures to facilities and patient populations with greatest need and/or risk
  - Provide additional LHD staff support to assist healthcare facility with data collection and outbreak response efforts
- **Culturally Competent Care and Communication**
  - Communicate with patients and families by tailoring messaging to the cultural and language needs of patients
  - Provide training and support to healthcare facility staff on how to deliver culturally competent care by tailoring care practices to the cultural and language needs of patients

- **Community Engagement**
  - Identify and address SDOH contributing to HAI disparities in collaboration with community organizations and social services
  - Engage affected communities in developing and implementing HAI prevention strategies, ensuring cultural relevance and responsiveness
  - Collaborate with local leaders for culturally relevant messaging, utilize community-specific media channels for broader reach, and provide multilingual resources to ensure inclusivity and accessibility, ensuring cultural relevance and responsiveness in their approach. *(See the Strategic Collaboration Guide for more detail about community engagement best practices).*
- **Continuous Quality Improvement**
  - Implement continuous quality improvement processes to monitor and evaluate the effectiveness of HAI response and prevention efforts and equity initiatives. *(See "Monitoring and Evaluation for Continuous Quality Improvement" for additional details)*

Developing Standardized Data and Metrics for Equity Indicators

Through comprehensive collection and analysis of standardized data and metrics for equity indicators, LHDs can assess which communities, facilities, and patient groups need targeted support and resources. LHDs can also use standardized data and metrics to make decisions and develop interventions that are equity-focused, context-specific, and evidence-based to maximize the effectiveness of their outbreak response and prevention efforts in healthcare settings.

This guide proposes a selection of standardized data and metrics for LHDs to consider when integrating equity into outbreak response and prevention work in healthcare settings. The list of standardized data and metrics provided below is not prescriptive; rather, it offers a broad array from which LHDs can select relevant equity indicators according to the specific challenges and opportunities within their jurisdictions.

The "Standardized Data and Metrics for Equity Indicators" presented in Table 1 on page 19 are organized into the following three categories: 1) community level, 2) facility level, and 3) outbreak level. This multi-level approach to data collection and analysis provides a comprehensive way for LHDs to work towards improving health equity. With three levels of data and metrics to consider, LHDs can make more informed decisions by assessing the complex interaction between community contexts, facility capabilities, and outbreak dynamics. Additional details on these three categories are outlined below.

Community Level

- Community-level data and metrics can help LHDs to prioritize interventions for populations that are particularly vulnerable, considering their unique demographic characteristics, SDOH, levels of need, and heightened risk of disease exposure and susceptibility.

Facility Level

- Facility-level data and metrics provide LHDs with important data to customize and improve outbreak response and prevention strategies in healthcare settings by identifying high-risk healthcare environments where patient populations may experience unequal exposure, transmission, susceptibility, or treatment.
- In addition, these data and metrics enable LHDs to strategically allocate resources, optimize outreach efforts, and prioritize targeted infection control measures.

Outbreak Level

- Outbreak-level data and metrics offer detailed information on outbreak spread, control, and impact. These data enable LHDs to execute targeted responses, adapting to the outbreak's changing dynamics within healthcare facilities and directing resources where they are most needed.
- By incorporating patient demographic data collected during an outbreak, LHDs can craft communication and education initiatives that are finely tuned to the unique characteristics of the patient population, ensuring information dissemination uses accessible language and is culturally appropriate.

The selection of data and metrics for this guide was determined by data availability and quality, relevance to health equity, and potential impact across LHDs. Publicly accessible data from sources like Census.gov and CMS Care Compare provide several community and facility-level metrics, while other data and metrics require direct collaboration with healthcare facilities. Relevance to health equity was determined by assessing alignment with frameworks like the CORHA "Healthcare-associated Infection (HAI) Outbreak Standardized Variables List" and Healthy People 2030, and their ability to offer immediate insights for equitable outbreak response and prevention work. This approach ensures LHDs are equipped with actionable, equity-focused data to guide decision-making. For an in-depth overview of the criteria for selecting standardized metrics and data sources, see Appendix 2.

Customizing Equity Indicators and Applying the Framework for Local Context

The "Standardized Data and Metrics for Equity Indicators" provided in Table 1 below are intended as a foundation upon which LHDs can build and customize their approach to equity. LHDs are empowered to customize the Equity Framework by selecting relevant data and metrics, incorporating additional metrics as needed, and/or focusing on specific subsets of data to better align with the current needs and strategic priorities of their communities and healthcare facilities. Some considerations for modification may include:

- Adapting to Population Needs: Communities have unique demographics, health disparities, and SDOH. LHDs are encouraged to prioritize data and metrics that most directly impact equity concerns in their communities.
- Tailoring to Facility Capabilities: Facilities differ in their patient populations, service capabilities, and resource needs. Not all data and metrics will be relevant or applicable to every healthcare facility. In addition, LHDs may identify additional data and metrics that work better for facilities in their jurisdiction. LHDs are encouraged to work with facilities to identify which data and metrics can yield the most meaningful insights for improving care delivery and addressing gaps in health equity.
- Data Access/Granularity: LHDs, particularly in rural areas, may face challenges with the granularity of publicly available data. When standardized data and metrics lack detail or are unavailable, LHDs may opt to replace the metrics and/or collaborate with their communities and healthcare facilities to collect additional data.
- Evaluating and Modifying Over Time: Implementing an Equity Framework is an ongoing process of learning and adaptation. LHDs are encouraged to periodically review and adjust their use of data and metrics in response to new data, emerging health threats, and the changing landscape of healthcare and SDOH in their communities. Monitoring and evaluation are critical to improving implementation of the framework and enhancing its impact over time.

Proposed Standardized Data and Metrics for Equity Indicators

Table 1 presents a selection of standardized data and metrics for equity indicators. These have been selected to provide the LHD with concrete data to collect, analyze, and act upon when conducting equity-focused outbreak response and prevention work. Spanning community, facility, and outbreak levels, these proposed data and metrics can offer LHDs the insights needed to effectively and equitably tailor their interventions. Further details on each proposed metric can be found in Appendix 1 *(click on the specific metric of interest in Table 1 to jump directly to the metric's description in the Appendix 1)*.

Table 1. Standardized Data and Metrics for Equity Indicators

Category Level	Standardized Metrics
Community Level Community-level data and metrics help LHDs understand and assess the factors that can impact community susceptibility and resilience to health emergencies.	▸ Social Vulnerability Index (SVI) ▸ Area Deprivation Index ▸ Medically Underserved Area or Population (MUA/MUP) ▸ Census Profile
Facility Level Facility-level data and metrics focus on healthcare settings, assessing healthcare quality and structural capabilities to gauge a facility's outbreak preparedness.	**All Healthcare Facilities:** ▸ Facility Healthcare Setting ▸ Facility Bed Count ▸ Facility Bed Capacity/Utilization Rate ▸ Insurance Distribution of Patients (e.g., % Medicare/Medicaid, % Private, etc.) ▸ CMS Overall Rating ▸ Healthcare Personnel Vaccination Coverage for COVID-19 ▸ Healthcare Personnel Vaccination Coverage for Seasonal Influenza ▸ Healthcare Personnel Vaccination Coverage for Additional Relevant Vaccines ▸ Facility Level of Stocked Personal Protective Equipment **Specific to Nursing Homes:** ▸ Average Number of Residents per Day ▸ Staff Turnover ▸ Registered Nurse Hours (per resident per day) ▸ Resident Vaccination Coverage for COVID-19 ▸ Resident Vaccination Coverage for Seasonal Influenza ▸ Percent of Short-Stay Residents Appropriately Given Vaccination for Seasonal Influenza ▸ Resident Vaccination Coverage for Additional Relevant Vaccines **Specific to Hospitals:** ▸ Staffing Levels ▸ Hospital Infection Scores • Central line-associated bloodstream infections (CLABSI) in ICUs and select wards • Catheter-associated urinary tract infections (CAUTI) in ICUs and select wards • Surgical site infections (SSI) from colon surgery • Surgical site infections (SSI) from abdominal hysterectomy • Methicillin-resistant Staphylococcus Aureus (MRSA) blood infections • Clostridium difficile (C.diff.) intestinal infections ▸ Percent of ICU, NICU, and/or PICU beds currently occupied
Outbreak Level Outbreak-level data and metrics provide a real-time snapshot of the outbreak's status and impact, capturing data on case numbers, testing availability, and patient demographics necessary for a robust and immediate response.	**Outbreaks in All Healthcare Facilities:** ▸ Number of Confirmed Cases ▸ Number of Probable Cases ▸ Number of Suspected Cases ▸ Pathogen Testing Availability ▸ Outbreak Case Demographics (including but not limited to): • Gender Distribution • Age Distribution • Race and Ethnicity Distribution • Primary Language Distribution • Comorbidities Distribution **Specific to Hospital Outbreaks:** ▸ Percent of hospitalized patients that are confirmed cases ▸ Percent of ICU patients that are confirmed cases

Use Cases in Implementing the Equity Framework

LHDs can utilize a tailored approach that leverages select data and metrics from community, facility, and outbreak levels. The four hypothetical use cases presented below illustrate how intentional application of the Equity Framework enables LHDs to address unique health challenges across diverse settings.

By choosing relevant data and metrics, LHDs can make informed decisions that reflect the needs of their patient populations, the capacities of healthcare facilities in their jurisdiction, and the dynamics of the specific outbreak they are addressing. Once a customized plan for data collection is developed, the LHD then uses the data and metrics for equity indicators to make informed decisions and develop targeted outbreak response interventions with an equity lens. In making these informed decisions, LHDs may prioritize different equity indicators based on their local context and specific needs. This flexible approach allows LHDs to adapt to changing circumstances and ensure that their interventions are both effective and contextually relevant.

The use cases in implementing the Equity Framework provide concrete examples for how LHDs can use equitable targeted interventions during an outbreak, utilizing a structured approach that leverages community, facility, and outbreak-level metrics.

1 Use Case:* Flu Outbreak Management across Several Long-Term Care Facilities

Context: Three long-term care facilities in the same county are simultaneously grappling with a seasonal flu outbreak. The LHD responding to these outbreaks is located in a medium-sized county with diverse communities across the jurisdiction.

The LHD Collects and Analyzes Standardized Data and Metrics for Equity Indicators

Community-Level Metrics:

- Social Vulnerability Index (SVI): The LHD can use this metric to determine the community's capacity to respond to public health emergencies and to recognize neighborhoods with outbreak response challenges in the jurisdiction. The LHD can compare the SVI for the three different neighborhoods of the affected facilities to help facilitate outbreak response decisions.

Facility-Level Metrics:

- CMS Overall Rating and Registered Nurse Hours (per resident per day): The LHD can use these metrics to compare facilities and gain a better understanding of the quality of care across the three facilities. The LHD can compare these metrics and then make a targeted plan to support patient populations who are residing in facilities with lower quality scores.
- Average Number of Residents per Day: The LHD can use this data to understand the size of the facility.
- Facility Bed Capacity / Utilization Rate: The LHD can use these data to understand a facility's capacity to isolate positive cases and manage patient flow during the outbreak.

Outbreak-Level Metrics:

- Number of Confirmed and Probable Cases: The LHD can use these data to assess the size of the outbreak and to calculate a case rate.
- Primary Language Distribution of Outbreak Patients: The LHD can use these metrics to learn details on the language needs of the patient population.
- Testing Availability: The LHD can use these data to understand a facility's capacity to identify positive cases.

* Explore the dashboard for Use Case 1 to visualize the sample data and metrics related to this scenario.

The LHD Develops Targeted Outbreak Interventions with an Equity Lens

Infection Control Recommendations and Education:

- The LHD uses the data on Average Number of Residents per Day and Number of Confirmed and Probable Cases to calculate case rates and determine which facilities are experiencing highest rate of infection.
- The LHD identifies facilities with low quality of care and staff capacity through CMS Overall Rating and RN Nurse Hours (per resident per day) metrics. The LHD prioritizes facilities for additional investigation and staff education where patient populations may be at highest risk.
- The LHD conducts an investigation to identify risk factors for exposure, transmission, and adverse outcomes, following guidelines from the CDC ICAR tools. The LHD provides targeted infection control training to facilities where patient populations may be at highest risk.
- The LHD uses Facility Bed Capacity / Utilization Rate to recommend that overburdened facilities modify operations to optimize isolation capabilities and minimize transmission risk.

Resource Allocation:

- The LHD identifies facilities with low quality of care through CMS Overall Rating metrics and low Testing Capacity and then deploys additional resources to facilities where patient populations may be at highest risk.
- The LHD uses the data on Average Number of Residents per Day, Facility Utilization Rate, and Number of Confirmed and Probable Cases to determine the necessary amount of testing and PPE supplies to provide the healthcare facility for outbreak management.
- The LHD compares SVI designation across the three locations to prioritize health services and additional resources. Addressing the broader impact of social vulnerability in specific neighborhoods will help the LHD to create a more targeted plan to support facilities in high-need areas during outbreak response.

Culturally Competent Care and Education:

- The LHD uses distribution of Primary Language of Outbreak Patients to inform the culturally competent care, education, and resources provided to the facility patients.

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2 **Use Case:*** LHD Prevention Efforts for Respiratory Illness Season in Long-Term Care Facilities

Context: In the fall, the LHD is working to prepare for the upcoming respiratory illness season across the region's ten long-term care facilities. The LHD conducting this prevention work is located in a medium-sized county with diverse communities across the jurisdiction.

The LHD Collects and Analyzes Standardized Data and Metrics for Equity Indicators

Community-Level Metrics:

- Social Vulnerability Index (SVI): The LHD can use this metric to determine the community's capacity to respond to public health emergencies and to recognize neighborhoods with outbreak response challenges in the jurisdiction. The LHD can compare the SVI for the different neighborhoods of the facilities to help facilitate outbreak prevention decisions.
- Census Profile: The LHD uses data obtained from the Census Bureau to obtain county, city, or neighborhood level information about the demographics of their surrounding community. The LHD can use these census data for planning and advocacy purposes.

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* Explore the dashboard for Use Case 2 to visualize the sample data and metrics related to this scenario.

Facility-Level Metrics:

- CMS Overall Rating and Registered Nurse Hours (per resident per day): The LHD uses these metrics to gain a better understanding of the quality of care for patients across the ten facilities. The LHD compares these metrics and then makes a targeted intervention plan for facilities with lower quality and staffing scores.
- Staff Turnover Rates: The LHD uses these metrics to understand staff retention and turnover within the facility. This may inform the LHD's plans for providing preventative education and training for facility staff.
- Healthcare Personnel Vaccination Coverage and Resident Vaccination Coverage: The LHD considers these data for both seasonal influenza and COVID-19 to gain a better understanding of inequities in susceptibility and potential transmission rates across the ten facilities. The LHD compares these data and then makes a targeted intervention plan for facilities with lower coverage.
- Average Residents Per Day: The LHD uses these data to understand the size and capacity of the ten facilities.
- Level of Stocked Personal Protective Equipment (PPE): The LHD uses these data to assess facility readiness for respiratory outbreaks and makes a targeted plan for resource allocation. The LHD considers PPE supplies including N95 masks, surgical masks, face shields, gloves, and gowns.
- Primary Language of Facility Staff: The LHD uses this information to provide effective communication and training materials tailored to the staff's language needs, ensuring full comprehension of infection control procedures and outbreak response strategies.

The LHD Develops Targeted Outbreak Interventions with an Equity Lens

Resource Allocation:

- The LHD identifies facilities with low quality of care and staff capacity through CMS Overall Rating, Registered Nurse Hours (per resident per day), and Staff Turnover metrics. The LHD deploys additional resources where patient populations may be at highest risk.
- The LHD uses the Average Residents per Day and Level of Stocked PPE to procure the necessary amount of testing supplies and infection control supplies for the upcoming respiratory illness season.
- The LHD reviews vaccination coverage rates using the Healthcare Personnel Vaccination Coverage and Resident Vaccination Coverage metrics and plans additional vaccination campaigns for facilities with low coverage in staff and/or patients.
- The LHD utilizes the Social Vulnerability Index (SVI) metric to compare facility neighborhoods across the county and inform their community's capacity to respond to emergencies. The LHD then coordinates with local health services to provide additional support and resources ahead of respiratory season. This approach helps address the broader community's impact on the outbreak prevention efforts of the facilities.

Infection Control Recommendations and Education:

- The LHD identifies facilities with low CMS Overall Rating, Registered Nurse Hours (per resident per day), and Staff Turnover metrics to provide targeted infection control training to facilities where patient populations may be at highest risk.
- The LHD uses the Primary Language of Facility Staff information to develop and deliver infection control training materials in the staff's primary languages, ensuring clear understanding and effective implementation of procedures.

Culturally Competent Care and Communication:

- The LHD uses the Census Profile of the community to learn more about race, ethnicity, language, and education level of the specific communities within their county. This information helps inform the culturally competent care, education, and resources that they provide to the facility patients and staff.

3 **Use Case:** An LHD Conducting Outbreak Response at a Large, Urban Hospital

Context: An LHD is tasked with managing an acute outbreak of a multidrug-resistant organism (MDRO) in a large urban hospital. The outbreak poses a significant risk to patient safety and threatens to overwhelm the hospital's infection control resources.

The LHD Collects and Analyzes Standardized Data and Metrics for Equity Indicators

Community-Level Metrics

- Census Profile: The LHD obtains county, city, or neighborhood data to learn more about the demographics of their surrounding community.

Facility-Level Metrics

- Hospital Infection Scores: The LHD reviews the hospital's infection scores for insights into the facility's infection control practices and areas needing immediate improvement.
- Staffing Levels: The LHD reviews this metric across hospital departments and against benchmarks to make a targeted plan to support hospital staff and patients.

Outbreak-Level Metrics

- Pathogen Testing Availability and Rates: Assessing testing availability enables the LHD to ensure that the hospital can rapidly identify and isolate MDRO cases.
- Number of Confirmed Cases: This metric provides a clear view of the outbreak's magnitude, guiding the intensity and focus of the hospital's response efforts.

The LHD Develops Targeted Outbreak Interventions with an Equity Lens

Infection Control Recommendations and Education

- The LHD collaborates with hospital administration, staff, and patient advocacy groups to ensure a coordinated and transparent response to the outbreak, to effectively address concerns and misinformation.
- The LHD conducts an infection control assessment using CDC ICAR Tools and makes recommendations based on assessment findings.

Resource Allocation

- The LHD will prioritize units with low Staffing Levels to provide additional outbreak response guidance where staff and patient populations may be at highest risk.
- The LHD works with the hospital to prioritize the allocation of PPE and infection control resources to departments within the hospital most affected by the outbreak.

Culturally Competent Care and Communication

- Understanding the stress and anxiety faced by patients and their families, especially those from diverse linguistic and cultural backgrounds, the LHD utilizes the information provided in the Census Profile to help the hospital develop a comprehensive communication protocol. This protocol includes the provision of multilingual information materials on MDROs and the outbreak response, and training for staff on culturally sensitive communication.
- The LHD supports the hospital language provision services for families to receive updates on their loved ones' care, addressing the need for information and reassurance during critical times.

Community Engagement

- To ensure the hospital's outbreak response is community-informed, the LHD facilitates the creation of a community advisory board comprising patients, family members, local health experts, and community leaders. This board meets regularly to review the response efforts, offering feedback and suggestions for improvement.

- The LHD organizes virtual community forums to keep the public informed and engaged, providing updates on the outbreak status, answering questions, and gathering community input to continuously refine and improve the response strategy.
- The LHD sets up a system for regular health checks and mental health support for hospital staff, recognizing the immense pressure they face during outbreaks. This initiative includes setting up a confidential hotline for staff to report symptoms, seek advice, and access counseling services, ensuring they feel supported both physically and mentally.

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4 **Use Case:** A Regional LHD Conducting Outbreak Response in Healthcare Settings across Multiple Counties

Context: A regional LHD oversees public health across multiple counties. The LHD serves many communities, each varying in urbanicity from densely populated urban centers to rural towns. The LHD is faced with managing a widespread outbreak of a novel respiratory virus, impacting facilities across its jurisdiction differently due to the diverse social, economic, and healthcare landscapes.

The LHD Collects and Analyzes Standardized Data and Metrics for Equity Indicators

Community-Level Metrics

- Social Vulnerability Index (SVI): The LHD utilizes the SVI to assess the capacity of different communities to respond to disease outbreaks within its jurisdiction. Understanding that urban areas might have different vulnerabilities compared to rural areas, such as housing density versus access to healthcare, allows the LHD to tailor its response accordingly.
- Medical Underserved Area (MUA): By determining whether a facility is located in an MUA, the LHD can prioritize resource allocation, ensuring that areas with limited healthcare access receive the necessary support, such as mobile testing units and additional healthcare personnel.

Facility-Level Metrics

- CMS Overall Rating: The LHD reviews this rating to identify facilities that may need additional support in infection control practices.
- Facility Level of Stocked Personal Protective Equipment (PPE): The LHD establishes direct communication with hospital supply chain managers and emergency preparedness coordinators to understand the current levels of PPE.
- Percent of ICU, NICU, and/or PICU Beds Currently Occupied: The LHD obtains this metric by contacting the hospital's patient administration or bed management departments.

Outbreak-Level Metrics

- Number of Confirmed Cases and Number of Probable Cases: These metrics guide the LHD in understanding the outbreak's spread and intensity across different facilities, enabling targeted interventions.
- Percent of Hospitalized Patients that are Confirmed Cases: The LHD requests aggregated data directly from hospital administration. If the LHD has existing electronic health record (EHR) sharing agreements, the LHD can access this data directly through EHR systems.
- Primary Language Distribution of Outbreak Patients: The LHD can use these metrics to learn details on the language needs of the patient population.

The LHD Develops Targeted Outbreak Interventions with an Equity Lens

Infection Control Recommendations and Education

- Utilizing the outbreak-level metrics, the LHD sets up a real-time surveillance system (i.e., formal electronic disease reporting systems or informal data collection via phone call and exchange of line list from facility) to monitor the spread of the outbreak across the counties. This system integrates data from electronic health records, pharmacy records, and local testing sites to identify hotspots of transmission quickly.
- The LHD analyzes data on confirmed and probable cases within each healthcare facility, enabling the LHD to rapidly deploy targeted interventions. Data analysis also includes monitoring hospital and ICU bed occupancy rates, guiding decisions on when to implement additional restrictions or support specific facilities with additional staff or equipment.
- The LHD considers SVI, CMS Overall Rating, and Number of Confirmed Cases to prioritize which hospitals will receive site visits first. The LHD conducts evaluations of infection control measures in place, sharing best practices across facilities to ensure a standardized high level of care and prevention.
- The LHD organizes tailored training sessions on infection prevention and control for facilities in areas identified in MUAs or with high SVI scores, addressing the unique challenges these facilities face.

Resource Allocation

- The LHD identifies critical resources needed across the spectrum of facilities, including PPE, ventilators, and testing kits. Special attention is given to MUAs, where healthcare facilities might lack the infrastructure to manage a surge in cases. The allocation strategy uses the SVI data to prioritize distribution, ensuring that the most vulnerable communities receive resources first. For instance, in rural areas identified with high SVI scores, the LHD deploys mobile health units equipped for testing and vaccination, along with telehealth services to bridge the healthcare access gap.

Community Engagement

- The LHD collaborates with a community advisory board to tailor educational programs to address the unique concerns and misinformation prevalent in different communities. The LHD organizes virtual town hall meetings in various languages as indicated by the Primary Language Distribution metric.
- For both urban and rural areas, the LHD collaborates with local community leaders and influencers to disseminate culturally appropriate health education messages through social media and local radio stations.
- Specifically for rural communities, the LHD leverages local health clinics, community centers, schools and churches to distribute printed materials and conduct small, safe in-person workshops focusing on preventive measures and the importance of vaccination.

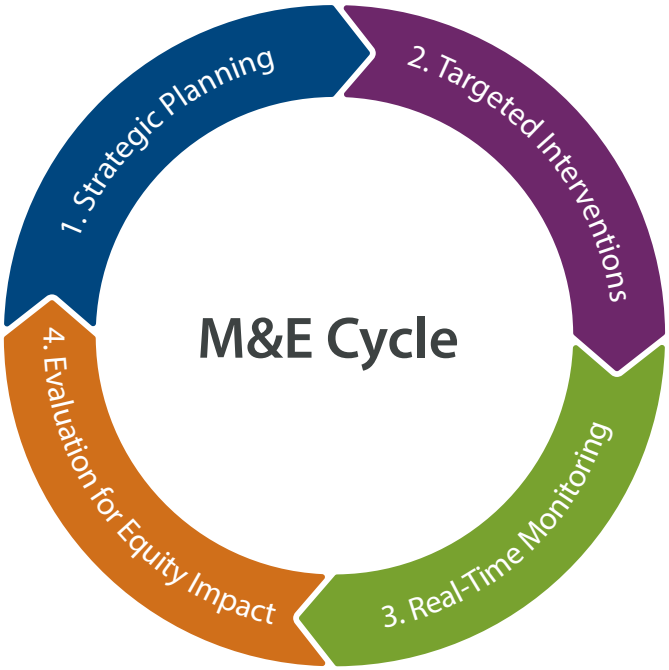
Monitoring and Evaluation for Continuous Quality Improvement

LHDs are at the forefront of outbreak response and prevention in healthcare settings, necessitating a strategic approach that emphasizes equity and relies on systematic monitoring and evaluation (M&E). M&E aims to instill a culture of continuous improvement, utilizing data-driven insights for iterative intervention adjustments. This approach not only addresses immediate public health needs but also lays the groundwork to help LHDs shift from reactive outbreak management to proactive outbreak prevention.

As shown in Figure 7, the M&E cycle has four phases. LHDs will begin the M&E cycle by utilizing the Equity Framework for strategic planning and then implementing targeted interventions. During strategic planning, LHDs systematically collect and analyze data for equity indicators. LHDs use these data to assess the vulnerabilities and outbreak readiness of healthcare facilities and identify patient groups at heightened risk. Next, LHDs move on to implementing targeted interventions with an equity lens specifically designed to address the identified risks and disparities.

The remaining two phases of M&E are real-time monitoring and evaluation for equity impact. During real-time monitoring, LHDs can collect additional data and leverage technology to observe an outbreak's progression and the effectiveness of implemented measures, tracking key metrics such as infection rates and relevant health outcomes across demographic groups. The cycle culminates with evaluation for equity impact, in which LHDs conduct thorough analyses to understand the success of their interventions in reducing disparities and improving health outcomes.

Figure 7. M&E Cycle for the Equity Framework



This iterative process can support LHDs to not only react to immediate outbreaks but also build a foundation for future prevention strategies that are both effective and equitable. This M&E cycle focuses on ease of implementation for LHDs, ensuring that all steps are manageable and practical, even for smaller health departments with limited resources. By learning from successes and challenges and integrating these lessons into future strategies, LHDs can be better equipped to address outbreaks in healthcare settings, mitigate health disparities, and advance health equity.[19] Ultimately, robust M&E practices can help LHDs create effective interventions that contribute to creating healthier, more resilient, and equitable communities.

Real-Time Monitoring

Utilize Technology to Track Key Metrics

- Establish a system that integrates with existing facility records to monitor outbreak metrics in real-time.
- Use simple dashboards (e.g., Excel, Google Sheets, Tableau) to visualize data and track progress, ensuring quick identification of trends and hotspots.
- Stratify data by demographic groups to identify disparities, using basic data management tools and preformatted templates.

Enable Swift Adjustments to Strategies as Needed

- Conduct regular (e.g., weekly, monthly) reviews of monitoring data to assess the outcome of interventions.
- Adapt and refine strategies based on real-time data, addressing emerging challenges and leveraging successful practices.
- Engage with facility administrators and frontline staff through brief, regular meetings to gather feedback and adjust approaches accordingly.

Evaluation for Equity Impact

Analyze the Success of Interventions in Reducing Disparities

- Use both quantitative data (e.g., infection rates, vaccination coverage) and qualitative assessments (e.g., brief interviews or surveys with facility staff and patients) to capture perceptions of intervention effectiveness and equity.
- Focus on clear and easily interpretable results to inform decision-making.

Gather Feedback from Healthcare Facility

- Use structured feedback forms to identify strengths and areas for improvement in the outbreak response.
- Incorporate community input into ongoing planning and adjustment of strategies, ensuring interventions remain responsive and relevant.

Develop Comprehensive Reports and Share Findings

- Prepare detailed but concise reports summarizing the outcomes of the M&E process, highlighting successes, challenges, and lessons learned.
- Share findings with healthcare facilities and community stakeholders through accessible formats.
- Use the insights gained to advocate for policy changes and secure funding, emphasizing the practical impact of the interventions on health equity.

The four use cases previously introduced (on pages 21-27) are further explored below to show how LHDs can implement M&E for a continuous quality improvement approach using the final two-steps of the M&E cycle.

1 M&E for Use Case 1*: Flu Outbreak Management across Several Long-Term Care Facilities

- **Monitoring:** Regular collection of data on flu cases, vaccination rates among residents and staff, and adherence to infection control measures helps LHDs monitor outbreaks more effectively. LHDs can use electronic disease reporting systems where possible to track these metrics in real time, enabling swift adjustments to strategies as needed.
- **Evaluation:** The LHD can assess the effectiveness of targeted resource allocation and education initiatives by comparing outbreak metrics before and after intervention implementation within the same flu season, or across different years within the same facility. The LHD can also utilize surveys and feedback from facility staff and residents' families to gather qualitative data, enhancing the understanding of the perceived impact of the interventions.

2 M&E for Use Case 2:* LHD Prevention Efforts for Respiratory Illness Season in Long-Term Care Facilities

- **Monitoring:** The LHD can implement tracking methods using publicly available data and manual mapping to understand the spread of respiratory illnesses across the region. By analyzing this information in conjunction with Social Vulnerability Index (SVI) scores and facility-level metrics (CMS Overall Rating, Nursing Staff Turnover, Registered Nurse Hours, PPE stock levels, and vaccination coverage rates), the LHD can identify high-priority areas for intervention and ensure real-time response capabilities.
- **Evaluation:** The LHD can assess the impact of interventions on respiratory illness rates by comparing pre- and post-intervention data collected from healthcare facilities. This includes analyzing infection rates, hospitalization rates, and vaccination coverage, complemented by direct feedback from healthcare facilities to evaluate the effectiveness of training and resource allocation.

3 M&E for Use Case 3: LHD Conducting MDRO Outbreak Response in a Large, Urban Hospital

- **Monitoring:** The LHD can implement an electronic dashboard, such as in Excel or Tableau, to monitor infection rates, staffing levels, and supply levels of PPE across areas in the hospital. This tool can help hospital administrators and the LHD to identify trends and potential hotspots within the facility.
- **Evaluation:** The LHD can conduct a detailed review of the outbreak response, focusing on infection control measures' adaptability and effectiveness. Patient and staff surveys can provide valuable feedback on the response's efficacy and areas needing enhancement.

* Explore the dashboards for Use Case 1 and Use Case 2 to visualize the sample data and metrics related to these scenarios.

4 **M&E for Use Case 4:** Regional LHD Conducting Outbreak Response in Healthcare Settings Across Multiple Counties

- **Monitoring:** The LHD can implement a surveillance system to monitor outbreak indicators across multiple counties. This includes tracking infection rates, healthcare resource utilization, and social determinants of health. This system can utilize basic Excel and manual record-keeping or utilize data visualization tools such as Tableau. The system should allow for the aggregation of data from various sources, including local healthcare facilities, to provide a real-time picture of the outbreak's evolution across different communities.
- **Evaluation:** The LHD can conduct periodic evaluations to assess the impact of the outbreak response strategies on reducing infection rates and improving healthcare access across the counties. This involves comparing baseline data collected at the onset of the outbreak to subsequent data points following the implementation of targeted interventions. Evaluation can also consider the equity of interventions, examining outcomes by demographics such as age, race, and socioeconomic status to ensure that efforts effectively reach and benefit all community segments. Feedback from community stakeholders, healthcare workers, and LHDs will be crucial in assessing the interventions' effectiveness and identifying areas for improvement.

Additional Considerations

As LHDs navigate the complexities of outbreak response and prevention in healthcare settings, it is important to not only apply the outlined Equity Framework and M&E strategies but also consider additional elements that can enhance the effectiveness and equity of public health interventions. This section describes further considerations aimed at reinforcing LHDs' capacity to manage health emergencies and foster equitable health outcomes.

Training and Capacity Building

To promote an equitable response to outbreaks in healthcare settings, LHDs must prioritize continuous learning and capacity building. By providing staff with a robust selection of training resources that emphasize health equity within outbreak management, LHDs can enhance their readiness and response strategies. Building strong partnerships with other public health entities can further enrich these educational offerings, equipping LHD staff with the knowledge and skills to sustain equitable outbreak response. Additional details on fostering effective partnerships can be found in the Strategic Collaboration Guide.

Policy and Advocacy

Data plays a pivotal role not only in guiding outbreak response but also in shaping health policies that promote equity. LHDs can leverage the data collected from outbreak monitoring and evaluations to advocate for policy changes that address the root causes of health disparities. This includes policies aimed at:

- Improving Healthcare Access: Advocating for increased funding and resources for healthcare facilities in underserved areas, based on data highlighting service gaps and health outcomes
- Addressing Social Determinants of Health: Using data to advocate for improvements in housing, education, employment, and environmental conditions that contribute to health disparities
- Supporting Workforce Development: Promoting policies that expand the public health workforce, particularly in areas lacking sufficient healthcare providers and in vulnerable communities

Moreover, achieving health equity requires public health to both leverage and share power. As highlighted in the "Building Community Power" module of the NACCHO ROOTS course, public health will be able to make greater gains in achieving health equity through shifting and sharing power with communities that experience marginalization.[20] This approach not only empowers marginalized communities but also ensures that their unique perspectives and needs are integrated into health policies and interventions.

LHDs can engage with policymakers, community leaders, and the public to present data-driven arguments for these policy changes, highlighting the long-term benefits of promoting health equity. Securing sustainable funding is critical for the implementation of equity-focused health interventions. LHDs can explore a variety of funding strategies, including:

- Grant Applications: Identifying and applying for city, state, and federal grants specifically aimed at achieving health equity projects, leveraging data to strengthen proposals
- Public-Private Partnerships: Collaborating with private sector partners who share a commitment to health equity, pooling resources for joint initiatives
- Community-Based Funding Models: Engaging the community in funding initiatives, such as crowdfunding campaigns, to support health equity projects in the community

Integrating equity considerations into long-term capacity building and policy efforts in addition to short-term outbreak response and prevention work will ensure that LHDs are working towards to reducing health disparities on a larger scale.[21] This approach requires a commitment to continuous assessment, adjustment of services, and advocacy to meet the evolving needs of diverse communities.

Conclusion

The Equity Framework and guide offer LHDs and public health professionals an approach to equitable and data-informed outbreak response and prevention in healthcare settings. By collecting and analyzing standardized data and metrics, developing targeted interventions, and performing robust monitoring and evaluation, LHDs can be a catalyst for change in their communities and drive outbreak response and prevention efforts that support health equity across patient populations.

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- All the public health professionals and teams who reviewed and provided feedback on this guide, helping to refine and enhance its content.

Your collective efforts have made this guide a valuable resource for LHDs nationwide. Thank you for your commitment to public health and your dedication to continuous improvement in outbreak response and prevention.

Questions? Contact Us: infectiousdiseases@naccho.org

Appendices

Appendix 1: Equity Framework Data and Metrics Descriptions and Supporting Literature

Community-Level Data and Metrics		
Metric	**Description**	**Data Source**
Social Vulnerability Index (SVI)	The CDC/ATSDR Social Vulnerability Index uses 16 U.S. census variables to help local officials identify communities that may need support before, during, or after disasters (Score of 0 lowest vulnerability, 1 highest vulnerability). "Social vulnerability refers to the potential negative effects on communities caused by external stresses on human health. Such stresses include natural or human-caused disasters, or disease outbreaks."	CDC/ATSDR: SVI Interactive Map CMS Dashboard: Mapping Disparities by Social Determinants of Health User can search the CMS Dashboard for SVI within "Social and Community Context" domain drop down. User can search by county or census tract, then view map or download a data table to access data provided at census tract level. Note: User needs to know census tract of healthcare facility. There is a tool linked at the top of the CMS Dashboard page to find census tract using facility address.
Area Deprivation Index	The Area Deprivation Index (ADI) is based on a measure created by the Health Resources & Services Administration (HRSA) over three decades ago, and has since been refined, adapted, and validated to the Census block group neighborhood level. It allows for rankings of neighborhoods by socioeconomic disadvantage in a region of interest (e.g., at the state or national level).	https://www.neighborhoodatlas.medicine.wisc.edu/mapping
Medically Underserved Area or Population (MUA/MUP)	This designation of MUA or MUP is assigned to neighborhoods as a whole and not to individual portions of it.	HRSA Website: MUA Find Tool User can only search by state and county. Results are presented by neighborhood and further expansion (user can click + for drop down) also provides census GEOIDs within the MUA. Note: Only neighborhoods that are designated MUA/MUP will be listed. Designation dates should be noted as the information provided may be outdated.
Census Profile	Census profiles provide a variety of demographic data on a specific census tract (race/ethnicity breakdown, income/poverty, health care coverage, education, housing, etc.).	Data.Census.gov User can search by county, city, and census tract level. User can click on map to view profile of demographics for different census tracts.

Facility-Level Data and Metrics		
Metric	**Description**	**Data Source**
Facility Healthcare Setting	Categories suggested by CORHA: Acute care hospital | Ambulatory surgical center | Dental | Dialysis center | Inpatient rehabilitation facility | Home health | Long term acute care hospital | Assisted living residence | Outpatient clinic | Nursing home/Skilled nursing facility | Urgent care | Other-specify * If the facility has more than one setting, only the setting involved in the outbreak should be chosen.	LHD Records; CMS Care Compare
Facility Bed Count	This measure represents the size of the facility and total patient beds.	Healthcare Facility (Note: CMS Care Compare only provides number of CMS certified beds for nursing homes, not total beds)
Facility Bed Capacity / Utilization Rate	This metric represents the capacity of the facility. The utilization rate can be measured as the number of beds occupied over available beds in the facility.	Healthcare Facility
Insurance Distribution of Facility	Report as percent of patients using each insurance type. Categories suggested by CORHA: Medicare | Medicaid | Cash Pay | Private Insurance | Tricare/VA/Military | IHS/Tribal Health Services	Healthcare Facility
CMS Overall Rating	Available for various CMS facility types (nursing homes, hospitals, dialysis centers, home health services, hospice care). Centers for Medicare & Medicaid Services (CMS) publishes quality ratings based on their Five-Star Quality Rating System.	CMS Care Compare Individual facility locator provides facility level data. User can search by zip code and facility type.
Healthcare Personnel Vaccination Coverage for COVID-19 (up to date)	This is reported for nursing homes in CMS Care Compare. "Percentage of current healthcare personnel up to date with COVID-19 Vaccines" Definition of "up to date" was revised by CDC in January 2024. Must have vaccine for current 2023-2024 season. Data reporting / quality for this season has been impacted by this as the nursing homes transition away from sharing primary vaccination series data.	CMS COVID-19 dashboard On the CMS dashboard, user can find a Nursing Home by using the Search box or by zooming in on the map. User can enter a city, state, and/or ZIP Code in the Search box, and hover over one of the dots to show data about the Nursing Home. CMS Care Compare; Healthcare Facility
Healthcare Personnel Vaccination Coverage for COVID-19 (primary vaccination series)	This is reported for hospitals and dialysis centers in CMS Care Compare. This metric is different than the measure for nursing homes above. It only measures completing the primary vaccination series and not necessarily "up to date" which requires vaccine for current season.	CMS Care Compare; Healthcare Facility
Healthcare Personnel Vaccination Coverage for Seasonal Influenza	Nursing homes in CMS Care Compare: "Percentage of healthcare personnel who got a flu shot for the current season." Hospitals in CMS Care Compare: "Percentage of healthcare workers given influenza vaccination."	CMS Care Compare; Healthcare Facility

Facility-Level Data and Metrics		
Metric	**Description**	**Data Source**
Healthcare Personnel Vaccination Coverage for Additional Relevant Vaccines	This measure reflects percentage of healthcare workers given a specific vaccination. LHD can choose additional relevant vaccinations and obtain data from healthcare facility.	Healthcare Facility
Facility Level of Stocked Personal Protective Equipment (i.e., N95 masks, surgical masks, face shields, gloves, and gowns)	This measure reflects the availability of essential PPE items such as N95 masks, surgical masks, face shields, gloves, and gowns at a healthcare facility.	Healthcare Facility
Primary Language Distribution of Facility Staff	This measure provides information on language needs for facility staff. LHDs may also consider stratifying the data based on job type (e.g., nurse, environmental services, etc.).	Healthcare Facility
Average Number of Residents per Day	This metric is specific to nursing homes.	CMS Care Compare; Healthcare Facility
Staff Turnover	Several staff turnover measures available, including the percent of nursing staff and number of administrators that stopped working at the nursing home over a 12-month period.	CMS Care Compare
Registered Nurse Hours per Resident per day	This metric is specific to nursing homes. The CMS proposed minimum is 0.55 hours (33 minutes) per resident per day.[16]	CMS Care Compare; Healthcare Facility
Staffing Distribution	Proportion of staff employed by facility vs. staffing agencies This metric provides insight into the reliance on agency staff versus in-house staff, which can affect consistency and quality of care. Higher reliance on staffing agencies may indicate underlying issues with staff retention and could impact the effectiveness of infection control practices.	Healthcare Facility
Resident Vaccination Coverage for COVID-19 (up to date)	This metric is specific to nursing homes. "Percentage of current residents up to date with COVID-19 Vaccines." Definition of "up to date" was revised by CDC in January 2024.	CMS COVID-19 dashboard; On the CMS dashboard, user can find a Nursing Home by using the Search box or by zooming in on the map. User can enter a city, state, and/or ZIP Code in the Search box, and hover over one of the dots to show data about the Nursing Home. CMS Care Compare; Healthcare facility
Resident Vaccination Coverage for Seasonal Influenza	This metric is specific to nursing homes. "Percentage of long-stay residents who needed and got a flu shot for the current flu season."	CMS Care Compare; Healthcare Facility

Facility-Level Data and Metrics		
Metric	**Description**	**Data Source**
Percentage of Short-stay Residents who Were Appropriately Given the Seasonal Influenza Vaccine	This metric is specific to nursing homes. "Percentage of short-stay residents who needed and got a flu shot for the current flu season."	CMS Care Compare; Healthcare Facility
Resident Vaccination Coverage for Additional Relevant Vaccines	This measure reflects percentage residents given a specific vaccination. LHD can choose additional relevant vaccinations and obtain data from healthcare facility.	Healthcare Facility
Staffing Levels	Specific to hospitals. One metric to consider is nurse-to-patient ratios. This can be collected across various units and compared against benchmarks, state standards, and proposed federal standards.[17]	Healthcare Facility
Hospital Infection Scores	This metric is available for hospitals. Score has National Benchmark of 1.0. Lower Numbers are better. Infection Metrics in CMS Care Compare include: ▸ Central line-associated bloodstream infections (CLABSI) in ICUs and select wards ▸ Catheter-associated urinary tract infections (CAUTI) in ICUs and select wards ▸ Surgical site infections (SSI) from colon surgery ▸ Surgical site infections (SSI) from abdominal hysterectomy ▸ Methicillin-resistant Staphylococcus Aureus (MRSA) blood infections ▸ Clostridium difficile (C.diff.) intestinal infections	CMS Care Compare
Percent of ICU, NICU, and/or PICU Beds Currently Occupied	This metric indicates the proportion of intensive care unit (ICU), neonatal intensive care unit (NICU), and pediatric intensive care unit (PICU) beds that are in use at any given time within a healthcare facility. This metrics assesses the capacity of healthcare facilities to respond to severe cases during an outbreak.	Healthcare Facility

In addition to publishing facility-level data through CMS Care Compare, CMS also offers many datasets available for download. Visit the CMS Provider Data Catalog to learn more.

Outbreak-Level Data and Metrics		
Metric	**Description**	**Data Source**
Number of Confirmed Cases	Represents the total count of individuals who have tested positive for the disease through laboratory verification. This metric provides information on the scale of the outbreak.	Healthcare Facility; Electronic Disease Reporting Systems
Number of Probable Cases	Represents individuals who exhibit symptoms of the disease and meet certain epidemiological criteria with presumptive testing results but have not received laboratory confirmation. This metric helps in estimating the scale of the outbreak.	Healthcare Facility; Electronic Disease Reporting Systems
Number of Suspected Cases	Represents individuals who exhibit symptoms of the disease and meet certain epidemiological criteria but have not received presumptive or confirmatory laboratory results. This metric helps in estimating the scale of the outbreak.	Healthcare Facility; Electronic Disease Reporting Systems
Pathogen Testing Availability	Evaluates the accessibility and frequency of testing within the facility, which is crucial for early detection of cases and the implementation of containment measures.	Healthcare Facility
Outbreak Case Demographics (including but not limited to): ▸ Gender ▸ Age ▸ Race and/or ethnicity ▸ Primary Language ▸ Comorbidities	By analyzing these demographic metrics, LHDs can pinpoint disparities in the outbreak's effects across different segments of the patient population.	Healthcare Facility
Percent of hospitalized patients that are confirmed cases	This metric represents the proportion of patients within a hospital who have been admitted and are confirmed to have the infectious disease under investigation. It is calculated by dividing the number of hospitalized patients with confirmed cases by the total number of hospitalized patients, then multiplying by 100 to get a percentage. A high percentage indicates a significant burden of the disease among hospitalized patients.	Healthcare Facility
Percent of ICU patients that are confirmed cases	This metric calculates the proportion of patients in the Intensive Care Unit (ICU) who have confirmed cases of the infectious disease in question. It is determined by dividing the number of ICU patients with confirmed cases by the total number of ICU patients, multiplied by 100 to express it as a percentage.	Healthcare Facility

Appendix 2: Criteria for Selecting Standardized Metrics

The decision-making process for selecting the specific metrics to propose in this guide included the three overarching domains:

Availability and quality of data

Many metrics listed below are readily available through user-friendly public government websites offering high-quality data. Specifically, three community-level metrics are derived from Census data, and these metrics can be accessed via public dashboards that provide detailed data down to the census tract level within a community. Numerous facility-level metrics, particularly for nursing homes, can be sourced from the CMS Care Compare website and are easy to collect. CMS Care Compare data are updated regularly, though the frequency may vary by metric (details on accessing these public websites are available in Appendix 1).

Other metrics, including some hospital-specific facility-level metrics and many outbreak-level metrics, are not publicly accessible. In these cases, LHDs must coordinate directly with healthcare facilities to acquire the necessary data. This coordination could occur during an outbreak response or as part of regular monitoring routines for ongoing prevention efforts.

Relevance to equity goals

The metrics selected were evaluated for their relevance to health equity. Several metrics align with the "Healthcare-associated Infection (HAI) Outbreak Standardized Variables List" developed by CORHA. Furthermore, "Health Care Access and Quality" is recognized as a crucial domain within the social determinants of health by Healthy People 2030, and literature corroborates the utility of facility-level metrics from CMS Care Compare as a measure of healthcare quality. The connections to the four categories of unequal pandemics proposed by Bambra (unequal exposure, transmission, susceptibility, and treatment) were also factored into the assessment of each metric's relevance to health equity goals, alongside the consideration of fair distribution of "benefits and burdens" as explained by WHO.

Potential for impact and applicability across LHDs

The potential impact and wide applicability of the metrics across various types of LHDs was also a key consideration for inclusion in the framework. While LHDs may find the proposed metrics relevant in certain scenarios and less so in others, outbreak-level metrics and facility-level metrics are likely to offer the most immediate equity-focused insights for decision-making and resource prioritization during an active outbreak response. Community-level metrics may also prove valuable during outbreak responses, especially within diverse jurisdictions where community needs and susceptibilities vary across census tracts.

For proactive prevention efforts, all LHDs can benefit from facility-level and community-level metrics. Even in areas with minimal variation across census tracts, these metrics can provide an equity-focused perspective, aiding LHDs in determining resource distribution and planning interventions.

Appendix 3: Additional Resources for Consideration

- NACCHO Resource Guides for Outbreak Response and Prevention in Healthcare Settings
  - Strategic Collaboration Guide
    - The purpose of this guide is to equip LHDs with strategies and tools for building and sustaining strategic collaborations to enhance outbreak response and prevention in healthcare settings.
    - This guide is designed to be a practical resource that supports LHDs in building robust, resilient partnerships that enhance their capacity to respond to and prevent outbreaks in healthcare settings. By implementing the strategies outlined in this guide, LHDs can improve their outbreak response efforts through collaboration with their partners, resulting in improved health and well-being of their communities.
  - Data Utilization and Management Guide
    - The purpose of this guide is to provide LHDs with strategies, tools, and success stories for effective data utilization and management to support outbreak prevention and response within healthcare settings.
    - This guide provides insights into outbreak reporting, infection control assessments, data-informed decision making, collaboration with healthcare facilities, and improving LHD data processes.
- CORHA Standardized Variables List
  - This listing of Outbreak Standardized Variables can be used by public health jurisdictions or health organizations when deciding what information is most appropriate to collect during a healthcare outbreak investigation.
  - Adoption of this standardized list of variables for HAI outbreak investigation can help increase the comprehensiveness and quality of data collected and better equip the field to conduct future analyses that expand knowledge on risk factors for HAI outbreaks. Systematic HAI outbreak data collection can also lead to enhanced synchronization of data across facilities, jurisdictions, and time, facilitating the identification of common outbreak sources, themes, and trends, which can help inform and strengthen prevention efforts over time.
- CDC Infection Control Assessment and Response (ICAR) Tools:
  - ICAR tools are used to systematically assess a healthcare facility's IPC practices and guide quality improvement activities (e.g., by addressing identified gaps).
- CMS Provider Data Catalog
  - This website can be used to explore and download Medicare provider data.

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