Test Plan Summary

HIMSS Immunization Integration Program CDC Test Plan v10.0

Description

Test Objectives

Test Case Group: Initial Data Load

Description

Test Objectives

The initial data load will consist of the vendor entering data during live interactive testing for four (4) patients with various scenarios. The data entry will include demographic data, immunization histories and specific conditions for each patient. The initial data load will also populate the inventory used in the use case.

Test Case	Juana Mariana Vazquez Initial Data Load

Description

The practice site for the scenario is Shoreline Pediatrics. The EHR vendor loads demographic data and clinical history for Juana Mariana Vazquez. The data includes immunizations provided by the practice.

The vendor also enters:

-Two vaccines administered at other sites

1. an influenza vaccine given at a local pharmacy

2. an inactivated polio vaccine given elsewhere and not reported to the registry - the history includes an adverse reaction (febrile seizure) 8 hours after the vaccine was administered

- Adverse reaction to inactivated polio vaccine (febrile seizure) and the date and source of information

NOTE: the historical vaccines will be imported during the Registry query (e.g. from another practice).

Test Objectives

Register New Patients: The EHR or other clinical software system must allow a user to enter distinguishing information about patients so that providers can uniquely identify patients who have similar sounding names or other similar identifying information. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar names. The EHR or other clinical software system must be able to store information to successfully match with patients in immunization registries, if the information is available. Specific to immunization registries, that information includes the mother's maiden name, whether the patient was part of a multiple birth, and the birth order (i.e., ordinal number of birth, first, second, etc.). This information allows the provider to correctly identify the patient and also helps ensure a match when the EHR sends the patient's information to external systems such as an immunization registry.

Record Past Immunizations: The EHR or other clinical software system allows providers to enter information about immunizations given elsewhere (e.g., by another doctor, at a public health clinic, pharmacy, etc.) with incomplete details.

Request/Receive Patient Immunization Data and Identify Source: The EHR stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry.

Data Quality Checks: The EHR or other clinical software system Integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections.

Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes:

- 2104 : Indicates that a historical dose is being reported for the current date.
- 2204 : Indicates that the administration being reported occurred too far in the past.

Supporting data for:

Compare Public Health Immunization Registry (IIS) Immunization History to EHR Immunization History: The public health immunization registry has returned the requested immunization history for a patient (Return Evaluated Immunization History and Forecast (Z42) – HL7 Version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). The EHR is able to display the evaluated immunization history received from the registry as well as the immunization history already present in the EHR so that a user can compare them. The EHR provides a way for the provider to view both histories, determine what is different (if anything), and update the existing EHR immunization history with new information from the public health registry if they choose to do so. The system must store the new information as structured data as part of the patient's local immunization history and include the time of the update and the source of the new information.

Identify Adverse Event: The EHR or other clinical software system enables capture of structured data regarding adverse events.

Test Steps

Enter Initial Demographic Data for New Patient Juana Mariana Vazquez	## Description The EHR vendor loads demographic data for Juana Mariana Vazquez. ## Test Objectives **Register New Patients:** The EHR or other clinical software system must allow a user to enter distinguishing information about patients so that providers can uniquely identify patients who have similar sounding names or other similar identifying information. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar names. The EHR or other clinical software system must be able to store information to successfully match with patients in immunization registries, if the information is available. Specific to immunization registries, that information includes the mother's maiden name, whether the patient was part of a multiple birth, and the birth order (i.e., ordinal number of birth, first, second, etc.). This information allows the provider to correctly identify the patient and also helps ensure a match when the EHR sends the patient's information to external systems such as an immunization registry.
Enter Initial Immunization Data for Juana Mariana Vazquez: Immunizations from Practice	## Description The EHR vendor loads immunization history data from the local practice for Juana Mariana Vazquez. This includes an MMR dose that was given too early. This MMR dose serves to seed checking for dose given too early in TestCaseGroup: Juana Mariana Vazquez Visit, TestCase: Query the Registry for Juana Mariana Vazquez, TestStep: Mark first MMR Dose as Invalid. ## Test Objectives **Record Past Immunizations:** The EHR or other clinical software system allows providers to enter information about immunizations given elsewhere (e.g., by another doctor, at a public health clinic, pharmacy, etc.) with incomplete details. **Request/Receive Patient Immunization Data and Identify Source:** The EHR stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry. Supporting data for: **Compare Public Health Immunization Registry (IIS) Immunization History to EHR Immunization History:** The public health immunization registry has returned the requested immunization history for a patient (Return Evaluated Immunization History and Forecast (Z42) – HL7 Version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). The EHR is able to display the evaluated immunization history received from the registry as well as the immunization history already present in the EHR so that a user can compare them. The EHR provides a way for the provider to view both histories, determine what is different (if anything), and update the existing EHR immunization history with new information from the public health registry if they choose to do so. The system must store the new information as structured data as part of the patient's local immunization history and include the time of the update and the source of the new information. **Receive Dose Not Indicated Alert for Single Vaccine Order:** The EHR or other clinical software system notifies the provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required.

Enter Initial Immunization Data for Juana Mariana Vazquez from Another Practice	## Description The EHR vendor loads immunization history data from another practice into the record for Juana Mariana Vazquez. ## Test Objectives **Record Past Immunizations:** The EHR or other clinical software system allows providers to enter information about immunizations given elsewhere (e.g., by another doctor, at a public health clinic, pharmacy, etc.) with incomplete details. **Request/Receive Patient Immunization Data and Identify Source:** The EHR stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered manually as patient-reported, and which were accepted electronically from the public health registry. Supporting data for: **Compare Public Health Immunization Registry (IIS) Immunization History to EHR Immunization History:** The public health immunization registry has returned the requested immunization history for a patient (Return Evaluated Immunization History and Forecast (Z42) – HL7 Version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). The EHR is able to display the evaluated immunization history received from the registry as well as the immunization history already present in the EHR so that a user can compare them. The EHR provides a way for the provider to view both histories, determine what is different (if anything), and update the existing EHR immunization history with new information from the public health registry if they choose to do so. The system must store the new information as structured data as part of the patient's local immunization history and include the time of the update and the source of the new information.
Attempt to enter vaccination too long ago for Juana Mariana Vazquez	## Description The provider attempts to enter immunization data with a data entry error and is alerted that the date identified is too long ago, in this case, before birth. ## Test Objectives **Data Quality Checks:** The EHR or other clinical software integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections. Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes: 2204: Indicates that the administration being reported occurred too far in the past.

Attempt to enter historical vaccination for current date for Juana Mariana Vazquez	**Description** The provider attempts to enter historical immunization for the current date and is alerted that of the possible data quality error. **Test Objectives** **Data Quality Checks:** The EHR or other clinical software integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections. Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes: - 2104: Indicates that a historical dose is being reported for the current date.
Enter Initial Immunization Data for Juana Mariana Vazquez Reported by Parent	**Description** The provider enters immunization data from a pharmacy as reported by the parent for Juana Mariana Vazquez. **Test Objectives** **Record Past Immunizations:** The EHR or other clinical software system allows providers to enter information about immunizations given elsewhere (e.g., by another doctor, at a public health clinic, pharmacy, etc.) with incomplete details. **Request/Receive Patient Immunization Data and Identify Source:** The EHR stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry. Supporting data for: **Compare Public Health Immunization Registry (IIS) Immunization History to EHR Immunization History:** The public health immunization registry has returned the requested immunization history for a patient (Return Evaluated Immunization History and Forecast (Z42) – HL7 Version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). The EHR is able to display the evaluated immunization history received from the registry as well as the immunization history already present in the EHR so that a user can compare them. The EHR provides a way for the provider to view both histories, determine what is different (if anything), and update the existing EHR immunization history with new information from the public health registry if they choose to do so. The system must store the new information as structured data as part of the patient's local immunization history and include the time of the update and the source of the new information.

Test Case	Juan Marcel Marina Initial Data Load

Description

The practice site for the scenario is Shoreline Pediatrics. The EHR vendor loads demographic data and clinical history for Juan Marcel Marina. The data includes a clinical history of varicella, and serological evidence of Hepatitis A immunity.

Test Objectives

Register New Patients: The EHR or other clinical software system must allow a user to enter distinguishing information about patients so that providers can uniquely identify patients who have similar sounding names or other similar identifying information. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar names. The EHR or other clinical software system must be able to store information to successfully match with patients in immunization registries, if the information is available. Specific to immunization registries, that information includes the mother's maiden name, whether the patient was part of a multiple birth, and the birth order (i.e., ordinal number of birth, first, second, etc.). This information allows the provider to correctly identify the patient and also helps ensure a match when the EHR sends the patient's information to external systems such as an immunization registry.

Supporting data for:

Modify Antigen Recommendations Based on Active Diagnoses: The EHR or other clinical software system notifies the provider of any conflicts between recommended vaccines in the updated forecast and the patient's current or historical diagnoses.

Test Steps

Enter Initial Demographic Data for New Patient Juan Marcel Marina	## Description The EHR vendor loads demographic data for Juan Marcel Marina. ## Test Objectives **Register New Patients:** The EHR or other clinical software system must allow a user to enter distinguishing information about patients so that providers can uniquely identify patients who have similar sounding names or other similar identifying information. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar names. The EHR or other clinical software system must be able to store information to successfully match with patients in immunization registries, if the information is available. Specific to immunization registries, that information includes the mother's maiden name, whether the patient was part of a multiple birth, and the birth order (i.e., ordinal number of birth, first, second, etc.). This information allows the provider to correctly identify the patient and also helps ensure a match when the EHR sends the patient's information to external systems such as an immunization registry.
Enter Clinical History for Juan Marcel Marina	## Description The clinical history of Chicken Pox (Varicella) is documented in the record created for Juan Marcel Marina. The lab tests show serologic immunity to Hep A and a finding is added indicating Hepatitis A Immune. ## Test Objectives Supporting data for: **Modify Antigen Recommendations Based on Active Diagnoses:** The EHR or other clinical software system notifies the provider of any conflicts between recommended vaccines in the updated forecast and the patient's current or historical diagnoses. Note: In this case, the vaccine is not recommended due to the history of the vaccine preventable condition (Varicella).

Test Case	Juana Mariela Gonzales Initial Data Load

Description

The practice site for the scenario is Shoreline Pediatrics. The EHR vendor loads demographic data and clinical history for twin Juana Mariela Gonzales.

Test Objectives

Register New Patients: The EHR or other clinical software system must allow a user to enter distinguishing information about patients so that providers can uniquely identify patients who have similar sounding names or other similar identifying information. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar names. The EHR or other clinical software system must be able to store information to successfully match with patients in immunization registries, if the information is available. Specific to immunization registries, that information includes the mother's maiden name, whether the patient was part of a multiple birth, and the birth order (i.e., ordinal number of birth, first, second, etc.). This information allows the provider to correctly identify the patient and also helps ensure a match when the EHR sends the patient's information to external systems such as an immunization registry.

Test Steps

Enter Initial Demographic Data for Juana Mariela Gonzales	**Description** The EHR vendor loads demographic data for Juana Mariela Gonzales. **Test Objectives** **Register New Patients:** The EHR or other clinical software system must allow a user to enter distinguishing information about patients so that providers can uniquely identify patients who have similar sounding names or other similar identifying information. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar names. The EHR or other clinical software system must be able to store information to successfully match with patients in immunization registries, if the information is available. Specific to immunization registries, that information includes the mother's maiden name, whether the patient was part of a multiple birth, and the birth order (i.e., ordinal number of birth, first, second, etc.). This information allows the provider to correctly identify the patient and also helps ensure a match when the EHR sends the patient's information to external systems such as an immunization registry.

Test Case	Juana Maria Gonzales Initial Data Load

Description

The practice site for the scenario is Shoreline Pediatrics. The EHR vendor loads demographic data and clinical history for twin Juana Maria Gonzales.

Test Objectives

Register New Patients: The EHR or other clinical software system must allow a user to enter distinguishing information about patients so that providers can uniquely identify patients who have similar sounding names or other similar identifying information. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar names. The EHR or other clinical software system must be able to store information to successfully match with patients in immunization registries, if the information is available. Specific to immunization registries, that information includes the mother's maiden name, whether the patient was part of a multiple birth, and the birth order (i.e., ordinal number of birth, first, second, etc.). This information allows the provider to correctly identify the patient and also helps ensure a match when the EHR sends the patient's information to external systems such as an immunization registry.

Test Steps

Enter Initial Demographic Data for Juana Maria Gonzales	## Description The EHR vendor loads demographic data for Juana Maria Gonzales. ## Test Objectives **Register New Patients:** The EHR or other clinical software system must allow a user to enter distinguishing information about patients so that providers can uniquely identify patients who have similar sounding names or other similar identifying information. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar names. The EHR or other clinical software system must be able to store information to successfully match with patients in immunization registries, if the information is available. Specific to immunization registries, that information includes the mother's maiden name, whether the patient was part of a multiple birth, and the birth order (i.e., ordinal number of birth, first, second, etc.). This information allows the provider to correctly identify the patient and also helps ensure a match when the EHR sends the patient's information to external systems such as an immunization registry.

Test Case	**Anita Francesca Marina Initial Data Load**

Description

The practice site for the scenario is Metro Primary Care. The EHR vendor loads demographic data and clinical history for Adult Anita Francesca Marina.

Test Objectives

Register New Patients: The EHR or other clinical software system must allow a user to enter distinguishing information about patients so that providers can uniquely identify patients who have similar sounding names or other similar identifying information. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar names. The EHR or other clinical software system must be able to store information to successfully match with patients in immunization registries, if the information is available. Specific to immunization registries, that information includes the mother's maiden name, whether the patient was part of a multiple birth, and the birth order (i.e., ordinal number of birth, first, second, etc.). This information allows the provider to correctly identify the patient and also helps ensure a match when the EHR sends the patient's information to external systems such as an immunization registry.

Provide Access to Update Immunization Information: The patient is able to add or request an update to immunization information for review by the provider.

Review Patient-Provided Immunization Information: The EHR or other clinical software system provides a mechanism for the provider to review patient-generated immunization data. It also provides a mechanism for the provider to update or annotate the immunization history, indicating the source of the information.

Request/Receive Patient Immunization Data and Identify Source: The EHR stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry.

Data Quality Checks: The EHR or other clinical software integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections.

Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes:

- 2002 : Indicates that the date of birth messaged in PID-7 is after the date of death messaged in PID-29.

- 2100 : Indicates that any date field is in the future. Specific errors for date transmitted in an OBX are also provided.

- 2202 : Indicates individual components of the address are valid, but overall, the address is invalid (conflict between elements, non-existent address, etc)

- 2007: Indicates a conflict between PID-29 and PID-30 or between PD1-16 and either PID field. In other words, one element indicates the patient is deceased and another element indicates the patient is not deceased.

- 2306 : Indicates that the patient found is too old.

Supporting data for:

Compare Public Health Immunization Registry (IIS) Immunization History to EHR Immunization History: The public health immunization registry has returned the requested immunization history for a patient (Return Evaluated Immunization History and Forecast (Z42) – HL7 Version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). The EHR is able to display the evaluated immunization history received from the registry as well as the immunization history already present in the EHR so that a user can compare them. The EHR provides a way for the provider to view both histories, determine what is different (if anything), and update the existing EHR immunization history with new information from the public health registry if they choose to do so. The system must store the new information as structured data as part of the patient's local immunization history and include the time of the update and the source of the new information.

Test Steps

Demographic Data Quality Checks for Anita Francesca Marina	**Description** The EHR vendor attempts to enter demographic data for new adult patient Anita Francesca Marina. These data quality checks primarily relate to improving patient matching information that will be included when submitting data to the immunization registry or when querying the immunization registry. **Test Objectives** **Data Quality Checks:** The EHR or other clinical software integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections. Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes: - 2002 : Indicates that the date of birth messaged in PID-7 is after the date of death messaged in PID-29. - 2100 : Indicates that any date field is in the future. Specific errors for date transmitted in an OBX are also provided. - 2202 : Indicates individual components of the address are valid, but overall, the address is invalid (conflict between elements, non-existent address, etc) - 2007: Indicates a conflict between PID-29 and PID-30 or between PD1-16 and either PID field. In other words, one element indicates the patient is deceased and another element indicates the patient is not deceased. - 2306 : Indicates that the patient found is too old.
Enter Initial Demographic Data for Anita Francesca Marina	**Description** The EHR vendor loads demographic and social history data for Anita Francesca Marina. **Test Objectives** **Register New Patients:** The EHR or other clinical software system must allow a user to enter distinguishing information about patients so that providers can uniquely identify patients who have similar sounding names or other similar identifying information. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar names. The EHR or other clinical software system must be able to store information to successfully match with patients in immunization registries, if the information is available. Specific to immunization registries, that information includes the mother's maiden name, whether the patient was part of a multiple birth, and the birth order (i.e., ordinal number of birth, first, second, etc.). This information allows the provider to correctly identify the patient and also helps ensure a match when the EHR sends the patient's information to external systems such as an immunization registry.
Anita Francesca Marina Electronically Submits Prior Immunization to Provider	**Description** The patient is able to provide information about the influenza vaccine that she received through her employer out of state using the patient facing features (e.g. portal) offered by the EHR. **Test Objectives** **Provide Access to Update Immunization Information:** The patient is able to add or request an update to immunization information for review by the provider.

Provider Review and Entry of Immunization Data for Anita Francesca Marina Provided by Patient	**Description** The provider is able to review the patient provided vaccine information for the influenza vaccine that she received through her employer out of state. The provider is able to document this historical vaccine in the EHR. **Test Objectives** **Review Patient-Provided Immunization Information:** The EHR or other clinical software system provides a mechanism for the provider to review patient-generated immunization data. It also provides a mechanism for the provider to update or annotate the immunization history, indicating the source of the information. **Record Past Immunizations:** The EHR or other clinical software system allows providers to enter information about immunizations given elsewhere (e.g., by another doctor, at a public health clinic, pharmacy, etc.) with incomplete details. **Request/Receive Patient Immunization Data and Identify Source:** The EHR stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry. Supporting data for: **Compare Public Health Immunization Registry (IIS) Immunization History to EHR Immunization History:** The public health immunization registry has returned the requested immunization history for a patient (Return Evaluated Immunization History and Forecast (Z42) – HL7 Version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). The EHR is able to display the evaluated immunization history received from the registry as well as the immunization history already present in the EHR so that a user can compare them. The EHR provides a way for the provider to view both histories, determine what is different (if anything), and update the existing EHR immunization history with new information from the public health registry if they choose to do so. The system must store the new information as structured data as part of the patient's local immunization history and include the time of the update and the source of the new information.
Enter Clinical History for Anita Francesca Marina	**Description** Lab tests show serologic immunity to Hepatitis A, and no serologic immunity to Hepatitis B. These finding are in the documented in the record created for Anita Francesca Marina indicating that she is Hepatitis A Immune, and that she has no immunity to Hepatitis B. **Test Objectives** Support for: **View Reconciled Immunization Forecast:** The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations. Note: clinical history for adult healthcare worker supporting vaccine recommendations.

Test Case	Enter Inventory

Description

The provider enters vaccine inventory data from available inventory.

Test Objectives

Update Vaccine Inventory from Stock Receipt: The EHR or other clinical software system updates the vaccine inventory when new stock is received at the site and updates the correct count of each vaccine, including those for use in guarantee programs (such as Vaccines for Children) and for private stock.

Display Available Vaccine Antigens: The system presents a list of vaccine antigens available for administration to patients (i.e., private stock vs. specific guarantee program).

Test Steps	
Enter Vaccine Inventory	## Description The provider receives a vaccine delivery and records the new vaccine data in available inventory. ## Test Objectives **Update Vaccine Inventory from Stock Receipt:** The EHR or other clinical software system updates the vaccine inventory when new stock is received at the site and updates the correct count of each vaccine, including those for use in guarantee programs (such as Vaccines for Children) and for private stock.
View Inventory	## Description The provider reviews the full list of vaccine inventory. ## Test Objectives **Display Available Vaccine Antigens:** The system presents a list of vaccine antigens available for administration to patients (i.e., private stock vs. specific guarantee program).

Test Case	Manage Configuration

Description

The user responsible for the EHR configuration updates the system with new vaccine codes, new vaccine schedules, and establishes SOAP-bases CDC WSDL configuration.

Test Objectives

Add new vaccine codes: Add codes to support new vaccines. This includes vaccine codes (CVX), National Drug Codes (NDC), and Vaccine Information Statement codes (VIS).

Update Patient Immunization Schedule: The EHR or other clinical software system displays a patient's anticipated immunization schedule routinely and updates the patient's schedule when immunization guidelines change.

Configure SOAP-based CDC WSDL for Transport: The EHR or other clinical software system configures connectivity using the SOAP-based CDC WSDL and demonstrates compliance with this standard transport

Add Jurisdiction-Specific Vaccine Eligibility Code: The EHR or other clinical software system demonstrates the ability to configure dose level vaccine eligibility codes per jurisdictional requirements. This includes tracking and exchanging a jurisdiction-specific dose level eligibility code for administered vaccines. Note that this capability only applies to newly administered doses, not historical doses.

Test Steps

Add New Vaccine Information	## Description The user responsible for the EHR configuration updates the system with new CVX, NDC, and VIS vaccine codes. ## Test Objectives **Add new vaccine codes:** Add codes to support new vaccines. This includes vaccine codes (CVX), National Drug Codes (NDC), and Vaccine Information Statement codes (VIS).
Update Vaccine Schedule Information	## Description The user responsible for the EHR configuration updates the system with a new vaccine schedule ## Test Objectives **Update Patient Immunization Schedule:** The EHR or other clinical software system displays a patient's anticipated immunization schedule routinely and updates the patient's schedule when immunization guidelines change.
Configure SOAP-based CDC WSDL	## Description The user responsible for the EHR configuration establishes SOAP-based CDC WSDL configuration and successfully submits a VXU record. ## Test Objectives **Configure SOAP-based CDC WSDL for Transport:** The EHR or other clinical software system configures connectivity using the SOAP-based CDC WSDL and demonstrates compliance with this standard transport.

Configure Jurisdiction-Specific Vaccine Eligibility Code	**Description** The user responsible for the EHR configuration adds a list of jurisdiction dose level vaccine eligibility codes that reflect jurisdiction-funded vaccine campaigns. **Test Objectives** **Add Jurisdiction-Specific Vaccine Eligibility Code:** The EHR or other clinical software system demonstrates the ability to configure dose level vaccine eligibility codes per jurisdictional requirements. This includes tracking and exchanging a jurisdiction-specific dose level eligibility code for administered vaccines. Note that this capability only applies to newly administered doses, not historical doses.

Test Case Group: Juana Mariana Vazquez Visit

Description

Test Objectives

Juana Mariana Vazquez visits the provider where her immunization history is retrieved from the registry and reconciled with the local information in the medical record to determine vaccines that are due. Vaccinations are ordered and administered. The parents refuse the Polio vaccine due to prior issues. The vaccines are reported to the immunization registry and a vaccine summary is available for the patient.

Test Case	Query the Registry for Juana Mariana Vazquez

Description

The EHR generates a Z44 query to the Immunization Registry to retrieve the Evaluated History and Forecast for Juana Mariana Vazquez.

Querying the registry will consist of the vendor creating Z44 messages for Juana Mariana Vazquez to be sent to the registry. The response will be processed as part of the 'Display, Reconcile, Import and Update Immunization Information' activity.

Using the Z42 Response to Immunization Registry Query, the EHR displays the Evaluated History and Forecast to the user for reconciliation and update. The vendor will receive information back from the registry and show the ability to view and reconcile, and import the information returned by the registry (NOTE: the Z42 message will be provided either manually, or as part of the tool). This test will also look at the system's ability to view the forecast returned by the registry and create a new forecast after reconciling the information.

Test Objectives

Select New Patient: The EHR or other clinical software system must allow a user to distinguish information about patients with similar names or identifying information in order to select the right patient from the providers' EHR or other clinical software system. This information is crucial for identifying and selecting the correct patient. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar sounding names. In order to match patients with those already in the immunization registry, the EHR or other clinical software should have the ability to record the mother's maiden name, whether the patient was part of a multiple birth, and if so, the order of birth (when such information is available). The provider should be aware of how often the protection indicator information must be updated based on local rules.

Request/Receipt of Patient Immunization History: The EHR or other clinical software system sends a request to the public health

immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5).

Compare Public Health Immunization Registry (IIS) Immunization History to EHR Immunization History: The public health immunization registry has returned the requested immunization history for a patient (Return Evaluated Immunization History and Forecast (Z42) – HL7 Version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). The EHR is able to display the evaluated immunization history received from the registry as well as the immunization history already present in the EHR so that a user can compare them. The EHR provides a way for the provider to view both histories, determine what is different (if anything), and update the existing EHR immunization history with new information from the public health registry if he or she chooses to do so. The system must store the new information as structured data as part of the patient's local immunization history and include the time of the update and the source of the new information.

Request/Receive Patient Immunization Data and Identify Source: The EHR stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry.

View Immunization Forecast: The EHR or other clinical software system provides a view of the immunization forecast provided by the IIS. The display includes the recommended vaccines and their associated dates (e.g., earliest, recommended, past due, latest) for each vaccine included in the forecast.

View Reconciled Immunization Forecast: The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations.

Review Patient Immunization History: The EHR or other clinical software systems displays vaccine history by vaccine series.

Record Past Immunizations: The EHR or other clinical software system allows providers to enter information about immunizations given elsewhere (e.g., by another doctor, at a public health clinic, pharmacy, etc.) with incomplete details.

Support for:

Receive Dose Not Indicated Alert for Single Vaccine Order: The EHR or other clinical software system notifies the provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required.

Test Steps

Select Patient Juana Mariana Vazquez	**Description** Juana Mariana Vazquez is selected as the patient and her record is opened in the EHR. **Test Objectives** **Select New Patient:** The EHR or other clinical software system must allow a user to distinguish information about patients with similar names or identifying information in order to select the right patient from the providers' EHR or other clinical software system. This information is crucial for identifying and selecting the correct patient. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar sounding names. In order to match patients with those already in the immunization registry, the EHR or other clinical software should have the ability to record the mother's maiden name, whether the patient was part of a multiple birth, and if so, the order of birth (when such information is available). The provider should be aware of how often the protection indicator information must be updated based on local rules.
Query Registry for vaccination history and forecast for Juana Mariana Vazquez	**Description** The provider uses the EHR to query the Immunization Registry for an Evaluated History and Forecast based on information known to the Immunization Registry. **Test Objectives** **Request/Receipt of Patient Immunization History:** The EHR or other clinical software system sends a request to the public health immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). Support for: **Receive Dose Not Indicated Alert for Single Vaccine Order:** The EHR or other clinical software system notifies the provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required.
	Description The Immunization Registry returns an Evaluated History and Forecast (Z42) to the EHR in response to the query for patient (Juana Mariana Vazquez). The provider reviews the immunization history from the registry and compares to the immunization history in the EHR. The provider reviews the information from these sources, identifying information known only to the registry, and identifying information that is more accurately reflected in the local EHR: The physician accesses the record for Juana Mariana Vazquez and the EHR differentiates: The following vaccinations are available only to the EHR: diphtheria, tetanus toxoids and acellular pertussis vaccine, 5 pertussis antigens (CVX 106) administered 11/20/2020 poliovirus vaccine, inactivated (CVX 10) administered 2/21/2018, -- Adverse Reaction: febrile seizure (e.g. Simple febrile seizure (finding) 432354000) VXC11^convulsions (fits, seizures) within 72 hours of dose^CDCPHINV) Influenza, injectable,quadrivalent, preservative free, pediatric (CVX 161) administered 10/15/2020 The EHR differentiates the following vaccinations which differ between the EHR and the IIS: For the hepatitis B vaccine, pediatric or pediatric/adolescent dosage (CVX 08) administered 12/20/2016, that EHR displays different text for the IIS (which documents a Non-specific formulation) and EHR (which documents hepatitis B vaccine, pediatric or pediatric/adolescent dosage) for Vaccine administered

View and Compare response to request for vaccination history for Juana Mariana Vazquez

The EHR differentiates the following vaccinations that are available from both the IIS and the local EHR:

measles, mumps, rubella virus vaccine (CVX 03) administered 8/22/2017 (an invalid dose)

The EHR differentiates the following vaccinations that are available from the IIS that are not known to the local EHR:

hepatitis B vaccine, pediatric or pediatric/adolescent dosage (CVX 08) administered 11/01/2016
hepatitis B vaccine, pediatric or pediatric/adolescent dosage (CVX 08) administered 05/20/2017
diphtheria, tetanus toxoids and acellular pertussis vaccine, 5 pertussis antigens (CVX 106) administered 1/22/2017
diphtheria, tetanus toxoids and acellular pertussis vaccine, 5 pertussis antigens (CVX 106) administered 3/23/2017
diphtheria, tetanus toxoids and acellular pertussis vaccine, 5 pertussis antigens (CVX 106) administered 5/22/2017
diphtheria, tetanus toxoids and acellular pertussis vaccine, 5 pertussis antigens (CVX 106) administered 2/21/2018
Haemophilus influenzae type b vaccine, PRP-OMP conjugate (CVX 49) administered 1/22/2017
Haemophilus influenzae type b vaccine, PRP-OMP conjugate (CVX 49) administered 3/23/2017
Haemophilus influenzae type b vaccine, PRP-OMP conjugate (CVX 49) administered 5/22/2017
Haemophilus influenzae type b vaccine, PRP-OMP conjugate (CVX 49) administered 11/21/2017
poliovirus vaccine, inactivated (CVX 10) administered 1/22/2017
poliovirus vaccine, inactivated (CVX 10) administered 3/23/2017 – Adverse Reaction: (VXC12^fever of >40.5C (105F) within 48 hours of dose^CDCPHINVS)
pneumococcal conjugate vaccine, 13 valent (CVX 133) administered 1/22/2017
pneumococcal conjugate vaccine, 13 valent (CVX 133) administered 3/23/2017
pneumococcal conjugate vaccine, 13 valent (CVX 133) administered 5/22/2017
pneumococcal conjugate vaccine, 13 valent (CVX 133) administered 1/11/2018
rotavirus, live, monovalent vaccine (CVX 119) administered 1/22/2017
rotavirus, live, monovalent vaccine (CVX 119) administered 3/23/2017
Influenza, seasonal, injectable (CVX 161) administered 9/25/2017
Influenza, seasonal, injectable (CVX 161) administered 10/29/2017
Influenza, injectable,quadrivalent, preservative free, pediatric (CVX 161) administered 10/2/2018
Influenza, injectable,quadrivalent, preservative free, pediatric (CVX 161) administered 11/4/2019
hepatitis A vaccine, pediatric/adolescent dosage, 2 dose schedule (CVX 83) administered 11/23/2017
hepatitis A vaccine, pediatric/adolescent dosage, 2 dose schedule (CVX 83) administered 5/23/2018
measles, mumps, rubella virus vaccine (CVX 03) administered 9/22/2020
Varicella virus vaccine (CVX 21) administered 12/15/2018

Test Objectives

Request/Receive Patient Immunization Data and Identify Source: The EHR stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 Version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry.

Compare Public Health Immunization Registry (IIS) Immunization History to EHR Immunization History: The public health immunization registry has returned the requested immunization history for a patient (Return Evaluated Immunization History and Forecast (Z42) – HL7 Version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). The EHR is able to display the evaluated immunization history received from the registry as well as the immunization history already present in the EHR so that a user can compare them. The EHR provides a way for the provider to view both histories, determine what is different (if anything), and update the existing EHR immunization history with new information from the public health registry if they choose to do so. The system must store the new information as structured data as part of the patient's local immunization history and include the time of the update and the source of the new information.

Review Patient Immunization History: The EHR or other clinical software system displays vaccine history by vaccine series.

Support for:

Receive Dose Not Indicated Alert for Single Vaccine Order: The EHR or other clinical software system notifies the

	provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required.
Mark first MMR Dose as Invalid	**Description** If the EHR does not already flag the first MMR as invalid, the provider updates the first MMR to indicate it is "invalid" as it was given too early (as notified by the registry). **Test Objectives** dose validity is an important aspect of: **View Reconciled Immunization Forecast:** The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations.
View the vaccination forecast for Juana Mariana Vazquez	**Description** The physician accesses the record for Juana Mariana Vazquez and: - Displays the registry forecast as returned by the immunization registry. **Test Objectives** **View Immunization Forecast:** The EHR or other clinical software system provides a view of the immunization forecast provided by the IIS. The display includes the recommended vaccines and their associated dates (e.g., earliest, recommended, past due, latest) for each vaccine included in the forecast.

Reconcile and import vaccinations from Evaluated History and Forecast for Juana Mariana Vazquez	## Description Juana Mariana Vazquez immunization registry provided Evaluated History and Forecast is reconciled with the Immunization history information in the EHR. ## Test Objectives **Request/Receive Patient Immunization Data and Identify Source:** The EHR or other clinical software system stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry. **Compare Public Health Immunization Registry (IIS) Immunization History to EHR Immunization History:** The public health immunization registry has returned the requested immunization history for a patient. The EHR is able to display the immunization history received from the registry as well as the immunization history already present in the EHR so that a user can compare them. The EHR provides a way for the provider to view both histories, determine what is different (if anything), and update the existing EHR immunization history with new information from the public health registry if they choose to do so. The system must store the new information as structured data as part of the patient's local immunization history and include the time of the update and the source of the new information. **Review Patient Immunization History:** The EHR or other clinical software systems displays vaccine history by vaccine series. Support for: **Receive Dose Not Indicated Alert for Single Vaccine Order:** The EHR or other clinical software system notifies the provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required.
View the updated vaccination forecast for Juana Mariana Vazquez	## Description Once the vaccine history is reconciled in the EHR, the vaccine forecast is updated. ## Test Objectives **View Reconciled Immunization Forecast:** The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations.

Test Case	Juana Mariana Vazquez, Enter Orders and Immunizations

Description

This test will consist of ordering vaccines for the test patients, reviewing any alerts caused by specific scenarios, and documenting vaccinations administered to the patients.

Test Objectives

Notify of Previous Adverse Event: The EHR or other clinical software system alerts providers to previous adverse events for a specific patient, in order to inform clinical decision-making when providers view an existing immunization record.

Record Vaccine Administration Deferral: The EHR or other clinical software system allows a user to enter a reason or reasons why a specific immunization was not given to a patient (e.g., due to contraindication, refusal, etc.). The system also stores that information in a structured way so it can be reported and analyzed as needed.

Receive Dose Not Indicated Alert for Single Vaccine Order: The EHR or other clinical software system notifies the provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required.

Receive Dose Not Indicated Alert Upon Vaccine Administration: The system notifies the individual administering a vaccine that the vaccine is inconsistent with expected timing intervals as suggested by the vaccine forecast. The method and timing of notification can be specified to meet local clinical workflow. This requirement is a "failsafe" mechanism in case the provider orders a vaccine dose that is inconsistent with appropriate timing intervals.

Record Vaccine Administration: The EHR or other clinical software system records information about each vaccine administered. The EHR records this information as structured data elements, including, at a minimum: date administered, administering clinician, route of administration (e.g. intramuscular), site of administration (e.g., left arm), immunization type, lot number, manufacturer, Vaccine Information Statement date, quantity of vaccine/dose size and ordering clinician. The system also assures data quality, i.e., data entered are appropriate (e.g., avoid "oral" route for IM vaccines, and assure dose is appropriate for the vaccine).

Receive Dose Not Indicated Alert Upon Vaccine Administration: The system notifies the individual administering a vaccine that the vaccine is inconsistent with expected timing intervals as suggested by the vaccine forecast. The method and timing of notification can be specified to meet local clinical workflow. This requirement is a "failsafe" mechanism in case the provider orders a vaccine dose that is inconsistent with appropriate timing intervals.

Enter Vaccination Order: The EHR or other clinical software system allows providers to order immunizations for a patient using filters for type of vaccine, including combination vaccines.

Record Past Immunizations: The EHR or other clinical software system allows providers to enter information about immunizations given elsewhere (e.g., by another doctor, at a public health clinic, pharmacy, etc.) with incomplete details.

Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration: The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or prefilled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The GTIN contains the National Drug Code (NDC) and manufacturer data elements. Implementers can use mapping tables to determine the manufacturer from this NDC. The software system records these elements as structured data elements so the immunization administration message can use them to include the NDC and manufacturer in the message to the IIS.

Request/Receive Patient Immunization Data and Identify Source: The EHR or other clinical software stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry.

Data Quality Checks: The EHR or other clinical software system integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections.

Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes:

- 2008: Indicates that either a refusal reason was messaged in RXA-18 when the completion status in RXA-20 was not RE or a valid refusal reason was not messaged when the completion status was RE

- 2014: Indicates that the administration amount is inconsistent with the vaccine administered
- 2016: Indicates that the administration route is inconsistent with the vaccine administered

Test Steps	
Order IPV and view prior reaction	**Description** The provider accesses the record for Juana Mariana Vazquez and: - Selects order for IPV and views information about the prior febrile seizure post-IPV vaccine. - IPV is ordered for the patient. **Test Objectives** **Enter Vaccination Order:** The EHR or other clinical software system allows providers to order immunizations for a patient using filters for type of vaccine, including combination vaccines. **Notify of Previous Adverse Event:** The EHR or other clinical software system alerts providers to previous adverse events for a specific patient, in order to inform clinical decision-making when providers view an existing immunization record.
Vaccine Refusal Data Quality Checks	**Description** The provider attempts to document vaccine refusal information for the immunization for Juana Mariana Vazquez. These data quality checks primarily relate to improving vaccine refusal information and associated observations that will be included when submitting data to the immunization registry. **Test Objectives** **Data Quality Checks:** Integrate additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections. Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes: - 2008 : Indicates that either a refusal reason was messaged in RXA-18 when the completion status in RXA-20 was not RE or a valid refusal reason was not messaged when the completion status was RE.

IPV Parental Refusal	## Description The mother is concerned about administering the IPV due to the prior adverse reaction and refuses to have the child immunized for IPV. The provider documents mother's refusal for IPV vaccine indicating the parent decision, the reason and documents a deferral at the time of attempted administration. ## Test Objectives **Record Vaccine Administration Deferral:** The EHR or other clinical software system allows a user to enter a reason or reasons why a specific immunization was not given to a patient (e.g., due to contraindication, refusal, etc.). The system also stores that information in a structured way so it can be reported and analyzed as needed.
Enter Immunization Data for MMR Given 2 Weeks Prior	## Description The EHR vendor loads immunization history data for an MMR dose entered 2 weeks prior to the current visit date and an MMR dose that was given too early. These MMR doses serve to seed checking for the condition that it is too early to give a live vaccine in TestCaseGroup: Juana Mariana Vazquez Visit, TestCase: Juana Mariana Vazquez, Enter Orders and Immunizations, TestStep: Attempt to order Varicella Dose. ## Test Objectives **Record Past Immunizations:** The EHR or other clinical software system allows providers to enter information about immunizations given elsewhere (e.g., by another doctor, at a public health clinic, pharmacy, etc.) with incomplete details. **Request/Receive Patient Immunization Data and Identify Source:** The EHR stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered manually as patient-reported, and which were accepted electronically from the public health registry. Supporting data for: **Receive Dose Not Indicated Alert for Single Vaccine Order:** The EHR or other clinical software system notifies the provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required. **Receive Dose Not Indicated Alert Upon Vaccine Administration:** The system notifies the individual administering a vaccine that the vaccine is inconsistent with expected timing intervals as suggested by the vaccine forecast. The method and timing of notification can be specified to meet local clinical workflow. This requirement is a “failsafe” mechanism in case the provider orders a vaccine dose that is inconsistent with appropriate timing intervals.

Attempt to order Varicella Dose	## Description The provider attempts to give a Varicella dose and is warned that it is too soon to give a live vaccine dose. ## Test Objectives **Receive Dose Not Indicated Alert for Single Vaccine Order:** The EHR or other clinical software system notifies the provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required.
Order Influenza Vaccine	## Description The physician accesses the record for Juana Mariana Vazquez and: - Selects order for Influenza vaccine. ## Test Objectives **Enter Vaccination Order:** The EHR or other clinical software system allows providers to order immunizations for a patient using filters for type of vaccine, including combination vaccines.
Vaccine Dosing and Administration Data Quality Checks	## Description The provider attempts to document vaccine route, site, and administration amount for the influenza immunization for Juana Mariana Vazquez. These data quality checks primarily relate to improving vaccine dosing and administration information that will be included in the vaccination details when submitting data to the immunization registry. The nurse documents administration route for the IM inactivated influenza vaccine as 'intranasal': - Is alerted when documenting "intranasal" for intramuscular inactivated influenza vaccine. - Is alerted when documenting the incorrect administration amount for the vaccine administered. ## Test Objectives **Data Quality Checks:** Integrate additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections. Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes: - 2014: Indicates that the administration amount is inconsistent with the vaccine administered - 2016 : Indicates that the administration route is inconsistent with the vaccine administered **Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration:** The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The National Drug Code and manufacturer data elements (NDC) is embedded in the Global Trade Item Number (GTIN). Using mapping tables, the manufacturer can be determined from the NDC Code. The NDC and manufacturer data elements are later transmitted to an IIS by cross walking/mapping from the GTIN. The software system records this information as structured data elements.

Record Influenza Vaccine administration	**Description** The nurse administers the inactivated influenza vaccine: - Documents all required information for the vaccine. **Test Objectives** **Record Vaccine Administration:** The EHR or other clinical software system records information about each vaccine administered. The EHR records this information as structured data elements, including, at a minimum: date administered, administering clinician, site of administration (e.g., left arm), immunization type, lot number, manufacturer, Vaccine Information Statement date, quantity of vaccine/dose size and ordering clinician. The system also assures data quality, i.e., data entered are appropriate (e.g., avoid “oral” route for IM vaccines, and assures dose is appropriate for the vaccine). **Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration:** The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The National Drug Code and manufacturer data elements (NDC) is embedded in the Global Trade Item Number (GTIN). Using mapping tables, the manufacturer can be determined from the NDC Code. The NDC and manufacturer data elements are later transmitted to an IIS by cross walking/mapping from the GTIN. The software system records this information as structured data elements.

Test Case	**Juana Mariana Vazquez Transmit Immunization Report**

Description

Following the vaccinations given during the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. The Vaccination report includes all newly administered vaccines. The report should include vaccines incorrectly recorded in the IIS. The report MAY send the immunizations that the EHR imported from the IIS.

Test Objectives

Transmit Standard Patient Immunization History Report: The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries.

Identify Adverse Event: The EHR or other clinical software system enables capture of structured data regarding adverse events.

Link Standard Codes to Immunization Data: The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization.

Note: Testing for NDC codes, CVX for immunizations.

Test Steps

Transmit the immunization report to the Immunization Registry	**Description** Following the vaccinations given during the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. The Vaccination report includes all newly administered vaccines. The report should include vaccines incorrectly recorded in the IIS. The report MAY send the immunizations that the EHR imported from the IIS. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries. **Link Standard Codes to Immunization Data:** The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization. Note: Testing for NDC codes, CVX for immunizations.
Receive ACK Z23 from Immunization Registry	**Description** The Immunization Registry returns a positive acknowledgement message indicating that no errors were found during the course of filing the message. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries.
Record an adverse reaction	**Description** Following the vaccine administration, the mother reports that the patient had a rash within 14 days of dose. **Test Objectives** **Identify Adverse Event:** The EHR or other clinical software system enables capture of structured data regarding adverse events.

Test Case	Juana Mariana Vazquez Display Immunization Report

Description

Following the vaccination visit, the provider uses the EHR to produce an immunization report for the patient including all history (the report can be provided in various formats - e.g., print, send to patient portal, etc.).

Test Objectives

Produce Standard Patient Immunization History Report: The EHR or other clinical software system produces a report of a patient's immunization history that is appropriate for various entities, such as schools and day-care centers.

Produce Immunization Forecast Report: The EHR or other clinical software system creates a list of immunizations to be administered within a specified time frame.

Test Steps

Produce an immunization report for Juana Mariana Vazquez including all history	## Description Following the vaccination visit, the provider uses the EHR to produce an immunization report for the patient including all history (the report can be provided in various formats - e.g., print, send to patient portal, etc.). ## Test Objectives **Produce Standard Patient Immunization History Report:** The EHR or other clinical software system produces a report of a patient's immunization history that is appropriate for various entities, such as schools and day-care centers. **Produce Immunization Forecast Report:** The EHR or other clinical software system creates a list of immunizations to be administered within a specified time frame.

Test Case	**Juana Mariana Vazquez Provide Patient Access to Immunization Report**

Description

Following the vaccination visit, the provider uses the EHR to produce an immunization report that can be accessed by the patient including all history and forecast information. The report can be provided in various formats, including view, and print. The patient is also able to access the Vaccine Information Statements.

Test Objectives

Provide Access to Patient Immunization Record: The EHR or other clinical software system provides patients and their authorized representatives with electronic access to immunization records (either directly or by interacting with an external system such as a patient portal).

Provide Access to Recommendations and Vaccine Information Statement(s): The immunization record displays immunization recommendations to be discussed with a provider, displaying the relevant Vaccine Information Statement.

Provide Access to Printable Immunization Record: The EHR or other clinical software system provides a printable version of the immunization record.

Test Steps

Produce an immunization report for Juana Mariana Vazquez including all history	**Description** Following the vaccination visit, the patient/parent uses the specified interface to access the immunization report for the patient including all history (the report can be provided in various formats - e.g., print, send to patient portal, etc.). **Test Objectives** **Provide Access to Patient Immunization Record:** The EHR or other clinical software system provides patients and their authorized representatives with electronic access to immunization records (either directly or by interacting with an external system such as a patient portal). **Provide Access to Recommendations and Vaccine Information Statement(s):** The immunization record displays immunization recommendations to be discussed with a provider, displaying the relevant Vaccine Information Statement.
Provide access to Printable Immunization Record for Juana Mariana Vazquez	**Description** Following the vaccination visit, the patient/parent uses the specified interface to print the immunization report for the patient including all history and forecast information. **Test Objectives** **Provide Access to Patient Immunization Record:** The EHR or other clinical software system provides patients and their authorized representatives with electronic access to immunization records (either directly or by interacting with an external system such as a patient portal). **Provide Access to Printable Immunization Record:** The EHR or other clinical software system provides a printable version of the immunization record.
Provide access to Vaccine Information Statements	**Description** The EHR is used to provide the patient access to the Vaccine Information Statements (VIS) for those vaccines administered during the visit. **Test Objectives** **Provide Access to Recommendations and Vaccine Information Statement(s):** The immunization record displays immunization recommendations to be discussed with a provider, displaying the relevant Vaccine Information Statement.

Test Case Group: Juan Marcel Marina Visit

Description

Test Objectives

Juan Marcel Marina visits the provider where his immunization history is retrieved from the registry and reconciled with the local information in the medical record to determine vaccines that are due. Vaccinations are ordered and administered. The vaccines are reported to the immunization registry and a vaccine summary is available for the patient.

Test Case	Query the Registry for Juan Marcel Marina

Description

Querying the registry will consist of the vendor creating Z44 messages for Juan Marcel Marina to be sent to the registry. The response will be processed as part of the 'Display, Reconcile, Import and Update Immunization Information' activity.

Using the Z42 Response to Immunization Registry Query, the EHR displays the Evaluated History and Forecast to the user for reconciliation and update. The vendor will receive information back from the registry and show the ability to view and reconcile, and import the information returned by the registry (NOTE: the Z42 message will be provided either manually, or as part of the tool). This test will also look at the system's ability to view the forecast returned by the registry and create a new forecast after reconciling the information.

Test Objectives

Select New Patient: The EHR or other clinical system system must allow a user to distinguish information about patients with similar names or identifying information in order to select the right patient from the providers' EHR or other clinical software system. This information is crucial for identifying and selecting the correct patient. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar sounding names. In order to match patients with those already in the immunization registry, the EHR or other clinical software should have the ability to record the mother's maiden name, whether the patient was part of a multiple birth, and if so, the order of birth (when such information is available). The provider should be aware of how often the protection indicator information must be updated based on local rules.

Request/Receipt of Patient Immunization History: The EHR or other clinical software system sends a request to the public health immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5).

Request/Receive Patient Immunization Data and Identify Source: The EHR stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry.

View Reconciled Immunization Forecast: The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations.

Review Patient Immunization History: The EHR or other clinical software system displays vaccine history by vaccine series.

Support for:

Receive Dose Not Indicated Alert for Single Vaccine Order: The EHR or other clinical software system notifies the provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required.

Test Steps

Select Patient Juan Marcel Marina	**Description** Juan Marcel Marina is selected as the patient and his record is opened in the EHR. **Test Objectives** **Select New Patient:** The EHR or other clinical software system must allow a user to distinguish information about patients with similar names or identifying information in order to select the right patient from the providers' EHR or other clinical software system. This information is crucial for identifying and selecting the correct patient. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar sounding names. In order to match patients with those already in the immunization registry, the EHR or other clinical software should have the ability to record the mother's maiden name, whether the patient was part of a multiple birth, and if so, the order of birth (when such information is available). The provider should be aware of how often the protection indicator information must be updated based on local rules.
Query Registry for vaccination history and forecast for Juan Marcel Marina	**Description** The provider uses the EHR to query the Immunization Registry for an Evaluated History and Forecast based on information known to the Immunization Registry. **Test Objectives** **Request/Receipt of Patient Immunization History:** The EHR or other clinical system sends a request to the public health immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5).

View and import response to request for vaccination history for Juan Marcel Marina	**Description** The physician accesses the record for Juan Marcel Marina and: - Accepts the vaccines provided by the registry as this is a new patient and there are no prior vaccines recorded. **Test Objectives** **Request/Receive Patient Immunization Data and Identify Source:** The EHR or other clinical system stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry. **Compare Public Health Immunization Registry (IIS) Immunization History to EHR Immunization History:** The public health immunization registry has returned the requested immunization history for a patient. The EHR is able to display the immunization history received from the registry as well as the immunization history already present in the EHR so that a user can compare them. The EHR provides a way for the provider to view both histories, determine what is different (if anything), and update the existing EHR immunization history with new information from the public health registry if they choose to do so. The system must store the new information as structured data as part of the patient's local immunization history and include the time of the update and the source of the new information. **Review Patient Immunization History:** The EHR or other clinical software system displays vaccine history by vaccine series. Supporting data for: **Receive Dose Not Indicated Alert for Single Vaccine Order:** The EHR or other clinical software system notifies the provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required.
View the vaccination forecast for Juan Marcel Marina	**Description** The physician accesses the record for Juan Marcel Marina and, once the vaccine history is reconciled in the EHR, the vaccine forecast is updated. - The provider views the updated vaccine forecast (either as provided by the Immunization Registry or as determined through EHR defined methods). **Test Objectives** **View Reconciled Immunization Forecast:** The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations. **Modify Antigen Recommendations Based on Active Diagnoses:** The system notifies the provider of any conflicts between recommended vaccines in the updated forecast and the patient's current or historical diagnoses.

Test Case	**Juan Marcel Marina, Enter Orders and Immunizations**

Description

This test will consist of ordering vaccines for the test patients, reviewing any alerts caused by specific scenarios, and documenting vaccinations administered to the patients.

Test Objectives

Modify Antigen Recommendations Based on Active Diagnoses: The EHR or other clinical software system notifies the provider of any conflicts between recommended vaccines in the updated forecast and the patient's current or historical diagnoses.

Enter Vaccination Order: The EHR or other clinical software system allows providers to order immunizations for a patient using filters for type of vaccine, including combination vaccines.

Receive Dose Not Indicated Alert for Single Vaccine Order: The EHR or other clinical software system notifies the provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required.

Receive Dose Not Indicated Alert Upon Vaccine Administration: The EHR or other clinical software system notifies the individual administering a vaccine that the vaccine is inconsistent with expected timing intervals as suggested by the vaccine forecast. The method and timing of notification can be specified to meet local clinical workflow. This requirement is a “failsafe” mechanism in case the provider orders a vaccine dose that is inconsistent with appropriate timing intervals.

Notify of Vaccine Dose Expiration: The EHR or other clinical software system notifies the provider administering a vaccine if the dose chosen for administration is expired.

Record Vaccine Administration: The EHR or other clinical software system records information about each vaccine administered. The EHR records this information as structured data elements, including, at a minimum: date administered, administering clinician, route of administration (e.g. intramuscular), site of administration (e.g., left arm), immunization type, lot number, manufacturer, Vaccine Information Statement date, quantity of vaccine/dose size and ordering clinician. The system also assures data quality, i.e., data entered are appropriate (e.g., avoid “oral” route for IM vaccines, and assure dose is appropriate for the vaccine).

Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration: The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The GTIN contains the National Drug Code (NDC) and manufacturer data elements. Implementers can use mapping tables to determine the manufacturer from this NDC. The software system records these elements as structured data elements so the immunization administration message can use them to include the NDC and manufacturer in the message to the IIS.

Notify of Vaccine Dose Ineligibility: The EHR or other clinical software system provides a method for alerting a provider if a vaccine is selected for a patient who is not eligible for the inventory item selected.

Add Jurisdiction-Specific Vaccine Eligibility Code: The EHR or other clinical software system demonstrates the ability to configure publicly funded dose level vaccine eligibility codes per jurisdictional requirements. This includes tracking and exchanging jurisdiction-specific dose level eligibility code(s) for administered vaccines. This capability only applies to newly administered doses, not historical doses.

Data Quality Checks: The EHR or other clinical software integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections.

Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes:

- 2013: Indicates that the funding source code in an OBX segment conflicts with other data in the message (eligibility, age etc).

- 2016: Indicates that the administration route is inconsistent with the vaccine administered

- 2001: Indicates a conflict between the administration date in RXA-3 and the expiration date in RXA-16. In other words it indicates that an expired vaccine was administered.

Test Steps	
Orders Administration of Hepatitis B vaccine	**Description** As indicated by the vaccine forecast, the third Hepatitis B is overdue, and is ordered. **Test Objectives** **Enter Vaccination Order:** The EHR or other clinical software system allows providers to order immunizations for a patient using filters for type of vaccine, including combination vaccines.
Orders administration of DTaP vaccine and alerted that the dose is too early	**Description** The fifth DTaP is ordered, and the provider is notified that the dose is too early. **Test Objectives** **Receive Dose Not Indicated Alert for Single Vaccine Order:** The EHR or other clinical software system notifies the provider in instances when there are single or combination vaccine orders that are inconsistent with the expected timing intervals included in the vaccine forecast. Inconsistencies include suggestion of different date(s) for ordering the vaccine(s) or indication the vaccine(s) is/are no longer required. **Enter Vaccination Order:** The EHR or other clinical software system allows providers to order immunizations for a patient using filters for type of vaccine, including combination vaccines.
Attempt to record HepB Vaccine administration route with data validation checking	**Description** The nurse documents administration route for the HepB vaccine: - Is prevented from documenting "oral" for HepB vaccine. **Test Objectives** **Record Vaccine Administration:** The EHR or other clinical software system records information about each vaccine administered. The EHR records this information as structured data elements, including, at a minimum: date administered, administering clinician, route of administration (e.g. intramuscular), site of administration (e.g., left arm), immunization type, lot number, manufacturer, Vaccine Information Statement date, quantity of vaccine/dose size and ordering clinician. The system also assures data quality, i.e., data entered are appropriate (e.g., avoid “oral” route for IM vaccines, and assure dose is appropriate for the vaccine). **Data Quality Checks:** The EHR or other clinical software integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections. Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes: - 2016 : Indicates that the administration route is inconsistent with the vaccine administered

Records Hepatitis B Vaccine lot number with expired lot alert	## Description The nurse documents administration lot number for the Hepatitis B vaccine: - Is prevented from ordering the Hepatitis B lot as it has expired. - Documents administration from a different lot that is not expired. ## Test Objectives **Notify of Vaccine Dose Expiration:** The EHR or other clinical software system notifies the provider administering a vaccine if the dose chosen for administration is expired. **Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration:** The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The GTIN contains the National Drug Code (NDC) and manufacturer data elements. Implementers can use mapping tables to determine the manufacturer from this NDC. The software system records these elements as structured data elements so the immunization administration message can use them to include the NDC and manufacturer in the message to the IIS. **Data Quality Checks:** The EHR or other clinical software integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections. Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes: - 2001: Indicates a conflict between the administration date in RXA-3 and the expiration date in RXA-16. In other words, it indicates that an expired vaccine was administered.

Record Hepatitis B Vaccine administration	**Description** The nurse administers the Hepatitis B vaccine: - Documents all required information for the vaccine. **Test Objectives** **Record Vaccine Administration:** The EHR or other clinical software system records information about each vaccine administered. The EHR records this information as structured data elements, including, at a minimum: date administered, administering clinician, route of administration (e.g. intramuscular), site of administration (e.g., left arm), immunization type, lot number, manufacturer, Vaccine Information Statement date, quantity of vaccine/dose size and ordering clinician. The system also assures data quality, i.e., data entered are appropriate (e.g., avoid “oral” route for IM vaccines, and assure dose is appropriate for the vaccine). **Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration:** The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The GTIN contains the National Drug Code (NDC) and manufacturer data elements. Implementers can use mapping tables to determine the manufacturer from this NDC. The software system records these elements as structured data elements so the immunization administration message can use them to include the NDC and manufacturer in the message to the IIS. **Add Jurisdiction-Specific Vaccine Eligibility Code:** The EHR or other clinical software system demonstrates the ability to configure dose level vaccine eligibility codes per jurisdictional requirements. This includes tracking and exchanging a jurisdiction-specific dose level eligibility code for administered vaccines. Note that this capability only applies to newly administered doses, not historical doses.

Records Influenza Vaccine administration with VFC eligibility checking	## Description The nurse documents administration for the inactivated influenza vaccine from a VFC source: - Is alerted that the patient is not eligible for VFC. - Orders a different non-VFC lot of inactivated influenza vaccine. ## Test Objectives **Notify of Vaccine Dose Ineligibility:** The EHR or other clinical software system provides a method for alerting a provider if a vaccine is selected for a patient who is not eligible for the inventory item selected. **Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration:** The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The GTIN contains the National Drug Code (NDC) and manufacturer data elements. Implementers can use mapping tables to determine the manufacturer from this NDC. The software system records these elements as structured data elements so the immunization administration message can use them to include the NDC and manufacturer in the message to the IIS. **Data Quality Checks:** The EHR or other clinical software integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections. Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes: - 2013: Indicates that the funding source code in an OBX segment conflicts with other data in the message (eligibility, age etc).

Record Influenza Vaccine administration for Juan Marcel Marina	**Description** The nurse administers the inactivated influenza vaccine: - Documents all required information for each vaccine. **Test Objectives** **Record Vaccine Administration:** The EHR or other clinical software system records information about each vaccine administered. The EHR records this information as structured data elements, including, at a minimum: date administered, administering clinician, route of administration (e.g. intramuscular), site of administration (e.g., left arm), immunization type, lot number, manufacturer, Vaccine Information Statement date, quantity of vaccine/dose size and ordering clinician. The system also assures data quality, i.e., data entered are appropriate (e.g., avoid "oral" route for IM vaccines, and assure dose is appropriate for the vaccine). **Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration:** The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The GTIN contains the National Drug Code (NDC) and manufacturer data elements. Implementers can use mapping tables to determine the manufacturer from this NDC. The software system records these elements as structured data elements so the immunization administration message can use them to include the NDC and manufacturer in the message to the IIS.
Attempt to administer DTaP vaccine and alerted that the dose is too early	**Description** The provider attempts to administer the fifth DTaP vaccine, and the provider is notified that the dose is too early. **Test Objectives** **Receive Dose Not Indicated Alert Upon Vaccine Administration:** The EHR or other clinical software system notifies the individual administering a vaccine that the vaccine is inconsistent with expected timing intervals as suggested by the vaccine forecast. The method and timing of notification can be specified to meet local clinical workflow. This requirement is a "failsafe" mechanism in case the provider orders a vaccine dose that is inconsistent with appropriate timing intervals.

Test Case	Juan Marcel Marina Transmit Immunization Report

Description

Following the vaccinations given during the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. The Vaccination report includes all newly administered vaccines. The report should include vaccines incorrectly recorded in the IIS. The report MAY send the immunizations that the EHR imported from the IIS.

Test Objectives

Transmit Standard Patient Immunization History Report: The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries.

Link Standard Codes to Immunization Data: The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization.

Note: Testing for NDC codes, CVX for immunizations.

Add Jurisdiction-Specific Vaccine Eligibility Code: The EHR or other clinical software system demonstrates the ability to configure dose level vaccine eligibility codes per jurisdictional requirements. This includes tracking and exchanging a jurisdiction-specific dose level eligibility code for administered vaccines. Note that this capability only applies to newly administered doses, not historical doses.

Test Steps

Transmit the Immunization Report for Juan Marcel Marina	## Description Following the vaccinations given during the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. The Vaccination report includes all newly administered vaccines, and an indication that Varicella was not administered due to a history of the disease as evidence of immunity. The Vaccination report also includes an indication that Hepatitis A was not administered due to serological evidence of immunity. The report MAY send the immunizations that the EHR imported from the IIS. ## Test Objectives **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries. **Link Standard Codes to Immunization Data:** The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization. Note: Testing for NDC codes, CVX for immunizations. **Add Jurisdiction-Specific Vaccine Eligibility Code:** The EHR or other clinical software system demonstrates the ability to configure dose level vaccine eligibility codes per jurisdictional requirements. This includes tracking and exchanging a jurisdiction-specific dose level eligibility code for administered vaccines. Note that this capability only applies to newly administered doses, not historical doses.

Receive ACK Z23 from Immunization Registry	**Description** The Immunization Registry returns a positive acknowledgement message indicating that no errors were found during the course of filing the message. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries.
Transmit Delete for Vaccine Recorded in Error	**Description** The provider identifies that the vaccine administration of Hepatitis B for this visit was documented in error. The vaccine was not administered during the visit but was inadvertently documented as administered. A delete notification for the Hepatitis B vaccination administered is transmitted to the Immunization Registry for Juan Marcel Marina. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries. **Link Standard Codes to Immunization Data:** The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization. Note: Testing for NDC codes, CVX for immunizations. **Add Jurisdiction-Specific Vaccine Eligibility Code:** The EHR or other clinical software system demonstrates the ability to configure dose level vaccine eligibility codes per jurisdictional requirements. This includes tracking and exchanging a jurisdiction-specific dose level eligibility code for administered vaccines. Note that this capability only applies to newly administered doses, not historical doses. **Support for delete functionality.**
Receive ACK Z23 from Immunization Registry	**Description** The Immunization Registry returns a positive acknowledgement message indicating that no errors were found during the course of filing the message. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries.

Test Case Group: Juana Mariela Gonzales Visit

Description

Test Objectives

Infant twin, Juana Mariela Gonzales visits the provider where her immunization history is retrieved from the registry and reconciled with the local information in the medical record to determine vaccines that are due. Vaccinations are ordered and administered. The vaccines are reported to the immunization registry and a vaccine summary is available for the patient.

Test Case	Query the Registry for Juana Mariela Gonzales

Description

The EHR generates a Z44 query to the Immunization Registry to retrieve the Evaluated History and Forecast for Juana Mariela Gonzales. Querying the registry will consist of the vendor creating Z44 messages for Juana Mariela Gonzales to be sent to the registry. The response will be processed as part of the 'Display, Reconcile, Import and Update Immunization Information' activity.

Using the Z42 Response to Immunization Registry Query, the EHR displays the Evaluated History and Forecast to the user for reconciliation and update. The vendor will receive information back from the registry and show the ability to view and reconcile, and import the information returned by the registry (NOTE: the Z42 message will be provided either manually, or as part of the tool). This test will also look at the system's ability to view the forecast returned by the registry and create a new forecast after reconciling the information.

Test Objectives

Select New Patient: The EHR or other clinical software system must allow a user to distinguish information about patients with similar names or identifying information in order to select the right patient from the providers' EHR or other clinical software. This information is crucial for identifying and selecting the correct patient. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar sounding names. In order to match patients with those already in the immunization registry, the EHR or other clinical software should have the ability to record the mother's maiden name, whether the patient was part of a multiple birth, and if so, the order of birth (when such information is available). The provider should be aware of how often the protection indicator information must be updated based on local rules.

Request/Receipt of Patient Immunization History: The EHR or other clinical software system sends a request to the public health immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5).

Request/Receive Patient Immunization Data and Identify Source: The EHR or other clinical software stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry.

View Reconciled Immunization Forecast: The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations.

Test Steps

Select Patient Juana Mariela Gonzales	**Description** Juana Mariela Gonzales is selected as the patient and her record is opened in the EHR. **Test Objectives** **Select New Patient:** The EHR or other clinical software system must allow a user to distinguish information about patients with similar names or identifying information in order to select the right patient from the providers' EHR or other clinical software. This information is crucial for identifying and selecting the correct patient. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar sounding names. In order to match patients with those already in the immunization registry, the EHR or other clinical software should have the ability to record the mother's maiden name, whether the patient was part of a multiple birth, and if so, the order of birth (when such information is available). The provider should be aware of how often the protection indicator information must be updated based on local rules.
Query Registry for vaccination history and forecast for Juana Mariela Gonzales	**Description** The provider uses the EHR to query the Immunization Registry for an Evaluated History and Forecast based on information known to the Immunization Registry. **Test Objectives** **Request/Receipt of Patient Immunization History:** The EHR or other clinical software system sends a request to the public health immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5).
View and import response to request for vaccination history for Juana Mariela Gonzales	**Description** The physician accesses the record for Juana Mariela Gonzales and: - Accepts the single vaccine in the registry record into the EHR history. **Test Objectives** **Request/Receive Patient Immunization Data and Identify Source:** The EHR or other clinical software system stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry.

View the vaccination forecast for Juana Mariela Gonzales	**Description** The physician accesses the record for Juana Mariela Gonzales and: - Views the vaccine forecast (either as provided by the Immunization Registry or as determined through EHR defined methods). **Test Objectives** **View Reconciled Immunization Forecast:** The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations.

Test Case	Juana Mariela Gonzales, Enter Orders and Immunizations

Description

This test will consist of ordering vaccines for the test patients, reviewing any alerts caused by specific scenarios, and documenting vaccinations administered to the patients.

Test Objectives

Supporting data for documenting contraindications (it could also trigger an alert as a locally configured alert rule)

Modify Antigen Recommendations Based on Active Diagnoses: The EHR or other clinical software system notifies the provider of any conflicts between recommended vaccines in the updated forecast and the patient's current or historical diagnoses.

Record Vaccine Administration Deferral: The EHR or other clinical software system allows a user to enter a reason or reasons why a specific immunization was not given to a patient (e.g., due to contraindication, refusal, etc.). The system also stores that information in a structured way so it can be reported and analyzed as needed.

Data Quality Checks: The EHR or other clinical software integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections.

Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes:

- 2101: Indicates that a contraindication effective date messaged in OBX-5 is in the future

Test Steps

Enter Initial Clinical Information for Juana Mariela	**Description** The triage nurse enters basic information on Juana Mariela Gonzales - she has a fever (Temperature of 100.8 degrees F). **Test Objectives** Supporting data for documenting contraindications (it could also trigger an alert as a locally configured alert rule): **Modify Antigen Recommendations Based on Active Diagnoses:** The EHR or other clinical software system notifies the provider of any conflicts between recommended vaccines in the updated forecast and the patient's current or historical diagnoses.

Vaccine Deferral Data Quality Checks	## Description The provider attempts to document vaccine deferral information for the immunization for Juana Mariela Gonzales. These data quality checks primarily relate to improving vaccine deferral information and associated observations that will be included when submitting data to the immunization registry. ## Test Objectives **Data Quality Checks:** The EHR or other clinical software integrate additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections. Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes: - 2101: Indicates that a contraindication effective date messaged in OBX-5 is in the future
Enters a medical deferral for the vaccines due	## Description The physician accesses the record for Juana Mariela Gonzales and: - Enters a deferral for the vaccines due (Hepatitis B, DTaP, Hib, Pneumococcal conjugate (PCV13) and Rotavirus) due to medical reason, indicating low grade fever, and defers for 1 month. ## Test Objectives **Record Vaccine Administration Deferral:** The EHR or other clinical software system allows a user to enter a reason or reasons why a specific immunization was not given to a patient (e.g., due to contraindication, refusal, etc.). The system also stores that information in a structured way so it can be reported and analyzed as needed.

Test Case	**Juana Mariela Gonzales Transmit Immunization Report**

Description

Following the vaccinations given during the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. The Vaccination report includes deferrals for the vaccines that were due this visit indicating the medical reason. The report MAY send the immunizations that the EHR imported from the IIS.

Test Objectives

Transmit Standard Patient Immunization History Report: The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries.

Link Standard Codes to Immunization Data: The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization.

Note: Testing for NDC codes, CVX for immunizations.

Test Steps

Transmit the Immunization Report for Juana Mariela Gonzales	**Description** Following the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. The Vaccination report includes the vaccine deferrals. The report MAY send the immunizations that the EHR imported from the IIS. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries. **Link Standard Codes to Immunization Data:** The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization. Note: Testing for NDC codes, CVX for immunizations.
Receive ACK Z23 from Immunization Registry	**Description** The Immunization Registry returns a positive acknowledgement message indicating that no errors were found during the course of filing the message. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries.

Test Case Group: Juana Maria Gonzales Visit

Description

Test Objectives

Infant twin, Juana Maria Gonzales Morales visits the provider where her immunization history is retrieved from the registry and reconciled with the local information in the medical record to determine vaccines that are due. Vaccinations are ordered and administered. The vaccines are reported to the immunization registry and a vaccine summary is available for the patient.

Test Case	Query the Registry for Juana Maria Gonzales

Description

The EHR generates a Z44 query to the Immunization Registry to retrieve the Evaluated History and Forecast for Juana Maria Gonzales. Querying the registry will consist of the vendor creating Z44 messages for Juana Maria Gonzales to be sent to the registry. The response will be processed as part of the 'Display, Reconcile, Import and Update Immunization Information' activity.

Using the Z42 Response to Immunization Registry Query, the EHR displays the Evaluated History and Forecast to the user for reconciliation and update. The vendor will receive information back from the registry and show the ability to view and reconcile, and import the information returned by the registry (NOTE: the Z42 message will be provided either manually, or as part of the tool). This test will also look at the system's ability to view the forecast returned by the registry and create a new forecast after reconciling the information.

Test Objectives

Select New Patient: The EHR or other clinical software system must allow a user to distinguish information about patients with similar names or identifying information in order to select the right patient from the providers' EHR or other clinical software. This information is crucial for identifying and selecting the correct patient. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar sounding names. In order to match patients with those already in the immunization registry, the EHR or other clinical software should have the ability to record the mother's maiden name, whether the patient was part of a multiple birth, and if so, the order of birth (when such information is available). The provider should be aware of how often the protection indicator information must be updated based on local rules.

Request/Receipt of Patient Immunization History: The EHR or other clinical software system sends a request to the public health immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5).

Request/Receive Patient Immunization Data and Identify Source: The EHR or other clinical software system stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry.

View Reconciled Immunization Forecast: The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations.

Test Steps

Select Patient Juana Maria Gonzales	## Description Juana Maria Gonzales is selected as the patient and her record is opened in the EHR. ## Test Objectives **Select New Patient:** The EHR or other clinical software system must allow a user to distinguish information about patients with similar names or identifying information in order to select the right patient from the providers' EHR or other clinical software. This information is crucial for identifying and selecting the correct patient. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar sounding names. In order to match patients with those already in the immunization registry, the EHR or other clinical software should have the ability to record the mother's maiden name, whether the patient was part of a multiple birth, and if so, the order of birth (when such information is available). The provider should be aware of how often the protection indicator information must be updated based on local rules.

Query Registry for vaccination history and forecast too many matches found response	**Description** The provider uses the EHR to query the Immunization Registry for an Evaluated History and Forecast based on information known to the Immunization Registry. This query will result in an error that too many matches are found. **Test Objectives** **Request/Receipt of Patient Immunization History:** The EHR or other clinical software system sends a request to the public health immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). Setup step to test error handling: Test the capability of the EHR to process a response message that returns no persons found and to provide an indication to the end user.
Error Handling - Too many matches found	**Description** The EHR processes notifies the user that there were too many matches found in response to the query the Immunization Registry for an Evaluated History and Forecast. **Test Objectives** **Request/Receive Patient Immunization Data and Identify Source:** The EHR or other clinical software system stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry. Tests error handling: Test the capability of the EHR to process a response message that returns too many matches found and to provide an indication to the end user.
Query Registry for vaccination history and forecast no persons found response	**Description** The provider uses the EHR to query the Immunization Registry for an Evaluated History and Forecast based on information known to the Immunization Registry. This query will result in an error that no persons are found. **Test Objectives** **Request/Receipt of Patient Immunization History:** The EHR or other clinical software system sends a request to the public health immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). Tests error handling: Test the capability of the EHR to process a response message that returns no persons found and to provide an indication to the end user.

Error Handling - No persons found	## Description The EHR processes notifies the user that there were no persons found in response to the query the Immunization Registry for an Evaluated History and Forecast. ## Test Objectives **Request/Receive Patient Immunization Data and Identify Source:** The EHR or other clinical software system stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry. Tests error handling: Test the capability of the EHR to process a response message that returns no persons found and to provide an indication to the end user.
Query Registry for vaccination history and forecast for Juana Maria Gonzales	## Description The provider uses the EHR to query the Immunization Registry for an Evaluated History and Forecast based on information known to the Immunization Registry. ## Test Objectives **Request/Receipt of Patient Immunization History:** The EHR or other clinical software system sends a request to the public health immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5).
View and import response to request for vaccination history for Juana Maria Gonzales	## Description The physician accesses the record for Juana Maria Gonzales and: - Accepts the single vaccine in the registry record into the EHR history. ## Test Objectives **Request/Receive Patient Immunization Data and Identify Source:** The EHR or other clinical software system stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry.

View the vaccination forecast for Juana Maria Gonzales	## Description The physician accesses the record for Juana Maria Gonzales and: - Views the vaccine forecast (either as provided by the Immunization Registry or as determined through EHR defined methods). ## Test Objectives **View Reconciled Immunization Forecast:** The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations.

Test Case	**Juana Maria Gonzales, Enter Orders and Immunizations**

Description

This test will consist of ordering vaccines for the test patients, reviewing any alerts caused by specific scenarios, and documenting vaccinations administered to the patients.

Test Objectives

Supporting data for error handling tests.

Record Vaccine Administration: The EHR or other clinical software system records information about each vaccine administered. The EHR records this information as structured data elements, including, at a minimum: date administered, administering clinician, route of administration (e.g. intramuscular), site of administration (e.g., left arm), immunization type, lot number, manufacturer, Vaccine Information Statement date, quantity of vaccine/dose size and ordering clinician. The system also assures data quality, i.e., data entered are appropriate (e.g., avoid “oral” route for IM vaccines, and assure dose is appropriate for the vaccine).

Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration: The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The GTIN contains the National Drug Code (NDC) and manufacturer data elements. Implementers can use mapping tables to determine the manufacturer from this NDC. The software system records these elements as structured data elements so the immunization administration message can use them to include the NDC and manufacturer in the message to the IIS.

Test Steps

Record Combo Vaccine administration	**Description** The nurse administers the DTaP-hepatitis B and poliovirus vaccine: - Documents all required information for the vaccine. **Test Objectives** **Record Vaccine Administration:** The EHR or other clinical software system records information about each vaccine administered. The EHR records this information as structured data elements, including, at a minimum: date administered, administering clinician, route of administration (e.g. intramuscular), site of administration (e.g., left arm), immunization type, lot number, manufacturer, Vaccine Information Statement date, quantity of vaccine/dose size and ordering clinician. The system also assures data quality, i.e., data entered are appropriate (e.g., avoid “oral” route for IM vaccines, and assure dose is appropriate for the vaccine). **Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration:** The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The GTIN contains the National Drug Code (NDC) and manufacturer data elements. Implementers can use mapping tables to determine the manufacturer from this NDC. The software system records these elements as structured data elements so the immunization administration message can use them to include the NDC and manufacturer in the message to the IIS.

Test Case	**Juana Maria Gonzales Transmit Immunization Report - Error Handling**

Description

Following the vaccinations given during the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. The Vaccination report includes all newly administered vaccines. The report MAY send the immunizations that the EHR imported from the IIS.

This transaction will result in an error or warning from the IIS.

Test Objectives

Transmit Standard Patient Immunization History Report: The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries.

Verify that the EHR is able to receive and display the error or warning response from the IIS.

Link Standard Codes to Immunization Data: The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization.

Note: Testing for NDC codes, CVX for immunizations.

Test Steps

Transmit the Immunization Report for Juana Maria Gonzales - Fatal Error Handling	**Description** Following the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. The report MAY send the immunizations that the EHR imported from the IIS. This will result in a warning from the IIS to assess the EHR ability to receive and display the error. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries. Setup to verify that the EHR is able to receive and display the error response from the IIS. **Link Standard Codes to Immunization Data:** The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization. Note: Testing for NDC codes, CVX for immunizations.
Receive ACK Z23 Fatal Error - CVX Code	**Description** The Immunization Registry returns a fatal error message indicating a table mapping error for the CVX code submitted was found during the course of filing the message. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries. Error Handling Support for a fatal error returned by the IIS, and the ability of the EHR to display a notification of this error to the user.

Transmit the Immunization Report for Juana Maria Gonzales - warning handling	**Description** Following the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. This will result in multiple warnings from the IIS to assess the EHR ability to receive and display the error. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries. Set up to verify that the EHR is able to receive and display the multiple warning response from the IIS. **Link Standard Codes to Immunization Data:** The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization. Note: Testing for NDC codes, CVX for immunizations.
Receive ACK Z23 Warning - Invalid Value	**Description** The Immunization Registry returns a warning message indicating an unrecognized administration site code submitted was found during the course of filing the message. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries. Error Handling Support for a warning returned by the IIS, and the ability of the EHR to display a notification of this warning to the user.

Transmit the Immunization Report for Juana Maria Gonzales - Multiple warning handling	**Description** Following the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. This will result in multiple warnings from the IIS to assess the EHR ability to receive and display the warnings. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries. Set up to verify that the EHR is able to receive and display the multiple warning response from the IIS. **Link Standard Codes to Immunization Data:** The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization. Note: Testing for NDC codes, CVX for immunizations.
Receive ACK Z23 Multiple Warnings	**Description** The Immunization Registry returns a message with multiple warnings indicating unrecognized administration site codes submitted were found during the course of filing the message. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries. Error Handling Support for multiple warnings returned by the IIS, and the ability of the EHR to display a notification of these warnings to the user.

Test Case Group: Reporting

Description

Test Objectives

These tests will include generation of cohort reports and acknowledgement error reports.

Test Case	Due and Overdue Immunizations

Description

The provider periodically uses the EHR to identify the cohort of patients that are due or overdue for immunizations along with their contact information in order to send reminder notifications to the patients/parents.

Test Objectives

Produce Population-Level Report: The EHR or other clinical software system generates aggregate, population-level reports based on known patient immunization data.

Test Steps

Produce Overdue Immunizations Cohort Report	**Description** The provider periodically uses the EHR to identify the cohort of patients that are due or overdue for immunizations along with their contact information in order to send reminder notifications to the patients/parents. **Test Objectives** **Produce Population-Level Report:** The EHR or other clinical software system generates aggregate, population-level reports based on known patient immunization data.

Test Case	**Acknowledgment Error Reporting**

Description

The EHR has received acknowledgment errors for vaccinations submitted to the IIS. The provider staff uses the EHR to generate an Acknowledgment Error Report or to export the information for use in a reporting tool.

Test Objectives

Acknowledgment Data Reporting: The EHR or other clinical software system is able to generate an Aggregate Error Report using the acknowledgment error message data returned in the ACK response to a vaccine update message (VXU/Z22). The report data must include the following data elements:

- Clinic code and name
- Patient identifier
- Vaccination date
- IIS error severity
- IIS error code and description

The aggregate report functionality should include grouping and sorting by error code, clinic, and vaccination date. Drill-down capability by error or date should also be supported as it is important to support identifying the source of the data errors and to correct the issue.

Test Steps

Produce Acknowledgments Report	### Description The provider has received acknowledgment errors for vaccinations submitted to the IIS. The provider staff uses the EHR to generate an Acknowledgment Error Report or to export the information for use in a reporting tool ### Test Objectives **Acknowledgment Data Reporting:** The EHR or other clinical software system is able to generate an Aggregate Error Report using the acknowledgment error message data returned in the ACK response to a vaccine update message (VXU/Z22). The report data must include the following data elements: • Clinic code and name • Patient identifier • Vaccination date • IIS error severity • IIS error code and description The aggregate report functionality should include grouping and sorting by error code, clinic, and vaccination date. Drill-down capability by error or date should also be supported as it is important to support identifying the source of the data errors and to correct the issue.

Test Case Group: Anita Francesca Marina Visit

Description

Test Objectives

Anita Francesca Marina works as a CNA, and is identified as a high-priority candidate for a new adult vaccine. She makes an appointment for the vaccination clinic where she will receive the vaccination. The provider identifies the list of patients that will be vaccinated the following day and requests the patient history from the registry. Anita is one of these patients. Her immunization history is retrieved from the registry and reconciled with the local information in the medical record to determine vaccines that are due. Vaccinations are ordered and administered. The vaccines are reported to the immunization registry and a vaccine summary is available for the patient.

Test Case	Notify Patients of Immunization Status

Description

The EHR is used to identify patients that are high-priority candidates for a new adult vaccine campaign due to their status as a healthcare worker. The EHR is used to notify patients. Anita Francesca Marina is one of these candidates.

Test Objectives

Notify Patients of Immunization Status: The EHR or other clinical software provides the ability to notify patients of recommendations based on their individual preferences for receiving notification.

Test Steps

Notify New Vaccine Candidate Patients	**Description** The provider is able to use the EHR to identify the cohort of patients that work in the healthcare industry that are prioritized for a newly available vaccine. **Test Objectives** **Notify Patients of Immunization Status:** The EHR or other clinical software provides the ability to notify patients of recommendations based on their individual preferences for receiving notification.

Test Case	**Query the Registry for Anita Francesca Marina**

Description

The EHR allows the provider to select the patients that will be seen in the clinic for the day. Anita Francesca Marina is one of these patients, and a query will be sent to the registry to retrieve her vaccine history.

Querying the registry will consist of the vendor creating a Z44 message for Anita Francesca Marina.

Using the Z42 Response to Immunization Registry Query, the EHR displays the Evaluated History and Forecast to the user for reconciliation and update. The vendor will receive information back from the registry and show the ability to view and reconcile, and import the information returned by the registry. This test will also look at the system's ability to view the vaccine recommendation returned by the registry and create a new recommendation after reconciling the information.

Test Objectives

Select One or More Patients: The EHR or other clinical software system must allow a provider to specify one or more patients in real time or those scheduled for appointment(s) in the future (e.g., the next day, week, month, etc.) so that a request can be sent to the public health immunization registry for each patient's complete immunization history.

Select New Patient: The EHR or other clinical software system must allow a user to distinguish information about patients with similar names or identifying information in order to select the right patient from the providers' EHR or other clinical software. This information is crucial for identifying and selecting the correct patient. For example, twins living in the same household will have similar dates of birth, addresses, and may have similar sounding names. In order to match patients with those already in the immunization registry, the EHR or other clinical software should have the ability to record the mother's maiden name, whether the patient was part of a multiple birth, and if so, the order of birth (when such information is available). The provider should be aware of how often the protection indicator information must be updated based on local rules.

Request/Receipt of Patient Immunization History: The EHR or other clinical software system sends a request to the public health immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5).

Request/Receive Patient Immunization Data and Identify Source: The EHR or other clinical software system stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry.

View Reconciled Immunization Forecast: The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations.

Review Patient Immunization History: The EHR or other clinical software system displays vaccine history by vaccine series.

Test Steps

Select the Set of Patients to be Seen in the Vaccination Clinic	**Description** The EHR allows the provider to select the patients that will be seen in the clinic for the day. Anita Francesca Marina is selected as the patient from this list and her record is opened in the EHR **Test Objectives** **Select One or More Patients:** The EHR or other clinical software system must allow a provider to specify one or more patients in real time or those scheduled for appointment(s) in the future (e.g., the next day, week, month, etc.) so that a request can be sent to the public health immunization registry for each patient's complete immunization history.
Query Registry for vaccination history and recommendations for Anita Francesca Marina	**Description** The provider uses the EHR to query the Immunization Registry for an Evaluated History and Vaccine Recommendations for an adult patient based on information known to the Immunization Registry. **Test Objectives** **Request/Receipt of Patient Immunization History:** The EHR or other clinical software system sends a request to the public health immunization registry "on demand," or in advance for those with scheduled appointments. The request includes the identifying information the immunization registry needs to match each patient with those in the registry including, if present, the mother's maiden name, a multiple birth indicator, and the birth order. The request also is sent in a pre-determined format the registry can read and interpret (Request Evaluated Immunization History and Forecast (Z44) - HL7 version 2.5.1 Implementation Guide for Immunization Messaging Release 1.5). Note: Adult Patient
View and import response to request for vaccination history for adult patient Anita Francesca Marina	**Description** The physician accesses the record for adult patient Anita Francesca Marina and: - Accepts the vaccines provided by the registry as the complete vaccination history for this patient had not yet been recorded in the EHR. **Test Objectives** **Request/Receive Patient Immunization Data and Identify Source:** The EHR or other clinical software system stores immunization history accepted electronically from other sources (such as a public health immunization registry consistent with HL7 version 2.5.1, Implementation Guide for Immunization Messaging Release 1.5) or communicated by the patient and manually entered by the clinician. When viewing such information, the provider can determine which immunizations were administered by the practice, which were entered historically as patient-reported, and which were accepted electronically from the public health registry. **Review Patient Immunization History:** The EHR or other clinical software system displays vaccine history by vaccine series. Note: Adult Patient

View the vaccination recommendations for Anita Francesca Marina	## Description The physician accesses the record for Anita Francesca Marina and: - Views the vaccine recommendations (as determined through EHR defined methods with consideration for both the IIS vaccine history and forecast and the information available through the EHR). As a healthcare worker: 1. The EHR or other clinical software system indicates that given her immunity status of negative for Hepatitis B, that she should receive the Hepatitis B vaccination. 2. Anita has been identified to receive a new vaccine as a campaign for healthcare workers. ## Test Objectives **View Reconciled Immunization Forecast:** The EHR or other clinical software system has the ability to re-evaluate and update the immunization forecast using a patient's newly updated immunization history. Forecasts are updated following reconciliation of immunization data contained in the public health immunization registry with immunization data contained in the EHR. Processing the new forecast can be internal to the EHR or it can use an external forecasting service, but should reference the most recent recommendations. Note: Recommendation for new vaccine; Vaccine Recommendation for Adult Patient

Test Case	Anita Francesca Marina, Enter Orders and Immunizations

Description

This test will consist of ordering vaccines for the test patients, reviewing any alerts caused by specific scenarios, and documenting vaccinations administered to the patients.

Test Objectives

Record Vaccine Administration: The EHR or other clinical software system records information about each vaccine administered. The EHR records this information as structured data elements, including, at a minimum: date administered, administering clinician, route of administration (e.g. intramuscular), site of administration (e.g., left arm), immunization type, lot number, manufacturer, Vaccine Information Statement date, quantity of vaccine/dose size and ordering clinician. The system also assures data quality, i.e., data entered are appropriate (e.g., avoid “oral” route for IM vaccines, and assure dose is appropriate for the vaccine).

Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration: The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The GTIN contains the National Drug Code (NDC) and manufacturer data elements. Implementers can use mapping tables to determine the manufacturer from this NDC. The software system records these elements as structured data elements so the immunization administration message can use them to include the NDC and manufacturer in the message to the IIS.

Note: New vaccine, adult

Data Quality Checks: The EHR or other clinical software integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections.

Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes:

- 2100: Indicates that any date field is in the future. Specific errors for date transmitted in an OBX are also provided.
- 2102: Indicates that a VIS given date messaged in OBX-5 is in the future
- 2103: Indicates that a VIS publication date messaged in OBX-5 is in the future
- 2013: Indicates that the funding source code in an OBX segment conflicts with other data in the message (eligibility, age etc)
- 2017: Indicates that the administration site is inconsistent with the vaccine administered

Test Steps

Vaccine Administration Data Quality Checks	**Description** The provider attempts to document vaccine administration information for the immunization for Anita Francesca Marina. These data quality checks primarily relate to improving vaccine administration information and associated observations that will be included when submitting data to the immunization registry. **Test Objectives** **Data Quality Checks:** The EHR or other clinical software integrates additional data quality checks into IIP Testing and Recognition to improve data quality and reduce rejections. Note: The EHR or other clinical software system prevents specific data issues which would potentially result in IIS errors as defined by the AIRA Error Codes. This supports reducing data quality issues that could trigger the following AIRA-defined Error Codes: - 2100: Indicates that any date field is in the future. Specific errors for date transmitted in an OBX are also provided. - 2102: Indicates that a VIS given date messaged in OBX-5 is in the future - 2103: Indicates that a VIS publication date messaged in OBX-5 is in the future - 2013: Indicates that the funding source code in an OBX segment conflicts with other data in the message (eligibility, age etc) - 2017: Indicates that the administration site is inconsistent with the vaccine administered
Record Vaccine Administration for Hepatitis B	**Description** Since Anita is a healthcare worker with no evidence of immunity to Hepatitis B, the nurse administers a Hepatitis B vaccination to adult patient, Anita Francesca Marina: - Documents all required information for the Hepatitis B vaccine **Test Objectives** **Record Vaccine Administration:** The EHR or other clinical software system records information about each vaccine administered. The EHR records this information as structured data elements, including, at a minimum: date administered, administering clinician, route of administration (e.g. intramuscular), site of administration (e.g., left arm), immunization type, lot number, manufacturer, Vaccine Information Statement date, quantity of vaccine/dose size and ordering clinician. The system also assures data quality, i.e., data entered are appropriate (e.g., avoid “oral” route for IM vaccines, and assure dose is appropriate for the vaccine). **Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration:** The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The GTIN contains the National Drug Code (NDC) and manufacturer data elements. Implementers can use mapping tables to determine the manufacturer from this NDC. The software system records these elements as structured data elements so the immunization administration message can use them to include the NDC and manufacturer in the message to the IIS. Note: Adult Patient

Record Vaccine Administration for New Vaccine	**Description** The nurse administers the new vaccine to adult patient, Anita Francesca Marina: - Documents all required information for the vaccine using the new vaccine information entered in the Manage Configuration test steps. **Test Objectives** **Record Vaccine Administration:** The EHR or other clinical software system records information about each vaccine administered. The EHR records this information as structured data elements, including, at a minimum: date administered, administering clinician, route of administration (e.g. intramuscular), site of administration (e.g., left arm), immunization type, lot number, manufacturer, Vaccine Information Statement date, quantity of vaccine/dose size and ordering clinician. The system also assures data quality, i.e., data entered are appropriate (e.g., avoid “oral” route for IM vaccines, and assure dose is appropriate for the vaccine). **Record Vaccine Information by Scanning 2D Barcode Found on Unit-of-Use for Vaccine Administration:** The EHR or other clinical software system allows users to record vaccination information from 2D barcodes (GS1 DataMatrix) found on unit-of-use (vial or pre-filled syringe) for each vaccine administered. This 2D barcode contains: the Global Trade Item Number (GTIN), expiration date and lot number. The GTIN contains the National Drug Code (NDC) and manufacturer data elements. Implementers can use mapping tables to determine the manufacturer from this NDC. The software system records these elements as structured data elements so the immunization administration message can use them to include the NDC and manufacturer in the message to the IIS. Note: Adult Patient

Test Case	**Anita Francesca Marina Transmit Immunization Report**

Description

Following the vaccinations given during the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. The Vaccination report includes all newly administered vaccines. The report should include vaccines incorrectly recorded in the IIS. The report MAY send the immunizations that the EHR imported from the IIS.

Test Objectives

Transmit Standard Patient Immunization History Report: The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries.

Note: Adult Patient

Link Standard Codes to Immunization Data: The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization.

Note: Testing for NDC codes, CVX for immunizations.

Test Steps	
Transmit the Immunization Report for Anita Francesca Marina	**Description** Following the vaccinations given during the visit, the EHR transmits an Immunization report to the Immunization Registry using the VXU/Z22. The Vaccination report includes all newly administered vaccines, and an indication that Varicella was not administered due to a history of the disease as evidence of immunity. The Vaccination report also includes an indication that Hepatitis A was not administered due to serological evidence of immunity. The report MAY send the immunizations that the EHR imported from the IIS. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries. Note: Adult Patient **Link Standard Codes to Immunization Data:** The EHR or other clinical software system links standard codes (i.e., LOINC for lab tests or evaluation tools, SNOMED CT for conditions or observations, NDC codes for current immunizations, CVX for historical immunizations, appropriate codes for administration site, route, method, etc.) to discrete data elements associated with an immunization. Note: Testing for NDC codes, CVX for immunizations.
Receive ACK Z23 from Immunization Registry	**Description** The Immunization Registry returns a positive acknowledgement message indicating that no errors were found during the course of filing the message. **Test Objectives** **Transmit Standard Patient Immunization History Report:** The EHR or other clinical software system directly or indirectly through an intermediary creates and transmits a report of a patient's newly administered or newly identified immunization history to public health immunization registries.

Test Case Group: Review Inventory

Description

Test Objectives

Demonstrates the ability to view inventory supply, including deprecated inventory used.

Test Case	View Inventory

Description

The provider reviews the available inventory following vaccine administrations used during the day.

Test Objectives

Update Vaccine Inventory from Patient Dosage Administration: The EHR or other clinical software system updates the vaccine inventory to ensure the correct count of remaining available vaccine inventory.

Test Steps

View updated vaccine inventory	## Description The provider reviews the available inventory following vaccine administrations used during the day. ## Test Objectives **Update Vaccine Inventory from Patient Dosage Administration:** The EHR or other clinical system updates the vaccine inventory to ensure the correct count of remaining available vaccine inventory.

Test Case	**Produce Inventory Report of Remaining Stock**

Description

The provider periodically uses the EHR to review inventory of remaining stock. The report may be sorted by expiration date or funding source.

Test Objectives

Produce Vaccine History Report: The EHR or other clinical software system generates inventory reports of remaining stock. The reports can be sorted by expiration date and source (e.g., private or guarantee program).

Test Steps

Produce Stock Inventory Report - Expiration Date Sort	## Description The provider periodically uses the EHR to review the stock inventory sorted by the expiration date to inform orders for new vaccine stock. ## Test Objectives **Produce Vaccine History Report:** The EHR or other clinical software software system generates inventory reports of remaining stock. The reports can be sorted by expiration date and source (e.g., private or guarantee program).

Produce Stock Inventory Report - Funding Source Sort	## Description The provider periodically uses the EHR to review the stock inventory sorted by funding source to inform orders for new vaccine stock. ## Test Objectives **Produce Vaccine History Report:** The EHR or other clinical software system generates inventory reports of remaining stock. The reports can be sorted by expiration date and source (e.g., private or guarantee program).