

Data Standardization: Dates of Importance to Public Health Surveillance

Illness (Symptom) Onset Date, Report Dates, Laboratory-Related Dates, (Clinical) Diagnosis Date

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INTRODUCTION

This document was developed by the Data Standardization Work Group (DSWG) of the CSTE Surveillance Practice and Implementation Subcommittee and will be published and maintained in a repository on the CSTE website [Insert website].

DATA STANDARDIZATION WORK GROUP OVERVIEW

As work on the Centers for Disease Control and Prevention (CDC) National Notifiable Diseases Surveillance System (NNDSS) Modernization Initiative (NMI) (<https://www.cdc.gov/nmi/>) has progressed, the need has been identified to develop consensus on common definitions for core surveillance data elements to address variation in how jurisdictions or programs define and populate these data elements.

Consistent, shared definitions and guidelines are imperative to accurately using epidemiology to improve health at the jurisdictional and national levels. This information allows public health professionals to effectively allocate resources to identify and respond to disease threats.

The objective of the CSTE Data Standardization Work Group (DSWG) is to improve data quality through the development of, and application of, consensus definitions for core data elements that are used for Nationally Notifiable Conditions surveillance. The DSWG combines the expert knowledge of its members to achieve agreement across diseases and jurisdictions to facilitate and support standardization for data elements, whether they are referenced as part of notification to CDC, in communication between states, or in analysis.

This effort directly aligns with key portions of CSTE's mission, including promoting the effective use of epidemiologic data to guide public health practice and improve health, as well as develop standards for practice.

As the work of the DSWG has progressed, some underlying principles for recommendations have evolved:

- 1) The DSWG has tried to find the balance between very prescriptive versus more flexible recommendations. Very prescriptive recommendations might, in theory, lead to better standardization across programs and jurisdictions, but may also create large barriers for implementation. State and local jurisdictions have a wide variety of surveillance systems and infrastructure currently in place, and also have different state and local needs. Given these factors, the DSWG has intentionally left flexibility for the judgment of state or local jurisdictions within some recommendations.
- 2) The recommendations focus on data elements communicated between states and CDC, which may also facilitate interjurisdictional data sharing and analysis. Data collection and surveillance practices at the state or local level directly affect the information available for transmission; these recommendations therefore include guidance for collection of data within state or local surveillance systems. However, many state or local jurisdictions will certainly maintain additional fields or data elements related to the concepts discussed in these recommendations for capturing information that goes beyond what is covered by these recommendations.

DATES OF IMPORTANCE TO PUBLIC HEALTH SURVEILLANCE

Within Generic v2.0 and Generic v2.0-based message mapping guides (MMGs), several dates are included both as individual core surveillance data elements as well as components of other, hierarchical data elements used for case counting and notification to CDC. Four dates/date concepts were selected as the first set of data elements for the DSWG to assess: illness onset date, report dates, laboratory-related dates, and diagnosis date. Standardizing the use of these dates across programs and jurisdictions has the additional benefit of establishing a common vocabulary when dealing with complex or hierarchical data elements in the future.

STRUCTURE OF THE DATA STANDARDIZATION BRIEF

Each data element addressed in this brief includes three areas:

- Background and Overview, including Importance of the Data Element and Current Usage
- Recommended Definitions and Implementation
- Recommended Actions

This structure will serve as a template for future data standardization efforts.

ILLNESS (SYMPTOM) ONSET DATE

BACKGROUND AND OVERVIEW

CURRENT DATA ELEMENT DESCRIPTION IN MMGS

The current data element description for the Date of Illness Onset in the Generic v2.0 MMG is shown below:

Data Element Name	Data Element Description	Data Element Identifier	CDC Priority
Date of Illness Onset	Date of the beginning of the illness. Reported date of the onset of symptoms of the condition being reported to the public health system.	11368-8	P

For more information on the content and information in MMG columns, including description of the “CDC Priority” options, please refer to the [Generic v2.0 MMG workbook](#), and the tab titled “MMG Column Description”.

With the exception of the Arboviral MMG, the disease-specific MMGs are intended to be used *along with* the Generic v2.0 MMG and thus do not include Date of Illness Onset. For the Arboviral v1.3 MMG, the specifications are as follows:

Data Element Name	Data Element Description	PHIN Variable	CDC Priority	ArboNET Variable ID
Date of Illness Onset	Date of the beginning of the illness. Reported date of the onset of symptoms of the condition being reported to the public health system.	INV137	P	OnsetDate

DATA ELEMENT IMPORTANCE AND CURRENT USAGE

Importance of the Data Element

Date of Illness Onset is considered a key data element for surveillance and reporting by many jurisdictions, in particular for infectious diseases, and may be collected as part of case investigation and follow up for many conditions. Illness onset date has a variety of important applications for public health investigation and surveillance, including determining the likely periods of exposure and/or infectiousness; ascertaining the appropriate time frames for collecting risk factors and exposures; identifying ill contacts or contacts requiring further follow-up; and establishing when outbreaks are over.

Current Usage

Date of Illness Onset generally represents the symptom onset date. However, it is currently common practice to populate this data element with alternate values if symptom onset date is not available for case reporting. Some jurisdictions treat this data element as a summary or counting date (similar to the current 'Event Date' used in the NETSS message format), using a hierarchical algorithm to populate the date with alternate dates – including diagnosis date, reporting dates, or laboratory dates – if symptom onset date is not available.

In the Generic v2.0 MMG, the Date of Illness Onset has a CDC Priority of *Preferred*, and therefore is not *Required* in the message; however, many of the *Preferred* data elements are considered high priority by CDC programs.

RECOMMENDED DEFINITION AND IMPLEMENTATION

Recommended Definition: Rename to Symptom Onset Date

Symptom Onset Date: *The data element should be interpreted as the **earliest date of the onset of signs or symptoms relevant to the reported condition.***

Some diseases present with prodromal symptoms before onset of actual illness. The importance of these prodromal symptoms varies by disease. It is the DSWG recommendation that changing this data element to **Symptom Onset Date**, using disease-specific sets of relevant symptoms, will more accurately capture the start of the illness period.

Recommended Implementation

1. Jurisdictions should populate the data element when information is available to meet the above description of the Symptom Onset Date; otherwise, the data element should remain NULL in the surveillance system (i.e., should not be populated) and the HL7 segment should not be sent.

Examples of specific scenarios resulting in a NULL (i.e., missing) Symptom Onset Date and exclusion from HL7 case notification messages are described below:

- a) Patient is asymptomatic
 - b) Symptom onset date is not collected
 - i. The data element may not be collected systematically for a particular condition, even after the adoption of the Generic v2.0 and disease-specific MMGs. As noted above, the data element is not *Required* for the case notification message.
 - ii. For some jurisdictions, individual cases for a condition may not be investigated and therefore the signs/symptoms may not be collected.
 - iii. Upon investigation, some cases may have no sign/symptom information available.
 - iv. A case may be lost to follow-up, with no onset information available.
2. For jurisdictions able to distinguish between unknown and NULL/missing values for Symptom Onset Date, jurisdictions should follow the Generic v2.0 MMG and send the numeric value "99999999" to indicate *unknown* values (i.e., the patient was known to be symptomatic but the onset date could not be determined/was unknown) rather than omitting the OBX segment. For these cases, the presence of signs and symptoms should be recorded in the investigation and reported in disease-specific case notification messages as appropriate. Jurisdictions that do not distinguish between unknown and missing values should follow the guidance above and omit the segment from the case notification message.

3. Substitution with another date, or calculation from other dates, is not recommended. Symptom Onset Date should be a distinct data element in the surveillance system. Some jurisdictions have substituted other dates or generated a calculated summary/counting date due to a surveillance system or program data analysis requirement. Although the Symptom Onset Date maybe used within a hierarchy to populate a summary/counting date, Symptom Onset Date itself should not be used to capture, store, or display this date.

Recommended Data Sources

During the course of an investigation, investigators may gather onset date from a variety of sources, including patient, proxy, or healthcare provider interviews; and/or medical record/chart reviews. Unless there is reason to believe the patient/proxy interview information is unreliable, it is the recommendation of the DSWG that the patient/proxy information should be considered the gold standard for the purpose of the investigation.

A recommended hierarchy for the data sources is as follows:

1. Patient/proxy interview
2. Provider interview or medical record/chart review
 - a. Documentation of the earliest date of the onset of signs or symptoms for the condition. (See section below [Identifying the Sign or Symptom for the Symptom Onset Date.](#))
 - b. Dates in the medical record/chart:
 - i. Date of illness or symptom onset as noted in the chart.
 - ii. If the medical record/chart references the timing of sign/symptom onset, but does not specify the date, the investigator should identify the correct date for populating Symptom Onset Date. For example, if the medical record/chart indicates onset three days prior to the visit, which occurred on January 1, 2018, then the onset should be documented as December 29, 2017.
 - iii. Date of care, i.e., when a patient sought medical care (e.g., date of visit, admission date). If the relevant signs or symptoms for the condition are noted on that date, and no additional information from the patient/proxy or elsewhere in the medical record/chart is available, the date of care represents the earliest known date that symptoms were present and can be utilized as the Symptom Onset Date.

Although the DSWG recommends using an onset date obtained by patient/proxy interview in favor of one from a provider or medical record/chart review in most situations, there may be value for the larger public health investigation in noting dates obtained from the provider or medical record/chart, if different. For example, jurisdictions may choose to exercise caution by using alternative dates if they result in wider intervals for the:

- Incubation period and relevant risk factors

Illness (Symptom) Onset Date

- Period of infectiousness that will inform the necessary exclusions or infectious disease precautions
- Timeframe during which post-exposure prophylaxis should be given

Investigators should follow the hierarchy of data sources above when identifying the most appropriate date for Symptom Onset Date, but should note conflicting dates elsewhere in the record.

Laboratory dates (e.g., specimen collection date, result date) are not included in the hierarchy, and are not recommended as a source of information to determine the Symptom Onset Date. In general, laboratory reports (unlike medical records) do not contain sign or symptom information with onset dates.

Identifying the Sign or Symptom for the Symptom Onset Date

Across conditions, the recommended signs and symptoms to consider for the Symptom Onset Date vary. Investigators should refer to the CSTE position statement for each condition. These list the signs or symptoms that may be relevant for each condition and are available in the CSTE position statement archive at: <http://www.cste.org/default.asp?page=PositionStatements>. The NNDSS case definition for the condition, as published on the CDC website at <https://wwwn.cdc.gov/nndss/conditions/>, is based on these position statements.

The disease-specific MMGs may require collecting onset dates for individual signs or symptoms. For these conditions, the date used for the Symptom Onset Date should be the date of the earliest relevant sign/symptom, which may be one of the signs/symptoms with its own discrete data element or a sign/symptom without a discrete data element.

RECOMMENDED ACTIONS

Data Element	DSWG Recommendations	Recommended Definition
<p>Date of Illness Onset</p>	<p>Change Data Element Name to Symptom Onset Date</p> <p>Data element should be a discrete data element, distinct from any summary or counting dates, and should not be populated from another field via substitution, calculation, or application of an algorithm.</p>	<p>The earliest date of the onset of signs or symptoms relevant to the reported condition.</p> <p>Revise HL7 Implementation Notes to read: “For unknown date (distinct from missing date), OBX-5 MAY be populated with ‘99999999’.”</p>

CSTE

1. Provide support for the vetting process and distribution of the final Data Standardization products to the CSTE community.
2. Publish the Data Standardization Brief and supporting documents on the CSTE website in a repository.
3. Data Standardization Work Group and Surveillance Practice and Implementation Subcommittee:
 - a. Promote the Data Standardization Brief and supporting documents on the Surveillance/Informatics Steering Committee and SPIS Subcommittee conference calls.
 - b. Review and update the brief upon changes to the Generic Messaging Mapping Guide.

CDC

1. Incorporate the following changes into any revisions of the Generic v2.0-based Message Mapping Guides, or into Generic v3:
 - a. Revise the Date of Illness Onset data element
 - i. Change the Data Element Name to **Symptom Onset Date**
 - ii. Revise the HL7 Implementation Note to “For unknown date (distinct from missing date), OBX-5 **MAY** be populated with ‘99999999’.”
 - iii. Include in the Data Element Description a reference to this document for appropriate application.
2. Review how this data element is used and defined across CDC programs and harmonize its use.

STATE, TERRITORIAL AND LOCAL HEALTH DEPARTMENTS

1. Review the brief and conduct a gap analysis for each data element to identify differences in the surveillance system implementation and application of the data element across disease programs.
2. Implement necessary revisions to the surveillance system(s) to address the following for Symptom Onset Date:
 - a. Data element should not be *Required*; NULL should be allowed.
 - b. Data element should not be populated from another field via substitution, calculation, or application of an algorithm.
 - c. Data element should be a discrete data element, distinct from any summary or counting dates.
 - d. If jurisdictions distinguish between unknown and missing values for this data element, jurisdictions should send the numeric value "99999999" (described in the Generic v2.0 MMG) for unknown values, and omit the OBX segment for missing values.

REPORT DATES

BACKGROUND AND OVERVIEW

CURRENT DATA ELEMENT DESCRIPTION IN MMGS

The four data elements related to reporting dates in the Generic v2.0 MMG:

Data Element Name	Data Element Description	Data Element Identifier	CDC Priority
Date Reported	Date that a health department first suspected the subject might have the condition	77995-9	P
Earliest Date Reported to County	Earliest date reported to county public health system.	77972-8	O
Earliest Date Reported to State	Earliest date reported to state public health system.	77973-6	P
Date First Reported to PHD	Date the report was first sent to the public health department (local, county or state) by reporter (physician, lab, etc.).	77970-2	P

For more information on the content and information in MMG columns, including description of the “CDC Priority” options, please refer to the [Generic v2.0 MMG workbook](#), and the tab titled “MMG Column Description”.

The disease-specific MMGs are intended to be used *along with* the Generic v2.0 MMG and thus do not include these report dates. These data elements are not included in any other MMG, including Arboviral v1.3.

DATA ELEMENT IMPORTANCE AND CURRENT USAGE

Importance of the Data Element

“Report dates”, or as typically used, dates representing when a public health agency is first notified about a case, are commonly collected across jurisdictions and programs. These dates may serve a variety of purposes:

- Component of a hierarchical variable for determining when the case should be counted;
- Monitoring trends over time;
- Calculating timeliness of reporting; or
- Calculating timeliness of public health action (investigation, implementation of control measures, etc.).

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The importance of the dates Earliest Date Reported to State or Earliest Date Reported to County vary greatly across jurisdictions, reflecting, at least in part, variations in health agency structure and legal authorities across the country.

Current Usage

These reporting date-related data elements are core Generic v2.0 data elements. While reports may be received from multiple sources for a given case, each of these dates, if collected, should only represent the “first” or “earliest” of the applicable reports for each element. Except for Earliest Date Reported to County, which has a CDC Priority of *Optional*, the other three dates have a CDC Priority of *Preferred*.

Jurisdictions generally collect at least one date to represent when a case is reported to the public health agency/department/system, but might not collect all four dates shown above.

The date most consistently used across jurisdictions, although with varied names in the surveillance systems and definitions for application, is the **Date First Reported to Public Health Department**.

Some jurisdictions track components of the reporting process by capturing when a report is first made to the local or county level (**Earliest Date Reported to County**) separately from when the state public health agency first receives a report or is notified (**Earliest Date Reported to State**). Depending on multiple factors, including the reporting requirements for each jurisdiction, either date may occur first. Some systems may also record multiple instances of Date Reported to County for use when multiple counties are involved in an investigation or as more is known about a patient’s location. Recording this level of specificity (date reported to county/local versus state, or multiple instances of the fields for each case) may help monitor the timeliness of implementing the public health response, especially in those states with decentralized local health agencies. However, it may not be relevant or applicable for all jurisdictions.

Many jurisdictions do not collect a separate date to represent when a public health agency “first suspected the subject might have the condition” as defined for **Date Reported**. This data element may be relevant for public health reporting completed via mail, when there is a lag between the suspicion of a case and receipt of the actual report to the public health agency, or when multiple, specific data elements are not available for recording the separate dates. As automated public health reporting via electronic laboratory reporting (ELR) and electronic initial case reporting (eICR) increases, this data element may no longer be as relevant to tracking the report of a case. Some jurisdictions also use this data element instead of, or interchangeably with, Date First Reported to Public Health Department.

The DSWG recommendations for each data element will be discussed in turn below.

RECOMMENDED DEFINITIONS AND IMPLEMENTATION

DATE FIRST REPORTED TO PUBLIC HEALTH DEPARTMENT

Recommended Definition: Rename to Date First Received by Public Health Agency

*The data element **Date First Received by Public Health Agency** should be defined as the **earliest date** a report for the case was **received** by a public health agency for the jurisdiction counting the case, whether a state/territory or county/local agency.*

Recommended Implementation: Date First Received by Public Health Agency should be used by all jurisdictions.

The recommendation of the DSWG is to rename the Generic v2.0 data element Date First Reported to Public Health Department to **Date First Received by Public Health Agency**.

As currently defined in the Generic v2.0 MMG, reporting jurisdictions may experience ambiguity in applying a date for this data element. The data element could represent a variety of dates including the date a report was printed from a laboratory or electronic health record system, the date a paper form was faxed or mailed, or various other dates in the transmission of an electronic report. The term “received” should be operationalized as the date a report of the case was received by the public health agency rather than when the report was sent, if different. This distinction is the rationale for renaming the data element. Additionally, the receiving public health agency might not know when a report was sent, but should be able to capture when it was received.

A “report” need not be a formal printed or electronic record, but may also include a telephone call or another method by which a health agency may identify or be notified about a case. See [Data Sources](#) for additional details.

For any of the reporting mechanisms (e.g., mail, fax, electronic), there may be various points at which a report can be considered “received” by the agency. For example, an HL7 transmission may be received by an ELR hub but not immediately processed into the surveillance system. Or, a mailed report may go first to an agency central mail room before reaching the surveillance staff. While recognizing that there will be some variability in how different agencies choose the time and date of receipt, the DSWG is not making a recommendation about which point in each process should be considered “received”, as the work involved in operationalizing those recommendations is likely to require extensive changes in systems or practices for many agencies.

The DSWG further recommends that all jurisdictions utilize this data element (**Date First Received by Public Health Agency**), whether it is the only one of this set of “reporting date” data elements used or in

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combination with one or more of the others. The CDC Priority for this date is *Preferred*. We recommend that this date be recorded for all cases (i.e., is never NULL/missing in the surveillance system and is always sent in HL7 case notification messages), though with no change to the CDC Priority.

Date First Received by Public Health Agency may be a calculated field taking the earliest of the data elements Date First Received by State Health Agency and Date First Received by Local Health Agency, if used, or it may be used alone. However, if Date First Received by Public Health Agency is a calculated field, some jurisdictions may find it useful to be able to manually override the calculation in a particular case if a more appropriate “first received” date is identified.

As mentioned above, this data element will generally reflect receipt by the jurisdiction in which the case will be counted for CDC notification. In the event that a case report is triaged through multiple jurisdictions, or is first reported to a jurisdiction that is not the counting jurisdiction, the data element should reflect receipt by an agency within the jurisdiction responsible for submitting the case notification to CDC. For the situation when the case was first received by a public health agency in a different state, the counting jurisdiction’s data element need not capture the date of first receipt by that other state. However, out-of-jurisdiction reporting could be considered when determining the timeliness of reporting or the implementation of control actions, as cases first received by another jurisdiction may have large delays in the recorded Date First Received by Public Health Agency. To help identify this situation, jurisdictions may find it useful to have a mechanism to identify cases they first received from an out-of-jurisdiction health agency, for example, use of a reporting source field or a flag for interjurisdictional transfers.

Additionally, some jurisdictions may find it useful to have a separate field to record the earliest date that a report was *sent* by the reporter. As discussed above, the date that a report was sent may be different from the date the report was received; examples include a report submitted by mail or a report sent electronically that fails to be received or successfully processed by the receiving application or platform. This distinction may be important for identifying compliance with reporting regulations or for detecting problems with data transmissions. However, the date a report is *sent* should remain a separate concept from the data element Date First Received by Public Health Agency.

EARLIEST DATE REPORTED TO STATE AND EARLIEST DATE REPORTED TO COUNTY

Recommended Definition: Rename to Date First Received by State Health Agency and Date First Received by Local Health Agency

The data element **Date First Received by State Health Agency** should be defined as the **earliest date** a report for the case was **received** by the state public health agency for the jurisdiction counting the case.

The data element **Date First Received by Local Health Agency** should be defined as the **earliest date** a report for the case was **received** by the local or tribal public health agency in the jurisdiction counting the case.

The recommendation of the DSWG is that these data elements be renamed from “Earliest Date Reported to [...]” to “**Date First Received by [...]**”, to reflect that the date a report was sent may not be the same as the date a report was received by the health agency. Furthermore, “County” should be replaced by “Local Health Agency” in the Generic v2.0 MMG since not all local health agencies are county health agencies. For the purposes of this brief, tribal health departments may be grouped with local health agencies; case data for most local and tribal entities are sent to the state health agency for inclusion in the state’s case notifications to CDC.

Recommended Implementation

“Received”, “report”, and “Local Health Agency” should be operationalized as above.

The CDC Priority for Earliest Date Reported to State is *Preferred*. We recommend making Date First Received by State Health Agency *Optional*. The Earliest Date Reported to County is currently *Optional*; we recommend keeping that priority for Date First Received by Local Health Agency.

The Date First Received by State Health Agency may not be relevant for local health systems. The Date First Received by Local Health Agency may not be relevant for jurisdictions/states with a centralized health agency. Differentiating the state versus local report dates may also not be deemed important by all jurisdictions. Furthermore, while these data elements may be valuable at the state or local level, their primary value may be as components to the Date First Received by Public Health Agency or the counting jurisdiction for reporting to CDC rather than as independent values.

If a jurisdiction chooses to include one or both of these data elements in their system, they should be populated if the date is known; otherwise, the HL7 segments for these data elements should not be sent. For jurisdictions that distinguish between unknown and NULL/missing values for these dates, jurisdictions should follow the Generic v2.0 MMG and send the numeric value “99999999” to indicate *unknown* values rather than omitting the OBX segment.

DATE REPORTED

As described above, Date Reported is defined in the Generic V2.0 MMG as “date that a health department first suspected the subject might have the condition.” Most jurisdictions do not collect a separate date to represent when a public health agency first *suspected* the subject might have the condition; some jurisdictions use this data element instead of, or interchangeably with, Date First Reported to Public Health Department. This data element, in practice, is redundant with the Date First Received by Public Health Agency.

Recommended Implementation: Retire Date Reported from the Generic V2.0 MMG

*We recommend **retiring** from the Generic v2.0 Message Mapping Guides the data element **Date Reported**.*

Continued inclusion within the state or local surveillance system and use of a data element to capture the date that public health first suspected a subject might have the condition should be at the discretion of the public health jurisdiction.

Recommended Data Sources

The data sources for the three date data elements recommended for use may vary across jurisdictions or programs, depending on the methods by which the jurisdiction receives information. Possible sources of reports include:

- Reports from healthcare providers or healthcare institutions
- Reports from laboratories
- Information collected during case investigations (e.g., symptomatic contacts identified during the course of a public health investigation)
- Other health agencies
- Medical records, death certificates, or other sources that provide the first knowledge of the case

Submissions from these sources may be electronic (eICR, ELR or direct entry into the surveillance system), or by fax, mail, telephone call, or any other method that the public health agency accepts. Each agency should have a procedure for recording the date of receipt of accepted report types.

The data sources for the three “Date First Received” data elements thus reflect the recording method(s) used:

- Electronic date stamps (e.g., from the surveillance, ELR, eICR, or fax systems)
- Mail processing stamps
- Investigative notes
- Other relevant sources, depending on the agency’s method of recording date received.

Because these data elements represent the “earliest” or the “first” for each concept, dates from multiple report types may need to be considered concurrently when populating these data elements. For example, Date First Received by Public Health Agency for some cases may need to reflect the date a laboratory report was received, while for others it reflects a provider report, depending on which report came first.

Examples of specific scenarios (where the three “Date First Received by” data elements are included in the surveillance system):

- A laboratory report is received by the state health agency on 1/5/2019. It is shared with the local health agency on 1/6/2019.
 - Date First Received by State Health Agency: 1/5/2019
 - Date First Received by Local Health Agency: 1/6/2019
 - Date First Received by Public Health Agency: 1/5/2019
- A provider reports a suspected case to the local health agency by phone on 1/5/2019. Information about this case is shared with the state health agency on 1/6/2019.
 - Date First Received by State Health Agency: 1/6/2019
 - Date First Received by Local Health Agency: 1/5/2019
 - Date First Received by Public Health Agency: 1/5/2019

RECOMMENDED ACTIONS

Data Element	DSWG Recommendations	Recommended Definition
Date First Reported to Public Health Department	<p>Change Data Element Name to Date First Received by Public Health Agency</p> <p>Health departments should ensure that Date First Received by Public Health Agency is populated and is defined as shown here.</p>	The earliest date a report for the case was received by a public health agency for the jurisdiction counting the case, whether a state/territory or county/local agency.
Earliest Date Reported to State	<p>Change Data Element Name to Date First Received by State Health Agency</p> <p>Change CDC Priority to Optional</p>	The earliest date a report for the case was received by the state public health agency for the jurisdiction counting the case.
Earliest Date Reported to County	Change the Data Element Name to Date First Received by Local Health Agency	The earliest date a report for the case was received by the local or tribal public health agency in the jurisdiction counting the case.
Date Reported	Retire Data Element Date Reported from the MMG	

CSTE

1. Provide support for the vetting process and distribution of the DSWG final products to the CSTE community.
2. Publish the Data Standardization Brief and supporting documents on the CSTE website in a repository.
3. Data Standardization Work Group and Surveillance Practice and Implementation Subcommittee:
 - a. Promote the Data Standardization Brief and supporting documents on the Surveillance/Informatics Steering Committee and SPIS Subcommittee conference calls.
 - b. Review and update the brief upon changes to the Generic Messaging Mapping Guide.

CDC

1. Incorporate the following changes into any revisions of the Generic v2.0-based Message Mapping Guides, or into Generic v3:
 - a. Revise the Date First Reported to Public Health Department
 - i. Change the Data Element Name to **Date First Received by Public Health Agency**
 - ii. Revise the definition, as shown above
 - b. Revise the Earliest Date Reported to State
 - i. Change the Data Element Name to **Date First Received by State Health Agency**
 - ii. Revise the definition, as shown above

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- iii. Make this data element *Optional*
- iv. Revise the HL7 Implementation Note to “For unknown date (distinct from missing date), OBX-5 **MAY** be populated with ‘99999999’.”
- c. Revise the Earliest Date Reported to County
 - i. Change the Data Element Name to **Date First Received by Local Health Agency** to reflect that not all local health agencies are county health agencies.
 - ii. Revise the definition, as shown above
 - iii. Revise the HL7 Implementation Note to “For unknown date (distinct from missing date), OBX-5 **MAY** be populated with ‘99999999’.”
- d. Retire the Date Reported from message mapping guides, as in practice it is used redundantly with the current Date First Reported to Public Health Department.
- e. Include in the Data Element Descriptions a reference to this document for appropriate application.

STATE, TERRITORIAL AND LOCAL HEALTH DEPARTMENTS

1. Review the brief and conduct a gap analysis for each data element to identify differences in the surveillance system implementation and application of the data elements across disease programs.
2. Implement necessary revisions to the surveillance system(s) to ensure that Date First Received by Public Health Agency is populated and is defined as above.

LABORATORY-RELATED DATES

BACKGROUND AND OVERVIEW

CURRENT DATA ELEMENT DESCRIPTION IN MMGS

This section focuses on four laboratory-related date data elements included in the *Lab Interpretive Repeating Group*¹ of Generic v2.0-based MMGs. The Generic v2.0 MMG itself does not include laboratory information; rather, these fields may be included in several MMGs used in conjunction with Generic v2.0. Generic v2.0-based MMGs that use the Repeating Group might not include all four of the dates listed below.

Laboratory information may also be transmitted using the *Laboratory Template*, a separate component of the case notification message which follows the HL7 2.5.1 ELR standard. Because dates included in the Laboratory Template already follow an established standard, this section will focus on the data elements from the *Lab Interpretive Repeating Group*. Dates from *Laboratory Template* will be referenced in discussion and recommendation sections as appropriate.

Laboratory Interpretative Repeating Group Data Elements:

Data Element Name	Data Element Description	Data Element Identifier	CDC Priority
Specimen Collection Date/Time ²	Date and/or time of collection of laboratory specimen	68963-8	P
Specimen Received Date/Time	The date/time the specimen is received	LAB595	P
Specimen Analyzed Date/Time	Date/time associated with generation of the result	45375-3	P
Date/Time of Lab Result ³	Date result sent from Reporting Laboratory	82773-3	P

For more information on the content and information in MMG columns, including description of the “CDC Priority” options, please refer to the [Generic v2.0 MMG workbook](#), and the tab titled “MMG Column Description”.

¹ The name of this repeating group varies slightly across MMGs.

² The STD and Arboviral v1.3 MMGs uses the similar data element Specimen Collection Date (33882-2).

³ The STD and CS MMGs use the similar data element Date of Lab Result (82772-5).

DATA ELEMENT IMPORTANCE AND CURRENT USAGE

Importance of the Data Element

Laboratory-related dates, overall, are very important to public health surveillance and investigations, frequently providing insight into the onset of symptoms, when healthcare was sought, and when a diagnosis might be confirmed. Laboratory reporting of case information may make these data elements more easily accessible and more universally available to public health departments than elements from other sources.

Importance of each of the concepts included within the Laboratory-Related Dates section is discussed in more depth below.

Current Usage

Jurisdictions vary in their usage of the Lab Interpretive Repeating Group and/or the Laboratory Template. Depending on the guidance for each condition and how each jurisdiction chooses to implement the MMGs, one or both sets of laboratory-related date data elements might be sent to CDC.

The CDC Priority for all four dates included in the Lab Interpretive Repeating Group is *Preferred*. The inclusion of individual laboratory-related dates within the repeating group varies not only by guide but, in the case of the Foodborne and Diarrheal Diseases (FDD) guide, by condition within the MMG.

Current usage of each of the concepts included within the Laboratory-Related Dates section is discussed in more depth below.

RECOMMENDED DEFINITIONS AND IMPLEMENTATION

SPECIMEN COLLECTION DATE/TIME

Importance of the Data Element

Specimen Collection Date/Time is an important data element for public health surveillance and control. It frequently contributes to calculated/hierarchical, aggregated, reporting dates for case counting and public health reporting (e.g., MMWR Week, Event Date). It may also be used to determine timing/appropriateness of testing and whether testing was done pre- or post-treatment, calculate age, differentiate between multiple specimens collected over the course of a disease event, and may be useful in deduplication of lab results that are reported by multiple sources.

Current Usage

Specimen Collection Date/Time is widely available from both paper and electronic laboratory reports and is captured in most jurisdictions' surveillance systems.

Definition and Implementation

Specimen Collection Date/Time represents the date a clinical specimen was collected from the patient for testing for the condition of concern; this date does not typically represent the date a microorganism isolate was identified. Note that the time component of this data element is not required by CDC. There are three data elements in the Laboratory Template (Specimen Collection Date/Time (SPM-17), Specimen Collection Date (OBX-14), and Observation Date/Time (OBR-7)) that should match Specimen Collection Date/Time in the Lab Interpretive Repeating Group.

Specimen Collection Date/Time should be populated directly from the corresponding date on the paper or electronic laboratory report or from a data element in the surveillance system that captures this information. If this information is not available, the associated HL7 segment should not be sent in case notification messages.

Recommended Implementation: Specimen Collection Date/Time

***Specimen Collection Date/Time** should be interpreted as the date a clinical specimen was collected from the patient for the laboratory testing relevant to the disease or condition being reported to a public health agency.*

SPECIMEN RECEIVED DATE/TIME

Importance of the Data Element

Specimen Received Date/Time was generally considered to be of lower importance to public health surveillance or investigation by the workgroup. Jurisdictions may use the date for calculating turnaround times or other quality control metrics for specimens tested at a public health laboratory, or potentially at other clinical laboratories; or for tracking specimens within the public health laboratory, particularly processing of outbreak specimens for foodborne conditions.

Current Usage

Specimen Received Date/Time is not frequently captured in surveillance systems, though it is typically available for electronically reported lab results. It is also usually available within a public health laboratory's information management system; some jurisdictions may look up Specimen Received Date within the public health laboratory's information management system, if needed, rather than routinely importing or storing it within the surveillance system.

Definition and Implementation

Specimen Received Date represents the date that a specimen is received at the laboratory performing the test for the condition of concern. This typically represents when a specimen package is opened by the lab rather than when it is first received at a facility, which may introduce a margin of error for use of this date. This date is directly comparable to Specimen Received Date/Time (SPM-18) in the Laboratory Template.

Because the DSWG did not consider the timing of receipt of the specimen at the performing laboratory to be widely relevant to public health surveillance or investigation, or for collection at the national level, the DSWG recommends retiring the data element Specimen Received Date from MMGs using the Lab Interpretive Repeating Group.

Recommended Implementation: Specimen Received Date/Time

*We recommend retiring **Specimen Received Date/Time** from MMGs using the Laboratory Interpretive Repeating Group.*

RESULT DATES

Existing MMGs include one or both of two laboratory result-related dates in the Lab Interpretive Repeating Group.

- **Date/Time of Lab Result** represents when a result was reported out by the laboratory.
- **Specimen Analyzed Date/Time** is intended to represent the date testing occurred or was performed (described in MMGs as when the result was generated).

The Laboratory Template includes two corresponding data elements. Results Rpt/Status Chng Date/Time (OBR-22) should typically match Date/Time of Lab Result, but may differ if the reporting lab sends an updated result, which would update the value of OBR-22. Specimen Analyzed Date (OBX-19) in the Laboratory Template directly corresponds with Specimen Analyzed Date/Time.

Importance of the Data Element

Two different data elements are included here as **Result Dates**. A “result date” is commonly captured and utilized within surveillance systems, and may provide information on when finalized test results are available, confirmation of diagnosis, or timeliness of reporting to public health.

However, the importance of the distinction between the two data elements is less clear, and many surveillance systems do not currently capture these data elements separately. The difference between the two elements becomes more relevant in certain situations for performing quality assurance or troubleshooting issues.

Current Usage

The two data elements are distinct in most HL7 ELR messages, but **Specimen Analyzed Date/Time** and **Date/Time of Lab Result** may not be stored separately in some surveillance systems. Paper or other non-ELR reports frequently do not include both the *date a result was reported* and the *specimen analyzed dates* and may not clearly specify *which date* is reflected on the lab result form. Many surveillance systems capture a single ‘result date’ data element that could represent either or both of the two dates, while other systems keep these elements distinct.

Definition and Implementation

Although there may be unusual situations in which the difference between Specimen Analyzed Date and Date/Time of lab result is substantial, for practical purposes, the date that a test is completed/result generated should not vary greatly from the date the result is reported out by the laboratory (especially in the case of electronic test reporting where results can be reported as soon as they are available), and the difference is generally not meaningful in terms of public health surveillance and control.

Laboratory-Related Dates

For this reason, it was the workgroup's view that in systems that do *not* differentiate between the types of 'result date,' the single 'result date' that is captured may be used to populate both 'result date' data elements in both the Lab Interpretive Repeating Group and the Laboratory Template.

For systems that feed ELR data directly into the NNDSS HL7 case notification messages, or for systems in which the two dates are captured as two distinct data elements, the two result dates can be populated accordingly. In systems with two distinct dates, values representing the date the lab result was reported should be used to populate Date/Time of Lab Result in the Lab Interpretive Repeating Group. Values representing the date the specimen was analyzed (the date testing was done) should be used to populate Specimen Analyzed Date/Time in the Lab Interpretive Repeating Group. Jurisdictions with system that differentiate these two dates may find it useful to compare the dates for quality assurance (reporting timeliness) purposes.

If no result date is available, the associated HL7 segment should not be included in the case notification message.

Recommended Implementation: Result Date

Result date may reflect either the date the specimen was analyzed or the date the latest result was released for reporting. If the surveillance system captures and stores the two dates separately, both data elements should be maintained and reported accordingly. If the surveillance system does not differentiate between these two concepts, jurisdictions may choose to use the available date to populate both Specimen Analyzed Date/Time and Date/Time of Lab Result, or populate only one date, leaving the other blank.

Recommended Data Sources

Laboratory-related dates may be obtained from ELR, paper laboratory reports, electronic medical record (EMR) review or via electronic initial case reporting (EICR) or sometimes from provider-submitted reports, other forms of medical records or a provider interview (uncommon). Data from ELR should be the gold standard, as each of these fields is captured distinctly and can be used to populate the HL7 case notification directly. Other sources may be missing some laboratory-related dates or dates may require some clarification as to what information is actually represented by available dates.

Examples of specific scenarios:

- A jurisdictional surveillance system captures specimen collection date and a *single* result date (which may contain either date result generated and/or date result reported). A lab result is

Laboratory-Related Dates

received with a specimen collection date of 3/1/2019, and a “result date” of 3/2/2019. MMG elements should be captured as follows:

- Specimen Collected Date/Time,: 3/1/2019
 - Specimen Received Date/Time: Do not send
 - Specimen Analyzed Date/Time : 3/2/2019
 - Date/Time of Lab Result: 3/2/2019
- A jurisdictional surveillance system captures each of the above dates separately from ELR messages. A lab result is received with a specimen collection date of 3/5/2019, a specimen received date of 3/6/2019, and specimen analyzed date of 3/6/2019, and a results reported date of 3/7/2019. MMG elements should be captured as follows:
 - Specimen Collected Date/Time: 3/5/2019
 - Specimen Received Date/Time: 3/6/2019
 - Specimen Analyzed Date/Time: 3/6/2019
 - Date/Time of Lab Result: 3/7/2019

Laboratory-Related Dates

RECOMMENDED ACTIONS

Data Element	DSWG Recommendations	Recommended Definition
Specimen Collection Date/Time	No changes recommended	Specimen Collection Date/Time should be interpreted as the date a clinical specimen was collected from the patient for the laboratory testing relevant to the disease or condition being reported to a public health agency.
Specimen Received Date/Time	Retire Data Element Specimen Received Date/Time from the Laboratory Interpretive Group in the MMGs	We recommend retiring Specimen Received Date/Time from MMGs using the Laboratory Interpretive Group.
Result Dates	Health departments should consider collecting result date data elements separately as Specimen Analyzed Date/Time (Date result was generated) and Date/Time of Laboratory Report (Date result reported by laboratory) within the surveillance system.	Result date may reflect either the date the specimen was analyzed or the date the latest result was released for reporting. If the surveillance system captures and stores the two dates separately, both data elements should be maintained and reported accordingly. If the surveillance system does not differentiate between these two concepts, jurisdictions may choose to use the available date to populate both Specimen Analyzed Date/Time and Date/Time of Lab Result, or populate only one date, leaving the other blank.

CSTE

1. Provide support for the vetting process and distribution of the final products to the CSTE community.
2. Publish the Data Standardization Brief and supporting documents on the CSTE website in a repository.
3. Data Standardization Work Group and Surveillance Practice and Implementation Subcommittee:
 - a. Promote the Data Standardization Brief and supporting documents on the Surveillance/Informatics Steering Committee and SPIS Subcommittee conference calls.
 - b. Review and update the brief upon changes to the Generic v2.0-based Messaging Mapping Guides.

CDC

1. Incorporate the following changes into any revisions of the Generic v2.0-based Message Mapping Guides, or comparable Generic v3-based guides:
 - a. Retire the Specimen Received Date, as it is infrequently captured or used in surveillance systems.

Laboratory-Related Dates

- b. Include in the Data Element Descriptions a reference to this document for appropriate application.

STATE, TERRITORIAL AND LOCAL HEALTH DEPARTMENTS

1. Review the brief and conduct a gap analysis for each data element to identify differences in the surveillance system implementation and application of the data elements across disease programs.
2. Implement necessary revisions to the surveillance system to address the following:
 - a. Ensure that surveillance system can capture Specimen Collection Date and at least one type of 'result date.'
 - b. Consider collecting result date data elements separately as Specimen Analyzed Date (Date result was generated) and Date of Laboratory Report (Date result reported by laboratory).

(CLINICAL) DIAGNOSIS DATE

BACKGROUND AND OVERVIEW

CURRENT DATA ELEMENT DESCRIPTION IN MMGS

The data element description for the Diagnosis Date in the Generic v2.0 MMG is as follows, “Earliest date of diagnosis (clinical or laboratory) of condition being reported to public health system.”

Data Element Name	Data Element Description	Data Element Identifier	CDC Priority
Diagnosis Date	Earliest date of diagnosis (clinical or laboratory) of condition being reported to public health system.	77975-1	P

For more information on the content and information in MMG columns, including description of the “CDC Priority” options, please refer to the [Generic v2.0 MMG workbook](#), and the tab titled “MMG Column Description”.

The disease-specific MMGs are intended to be used *along with* the Generic v2.0 MMG and thus do not include diagnosis date. Please note, this data element is not included in the Arboviral v1.3 MMG.

DATA ELEMENT IMPORTANCE AND CURRENT USAGE

Importance of the Data Element

Diagnosis Date is a key data element for some jurisdictions and may be used for calculating the exposure period of interest, or for determining the week or year in which a case should be counted, among other uses. However, in other jurisdictions it is used primarily as a component of more complex or hierarchical data elements including when a case should be counted.

Current Usage

Diagnosis Date can be interpreted to represent the date an illness was identified by the healthcare system as the particular notifiable condition, for example the date a pertussis case was identified as pertussis. As the date of clinical diagnosis may not always be available to public health, many jurisdictions currently use other dates, typically laboratory-related, as a proxy for diagnosis, or populate diagnosis date using a hierarchy of available clinical and laboratory dates. Date of clinician diagnosis, Specimen Collection Date, and Test Result Date often contribute to the data in this field.

(Clinical) Diagnosis Date

When Diagnosis Date is determined based on a hierarchy of other dates, there is a great deal of variability and complexity in which dates are considered relevant or contributory for the condition in question. For example:

- Clinical signs and symptoms and patient history may be sufficient for a presumptive diagnosis of some conditions, while for many others a laboratory test result may be required to differentiate a particular reportable condition from other conditions with a similar clinical presentation.
- Ordering of a laboratory test may not always indicate clinical suspicion or presumptive diagnosis of a *specific* reportable condition, since testing is often ordered simultaneously for multiple conditions, so use of Specimen Collection Date as a proxy for Diagnosis Date may not approximate clinical diagnosis in many instances.
- While a test result date may indicate identification of a particular organism or other laboratory findings suggestive of a condition, a true diagnosis requires a clinician interpretation of available clinical and laboratory information.

Hierarchical determination of Diagnosis Date can be based on several different algorithms incorporating any of the data elements mentioned above as well as other dates.

The substantial variability in practice across both jurisdictions and program areas currently limits the utility of Diagnosis Date as a standardized data element and makes interpretation of this data element challenging. Standardization efforts are focused on developing common terminology with a consistent meaning across conditions and jurisdictions, with the goal of standardized data elements that are discrete – clean, simple, and well-defined. For this reason, the workgroup agreed that the Diagnosis Date should represent clinical diagnosis only, while laboratory dates should be captured in separate, discrete data elements.

RECOMMENDED DEFINITION AND IMPLEMENTATION

Recommended Definition: Rename Diagnosis Date to Clinical Diagnosis Date

Diagnosis Date should represent ***clinical diagnosis*** only and is defined as the earliest date that the condition being reported to public health system was diagnosed by a clinician. Other dates relevant to diagnosis, such as laboratory dates, should be captured in separate, discrete data elements.

Recommended Implementation: Clinical Diagnosis Date

In order for **Clinical Diagnosis Date** to represent a discrete, well-defined element, it is recommended that this date be stored as a data element separate from other fields, such as laboratory-related dates, that are sometimes used to populate Diagnosis Date in current practice. Many of these other dates are already typically captured elsewhere in jurisdictional surveillance systems, and jurisdictions may choose to use any combination of date types for internal use as appropriate.

In the Generic v2.0 MMG, Clinical Diagnosis Date has a CDC Priority of *Preferred*, and therefore is not *Required* in the message. Jurisdictions should populate the data element when information is available to meet the above description of the Clinical Diagnosis Date; otherwise, the data element remain NULL in the surveillance system (i.e., should not be populated) and the HL7 segment should not be sent in the case notification message. Jurisdictions may choose to discriminate between missing dates and unknown values if this level of specificity is available in the surveillance system; if so, jurisdictions should follow the Generic v2.0 MMG and send the numeric value "99999999" to indicate *unknown* values rather than omitting the OBX segment. Substitution of another date, or calculation from other dates, is not recommended.

For most condition-specific MMGs, the laboratory-related dates of Specimen Collection Date and Result Date are collected in separate, discrete fields; both are collected in the laboratory template. Collecting clinical and laboratory dates as separate, discrete data elements may provide clarity in terms of which information is available, compared to a single date that could potentially represent a variety of time points. Because laboratory dates are not available for conditions that rely solely on core Generic v2.0 data elements, implementation of this definition of Diagnosis Date may require the addition of one or more laboratory-related data elements to future updates of Generic v2.0 or to Generic v3 in order for those dates to be captured within fields collected by CDC.

Recommended Data Sources

During the course of an investigation, investigators may utilize data from a variety of sources, including case reports from healthcare providers (electronic or not), interviews with a healthcare provider, and medical record/chart reviews. The patient-reported date of diagnosis (even if reflecting diagnosis by a healthcare provider) is not a recommended data source for this element.

Recommended data sources include:

1. Provider report, provider interview, or medical record/chart review
 - a. Date of earliest clinical diagnosis; generally speaking, the earliest date at which a clinician identified the specific condition of interest as a suspected or final diagnosis.
 - b. If multiple conditions are initially suspected (i.e., included in the differential diagnosis), the date of diagnosis should reflect when the particular condition reported to public health was determined to be the most likely diagnosis. For some conditions, this may not occur until laboratory results are available to the clinician to make the diagnosis. In this situation, diagnosis should still represent a clinical date of diagnosis rather than a date from the laboratory report itself.
2. Electronic case reports
 - a. Earliest visit/encounter date associated with an eICR or other electronic case report which includes an ICD10 code or other diagnostic indicator of the particular condition.

Laboratory dates (e.g., Specimen Collection Date, Result Date) should not be used as a proxy for diagnosis and should instead be captured in separate data elements within the MMGs and the surveillance system.

RECOMMENDED ACTIONS

Data Element	DSWG Recommendations	Recommended Definition
Diagnosis Date	<p>Change the Data Element Name to Clinical Diagnosis Date</p> <p>Data element should be a discrete data element reflecting clinical diagnosis and should not be populated from a laboratory date or other field via substitution, calculation, or application of an algorithm.</p>	<p>The earliest date that the condition being reported to public health system was diagnosed by a clinician.</p>

CSTE

1. Provide support for the vetting process and distribution of the final products to the CSTE community.
2. Publish the Data Standardization Brief and supporting documents on the CSTE website in a repository.
3. Data Standardization Work Group and Surveillance Practice and Implementation Subcommittee:
 - a. Promote the Data Standardization Brief and supporting documents on the Surveillance/Informatics Steering Committee and SPIS Subcommittee conference calls.
 - b. Review and update the brief upon changes to the Generic Messaging Mapping Guide.

CDC

1. Incorporate the following changes into any revisions of the Generic v2.0-based Message Mapping Guides, or into Generic v3:
 - a. Revise the Diagnosis Date data element
 - i. Change the Data Element Name to **Clinical Diagnosis Date**
 - ii. Revise the Data Element description to “Earliest date that the condition being reported to public health system was diagnosed by a clinician.”
 - iii. Revise the HL7 Implementation Note to “For unknown date (distinct from missing date), OBX-5 **MAY** be populated with ‘99999999’.”
 - iv. Include in the Data Element Description a reference to this document for appropriate application.
 - b. Consider adding laboratory dates that have commonly been used to populate Diagnosis Date, such as first Specimen Collection Date for the first positive test for the condition being reported or First Positive Result Date, to the Generic v2.0 MMG core set of data elements. These laboratory dates may be relevant for CDC, or may be needed for

(Clinical) Diagnosis Date

calculated dates such as an Event Date or for identifying when cases should be counted, but should be discrete from the Clinical Diagnosis Date.

STATE, TERRITORIAL AND LOCAL HEALTH DEPARTMENTS

1. Review the brief and conduct a gap analysis for each data element to identify differences in the surveillance system implementation and application of the data elements across disease programs.
2. Implement necessary revisions to the surveillance system to address the following:
 - a. Data element should not be *Required*; NULL values should be allowed.

REFERENCES & RESOURCES

- Centers for Disease Control and Prevention (CDC) NNDSS Modernization Initiative (NMI):
<https://www.cdc.gov/nmi/>
- Message Mapping Guides:
<https://wwwn.cdc.gov/nndss/case-notification/message-mapping-guides.html>
- MMG Related Documentation:
<https://wwwn.cdc.gov/nndss/case-notification/related-documentation.html>
- Lab Repeating Group Template:
https://wwwn.cdc.gov/nndss/document/Laboratory%20Template_R1_20180511.xlsx
- CSTE Position Statements:
<https://www.cste.org/page/PSInfo>
- Surveillance Case Definitions for Current and Historical Positions:
<https://wwwn.cdc.gov/nndss/conditions/>

Appendix

APPENDIX: 2019 CSTE DATA STANDARDIZATION WORK GROUP MEMBERS

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