**Strategy 1: Enhance Laboratory, Surveillance, Informatics and other Workforce Capacity**

1. Train and hire staff to improve laboratory workforce ability to address issues around laboratory safety, quality management, inventory management, specimen management, diagnostic and surveillance testing and reporting results.

2. Build expertise for healthcare and community outbreak response and infection prevention and control (IPC) among local health departments.

3. Train and hire staff to improve the capacities of the epidemiology and informatics workforce to effectively conduct surveillance and response of COVID-19 (including case investigation and contact tracing) and other emerging infections and conditions of public health significance. This should include staff who can address unique cultural needs of those put at higher risk for COVID-19.

4. Build expertise to support management of the COVID-19 related activities within the jurisdiction and integrate into the broader ELC portfolio of activities (e.g., additional leadership, program and project managers, budget staff, etc.).

5. Increase capacity for timely data management, analysis, and reporting for COVID-19 and other emerging coronavirus and other infections and conditions of public health significance.

**Strategy 2: Strengthen Laboratory Testing**

1. Establish or expand capacity to quickly, accurately and safely test for SARS-CoV-2/COVID-19 and build infectious disease preparedness for future coronavirus and other events involving other pathogens with potential for broad community spread. a. Develop systems to improve speed and efficiency of specimen submission to clinical and reference laboratories.

   b. Strengthen ability to quickly scale testing [e.g., nucleic acid amplification test (NAAT), antigen, etc.] as necessary to ensure that optimal utilization of existing and new testing platforms can be supported to help meet increases in testing demand in a timely manner. Laboratories are strongly encouraged to diversify their testing platforms to enable them to pivot depending on reagent and supply availabilities.

   c. Perform serology testing with an FDA EUA authorized serological assay in order to conduct surveillance for past infection and monitor community exposure.

   d. Work with LHDs, including through sub-awards, to build local capacity for testing of COVID-19/SARS-CoV-2 including within high-risk settings or in vulnerable populations that reside in their communities.

   e. Apply laboratory safety methods to ensure worker safety when managing and testing samples that may contain SARS-CoV-2/COVID-19.

   f. Implement alternative surveillance methods, including sequencing, wastewater surveillance, regional testing centers for surveillance and screening, etc. and link with other relevant surveillance systems (e.g., immunization registry). [This activity is optional and should complement other already funded activities.]

   g. Augment or add specificity to existing laboratory response plans for future coronavirus and other outbreak responses caused by an infectious disease.

   h. Support national surveillance for SARS-CoV-2 by submitting representative, deidentified samples to CDC for sequencing through the National SARS-CoV-2 Strain Surveillance (NS3) program.

   i. Expand the use of SARS-CoV-2 genomic sequencing and molecular epidemiology for state and local surveillance and response.

2. Enhance laboratory testing capacity for SARS-CoV-2/COVID-19 outside of public health laboratories

   a. Conduct surveillance of all SARS-CoV-2/COVID-19 testing resources and map the jurisdictional testing resources that exist outside the public health arena (e.g., point of care, private, academic, etc.).

b. Establish or expand capacity to coordinate with public/private laboratory testing providers, including those that assist with surge and with testing for high-risk environments.

c. Secure and/or utilize mobile laboratory units, or other methods to provide POC testing (including antigen testing) at public health-led clinics or non-traditional test sites including but not limited to shelters or other places of congregate housing, food processing plants, correctional facilities, Long Term Care Facilities (LTCF), elementary and secondary schools, child care facilities, and institutions of higher education.

d. Ensure public/private laboratory testing providers, including those providing POC testing at public health-led clinics or non-traditional test sites, are provided biosafety resources for SARS-CoV-2 specimen collection and/or testing.

3. Enhance data management and analytic capacity in public health laboratories to help improve efficiencies in operations, management, testing, and data sharing.

a. Improve efficiencies in laboratory operations and management using data from throughput, staffing, billing, supplies, and orders. Ensure ability to track inventory of testing reagents by device/platform, among other things.

b. Improve the capacity to analyze laboratory data to help understand and make informed decisions about issues such as gaps in testing and community mitigation efforts. Data elements such as tests ordered and completed (including by device/platform), rates of positivity, source of samples, specimen collection sites, and test type will be used to create data visualizations that will be shared with the public, local health departments, and federal partners.

**Strategy 3: Advance Electronic Data Exchange at Public Health Labs**

1. Enhance and expand laboratory information infrastructure, to improve jurisdictional visibility on laboratory data (tests performed) from all testing sites and enable faster and more complete data exchange and reporting.

a. Employ a well-functioning Laboratory Information Management System (LIMS) system to support efficient data flows within the PHL and its partners. This includes expanding existing capacity of the current LIMS to improve data exchange and increase data flows through LIMS maintenance, new configurations/modules, and enhancements. Implement new/replacement LIMS where needed.

**Note:** If implementing new or replacement systems, develop an implementation plan, including appropriate milestones and timeline to completion. Implementation plans will be reviewed and approved for consistency with the activities set forth in the ELC awards by CDC prior to start of implementation.

b. Ensure ability to administer LIMS. Ensure the ability to configure all tests that are in LIMS, including new tests, EUAs, etc., in a timely manner. Ensure expanding needs for administration and management of LIMS system are covered through dedicated staff.

c. Interface diagnostic equipment to directly report laboratory results into LIMS.

d. Put a web portal in place to support online ordering and reporting. Integrate the web portal into the LIMS.

**Note:** If implementing new or replacement systems, develop an implementation plan, including appropriate milestones and timeline to completion. Implementation plans will be reviewed and approved for consistency with the activities set forth in the ELC awards by CDC prior to start of implementation.

e. Enhance laboratory test ordering and reporting capability.

i. Implement or improve capacity to consume and produce electronic HL7 test orders and result reporting (ETOR) to allow laboratories and healthcare providers to directly exchange standardized test orders and results across different facilities and electronic information systems using agreed upon standards.

ii. 100% of results must be reported with key demographic variables including age/gender/race.

iii. Report all testing to the health department and CDC using HL7 ELR.

**Strategy 4: Improve Surveillance and Reporting of Electronic Health Data**

*Conducting the activities in this section to enable comprehensive, automated, daily reporting to the CDC and others in a machine-readable format, is a requirement of accepting these funds. See CDC website(s) for required data elements. Websites will be amended as requirements are updated.*

*A. Lab Reporting: https://www.cdc.gov/coronavirus/2019-ncov/lab/reporting-lab-data.html#what-to-report*

*B. Case Reporting: https://www.cdc.gov/coronavirus/2019-ncov/php/reporting-pui.html.*

1. Establish complete, up-to-date, timely, automated reporting of morbidity and mortality to CDC and others due to COVID-19 and other coronavirus and other emerging infections which impact conditions of public health significance, with required associated data fields in a machine-readable format, by:

    a. Establishing or enhancing community-based surveillance, including surveillance of vulnerable populations, individuals without severe illness, those with recent travel to high-risk locations, or who are contacts to known cases.

    b. Monitoring changes to daily incidence rates of COVID-19 and other conditions of public health significance at the county or zip code level to inform community mitigation strategies.

2. Establish additional and on-going surveillance methods (e.g. sentinel surveillance) for COVID-19 and other conditions of public health significance.

3. Establish complete, up-to-date, timely, automated reporting of individual-level data through electronic case reporting to CDC and others in a machine-readable format (ensuring LHD have access to data that is reported):

    a. At the health department, enhance capacity to work with testing facilities to onboard and improve electronic laboratory reporting (ELR), including to receive data from new or non-traditional testing settings. Use alternative data flows (e.g., reporting portals) and file formats (e.g., CSV or XLS) to help automate where appropriate. In addition to other reportable results, this should include all COVID-19/SARS-CoV-2-related testing data (i.e., tests to detect SAR-CoV-2 including serology testing).

    b. Automate receiving EHR data, including eCR and FHIR-base eCR Now, to generate initial case report as specified by CDC for the reportable disease within 24 hours and to update over time within 24 hours of a change in information contained in the CDC-directed case report, including death. Utilize eCR data to ensure data completeness, establish comprehensive morbidity and mortality surveillance, and help monitor the health of the community and inform decisions for the delivery of public health services.

    c. Develop a project plan for the automated processing of the Electronic Initial Case Report (eICR) and Reportability Response (RR) into health information systems. Prior to implementation of eICR and RR for a specific disease or disease group, plan how data will be used for surveillance workflows (e.g. negative COVID-19 reports from providers), draft reporting specifications, and consumption, as appropriate.

**Note:** As an interim solution, while health information system capacity is being developed, convert to a human readable format and provide for use by appropriate surveillance program personnel.

d. Increase connectivity with laboratory and healthcare feeds for epidemiologic analysis (including using automated single CSV files).

e. Expand electronic reporting mechanism (e.g., eCR, ELR) to include all conditions of public health significance.

4. Improve understanding of capacity, resources, and patient impact at healthcare facilities through electronic reporting.

a. Required expansion of reporting facility capacity, resources, and patient impact information, such as patients admitted and hospitalized, in an electronic, machine-readable, as well as human-readable visual, and tabular manner, to achieve 100% coverage in jurisdiction and include daily data from all acute care, long-term care, and ambulatory care settings. Use these data to monitor facilities with confirmed cases of COVID-19/SARS-CoV-2 infection or with COVID-like illness among staff or residents and facilities at high risk of acquiring COVID-19/SARS-CoV-2 cases and COVID-like illness among staff or residents.

b. Increase ADT messaging and use to achieve comprehensive surveillance of emergency room visits, hospital admissions, facility and department transfers, and discharges to provide an early warning signal, to monitor the impact on hospitals, and to understand the growth of serious cases requiring admission.

5. Enhance systems for flexible data collection, reporting, analysis, and visualization.

a. Implement new/replacement systems where needed. Ensure systems are interoperable and that data can be linked across systems (e.g., public health, healthcare, private labs), including adding the capacity for lab data and other data to be used by the software/tools that are being deployed for case investigation and contact tracing.

**Note:**

1. If implementing new or replacement systems, develop an implementation plan, including: a. Rationale for acquiring a new/replacement health information surveillance system and information used to make the decision, such as i. gaps in existing system

a. options explored prior to making the decision.

b. Tasks and efforts required (appropriate milestones).

c. Timeline for completion.

d. Person responsible for these activities.

Implementation plans must be submitted to EDX@cdc.gov, with a copy uploaded into REDCap. Plans will be reviewed and must receive programmatic support from CDC prior to start of implementation.

2. Examples for data linkages and/or interoperability across systems include case surveillance data, vaccination data, vital records, etc.

3. If implementing or expanding immunizations related information technology systems (e.g., registries, data lake, VAMS, vaccine finder, etc.), recipient should work with Immunization Cooperative Agreement

Project Officer for long-term support. Once COVID funds are exhausted, ELC Cooperative Agreement will not have resources for ongoing financial assistance with these registries.

b. Update/Enhance/Modernize infrastructure to handle large data streams and properly process, triage, and retain data. For example, receiving large numbers of negative test results, triage, process, and use as appropriate. Consider scalable storage (e.g. data lake).

c. Data must be made available at the local, state, and federal level.

d. Make data on cases, syndromic surveillance, laboratory tests, hospitalization, and healthcare capacity available on health department websites at the county/zip code level in a visual and tabular manner.

6. Establish or improve systems to ensure complete, accurate and immediate (within 24 hrs.) data transmission to a system and open website available to local health officials and the public by county and zip code, that allows for automated transmission of data to the CDC in a machine readable format.

a. Increase coverage (Target for emergency departments (ED): 100%) and number of facilities submitting syndromic surveillance data to the National Syndromic Surveillance Program (NSSP) [https://www.cdc.gov/nssp/index.html] for emergency department (ED) and urgent care facilities for syndromes and illnesses with messages that include the NSSP priority 1 and 2 data elements.

b. Submit all case reports in an immediate, automated way to CDC for COVID-19/SARS-CoV-2 and other conditions of public health significance with associated required data fields in a machine-readable format.

c. Provide accurate accounting of COVID-19/SARS-CoV-2 associated deaths. Establish electronic, automated, immediate death reporting to CDC with associated required data fields in a machine-readable format.

d. Report requested COVID-19/SARS-CoV-2-related data, including line level testing data (negatives, positives, indeterminants, serology, antigen, nucleic acid) daily by county or zip code to the CDC-designated system.

e. Establish these systems in such a manner that they may be used on an ongoing basis for surveillance of, and reporting on, routine and other threats to the public health and conditions of public health significance.

**Strategy 5: Use Laboratory Data to Enhance Investigation, Response and Prevention**

1. Use laboratory data to initiate and conduct case investigation and contact tracing and follow up; and implement containment measures.

a. Conduct necessary case investigation and contact tracing including contact elicitation/identification, contact notification, contact testing, and follow-up. Activities could include traditional case investigation and contact tracing and/or proximity/location-based methods, as well as methods adapted for healthcare-specific contexts, employers, elementary and secondary schools, childcare facilities, institutions of higher education, long-term care facilities, or in other settings.

b. Utilize tools (e.g., geographic information systems and methods) that assist in the rapid mapping and tracking of disease cases for timely and effective epidemic monitoring and response, incorporating laboratory testing results and other data sources.

2. Identify cases and exposure to COVID-19 in high-risk settings or within populations at increased risk of severe illness or death to target mitigation strategies and referral for therapies (for example, monoclonal antibodies) to prevent hospitalization. a. Assess and monitor infections in healthcare workers across the healthcare spectrum.

b. Monitor cases and exposure to COVID-19 to identify need for targeted mitigation strategies to isolate and prevent further spread within high-risk healthcare facilities (e.g., hospitals, dialysis clinics, cancer clinics, nursing homes, and other long-term care facilities, etc.).

c. Monitor cases and exposure to COVID-19 to identify need for targeted mitigation strategies to isolate and prevent further spread within high-risk occupational settings (e.g., meat processing facilities), and congregate living settings (e.g., correctional facilities, youth homes, shelters).

d. Work with LHDs to build local capacity for reporting, rapid containment and prevention of COVID-19/SARS-CoV-2 within high-risk settings or in vulnerable populations that reside in their communities.

e. Jurisdictions should ensure systems are in place to link test results to relevant public health strategies, including prevention and treatment.

**Note**: Additional resources

Treatment: https://www.cdc.gov/coronavirus/2019-ncov/your-health/treatments-for-severe-illness.html

Public health strategies: https://www.cdc.gov/mmwr/volumes/69/wr/mm6949e2.htm

3. Implement prevention strategies in high-risk settings or within vulnerable populations (including tribal nations as appropriate) including proactive monitoring for asymptomatic case detection. Note: These additional resources are intended to be directed toward testing, case investigation and contact tracing, surveillance, containment, and mitigation, including support for workforce, epidemiology, use by employers, elementary and secondary schools, child care facilities, institutions of higher education, long-term care facilities, or in other settings, scale up of testing by public health, academic, commercial, and hospital laboratories, and community-based testing sites, mobile testing units, health care facilities, and other entities engaged in COVID–19 testing, and other related activities related to COVID–19 testing, case investigation and contact tracing, surveillance, containment, and mitigation which may include interstate compacts or other mutual aid agreements for such purposes.

a. Build capacity for infection prevention and control in LTCFs (e.g., at least one Infection Preventionist (IP) for every facility) and outpatient settings.

i. Build capacity to safely house and isolate infected and exposed residents of LTCFs and other congregate settings.

ii. Develop interoperable patient safety information exchange systems.

iii. Assist with enrollment of all LTCFs into NHSN and provision of related user support.

b. Build capacity for infection prevention and control in elementary and secondary schools, childcare facilities, and/or institutions of higher education.

c. Increase Infection Prevention and Control (IPC) assessment capacity onsite using tele-ICAR.

d. Perform preparedness assessment to ensure interventions are in place to protect high-risk populations.

e. Coordinate as appropriate with federally funded entities responsible for providing health services to higher-risk populations (e.g., tribal nations and federally qualified health centers).

**Strategy 6: Coordinate and Engage with Partners**

1. Partner with LHDs to establish or enhance testing for COVID-19/SARS-CoV-2.
   a. Support appropriate LHDs with acquiring equipment and staffing to conduct testing for COVID-19/SARS-CoV-2.

b. Support LHDs to conduct appropriate specimen collection and/or testing within their jurisdictions.

2. Partner with local, regional, or national organizations or academic institutions to enhance capacity for infection control and prevention of COVID-19/SARS-CoV-2.
   a. Build infection prevention and control and outbreak response expertise in local health departments (LHDs).

   b. Partner with academic medical centers and schools of public health to develop regional centers for IPC consultation and support services.