PHIN Preparedness

EARLY EVENT DETECTION

FUNCTIONAL REQUIREMENTS

Version 1.0

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1   INTRODUCTION

This document describes the Public Health Information Network (PHIN) functional requirements for systems implemented to collect, integrate and analyze data from heterogeneous information sources for the early discovery of a potential public health emergency. Early Event Detection (EED) supports the early detection of health events including determining and monitoring the size, location and spread of health events, and providing situational awareness to assist in the investigation and management of health events.

Often, initial detection is made by an astute care provider who recognizes the presentation of symptoms of an immediately notifiable condition and initiates a public health case report. Case reports may be made using a designated 24/7/365 call reporting system that distributes the information based on established call triage protocols, a web-based reporting system available to care providers, or automated case report messages from surveillance and other systems. Initial detection case reporting is complemented by the automated electronic reporting of health related and environmental data from substantiated sources to detect aberrations in normal trends.

Health events may be naturally occurring (e.g., SARS, influenza), accidents (e.g., chemical spills), or intentional acts (e.g., bioterrorism). After a health event is detected, systems supporting EED must provide the ability to localize the population and geographic areas affected, identify other potential cases, and support quick and appropriate response to reduce morbidity and mortality in the population. Public health emergencies may involve multiple jurisdictions and agencies; therefore, systems supporting EED must provide the ability to exchange data and support collaboration among jurisdictions and across all levels of public health.

This document provides minimum operational requirements necessary to support Early Event Detection and should in no way preclude incorporating additional functionality beyond what this document addresses.

2   REQUIREMENTS

The following requirements describe baseline functionality for any system implemented to support Early Event Detection:

2.1 Case Reporting: Case reporting addresses the 24/7/365 reporting of immediately notifiable conditions and emergent public health threats, and the processes and personnel required to accept, triage and escalate those reports for appropriate action.

2.2 Health Related and Environmental Data Sources: Data sources should include diagnostic and potentially pre-diagnostic data, environmental data (e.g., BioWatch), and other jurisdictionally appropriate data (e.g., school and work absenteeism reports, hotel security reports, veterinary systems) that are selected to support early detection of a broad array of public health threats*.*

2.3 Data Requirements and Linkages: Specific data characteristics are required, dependent upon the source of the data, and must include traceable linkages to support updates to the data.

2.4 Data Receipt and Storage: Data collected from multiple heterogeneous sources must be accumulated and standardized to support analysis across data sources and integration with external systems.

2.5 Data Analysis: Established algorithms are applied to aggregated data from data sources to detect deviations from normal patterns.

2.6 Data Visualization and Analytical Reporting: Analytical results should be supported by visual representation (e.g., maps, graphs, charts), and by pre-defined and ad-hoc reporting at aggregate and detailed levels.

2.7 Communications and Alerts: Systems supporting EED should have the ability to notify partners of a possible or confirmed public health emergency, whether it is a notifiable disease or other public health emergency.

2.8 Consequence Management Support: EED requires policies, procedures and personnel to investigate a potential case or an aberration to normal data patterns, and to confirm or rule out an unconfirmed signal.

2.9 Situational Awareness Support: EED provides the critical elements of information about a potential or confirmed signal to investigators, responders and officials. These critical elements include the location(s), the size, the etiology and other factors that inform responders, investigators and health officials.

2.10 System Integration and Data Exchange: EED information must be exchangeable, based on established standards, between systems involved in the detection of, monitoring of, and response to public health emergencies.

2.11 Vocabulary Standards: Standard vocabulary lists and data structures have been defined by standards organizations. Where they exist, systems supporting EED should use them. As additional standards are defined, they should be accepted and implemented.

2.12 Operations: Personnel, roles, and responsibilities necessary to support all aspects of EED should be clearly defined.

2.13 System Security and Availability: Security of EED data includes the protection of data from corruption and access by unauthorized individuals, as well as the protection of the actual systems supporting EED from sabotage or other failure. A plan must be established for continuing activities when systems supporting EED are unavailable.

2.14 Privacy: Patients, organizations, and personnel must be protected from fraudulent and unauthorized use of their information.

2.1   CASE REPORTING

Systems supporting EED must have the capability to receive reports of immediately notifiable conditions and emergent public health threats 24/7/365 and to aggregate and manage those reports. The channels for reporting may include telephone call reporting, web-based reporting, and/or electronic case report messages from other organizations or systems. Case reporting capabilities must be supported by processes and personnel to accept, triage, and escalate reports that require urgent response.

2.1.1   Systems supporting EED must have 24/7/365 capability to accept reports of confirmed, probable, and suspect cases (e.g., call-in capability, web-based reporting, electronic case report messages).

2.1.2   A method of reporting that is broadly available and accessible to health care practitioners (e.g., telephone number for call-in capability, URL for web-based reporting) must exist.

    2.1.2.1   The reporting solution should not require technologies that may be disabled on clinical care workstations (e.g., ActiveX).

    2.1.2.2   The reporting solution should prompt for information about the case which is appropriate to the disease condition being reported.

2.1.3   Systems supporting EED should be configurable to support unknown needs associated with emergent diseases and support entry of reports for both notifiable diseases and other identified diseases or conditions.

2.1.4   Systems supporting EED must support urgency levels for reports, so that reports that require urgent response can be escalated.

2.1.5   Systems supporting EED must provide options for immediate escalation of urgent reports to a knowledgeable, on-call health professional.

2.1.6   For reports of immediately notifiable conditions (Category A agents at minimum), systems supporting EED must reach the appropriate knowledgeable, on-call health professional within 15 minutes of the initial receipt of the report.

2.1.7   Systems supporting EED must verify that the knowledgeable, on-call health professional responded within 15 minutes of receiving a case report.

    2.1.7.1   Contact must be re-attempted until the knowledgeable, on-call health professional verifies message receipt.

2.1.8   Systems supporting EED should be able to implement the triage protocol business rules, which include linking knowledgeable, on-call health professionals to emergency types, directing case reports to the designated individuals based on the nature of the report, and identifying primary and back-up on-call responders.

    2.1.8.1   A triage protocol must be defined to specify how case reports should be escalated and who should be contacted in an emergency, including primary and backup on-call health professionals.

    2.1.8.2   A triage protocol must include immediate automated notification of state health department in accordance with state/local agreements.

2.1.9   A call-down system must be available to notify the appropriate individuals based on the type of the emergency. For more information, please refer to section *2.7 Communications and Alerts* of this document.

2.2   HEALTH-RELATED AND ENVIRONMENTAL DATA SOURCES

Substantiated, pre-existing health-related and environmental data sources can be used as the basis for analysis. These include diagnostic human data (e.g., lab test results, ambulatory care diagnoses, confirmed case reports), potentially pre-diagnostic data (e.g., chief complaint data, lab test requests, over-the-counter drug sales), and environmental data (e.g., BioWatch). The early detection of health events should be a secondary use rather than the primary purpose for collecting health-related data.   The EED infrastructure should be able to support adopting additional investigational data sources (e.g., school absenteeism reports, nurse call lines reports, poison control center reports) as they are evaluated for effectiveness and value.

2.2.1   Systems supporting EED should be able to accept data from multiple established sources, such as claims clearinghouses, hospital systems, clinical laboratories, health plans, and integrated delivery systems.

2.2.2   Systems supporting EED must have the ability to access data that extends beyond the traditional case data reported for notifiable diseases.

    2.2.2.1   Diagnostic data collected from sources such as lab test results or case reports is the primary source of extended data, and should be used to support analysis and investigation.

    2.2.2.2   Sufficient diagnostic data must be collected from critical care sites to identify outbreaks of established or emerging diseases.

    2.2.2.3   Data may be collected from pre-diagnostic sources as the sources become available and are evaluated as compatible with existing requirements. Pre-diagnostic data are collected prior to a diagnosis being determined. Examples of pre-diagnostic data sources are laboratory test requests, CPT codes, over-the-counter drug sales, and nurse call lines.

2.2.3   Data sources that monitor changes in the environment (e.g., BioWatch) should be considered for EED and used in conjunction with confirmatory data sources. Ideal sources would represent major metropolitan areas where significant populations are likely to be targeted.

2.2.4   Systems supporting EED should be able to support the adoption of other investigative data sources appropriate to the jurisdiction as they are evaluated for effectiveness and value; for example, school and work absenteeism reports, hotel security reports, poison control center reports, veterinary systems, 911 calls, and international organizations.

2.2.5   Wherever possible, data should be pre-existing and available electronically. Because compliance with manual reporting (among other factors) has historically been poor, it is preferable that a data source not require manual data entry into a system supporting EED.

2.2.6   Data should be collected frequently enough to support the needs of systems supporting EED (at least daily), and should not introduce undue latency to the data source during its attempt to provide timely data.

2.2.7 Data sources must be evaluated for the following characteristics before use in systems supporting EED:

2.2.7.1 Data must be available in near real-time to minimize the delay between a health event and data accumulation.

2.2.7.2 A baseline of one year's data is desirable to train algorithms for seasonal variations.

2.2.7.3 Data collection and management issues will substantially affect the usefulness of data sources; therefore, the quality of collected data must be consistently accurate and maintainable.

2.2.7.4 Data sources should ideally meet accepted coding characteristics to ensure that the data support standardized formats and requirements.

2.2.7.5 Data sources should be representative of the population characteristics for the selected geographic area, and contain enough records to provide appropriate power for statistical analyses.

2.3   DATA REQUIREMENTS AND LINKAGES

The following high-level requirements discuss the data elements and traceable linkages needed to support both analysis and updates to the data.

2.3.1 Organization Data

Standardized organization data enables interoperable systems to report at the local, state and national levels and compensates for differences in organization structures (e.g., boroughs, MSAs, counties, departments) of the multiple data sources. Organization data standards facilitate the delivery of data from multi-jurisdictional sources to the appropriate recipients and enables investigation and follow-up.

2.3.1.1 Organization data must be stored for all organizations participating in and providing data for EED (e.g., jurisdiction where a case occurred, reporting facility, provider, laboratories, treatment facilities, data source providers, hospitals, state and local health departments) .

2.3.1.2 Organization information must be stored in a local instance of a public health directory. More information about public health directories is included in *PHIN Preparedness Cross Functional Components,* available at *www.cdc.gov/phin.*

2.3.2 Case Report Data

This section describes the data to be captured from confirmed, probable, and suspect case reports, and the linkages to be supported for analysis and updates.

2.3.2.1 Patient and Epidemiological Data

2.3.2.1.a Patient data must include the patient's name, DOB, current gender, race, ethnicity, address, phone number and other contact information.

2.3.2.1.b Patient identifiers (e.g., social security number, license number) should be captured to assist in any investigations which may ensue or to provide updates to the case report.

2.3.2.1.c   Systems supporting EED should provide the ability to capture patient identification and demographic data for each reported case. Edits to these data may only be made in association with continued follow up of the reported case.

2.3.2.1.d   The patient's occupation, industry, and work location (including zip code) should be captured to identify occupational exposures that might not be apparent from residence information.

2.3.2.1.e   To support investigation, organizational affiliations should be captured and may include day care sites, nursing homes, health care organizations, or restaurants.

2.3.2.1.f   Possible vectors (e.g., food, air, water) should be captured.

2.3.2.1.g   The status of the case (e.g., open, closed) should be captured.

2.3.2.2   Condition Data

2.3.2.2.a   The disease condition must be captured, using the standard vocabulary if it exists for the condition.

2.3.2.2.b   The date of disease onset, symptoms and date of diagnosis must be captured.

2.3.2.2.c   If the patient is deceased, the date of death must be captured.

2.3.2.2.d   If the patient was hospitalized, the dates of hospitalization should be captured.

2.3.2.3   Laboratory Report Data

2.3.2.3.a   Laboratory reports of test results must include the report date and time, specimen identifier, collection date and time, and test performed.

2.3.2.3.b   Laboratory reports of test results must support multiple result types (e.g., text, numeric).

2.3.2.3.c   Laboratory reports must adhere to standard vocabulary, as referenced in *PHIN Preparedness Connecting Laboratory Systems*, available at *www.cdc.gov/phin*.

2.3.2.4   Countermeasure Administration Data

2.3.2.4.a   Countermeasures (e.g., treatment, vaccination) delivered during the course of the health event must be reported.

2.3.2.4.b   Countermeasure information must include the dates the countermeasure was administered, the countermeasure that was administered, and the result of the administration of the countermeasure.

2.3.2.4.c   Countermeasure information must include the individual who administered or provided the countermeasure.

2.3.2.5   Reporter Data

2.3.2.5.a   The reporter's name and contact information (e.g., name, phone number, e-mail address) must be captured so that next steps can be communicated by the health department.

2.3.2.6   Data Linking

2.3.2.6.a   Linkages to detailed patient information must be available to support public health investigations, countermeasure administration/response, and contract tracing as well as to contact patients for follow-up exams and any necessary interventions.

2.3.2.6.b   Systems supporting EED must link updated information to the initial report of the confirmed, probable, or suspect case as it becomes available (e.g., updated case reports, confirmatory lab results, additional treatment or vaccination information).

2.3.2.6.c   Updated and additional information related to the case must be viewable with the initially reported case information.

2.3.3 Health-Related and Environmental Data

This section describes the data to be captured from secondary use health-related and environmental data sources, and the linkages to be supported for analysis and updates.

2.3.3.1   Patient Data

2.3.3.1.a   When available from the data source, demographic patient data should be collected to support localizing and characterizing a health event, including: age (but preferably not date of birth), gender, and zip code.

2.3.3.1.b   Patient data should be linked to the original data source and also to the supplying data source. For example, the data source may be a data processor such as a claims clearinghouse, but the clearinghouse data come from claims submitted by various hospitals and health plans. Both the clearinghouse and the hospital must be identified in the data and linked to the patient information.

2.3.3.2   Patient Event Data Linking

2.3.3.2.a   Each patient event (e.g., scheduled lab test, reported lab result) should be assigned an unambiguous identifier, unique within the jurisdiction, which can be used to link back to the original data source if necessitated by an ensuing public health investigation. This identifier should not include the patient's name, medical record number, or other identifier that is individually unique to the patient.

2.3.3.2.b   The date and type of event (e.g., scheduled lab test, reported lab result) must be stored.

2.3.3.2.c   The data source must have the ability to link patient event data to clinical and environmental lab results and provide that linkage to support a public health investigation.

2.3.3.2.d   During the investigation of a possible health event, additional information may be requested from the data source to support linking test results, additional demographic and environmental characteristics, and associated data relative to the circumstances of the case to the health event. To support administration of countermeasures as a part of response and contact exposure tracing, this supplementary data may include the patient's identifying information if requested by an authorized public health agency in the in the context of an investigation.

2.4   DATA RECEIPT AND STORAGE

2.4.1   Data collected from confirmed, probable and suspect case reports must be aggregated, analyzed and used to characterize localize health events.

2.4.2   Data collected from case reports should be standardized for comparison with secondary use health related and environmental data; these data can be used to corroborate reported conditions.

2.4.3   Data collected from multiple secondary use data sources must be standardized prior to aggregation in a centralized data store (or data staging area).

2.4.4   Standardized, aggregated data may be transferred to a data warehouse designed to optimize analysis, extraction and reporting.

2.4.5   Data should be accessible for use with commonly available analytical tools (e.g., SAS, SPSS, EPI-INFO, MS Access, MS Excel, Crystal Reports).

2.5   DATA ANALYSIS

2.5.1   Analytic capacity should support associations among secondary use health related and environmental data and confirmed, probable and suspect case reports, recognizing where the data validates or invalidates the existence of a possible signal.

2.5.2   Systems supporting EED must have the analytic capacity to process data and identify signals of possible health events from large data sets that may include multiple data sources.

2.5.3   Analysis should account for expected seasonal fluctuations (e.g., allergies in the spring, flu-like symptoms in the winter).

2.5.4   Analysis should account for environmental factors (e.g., increase in respiratory illness following wildfires or volcanic eruptions).

2.5.5   The data should provide the ability to drill-down to a more detailed level from aggregated data to support evaluation of possible data anomalies.

2.5.6   Analysis should use methodologies that reduce false alarms and minimize end-user burden.

2.5.7   Historical trending and comparative analysis methods should be established to detect aberrations with sensitivity and specificity.

2.5.8 Aberration detection algorithms must be used, compared, tested, and refined based upon a thorough understanding and working knowledge of the interpretation of previous findings.

2.5.9 Data must support associating possible health events to data in other sectors (e.g., agriculture, environment).

2.6 DATA VISUALIZATION AND ANALYTICAL REPORTING

2.6.1 Data must be visually represented using geospatial mapping and/or temporal charting.

2.6.1.1 Geospatial mapping should be leveraged to display health events in different geographic areas (e.g., zip, county, state, region) by data source (e.g., BioWatch cities, states, MSAs).

2.6.1.1.a Geospatial mapping should reflect population densities.

2.6.1.1.b Geospatial mapping should provide the capability for geographic areas to be defined "on-the-fly" (e.g., by grouping zip codes) to support analysis and monitoring of occasions such as large public gatherings (e.g., World Series, political convention).

2.6.1.2 Temporal charts, such as time series graphs, should be used to visualize how quickly is a health event is spreading across geographic borders (e.g., zip, county) and should include environmental factors (e.g., wind directions and speed which affect the spreading of airborne agents).

2.6.2 Systems supporting EED should support the ability to perform a variety of ad-hoc queries for electronic data investigation, including reporting for single or multiple zip code areas, MSA comparisons, or national comparisons.

2.6.3 Automated reporting tools and pre-defined report templates should be supported to ensure consistency and quality.

2.6.4 Systems supporting EED must have the ability to generate both detailed and aggregated reports.

2.6.5 Historical trending must provide a baseline against which new health events may be compared.

2.6.6 An infrastructure must be established to support cross-jurisdictional investigations and to provide views of trends that extend beyond jurisdictional borders.

2.7 COMMUNICATIONS AND ALERTS

Communications and alerts refer to information sent to organizations, jurisdictions, or individuals. Information may be sent by a variety of mechanisms depending on whether the information is sensitive or non-sensitive. For more information on communications and alerts, refer to "PHIN Preparedness Partner Communications and Alerting", available at www.cdc.gov/phin.

2.7.1 Systems supporting EED must be able to initiate alerts to key personnel involved in responding to public health emergencies.

2.7.2 Systems supporting EED must be able to interact with a local instance of a public health directory to support routing of data (e.g., case reports) to partners based on profile information that includes the participant's name, role, and associated organizations. For more information on communication profiles, please refer to the section *Directory Integration* of *PHIN Preparedness Cross Functional Communications*, available at *www.cdc.gov/phin*.

2.7.3 Systems supporting EED should be able to configure thresholds that are used to determine when a communication or alert should be initiated. Thresholds may be based upon a health event type, level of potential risk to the population, and the existence of external factors that may prompt increased watchfulness.

2.8 CONSEQUENCE MANAGEMENT SUPPORT

Consequence Management Support refers to the capabilities needed to assist in the investigation and management of the event, such as confirming or ruling out an unconfirmed signal, initiating and supporting response by providing information to determine what type of response is necessary, and continuing to monitor for and identify new cases.

2.8.1 Processes and personnel must be in place to evaluate reports of confirmed, probable and suspect cases.

2.8.2 Personnel must be trained regularly on protocols established for triaging cases.

2.8.3 Guidelines must be established for determining whether a detected signal constitutes a health event or a false alarm.

2.8.4 Personnel must be trained and available to investigate aberrations in data patterns and follow established guidelines to determine if the health event is real or a false alarm.

2.8.5 Personnel must be trained to use analysis from secondary use health-related and environmental data to corroborate or question data provided through confirmed, probable and suspect case reports.

2.8.6 A list of primary and technical contacts for data sources and associated organizations should be readily available to support preliminary investigations to validate signals.

    2.8.6.1 Contact information must be stored in a local instance of a public health directory.

2.8.7 When a health event is detected, it must be immediately communicated to public health partners and other related parties involved in public health investigations via appropriate communication and alerting systems.

2.8.8 Personnel must be trained to operate in conjunction with investigation teams to detect additional cases, and characterize and localize health events.

2.9 SITUATIONAL AWARENESS SUPPORT

Situational Awareness for Early Event Detection provides the critical elements of information about a potential case or confirmed signal to investigators, responders and health officials. Situational awareness should be provided both during the investigation period that follows initial detection as well as during ongoing investigation and management of a health event.

2.9.1   Systems supporting EED must provide the location(s) affected by a health event.

2.9.2   Systems supporting EED must provide the size of the health event, both in terms of the geographic location affected and the magnitude of the population affected.

2.9.3   Systems supporting EED must be able to provide information about the etiology of the health event, and other characteristics that may aid in response and containment.

2.9.4   The spread of a health event should be provided to assist in determining the response necessary to manage and contain a health event.

2.9.4.1   During the response to a health event, changes in the pattern of spread should be provided to assist in assessing the effectiveness of the response.

2.10 SYSTEM INTEGRATION AND DATA EXCHANGE

Systems integration requirements specific to systems supporting EED are included in the section below and describe the types of data that EED should be able to send and receive. This section is limited to describing the types of data exchange that EED must support; not the requirements for transporting the data. Bi-directional, secure exchange of data with partner organizations supports public health investigations across all levels of public health. Message construction and parsing, and secure data transport requirements that span PHIN functional areas are separately defined and should be reviewed in "PHIN Preparedness Cross Functional Components Requirements", available at www.cdc.gov/phin.

2.10.1   Data exchange must support investigations across jurisdictions and require collaboration at multiple levels (e.g., local, state, and national). When a possible emergency extends beyond the Health Department's jurisdiction, the Health Department must be able to share confirmed, probable and suspect case reports across jurisdictions and multiple levels of public health.

2.10.2   Efficient data exchange must be established between the data sources, state and local health departments, and national health partners or data brokers.

2.10.2.1   Systems supporting EED must exchange messages for confirmed, probable and suspect cases, and the other case classifications that are noted in the PHIN message implementation guide.   This requirement is identified as a key performance measure for assessing preparedness as described in *PHIN Preparedness Key Performance Measures*, available at *www.cdc.gov/phin*.

2.10.2.1.a   After suspect cases are identified, messages are sent to support investigation and outbreak management (OM) by providing the data needed to identify affected persons and their exposure levels, as well as to enable case management and contact exposure tracing.

2.10.2.1.b The response team(s) should continue surveillance of the health event location to evaluate whether the response is effectively containing the health event.

2.10.2.2   Systems supporting EED must receive, parse and process messages for laboratory results. This requirement is identified as a key performance measure for assessing preparedness as described in *PHIN Preparedness Key Performance Measures*, available at *www.cdc.gov/phin*.

2.10.2.3   Systems supporting EED must be able to receive, parse and process health related data for early event detection purposes. This requirement is identified as a key performance measure for assessing preparedness as described in *PHIN Preparedness Key Performance Measures*, available at *www.cdc.gov/phin*.

2.10.2.4   Systems supporting EED should be able to create and send health related data for early event detection purposes, in accordance with *Healthcare Encounter – Chief Complaint Message Implementation Guide* and *Healthcare Encounter – Diagnosis Message Implementation Guide*, available at *www.cdc.gov/phin*.

2.10.2.5   Systems supporting EED should be able to receive, parse and process message for laboratory test requests, in accordance with *Laboratory Test Order Message Implementation Guide*, available at *www.cdc.gov/phin.*

2.10.2.6   When a state or local health department needs further information to investigate a public health concern, it must be able to electronically request and receive that information from the data source either directly, or via the national broker.

2.10.2.7   Upon receipt of a request for additional information, a data source must be able to electronically provide that information to the requesting party.

2.10.3 Local jurisdictions associated with a metropolitan area should receive all data for the metropolitan area.

2.10.4 Systems supporting EED should integrate with conventional surveillance systems and corroborate surveillance findings.

2.10.5 Systems supporting EED should integrate with systems that support response tracking to identify emergency response team members, assess prophylaxis, training and qualification necessary to respond to the health event.

2.11 VOCABULARY STANDARDS

It is recommended that standards be used across systems supporting EED; however, it is required that vocabulary standards be used when exchanging data. Vocabulary requirements specific to systems supporting EED are included in the section below. Vocabulary requirements that span PHIN functional areas are separately defined and should be reviewed in "PHIN Preparedness Cross Functional Components Requirements", available at www.cdc.gov/phin.

2.12 OPERATIONS

Operational requirements, such as system backup policies and procedures, continuity of operations, system monitoring, and employee training ensure that public health partners can effectively support activities in EED and other PHIN functional areas. Operational requirements that span PHIN functional areas should be reviewed in "PHIN Preparedness Cross Functional Components Requirements", available at www.cdc.gov/phin.

2.12.1 Systems supporting EED must support 24/7/365 monitoring of secondary use health-related and environmental data for changes to the normal pattern.

2.12.2 Systems supporting case reporting must be updated regularly to include diagnostic advances as they become available.

2.12.3 Education must be developed and provided to health care providers and laboratorians concerning the systems available for reporting confirmed, probable and suspect cases, and how to use the systems.

    2.12.3.1 Education must include clear instructions on how to report a confirmed, probable or suspect case.

    2.12.3.2 Education should include and differences between reporting confirmed cases and suspicious cases, such as which fields are required and which fields are optional.

    2.12.3.3 Education must be updated and provided to laboratorians and licensed health care providers (or subsets delineated by specialty or practice types) on an annual basis, minimally.

2.12.4 Health professionals must be trained on the use of systems supporting 24/7/365 case reporting; the training must be refreshed on a periodic basis.

2.12.5 The health department should provide regular feedback on the steps initiated after a case report has been received.

2.12.6 Health care providers and laboratorians must be provided with the list of disease conditions, diagnosis types, test requests, and test results that should be immediately reported.

2.12.7 Systems supporting EED should be regularly tested and exercised to ensure that the systems operate properly under both routine and emergency conditions.

2.13 SYSTEM SECURITY AND AVAILABILITY

Systems and data supporting EED must be protected from sabotage, corruption and unauthorized access, and must be available subsequent to a catastrophic event. Security and Availability requirements that span PHIN functional areas should be reviewed in "PHIN Preparedness Cross Functional Components Requirements", available at www.cdc.gov/phin.

2.14 PRIVACY

Privacy requirements ensure that sensitive information is not accessible to unauthorized users. Privacy requirements are broadly defined because they span all PHIN functional areas. These requirements should be reviewed in "PHIN Preparedness Cross Functional Components Requirements", available at www.cdc.gov/phin.