

The National Center for Immunization and Respiratory Diseases

Notes for Implementation of Message Mapping Guides*

Implementation of the message mapping guides (MMGs) for the conditions for which the National Center for Immunization and Respiratory Diseases (NCIRD) provides subject matter expertise strengthens the National Notifiable Diseases Surveillance System (NNDSS). In addition, MMG implementation supports two separate but related aspects of surveillance: 1) modification of jurisdiction processes to collect epidemiologically important data elements and valid values, especially as surveillance needs change (e.g., modified case definitions, new interventions); and 2) modernization of case notifications to Health Level 7 (HL7) standards.

ACIP Recommendations

- The data element "Was the subject vaccinated as recommended by ACIP?" (VAC148) is intended to indicate whether a case has received routine or other recommended vaccine doses according to the Advisory Committee on Immunization Practices (ACIP) schedules. To respond to VAC148, use the ACIP vaccine schedule recommended at the time of case investigation. The ACIP recommendations are updated each year and are available online [here](#).
 - ACIP recommendations often indicate a range of recommended ages for a specific dose in a series to be administered (e.g., between 12 and 15 months old). According to ACIP recommendations, if a case has received the appropriate number of doses for their age and vaccine history (e.g., routine or delayed schedule) in the ACIP recommended time interval(s), then the case has been vaccinated per ACIP recommendations, and the response for VAC148 would be "Yes." Cases who are too young for any doses and cases who have not yet received the subsequent dose in a series, but are within the age range for the next recommended dose, are also considered to have been vaccinated per ACIP recommendations.
 - If data are not available to support a response of "yes" or "no," "unknown" should be entered.
- Value sets that are included in multiple MMGs may contain valid values for multiple scenarios and conditions (e.g., vaccine types, reasons not vaccinated per ACIP recommendations), allowing for harmonization of the value sets across MMGs/pathogens. Jurisdictions are encouraged to apply epidemiologic discretion to respond as most appropriate under jurisdiction-specific guidance/policies.
- ACIP provides disease-specific recommendations for outbreak scenarios for patients at risk of exposure. If a case has received additional doses for a vaccine in response to an outbreak or potential exposure, refer to the ACIP outbreak guidelines when determining if a case has been appropriately vaccinated. If a case has received additional doses of vaccine during an outbreak as directed in outbreak recommendations from ACIP, then the appropriate response to VAC148 would be "Yes."
- Case investigators should consult the jurisdiction's Immunization Program for interpretation of case-specific situations regarding compliance with ACIP recommendations.

Antimicrobial Susceptibility Testing

- The concept "Antimicrobial Susceptibility Testing" is included in the Respiratory and Invasive Bacterial Diseases (RIBD) MMGs, as both a unique data element in the Drug Susceptibility/Resistance repeating group (data element identifier LABAST6) and a coded response to "Test Type" (INV290) in the value set [PHVS_LabTestType_RIBD](#). If antimicrobial susceptibility testing was done for a case, jurisdictions should include this in the case notification by:
 - a) Indicating "Antimicrobial Susceptibility Testing" (valid value LABAST6) as the response for "Test Type" (INV290) in the Epidemiology and Laboratory (Epi/Lab) repeating group; and
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- b) Indicating “Yes” as the response for “Was any susceptibility test data available” (LAB222), designating the antimicrobial agent as the response for “Antimicrobial Susceptibility Test Type” (data element identifier LABAST6) in the Drug Susceptibility/Resistance repeating group.
- Jurisdictions should include all other related and available data for the remaining data elements in the Epi/Lab and Drug Susceptibility/Resistance repeating groups.
 - a) Note that all data elements in the Epi/Lab Repeating Group (e.g., “Test Method” [85069-3], “Test Result” [INV291]) may not have valid values when antimicrobial susceptibility testing is done for a case (i.e., “Test Type” [INV290] is “Antimicrobial Susceptibility Test” [valid value LABAST6]). Therefore, jurisdictions should indicate “Other” for the responses to these data elements and specify the appropriate information in a text field (i.e., OBX-5.9).
- The chart below provides appropriate responses to the data elements regarding laboratory information and antimicrobial susceptibility testing information when susceptibility data are available and when they are not available.

Data Element	Response	
	Yes	No
“Was any susceptibility test data available?” (LAB222)	Yes	No
“Test Type” (INV290)	Antimicrobial susceptibility Test Type (LABAST6)	Indicate lab test type(s) (valid value set PHVS_LabTestType_RIBD)
“Antimicrobial Susceptibility Test Type” (LABAST6)	Indicate antimicrobial agent (valid value set PHVS_ARAgent_RIBD)	No response
Data elements within Epi/Lab repeating group for which no appropriate valid values are included in value set	“Other,” specifying the appropriate information in a text field (i.e., OBX-5.9)	Indicate appropriate information (e.g., from valid value sets) as requested
Data elements within Epi/Lab repeating group for which appropriate valid values are included in value set	Indicate appropriate information (e.g., from valid value sets) as requested	Indicate appropriate information (e.g., from valid value sets) as requested

Change Requests

- Requests for clarification and recommendations regarding change requests can be sent to NCIRDSurvData@cdc.gov.
- NCIRD will provide guidance on mapping any variable(s) affected by change requests (e.g., map data to “other” until more specific value is added).

Comments Section

- Additional relevant information related to a case that is not addressed in the current MMGs may be communicated in the Generic v2 MMG as a response for “Comments” (77999-1).

Confirmation Date

- The data element “Confirmation Date” (INV162) in the measles, rubella, and CRS MMGs is intended to capture the date on which the jurisdiction classified the case as “confirmed,” according to the CSTE case definition. This date should represent the date that the method indicated in “Confirmation Method” (INV161) was used to determine the public health case classification. Jurisdictions should use epidemiologic discretion to determine the appropriate method and corresponding date, when providing responses to “Confirmation Date” (INV162) and “Confirmation Method” (INV161).

Data Elements Requesting Similar Information

- Throughout the MMGs, there are certain data element “pairs” that request similar information for a case (e.g., “Number of Weeks Gestation at Onset of Illness” and “Trimester at Onset of Illness”). In these situations, both options are included in the MMG to accommodate differences in data collection across jurisdictions. Jurisdictions are encouraged to transmit the field that is most suited to their systems.

Dates

- Send dates in YYYYMMDD format, as noted in the MMGs.
- For non-repeating data elements that request a single date for events that could occur on more than one occasion (e.g., “Date of Mother’s Tdap Administration” [MTH172], “Year of Previous Immunity Testing” [85692-2]), jurisdictions should use epidemiologic discretion to determine which date should be included in the case notification.
- Jurisdictions should use epidemiologic discretion to determine appropriate values for dates for which there is not yet a standard definition (e.g., “Illness end date” [77976-9]). Jurisdictions should communicate their strategies for these situations (e.g., calculations, timelines for system changes) to NCIRD through the Implementation Spreadsheets.

Data Transmission for Conditions That Are Not Reportable in Jurisdiction

- Implementation of MMGs for diseases/conditions that are nationally notifiable or under standardized surveillance but are not reportable in the jurisdiction will not be required for national surveillance (i.e., NNDSS). However, if the jurisdiction has the authority to collect and submit those data, NCIRD will accept and use any transmitted data for which NCIRD has received OMB/PRA approval.

Disease Importation

- There are multiple data elements that describe whether a case likely acquired the disease or condition within the U.S. or internationally, each of which has a unique intent.
 - “Case Disease Imported Code” (77982-7) in the Generic v2 MMG: This data element is intended to indicate specifically where the disease was likely acquired (e.g., within the jurisdiction, out of jurisdiction, international). This information is important for understanding the epidemiology of each case.
 - “Import Status” (INV293) in the mumps, measles, and rubella MMGs: This data element is intended to indicate if the case was likely to have acquired the disease internationally, based on the timing of symptom onset after entering the U.S. This data element is used in conjunction with molecular epidemiology information to provide a clear understanding of the impact of travel on disease transmission and spread.
 - “U.S. Acquired” (INV516) in the CRS, mumps, measles, and rubella MMGs: This data element is intended to support further sub-classification (e.g., endemic case, imported-virus case, import-linked case) of cases who acquired the disease in the U.S. For cases who are traceable to international import, this data element indicates specifically how a case was determined to be traceable (e.g., imported-virus case, import-linked case).
 - “Traceable to International Import” (INV286) in the measles and rubella MMGs: This data element is intended to indicate if a US-acquired case was traceable to a case that acquired the disease internationally. If the case itself acquired the disease internationally, the case would

not be considered “traceable to an international import” (i.e., answer “No” to “Traceable to International Import”).

History of Disease (For Vaccine-Preventable Diseases)

- Because history of disease is not specifically addressed in the following vaccine-preventable disease-specific MMGs, that information may be communicated as follows for the specified conditions:
 - Pertussis: History of pertussis disease may be communicated through “Comments” (77999-1) in the Generic v2 MMG.
 - Mumps, Measles, Rubella, CRS: History of these diseases may be communicated through “Vaccine History Comments” (VAC133) in the condition-specific MMG.
- History of disease is specifically addressed in the current versions of the other vaccine-preventable disease-specific MMGs.

Industry and Occupation Repeating Group

- Since workers may be exposed to infectious diseases through their jobs, it is important to use standard methods to collect work information. The MMGs include four data elements that describe the job(s) of a case: “Current Occupation” (85658-3), “Current Occupation Standardized” (85659-1), “Current Industry” (85078-4), and “Current Industry Standardized” (85657-5).
 - “Current Occupation” refers to the type of job that the case has most recently been doing, whether paid or unpaid (e.g., volunteer).
 - If a case has more than one current job, collect information on each job separately.
 - To prompt the respondent, it is recommended that jurisdictions use the question, “What kind of work do you do?” and list some examples to demonstrate the level of specificity required for this response (e.g., registered nurse, janitor, cashier, auto mechanic, barber, civil engineer, volunteer firefighter).
 - If a case is not currently employed, an appropriate response to “Current Occupation” would be “not employed” or “not working.”
 - If a case is a volunteer, this should be indicated in the response to “Current Occupation” (85658-3) by including text specifying “volunteer” (e.g., zoo volunteer, school volunteer, library volunteer).
 - “Current Industry” refers to the kind of business or industry in which the case works – not the name of the employer (e.g., indicate “fast-food service,” not the name of the restaurant).
 - If a case has more than one current job, collect information on each job separately.
 - To prompt the respondent, it is recommended that jurisdictions use the question, “What kind of business or industry do you work in?” and list some examples to demonstrate the level of specificity required for this response (e.g., a hospital, dairy farm, restaurant, trade school, library).
 - If a case is not currently employed, an appropriate response to “Current Industry” (85078-4) would be “not employed” or “not working.”
 - If a case is a volunteer, text specifying the industry in which the case volunteers should be indicated in the response to “Current Industry” (85078-4).
- For more information about collecting and coding industry and occupation data, see www.cdc.gov/niosh/topics/coding/default.html.
- Jurisdictions may collect/submit the free text fields “Current Occupation” and “Current Industry,” understanding that case occupation and industry may be described in non-standardized ways. When resources allow, the NIOSH Industry and Occupational Computerized Coding System (NIOCCS) should be used to convert the text response to

standard codes for analysis. NCIRD recommends jurisdictions review the NIOSH “Collecting and Using Occupation Data” [webpage](#).

Laboratory Confirmed

- The MMGs for which NCIRD provides subject matter expertise may contain two data elements related to laboratory testing: “Was laboratory testing done to confirm the diagnosis?” (LAB630) and “Was the case laboratory confirmed?” (INV164). These data elements represent related but distinct concepts:
 - LAB630 addresses whether any diagnostic testing was done, which may include specimens and test methods that are not appropriate for use in public health case classification, especially to confirm a case.
 - INV164 addresses public health case classification, specifically whether the case is or is not confirmed by laboratory testing. An answer of “Yes” to INV164 should be given only if the case meets the confirmatory laboratory evidence as defined in the CSTE case definition. Refer to the condition-specific chapters and the “Laboratory Support for Surveillance of Vaccine-Preventable Disease” chapter in the [Manual for the Surveillance of Vaccine-Preventable Diseases](#) for information on testing methods required for laboratory confirmation. INV164 allows distinction between case classifications when analyzing case counts and describing epidemiologic trends.
 - The differences in these concepts can be seen for diagnostic tests that do not support “confirmed” case classifications but do allow “suspected” or “probable” case classifications (i.e., tests that indicate infection but are not confirmatory tests). Therefore, cases may have a response of “Yes” for LAB630 if laboratory testing was done for clinical diagnosis, but also have a response of “No” for INV164 if the testing did not meet the CSTE criteria for “laboratory confirmed.”
- Electronic linkages between public health laboratory information systems and jurisdiction surveillance systems may provide context for interpretation of case data (e.g., interpretation of INV164 and LAB630 when a jurisdiction is notified of a case only when confirmatory laboratory testing was performed). Although an algorithm could impute a response of “Yes” for either of these data elements if any laboratory data are provided in the case notification, laboratory data are often missing, especially early in the investigation. Therefore, it would not be appropriate to impute a response of “No” for these data elements when no laboratory data are entered. NCIRD has consequently assigned priority 1 (“highest”) designations to these data elements as NCIRD appropriately does not apply an algorithm to impute these responses.

Legacy Format/Supplemental Data for Cases of Nationally Notifiable Conditions

- NCIRD is committed to supporting the use of the MMGs for transmitting case notification data via HL7 messages for nationally notifiable conditions. The long-term goal is for jurisdictions to fully implement HL7 MMGs for sending case data in place of other methods (e.g., spreadsheets for Tier II ELC “Enhanced VPD Surveillance” projects). Full implementation includes updating surveillance systems and necessary interfaces to support the collection and transmission of all data elements noted as priority 1 (“highest”) and priority 2 (“high”) in the NCIRD Data Element Priority Lists, available on the [NNDSS MMGs and Artifacts webpage](#).
 - The expectation is that all NNDSS data previously collected via supplemental data streams will be incorporated into the HL7 message as a component of system updates and full implementation of the MMG. If supplemental data streams require information not currently included in the MMGs (e.g., changes to case definitions or epidemiology of a disease), jurisdictions will continue to send
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data via the supplemental data streams until the development and implementation of an updated MMG is completed.

- Although there will be individual cases for whom certain data elements are not available, the requirement is for MMG implementation to include structure and content that supports the collection and transmission of those data.
- In circumstances where a jurisdiction needs additional time to build the capacity to collect and transmit certain priority 1 (“highest”) and priority 2 (“high”) data elements, the jurisdiction may continue collecting and submitting data via the supplemental data streams until the jurisdiction can transmit this information via HL7 messages.

Measures and Unit Pairs

- Both a measure and the associated units should be captured (e.g., temperature and temperature units); however, if the units are not available, then a measure can be sent with an “Unknown” value for units until the system interface is updated to include the units.

Pregnancy Outcome

- The data element “Pregnancy Outcome” (63983-2) is intended to describe pregnancy-associated infections, if the case is pregnant or postpartum during the illness or during the case investigation. If the case is still pregnant at the completion of the case investigation, no additional long-term follow up by the jurisdiction is required to determine the outcome of the pregnancy.

Priority Data Elements

- Data element priority lists that indicate the NCIRD prioritization of the MMG data elements, as guidance for inclusion in reporting and case notification systems for surveillance, are published on the [NNDSS MMGs and Artifacts webpage](#) under the relevant MMG(s). These data element priority lists provide guidance to jurisdictions for updating surveillance system capability to collect the priority data elements and transmit these data elements in HL7 case notifications. The CDC Priority in the MMG format is being updated to reflect these priorities using the R, 1, 2, 3 designation, where priority 1 corresponds to “highest” priority and priority 2 corresponds to “high” priority data elements.
- Jurisdictions should use the Implementation Spreadsheets provided by the CSELS onboarding team to indicate which data elements are or will be collected and transmitted in HL7 case notifications. NCIRD recognizes that there is variability in jurisdiction systems and processes for adding data elements to their surveillance systems and for transmission to CDC. Therefore, jurisdictions should include the information listed below in their Implementation Spreadsheet. NCIRD will work with jurisdictions to identify resources to support the inclusion of data for all priority 1 (“highest”) and priority 2 (“high”) data elements in the HL7 case notifications.
 - For each priority 1 (“highest”) data element marked as “not collected” in the Implementation Spreadsheet(s), jurisdictions should include a **timeline** for future inclusion of the data element in the collection and transmission of HL7 case notifications (e.g., “jurisdiction will update systems/transmission by {month/year},” “jurisdiction will bring data element to change control board by {month/year}”).
 - For each priority 2 (“high”) data element marked as “not collected” in the Implementation Spreadsheet(s), jurisdictions should include a brief **plan** for future inclusion of the data element in the collection and transmission of HL7 case notifications (e.g., “jurisdiction will work with NCIRD to request/identify resources to support the activities that would be required to provide this information”).

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- For any data elements that will not be added under any circumstances, jurisdictions should include the reason (e.g., “jurisdiction does not have legal authority to collect this information”).
 - If the implementation of certain priority 1 (“highest”) and priority 2 (“high”) data elements is expected to be delayed, NCIRD may approve “onboarding with contingencies” based on the action items and timelines indicated in the Implementation Spreadsheet. Onboarding with contingencies allows the jurisdiction to complete the onboarding process and proceed to production but may require alternate data submission processes for those data elements. Additionally, the dates provided in the Implementation Spreadsheet will inform NCIRD follow-up on progress and support the continued assessment of resource needs. The alternate data submission process and progress checks will remain in place until the jurisdiction has fully implemented the MMG(s) by updating surveillance systems and necessary interfaces to support the collection and transmission of priority 1 (“highest”) and priority 2 (“high”) data elements.
 - If there is no standard disease-specific definition for a priority 1 (“highest”) or priority 2 (“high”) data element in the current MMG or associated value sets, NCIRD defers to jurisdictions’ epidemiologic discretion for determining the appropriate responses for the data element(s). Jurisdictions should communicate their strategies for these situations to NCIRD through the Implementation Spreadsheets, including calculations and criteria.
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Specimens Sent to VPD Reference Centers

- The four VPD Reference Centers (CA DPH, MN DOH, NYS DOH-Wadsworth, and WI State Lab of Hygiene) conduct viral and bacterial testing for jurisdictions’ public health laboratories as agents of NCIRD using the same test methodologies as CDC laboratories.
 - The data element “Specimen Sent to CDC” (82314-6) is intended to distinguish between the test methodologies performed by CDC/VPD Reference Centers and other (non-CDC) laboratories.
 - If a specimen is sent to either CDC or one of the four VPD Reference Centers, it is considered to have been sent to CDC for testing, and the appropriate response to “Specimen Sent to CDC” (82314-6) would be “Yes” (i.e., the specimen was sent to CDC for testing).
 - The data element “Performing Lab Type” (82771-7) is intended to distinguish between tests performed at CDC or the CDC-supported VPD Reference Centers and other (non-CDC) laboratories, such as state/local laboratories or commercial laboratories, for logistical purposes (e.g., turnaround time, programmatic work distribution).
 - The appropriate response to “Performing Lab Type” (82771-7) would be “VPD Testing Laboratory” (PHC1316) for test results from one of the four VPD Reference Center laboratories. The appropriate response to “Performing Lab Type” (82771-7) for laboratory results received from any other state- or locally-run laboratory providing public health specimen testing would be “Public Health Laboratory” (PHC643).
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Test Case Scenarios

- The test case scenarios are designed to create situations that identify potential challenges with data entered in the electronic data system(s). When developing the HL7 test messages, NCIRD requests that jurisdictions submit data that match as closely as possible the information requested in the Test Case Scenario Worksheet.
 - If a jurisdiction implements business rules in their surveillance system that limit potential data entry errors, preventing the transmission of test messages which are exactly matched to the test case scenarios, then the jurisdiction should send an alternate value that is as close as possible to the
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value(s) requested in the test case scenarios. Please note the intent for this difference in the Test Case Scenario Worksheet when submitting to CDC for review.

Travel-Related Questions

- Travel-related questions often do not have a specific timeframe stipulated in the question. This structure was used to harmonize the question within and among MMGs. When mapping this information, jurisdictions should use epidemiologic discretion by applying time frames relevant to the condition (e.g., the most recent travel dates within the exposure period for a mumps case; maternal travel destinations/dates within the first trimester of a mother's pregnancy for a congenital rubella case).
 - The data element "Date of Return from Travel" (TRAVEL08) is intended to collect the date a case returned to the U.S. from any international travel, whether from a single country or multiple countries.
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Vaccine Information

- NCIRD encourages jurisdictions to capture the entire date(s) of vaccine administration (month, day, and year). If the day of vaccine administration is not available, the jurisdiction should include all available information in the case notification to CDC, using the 15th of the month for the missing "day" component of the date. If either the month or the year of vaccine administration is not available, the jurisdiction should submit the date as "99999999" (a string of 8 "9s").
 - Jurisdictions should count only valid doses when assessing the number of doses a case received prior to illness onset ("Vaccination Doses Prior to Onset" [82745-1]) or the dose number of a vaccine in a series ("Vaccine Dose Number" [30973-2]). A dose should not be considered valid when the information for "Vaccine Administered Date" (30952-6) and "Vaccine Type" (30956-7) are not available.
 - When assessing how many pathogen-specific doses a case received prior to illness onset for the data element "Vaccination Doses Prior to Illness Onset" (82745-1), jurisdictions should use epidemiologic discretion to determine likely onset dates if the illness onset date is not available for a case (e.g., base response on symptom onset and incubation period). If applicable, use the "Vaccine History Comments" data element (VAC133) to provide any additional relevant case information (e.g., receipt of a pathogen-specific vaccine during the potential incubation period).
 - NCIRD encourages jurisdictions to submit all reported vaccine administration dates in the HL7 messages; however, NCIRD defers to the jurisdiction for acceptance of non-immunization information system (IIS) vaccine administration dates (e.g., recalled dates or dates from a handwritten childhood immunization book). Responses to "Vaccine Event Information Source" (VAC147) are considered when interpreting the data.
 - "Vaccine Event Information Source" (VAC147) is assigned priority 1 ("highest") as it indicates the reliability of case immunization records. When reviewing a case immunization record, vaccine events should be assessed in the context of the reliability of the information source (e.g., immunization card, parent's recollection). Guidance related to vaccine information source can be found in the ["HL7 Implementation Guide for Immunization Messaging"](#) and by reviewing the business rules from the [American Immunization Registry Association \(AIRA\)](#). Case investigators should consult jurisdiction Immunization Program and/or Epidemiology Program colleagues for assistance in determining the reliability of vaccine information sources.
 - While the entire "Vaccination History" repeating group is of highest priority, some specific elements within the repeating group may be considered as lower priority if the reporting system is not yet
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linked to an IIS (i.e., “Vaccine Lot Number” (30959-1), “Vaccine Expiration Date” (VAC109), “National Drug Code (NDC)” (VAC153), and “Vaccination Record Identifier” (VAC102)). Jurisdictions should consider implementation of electronic linkages between their NNDSS and IIS systems, to support completeness of vaccine history data in case notifications for vaccine-preventable diseases.

- The National Drug Code (NDC) from the vaccine’s bar code may be used to obtain the brand name, type, and manufacturer of the vaccine. If a jurisdiction can capture the NDC (VAC153) and the NDC is provided for a case’s vaccine history, the jurisdiction may use the NDC to impute the “Vaccine Type” (30956-7), “Vaccine Manufacturer” (30957-5), and “Vaccine Name” (VAC155) of the dose.
- Either an IIS or non-electronic data source may be used to populate information requested in the “Vaccine History” repeating group. Additional guidance for using an IIS to populate vaccine history information can be found in the following guides:
 - [“Clinical Support for Immunization \(CDSi\): Logic Specification for ACIP Recommendations”](#)
 - [“HL7 Version 2.5.1: Implementation Guide for Immunization Messaging”](#)

Value Sets

- Some data elements in the MMGs for which NCIRD provides subject matter expertise include value sets that contain valid values for multiple conditions (e.g., Lab Test Type [RIBD], Specimen Type [VPD], Microorganism [RIBD]). Jurisdictions can refer to existing condition-specific worksheet guidance for valid values when responding to these data elements. NCIRD defers to jurisdictions’ epidemiologic discretion for determining the appropriate responses for these data element(s) from among the coded values in the value sets.
- Some data elements in the MMGs for which NCIRD provides subject matter expertise include value sets that do not contain all appropriate responses to data element. In situations where data are requested but a valid value is not available, jurisdictions should indicate “Other” and specify the value in the text field (i.e., OBX-5.9).
- In situations where a legacy value represents multiple concepts (e.g., “arthritis/arthralgia” for rubella cases in NETSS) and the HL7 valid values include unique values for each concept represented (e.g., “Arthritis” [3723001] and “Arthralgia” [57676002] in [PHVS SignsSymptoms Rubella](#)), jurisdictions should adjust their data collection and data entry interface to collect and transmit the concepts separately, to match the HL7 valid values. Until the concepts have been separated, jurisdictions may map the combined value to “Other” and specify the appropriate value in OBX-5.9. Jurisdictions should provide a time frame as to when the separate values will be added for the collection and transmission of this data.

Condition-Specific Questions

Congenital Rubella Syndrome (CRS)

- **“Industry and Occupation” Repeating Group**
 - CRS cases are most often diagnosed and reported at an early age. However, case patients may reach adulthood and, therefore, may be employed. Although rare, a health care provider for that adult could report the CRS case in their care. Therefore, although the information for industry and occupation will be largely missing for CRS cases, the data elements within the Industry and Occupation repeating group may be populated with case-specific information.
- **“Number of Children in Household” Data Elements (85722-7, 85721-9, and 85720-1)**
 - Responses to the CRS MMG data elements “Number of Children Less Than 18 Years of Age Living in Household During This Pregnancy” (85722-7), “Were Any of the Children Living in the Household Immunized With Rubella-Containing Vaccine” (85721-9), and “Number of Children Less Than 18 Years of Age Immunized With the Rubella Vaccine” (85720-1) should include all children living in the mother’s household during the pregnancy, whether biologically related or not.
- **“Vaccination History” Repeating Group**
 - The data elements within the “Vaccination History” repeating group of the CRS MMG request information regarding the mother’s vaccine history.

COVID-19

- **Data Elements Regarding ACIP Recommendations for COVID-19 Vaccination**
 - The data element “Was the subject vaccinated as recommended by ACIP?” (VAC148) is intended to indicate whether a case has received routine or other recommended vaccine doses according to the Advisory Committee on Immunization Practices (ACIP) schedules. To respond to VAC148 for COVID-19, use the ACIP vaccine schedule recommended at the time of case investigation, available online at the [ACIP COVID-19 Recommendations](#) webpage. Case investigators should consult the jurisdiction’s Immunization Program for interpretation of case-specific situations regarding compliance with ACIP recommendations. However, if data are not available to support a response of “yes” or “no,” “unknown” should be entered.
- **“Vaccine History” Repeating Group**
 - NCIRD recommends that jurisdictions adjust their data collection and data entry interface to collect and transmit the vaccine history concepts to match the HL7 data structure and valid values. The vaccine history repeating group is harmonized from the MMGs for other vaccine-preventable diseases for which NCIRD provides subject matter expertise (e.g., mumps, pertussis, varicella) and is designed to support electronic consumption of the HL7 data from jurisdictions’ Immunization Information Systems to best support jurisdictions’ ability to efficiently send this information.
 - The CVX codes for the vaccines approved for use to prevent COVID-19, in addition to the HL7 mapping information for other related vaccine history data, are included in the value sets within the MMG. These value sets include information that can also be found on the “IIS: HL7 Standard Code Set Mapping product names to CVX and MVX” [webpage](#). Jurisdictions may use the table provided on that webpage to search for a particular manufacturer, MVX code, product name, vaccine type, or CVX code (e.g., Moderna US, Inc; MVX code “MOD”; product name “Moderna COVID-19 vaccine”; vaccine type “COVID-19, mRNA, LNP-S, PF, 100 mcg/0.5 mL dose”; CVX code 207). Jurisdictions may refer to this webpage or to the value sets to identify

the appropriate HL7 values for the data elements in the “Vaccine History” repeating group of the COVID-19 message mapping guide.

- **“Interpreter” (54588-9)**
 - An interview conducted in any language other than English during COVID-19 case investigation would be considered to have used a translator, and jurisdictions should indicate this by providing a “Yes” response for the COVID-19 MMG data element “Interpreter” (54588-9). Jurisdictions should also specify the interpretation language, using the COVID-19 MMG data element “Primary Language” (DEM142).
- **“Current Smoker” and “Former Smoker” (valid values for “Patient Epidemiological Risk Factors,” INV117)**
 - The definition of smoking includes consumption of tobacco (or nicotine) through combustible tobacco products (e.g., cigarettes) or electronic nicotine delivery systems (e.g., vapes or e-cigarettes). It does not include chewing tobacco. Smoking of substances other than tobacco (e.g., marijuana) should be indicated by the response “Substance abuse or misuse.”
- **Targeted Submission of Vaccine History in COVID-19 Case Notifications**
 - CDC offers jurisdictions the opportunity to transmit COVID-19 vaccine history data (i.e., the “Interpretive Vaccine History” section and the “Vaccine History” repeating group) through the COVID-19 MMG without initially including the other (non-vaccine) sections of the MMG (i.e., onboarding the “COVID Lite” format). However, other than this onboarding of the “COVID Lite” format (which includes Generic V2 data elements in addition to the vaccine history sections listed above), NCIRD does not anticipate approval for any partial (“stepwise”) onboarding processes for the non-vaccine history-related sections in the COVID-19 MMG. Additionally, NCIRD does not anticipate approval for partial (“stepwise”) onboarding for any of the other MMGs for which NCIRD provides subject matter expertise.

Mumps

- **“Salivary Gland Swelling Duration in Days” (85929-8)**
 - The mumps MMG data element “Salivary Gland Swelling Duration in Days” (85929-8) refers to the swelling of any salivary gland (parotid, sublingual, or submandibular) and is intended to capture the swelling duration that can occur in cases, to evaluate vaccine efficacy for under-vaccinated cases or cases who have received a third dose.
- **“Vaccinated per ACIP Recommendations” (VAC148)**
 - Within mumps case notifications, jurisdictions should focus on the routine 2-dose series when responding to the questions regarding ACIP recommendations. However, if a case has received additional doses of vaccine during an outbreak as directed in outbreak recommendations from ACIP, then the appropriate response to VAC148 would be “Yes.”

Neisseria meningitidis

- **“Homeless” (32911000)**
 - For the data element “Homeless” in the *N. meningitidis* MMG, use the current Department of Housing and Urban Development definition, available [here](#). This data element supports understanding of case epidemiology, and it is only applicable to the status of the case at symptom onset.

Pertussis

- **Isolation of Species Other than *B. pertussis***

- The current value set for “Test Result” (INV291) in the pertussis MMG ([PHVS LabTestInterpretation Pertussis](#)) contains valid values for species other than *B. pertussis* (i.e., “*B. parapertussis*,” “Bordetella species, not *B. pertussis* and not *B. parapertussis*”). If a Bordetella species other than *B. pertussis* was isolated and the jurisdiction wishes to include this information in a pertussis case notification, the jurisdiction should submit laboratory data for this test—indicating the identified species in the response for “Test Result” (e.g., “*B. parapertussis*”)—in addition to the laboratory data indicating the information about test(s) and test result(s) for *B. pertussis*.

Rubella

- **“Birth Result” Section**

- The rubella MMG data elements “At the time of cessation of pregnancy, what was the age of the fetus” (85719-3), “Was an Autopsy Performed” (85699-7), and “Result of Autopsy” (85691-47) in the “Birth Result” section refer to the infant, if the case of the disease was pregnant.

- **“Diagnosed with the Condition Before” (85697-1)**

- The rubella MMG data element “Diagnosed with the Condition Before” (85697-1) is intended to indicate whether a mother who is either currently pregnant or has given birth to an infant presenting with CRS-like symptoms has been diagnosed with rubella in the past. Responses to this data element help assess whether CRS may need to be considered if the infant is presenting with CRS-like symptoms.
- Since this data element pertains to the mother of a newborn infant, it is likely that the mother is not pregnant at the time of the interview. Therefore, this question should be answered for either a pregnant female or a non-pregnant female that, at the time of the interview, had recently given birth.

- **“Expected Place of Delivery” (85712-8)**

- The rubella MMG data element “Expected Place of Delivery” (85712-8) does not have an assigned valid value set and allows for text responses. Anticipated responses to this data element are based on the [LOINC answer list](#), though may include other data, as the data type of the response field is a string of up to 199 characters for HL7 messages.

- **“Part of Outbreak” (INV963)**

- The rubella MMG data element “Part of Outbreak” (INV963) is specific to an outbreak of 3 or more rubella cases. The ability to distinguish if the outbreak was of 3 or more cases supports the understanding of the epidemiology of rubella in the U.S.

Varicella

- **“Type of Case This Case is Epi-linked to” (VAR155)**
 - Responses to “Type of case this case is epi-linked to” (VAR155) in the varicella MMG should indicate the case status of the other case (Case B) as it is at the time of investigation of the case of interest (Case A). The chart below provides the appropriate responses for VAR154 and VAR155 for varicella cases epi-linked to other varicella cases.

Case A	“Case A Class Status Code” (77990-0)	Response to “Is this case (Case A) epi-linked to another confirmed or probable case?” (VAR154)	Response to “Type of case this case (Case A) is epi-linked to” at the time of investigation of Case A (VAR155)
No epi-link	Probable (2931005)	No	Blank
Epi-link to probable case	Confirmed (410605003)	Yes	Probable Varicella Case (PHC168)
Epi-link to confirmed case	Confirmed (410605003)	Yes	Confirmed Varicella Case (PHC166)

Additional Questions and Assistance

Contact NCIRD at NCIRDSurvData@cdc.gov for any additional disease program-related questions. Contact CSELS at edx@cdc.gov for any technical questions.

*This document is applicable for the nationally notifiable conditions for which NCIRD provides subject matter expertise and for which there is a condition-specific MMG.