September 2024

NACCHO[SM]
National Association of County & City Health Officials

Data Utilization and Management Guide for Outbreak Prevention and Response in Healthcare Settings

Success Stories and Resources for Local Health Departments

Prepared by: The National Association of County and City Health Officials (NACCHO) and the Population Health Innovation Lab (PHIL), a program of the Public Health Institute (PHI)

For: Local Health Departments and Public Health Practitioners

Purpose: To provide Local Health Departments (LHDs) with strategies, tools, and success stories for effective data utilization and management to support outbreak response and prevention in healthcare settings.

Key Contents:

- Collecting initial outbreak reports and managing outbreak data
- Conducting infection control assessments and utilizing Infection Control Assessment and Response (ICAR) tools
- Identifying and prioritizing high-risk facilities using facility and community data
- Making data-informed decisions using surveillance data
- Enhancing collaboration with healthcare facilities and ensuring data quality and protection
- Improving LHD data processes using standard procedures and outbreak response metrics

Questions? Contact Us: infectiousdiseases@naccho.org

Contents

Introduction and Purpose

The purpose of this guide is to provide Local Health Departments (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. Each section offers practical guidance and real-world success stories from LHDs across the United States (Appendix 1), illustrating effective practices for data utilization and management in outbreak prevention and response within healthcare settings. In addition, specific resources and tools are linked throughout the guide to help LHDs implement the strategies shared in the success stories. A full list of resources is provided in Appendix 2.

LHDs can use this guide as they work to continuously improve their ability to manage outbreak data, make informed decisions, and collaborate effectively with healthcare facilities to enhance overall outbreak response efforts.

This guide was one of three resources developed by the National Association of County and City Health Officials (NACCHO) and the Population Health Innovation Lab (PHIL) to support LHDs in strengthening their outbreak management capabilities. The Strategic Collaboration Guide and the Equity Framework Guide provide further guidance on partnership, community engagement, and data-driven equity strategies to incorporate in outbreak response and prevention work in healthcare settings.

Outbreak Reporting and Data Management

What Strategies can LHDs Use to Collect Initial Outbreak Reports from Facilities?

Healthcare facilities play an essential role in notifying LHDs of potential outbreaks, and established notification processes are important for clear and efficient communication between healthcare facilities and LHDs. LHDs use a variety of strategies to collect and streamline the initial notification from healthcare facilities, as highlighted below.

Figure 1. Strategies for Outbreak Reporting and Notification

Phone

The healthcare facility calls the LHD to report an outbreak.

The LHD staff then record the outbreak information onto an internal intake form.

Form

The LHD shares a fillable outbreak reporting form template (e.g., Microsoft Word document) with all healthcare facilities in their jurisdiction.

When an outbreak occurs, the healthcare facility staff can complete the form and then securely email or fax the form back to the LHD.

Online Survey

The LHD creates a secure online survey tool (using software such as Microsoft Forms, REDCap, and Qualtrics) and shares the survey link with all healthcare facilities in their jurisdiction.

When an outbreak occurs, the healthcare facility staff can complete the online survey, and the LHD is notified.

Portal

The LHD provides an online reporting form within the secure state portal for healthcare providers.

When an outbreak occurs, the provider at the healthcare facility can log in to the secure portal and complete the online reporting form, and the LHD is notified.

Success Story: Developing Secure Online Surveys for Outbreak Reporting

Long Beach Health and Human Services in California recently launched the HAI REDCap project, which is designed to allow healthcare facilities to report various diseases and outbreaks via secure, online surveys. This REDCap project serves to improve data collection, storage, and reporting.

Long Beach Health and Human Services first developed custom surveys aligned to specific HAI reporting requirements using the REDCap platform. Then, healthcare facility staff received training from this LHD on how to properly submit HAI outbreak reports using the web-based survey tool. The REDCap survey reporting will replace handwritten and digital reporting, and the adoption of this online survey system will help in providing accurate and consistent reporting that in the past had the potential to be lost in fax or email trails.

REDCap Secure Survey Resources

- REDCap is a free, secure, browser-based application to support data collection.
- Long Beach Health and Human Services developed several REDCap survey templates for outbreak reporting available for download.
  - *Candida auris* Outbreak Reporting Survey
  - COVID-19 Outbreak Reporting Survey
  - COVID-19 Weekly Survey
  - Gastrointestinal Illness Outbreak Reporting Survey
  - Influenza Outbreak Reporting Survey
  - *Legionella* Outbreak Reporting Survey
  - Scabies Outbreak Reporting Survey
  - Scabies Outbreak Weekly Follow-up Survey
  - RSV Outbreak Reporting Survey
- Learn more about the HAI REDCap Project at Long Beach Health and Human Services.
- View the REDCap COVID-19 Outbreak Reporting Form developed by DuPage County Health Department.
- Access additional materials related to Streamlining Long-term Care Facility COVID-19 Outbreak Reporting and Response: A Practical and Time-saving Application of REDCap at a Local Health Department. These materials were presented by DuPage County Health Department during the NACCHO 360 Conference in July 2024.

Intake Form Resource

- Download the sample internal intake form developed by Washington County Public Health Division.

What Systems and Tools can LHDs Employ to Manage Outbreak Data?

LHDs employ a variety of systems and tools to help manage the data collected during or after an outbreak investigation.

- Many LHDs use Microsoft Excel to record and manage outbreak information in the form of a line list. This line list is a case log that can include variables related to patient demographics, onset details, symptoms, and other outcomes. In addition to offering a simple and easily adaptable line list approach, additional features can be built into the Excel workbook to help generate Epi curves and run other analyses.
- For LHDs that want a streamlined data entry process and a more robust system that provides advanced organization and analysis of complex data, it can be beneficial to use a database program (such as Epi Info, Microsoft Access, and REDCap) to record and manage outbreak data.
- Some LHDs work with their local or state information technology (IT) team to create outbreak modules within their reportable disease case management system. This outbreak module can be an effective option to help streamline the management of case and outbreak data and may include additional variables, such as laboratory results, address, facility name, and close contacts.

Success Story: Creating Excel Line Lists for Outbreak Data Management and Analysis

Washington County Public Health Division in Oregon created an Excel spreadsheet where line list data can be entered, and an automated epi curve is created. This automated spreadsheet is a time saver for this LHD's staff, as they do not have to duplicate the manual data entry of illness onset information into another system to generate the epi curve.

In addition, Washington County Public Health Division developed a template for their outbreak close out report to help streamline the process and ensure that the same information is routinely captured across different outbreaks.

Outbreak Line List Resources

- Download the line list template for gastrointestinal outbreaks developed by Washington County Public Health Division.
- Download the line list template for respiratory outbreaks developed by Washington County Public Health Division.
- Access the HAI program resources provided by the California Department of Public Health, including downloadable line list templates for COVID-19, MDRO, and CDI under the Outbreaks tab.

Success Story: Using Epi Info for Outbreak Data Management and Analysis

The Florida Department of Health in Polk County (DOH-Polk) found Epi Info to be a useful, free tool to create customized exposure questionnaires for outbreak investigations and to collect large amounts of data quickly.

While investigating a gastrointestinal illness outbreak associated with a holiday luncheon among 800 staff in a health care facility, this county health department found that Epi Info was an efficient way to collect and analyze food exposure data. DOH-Polk staff wrote queries in Epi Info to calculate the incubation period of the organism and used these findings to narrow down potential pathogens to test for in food samples at the laboratory.

In addition, DOH-Polk has used Epi Info to easily create epi curves, generate stratified reports in health care outbreaks (e.g., residents vs. staff), and export data into Excel for further analysis.

Epi Info Database Resource

- Learn more about the free Epi Info 7 tool, and explore the website for access to a user guide and tutorials.

Epi Info 7 is a free CDC software tool that allows users to rapidly develop a questionnaire or form, customize the data entry process, and enter and analyze data.

CORHA Outbreak Response Database Resource

The Council for Outbreak Response: Healthcare-Associated Infections and Antimicrobial-Resistant Pathogens (CORHA) developed several data management resources for health departments.

- Learn more about the CORHA HAI-AR Outbreak Response Tracking System and download a sample Microsoft Access database along with the matching data dictionary.

Note: The database is intended to be used for tracking summary data for response activities. It is not intended to capture individual case data as would be done with a line list or a database developed for a specific epidemiologic investigation.

Success Story: Comprehensive Data Management and Local Decision Making

During the COVID-19 pandemic, Monongalia County Health Department in West Virginia made the decision to generate their own infection rate data in order to have accurate and timely information to refer to when making decisions at the local level.

To generate their own infection rate data, Monongalia County Health Department implemented a robust local data management process by combining information from several data sources. LHD staff maintained Excel line lists with data collected from EDSS (the state's electronic disease management system) and case investigation phone calls. In addition, LHD staff utilized data from EPIC for hospital medical records, the West Virginia Health Information Network (WVHIN) and ArgoLIMS for test results. In addition, this LHD held daily check-in meetings with epidemiology staff to review and validate their internally derived infection rate data.

Monongalia County Health Department also created a specific approach for COVID-19 cases in congregate settings. This LHD developed a tool in REDCap to monitor infection rates within student dormitories at the nearby university. R-Studio was utilized to organize and visualize data. This data-driven approach enabled this LHD and the university to collaborate and make timely decisions on outbreak mitigation measures, such as targeted isolation and closure of specific dormitories.

REDCap Secure Survey Resources

- REDCap is a free, secure, browser-based application to support data collection.

How can LHDs Use Data to Identify Unreported Outbreaks in Healthcare Facilities?

Disease surveillance systems are important tools to help LHDs monitor reportable diseases and potential outbreaks. LHDs play a critical role in monitoring and responding to clusters or outbreaks in healthcare facilities.

Identifying unreported clusters or outbreaks is vital for early intervention, minimizing spread, and ensuring public health safety. Utilizing a variety of data sources and analytical methods, LHDs can detect anomalies and trends indicative of potential outbreaks that might not have been reported through traditional channels.

Success Story: Using Surveillance Systems and Electronic Medical Records to Monitor Facility-Associated Cases and Identify Possible Unreported Outbreaks

The Florida Department of Health in Polk County (DOH-Polk) uses a combination of their reportable disease surveillance system (Merlin), electronic medical records, and their syndromic surveillance system (ESSENCE-FL) to monitor facility-associated cases and identify possible unreported outbreaks. DOH-Polk has identified several unreported outbreaks using these methods and followed up with the facilities for further investigation and mitigation.

- **Strategy 1 -** Using the Merlin surveillance system, DOH-Polk staff review specific cases that have been designated as individuals residing in a "group setting." They then work to determine if these cases can be attributed to a specific health care facility using a fuzzy match to compare the address of the patient with the list of addresses for local health care facilities. Fuzzy matching is a technique that finds similarities between data entries and can identify potential connections even when addresses are not an exact match.
- **Strategy 2** - DOH-Polk staff review the electronic medical records of confirmed cases to search for potential connections to other health care facilities in the chart notes.
- **Strategy 3 -** Using the ESSENCE-FL syndromic surveillance system, DOH-Polk staff can write queries that include key phrases such as "nursing home" or "long-term care" and simultaneously search for disease codes. This method can identify cases associated with health care facilities that were not previously reported by the facility.

ESSENCE Syndromic Surveillance Resource

- Learn more about CDC's Electronic Surveillance System for the Early Notification of Communitybased Epidemics (ESSENCE) tool.

ESSENCE is the key tool that allows public health professionals to access and interpret the syndromic surveillance data that flow into the BioSense Platform. This supports collaboration and investigation. It also allows users to analyze, visualize, and share data.

Success Story: Conducting Point-Prevalence Surveys and Patient Screenings to Identify Additional Cases

During the early stages of the COVID-19 pandemic in 2020, Public Health – Seattle & King County in Washington used point-prevalence surveys to identify asymptomatic and presymptomatic COVID-19 cases. This LHD tested residents in a skilled nursing facility and demonstrated that the facility had many patients who tested positive for SARS-CoV-2 infections without showing symptoms. Public Health – Seattle & King County concluded that asymptomatic and presymptomatic cases most likely contributed to transmission of infection within the facility, and consequently infection control practices that focused solely on symptomatic cases were not sufficient to control the spread of COVID-19.

Public Health – Seattle & King County uses several patient screening strategies to help control transmission of multidrug resistant organisms in healthcare facilities. In response to each new case of Carbapenemase-producing organisms or *Candida auris* in a healthcare facility, this LHD provides patient screening recommendations using the CDC guidelines. These screening guidelines are useful during an investigation as they can help identify a potential source that was previously unknown to be colonized and/or pinpoint silent transmission from the newly identified case.

Public Health – Seattle & King County also provides guidance to implement proactive screening procedures for multidrug resistant organisms in healthcare facilities. Through the Partners for Patient Safety program, this LHD works with long-term acute care hospitals and ventilator-capable skilled nursing facilities to screen patients on admission and biannually for Carbapenemase-producing organisms and *Candida auris*. This proactive patient screening approach is an important strategy to quickly identify multidrug resistant organisms within facilities before transmission can occur.

Point-Prevalence and Patient Screening Resources

- Learn more about Public Health - Seattle & King County's use of point prevalence surveys in a skilled nursing facility during the COVID-19 pandemic.
- Explore CDC's resources on *Candida auris* and learn more about the importance of screening patients to prevent or stop outbreaks in healthcare facilities.
- Learn more about Partners for Patient Safety. This is a partnership between CDC, Washington State Department of Health, Local Health Jurisdictions (LHJ), and participating healthcare facilities to identify patients who are unknowingly colonized with targeted multidrug resistant organisms (MDRO) so that appropriate infection prevention measures can be implemented to prevent spread.

Success Story: Comparing Weekly Healthcare Facility vs. Community Cases

A rural LHD in Texas created a communicable disease reporting form that long-term care facilities are required to complete weekly and send back to the LHD via secure email. In the weekly report, facilities provide the number of new cases of COVID-19, influenza, and several other vaccine preventable diseases. The weekly case counts are then entered into a line list and weekly percent changes are calculated for each facility.

This LHD uses this weekly data to compare a healthcare facility's percent change in cases to the surrounding community for the same zip code. If the facility's percent change in cases is notably higher than the surrounding community, LHD staff reach out to the facility to investigate the potential outbreak and offer an infection control assessment.

Infection Control Assessments and ICAR Tools

What are ICAR Tools and When are They Utilized?

The CDC developed Infection Control Assessment and Response (ICAR) tools to provide a systematic approach for health departments to assess a healthcare facility's infection prevention and control (IPC) practices, identify gaps, and guide quality improvement activities. These tools are specific for acute care, long-term care, and outpatient facilities.

The timing and purpose of conducting infection control assessments and using ICAR tools can look different across health departments. For example:

- LHDs can conduct assessments and collect ICAR data when responding to outbreaks or clusters of cases in a healthcare facility. Completing the infection control assessment early in an outbreak investigation can help identify gaps in the healthcare facility's IPC strategy and lead to timely intervention. After the ICAR data is collected, the LHD provides a summary report to the healthcare facility with recommendations on how to improve IPC practices and employ targeted strategies to prevent further spread of infection.
- LHDs can also utilize ICAR tools as part of a proactive infection control education process. In proactive consultations, LHDs use infection control assessments to collaborate with healthcare facilities and provide recommendations on how to prevent disease spread and potential outbreaks.

CDC ICAR Resources

- Learn more about the CDC ICAR tools, including fillable PDF templates of various ICAR forms available for download.

CDC's TeleICAR team also offers trainings to public health jurisdictions on how to use the ICAR tools.

Success Story: Using ICAR Tools for Both Proactive Consultation and Targeted Infection Control Intervention

Public Health - Seattle & King County in Washington offers proactive consultations using ICAR tools at healthcare facilities such as hospitals, nursing homes, assisted living facilities, and adult family homes. These proactive consultations can be requested by a healthcare facility or can be initiated by Public Health – Seattle & King County.

Public Health – Seattle & King County also uses ICAR tools for targeted infection control intervention. For example, every time a new case of Carbapenemase-producing organisms or *Candida auris* is reported by a healthcare facility, this LHD offers to conduct an infection control assessment to help control the spread of the drug-resistant organism within the facility. After each visit, this LHD provides a letter that details the ICAR observations, the facility's IPC strengths, recommendations for short-term and long-term improvement, and resources and templates to support implementation of the recommendations.

CDC ICAR Resources

- Learn more about the CDC ICAR tools, including fillable PDF templates of various ICAR forms available for download.

Additional Infection Control Assessment and ICAR Resources

- This ICAR webinar, hosted by the California Department of Public Health in October 2022, is designed for Local Health Department Infection Preventionists and provides an overview of the CDC ICAR tools. You can also find the corresponding CDC slides here.
- This slideshow on Infection Prevention Assessments: Maximizing Your On-Site Impact was created by the County of Los Angeles Public Health and presented at the May 2024 NACCHO IPC Summit.
- This slideshow walks through a detailed ICAR workflow strategy to maximize the LHD's impact.
- The NACCHO Infection Prevention and Control Resource Library provides materials shared by other LHDs around the country on various infection control topics, including several related to ICAR.
- The NACCHO Project Firstline Infection Prevention and Control Quick Start Guide provides resources that aim to support LHDs with training healthcare workers in IPC.

Who Conducts Infection Control Assessments and Collects ICAR Data?

The responsibility of conducting an infection control assessment and collecting ICAR data varies across jurisdictions and can depend on state policies, the size and capacity of the LHD, and the type or severity of an outbreak.

- In jurisdictions where LHDs have sufficient staff capacity and public health authority, LHDs take the lead in conducting infection control assessments, collecting and managing ICAR data, and implementing the follow-up response.
  - In some cases, an LHD may use third-party contractors to conduct infection control assessments. After the assessment is completed by the contractor, the LHD will then take the lead on managing the assessment data and implementing the follow-up response.
- In other jurisdictions, LHDs defer to the state's central or regional infection control team to lead the infection control assessment and/or LHDs may collaborate with the state team for infection control activities.

Success Story: Improving Infection Control Expertise and Assessment Capacity by Training and Certifying LHD Staff

A rural LHD in Texas reflected on their outbreak response process and their reliance on state partners to lead the infection control portion of outbreak investigations in healthcare facilities. In order to become more self-reliant and improve LHD knowledge of infection prevention and control, this LHD secured an IPC grant to educate and certify their epidemiology staff in infection control.

Pima County Health Department in Arizona recently used a NACCHO scholarship to complete infection prevention and control certification for five of their LHD staff. This additional training and certification will allow this LHD to begin leading their own infection control assessments.

Certification in Infection Control Resources

- Learn more about the Certification in Infection Control (CIC) process.
- Learn more about the impact of Certification in Infection Control from the 2018 NACCHO Assessment and the 2023 NACCHO Assessment.

How can ICAR Tools and Assessment Processes be Streamlined for the Needs of the LHD?

There are many different modules available within the CDC ICAR tools. The Facilitator Guide Assessment Modules cover 11 topics:

1. Training, Audits, Feedback
2. Hand Hygiene
3. Transmission-Based Precautions
4. Environmental Services
5. High-Level Disinfection and Sterilization
6. Injection Safety
7. Point of Care Blood Testing
8. Wound Care
9. Healthcare Laundry
10. Antibiotic Stewardship
11. Water Exposure

LHDs can choose to select specific ICAR tools, modify the ICAR tools, and/or streamline the assessment processes depending on the pathogen, known details of the outbreak, and needs of the healthcare facility. For example:

- LHDs can choose to focus on one ICAR module or multiple modules during the infection control assessment.
- LHDs can shorten the ICAR forms to create a quicker and more streamlined consultation process.
- LHDs can add additional variables of interest to the infection control assessment to explore factors that may be relevant to the current outbreak investigation. For example, an LHD may choose to collect additional patient location information and map cases on a printed facility floorplan to better understand transmission within the facility.
- LHDs can conduct the infection control assessment in person or virtually.

CDC ICAR Resources

- Learn more about the various CDC ICAR modules and download data collection forms.
- Read more about CDC's implementation of Remote Infection Control Assessments in nursing homes during the COVID-19 pandemic.

Success Story: Prioritizing Specific ICAR Modules for Targeted Outbreak Response

The South Carolina Department of Health and Environmental Control's (DHEC)* Upstate Region shared that choosing the ICAR module depends on the pathogen of interest and the goal of the infection control assessment. This LHD uses the Demographics, Hand Hygiene, and Environmental Services (EVS) modules as a starting point for most investigations. They recently added the EVS module as part of the standard ICAR data collection process because they have observed that environmental services and laundry are important but underappreciated factors when considering infection control in healthcare facilities. Additionally, they have observed that EVS staff are often the least trained in infection prevention and control.

In addition to completing these initial ICAR modules, the Upstate Region team will add other modules specific to the pathogen of focus. For example, this LHD will use the Water Exposure tool for *Legionella* and Wound Care tool for Group A Strep to help identify possible routes of transmission and exposure.

** The South Carolina Department of Public Health (DPH) was created by the state Legislature with the DHEC Restructuring Act of 2023 (Act 60). It is the health component of the agency formerly known as DHEC.*

Success Story: Utilizing 90-minute ICAR Tool for Shorter Site Visits and Quicker Feedback to Facilities

Long Beach Health and Human Services in California recently collaborated with Marin County Health and Human Services in California to customize Marin County's 90-minute version of the infection control assessment. The full-length ICAR tools provided by CDC take about five hours to complete while this modified tool can be completed in 90 minutes.

Another major advantage to the shortened ICAR tool is that Long Beach Health and Human Services can now quickly populate the results into a premade report template and then share the results back to the facility in the same day. This is a much quicker turnaround time for feedback, as the LHD staff required at least one week to create a summary report when using the full-length ICAR tools.

Modified ICAR Resources

- View the IPC Assessment Site Visit Worksheet developed by Marin County Health and Human Services.
- View the IPC Assessment Site Visit Worksheet modified for Long Beach Health and Human Services.
- View the IPC Program Assessment Site Visit Planning Document developed by Marin County Health and Human Services.

How is ICAR Data Stored and Managed by LHDs?

ICAR information is instrumental in tracking and managing outbreaks in healthcare settings. Effective data storage, access, and sharing can greatly impact an outbreak response. In addition, subsequent analysis of the data can be leveraged for future prevention efforts and/or monitoring of trends.

- Some LHDs keep paper copies of ICAR assessments organized in physical binders for each facility. This storage method allows the LHD staff to quickly review previous ICAR results from a specific facility, which can help inform outbreak response decisions ahead of the new ICAR assessment.
- Some LHDs manage ICAR data in databases using programs such as SAS or REDCap. Storing this information in a database allows LHD staff to organize data in a more standardized way and streamline the review of ICAR results.

Success Story: Using Previous ICAR Findings to Help Guide Intervention Strategies During an Outbreak Investigation

A rural LHD in Texas maintains a binder system of previous ICAR findings for each healthcare facility. Referring back to previous ICAR findings can provide useful information at the beginning of an outbreak investigation because conducting new infection control assessments can take time to implement, involve coordination with the state team, and require permission from the facility.

During the COVID-19 pandemic, this LHD identified a facility experiencing higher case counts than expected. LHD staff reviewed the facility's previous ICAR findings at the beginning of the investigation and discovered that the healthcare facility had been reusing PPE during the pandemic. LHD staff were able to act quickly by verifying the facility's need for increased supplies of PPE and then connecting the facility with the state's assistance request process to secure additional PPE for healthcare staff.

Data-Informed Decision Making

How can LHDs Use Data to Identify and Prioritize High-Risk Facilities for Intervention?

LHDs can use outbreak-level, facility-level, and community-level data to help make decisions in their outbreak prevention and response work. Using this approach can help LHDs prioritize interventions in facilities and communities with the greatest risk for poor outbreak outcomes. For example:

- LHDs can use outbreak-level data such as patient demographics and laboratory results to implement targeted interventions.
- LHDs can use facility-level data and metrics such as staff turnover, Centers for Medicare and Medicaid Services (CMS) ratings, healthcare-associated infection (HAI) rates, and staff vaccination status to identify and prioritize high-risk facilities for targeted intervention. Some of these data are available on public websites such as CMS Care Compare, while other data may require the LHD to connect with the facility administrative staff to collect.
- LHDs can use community-level data such as the CDC's Social Vulnerability Index (SVI) to incorporate information about the surrounding community. SVI was developed by the CDC using 16 different census metrics to measure a community's vulnerability in times of emergency or disaster scenarios, including infectious disease outbreaks. This index can be useful when LHDs are conducting outbreak prevention planning and when LHDs are developing outbreak response strategies for facilities in vulnerable neighborhoods.

Success Story: Analyzing Staff Turnover Rates to Prioritize IPC Education in Long-Term Care Facilities

Monmouth County Health Department in New Jersey conducted an analysis using outbreak metrics which demonstrated that long-term care facilities with lower staff turnover had better outcomes during outbreaks. In facilities with lower staff turnover, outbreaks were more likely to be reported faster, end more quickly, and have fewer cases. In facilities with high administrator turnover, staff were less likely to contact the LHD for outbreak support and outbreak metrics were worse.

As a result of these findings, Monmouth County Health Department used grant funds to prioritize outreach and education efforts to facilities with high staff turnover, especially among key administrators such as executive directors, nursing directors, and infection preventionists.

Success Story: Utilizing Hospital Standardized Infection Ratios and Staff Vaccination Rates to Identify High-Risk Facilities and Prioritize Intervention

The South Carolina Department of Health and Environmental Control's (DHEC)* Upstate Region utilizes the standardized infection ratios of hospitals to help identify high-risk facilities for further intervention.

The state implemented the Hospital Infections Disclosure Act (HIDA) in 2006. The annually published infection ratio data helps the region's health departments make decisions about where their infection control nurses should focus their efforts to review hospital practices and provide guidance to hospital staff on preventing bloodstream infections.

Another data-driven strategy implemented by DHEC Upstate Region during the COVID-19 pandemic focused on healthcare staff vaccination rates. This LHD identified counties and healthcare facilities with low staff vaccination rates, and this vaccination rate data prompted an effort to provide additional vaccinations at the facilities. In addition, LHD staff conducted targeted outreach to local healthcare organizations and community members to raise awareness on the importance of vaccinations.

** The South Carolina Department of Public Health (DPH) was created by the state Legislature with the DHEC Restructuring Act of 2023 (Act 60). It is the health component of the agency formerly known as DHEC.*

Facility-Level Metrics Resource

- Access CMS Care Compare, which provides many facility-level metrics for nursing homes and hospitals, including:
  - nursing staff and administrator turnover data for nursing homes
  - staff influenza and COVID-19 vaccination data for nursing homes and hospitals
  - 6 different infection metrics for hospitals.

Success Story: Utilizing Facility-Level and Community-Level Data to Identify High-Risk Healthcare Facilities

The Fairfax County Health Department in Virginia uses electronic health record (EHR) information to obtain detailed patient-level data to better understand exposures and risk factors of case-patients during outbreak investigations. Integrating EHR data (such as patient demographics and detailed healthcare exposure history) with surveillance and laboratory data helps this LHD to conduct comprehensive epidemiological investigations and tailor interventions specific to those populations or facilities.

In addition, the Fairfax County Health Department in Virginia has recently expanded their data-driven approach to better incorporate equity indicators. After attending a recent NACCHO "Equity Framework" workshop, they found facility-level and community-level indicators such as The Centers for Medicare & Medicaid Services (CMS) ratings and Social Vulnerability Index (SVI) metrics useful to help identify high-risk facilities and create timely, targeted interventions. In addition, the Fairfax County Health Department has encouraged other LHDs to adopt these data-driven strategies into their work. They noted that LHDs with fewer resources can benefit from utilizing public websites such as CMS Care Compare and the SVI Dashboard to collect data on equity indicators to drive and prioritize public health outreach.

Facility-Level and Community-Level Metrics Resources

- Access CMS Care Compare, which provides many facility-level metrics for nursing homes and hospitals, including overall CMS ratings.
- Access the CMS Dashboard for Mapping Disparities by Social Determinants of Health. SVI can be visualized in this dashboard by census tract after selecting the Social and Community Context domain.
- Access the NACCHO's Equity Framework for Outbreak Prevention and Response in Healthcare Settings for strategies and resources on how to collect data at the facility, community, and outbreak level to identify high-risk facilities. This resource also provides additional guidance for LHDs on how to incorporate an equity lens and develop targeted interventions for healthcare facilities during outbreak and prevention work.

Success Story: Creating a "Health Equity Index" to Prioritize Acute Care Hospitals for Infection Prevention Activities

Chicago Department of Public Health in Illinois developed a "Health Equity Index" for acute care hospitals to characterize facility resource levels, burden of HAIs, and vulnerabilities of the communities they serve. The goal of this index was to create a metric to help the LHD prioritize facilities for infection prevention activities, such as ICARs.

Acute care hospitals in Chicago were ranked on several metrics, including:

- percentage of transfers to skilled nursing facilities
- annual standardized infection ratios for device-associated infections
- infection preventionist to bed ratio
- percentage of patients insured by Medicaid/Medicare
- community hardship (the Hardship Index was developed internally by Chicago Department of Public Health using data related to unemployment, age dependency, education, per capita income, crowded housing, and poverty by zip code)

Acute care facilities scoring in the top half of the "Health Equity Index" were prioritized for a site visit and ICAR assessment with the goal of mitigating inequities in HAI incidence and outcomes at acute care hospitals.

Facility-Level and Community-Level Metrics Resources

- Access CMS Care Compare, which provides many metrics for hospitals, including six different infection ratios.
- Access the CMS Dashboard for Mapping Disparities by Social Determinants of Health. SVI can be visualized in this dashboard by census tract after selecting the Social and Community Context domain. SVI may be a comparable tool for LHDs looking to incorporate a metric to measure community hardship similar to Chicago's internal metric.
- Access NACCHO's Equity Framework for Outbreak Prevention and Response in Healthcare Settings for strategies and resources on how to collect data at the facility, community, and outbreak level. This resource also provides additional guidance for LHDs on how to incorporate an equity lens and develop targeted interventions for healthcare facilities during outbreak and prevention work.

How can LHDs Use Surveillance Data to Inform and Prepare Facilities?

LHDs can use surveillance data at the community, regional, and state levels to stay informed on current trends that may impact healthcare facilities in their jurisdiction. Sharing surveillance data with providers and facilities can help facilities implement necessary precautions and prepare ahead of potential outbreaks. LHDs may use surveillance data that:

- Focuses on broader illness categories such as influenza-like illness (ILI) and gastrointestinal (GI) illness. These data may be provided through state surveillance reports or public dashboards published on state or CDC websites.
- Provides information on a specific disease. These data may be available to the LHD through in-house case management systems for laboratory-confirmed cases or by conducting wastewater surveillance.

Success Story: Using ILI and GI State Surveillance Trends to Inform and Prepare Healthcare Facilities

Crater Health District- Virginia Department of Health frequently reviews the surveillance reports, trends analyses, and visual dashboards prepared by the state's central office to stay informed about rates of ILI, COVID-19, and GI illness. The reports are updated weekly and are stratified by region within the state. The GI Illness report is an internal report.

When Crater Health District staff identify a peak in the surveillance trends for a specific illness type, they will begin targeted outreach to inform providers and healthcare facility staff. Outreach to other facilities at greater risk of outbreaks are also included in the outreach such as long-term care facilities, assisted living facilities, schools, daycares, correctional facilities, and churches. In addition, this LHD will provide pertinent education to prepare them ahead of a potential outbreak.

Respiratory Surveillance Trends and Dashboards Resources

- Visit the Virginia Department of Health's Influenza Surveillance Website to access the Stratified ILI tab, which features an ILI dashboard stratified by region.
- Visit the Virginia Department of Health's COVID-19 Dashboards.
- Access the CDC FluView Interactive website, which provides several dashboards that display influenza surveillance data. The data can be viewed at the national level, by region of the country, or by state.
- Access the CDC COVID Data Tracker website, which provides several dashboards that display COVID-19 surveillance data. The data can be viewed at the national level, by region of the country, or by state.

Success Story: Analyzing Wastewater Trends to Understand COVID-19 Community Case Levels and Help Healthcare Facilities Make Informed Decisions

Orange County Department of Health in New York has found success in using wastewater surveillance to inform their understanding of COVID-19 trends in their community. As the pandemic progressed, COVID-19 testing shifted away from traditional laboratory testing and towards at-home tests. As a result, this LHD and healthcare facilities felt the data coming from laboratory testing was not providing an accurate picture of the current COVID-19 case levels in the community. A shift to wastewater surveillance data provided an alternate way to obtain information on virus levels in various areas around the community.

The Orange County Department of Health used wastewater metrics in combination with surveillance data of COVID-19 hospitalizations to help advise healthcare facilities when increases in virus levels and severity were observed. When a COVID-19 surge was detected, LHD staff shared these data with healthcare facilities and provided a notification that included recommendations on precautions to take, such as reinstating masking, performing additional testing, and limiting congregate gatherings.

Wastewater Surveillance Resources

- Learn more about Orange County's wastewater surveillance program.
- Access additional materials related to Using a Paired Early Detection and Early Notification Wastewater Surveillance System to Prepare for Future COVID-19 Surges, presented by the Orange County Health Department during the 2023 Public Health Partnership Conference in April 2023.
- View the New York State COVID-19 Wastewater Surveillance dashboard.
- View the CDC COVID-19 Wastewater Surveillance dashboard. The Wastewater Metric Map on this website is an interactive dashboard that shows recent data that can be filtered by state and county level for participating sites.

Success Story: Using Data Visualizations and Collaborating with Regional Healthcare Partners to Determine Masking Thresholds

Snohomish County Health Department in Washington created a Respiratory Illness Dashboard that highlights syndromic surveillance data using emergency department visit trends for COVID-19, RSV, and influenza. The dashboard displays three years of data trends and a "Transmission Alert Threshold." Both healthcare facilities and members of the public can use this visual dashboard to learn more about respiratory illness trends in their community and make data-informed decisions.

Snohomish County Health Department along with several other LHDs in the Western Washington Region developed a regional masking policy based on local respiratory illness burden metrics. This strategy establishes a "Transmission Alert Threshold" based on percent of ED visits with a COVID-19, influenza or RSV diagnosis. Universal masking is implemented in participating healthcare organizations by the time the threshold for at least one pathogen is met. The development of the methods for calculating local threshold values was led by Public Health – Seattle & King County and participating LHDs adopted this methodology. The Northwest Healthcare Response Network, a regional coalition bridging healthcare and public health, led the collaborative effort and convened participating partners to establish this regional approach.

Respiratory Surveillance Trends and Dashboards Resources

- Access the Snohomish County Health Department Respiratory Illness dashboard.
- Learn more about the threshold strategy and universal masking policy developed by the Northwest Healthcare Response Network.
- Access the CDC FluView Interactive website, which provides several dashboards that display influenza surveillance data. The data can be viewed at the national level, by region of the country, or by state.
- Access the CDC COVID Data Tracker website, which provides several dashboards that display COVID-19 surveillance data. The data can be viewed at the national level, by region of the country, or by state.

Collaborating with Facilities and Increasing Engagement

How can LHDs Use Data to Improve Collaboration and Engagement with Healthcare Facilities?

LHDs engage with healthcare facilities and share important information by hosting collaborative calls, offering online trainings, and sending out monthly newsletters. LHD staff noted that when the LHD offers regular opportunities for collaboration and communication, they develop stronger relationships with healthcare facility staff ahead of outbreaks.

LHDs have also found success in employing web-based surveys to receive information directly from healthcare facilities and help provide necessary interventions, including education and supplies. Collecting surveys from facilities on a regular basis can help LHDs capture information such as case counts, vaccination status, personal protective equipment (PPE) levels, testing supply levels, and other infection control needs.

Success Story: Engaging Facilities with Online Trainings and Email Newsletters

Long Beach Health and Human Services in California recently hosted a nine-week online training series on infection prevention and control for long-term care facility staff in the city. In addition, this LHD sends out a monthly HAI newsletter by email to healthcare facilities to share best practices and updates on new information related to the HAI program.

Long Beach Health and Human Services tracks newsletter engagement using the Mailchimp platform to help determine if facilities have opened the newsletter. Using the Mailchimp metrics, online training attendance, and internal data regarding the facility's direct communication with the LHD, Long Beach Health and Human Services developed a targeted plan to reach out to facilities that were not engaging with the program to encourage increased participation.

IPC Education Resources

- View a sample monthly HAI newsletter from Long Beach Health and Human Services.
- The NACCHO Project Firstline Infection Prevention and Control Quick Start Guide provides resources that aim to support LHDs with training healthcare workers in IPC.
- The NACCHO Infection Prevention and Control Resource Library provides materials shared by other LHDs around the country on various infection control topics. The Training tab provides presentation materials and training plans.
- Access the Resources for Public Health Partners website provided by the HAI Program at the California Department of Public Health. There are many webinar trainings and educational resources available for download.

Success Story: Hosting Collaborative Calls and Providing Online Surveys to Improve Information Sharing with Facilities

Pima County Health Department in Arizona hosts a regular "Congregate Care Call" video-based meeting every month with the area's healthcare residential facilities. About 95% of attendees on the call are staff from long-term care facilities, skilled nursing facilities, and rehabilitation centers. During these regular calls, this LHD provides situational awareness updates to facility staff by reviewing information about current trends in the area and sharing information about emerging infections of concern and infection prevention recommendations.

The rollout of a secure online survey for healthcare facilities during the COVID-19 pandemic was a successful strategy for engagement and timely communication for Pima County. When responding to the survey, facilities can report details of an emerging outbreak by providing timely case reports. As part of the response, case investigators and epidemiologists are able to help coordinate resources requests like PPE and testing kits, or request an Infection Control Assessment and Response (ICAR) consultation. Pima County Health Department found that the use of an online survey helped cut down the time of facility reporting and outbreak response. It also led to faster coordination with local and state partners to respond to the outbreak.

How can LHDs Collaborate with Facilities to Ensure They are Receiving Quality Data and Protecting Sensitive Health Information?

LHDs use a variety of methods to receive outbreak data and patient information from healthcare facilities.

- Some methods, such as receiving information from the facility by phone or fax, are secure and simple to implement. However, they can be time-consuming for both the LHD and healthcare facility staff.
- Encrypted emailing is another secure method to share information. When collaborating with healthcare facilities that are unfamiliar with using encrypted emailing, LHDs can work with facility staff to share training resources on encryption. For facilities that cannot utilize email encryption, an alternate option is to send the password-protected file by email and then call the recipient directly to share the file's password.
- LHDs can also use secure software tools to receive protected information. REDCap, Microsoft Forms, and Qualtrics are a few tools that LHDs have employed to collect protected outbreak information from facilities.
- Direct access to electronic health records (EHRs) is also an efficient and secure option when LHDs need to review a patient's medical chart as part of an outbreak or case investigation. This method can save time and duplicative work for healthcare facility and LHD staff and can lead to faster outbreak response times as well.

Success Story: Working with Healthcare Facilities to Establish EHR Access

Snohomish County Health Department in Washington worked with their local healthcare facilities to obtain EHR access. This LHD now has access to the EHRs for a majority of the local primary care clinics and inpatient hospitals.

Having direct access to the EHR is extremely useful for multiple aspects of case and outbreak investigation. With easy access to EHR information, Snohomish County Health Department can make response plans in a timely manner. In addition, LHD staff can see a fuller picture of the patient's history, which may prompt additional topics to explore in the subsequent patient interview process. This improved response and access to robust information help this LHD in its goal of controlling outbreaks and limiting their spread.

The EHR access is also helpful for the healthcare facility as it greatly reduces the amount of staff time required to pull medical records, send medical records to the LHD, and respond to subsequent requests. In addition, the patient benefits because they are receiving fewer repetitive questions during the LHD interview since the Snohomish County Health Department staff have access to questions that were already answered during their medical visit in the EHR.

EHR and Data Sharing Resource

- Learn more about Snohomish County Health Department's strategies for successfully gaining access to electronic health records (EHRs) of healthcare system partners.

Success Story: Utilizing REDCap for Secure Collection of Case and Outbreak Information

In June 2023, DuPage County Health Department (DCHD) in Illinois launched a new COVID-19 reporting process for long-term care facilities (LTCFs) using a web-based, secure REDCap form. DCHD had several goals for this new process, including saving LHD and LTCF staff time, maintaining systematic collection of data for outbreak reports, and connecting LTCFs with timely infection prevention and control guidance and resources. In addition, DCHD created this tool to ensure the secure collection of protected health information (such as line lists) across the span of the outbreak, as many LTCF personnel had previously struggled to properly use secure email systems.

DCHD has found great success with implementation of the REDCap reporting tool for LTCF COVID-19 outbreaks. In the first year of using the tool, DCHD received over 1,400 reports from 84 facilities. Due to this shift away from secure email systems to the secure REDCap form, there was considerable improvement in receiving information securely. In addition, there was a substantial reduction in staff time required to organize incoming reports and data, leading to more efficient outbreak response and documentation, as well as improved staff capacity.

REDCap Survey Resources

- REDCap is a free, secure, browser-based application to support data collection.
- View the REDCap COVID-19 Outbreak Reporting Form developed by DuPage County Health Department.
- Access additional materials related to Streamlining Long-term Care Facility COVID-19 Outbreak Reporting and Response: A Practical and Time-saving Application of REDCap at a Local Health Department. These materials were presented by DuPage County Health Department during the NACCHO 360 Conference in July 2024.
- Long Beach Health and Human Services developed several REDCap survey templates for outbreak reporting available for download.
  - *Candida auris* Outbreak Reporting Survey
  - COVID-19 Outbreak Reporting Survey
  - COVID-19 Weekly Survey
  - Gastrointestinal Illness Outbreak Reporting Survey
  - Influenza Outbreak Reporting Survey
  - *Legionella* Outbreak Reporting Survey
  - Scabies Outbreak Reporting Survey
  - Scabies Outbreak Weekly Follow-up Survey
  - RSV Outbreak Reporting Survey
- Learn more about the HAI REDCap Project at Long Beach Health and Human Services.

Email Encryption Resource

- Access Norton's "How To" article on email encryption.

Success Story: Collaborating with Hospitals to Ensure Accurate and Transparent COVID-19 Reporting

Steuben County Health Department in Indiana encountered significant discrepancies with the initial COVID-19 data provided from state surveillance systems since case counts were being inflated due to duplicate results from some patients. To address these discrepancies, this LHD took a proactive approach by collaborating daily with the local hospital to verify state COVID-19 reports and total numbers. LHD staff used surveillance data, hospital reports, and Excel spreadsheets to cross-check and correct discrepancies. These spreadsheets contained data such as patient names, dates of birth, test dates, and test results, which were used to identify and consolidate duplicate records, ensuring accurate case counts for the county.

This meticulous data validation process and collaboration with the hospital allowed Steuben County Health Department to provide transparent and reliable information to the community, reducing public panic and building trust. This LHD was also able to use the corrected case count data to inform quarantine guidelines and plan for vaccination clinics alongside the local hospital. Their transparent approach and commitment to data accuracy were recognized by the community partners and shared as best practices for other counties facing similar case count issues.

Strategic Collaboration Resource

- Access the NACCHO's Strategic Collaboration Guide for Outbreak Prevention and Response in Healthcare Settings resource, which includes success stories from LHDs on collaboration and provides additional resources on how to build outbreak response and prevention infrastructure through effective partnership.

Streamlining and Improving Internal Data Processes

How can LHDs Streamline and Create Consistency in their Internal Data Processes?

LHDs can create consistency in their data collection, management, accessibility, and utilization processes by creating and routinely updating their standard operating procedures (SOPs) and standard operating guidance (SOGs) documents.

Success Story: Creating and Regularly Updating SOPs and SOGs to Improve Data Processes

In 2019, Monmouth County Health Department in New Jersey created SOPs and SOGs to help ensure that everyone on the team had a shared understanding of team protocols. These SOPs and SOGs proved to be very beneficial during the COVID-19 pandemic as the size of the team expanded. These documents covered not just the process of how to respond to an outbreak, but also details on how to access data (including file locations), how to share data, who data could be shared with, etc.

Monmouth County Health Department continues to use and update their SOPs and SOGs regularly. They keep a master copy of all SOPs and SOGs on a centralized shared drive. Every two weeks the team attends their internal Communicable Disease Grand Rounds, and they have an opportunity to discuss changes to these protocols and guidance documents as needed.

SOP Resource

- View a sample SOP provided by Florida Department of Health in Polk County. This SOP is specific to outbreaks in long-term care facilities.

How can LHDs Use Outbreak Metrics to Improve Preparedness and Response Capacity?

LHDs can use outbreak data not only for current investigation work but also to measure performance metrics. These metrics can help the LHD gain insight into their internal processes and make plans to improve the preparedness and response capacity of both the LHD and their healthcare facility partners.

Success Story: Adapting the 7-1-7 Outbreak Timeliness Metrics to Evaluate COVID-19 Outbreak Response

Pima County Health Department in Arizona adapted the 7-1-7 outbreak timeliness metrics to contain infectious disease outbreaks. These metrics were adapted to measure how quickly the LHD was able to respond to outbreaks with the goal being:

- 7 days to detect a suspected infectious disease outbreak
- 1 day to notify public health authorities to start an investigation
- 7 days to complete early response actions

Pima County Health Department now collects data related to the 7-1-7 performance metrics both during and immediately after an outbreak response to evaluate their timeliness and other quality indicators. The collection and analysis of these metrics have allowed this LHD to advocate for additional staffing, and they have increased their epidemiology team from 5 to 24 staff members to improve their capacity and outbreak response timeliness. In addition, this LHD has established regular collaborative calls with healthcare facility partners to help improve preparedness and improve the timeliness of the initial detection and notification processes, based on reviews conducted with the 7-1-7 metrics.

7-1-7 Outbreak Metrics Resources

- Access additional materials related to Adaptation and Implementation of the 7-1-7 Outbreak Timeliness Metrics to Evaluate COVID-19 Outbreak Response in High-Risk Congregate Settings in Pima County, AZ. These materials were presented by Pima County Health Department during the NACCHO 360 Conference in July 2024.
- Learn more about the 7-1-7 metrics for early detection and response proposed by the Resolve to Save Lives program.

Closing

Conclusion

This guide provides a comprehensive overview of effective strategies and tools for LHDs to utilize in outbreak prevention and response within healthcare settings. By highlighting success stories from various LHDs, this resource offers practical insights into managing outbreak reports and data, conducting infection control assessments, making data-informed decisions, and fostering collaboration with healthcare facilities.

The success stories illustrate the impact of these strategies and offer practical approaches for LHDs to adopt or adapt. Implementing the practices detailed in this guide can enhance the ability of LHDs to respond swiftly and effectively to outbreaks, improve infection control practices, and ensure the protection of public health.

As public health challenges continue to evolve, it is essential for LHDs to adapt and continuously improve their outbreak response capabilities. This guide serves as a foundational resource to support LHDs in their mission to protect and promote community health through data-driven practices and strategic partnerships.

Acknowledgments

This guide was developed through the collaborative efforts of many dedicated professionals and organizations. We would like to extend our deepest gratitude to all those who contributed their time, expertise, and insights.

We are especially grateful to the following organizations:

- NACCHO for its leadership and vision in supporting LHDs
- The Population Health Innovation Lab (PHIL) and the Public Health Institute (PHI) for their guidance and resources
- The LHDs who shared their success stories, strategies, and tools, providing invaluable real-world examples of effective outbreak management
- 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 prevention and response.

Questions? Contact Us: infectiousdiseases@naccho.org

Appendices

Appendix 1: LHD Project Participants Overview

Local Health Department	State	Census Region	Population Category*	Governance	Jurisdiction	Urban/ Rural**
Chicago Department of Public Health	IL	Midwest	Large	Local	City	Urban
Crater Health District – Virginia Department of Health	VA	South	Medium	State	Multi-county	Urban
DuPage County Health Department	IL	Midwest	Large	Local	County	Urban
Fairfax County Health Department	VA	South	Large	State	Multi-county	Urban
Florida Department of Health in Polk County	FL	South	Large	State	County	Urban
Local Health Department	TX	South	Medium	Local	County	Rural
Long Beach Health and Human Services	CA	West	Medium	Local	City	Urban
Monmouth County Health Department	NJ	Northeast	Medium	Local	County	Urban
Monongalia County Health Department	WV	South	Medium	Local	County	Urban
Orange County Department of Health	NY	Northeast	Medium	Local	County	Urban
Pima County Health Department	AZ	West	Large	Local	County	Urban
Public Health – Seattle & King County	WA	West	Large	Local	County	Urban
Snohomish County Health Department	WA	West	Large	Local	County	Urban
Steuben County Health Department	IN	Midwest	Small	Local	County	Rural
South Carolina Department of Health and Environmental Control, Upstate Region	SC	South	Large	State	Multi-county	Urban
Washington County Public Health Division	OR	West	Large	Local	County	Urban

***Population Category:** NACCHO classifies LHDs as small if they serve fewer than 50,000 people, medium if they serve populations between 50,000 and 500,000 people, and large if they serve 500,000 or more people.

****Urban/Rural:** NACCHO classifies LHD populations as serving either an urban or rural jurisdiction using the Census Bureau classification system. Each LHD jurisdiction is classified as urban or rural based on whether the majority of people it serves are from urban or rural settings (i.e., more than 50 percent urban were classified as urban), calculated for each census tract the LHD serves.

Appendix 2: Full Resource List

The resources presented below are a list form of those referenced throughout this guide. These links provide additional information, templates, and tools to support LHDs in their outbreak prevention and response efforts.

1 Outbreak Reporting and Data Management

Outbreak Intake Form

- Washington County Public Health Division: Congregate Setting Intake Form

Online REDCap Secure Surveys

- REDCap Website
- REDCap survey templates developed by Long Beach Health and Human Services:
  - *Candida auris* Outbreak Reporting Survey
  - COVID-19 Outbreak Reporting Survey
  - COVID-19 Weekly Survey
  - Gastrointestinal Illness Outbreak Reporting Survey
  - Influenza Outbreak Reporting Survey
  - *Legionella* Outbreak Reporting Survey
  - Scabies Outbreak Reporting Survey
  - Scabies Outbreak Weekly Follow-up Survey
  - RSV Outbreak Reporting Survey
- Long Beach Department of Health and Human Services: HAI/AR Prevention and Response Spotlight
- Dupage County Health Department: REDCap COVID-19 Reporting Form
- Dupage County Department of Health NACCHO 360 presentation materials "Streamlining Long-term Care Facility COVID-19 Outbreak Reporting and Response: A Practical and Time-saving Application of REDCap at a Local Health Department"

Outbreak Line List

- Washington County Public Health Division: Line List Template for Gastrointestinal Outbreaks
- Washington County Public Health Division: Line List Template for Respiratory Outbreaks
- California Department of Health HAI Program: Resources for Public Health Partners

Outbreak Response Database

- Epi Info 7
- CORHA "HAI-AR Outbreak Response Tracking System" (Microsoft Access Database and Data Dictionary)

Syndromic Surveillance

- CDC Resources for Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE)

Point-Prevalence Surveys/Asymptomatic Screening

- CDC Resources for Screening for *Candida auris*
- Public Health – Seattle & King County: Presymptomatic SARS-CoV-2 Infections and Transmission in a Skilled Nursing Facility
- Partners for Patient Safety

2 Infection Control Assessments and ICAR Tools

CDC ICAR

- CDC ICAR Tools and Resources

Infection Prevention Assessments Webinar

- California Department of Public Health ICAR Webinar and CDC ICAR Webinar Slides

ICAR Workflow Strategy

- County of Los Angeles Public Health: Presentation Slides "Infection Prevention Assessments: Maximizing Your On-Site Impact"

IPC Additional Resources

- NACCHO Infection Prevention and Control Resource Library
- NACCHO Project Firstline Infection Prevention and Control Quick Start Guide

Certification in Infection Control (CIC)

- CIC Details and Certification Process
- NACCHO 2018 CIC Assessment and NACCHO 2023 CIC Assessment

Remote Infection Control Assessments

- Remote Infection Control Assessments of US Nursing Homes During the COVID-19 Pandemic, April to June 2020

Modified 90-Minute ICAR Tool

- Marin County Health and Human Services: IPC Assessment Site Visit Worksheet (PDF)
- Long Beach Health and Human Services: IPC Assessment Site Visit Worksheet (Word Document)
- Marin County Health and Human Services: IPC Program Assessment Site Visit Planning Document (PDF)

3 Data-Informed Decision Making

Facility-Level Data and Metrics

- CMS Care Compare Website

Community-Level Metrics

- CMS Dashboard for Mapping Disparities by Social Determinants of Health / Visualize Social Vulnerability Index (SVI) Data

NACCHO Equity Framework Guide

- Equity Framework for Outbreak Prevention and Response in Healthcare Settings

Respiratory Surveillance

- Virginia Department of Health: Influenza Surveillance Website
- Virginia Department of Health: COVID-19 Dashboards
- CDC FluView Interactive
- CDC COVID Data Tracker
- Snohomish County Health Department: Respiratory Illness Dashboard and Threshold Strategy and Universal Masking Policy

Wastewater Surveillance

- Orange County Department of Health: Wastewater Surveillance Overview
- Orange County Department of Health: Poster Presentation "Using a Paired Early Detection and Early Notification Wastewater Surveillance System to Prepare for Future COVID-19 Surges."
- New York State COVID-19 Wastewater Surveillance Dashboard
- CDC COVID-19 Wastewater Surveillance Dashboard

4 Collaborating with Facilities and Increasing Engagement

Newsletters

- Long Beach Health and Human Services: Sample Monthly HAI Newsletter

Training Resources

- NACCHO Project Firstline Infection Prevention and Control Quick Start Guide
- NACCHO Infection Prevention and Control Resource Library
- California Department of Health HAI Program: Resources for Public Health Partners

Online REDCap Secure Surveys

- REDCap Website
- Dupage County Health Departmnet: REDCap COVID-19 Reporting Form
- Dupage County Department of Health NACCHO 360 presentation materials "Streamlining Long-term Care Facility COVID-19 Outbreak Reporting and Response"
- A Practical and Time-saving Application of REDCap at a Local Health Department"REDCap survey templates developed by Long Beach Health and Human Services:
  - *Candida auris* Outbreak Reporting Survey
  - COVID-19 Outbreak Reporting Survey
  - COVID-19 Weekly Survey
  - Gastrointestinal Illness Outbreak Reporting Survey
  - Influenza Outbreak Reporting Survey
  - *Legionella* Outbreak Reporting Survey
  - Scabies Outbreak Reporting Survey
  - Scabies Outbreak Weekly Follow-up Survey
  - RSV Outbreak Reporting Survey
- Long Beach Department of Health and Human Services: HAI/AR Prevention and Response Spotlight

Data Security

- Norton Email Encryption "How To"

Electronic Health Records (EHR) and Data Sharing

- Snohomish County Health Department: CORHA Spotlight "Local Health Department's Use of Data Sharing Modeled by Snohomish County, WA"

Strategic Collaboration

- Strategic Collaboration Guide for Outbreak Prevention and Response in Healthcare Settings

5 Streamlining and Improving Internal Processes

Standard Operating Procedures

- Florida Department of Health in Polk County: LTCF Outbreak Standard Operating Procedures Manual

Outbreak Performance Metrics

- 7-1-7 Metrics for Early Detection and Response
- Pima County Department of Health: NACCHO 360 Presentation Materials on "Adaptation and Implementation of the 7-1-7 Outbreak Timeliness Metrics to Evaluate COVID-19 Outbreak Response in High-Risk Congregate Settings in Pima County, AZ"

NACCHO[SM]

National Association of County & City Health Officials

Contact Us | infectiousdiseases@naccho.org | www.naccho.org