Centers for Disease Control and Prevention (CDC)

NNDSS HL7 Message Mapping Guide Implementation Process

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ACRONYM GLOSSARY

Acronym	Name
APHL	Association of Public Health Laboratories
CDC	Centers for Disease Control and Prevention
CSOT	CDC Case-based Surveillance Operations Team
DHIS	CDC Division of Health Informatics and Surveillance
DMB	Data Message Brokering
DMI	Data Modernization Initiative
DSAT	CDC Data Standardization and Assistance Team
EDX	Electronic Data Exchange
EIP	Emerging Infections Program
EOC	Emergency Operations Center
eSHARE	electronic State HL7 Implementation to Achieve Resource Exchange
ETL	Extract, Transform, and Load
FAQs	Frequently Asked Questions
FIPS	Federal Information Processing Standard
GenV2	Generic version 2
HL7	Health Level 7 (www.hl7.org)
IS	Implementation spreadsheet
IT	Information technology
LPM	Limited production messages
METS	Message Evaluation and Testing System
MMG	Message mapping guide
MMWR	Morbidity and Mortality Weekly Report
MVPS	Message Validation Processing and Provisioning System
NBS	NEDSS Base System
NNDSS	National Notifiable Diseases Surveillance System
O&M	Operations and maintenance
OS	NNDSS onboarding specialist
OT	Onboarding team
PHA	Public health agency
PHIN MS	Public Health Information Network Messaging System
Program	CDC program
SAMS	Security Access Management System
SDB	CDC Surveillance and Data Branch
TA	Technical assistance
TCSW	Test case scenario worksheet
TM	Test messages
YTD	Year-to-date

PURPOSE OF NNDSS MMG IMPLEMENATION PROCESS

This document is intended to support the onboarding of National Notifiable Disease Surveillance System (NNDSS) message mapping guides (MMGs). It clarifies roles and responsibilities, presents the phases of MMG implementation, and provides general information on the process. The Data Standardization and Assistance Team (DSAT) should be contacted for clarification through the Electronic Data Exchange (EDX) mailbox (edx@cdc.gov) with the subject "Onboarding Process."

ROLES AND RESPONSIBILITIES

A wide array of people and teams are required to onboard a jurisdiction for a message mapping guide. Successful and efficient onboarding requires a cohesive effort and a shared understanding of each team's roles and work efforts. This section explains each role and the associated responsibilities to allow for a smooth, timely, and quality onboarding outcome.

CDC DATA STANDARDIZATION AND ASSISTANCE TEAM

The Data Standardization and Assistance Team (DSAT) is part of the Surveillance and Data Branch in CDC's Division of Health Informatics and Surveillance (DHIS). The team serves as the knowledge source for message mapping guides (MMG) implementation and informatics, coordinates and implements any updates and revisions to an MMG, and coordinates jurisdiction onboarding efforts. DSAT provides subject expertise on MMGs' HL7 structure and is well-versed in the data elements present in the MMGs, including common jurisdictional barriers related to onboarding these data elements. DSAT maintains technical knowledge of the MMG, executes all changes and improvements, and is responsible for creation of new MMGs. The team coordinates the people and processes for any work effort impacting an MMG, including data element additions or changes and value set updates, and serves as a knowledge source for vocabulary and HL7 structure. Each MMG has a DSAT team member assigned as an MMG lifecycle lead to manage work impacting MMG development and implementation. The MMG lifecycle lead coordinates all onboarding efforts and works with other members of DSAT, CDC programs, jurisdictions, and other NNDSS partners (e.g., MVPS, NBS) to maintain and improve MMGs and MMG onboarding efforts.

NNDSS ONBOARDING SPECIALIST

During onboarding, the DSAT MMG lifecycle lead serves as the NNDSS onboarding specialist (OS). The OS acts as a single point of contact for a jurisdiction throughout onboarding and coordinates all meetings, partners, and CDC feedback to facilitate a timely onboarding process. To provide a single, consistent voice for feedback to the jurisdiction, all communication from CDC to a jurisdiction related to onboarding an MMG is performed by the OS. This practice establishes a clear channel for communications, supports a strong working relationship with jurisdiction informatics personnel, and ensures effective coordination between the CDC and jurisdiction.

CDC PROGRAM

The CDC program is the subject expert for the surveillance data needed to understand the disease, interpret trends, and guide public health action. The CDC program provides justification for the data to be collected, feedback on how the data elements are defined in an MMG, and how the data will be integrated with previous data collection efforts or other information.

The CDC program serves as a primary resource for the OS and provides input regarding program intent for data collection and use.

When NNDSS data are used to support an emergency response, a response task force may serve in the role of a CDC program. For this document, any usage of "CDC program" should be understood to include emergency response roles. In the instance where an MMG requires input from multiple CDC programs, "CDC program" represents all applicable CDC programs.

JURISDICTION

Jurisdiction health departments are responsible for sending HL7 case notifications to CDC. Jurisdictions serve as the subject experts on their surveillance systems and the data within the systems. Jurisdictions apply their knowledge and tools to perform tasks such as data preparation, transformation, mapping, and transport to send case notifications using the HL7 format specified in the most current message mapping guide and the current PHIN Messaging Specification for Case Notification (PHIN Spec) found on the NNDSS website under Supporting Documents for Implementation.

TECHNICAL ASSISTANCE

Technical assistance (TA) is provided or coordinated by CDC to help jurisdictions build and implement NNDSS HL7 case notification messages. Through individual technical assistance or cohorts, experts guide participants through planning, gap analysis, data extraction, HL7 message creation, and validation. At completion of TA activities, the jurisdictions are ready to begin onboarding. TA support includes development and review of the onboarding package and HL7 case notification messages.

SHARED GOALS AND EXPECTATIONS

Successful onboarding requires coordination of multiple partners, clear communication, and effective management of time and tasks. Working from a set of goals and a timeline that are shared among DSAT, the CDC program, the jurisdiction, and other partners ensures successful and timely MMG implementation. The goals and timeline define work efforts associated with each milestone and facilitate clear communication during each MMG implementation phase. Upon completion of onboarding, a jurisdiction will implement routine notifications using new HL7 messages that **maintain or improve upon** the data sent to CDC in legacy streams. To achieve efficient MMG onboarding, the CDC program, OS, and jurisdiction agree to the following:

- Determine a timeline within which all parties can produce the expected outputs
- Designate resources to complete tasks within the agreed-upon schedule
    - Ensure that the anticipated timeline is discussed with all team members and onboarding partners to confirm their availability
    - Account for any technology updates or changes that may impact onboarding efforts
- Maintain the OS as the single source of communication between CDC and the jurisdiction
- Practice open communication across all parties
    - Communicate early, clearly, and often
    - If needed, establish or request a meeting
- Respond in a timely manner
- Review documents and sample messages within the timelines jointly agreed upon by DSAT, the jurisdiction, and the CDC program
- Once the CDC onboarding process has begun, the OS will include the CDC program on emails to the jurisdiction

TIMELINE

To ensure onboarding can be completed in a timely manner, all parties need to agree to a timeline. The OS discusses the timeline with the jurisdiction when a jurisdiction expresses interest in starting pre-onboarding activities, and again during the onboarding kickoff call after the onboarding package has been received. Before the onboarding kickoff call, the CDC program and OS will meet to discuss the timeline so that it can be presented and discussed with the jurisdiction during the kickoff call. This timeline contains anticipated turnaround times for the different phases of onboarding to facilitate collaboration and help all members complete onboarding within the established timeline.

TIMELINE DETERMINATION

The timeline is established based on previous MMG implementation timelines and an assessment of jurisdiction and CDC program availability. Establishing a timeline should include a realistic assessment of upcoming activities and non-onboarding priorities. If there are specific months or weeks when staffing will be limited, this should be built into the timeline. These details inform next steps and may shift the start of the onboarding process.

A timeline is initially developed when a jurisdiction has expressed interest in onboarding an MMG or when a new MMG cohort is created. The OS creates pre-onboarding timelines as part of the pre-onboarding phase by engaging with the CDC program and Technical Assistance (TA) team. MMG cohort timelines are created and shared by the TA team in coordination with the OS and CDC program. Cohort timelines include start date, routine meetings, and milestones. If the CDC program staff cannot meet the proposed pre-onboarding or MMG cohort timeline, this should be communicated clearly and early to the OS. This allows the OS and technical assistance partners to determine if MMG efforts should be paused. This also allows jurisdictions to determine if they would prefer to divert their resources to a different MMG until the CDC program is able to support pre-onboarding or onboarding efforts.

Timeline determination is performed again once the onboarding package is received and before the kickoff call is held. This timeline outlines the onboarding stages, including the turnaround times associated with each stage.

When considering an achievable timeline, all parties should consider anything that may require additional time. Some examples include:

- Routine “black-out” dates for CDC programs
    - This occurs when a CDC program has known priorities that would not enable them to support onboarding, such as conferences or a seasonal surge in cases
- Closeout or reconciliation activities
- Planned system maintenance or downtime
    - This includes CDC and jurisdiction system maintenance and upgrades and other IT impacts
- Staff vacations, sick-leave, emergency response details, etc.
- Planned resource sharing or reallocation
    - Some examples include:
        - Staff supporting onboarding efforts will shift to 50% on an upcoming project
        - IT staff needed for onboarding efforts unavailable, or available with limited capacity, for some part of the onboarding timeline due to a competing project
- Number of conditions in the MMG
    - Guides with multiple conditions should factor in the amount of time needed to coordinate with others within the jurisdiction and CDC program
    - Time for reviewing messages at each phase may take longer than what is suggested in this document due to the increased volume of conditions for some MMGs
- Multiple disease subject experts or staff needed to onboard certain MMGs

- If an MMG contains multiple conditions that require multiple jurisdiction and CDC program members, including EIP, to review and provide feedback on an MMG, coordination of their review and feedback should be considered when establishing a timeline

The OS will provide the CDC program with any information learned from jurisdictions that would affect or delay onboarding efforts, e.g., likelihood to start onboarding, potential to initiate pre-onboarding. The CDC program will communicate to the OS any issues or planned work that may impact onboarding a new jurisdiction or a current onboarding effort.

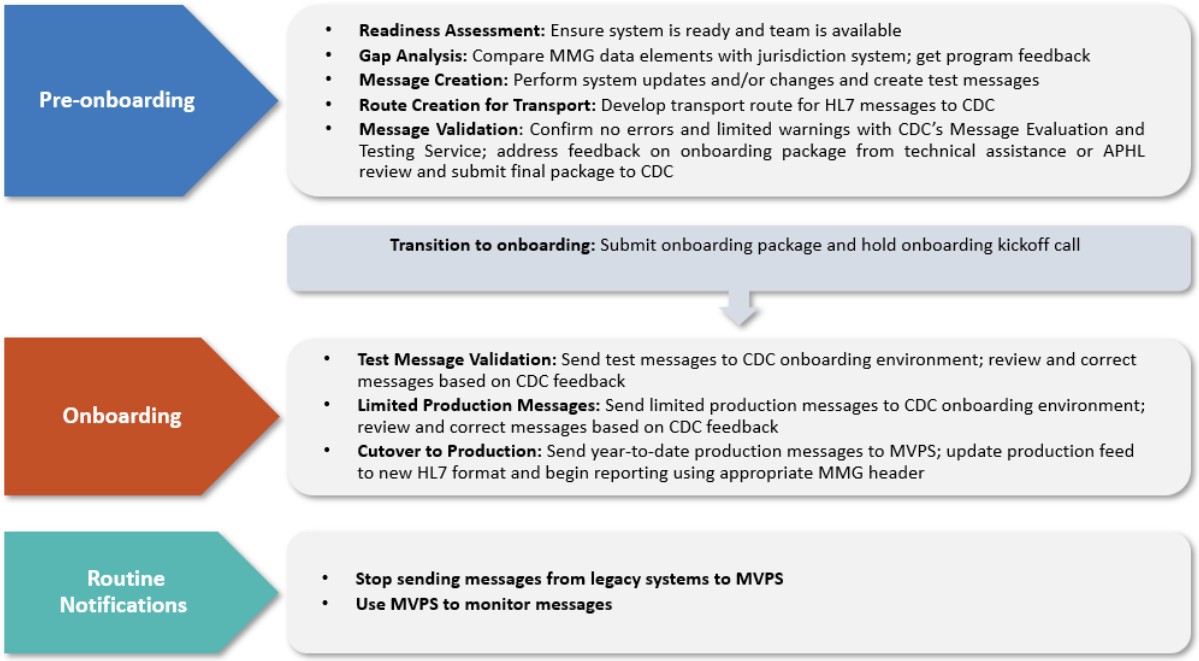
UNANTICIPATED TIMELINE IMPACTS

Unexpected or unpredictable events that impact timelines are an inevitable part of any project. These events should be communicated to the OS and other onboarding partners as soon as possible. Knowing about schedule risks and impacts early allows the OS, CDC program, jurisdiction, and other partners to reassess their resources and staff task allocation to produce an updated timeline.

MMG IMPLEMENTATION OVERVIEW

A jurisdiction moves through three phases to implement an MMG: pre-onboarding, onboarding, and routine notification. Figure 1 summarizes the activities associated with each phase.

Figure 1. Overview of the phases of MMG implementation.



PHASE 1: PRE-ONBOARDING

Roles: Jurisdiction, OS, TA Support, CDC program

During the pre-onboarding phase, a jurisdiction notifies CDC of plans to implement an MMG and moves through stages to prepare for the onboarding phase. Jurisdictions can move through these stages with or without technical assistance.

As a reminder, the onboarding process, including pre-onboarding, differs slightly for the arboviral V1 series MMG. Please see "Appendix A: Arboviral MMG V1 Series Onboarding Process" for more information.

NOTE: Jurisdictions looking to add a new disease condition or interested in using a newer version to a previously onboarded MMG should contact edx@cdc.gov with the subject *"[Jurisdiction name]: [MMG name]* - Update to MMG in Production*"* for instructions.

HOW TO START PRE-ONBOARDING

The best way a jurisdiction can notify CDC of interest in pre-onboarding an MMG is to contact edx@cdc.gov with the subject "*[Jurisdiction name]: [MMG name]* - Pre- onboarding."

Other ways a jurisdiction can notify CDC of interest in pre-onboarding an MMG include:

- Epidemiology and Laboratory Capacity for Prevention and Control of Emerging Infectious Diseases (ELC) calls.
- An NNDSS ELC Health Information Systems update in REDCap.
- Leaning of an upcoming cohort. Cohorts are formed when three or more jurisdictions express interest in—and capacity to implement—an MMG. If a cohort cannot be formed, then individual technical assistance is offered to the jurisdiction.

CDC may also contact a jurisdiction to determine if they would consider onboarding for a specific MMG.

Once a request from a jurisdiction is received, the jurisdiction is contacted to determine if they have the need/desire to join an existing or upcoming TA cohort or would be interested in individual TA support to assist in the development of the MMG. If TA is not requested, the OS will discuss with the jurisdiction anticipated timelines, any programmatic requests for documentation associated with gap analysis, and what should be submitted for the onboarding package once pre-onboarding is completed.

NOTE: For jurisdictions not using technical assistance or joining a cohort for pre-onboarding, CDC will send the onboarding package to APHL for review during the pre-onboarding phase.

The OS notifies the CDC program when a jurisdiction has expressed interest in onboarding an MMG. CDC programs requesting materials and information that exceed the data captured in the onboarding package should clearly define the requested materials/information at the time a jurisdiction expresses interest in onboarding an MMG.

STAGES OF PRE-ONBOARDING

Jurisdictions move through five stages to help ensure pre-onboarding is as efficient as possible:

1. Readiness Assessment
2. Gap Analysis
3. Message Creation
4. Route Creation for Transport
5. Message Validation

These stages are designed to identify and resolve common issues early in the implementation process. The OS or TA work with the jurisdiction during pre-onboarding and facilitate communication. The CDC program is engaged by the OS as needed by the jurisdiction, or is engaged by the jurisdiction, ensuring the OS is included in these communications. The CDC program will review the implementation spreadsheet during the gap analysis stage.

STAGE 1: READINESS ASSESSMENT

The Readiness Assessment stage begins by the jurisdiction gathering resources (personnel and artifacts), evaluating technical assistance need, and reviewing current data collection for the MMG. A step-by-step procedure is listed below:

1. Identify the MMGs intended for implementation. Message mapping guides currently available may be found on the NNDSS Technical Resource Center under the HL7 message mapping guides & standards page, along with MMG-related documentation such as the PHIN Spec.
2. Conduct a readiness assessment of technical infrastructure, test environment, transport, expertise, and resources by using the readiness checklist and reviewing the infrastructure questions.
3. Identify the team:
    a. project lead/champion,
    b. lead for integrated surveillance system,
    c. person responsible for gap analysis,
    d. person responsible for creating electronic messages,
    e. person responsible for configuring message transport, and
    f. person responsible for data administration of surveillance system for conditions covered by selected MMG.
4. Gather technical documentation, such as case investigation forms, electronic laboratory reporting message examples, data extracts, and technical architecture diagrams and workflows.

STAGE 2: GAP ANALYSIS

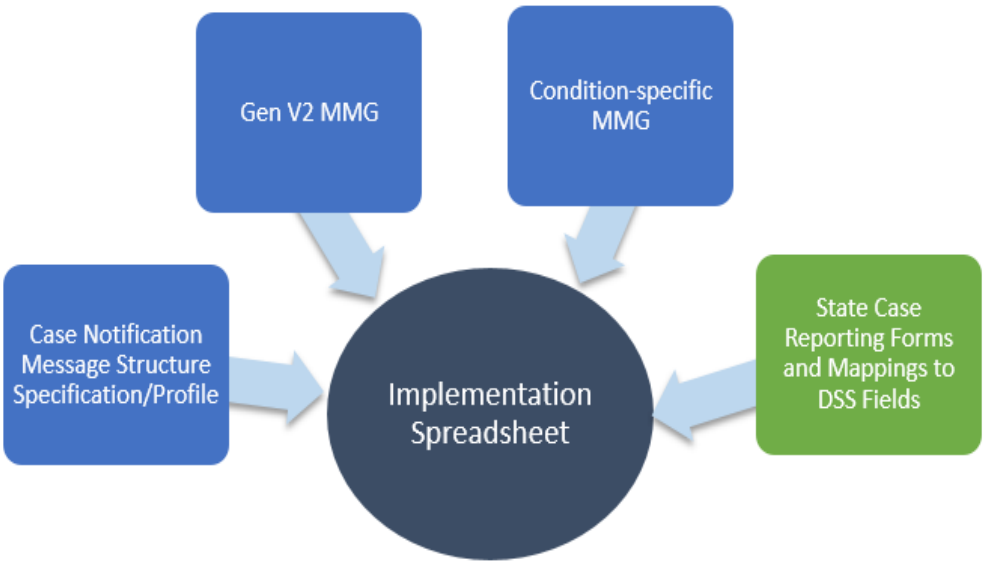
During the Gap Analysis, the jurisdiction compares MMG data elements against the information contained in the jurisdiction's surveillance systems, including

- Existing data elements
- Data elements that may be derived from script and logic creation
- Data elements that may need to be created or added to the jurisdiction's surveillance system. 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 jurisdiction's surveillance system, it will need to be added prior to onboarding.

The NNDSS Implementation Spreadsheet (IS) has been created to facilitate gap analysis. In the IS, annotate which data elements within the disease surveillance system (DSS) exist, can be derived, or need to be built and the

feasibility or timeline for such development. Figure 2 demonstrates how the IS merges information from the MMGs, the PHIN Spec, and PHIN VADS.

Figure 2. Sources for the MMG Implementation Spreadsheets.



NOTE: Jurisdictions not using TA assets should submit their initial IS for CDC program review *prior* to beginning any system development or updates. Email the IS to EDX with the subject "[*Jurisdiction name*]: [*MMG name*] - Gap Analysis." It is critical that the CDC program communicate any concerns regarding the jurisdiction's IS at this point during pre-onboarding so that potential problems can be addressed before the onboarding phase.

STAGE 3: MESSAGE CREATION

After the CDC program reviews and provides feedback on the IS, system updates and changes can begin. Once the required updates have been applied to jurisdiction's surveillance system, a data extract should be created containing all MMG data elements as indicated in the MMG Implementation Spreadsheet. Next, the jurisdiction should enter test messages associated with the test case scenario worksheet (TCSW), noting any differences from the values CDC provides.

STAGE 4: ROUTE CREATION FOR TRANSPORT

The jurisdiction develops the transport route necessary to generate and send HL7 case notification messages to CDC in accordance with the MMG and PHIN Spec. CDC and its partners have developed template Rhapsody routes based on the MMG specifications. Jurisdictions can use them as a baseline to develop a route that will transform and translate data from the surveillance system to create valid HL7 messages. The jurisdiction may select the transport option that best fits their needs. To discuss transport options, the jurisdiction should send an email to edx@cdc.gov with the subject "*[Jurisdiction name]: [MMG name]* - Transport Options."

STAGE 5: MESSAGE VALIDATION

Using the CDC provided MMG test package, the jurisdiction enters the test messages into their surveillance system using the test scenarios in the TCSW for the MMG and the condition. At this stage, the jurisdictions can validate

generated HL7 messages using the Message Evaluation and Testing Service (METS). METS provides feedback on message structure and content. Messages are not transported to CDC during validation. During this iterative process, jurisdictions make any needed changes to their surveillance system and generated HL7 test messages until all test messages successfully pass METS validation without errors. Jurisdictions should investigate all warnings. If the jurisdiction cannot resolve a warning (e.g., a warning for a missing non-required data field that the jurisdiction does not collect), that warning should be documented and expected throughout the validation process. The number of test messages a jurisdiction must develop varies per MMG; please refer to the TCSW for the MMG being implemented.

GET ACCESS TO MVPS PORTAL

In preparation for onboarding, the jurisdiction's data manager sends an email to the EDX mailbox (edx@cdc.gov) with the subject "*[Jurisdiction Name]:* MVPS Portal access" to request SAMS Level 2 access and MVPS Portal access. If this request is not completed prior to the onboarding kickoff call, the jurisdiction can submit a request and all relevant information to the EDX mailbox (edx@cdc.gov) with the subject "[*Jurisdiction name*]: [*MMG name*] onboarding – MVPS Portal Access" after the call. The OS can also submit the request on the jurisdiction's behalf. SAMS Level 2 access is needed to access the MVPS portals. Jurisdiction users with SAMS Level 2 access but no access to the condition being onboarded should work with their data manager to ensure appropriate access and permissions.

TRANSITION TO THE ONBOARDING PHASE

Roles: Jurisdiction, OS, CDC program, TA and system vendors (as appropriate)

After completing the pre-onboarding stages, the jurisdiction is ready to transition to the onboarding phase. The transition includes the jurisdiction submitting the onboarding package to CDC and completing any updates to these documents requested by CDC or TA. During this time, the CDC program should assess capacity for onboarding the jurisdiction to the requested MMG and work with the OS to draft a timeline for discussion with the jurisdiction. Once onboarding package materials are approved, the jurisdiction participates in the onboarding kickoff meeting.

SUBMIT ONBOARDING PACKAGE

The jurisdiction submits the final onboarding package to edx@cdc.gov with the subject "[*Jurisdiction name*]: [*MMG name*] - Onboarding Package."

If the jurisdiction did not receive technical assistance or participate in a cohort during pre-onboarding, CDC will send the onboarding package to APHL for review. Once all feedback is addressed, APHL will assist with submitting the final onboarding package to CDC to begin the onboarding phase.

If the jurisdiction did receive technical assistance or participate in a cohort, APHL will help the jurisdiction submit the final onboarding package to CDC to begin the onboarding phase.

REVIEW FINAL ONBOARDING PACKAGE

The OS reviews the jurisdiction's onboarding package and confirms the following:

- Implementation spreadsheet (IS), available from the NNDSS MMG website
- Test case scenario worksheet (TCSW), available from the NNDSS MMG website
- A list of all NNDSS conditions that are state reportable and will be sent for the MMG. *This is only needed when the MMG includes more than one condition*. The OS can provide a state reportable conditions checklist to help capture this information.
- Written confirmation stating that all jurisdiction users have SAMS Level 2 access and access to the MVPS onboarding and production portals
- Written confirmation that the jurisdiction's test messages have been validated in METS
- Clear description of any outstanding issues that may still exist on jurisdiction's end after completing the pre-onboarding phase
- Written confirmation that the jurisdiction's transport mechanism is in place for both test and production environments
    - *If applicable,* written confirmation that the jurisdiction's PHIN MS certificates are up-to-date

The OS then reviews the onboarding package documents to confirm the following:

- All jurisdiction-specific fields are populated correctly in the TCSW, including location, reporting jurisdiction, and date values.
- Column AA of the IS documents all data elements that will be collected and sent to CDC by the jurisdiction. High-priority items (CDC priority Level 1 and Level 2) that will not be collected and sent to CDC need to include an explanation as to why these data elements are not populated. Questions regarding data mapping and population of data elements differently than what is defined in the MMG data element description should be discussed with the CDC program and documented.
- *When applicable*, the jurisdiction has correctly and fully filled out the State Reportable Conditions Checklist of the jurisdiction reportable conditions they plan to transmit for the MMG being onboarded.

If corrections or additional information is needed, the OS assesses if follow-up with the jurisdiction is necessary or if any outstanding questions may be resolved during the onboarding Kickoff Meeting.

The OS contacts the jurisdiction to confirm receipt of the onboarding package and to request any corrections or additional pieces of information necessary to have a complete onboarding package.

Response may include:

- Request for any necessary documents found to be incomplete or missing
- Request for written confirmation that all users have SAMS Level 2 access and access to the MVPS onboarding and production portals, if not previously provided
- An estimated timeline for when the jurisdiction will be contacted to schedule a kickoff call
- Request to correct the IS and TCSW

Once a complete and accurate onboarding package is received, the OS will provide the TCSW, IS, and, if applicable, the jurisdiction's state reportable conditions checklist to the CDC program. If the onboarding package includes the jurisdiction's state reportable conditions checklist, the Case-based Surveillance Operations Team (CSOT) should be cc'd on the email to the CDC program. All onboarding package documents are saved to an archive managed by DSAT.

ASSESS CAPACITY FOR ONBOARDING

The OS works with the CDC program to assess capacity to onboard a jurisdiction within the high-level timeline outlined within this document using the information presented in the Timeline section above.

If capacity does not exist, the OS and the CDC program will discuss an anticipated date to begin onboarding the jurisdiction's MMG; the kickoff meeting is scheduled when capacity is available.

Every effort should be made to avoid delaying jurisdiction onboarding. If a CDC program knows they will not be able to support onboarding at a given time, this should be communicated to the OS as soon as the CDC program is aware of delays. These pauses can then be communicated to jurisdictions to allow them to pivot their efforts, if needed.

If capacity is confirmed, a rough timeline will be created to present to the jurisdiction during the onboarding kickoff meeting.

MVPS ONBOARDING ENVIRONMENT ACCESS

Prior to the kickoff call, the OS requests that the MVPS team give the jurisdiction access to send messages to the MVPS onboarding environment for the notifiable conditions being onboarded.

ONBOARDING KICKOFF MEETING

The OS schedules a kickoff meeting with the jurisdiction, the CDC program, and, if appropriate, TA support partners and system vendors (e.g, NBS, Inductive Health). Invitations are also extended to DSAT and CSOT as optional attendees. Members of the NBS team are invited for NBS jurisdictions.

During the kickoff call, the following topics are discussed:

- Stages of the onboarding process and any questions that the jurisdiction may have about the onboarding process
- Any outstanding questions or issues with documentation from the onboarding package
- Any edits or changes needed to the proposed onboarding timeline
    - Assess for planned staff outages, competing projects, or tied up resources that may influence the timeline
    - Determine if reconciliation efforts may influence the timeline
- Date and time the jurisdiction will begin test message transmission
    - Try to agree on a set date during the call
- Transportation method jurisdiction will use to transmit messages to CDC
    - Guidance on transport during the onboarding process and troubleshooting guidance is tailored to each of the different transport options
- MVPS portal access needs for any additional jurisdiction users

The onboarding kickoff call slide deck will be attached to the meeting invite for the onboarding kickoff call.

PHASE 2: ONBOARDING

Once the kickoff call is complete, onboarding consists of three stages:

1. Test message validation
2. Limited production validation
3. Cutover to production

These stages help ensure that the jurisdictions can make the transition to sending the MMG-specific HL7 messages, the data can be received and provisioned appropriately within CDC, and the CDC programs are comfortable with the quality of the data received from the jurisdictions. These stages must be completed before a jurisdiction can commence HL7 routine notifications to MVPS production.

STAGE 1: TEST MESSAGE VALIDATION

Roles: Jurisdiction, OS, Optional – CDC program

The test message validation stage consists of the jurisdiction establishing transport and successfully transmitting quality test messages to CDC.

After the kickoff call, the OS will send an email to the jurisdiction with next steps, including transportation information (i.e., the PHINMS service action pair, if applicable). Within the email, the OS will remind the jurisdiction to send an email to the CDC EDX Mailbox (edx@cdc.gov) with the subject "[*Jurisdiction name*]: [*MMG name*] Onboarding - Test Messages Submitted" once they've submitted their test messages to the MVPS onboarding environment.

SEND TEST MESSAGES

Jurisdiction submits test messages to CDC's MVPS onboarding environment.

- The jurisdiction uses their preferred transport method to send their test messages to the MVPS onboarding environment
- The jurisdiction sends an email to the EDX Mailbox (edx@cdc.gov) "[*Jurisdiction name*]: [*MMG name*] Onboarding - Test Messages Submitted" once their test messages are submitted.
- OS verifies that the test messages have been received in the MVPS onboarding environment and contacts the jurisdiction to confirm that the messages were received successfully or to notify the jurisdiction that the messages were not received. The CDC program is copied in this communication to the jurisdiction, and this serves as notification to the CDC program that the test messages are available in the MVPS onboarding environment.

REVIEW TEST MESSAGES

The OS reviews the test messages for compliance with the MMG, content issues, and structural issues. A CDC program interested in participating in the test message review should respond to the email sent by the OS indicating that they plan to review, unless previously communicated to DSAT that they plan to routinely participate.

The OS reviews the test messages, comparing HL7 test messages to the jurisdiction's expected test message values within the completed Test Case Scenario Worksheet and Implementation Spreadsheet.

All test messages undergo validation. The list that follows, although *not* comprehensive, shows the validation checks OS will perform:
Transmission Validation – based on what and how messages were received

- Confirmation that sending application OID and facility OID are correct
- Number of messages sent = number of messages received
- Number of cases sent = number of cases received
- Check for appropriate MSH-11 values

Structural Validation – based on the message structure and validated against HL7 2.5.1 Spec and PHIN Spec

- Data Type Processing Rules (Outlined in the PHIN Spec)
- Length issues
- Literal and PID value errors
- Required variables
- Missing values

Content Validation – based on data type, cardinality, and value sets

- Validation against MMG-specific value sets
- Incorrect data types, cardinality
- Valid OBR group (section header) identifiers
- Missing/incorrect condition codes, report statuses

Blanket Business and Processing Rules – minimum message checks

- Inaccurate messaging of data elements in a repeating group
- Missing OBX-4 issues
- Literal value errors
- Triplets
- Illogical scenarios, cross-variable checking

Additional Review

- Review of the lab template (if sent)
- Systematic issues across all messages (e.g., mapping issues)
- Required and Priority 1 data elements that the jurisdiction has confirmed they can send are populated
- Percentage of a data element that is populated across sample messages

Five business days are allotted to complete test message validation work: message review, issue identification, issues reported to OS (if the CDC program opts to review), and feedback provided to the jurisdiction by the OS. If additional iterations are required, the timeline of five business days is reset for each iteration. If the CDC program chooses to review the test messages, they will do this simultaneously with the OS; the five business days is inclusive of both CDC parties performing test message review.

- *If issues are identified,* the OS consolidates the feedback, sends it to the jurisdiction, and includes the CDC program. Feedback may include requests for the jurisdiction to update or validate documentation to align with test messages received and corrections or updates to their system. (Proceed to "Jurisdiction Corrects Test Messages.")
    - *Process is iterative until no further issues are identified or until the OS and the CDC program agree to allow the jurisdiction to proceed to the next step*
- *If there are no issues*, OS notifies the jurisdiction they should proceed to the next onboarding stage—Limited Production Message Validation (LPM).

JURISDICTION CORRECTS TEST MESSAGES

(If needed) The jurisdiction corrects messages and updates system based on feedback from CDC and resubmits updated test messages to the MVPS onboarding environment.

Five business days are allotted to the jurisdiction to review feedback and make corrections. If updates or corrections will take longer than five business days, the jurisdiction should communicate this to the OS so the timeline may be reviewed and updated as needed.

Updated test messages are reviewed upon receipt at CDC following the process outlined in "Review Test Messages."

JURISDICTION APPROVED TO SUBMIT LIMITED PRODUCTION MESSAGES (LPM)

The OS sends an email confirming the test messages are correct and approves the jurisdiction to move to the limited production phase.

The email includes instructions on how to send limited production messages (LPM) to the MVPS onboarding environment and instructs the jurisdiction to send an email to edx@cdc.gov with the subject "[*Jurisdiction name*]:[*MMG name*] Onboarding - LPM Submitted" when limited production messages have been transmitted to the MVPS onboarding environment. The email should contain the number of limited production messages sent.

STAGE 2: LIMITED PRODUCTION MESSAGE VALIDATION (LPM)

Roles: Jurisdiction, OS, CDC program

Limited production message validation requires a jurisdiction to submit a high volume of production messages from their production environment to the CDC MVPS onboarding environment. These messages allow for validation of production-level data from the jurisdiction. During limited production validation, the CDC program should confirm data provisioning is accurate and identify any issues requiring resolution prior to the jurisdiction shifting to production-level reporting in MVPS production environment.

SUBMIT LIMITED PRODUCTION MESSAGES

The jurisdiction submits LPMs to the CDC MVPS onboarding environment. The requested number and content of LPMs may differ among jurisdictions and between MMGs to meet CDC program needs.

- The requested LPM volume is based on the average annual monthly case counts per condition, not to exceed 500 cases per condition
    - Prior to a jurisdiction onboarding, the CDC program and the OS determine the number of limited production messages that will be requested and provide the number during the onboarding kickoff call
- Messages should reflect scenarios defined by the CDC program
    - The CDC program communicates to the OS about specific LPMs the jurisdiction should submit
    - This provides the CDC program the opportunity to receive messages that reflect challenging or rare scenarios
    - These messages are part of the total quantity sent (e.g., among the 250 messages sent for a condition, 10 are scenarios, or specific cases, requested by the CDC program)

REVIEW LIMITED PRODUCTION MESSAGES

The OS and CDC program review and validate the limited production messages.

Ten business days are allotted to each iteration of the review of the limited production messages. The work includes review of messages, identifying issues, reporting them to OS, and OS communicating the discrepancies to the jurisdiction. The CDC program and the OS will review the LPMs simultaneously, and the 10 business days applies to both teams' work efforts. For MMGs with multiple conditions, this timeframe may be longer – the CDC program and the OS should discuss this as part of the timeline determination during pre-onboarding or onboarding.

During the review process, limited production messages undergo the following review efforts:

- OS
    - Review to determine that messages are being created and submitted properly
    - Identify issues that are systematic or stem from the switchover from the jurisdiction's test environment to their production environment (e.g., errors, warnings, and consistently missing data)
- CDC program
    - Opportunity to confirm data are equal to or an improvement on current legacy feed
    - Determine potential positive or negative programmatic impact
    - Update provisioning system to incorporate the jurisdiction's MMG production data

If issues are found, the OS consolidates feedback and emails the jurisdiction, copying the CDC program, with the requested changes and instructions for submitting corrected messages. If needed, a conference call may be held to help clarify requests prior to submission of the updated messages. (Proceed to "Correct Limited Production Messages.")

If there are no issues, or once all issues are resolved, proceed to "Move to Production Signoff."

CORRECT LIMITED PRODUCTION MESSAGES

The jurisdiction reviews feedback and determines the source of the errors or warnings identified in the feedback. The jurisdiction adjusts mapping and updates system to resolve the issue(s).

Once corrections are made, the jurisdiction submits the updated limited production messages and notifies the OS that the updated messages were sent. The process then returns to "Submit Limited Production Messages" step.

MOVE TO PRODUCTION SIGNOFF

After consulting with the CDC program, the OS notifies the jurisdiction, via email, of the jurisdiction's successful completion of the limited production message phase and the plan to schedule the Cutover to Production meeting.

> **Note:** An issue that has a minor impact to the data should not prevent a jurisdiction from moving forward to the Cutover to Production stage of the onboarding process. To respect the time and effort put in by all parties involved in the onboarding process, do everything possible to bring data into production.

STAGE 3: CUTOVER TO PRODUCTION

Roles: Jurisdiction, OS, CDC program

This stage of onboarding includes the cutover to production meeting, transmission of year-to-date (YTD) messages, and transition to the MMG HL7 format. After completing this stage, onboarding is finalized and monitoring of messages moves to routine notification processes.

This section describes the onboarding process of a jurisdiction transitioning from a legacy NNDSS format to a new HL7 MMG. If the jurisdiction is moving from a generic version 2 (GenV2) MMG to condition-specific MMG the process to follow is outlined in "Appendix B: Cutover to Production for GenV2 MMG to Condition-specific MMG."

MVPS NOTIFIED OF INCOMING YEAR-TO-DATE

On or before the cutover to production meeting, OS notifies MVPS that the jurisdiction is preparing to send messages to the MVPS production environment, providing the relevant information to MVPS, and requesting the appropriate changes in MVPS to allow receipt of the HL7 data format for approved conditions.

- MVPS team grants permission to the jurisdiction to send messages to the MVPS production environment.
- MVPS informs the OS that the jurisdiction has been granted permission for the new MMG format.
- *If applicable,* the OS gives MVPS, the CDC program, and transport partners advance warning that a large volume of YTD messages is expected in the MVPS production environment.
    - CDC will instruct jurisdictions on batch sizes and provide guidance for a submission timeline of YTD data.

CUTOVER TO PRODUCTION MEETING

The OS schedules a meeting with the jurisdiction, the CDC program, and any additional partners needed (i.e., CSOT, APHL, and NBS) to discuss the transition to HL7 case notifications using the message mapping guide (MMG).

- Information shared during this meeting:
    - Definition of YTD data as unreconciled data for the current MMWR year and previous year(s) (if applicable)
    - Any barriers identified by the jurisdiction that CDC should be aware of related to transmitting non-reconciled YTD messages
    - Date the jurisdiction anticipates they'll begin sending YTD messages
        - Closeout or reconciliation activities by programs and NNDSS must be considered when establishing the date for transmission and years included in the YTD messages
    - Discussion of batch sizes and preferred days of submission to allow for successful transmission of a large volume of data
    - Estimated count of messages to be sent as YTD data
    - Function of the "Data Source" drop-down menu in MVPS production portal
    - Reminder to email edx@cdc.gov with the subject "[*Jurisdiction name*]: [*MMG name*] Onboarding - YTD submitted" when the jurisdiction has submitted their messages
        - This email should include a count of the messages the jurisdiction transmitted to the MVPS production environment. Inclusion of additional information from the jurisdiction may be requested.
    - Approval for jurisdiction to begin sending YTD data to the MVPS production environment on or around the agreed upon date
- After the cutover to production meeting, the OS will send an email to the jurisdiction with next steps, including transportation information (i.e., the PHINMS service action pair, if applicable) and instructions

on sending YTD messages, as well as legacy YTD messages, where applicable, to the production environment
    - Proceed to "Year-to-date Validation."

YEAR-TO-DATE VALIDATION

Roles: Jurisdiction, OS, CDC program

Year-to-date validation requires a jurisdiction to submit production YTD messages to CDC's MVPS production environment. These messages are used to populate CDC production databases and to ensure that the new format accounts for all unreconciled data. Jurisdictions are considered **IN PRODUCTION** for the new case notification format, or MMG, and all new cases will be sent in this format. Only after YTD messages are assessed for errors and case count discrepancies will the jurisdiction's data be included in NNDSS publications; as a result, new cases sent during this time might not be published until YTD validation is complete.

JURISDICTION SUBMITS MESSAGES TO PRODUCTION

The jurisdiction submits production YTD messages to CDC's MVPS production environment and begins submitting current case notifications using the new NNDSS format.

- If applicable, the jurisdiction will first send their full unreconciled, NNDSS legacy-formatted YTD messages **before** sending the HL7 YTD messages.
    - Jurisdictions can choose to continue to send their NNDSS legacy format to continue to populate NNDSS public data sources (e.g., CDC WONDER).
    - If a jurisdiction is not able to send, or prefers not to continue sending, NNDSS legacy transmissions, the NNDSS publicly displayed data (e.g., CDC WONDER) will not be populated with new case data until the HL7 data has been validated and approved for publication in NNDSS public data sources.
- The jurisdiction reconfigures their production environment to send the HL7 messages to the MVPS production environment using the correct configuration of their transport mechanism.
- The jurisdiction begins submitting their current case notifications using the new HL7 format to the MVPS production environment.
    - These messages can be viewed in the MVPS portal using the "Data Source" drop-down menu and in the MVPS SQL views using the "onboarding status" variable, where it is set to "O."
- The jurisdiction emails edx@cdc.gov with the subject "[*Jurisdiction name*]: [*MMG name*] Onboarding - YTD submitted" to confirm messages have been transmitted and provide the number of messages and cases submitted.

CONFIRM TRANSMISSION AND DATABASE POPULATION

The OS confirms that the number of messages and cases transmitted have arrived successfully in the MVPS NNSD

- The OS emails the jurisdiction to notify them of successful or unsuccessful receipt of messages.
    - *If transmission issues are identified*, the OS provides feedback to the jurisdiction, copying the CDC program
        - The issues may be related to the transport mechanism or errored messages (i.e., HL7 structural errors or required data elements that will not allow the message to be processed)
        - OS requests the jurisdiction implement feedback (make corrections or updates to their system)
        - OS will engage MVPS, transport, or other partners if needed to resolve any outstanding issues
    - *If there are no issues,* proceed to "Year-to-Date Messages Review."

YEAR-TO-DATE MESSAGES REVIEW

The YTD messages are reviewed to assess for any final issues/concerns and to confirm all cases in legacy feed are included in the YTD messages. **Five business days** are allotted for this review.

- Any major warnings will be reviewed, and summary reports will be created for the jurisdiction to review and correct
- CDC program confirms YTD cases received are in their system
- Any issues identified are communicated to the jurisdiction as soon as possible to reduce the need for re-submission of YTD message batches

DSAT and the CDC program will work together to review and discuss next steps for a jurisdiction whose data contain a systematic issue which may require time greater than ten business days to rectify or which cannot be rectified at all. If a consensus cannot be reached with these CDC staff, then the item will be escalated to an appropriate level of CDC program and DHIS leadership.

JURISDICTION YEAR-TO-DATE DATA MOVED TO "PRODUCTION" FOR PUBLICATION

Once all expected YTD messages are confirmed as received and acceptable by CDC and the jurisdiction, the OS notifies MVPS that the jurisdiction's YTD data has been approved and the "onboarding status" can be updated from "Onboarding (O)" to "Production (P)" status. These messages can now be viewed in the MVPS portal using the "Data Source" drop-down menu set to "Production (P)" and in the MVPS SQL views using the "onboarding status" variable set to "(P)." This allows the HL7 YTD data to be provisioned to CDC WONDER and consolidated views for approved conditions.

- MVPS team updates YTD data to "Production (P)" status and inactivates legacy data, if applicable.
- After MVPS has confirmed that the jurisdiction's status has been updated, the MVPS dashboard case summary view displays the case counts for the HL7 format using the "Data Source" set to "Production (P)" and legacy formats are no longer visible on the case summary view (the messages can still be found in other views or using the "Show Message Type Retired" toggle to see retired formats).

JURISDICTION ONBOARDING IS COMPLETE

The OS emails the jurisdiction to let them know that onboarding has been completed and they should continue to send new cases and updates to the MVPS production environment using the MMG HL7 format.

The OS provides the jurisdiction with directions related to non-NNDSS legacy data feeds, if applicable.

PHASE 3: ROUTINE NOTIFICATIONS

Onboarding is now complete. All new case notifications will be sent using the new MMG HL7 format. Messages sent in legacy formats or previous MMGs (e.g., generic version 2 [GenV2] MMG profile if the jurisdiction just onboarded a condition-specific guide) will not be processed, and MVPS will log a format error in the portal. The OS will continue to monitor the messages for two weeks after completion. Jurisdictions will work directly with the CDC program or CSOT to address data completeness and data quality issues which can be corrected by sending updated messages.

In an emergency response, data needs may require jurisdictions to enter or provide data in additional systems or formats to supplement regular HL7 case notification.

PRODUCTION BEST PRACTICES AND NEXT STEPS

- Messages should be submitted as close to real-time as possible (daily or multiple times a day), but no less than weekly.
    - Once a case meets the case definition, the jurisdiction should send a case notification to CDC even if minimal information is available for the case. Updated messages should be sent as more information is obtained and to update the case classification status.
- Jurisdictions should monitor regularly for value set updates, which may post at any time. DSAT will use a variety of mechanisms to announce when new value sets are available. Jurisdictions should work to adopt new value sets as close to release as possible, but no later than within one year of release.
- The MVPS portal offers a variety of dashboards that jurisdictions can use to monitor their case notifications. It is recommended that jurisdictions check the dashboard daily to ensure that messages are received and processed, and errors are corrected.
- Issues with the MVPS portal or requests for enhancements should be submitted to edx@cdc.gov with a clear indication of the issue in the subject line to facilitate routing and resolution.
- The OS may share their knowledge of the jurisdiction's system and case notification processes when needed to resolve post-production issues.

APPENDICES

APPENDIX A: ARBOVIRAL V1 SERIES MMG ONBOARDING PROCESS

JUSTIFICATION FOR ARBOVIRAL MMG DIFFERENCES

During the 2016 Zika response, rapid implementation of the arboviral MMG was needed to provide Zika virus disease and infection data to the CDC program. This immediate need resulted in a decision to use the existing NNDSS's Data Message Brokering (DMB) system for data receipt and processing rather than waiting for the launch of MVPS.

The CDC arboviral program's system, ArboNET, updates by pulling all the data for a jurisdiction from DMB and overwriting the previous data. This requires a different onboarding process for the arboviral MMG.

Please note that the arboviral MMG is currently not based on the Genv2 MMG. The arboviral V1 Series MMG is based on an older PHIN Spec format (version 2 series) than the PHIN Spec for the generic-based MMGs (version 3 series).

DIFFERENCES IN THE PROCESS

Though most of the arboviral MMG pre-onboarding phase and the onboarding phase's test message validation stage activities are very similar to the activities for onboarding other MMGs, the arboviral MMG onboarding process differs at several points outlined below.

The arboviral MMG onboarding process utilizes three DMB system environments (staging, backup production, and production), instead of the two MVPS environments (onboarding and production). Because the arboviral data is not sent to MVPS or processed into the MVPS portal, there is no need for a jurisdiction to request SAMS or MVPS portal access.

PRE-ONBOARDING

The jurisdiction will use technical documentation such as case investigation forms, example data currently sent to CDC, and technical architecture workflows and diagrams to compare MMG data elements against their surveillance system. A jurisdiction may need to review current business processes to ensure all data previously submitted to CDC can be captured in the integrated surveillance system.

A jurisdiction must transition all human arboviral data into one system, preferably the integrated surveillance system. The integrated surveillance system's test and production environments should be updated by addressing gaps between the system and MMG identified during the gap analysis stage.

With these differences in mind, the "Pre-onboarding" section can be followed for the arboviral MMG.

ONBOARDING: YEAR-TO-DATE DATA COMPARISON

Instead of limited production message validation, an in-depth year-to-date (YTD) data comparison is performed to ensure no data is lost when the jurisdiction's year-to-date data replaces the data in ArboNET during onboarding. The iterative review process and timelines described for the "Review Limited Production Messages" and "Correct Limited Production Messages" steps will be used for the arboviral YTD data comparison process.

ONBOARDING: CUTOVER TO PRODUCTION

Rather than the jurisdiction sending the year-to-date data to the production environment directly, the DMB system team moves the YTD from backup production to production to ensure the accuracy of the HL7 data that

will overwrite the data in ArboNET. Once the CDC program and the OS have confirmed the data comparison stage is complete, the OS emails the DMB system team to request the YTD data be moved from backup production to production. The CDC program then reviews the data in production and notifies the OS of approval of the data or if issues or changes required. The OS works with the CDC program, the DMB system team, and the jurisdiction to resolve any outstanding issues. Once the CDC program has confirmed the data is in production as expected, the OS notifies the jurisdiction that onboarding is complete. Jurisdictions should submit data as outlined in the "Production Best Practices and Next Steps" section and include all queued messages in the new production feed.

JURISDICTION ONBOARDING IS COMPLETE

From this point forward, a jurisdiction can only submit new human arboviral cases and updates to existing cases via HL7 arboviral version 1 series messages. To confirm arboviral notification messages were received at CDC, jurisdictions should review their transport logs (e.g., PHINMS acknowledgements in their console) and can reach out to DMB staff by emailing dmbnndsupport@cdc.gov. Jurisdictions can view their arboviral notification data received by CDC within the ArboNET web application, but it **should not** be edited in ArboNET after onboarding the MMG; instead, changes should be made in the jurisdiction system and the updates should be transmitted in case notifications. Since the arboviral MMG is only for human cases, animal/vector data should continue to be submitted through a jurisdiction's existing method.

APPENDIX B: CUTOVER TO PRODUCTION FOR GENV2 MMG TO CONDITION-SPECIFIC MMG

EXPECTATION OF THE "ONBOARDING STATUS"

When a jurisdiction is already in production for the GenV2 MMG, the "onboarding status" of their HL7 messages is "P" for production. When a jurisdiction is ready to transmit their condition-specific MMG HL7 messages to the MVPS production environment during Stage 3: Cutover to Production, MVPS will not make any changes to the "onboarding status"; the "onboarding status" continues to be "P." To filter the condition-specific MMG HL7 messages from the GenV2 MMG HL7 messages during onboarding, the OS and the CDC program must filter using the condition-specific message profile identifier and the date the YTD messages were first received in MVPS production. The most recent messages will update existing cases and MVPS will annotate with a "current record flag" = "Y." *Note: Additional updates to these messages may occur if the case data are corrected during review.*

MVPS NOTIFIED OF INCOMING YEAR-TO-DATE

On or before the cutover to production meeting, the OS notifies MVPS that the jurisdiction is preparing to send updated production YTD messages with the condition-specific MMG profile and requests the appropriate changes in MVPS to allow receipt of the new message profile for approved conditions.

- MVPS team grants permission to the jurisdiction to send messages to the MVPS production environment with the additional condition-specific message profile.
- MVPS informs the OS that the jurisdiction has been granted permission for the new MMG format.
- If applicable, the OS gives MVPS, the CDC program, and transport partners advance warning that a large volume of YTD update messages is expected.
    - CDC will instruct jurisdictions on batch sizes and provide guidance for a submission timeline of YTD data.

CUTOVER TO PRODUCTION MEETING

The OS schedules a meeting with the jurisdiction, the CDC program, and any additional partners needed (i.e., CSOT, APHL, and NBS) to discuss the transition to HL7 case notifications using the condition-specific message profile.

- Information acquired during this meeting:
    - Definition of updated production YTD data as unreconciled data for the current MMWR year and previous year(s) (if applicable)
    - Any barriers identified by the jurisdiction that CDC should be aware of related to transmitting non-reconciled, updated production YTD messages
    - Dates of:
        1. When the jurisdiction will update the GenV2 message profile identifier to the condition-specific MMG message profile identifier, and
        2. When the jurisdiction anticipates they'll begin sending YTD messages.

      Reminder: *the jurisdiction should not switch back to the GenV2 message profile identifier once production or the YTD messages have been transmitted.*

    - Discussion of batch sizes and preferred days of submission to allow for successful transmission of a large volume of data
    - Estimated count of messages to be sent as updated production YTD data
    - Reminder to use the "Data Source" drop-down menu value of "Production (P)" in the MVPS production portal for viewing the transmitted YTD messages

- Reminder to email edx@cdc.gov with the subject "[*Jurisdiction name*]:[*MMG name*] Onboarding - YTD submitted" when the jurisdiction has submitted their messages
    - This email should include a count of the messages the jurisdiction transmitted to the MVPS production environment. Inclusion of additional information from the jurisdiction may be requested.
- Approval to jurisdiction to begin sending updated production YTD data to the MVPS production environment on or around the agreed upon date

After the cutover to production meeting, the OS will send an email to the jurisdiction with next steps, including transportation information (i.e., the PHINMS service action pair, if applicable) and instructions on sending updated production YTD messages to the production environment.

YEAR-TO-DATE VALIDATION

Roles: Jurisdiction, OS, CDC program

Year-to-date validation requires a jurisdiction to submit updated production YTD messages with the condition-specific message profile to CDC's MVPS production environment. These messages are used to populate CDC production databases with the unreconciled data in the new MMG format. Jurisdictions are considered **IN PRODUCTION** for the new MMG, and all new cases will be sent with the condition-specific message profile while YTD messages are assessed for errors. Unlike transitioning from a legacy format to a new format, a jurisdiction's data will continue to be included in NNDSS publications during this transition.

JURISDICTION SUBMITS UPDATED MESSAGES TO PRODUCTION

The jurisdiction submits updated production YTD messages to CDC's MVPS production environment. The jurisdiction begins submitting current case notifications using the new message profile.

- The jurisdiction confirms the configuration of their production environment is still set to send the updated production HL7 messages to the MVPS production environment using the correct configuration of their transport mechanism.
- Jurisdiction begins submitting their updated production YTD and current case notifications using the condition-specific message profile to the MVPS production environment.
    - These messages are viewed in the MVPS portal when the "Data Source" is set to "Production(P)," and in the MVPS SQL views, the messages will have the "onboarding status" variable set to "P" and should have a "current record flag" designation of "Y."
- Jurisdiction emails edx@cdc.gov with the subject *"[Jurisdiction name]:[MMG name]* Onboarding - YTD submitted" to confirm messages have been transmitted and provide the number of messages and cases submitted.

CONFIRM TRANSMISSION AND DATABASE POPULATION

The OS confirms that the number of updated production YTD messages have arrived successfully in the MVPS production environment. **Three business days** are allotted for this confirmation.

- The OS emails the jurisdiction to notify them of successful or unsuccessful receipt of messages.
    - *If transmission issues are identified,* the OS provides feedback to the jurisdiction
        - The issues may be related to the transport mechanism or errored messages (i.e., HL7 structural errors or required data elements that will not allow the message to be processed)
        - OS requests the jurisdiction implement feedback (make corrections or updates to their system)

        - OS will engage MVPS, transport, or other partners if needed to resolve any outstanding issues
    - *If there are no issues*, proceed to "Year-to-Date Messages Review."

YEAR-TO-DATE MESSAGES REVIEW

The updated production YTD messages are reviewed to assess for any final issues/concerns and to confirm all cases contain the condition-specific message profile and additional condition-specific data elements. **Five business days** are allotted for this review.

- Any major warnings will be reviewed, and summary reports will be created for the jurisdiction to review and correct
- CDC program confirms updated YTD cases received are in their system
- Any issues identified are communicated to the jurisdiction as soon as possible to reduce the need for re-submission of YTD message batches

DSAT and the CDC program will work together to review and discuss next steps for a jurisdiction whose data contain a systematic issue which may require time greater than ten business days to rectify or which cannot be rectified at all. If a consensus cannot be reached with these CDC staff, then the item will be escalated to an appropriate level of CDC program and DHIS leadership.

Upon completion, proceed to "Jurisdiction Onboarding is Complete."