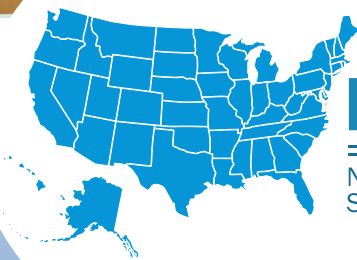
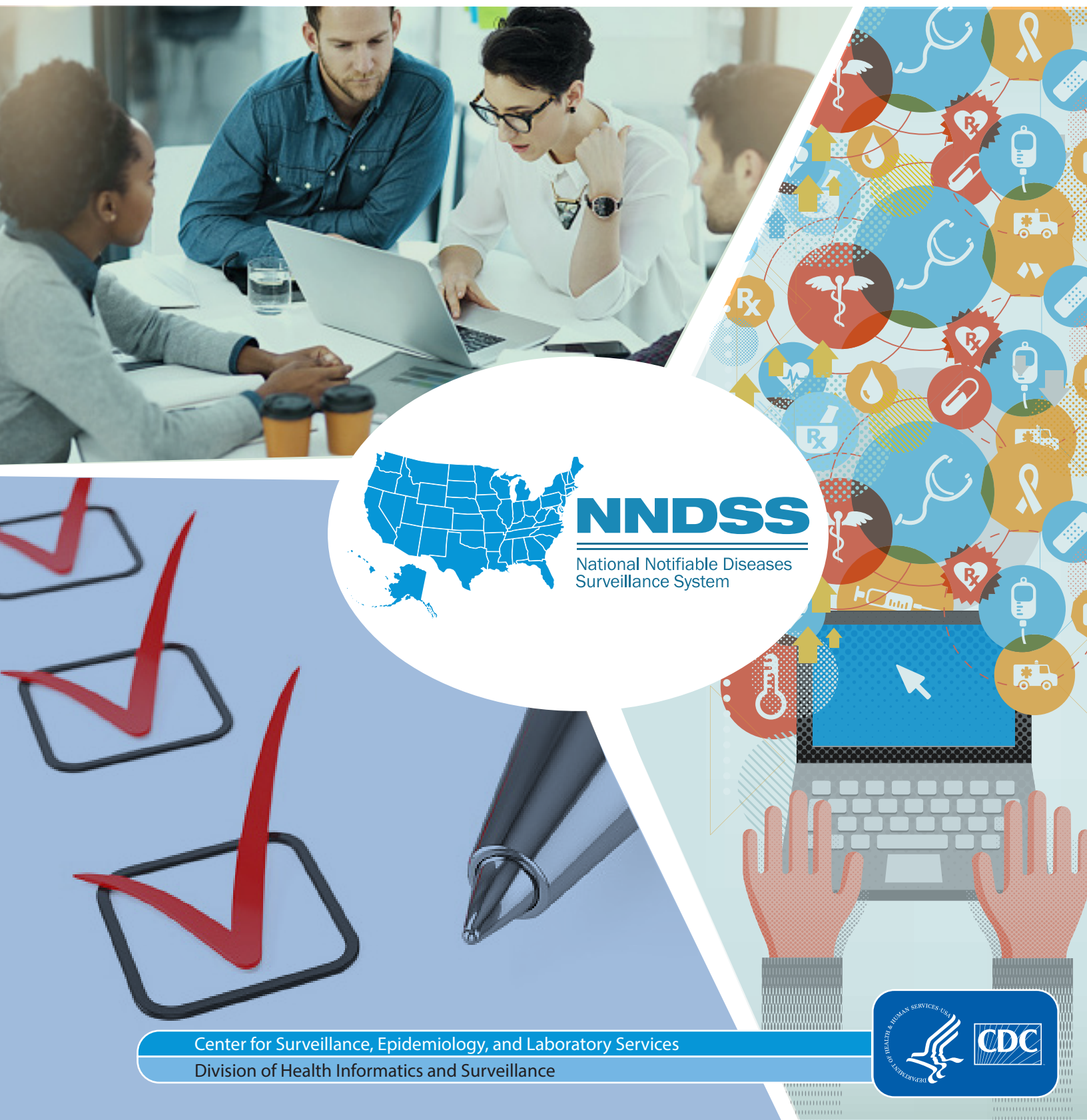


NNDSS Modernization Initiative

HL7 Case Notification Implementation Guidebook

January 2017



NNDSS

National Notifiable Diseases
Surveillance System

Center for Surveillance, Epidemiology, and Laboratory Services

Division of Health Informatics and Surveillance



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INTRODUCTION

As part of the Centers for Disease Control and Prevention (CDC) Surveillance Strategy, the National Notifiable Diseases Surveillance System (NNDSS) Modernization Initiative (NMI) is enhancing NNDSS capabilities to provide more comprehensive, timely, and higher quality data than ever before for public health decision making.

Through this multi-year initiative, CDC seeks to increase the robustness of the NNDSS technological infrastructure so that it is based on interoperable, standardized data and exchange mechanisms.

NMI has three key components:

- developing prioritized message mapping guides (MMGs) for Health Level 7 (HL7) case notifications;
- developing, maintaining, and upgrading the Message Validation, Processing, and Provisioning System (MVPS), software that validates and processes nationally notifiable disease case notification messages sent by jurisdictions and provisions the data to CDC programs; and
- providing technical assistance (TA) for implementation of HL7 case notification messages in jurisdictions submitting case notifications to NNDSS.

One of the most important processes in the NMI effort is public health agencies (PHAs) successfully implementing HL7 case notification messages based upon each of the new NNDSS HL7 MMGs developed through NMI.

INTENDED AUDIENCE

This guide is intended for the following audiences in PHAs:

- surveillance system administrators,
- program subject matter experts (SMEs), and
- PHA information technology (IT) staff.

Please note: This resource is not intended for PHAs who use the National Electronic Disease Surveillance System (NEDSS) Base System (NBS) for disease surveillance. NBS PHAs can learn more about their technical assistance options by emailing the CDC Electronic Data Exchange Mailbox at edx@cdc.gov.

PURPOSE

This guidebook provides a high-level description of the NMI implementation process and serves as a guide for PHA teams that are going through this process. For PHA program SMEs, the guidebook describes how to prepare internally for sending HL7 messages and to address potential barriers. For PHA IT staff, this document provides guidance that they can use to design and set up the PHA's infrastructure for messaging and validation.

CDC supports NMI Technical Assistance through the Association of Public Health Laboratories (APHL) to help PHAs through the implementation process. This guidebook summarizes the TA options available to PHAs and outlines the TA process. PHAs can request technical assistance at any point in the implementation process, from assessing readiness and infrastructure through validating HL7 test messages, by sending an email outlining support needs to edx@cdc.gov.

Please note: No solution is universal. Therefore, the guidance contained in this document is advisory only. PHAs should use the guidebook to inform their approach to implementation, adapting the process where appropriate.

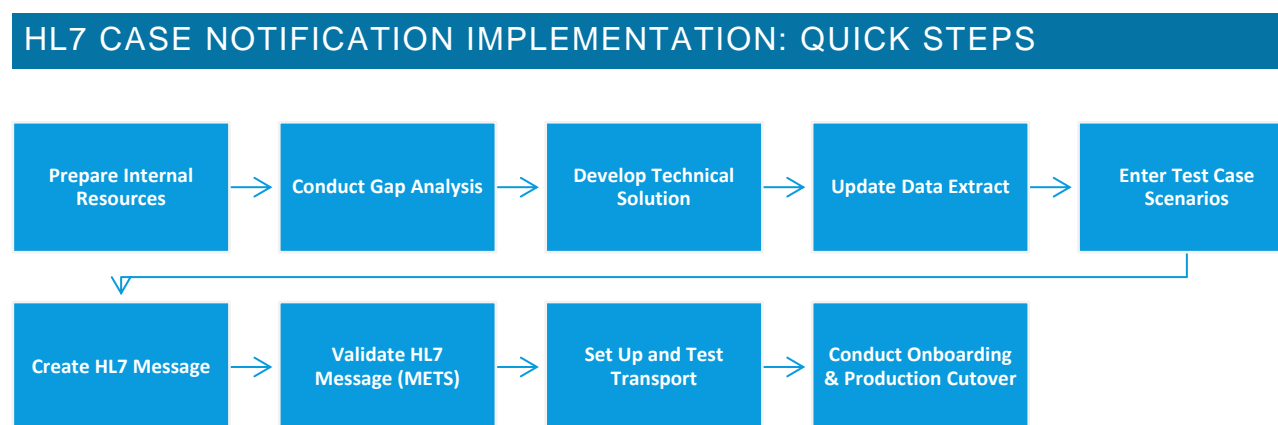


Figure 1: The steps in the HL7 case notification implementation process

This section lists the major steps involved in implementing HL7 case notification messages. See the following section(s) for further guidance on each step in this process.

- ❑ **Prepare Internal Resources:** Review materials and identify the technical and staffing resources to begin implementing HL7 messaging for case notification.
- ❑ **Conduct Gap Analysis:** Compare MMG data elements against PHA's current surveillance system to identify available data elements needed to populate MMG fields.
- ❑ **Identify and Develop Technical Solution:** Review technical infrastructure and develop and document the system design for HL7 case notification messages.
- ❑ **Update Data Extract/Surveillance System (if needed):** If gaps exist, update the data extract so that it contains all MMG required elements and as many preferred and optional data elements as possible.
- ❑ **Enter Test Case Scenarios:** Enter test scenario data that CDC has developed for each MMG.

- ❑ **Create HL7 Message:** Transform and translate data as needed to generate valid HL7 test messages according to the test scenarios accompanying the MMG for a given condition.
- ❑ **Validate HL7 Messages in METS:** Validate HL7 test messages by using the [Message Evaluation and Testing Service \(METS\) tool](#). The METS tool provides feedback on message structure and content. Make changes as necessary until all test messages successfully pass the METS tool without errors.
- ❑ **Set Up and Test Transport:** Use the PHIN Messaging System ([PHINMS](#)), or other transport services, to send case notification messages to CDC.
- ❑ **Conduct MPVS Onboarding and Production Cutover:** Proceed through the Message Validation, Processing, and Provisioning System onboarding and production cutover process. CDC considers a PHA ready for MPVS onboarding and cutover to production once their full suite of test messages for an MMG has passed METS validation and PHINMS has been set up and tested for connectivity.

HL7 CASE NOTIFICATION IMPLEMENTATION: DETAILED GUIDANCE

PREPARE INTERNAL RESOURCES

PHAs can take several steps to prepare for implementing HL7 messaging for case notification. Table 1 shows a preparation checklist that guides the PHA through their initial planning and helps ensure that the PHA has considered all elements of implementation:

- ☐ Collect and review NMI resources.
- ☐ Conduct readiness assessment.
- ☐ Assemble PHA implementation team.
- ☐ Gather technical documentation.

Table 1: HL7 case notification implementation public health agency (PHA) readiness checklist

<input type="checkbox"/> Readiness	Description
<input type="checkbox"/> Technical Infrastructure	The PHA's infrastructure (i.e., the hardware, software, network resources, and related systems) should have the minimum requirements to create, generate, validate, and transport HL7 case notification messages.
<input type="checkbox"/> Test Environment	The PHA's test environment should mimic the workflows of the production environment, and the relationship of the systems in the test environment should mirror those of the production environment.
<input type="checkbox"/> Transport	The PHIN Messaging System (PHINMS) (http://www.cdc.gov/phinf/PHINms/) is the preferred method of transport for HL7 case notification messages. PHAs sending HL7 messages through PHINMS will need to establish PHINMS connectivity and obtain the necessary certificates . PHAs that either cannot establish PHINMS connectivity or would like to identify alternative transport options can discuss further with CDC.
<input type="checkbox"/> Expertise/Resources	Table 2 below summarizes specific roles that are required at the PHA to implement HL7 messaging for case notifications. The level of effort for experts in each role will vary by PHA and likely by condition. In general, PHA program SMEs are primarily involved early in the process to reconcile condition-specific MMG fields with surveillance system data, while the PHA's IT implementer is involved later to create and validate the HL7 message.

COLLECT AND REVIEW NMI RESOURCES

Prior to beginning HL7 message implementation, PHAs should visit CDC's NNDSS [HL7 Case Notification Resource Center](#) to learn more about MMG development and to confirm which MMGs are final and ready for PHAs to implement. From the resource center PHAs can download MMGs, associated artifacts, and other related documentation, including the latest PHIN Messaging Guide for Case Notification and FAQs for MMG Implementation.

CONDUCT READINESS ASSESSMENT

The list shown in Table 1 identifies the technical and staffing resources that each PHA should have in place to begin implementing HL7 messaging for case notification. The PHA should carefully review these resources and determine the agency's readiness to implement case notifications. PHAs are encouraged to review and complete the [NMI Infrastructure Questions](#) to help assess internal readiness and identify needs prior to beginning implementation efforts.

ASSEMBLE PHA IMPLEMENTATION TEAM

The PHA should identify the appropriate staff for each role listed below in Table 2, as well as designate an overall project champion. Project stakeholders should understand the roles and responsibilities associated with each step of implementation. The PHA should coordinate with existing staff resources to ensure resource availability and their understanding of and commitment to NMI's project objectives and timeline.

Table 2 lists common implementation team members. Keep in mind that a PHA may need multiple contacts for each role, particularly if multiple surveillance systems are involved in the message mapping process. Individuals from the PHA also may be able to serve multiple roles on the PHA's implementation team.

Table 2: Public health agency (PHA) HL7 case notification implementation team roles and contact information

Implementation Team Role	Name	Phone	Email
Project Lead/Champion			
Lead for Integrated Surveillance System			
Person Responsible for Gap Analysis			
Person Responsible for Creating Electronic Messages			
Person Responsible for Configuring Message Transport			
Person Responsible for Data Administration of PHA Surveillance System for Conditions Covered by MMG			

GATHER TECHNICAL DOCUMENTATION

The technical documentation checklist in **Error! Reference source not found.** summarizes the artifacts that the PHA may find useful while preparing to implement HL7 case notifications. These artifacts help the PHA fully understand the current technical architecture within the agency, initiate a gap analysis, and design an appropriate technical solution.

Table 3: Public health agency (PHA) technical documentation checklist to prepare for HL7 case notification implementation

Technical Document	Description
<input type="checkbox"/> Case Investigation Form(s)	Forms used by the PHA to collect case investigation information from the provider for the relevant condition(s).
<input type="checkbox"/> Example Electronic Laboratory Reporting (ELR) Message	ELR message specification used by the agency to receive ELR from laboratories; or example ELR messages.
<input type="checkbox"/> Data Extract	Example extract from the surveillance system that the PHA uses to generate the current case report for the National Notifiable Diseases Surveillance System (often an xml).
<input type="checkbox"/> Technical Architecture Diagrams/Workflows	Any diagrams, workflows, or other information that the PHA has outlining or describing the systems that comprise the PHA's technical infrastructure and how these systems are integrated.

Implementation Milestone Complete: PHA internal resource preparation completed.

CONDUCT GAP ANALYSIS

During the gap analysis, the PHA compares MMG data elements (required, preferred, and optional) against the information contained in the PHA's surveillance system and identifies the data elements needed to populate MMG fields, including:

1. existing data elements,
2. data elements that may be derived from script and logic creation, and
3. data elements that may need to be created or added to the PHA surveillance system. (Note: Required data elements noted in the MMG must be sent as part of the HL7 case notification message. If a required data element is not present in the PHA surveillance system, it will need to be added prior to onboarding.)

The PHA may need to apply surveillance system changes to populate MMG required fields; MMG preferred and optional fields are populated if data are available.

The PHA can use the [NMI Implementation Spreadsheet](#) to help facilitate gap analysis. As Figure 2 demonstrates, this template merges information from the MMGs, NMI HL7 Message Specification, and the PHIN Vocabulary Access and Distribution System (PHINVADS). See the [Implementation Spreadsheet Instructions](#) for a detailed guide on how to use this tool.

Implementation Milestone Complete: Gap analysis template completed.

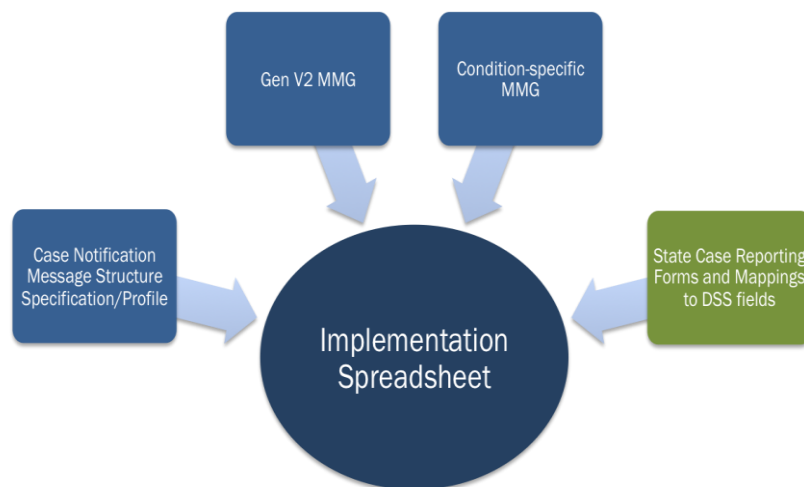


Figure 2: Sources for the National Notifiable Diseases Surveillance System Modernization Initiative Implementation Spreadsheet

IDENTIFY AND DEVELOP TECHNICAL SOLUTION

Next, the PHA will want to identify their technical solution. The technical solution will outline how the PHA system components (e.g., surveillance system, database, integration engine) will interact to build and send HL7 case notification messages to CDC. The solution will vary depending on the PHA's existing technical architecture and messaging capabilities. The PHA may identify a need for new components, such as an additional database or data warehouse. The PHA is encouraged to document the technical architecture design for HL7 case notification messages and the process to identify new, updated, and deleted cases and to identify message actions for each case. Once the technical solution design has been identified, the PHA can develop the appropriate routes and components.

Through CDC support, APHL developed template Rhapsody and Mirth channels based on the MMG specifications that PHAs can use as a baseline to develop the route that will transform and translate data from the surveillance system to create valid HL7 messages; these routes and the associated user guides are available on the [NMI Technical Assistance and Training Resource Center](#).

Implementation Milestone Complete: Technical solution identified and developed.

UPDATE DATA EXTRACT/SURVEILLANCE SYSTEM

The gap analysis may identify certain elements of the agency's data extract that need to be modified to generate a valid case notification message. Once the PHA applies the required changes to its surveillance system and data extract, the updated data extract should contain all MMG elements, including required, preferred, and optional elements as available.

Implementation Milestone Complete: Data extract file updated, unit tested, and reviewed.

ENTER TEST CASE SCENARIOS

CDC has developed test case scenarios for each MMG that the PHAs will use to create test HL7 messages in preparation for onboarding. Each PHA will need to enter test scenario data and generate the data extract per MMG. The test scenarios should be customized based on the agency's local codes and information management system. The PHA uses the test scenario worksheet to record the specific data element entered in the test case scenarios. Depending on the surveillance system, the PHA may need to generate a data extract based on this test scenario document.

NOTE: [The Test Scenario Worksheet](#) is required documentation for completing the onboarding process and will be used by CDC programs to validate test messages sent through MVPS as part of the onboarding process.

Implementation Milestone Complete: Test scenarios created and test scenario worksheet completed.

CREATE HL7 MESSAGES

Once the PHA has implemented the technical solution, the agency generates HL7 test messages per the test scenarios in accordance with the MMG and the Message Structure Specification for National Condition Reporting.

Implementation Milestone Complete: HL7 message produced through newly updated route.

VALIDATE HL7 MESSAGES IN METS

The PHA generates a full suite of test messages, per the test scenarios accompanying the MMG for a given condition. At this stage, the PHA can validate generated HL7 messages by using the [Message Evaluation and Testing Service \(METS\) Tool](#). The METS tool allows users to upload messages or copy and paste messages into text boxes and then provides feedback on message structure and content.

During this iterative process, the PHA will make changes as necessary to the PHA's surveillance system, data extract, and generated HL7 test messages until all test messages successfully pass the METS tool without errors. The PHA should investigate all warnings, and, if a warning cannot be resolved (e.g., a warning for a missing optional data field that the PHA does not collect), then the PHA should document that warning and consider it expected throughout the validation process. Note that the minimum full suite of test messages will consist of the standard test messages provided by CDC.

Implementation Milestone Complete: HL7 message validation completed when the full test message suite is complete and [all messages pass the METS validation tool with no errors and only expected warnings](#).

SET UP AND TEST TRANSPORT

MVPS uses the [PHIN Messaging System](#) to receive HL7 case notification messages at CDC. PHINMS is CDC-developed software that provides a secure messaging platform with a common approach to security requirements (such as encryption and authentication) and a standard method for addressing and routing content. PHAs can view specific PHINMS configuration and setup steps online at the [PHINMS website](#).

Some PHAs are unable to use [PHINMS](#) to send case notification messages to CDC and may want to explore other transport services such as the APHL Informatics Messaging Services (AIMS) Platform. PHAs in this circumstance should contact CDC at edx@cdc.gov to discuss transport issues and determine a solution.

Implementation Milestone Complete: Transport service set up and tested.

CONDUCT MVPS ONBOARDING AND PRODUCTION CUTOVER

ONBOARDING PREPARATION:

CDC considers a PHA ready for Message Validation, Processing, and Provisioning System onboarding and production cutover once a PHA's full suite of test messages for an MMG has passed METS validation and PHINMS has been set up and tested for connectivity. To initiate the onboarding process, the PHA sends an email to edx@cdc.gov that confirms that the PHA has completed the following steps and attaches the completed documentation listed below:

- Completed all required trainings (Secure Access Management Services [SAMS], MVPS), is able to access MVPS Dashboard, and has identified a Data Manager role in MVPS.
- Provided PHA stakeholder roles and contact information to CDC.
- Identified NNDSS diseases that are state reportable for the guide to be onboarded.
- Completed NMI Implementation Spreadsheet Condition Summary tab(s).
- Completed NMI Test Case Scenario Worksheet with jurisdiction-specific data.
- Validated that test messages have passed METS with no errors.

ONBOARDING PROCESS

An NMI onboarding specialist will meet with the PHA and review the submitted onboarding readiness package (please refer to above list) and onboarding process in detail. For specific information on the onboarding process, please refer to the *NMI Public Health Agency Onboarding Guidebook* found at the [NMI Technical Assistance and Training Resource Center](#).

HL7 CASE NOTIFICATION IMPLEMENTATION TECHNICAL ASSISTANCE

TECHNICAL ASSISTANCE AREAS

CDC is supporting technical assistance through APhL to assist public health agencies in implementing electronic data exchange, including HL7 case notification protocols. The NMI TA Team provides services across all areas of data exchange implementation and is available for both onsite and virtual help. The TA teams work with PHA leadership, IT personnel, and epidemiology SMEs to assist in any of the following areas:

- **Project management and business analysis**
 - Help understand the short- and long-term goals, benefits, and challenges of HL7 case notification messaging.
 - Help determine your path to completing this project, identify potential risk and needed resources, and develop a custom project plan.
 - Transfer knowledge to enhance in-house capability on the use of integration engines and infrastructure management for case notifications to CDC based on MMGs.
 - Provide hands-on assistance and training to build capacity to implement case notification messages and achieve production status.
- **Terminology expertise, data standards expertise, and workflow analysis**
 - Harmonize surveillance system terminology and incorporate nationally recognized electronic data standards into your workflow.
 - Help map local vocabulary and disease surveillance system (DSS) data elements to data elements within the MMG and to PHINVADS value sets.
 - Identify and explore solutions to gaps between available DSS data elements and MMG data elements.
 - Help understand how, when, and why to use standard codes (e.g., LOINC, SNOMED, PHIN value sets).
- **Technical architecture and system integration expertise**
 - Extract data from surveillance information systems.
 - Map codes in the data extract to vocabulary specified in the MMGs.
 - Create HL7 messages based on the MMGs by using an integration engine (e.g., Rhapsody) or other tools.
 - Facilitate secure transport of HL7 messages.
 - Address security concerns.
 - Provide detailed analysis of proposed solution(s).
 - Use previous experience and reusable components from successful solutions in other organizations so that every implementation does not reinvent the wheel.
 - Provide hands-on assistance with data exchange mechanisms and other technical architecture options.

TECHNICAL ASSISTANCE APPROACH

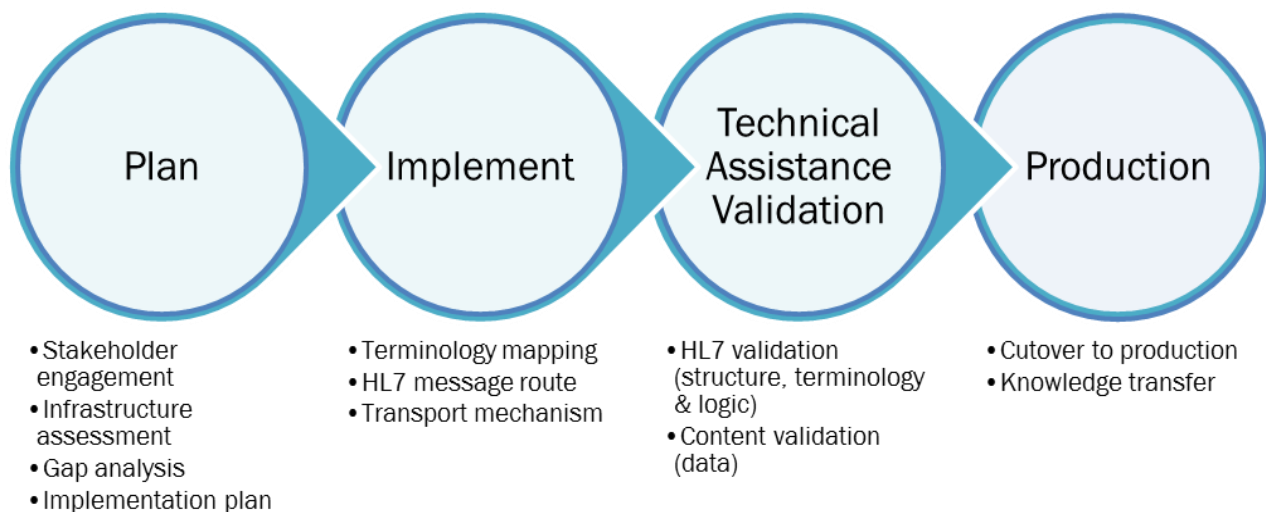


Figure 3: The HL7 case notification implementation technical assistance approach

The TA team provides customized assistance to meet the needs of each PHA. For example, some PHAs may have the internal resources and expertise to complete the implementation process independently but would appreciate a project planning consultation with the TA team, while another PHA with limited SME and/or IT resources may request hands-on assistance with the gap analysis or customizing an integration engine route. The TA team is available to guide PHAs through every step of the implementation process as described in the [Detailed Guidance](#) section above.

For PHAs that request assistance, the TA team will lead the agency's team through the following planning exercises during the preparation step:

- Technical assistance initial call
 - Readiness assessment conducted and reviewed with PHA
 - Plan drafted for PHA, including proposed timeline, preliminary gap analysis, and technical solution
- Technical assistance kickoff call.

TECHNICAL ASSISTANCE INITIAL CALL

The purpose of the initial call between the TA team and the PHA team is to collect and share baseline information about the agency's systems and current case notification processes. Generally during this call, the technical assistance team will discuss the public health agency's technical architecture, security setup, disease surveillance system, and vocabulary (i.e., standard coding, etc.) to identify needs and available resources.

Technical Assistance Milestone Complete: Initial call conducted.

TECHNICAL ASSISTANCE KICKOFF CALL

The second call between the TA team and the PHA team officially begins implementation work and finalizes the project plan. The kickoff call occurs when both the TA team and PHA are ready to begin work. During this call, the TA team and PHA will identify any remaining preparation to be done, develop a target implementation timeline, and establish weekly checkpoints.

Technical Assistance Milestone Complete: Kickoff call conducted.

After the kickoff call, the TA team will work with the PHA through all of the implementation steps described above in the Detailed Guidance section and provide support to meet specific needs.

HOW TO REQUEST TECHNICAL ASSISTANCE

PHAs may request NMI technical assistance for implementing HL7 messaging for case notifications by emailing the CDC Electronic Data Exchange mailbox at edx@cdc.gov with “NMI Technical Assistance Request” as the subject line.

APPENDIX

NMI TOOLS AND RESOURCES

Below is a list of tools and resources that the PHA is likely to use while working on the National Notifiable Diseases Surveillance System Modernization Initiative (NMI).

Table 4: National Notifiable Diseases Surveillance System (NNDSS) Modernization Initiative (NMI) tools and resources

Tool/Resource	Description
NMI Technical Assistance and Training Resource Center	The NMI Technical Assistance and Training Resource Center contains various documents and resources that can help a public health agency (PHA) understand the timeline of the HL7 case notification implementation process and what each step in the process entails.
NMI Implementation Spreadsheet	A one-stop resource for all audiences tasked with implementing NMI messaging, this template merges information from the message mapping guides (MMGs), NMI HL7 Message Specification, and the PHIN Vocabulary Access and Distribution System (PHINVADS). For PHA program subject matter experts, the spreadsheet serves as the worksheet to perform gap analysis (existing data vs. requested data) and map to the local data elements. For PHA IT implementers, it serves as the underlying structure for the integration engine, provides mapping from local to standardized data elements, and provides links to the bound value set for vocabulary validation. This document can be found in the Implementation and Onboarding section of the NMI Technical Assistance and Training Resource Center.
MMG Test Scenarios	The CDC-published test case scenario documents for each MMG explain each data element in detail and provide the information the PHA needs to create test messages for validation. Published test case scenarios and supplemental resources for each MMG can be found in the MMG and Artifacts section of the NNDSS website.
NMI Test Case Scenario Worksheet	The NMI Test Case Scenario Worksheet provides examples of the structure and content of a valid case notification. The PHA will construct 7–10 test messages based on the test case scenarios provided by CDC. These test messages demonstrate that a PHA's system is capable of populating data fields with the appropriate values in various instances, creating valid messages.
Integration Engine Route & User Guide	PHAs can use these NMI-specific Rhapsody or Mirth channels as a starting point for implementation; includes mapping and validation.
METS	CDC provides the Message Evaluation and Testing Service (METS) tool to its PHA and other messaging partners to test generated messages one by one. The METS tool is a great way for jurisdictions to perform independent validation on messages before end-to-end testing.
MVPS	CDC uses the Message Validation, Processing, and Provisioning System (MVPS) to receive and process HL7 case notification

Tool/Resource	Description
	messages from PHAs and provision them to CDC programs. PHA and other messaging partners have access to the MVPS Dashboard, which provides feedback on messages received and information on any warnings or errors generated. CDC provides PHAs with information and training on how to access and use the MVPS Dashboard.
MMG Test Messages	The MMG test messages are helpful for testing the integration engine route and for comparing to PHA-created test messages.
PHIN Case Notification Guide	This guide outlines the specifications for case notification messaging. This information is incorporated into the NMI Implementation Template.
MMG	The message mapping guide outlines the required, preferred, and optional fields for a valid HL7 case notification message for a given condition. This information is incorporated into the NMI Implementation Template. Final and draft MMGs and their associated artifacts are posted to the NNDSS HL7 Case Notification Resource Center.

EXTERNAL RESOURCES

PHAs can take advantage of messaging and vocabulary resources authored by standards development organizations such as HL7, LOINC, and SNOMED CT as summarized in Table 5.

Table 5: Messaging and vocabulary resources for public health agencies

PHIN Resources	
PHIN Messaging System	CDC's home page for PHIN Messaging System (PHIN MS), which includes installation instructions and support.
PHIN VADS Value Sets	The PHIN Vocabulary and Access Distribution System (PHIN VADS) is a CDC repository containing value sets for message mapping guide case notification value sets, including epidemiologically important questions, as well as electronic laboratory reporting (ELR) HL7 v.2.5.1 and many other message guides.
PHIN VADS RCMT	The Reportable Condition Mapping Table (RCMT) contains a list of LOINC codes and SNOMED codes for reportable conditions.
HL7 Resources	
HL7.org	Visitors can download HL7 implementation guides on this website, participate in user discussions, and identify opportunities for training and certification; has a help desk.
HL7 OID registry	This site is an online HL7 Object Identifier (OID) registry; users can register, search for, and edit OIDs.
7Edit	This site is an HL7 message validator application.
HL7 Case Notification Resource Center	Contains the most up-to-date MMGs under the MMGs and Artifacts page as well as supplemental documents and historical MMGs.
LOINC & SNOMED Resources	
LOINC website	This site is for the Logical Observation Identifiers Names and Codes (LOINC), Database and Mapping Tools.
SNOMED CT website	This site is for the Systematized Nomenclature of Medicine – Clinical Terms (SNOMED CT).
UMLS Terminology Services (UTS)	The National Institute of Health's (NIH) Unified Medical Language System (UMLS) brings together many vocabularies and standards to enable greater interoperability between systems. UTS serves as a gateway to search the UMLS databases. SNOMED CT content is available for the U.S. edition, i.e., the codes

PHIN Resources

from the international release as well as the U.S. extension (codes used ONLY in the United States).

[VA tech SNOMED browser](#)

SNOMED CT content is available for the U.S. edition, i.e., the codes from the international release as well as the veterinary extension (codes related to non-human content).

NMI INFRASTRUCTURE QUESTIONS

The NNDSS Modernization Initiative (NMI) Infrastructure Questions can be used to help a public health agency (PHA) assess the overall infrastructure and available resources to implement case notifications. Areas covered include current state of information systems, technical architecture, a high-level overview of the PHA surveillance system, and terminology-related questions.

TECHNICAL ARCHITECTURE QUESTIONS

1. What surveillance system are you using?
2. How do you extract disease-specific case information from your surveillance system? How are these extracts stored? Are they manual or electronic; what is the frequency with which extracts are generated? What is the process for corrections and edits?
3. What is the current process to send case notifications to CDC?
4. Do you use an integration engine for NMI (e.g., Rhapsody, MIRTH, multiple)?
5. What are the HL7 versions (e.g., 2.3.1, 2.5.1) and message types (e.g., ORU, OML, OUL, ORM) that are currently supported, if any?
6. Do you use different surveillance systems for different diseases?
7. Are there any limitations for access to surveillance systems, integration engines, databases, or other components involved in your case notification reporting route?
8. Have you gathered necessary documents (technical architecture diagrams, local mapping data dictionaries, etc.) that may be needed?
9. Do you have staging (test environment) and production environments available?
10. Does your organization require a separate test evaluation and acceptance testing processes before software can be rolled out to production?
11. Does your staff have direct access to systems needed to make changes to data streams? If not, will contractors/vendors be needed?

TECHNICAL ARCHITECTURE: TRANSPORT QUESTIONS

12. What is your current transport mechanism for reporting?
13. Will you use the PHIN Messaging System (PHINMS) to send HL7 messages?
14. Do you currently use the APHL Informatics Messaging Services (AIMS) Hub?

TECHNICAL ARCHITECTURE: PERFORMANCE QUESTIONS

15. What is your estimate of the overall volume and frequency of reportable condition data?
 16. Are there other notable applications running on the system that may influence system performance (e.g., hardware)?
-

VOCABULARY: BACKGROUND QUESTIONS

17. Are standard CDCREC codes used for race/ethnicity (Race Category and Ethnic Group Code)? What alternate code(s) and/or free text are available?
 18. For fields populated from a predefined list of answers (i.e., dropdowns), do you have codes available? Are the codes in use standardized?
 19. Do you have a process for updating/maintaining standard and/or local codes and value sets? If so, what process and sources are used (e.g., PHIN Vocabulary Access and Distribution System [PHINVADS], Reportable Condition Mapping Table [RCMT], official standard code distributions including Regenstrief Institute for LOINC and NLM for SNOMED CT, other)?
 20. In what formats do you receive data from local health departments, hospitals, etc? Are any of these data received in a coded form? Is further normalization/coding/translation/mapping done after receiving the data (e.g., in surveillance system, integration engine, other)?
 21. Can you access raw laboratory data for NMI reporting (e.g., from your electronic laboratory reporting [ELR] feed)?
 22. Which value sets and/or free text are available for lab tests (e.g., LOINC, SNOMED CT, local codes, free text)?
 23. What value sets and/or free text are available for non-numeric lab results and interpretations (abnormal flags) (e.g., organisms, descriptive, categorical, pos/neg)?
 24. Are standard codes (SNOMED CT or HL7) used for specimen source/type? What alternative code(s) and/or free text are available?
-

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
Center for Surveillance, Epidemiology and Laboratory Services
Division of Health Informatics and Surveillance