

Reporting Mass Vaccination Event Population Groups and Tiers

Vocabulary and HL7 Guidance for Mass Vaccination Event Data Capture

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# **Background**

During a Pandemic Response, as well as during Mass Vaccination Event Scenarios for emergency response and natural disasters, the availability of vaccine that can be administered can be limited. Because of this, there are priorities that place certain individuals into groups to protect the health care infrastructure, vulnerable population and keep a stable public infrastructure in place. The Centers for Disease Control and Prevention (CDC) has developed guidance on how they will categorize population groups then determine a specific tier those population groups would be placed in based on the severity level of the contagious disease. There are many factors that will determine the administration of vaccine to those tiers based on vaccine availability and these population groups.

Currently there is no common vocabulary or standardized way to describe some of the documentation that has been provided by the CDC to inform Immunization Information Systems (IIS) how to handle a Mass Vaccination Event and how distribution and administration will be conducted based on tiers and population groups. There is also no guidance in regards how to handle individuals movement between these population groups based on various factors or phases and how that would affect the individuals tier status as well as vaccine availability to that individual for administration so an effective date of assessment would be beneficial for IIS to capture. Additional guidance is needed as well in regards to how the administration of a vaccine being administered to an individual in a tier is able to be tracked and captured and how that relates to the individuals population group. Using the current HL7 2.5.1 release 1.5, VXU standard will the necessary structure to submit mass vaccination event population group, tier, and effective date information.

There are additional needs for other systems that are able to identify and capture individuals in these population groups and tiers and communicate that information over to an IIS that need to be developed as well. There are needs for other systems to be able to identify and capture that individuals population group and tier when administering vaccine to that individual and be able to report that information over to an IIS. There are other needs as well in regards to provider workflow assessment and assignment of population groups and tiers necessary as well when it comes to administration of vaccine as well so the IIS is capturing the best information as possible at time of administration.

## Mass Vaccination Event and Pandemics

CDC documents refer to planning for a pandemic and dividing the population into groups that could be given priority for limited vaccination supply. However, this guidance document uses the term “Mass Vaccination Event” to refer any event at the national or local jurisdiction level that requires a similar response, including:

* Pandemic (E.g. COVID-19)
* Natural Disaster (E.g. Hurricane)
* Bioterror Event (E.g. Anthrax)

For the purposes of this document the term “Mass Vaccination Event” and “Pandemic” will be used interchangeably and refer to the same concept. Also, the term “Mass Vaccination Event” is not meant here to imply how vaccinations will be distributed and administered during a pandemic, that is beyond the scope of this document.

# **Scope of Guidance**

This workgroup has been put together and will focus primarily on the following in regards to being able to provide guidance and information specific that should be a standardized approach that the IIS community can use going forward in regards to Mass Vaccination Event situations where vaccine need to be determined and distributed based on population groups and tiers.

## In Scope

1. **Vocabulary**The workgroup will work on a standardized vocabulary in supplement to the CDC information so that when an IIS is involved in vaccination during a mass vaccination event everyone is able to speak the same generic basic vocabulary that can be used across the IIS community as well as other systems communicating with the IIS.
2. **Generic Non Specific Guidance**The workgroup will work on developing guidance in regards to handling Mass Vaccination Events/Population Groups/Tiers and how they interact with each other and where the information is needed to be captured based on a patient(client) level or the vaccination level in a generic manner so that it can be repeatable in the event of any Mass Vaccination Event.
3. **Patient Level Capture**The workgroup will work on developing HL7 2.5.1 Release 1.5 VXU messaging guidance in regards to how message information that is seen as ideal information to capture for patient(client) level information specific to a Mass Vaccination Event Events/Population Groups/Tiers that patient(client) is determined to be in for that Mass Vaccination Event without administration of vaccine specific to the Mass Vaccination Event.
4. **Vaccination Level Capture**This workgroup will work on developing HL7 2.5.1 Release 1.5 VXU messaging guidance in regards to how message information that is seen as ideal information to capture for patient(client) level information specific to a Mass Vaccination Events/Population Groups/Tiers that patient(client) is determined to be in for that Mass Vaccination Event with administration of vaccine specific to the Mass Vaccination Event.
5. **Vaccination Level Capture**This workgroup will work on developing HL7 2.5.1 Release 1.5 VXU messaging guidance in regards to how message information that is seen as ideal information to capture for vaccination level information specific to a Mass Vaccination Events/Population Groups/Tiers that the patient(client) was in at time of vaccine administration specific to the Mass Vaccination Event.

## Out of Scope

* How specific priority groups or populations will be identified during a mass vaccination event. These will be determined as needed by national and local jurisdictions.
* Reporting the population group or tier information in a query response (RSP) message.
* Importing lists of patients of specific population groups into the IIS in a non-HL7 format. (e.g. importing a list of employees who need to be vaccinated as a group)
* Reminders and recalls that the IIS might create based on population group or tier.
* How vaccines will be distributed.
* Reports an IIS may generate to report on population groups or tiers.
* How an individual is assigned to a specific population group, especially when the person qualifies for more than one.

# **Vocabulary**

## CDC Definitions

Pandemic - Pandemics happen when new (novel) pathogens emerges that are able to infect people easily and spread from person to person in an efficient and sustained way.

Population Group - People targeted for vaccination defined by occupation, age group, or risk level.

Tier - Across categories, vaccine will be allocated and administered according to tiers where all groups designated for vaccination within a tier have equal priority for vaccination. Groups within tiers vary depending on pandemic severity.

Category - Pandemic vaccination population groups are clustered into four broad categories (homeland and national security, health care and community support services, other critical infrastructure, and the general population).

Priority Group - Groupings of Population Groups that are defined by a tier.

Severity - Once a novel pathogen is identified and is spreading from person-to-person in a sustained manner, public health officials use the Pandemic Severity Assessment Framework (PSAF) to determine the impact of the pandemic, or how “bad” the pandemic will be. There are two main factors that can be used to determine the impact of a pandemic. The first is clinical severity, or how serious is the illness associated with infection. The second factor is transmissibility, or how easily the pandemic virus spreads from person-to-person. These two factors combined are used to guide decisions about which actions CDC recommends at a given time during the pandemic and these factors are used when defining tiers.

## IIS Definitions

**Mass Vaccination Event**A mass vaccination event is an event that requires vaccine to be distributed to mass populations in the event of a Pandemic, Emergency Response, and or natural disaster. IIS should be able to capture a Mass Vaccination Event based on the Patient(Client) Level as well as the Vaccination Level.

**Population Group**The Population Group refers to the CDC Population Group Definition and is the Population Group that the Patient(Client) that was assessed by the administering provider to be a part of based on the Mass Vaccination Event. IIS should be able to capture a Population Group for the Patient(Client) Level as well as the Vaccination Level.

**Tier**The Tier refers to the CDC Tier Definition and is the specific Tier that the highest most important Population Group the Patient(Client) that was determined to be in when assessed by the administering provider based on the Mass Vaccination Event. IIS should be able to capture a Tier based on the Patient(Client) Level as well as the Vaccination Level.

**Mass Vaccination Effective Date**The Mass Vaccination Effective Date is determined to be the date the Patient(Client) was assessed by the administering provider for population group and tier for a Mass Vaccination Event. IIS should be able to capture the Effective Date based on the Patient(Client) Level as well as the Vaccination Level.

**Category**The Category refers to the CDC Category Definition and is something that the IIS should not be capturing at this point in time.

**Priority Group**The Priority Group refers to the CDC Priority Group Definition and is something that the IIS should not be capturing at this point in time.

**Severity**The Severity refers to the CDC Severity Definition and is something that the IIS should not be capturing at this point in time.

## Generic Vocabulary

Use Case - A use case will have a name and describe at a high level the actors and description of a process of the use case as well as the expected outcome of the process. Similar to the example format below.

## Case Name - Example

- Actors - Who is establishing the process or using the process.

- Description - Description of the process.

- Expected Outcome - Describes the expected output of the process.

- General messaging guidance - Describes how to submit mass vaccination event, population groups, tier and effective date in a HL7 message.

# **Guidance**

The IIS must be able to capture Mass Vaccination Event at both the patient and vaccination level. The patient level information would be gathered when evaluating which population group and/or tier the patient belongs to and the vaccination level information would be associated with the administration of a vaccination that is part of a Mass Vaccination Event. This information would be contained in these fields:

* Mass Vaccination Event
* Population Group
* Tier
* Effective Date

These are communicated as a set of OBX segments grouped by a common Observation Sub-ID (OBX-4). They are organized in the HL7 message at two different levels:

|  |  |
| --- | --- |
| Patient Level | Grouped under an ORC/RXA combination where RXA-3 indicates “998^No vaccine administered^CVX”, following the same pattern as reporting patient related information such as reporting contraindications or precautions. |
| Vaccination Level | Grouped under an ORC/RXA that reports the administration of the vaccination related to the Mass Vaccination Event. |

Each OBX segment can be seen as a question and answer, where Observation Identifier (OBX-3) indicates the question and Observation Value (OBX-5) indicates the answer.

|  |  |  |
| --- | --- | --- |
| **Concept** | **Location** | **Details** |
| Mass Vaccination Event | OBX-5 | Where OBX-3 indicates Mass Vaccination Event |
| Population Group | OBX-5 | Where OBX-3 indicates Population Group |
| Tier | OBX-5 | Where OBX-3 indicates Tier |
| Effective Date | OBX-14 | The preceding OBX segments should all indicate the same effective date |

The Observation Identifier (OBX-3) and Observation Value (OBX-5) must be assigned coded values:

* There are no current LOINC codes to indicate the questions in Observation Identifier (OBX-e), these will need to be requested and this guide updated.
* Additional community discussion will be needed to determine how the answers in Observation Value (OBX-5) will be coded.

In order to communicate a complete set of information the following information must be communicated:

|  |  |  |
| --- | --- | --- |
| **Concept** | **Status** | **Details** |
| Mass Vaccination Event | Required | Population Group and Tier assignment occurs within the context of a specific event, and this must be indicated to both differentiate from other events and provide meaning to the other concepts.  In order to communicate any of the following concepts the Mass Vaccination Event must be indicated. |
| Population Group | Required if known, but may be omitted if Tier is indicated | Population Group should be indicated if known. Otherwise, if it is not known or was not determined then the concept, including the OBX segment it would be sent in, should be omitted.  If the Tier is omitted, then the Population Group is required. |
| Tier | Required if known, but may be omitted if Population Group is indicated | Tier should be indicated if known. Otherwise, if its not know or was not determined then the concept, including the BOX segment it would be sent in, should be omitted.  If the Population Group is omitted, then the Tier is required. |
| Effective Date | Required if known, but may be empty | Each OBX segment that communicates the Mass Vaccination Event information should indicate the effective date of this information in OBX-14. If the effective date cannot be determined or is unknown then OBX-14 should be left empty. |

This Mass Vaccination Event should only be communicated when the Population Group and/or Tier have been determined at either the patient or vaccination level. If no determination has been made, then no Mass Vaccination information should be submitted at the patient or vaccination level.

## Interaction Between Population Group and Tier

The guidance from the CDC indicates that as the severity of a pandemic changes, population groups will be re-assigned to new tiers. For example, in low severity a certain population may be not indicated to receive a vaccination but will in a high severity situation. The guidance for messaging this information is to:

* Senders should always communicate the Population Group and/or Tier as it was determined to be as of the Effective Date.
* Receivers should assume that patients may move in an out of population groups based on personal status changes. (E.g. employment changes.)
* Receivers should be prepared for population groups to be re-assigned to tiers as a pandemic progress.

# Examples

Test cases are being developed and update here: <https://github.com/immregistries/sisc-priority/wiki/Test-Cases>

Currently we have the following formatting and examples provided in regards to the Standardized Code Set construction information in order to stay conformant with discussion should be had in regards to who maintains these code sets we understand that as a community there should be some consensus when it comes to national guidance, however in cases of a jurisiction specific Emergency Response or Natural Disaster it would be beneficial to use possibly custom codes as well where needed, but wanted to be able to define a syntax to use to try to stay in conformance with the IIS community as best as we can.

Mass Vaccination Event – Code Set Syntax – PYYYY-Event Name

Mass Vaccination Event – Code Example – P2020-Flu

Mass Vaccination Event – Code Description – Pandemic 2020 – Influenza

Mass Vaccination Event – Code Set – 99TPG

Mass Vaccination Event Code Specific Information Example:

P2020-Flu^Pandemic 2020 – Influenza^99TPG

Population Group – Code Set Syntax – PG##

Population Group – Code Example – PG01

Population Group – Code Description – Deployed and mission essential personnel

Population Group – Code Set – 99TPG

Population Group Code Specific Information Example:

PG01^Deployed and mission essential personnel^99TPG

Tier – Code Set Syntax – T#

Tier – Code Example – T1

Tier – Code Description – Tier 1

Tier – Code Set – 99TPG

Tier Code Specific Information Example:

T1^Tier 1^99TPG

Specific Use Cases Developed to describe scenarios in which an IIS should be able to capture this information within a HL7 VXU 2.5.1 Release 1.5 message

EHR/EMR/Outside system submission of VXU message to IIS specific needs:

## Use Case 1:

Patient(Client) Level Mass Vaccination Identification

Actors - Provider & Patient & Submitting System & Receiving System

Description - Provider identifies what population group and/or tier the patient is in for the mass vaccination event and records that information in the submitting system.

Expected Outcome - Providers system sends the mass vaccination event information as well as the population group and/or tier the patient is in over to the IIS.

General messaging guidance - Describes how to submit mass vaccination event, population groups, tier and effective date in a HL7 message.

* No Vaccine Administered RXA Segment
* OBX group submission
  + Mass vaccination event information
  + Population group information
  + Tier information

## Example:

RXA|0|1|20200605||998^No Vaccine Administered^CVX|999||||||||||||||NA|A

OBX|1|CE|TPG\_PAND^Priority Group - Pandemic^99TPG|1|P2020-Flu^Pandemic 2020 - Influenza^99TPG||||||F|||20200524

OBX|2|CE|TPG\_POP\_GRP^Priority Group - Population Group^99TPG|1|PG01^Deployed \T\ mission essential personnel^99TPG||||||F|||20200654

OBX|3|CE|TPG\_TIER^Priority Group - Tier^99TPG|1|T1^Tier 1^99TPG||||||F|||20200524

## Use Case 2:

## Patient Mass Vaccination Vaccine Administration

Actors - Provider & Patient & Submitting System & Receiving System

Description - Provider identifies what population group and/or tier the patient is in for the mass vaccination event and records that information in the submitting system. Patient is identified as being in the population group and/or tier that is being vaccinated currently. Patient receives the vaccine available for the mass vaccination event.

Expected Outcome - Providers system sends the mass vaccination event information as well as the population group and/or tier the patient is in over to the IIS as well as the vaccine information that was administered to the patient.

General messaging guidance - Describes how to submit mass vaccination event, population groups, tier and effective date in a HL7 message.

* Vaccine Administered RXA Segment
* OBX group submission
  + Mass vaccination event information
  + Population group information
  + Tier information

## Example:

|  |
| --- |
| RXA|0|1|20200524||135^Influenza, high dose seasonal^CVX|0.5|mL^mL^UCUM||00^New Record^NIP001|7824^Jackson^Lily^Suzanne^^^^^NIST-PI-1^L^^^PRN|^^^NIST-Clinic-1||||315841|20201216|PMC^Sanofi Pasteur^MVX|||CP|A |
|  |

RXR|C28161^Intramuscular^NCIT|RD^Right Deltoid^HL70163

OBX|1|CE|TPG\_PAND^Priority Group - Pandemic^99TPG|1|P2020-Flu^Pandemic 2020 - Influenza^99TPG||||||F|||20200524

OBX|2|CE|TPG\_POP\_GRP^Priority Group - Population Group^99TPG|1|PG01^Deployed \T\ mission essential personnel^99TPG||||||F|||20200654

OBX|3|CE|TPG\_TIER^Priority Group - Tier^99TPG|1|T1^Tier 1^99TPG||||||F|||20200524

The Test Cases and the Testing Scenarios are based around these use cases specifically and provides specific examples based around these concepts.

# **Examples**

# **Appendix A: References**

1. HL7 Version 2.5.1 Implementation Guide for Immunization Messaging. <https://repository.immregistries.org/files/resources/5bef530428317/hl7_2_5_1_release_1_5__2018_update.pdf>
2. CDC Flu Pandemic Resource Guide.

<https://www.cdc.gov/flu/pandemic-resources/pdf/2018-Influenza-Guidance.pdf>

1. CDC Vaccination of Tier 1 at All Pandemic Severities

<https://www.cdc.goc/flu/pandemic-resouces/national-strategy/planning-guidance/pandemic-severities-tier-1.html>

1. CDC Roadmap

<https://www.cdc.gov/flu/pandemic-resources/pdf/roadmap_panflu.pdf>

# **Appendix B: Technical Resources**

* HL7 Version 2.5.1 Implementation Guide for Immunization Messaging. <https://repository.immregistries.org/files/resources/5bef530428317/hl7_2_5_1_release_1_5__2018_update.pdf>
* LOINC Code Sets

<https://loinc.org/downloads/loinc-table/>

# **Appendix C: Acknowledgements**

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