

HL7 Immunization User Group

MONTHLY MEETING

NOVEMBER 9, 2017

2:00 PM ET

Agenda

- Welcome
- Updates
 - SISC Update (Craig Newman)
 - Frequently Asked Questions (Skipping, no updates this month)
- Discussion Topic: Forecasting
 - IIS Perspective (NY CIR – Shirley Huie)
 - Lessons Learned from AART Testing (Nathan Bunker)
 - Lessons Learned from EHR Perspective (Danny Wise)
 - Additional Questions / Discussion

SISC Update

STANDARDS AND INTEROPERABILITY STEERING
COMMITTEE (CRAIG NEWMAN)

Discussion Topic

READING FORECAST RESULTS IN QUERY
RESPONSES

IIS Perspective




NEW YORK CITYWIDE IMMUNIZATION REGISTRY –
SHIRLEY HUIE

New York City
Citywide Immunization Registry (CIR):

Online Registry

Immunization Record Display

Dose by date →

Status
 red=due now
 green=up-to-date
 orange=due soon

First: **Testdemo** Middle: Last: **Testdemo** DOB: **05/01/2016** Gender: **F**
 788530329 2 Main Street, 2B (Age: 18m 1w) New York, NY 10000

Immunization Recommendations

Vaccine Groups

Event	1	2	3	4	5	Next Due
Influenza 1 Event/s	11/01/2017 Influenza-IV4 IM, Presrv-free (8-35mos) 18m 0w					11/29/2017 INFLUENZA
HepB 4 Event/s	05/01/2016 Hep B Peds <20 yrs 0w 0d	07/12/2016 DTaP/HepB/IPV (Pediarix) 10w 2d	10/01/2016 DTaP/HepB/IPV (Pediarix) 21w 8d	12/01/2016 Hep B Peds <20 yrs 7m 0w		Completed Vaccine Series
Rotavirus 0 Event/s						Not recommended after 8 months.
DTP 2 Event/s	07/12/2016 DTaP/HepB/IPV (Pediarix) 10w 2d	10/01/2016 DTaP/HepB/IPV (Pediarix) 21w 8d				DUE NOW DTAP
Hib 1 Event/s	08/01/2017 Hib-PRP-T (ActHib; Hiberix) 15m 0w					Completed Vaccine Series
Pediatric Pneumococcal (PCV & PPSV) 3 Event/s	07/12/2016 Pneum Conj (PCV13) 10w 2d	10/01/2016 Pneum Conj (PCV13) 21w 8d	12/01/2016 Pneum Conj (PCV13) 7m 0w			DUE NOW PNEUM CONJ (PCV13)
Polio 3 Event/s	07/12/2016 DTaP/HepB/IPV (Pediarix) 10w 2d	10/01/2016 DTaP/HepB/IPV (Pediarix) 21w 8d	08/01/2017 IPV 15m 0w			05/01/2020 IPV
MMR 2 Event/s	04/28/2017 MMR 11m 3w	08/01/2017 MMR 15m 0w				05/01/2020 MMR
Varicella 1 Event/s	08/20/2017 Varicella 15m 2w					DUE NOW VARICELLA
HepA 1 Event/s	08/20/2017 HepA ped/adol 2-dose 15m 2w					02/18/2018 HEPA PEDI/ADOL 2-DOSE
Meningococcal (MenACWY) 0 Event/s						Recommended for high risk groups, otherwise 05/01/2027 MENACWY CONJUGATE
Human Papillomavirus 0 Event/s						05/01/2027 HUMAN PAPILLOMAVIRUS (HPV9- GARDASIL 9)
Adult Pneumococcal (PCV & PPSV) 0 Event/s						Not recommended
H1N1 Influenza 0 Event/s						No longer recommended
Other Vaccines						
Other 0 Event/s						

Due soon with date

Due now

Due in future with date

Event	1	2	3	4	5	Next Due
Influenza 1 Event/s	11/01/2017 Influenza-IV4 IM, Presrv-free (8-35mos) 18m 0w					11/29/2017 INFLUENZA
HepB 4 Event/s	05/01/2016 Hep B Peds <20 yrs 0w 0d	07/12/2016 DTaP/HepB/IPV (Pediarix) 10w 2d	10/01/2016 DTaP/HepB/IPV (Pediarix) 21w 6d	12/01/2016 Hep B Peds <20 yrs 7m 0w		Completed Vaccine Series
Rotavirus 0 Event/s						Not recommended after 8 months.
DTP 2 Event/s	07/12/2016 DTaP/HepB/IPV (Pediarix) 10w 2d	10/01/2016 DTaP/HepB/IPV (Pediarix) 21w 6d				DUE NOW DTAP
Hib 1 Event/s	08/01/2017 Hib-PRP-T (ActHib; Hiberix) 15m 0w					Completed Vaccine Series
Pediatric Pneumococcal (PCV & PPSV) 3 Event/s	07/12/2016 Pneum Conj (PCV13) 10w 2d	10/01/2016 Pneum Conj (PCV13) 21w 6d	12/01/2016 Pneum Conj (PCV13) 7m 0w			DUE NOW PNEUM CONJ (PCV13)
Polio 3 Event/s	07/12/2016 DTaP/HepB/IPV (Pediarix) 10w 2d	10/01/2016 DTaP/HepB/IPV (Pediarix) 21w 6d	08/01/2017 IPV 15m 0w			05/01/2020 IPV
MMR 2 Event/s	04/28/2017 MMR 11m 3w	08/01/2017 MMR 15m 0w				05/01/2020 MMR
Varicella 1 Event/s	08/20/2017 Varicella 15m 2w					DUE NOW VARICELLA
HepA 1 Event/s	08/20/2017 HepA ped/adol 2-dose 15m 2w		04/26/2017 2 MMR 11m 3w			02/18/2018 HEPA PEDI/ADOL 2-DOSE
Meningococcal (MenACWY) 0 Event/s			08/20/2017 3 Varicella 15m 2w			Recommended for high risk groups, otherwise 05/01/2027 MENACWY CONJUGATE
Human Papillomavirus 0 Event/s						05/01/2027 HUMAN PAPILLOMAVIRUS (HPV9- GARDASIL 9)
Adult Pneumococcal (PCV & PPSV) 0 Event/s						Not recommended
H1N1 Influenza 0 Event/s						No longer recommended
Other Vaccines						
Other 0 Event/s						

Footnotes

- 1: This immunization event occurred prior to the recommended age or recommended interval for this dose.
- 2: The age of this patient was below the recommended minimum age of the vaccine.
- 3: This imm. occurred prior to the min recommended interval for admin. of another live virus vaccine.

Other footnotes for invalid doses:

- Dose was given prior to recommended interval or age
- Extra dose


Immunization History						
Event	1	2	3	4	5	Next Due
Influenza 1 Event/s	11/01/2017 Influenza-IV4 IM, Presrv-free (6-35mos) 18m Dw					11/29/2017 INFLUENZA
HepB 4 Event/s	05/01/2016 Hep B Peds <20 yrs 0w 0d	07/12/2016 DTaP/HepB/IPV (Pediarix) 10w 2d	10/01/2016 DTaP/HepB/IPV (Pediarix) 21w 6d	12/01/2016 Hep B Peds <20 yrs 7m 0w		Completed Vaccine Series
Rotavirus 0 Event/s						Not recommended after 8 months.
DTP 2 Event/s	07/12/2016 DTaP/HepB/IPV (Pediarix) 10w 2d	10/01/2016 DTaP/HepB/IPV (Pediarix) 21w 6d				DUE NOW DTAP
Hib 1 Event/s	08/01/2017 Hib-PRP-T (Act-Hib; Hiberix) 15m Dw					Completed Vaccine Series
Pediatric Pneumococcal (PCV & PPSV) 3 Event/s	07/12/2016 Pneum Conj (PCV13) 10w 2d	10/01/2016 Pneum Conj (PCV13) 21w 6d	12/01/2016 Pneum Conj (PCV13) 7m 0w			DUE NOW PNEUM CONJ (PCV13)
Polio 3 Event/s	07/12/2016 DTaP/HepB/IPV (Pediarix) 10w 2d	10/01/2016 DTaP/HepB/IPV (Pediarix) 21w 6d	08/01/2017 IPV 15m 0w			05/01/2020 IPV
MMR 2 Event/s	04/26/2017 MMR 11m 3w	08/01/2017 MMR 15m Dw				05/01/2020 MMR
Varicella 1 Event/s	09/10/2017 Disease/Immunity Reported					Completed Vaccine Series
HepA 1 Event/s	08/20/2017 HepA ped/adol 2-dose 15m 2w					02/18/2018 HEPA PEDI/ADOL 2-DOSE
Meningococcal (MenACWY) 0 Event/s						Recommended for high risk groups, otherwise 05/01/2027 MENACWY CONJUGATE
Human Papillomavirus 0 Event/s						05/01/2027 HUMAN PAPILLOMAVIRUS (HPV9-GARDASIL 9)
Adult Pneumococcal (PCV & PPSV) 0 Event/s						Not recommended
H1N1 Influenza 0 Event/s						No longer recommended
Other Vaccines						
Other						

09/10/2017
Disease/Immunity Reported

Footnotes




- 1: This immunization event occurred prior to the recommended age or recommended interval for this dose.
- 2: The age of this patient was below the recommended minimum age of the vaccine.
- 3: Reported as having had the disease or having a positive titer or serology.

Due Soon Status

908619548 
 First: **Testnita** Middle: Last: **Test** DOB: **09/27/2017** Gender: **M**
 543 Fake Drive
 Fake City, NY 12345 (Age: 5w 5d)

Scroll down to [Lead Test History](#)

Immunization History

Event	1	2	3	4	5	Next Due
Influenza 1 Event/s	09/27/2017  Influenza-IV4 IM,Prsrv-free(age varies) Dw Od					03/28/2018 INFLUENZA
HepB 1 Event/s	09/27/2017 Hep B Peds <20 yrs Dw Od					11/27/2017 HEP B PEDS <20 YRS
Rotavirus 0 Event/s						11/27/2017 ROTAVIRUS RV5 (ROTATEQ, 3 DOSE)
DTP 1 Event/s	09/27/2017  DTaP Dw Od					11/27/2017 DTAP
Hib 0 Event/s						11/27/2017 HIB
Pediatric Pneumococcal (PCV & PPSV) 0 Event/s						11/27/2017 PNEUM CONJ (PCV13)
Polio 0 Event/s						11/27/2017 IPV
MMR 0 Event/s						09/27/2018 MMR
Varicella 1 Event/s	09/27/2017  Varicella Dw Od					09/27/2018 VARICELLA
HepA 0 Event/s						09/27/2018 HEPA PED/ADOL 2-DOSE
Meningococcal (MenACWY) 0 Event/s						Not recommended
Human Papillomavirus 0 Event/s						09/27/2028 HUMAN PAPILLOMAVIRUS (HPV9-GARDASIL 9)
Adult Pneumococcal (PCV & PPSV) 0 Event/s						Not recommended

Lessons Learned from AART Testing

NATHAN BUNKER

AART Testing

American Immunization Registry Association

- Measurement & Improvement Initiative
 - <http://www.immregistries.org/initiatives/measurement-and-improvement-initiative>
- Three stages:
 - Testing and Discovery
 - Assessment
 - Validation

Aggregate Analysis Reporting Tool (AART)

- Send 1000+ VXU messages to every IIS every month
- Send 1000+ QBP messages to query back these same VXU's
- Results are recorded in AART
 - <http://www.immregistries.org/initiatives/measurement/aggregate-analysis-reporting-tool>

AART Forecast Testing

TCH Forecast Tester

- Originally developed to test TCH Forecaster
- Also allows comparison between forecasters
- AART currently stores forecast results here for analysis
- <http://tchforecasttester.org/>

NIST - Forecasting for Immunization Test Suite (FITS)

- Just released this year
- AART will transition to using FITS exclusively in 2018
- <https://fits.nist.gov/fits/#/home>
- NIST presentation at AIRA conference in April:
 - http://repository.immregistries.org/files/resources/59022cf23f035/aira_2017_7d_using_nist_tools_for_evaluation_of_immunization_clinical_decision_support_systems_ni.pdf

AART Forecast Testing

AART receives RSP messages and tries to read vaccination forecasts

AART expects a great deal of variability

- HL7 v2.3.1 VXR Response to Vaccination Query Returning Vaccination Record
- HL7 v2.4 RSP
- HL7 v2.5 release 1.4
- HL7 v2.5 Z32 or Z42 release 1.5

AART goal:

- Get as much useful information as possible out of the message

Warning:

- The process next shown is based off of decisions made 3 years ago only for testing purposes, you must assume decisions made are not 100% correct

AART Forecast Testing

Processing rules:

- Read through RXA and OBX segments and create a list of forecast items
- Only OBX segments in certain RXA (ORC) groups are considered
- There are triggers for making a forecast item
- The forecast item is updated
- There are triggers for adding forecast item to list

Forecast item (or object):

- Dose Number
- Valid Date
- Due Date
- Overdue Date
- Finished Date
- Vaccine CVX
- Schedule Name
- Series Name
- Series Dose Count
- Series Status
- Reason Code

AART Forecast Testing

Trigger for making forecast item

- First, an OBX segment must be encountered with one of the following criteria
 - OBX-3 = “30956-7”, or
 - OBX-3 = “38890-0”, or
 - OBX-3 = “30979-9” and OBX-3.2 = “”
- Second, one of these two criteria must be met:
 - OBX is part of a “Dummy” RXA segment
 - ORC/RXA group where RXA-3 = “998”
 - OBX is grouped with another OBX that indicates the due date
 - OBX-3 = “ 30890-7” or
 - OBX-3 = “ 30979-9” and OBX-3.2 = “30980-7”

Triggers for adding current forecast item to list:

- Creating a new forecast item (need to add current one to move on to new one)
- Finished processing message
 - There are no more OBX to read, so last forecast item needs to be added to the list

AART Forecast Testing

Forecast Field	OBX-3
Vaccine CVX (required)	(same as trigger) 30956-7 or 38890-0 or 30979-9 and OBX-3.2 = ""
Due Date (required)	30890-7 or 30979-9 and OBX-3.2 = "30980-7"
Valid Date	30981-5
Overdue Date	59778-1
Finished Date	59777-3
Dose Number	30973.2

AART Forecast Testing

Forecast Field	OBX-3
Schedule Name	59779-9
Series Name	59780-7
Series Dose Count	59782-3
Series Status	59783-1
Reason Code	30982-3

AART Forecast Testing

Series Status

- Currently a great deal of variation in this field
- Have not yet attempted to sort this one completely out

TCH Forecaster has:

- A: assumed complete or immune
- C: complete
- D: due
- E: error
- F: finished
- G: aged out

continued...

- I: immune
- L: due later
- N: not complete
- O: overdue
- R: no results
- S: complete for season
- U: unknown
- V: consider
- W: waived
- X: contraindicated
- Z: recommend, but not required

AART Forecast Testing

Summary

- It is possible to write a single parser to read most results from IIS
- Some translation will be needed

Caveat

- Certain the current process needs to be updated
- Expecting to update this in 2018 during integration with FITS

More information

- Want to see the actual Java code?
 - <https://github.com/nathanbunker/smm-tester/blob/master/src/main/java/org/immregistries/smm/tester/manager/forecast/ForecastTesterManager.java>

FORECASTING

Lessons Learned (An EHR Vendor's Perspective)

Danny Wise, Allscripts

Systems Analyst

Development, Public Health Reporting Hub



2015 CEHRT Certification

- 2015 NIST Immunization Test Suite
 - <http://hl7v2-iz-r1.5-testing.nist.gov>
- HL7 v. 2.5.1, rel. 1.5
- Z44-profile QBPs
- 4 query / response test cases
 - 2 “Exact Match”
 - 1 “No Match”
 - 1 “Too Many”

2015 CEHRT Certification

- Evaluated History concepts
 - Vaccine Type (LOINC 30956-7)
 - CVX code
 - Dose Validity (LOINC 59781-5)
 - always provided
 - Reason (LOINC 30982-3)
 - Immunization Schedule Used (LOINC 59779-7)

2015 CEHRT Certification

- Forecasting concepts
 - Vaccine Type (LOINC 30956-7)
 - CVX code
 - Date Vaccination Due (LOINC 30980-7)
 - Earliest Date to Give (LOINC 30981-5)
 - Immunization Schedule Used (LOINC 59779-7)
 - All forecast vaccines under a single RXA segment
 - OBX-4 unique

The “Real World”

- Some IIS haven't updated for rel. 1.5 yet and reject Z44-profile QBPs
- Rel. 1.4 supports forecasting in Z32-profile RSPs
- Z31-profile “Multiple Matches” responses

The “Real World”

- Variation among IIS for how evaluated and forecasted vaccines are identified
 - Vaccine Type (LOINC 30956-7)
 - CVX code
 - Component Vaccine Type (LOINC 38890-0)
 - CVX code
 - Vaccine Due Next (LOINC 30979-9)
 - CVX code
 - Series Name (LOINC 59780-7)
 - locally-defined code / string value
 - Locally-defined “LOINC-like” code
 - locally-defined code / string value

The “Real World”

- Evaluated History concepts
 - Vaccine Identifier (various LOINC usage)
 - CVX code
 - locally-defined code / string value
 - Dose Validity (LOINC 59781-5)
 - not always provided
 - Reason (LOINC 30982-3)
 - Dose Number in Series (LOINC 30973-2)
 - Total # Doses in Series (LOINC 59782-3)
 - Immunization Schedule Used (LOINC 59779-9)

2015 CEHRT Certification (revisited)

- Evaluated History concepts
 - Vaccine Type (LOINC 30956-7)
 - CVX code
 - Dose Validity (LOINC 59781-5)
 - always provided
 - Reason (LOINC 30982-3)
 - Immunization Schedule Used (LOINC 59779-7)

The “Real World”

- Forecasting concepts
 - Vaccine Identifier (various LOINC usage)
 - CVX code
 - locally-defined code / string value
 - Date Vaccine Due (LOINC 30980-7)
 - Earliest Date to Give (LOINC 30981-5)
 - Latest Date to Give (LOINC 59777-3)
 - Date Dose Overdue (LOINC 59778-1)
 - Dose Number in Series (LOINC 30973-2)
 - Total # Doses in Series (LOINC 59782-3)

The “Real World”

- Forecasting concepts (continued)
 - Status in Series (LOINC 59783-1)
 - Reason (LOINC 30982-3)
 - Immunization Schedule Used (LOINC 59779-9)
 - Locally-defined “LOINC-like” code
 - Forecasted vaccines all under a single RXA segment
 - OBX-4 unique
 - Forecasted vaccines each under their own RXA segments
 - OBX-4 not always unique

2015 CEHRT Certification (revisited)

- Forecasting concepts
 - Vaccine Type (LOINC 30956-7)
 - CVX code
 - Date Vaccination Due (LOINC 30980-7)
 - Earliest Date to Give (LOINC 30981-5)
 - Immunization Schedule Used (LOINC 59779-7)
 - All forecast vaccines under a single RXA segment
 - OBX-4 unique

Functional Guide

Forecast when a dose is not recommended to be given	
2.11 The Responding System SHALL have the ability to respond with a forecast when a dose is not recommended to be given.	<p>The Responding System SHALL have the ability to exchange the following Forecast data elements when a dose is not recommended to be given:</p> <ul style="list-style-type: none">• Vaccine Type• Series Status• Forecast Reason <p>The Responding System MAY have the ability to exchange:</p> <ul style="list-style-type: none">• Immunization Schedule Used <p>The Responding System SHALL include a forecast for each vaccine preventable disease within the scope of the Responding System when a dose is not recommended to be given based on currently available information.</p> <ul style="list-style-type: none">• See Appendix A.4 for more information

- No dates!
- Rel. 1.5 IG and “Guidance on Detailed Message Structure and the Use of Specific LOINC Codes” document suggest dates are required for forecasting

Not Recommended Vaccines

- Impact to UI:

Immunization Schedule Type: ACIP
Forecast Received on: 09/29/2017 04:29 PM

Immunization Name	Next Date	Earliest Date	Latest Date	Overdue Date
HEP B, UNSPECIFIED FORMULATION	09/07/1996			
MMR	07/07/1997			
VARICELLA	07/07/1997			
DTAP UNSPECIFIED FORMULATION	02/10/2027			
PNEUMOCOCCAL POLYSACCHARIDE PPV23	07/07/2061			
HPV, UNSPECIFIED FORMULATION				
ROTAVIRUS, UNSPECIFIED FORMULATION				
POLIO, UNSPECIFIED FORMULATION				

- Mouse-over pop-up boxes, but....
- What do blank rows mean to providers?
 - OK to immunize at their discretion?
 - Potential patient safety concern?

Not Recommended Vaccines

- How to address?
 - 2015 CEHRT releases already “in the wild”
 - Add new column(s) to UI?
 - UI “clutter?”
 - Providers must install updated release (service pack, hotfix)
 - Minimum version check in interface engine to avoid patient safety issue?
 - “But I already purchased an upgrade to the certified version!”
 - Add filter to interface engine?
 - Look-ahead logic complications

Not Recommended Vaccines

Immunization Schedule Type: ACIP

Forecast Received on: 09/29/2017 04:29 PM

Immunization Name	Next Date	Earliest Date	Latest Date	Overdue Date	Details from Registry
HEP B, UNSPECIFIED FORMULATION	09/07/1996				Overdue
MMR	07/07/1997				Overdue
VARICELLA	07/07/1997				Overdue
DTAP UNSPECIFIED FORMULATION	02/10/2027				On schedule
PNEUMOCOCCAL POLYSACCHARIDE PPV23	07/07/2061				On schedule
HPV, UNSPECIFIED FORMULATION					Not Recommended - Series Complete
ROTAVIRUS, UNSPECIFIED FORMULATION					Not Recommended - Too old
POLIO, UNSPECIFIED FORMULATION					Not Recommended - Series Complete

Next Meeting

THURSDAY, DECEMBER 14TH

2:00 PM ET / 11:00 AM PT

More Information

Web Links

- Subscribe to immunization group
<http://www.hl7.org/participate/UserGroups.cfm?UserGroup=Immunization>
- Public User Group Wiki
<http://www.hl7.org/special/committees/iug/index.cfm>
- Private User Group Wiki
<http://iugwiki.hl7.org/>
- HL7 Press Release
<http://www.hl7.org/documentcenter/public temp F760602A-1C23-BA17-0C0D326E635471F9/pressreleases/HL7 PRESS 20140402.pdf>
- AIRA Press Release
<http://www.immregistries.org/events/2014/04/10/hl7-immunization-user-group>

Contact Information

If you have any questions or comments:

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- Kevin Snow ksnow@envisiontechnology.com
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Thank you!