IIS-EHR Partnerships: Providing and Displaying Immunizations and Clinical Decision Support in EHRs

#AIRA2016 National Meeting

Angel Aponte, Vikki Papadouka, Amy Metroka, and Paul Schaeffer (NYC DOHMH)

Eugene Gun (Public Health Solutions)

Emily DeMeo (NYSTEC)

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Objective

- Demonstrate how EHRs query IIS

- Identify functionality that EHRs have in common

- Motivate the IIS and healthcare provider communities to document best practices for EHR to IIS integration

Outline

- Background on Immunization Information Systems (IIS) and Electronic Health Record (EHR) integration

- Demonstrate existing bi-directional immunization information exchange between EHRs and IIS

- Vision for EHR integration with IIS

Background 1

- Immunization Information Systems (IIS) receive, consolidate, and disseminate electronic immunization records in their communities
- Electronic Health Record (EHR) systems are replacing paper records in provider offices and hospitals
- MU Stages 1 and 2 provide payment incentives to implement standard electronic reporting from EHRs to IIS
- MU Stage 3 will provide incentives to implement standard EHR to IIS queries and clinical decision support

Background 2

- Citywide Immunization Registry (CIR) is the IIS for the Bureau of Immunization (BOI) at New York City's Department of Health and Mental Hygiene (DOHMH)
  - Supports Health Level 7 (HL7) 2.3.1 and 2.5.1 reporting (VXU) and query (VXQ, QBP) messages
  - Implements Centers for Disease Control (CDC) Transport Layer Workgroup Web Service interface
  - Provides real-time immunization report, query, and decision support services
- CIR uses the Immunization Calculation Engine (ICE) for clinical decision support

EHR to IIS Bi-directional Technology Architecture
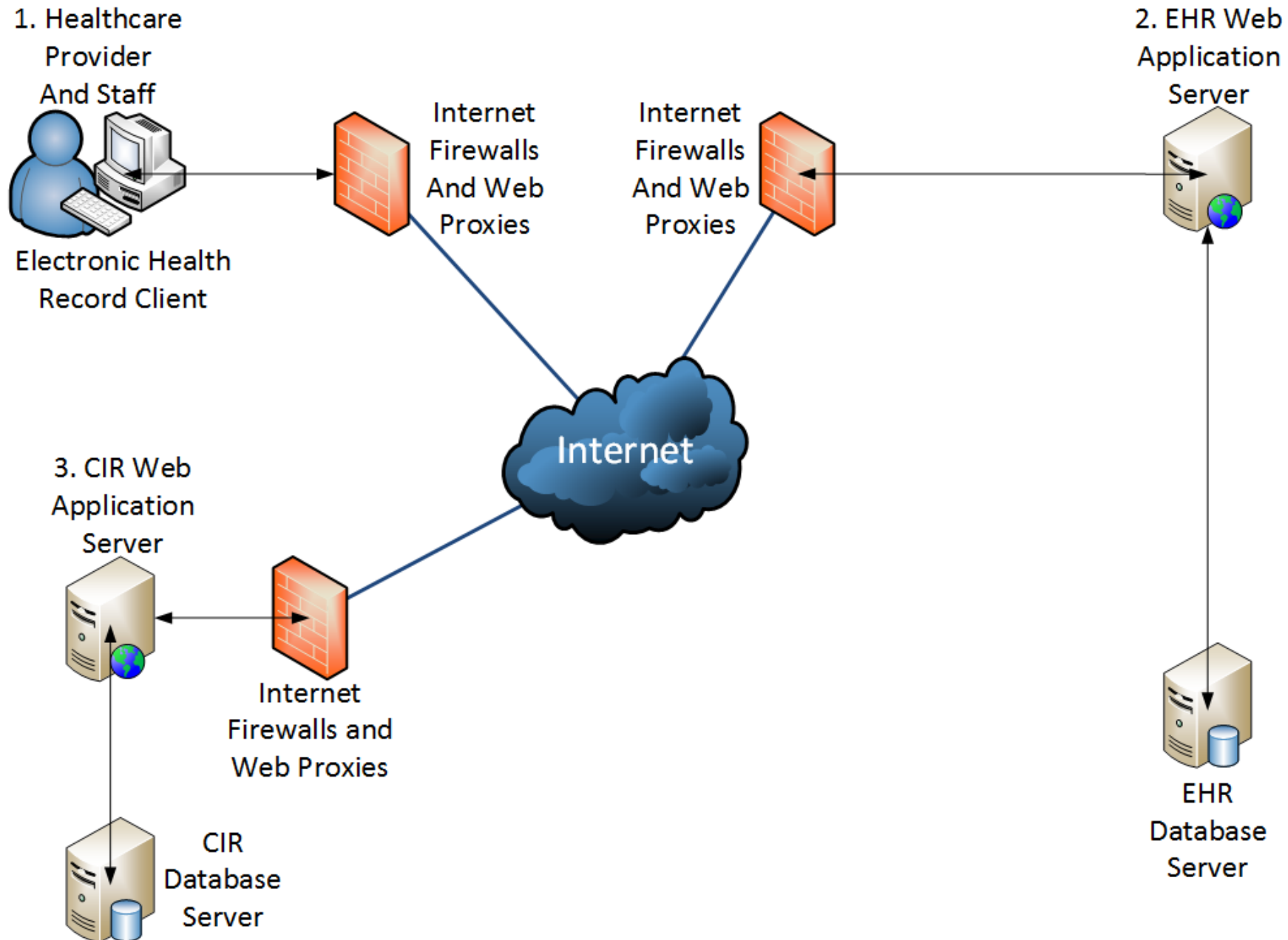
Method

- Reached out to EHRs and healthcare facilities for a demonstration of their integration with NYC's real-time Web Service
- Notified EHR vendors that screen shots from the demonstration will be presented
- Created test records with immunizations in CIR, to observe EHR behavior
- Took screen shots of the EHRs for review and discussion
- Participants are iClinic from MDLand, eClinicalWorks (eCW), Sunrise Clinical Manager by AllScripts, and Office Practicum by Connexin Software

Status of bi-directional EHR Integration With CIR

- 43 EHRs have integrated with CIR's real-time HL7 Web Service

- 12 of those EHRs are querying the CIR
    - 118 out of 119 MDLand iClinic sites
    - 301 out of 302 eCW sites
    - 85 out of 87 Connexin Software Office Practicum sites
    - 17 out of 58 AllScripts Sunrise Clinical Manager sites

Number of HL7 Web Service Queries Performed by CIR Data Exchange Partners
January, 2011 to March, 2016
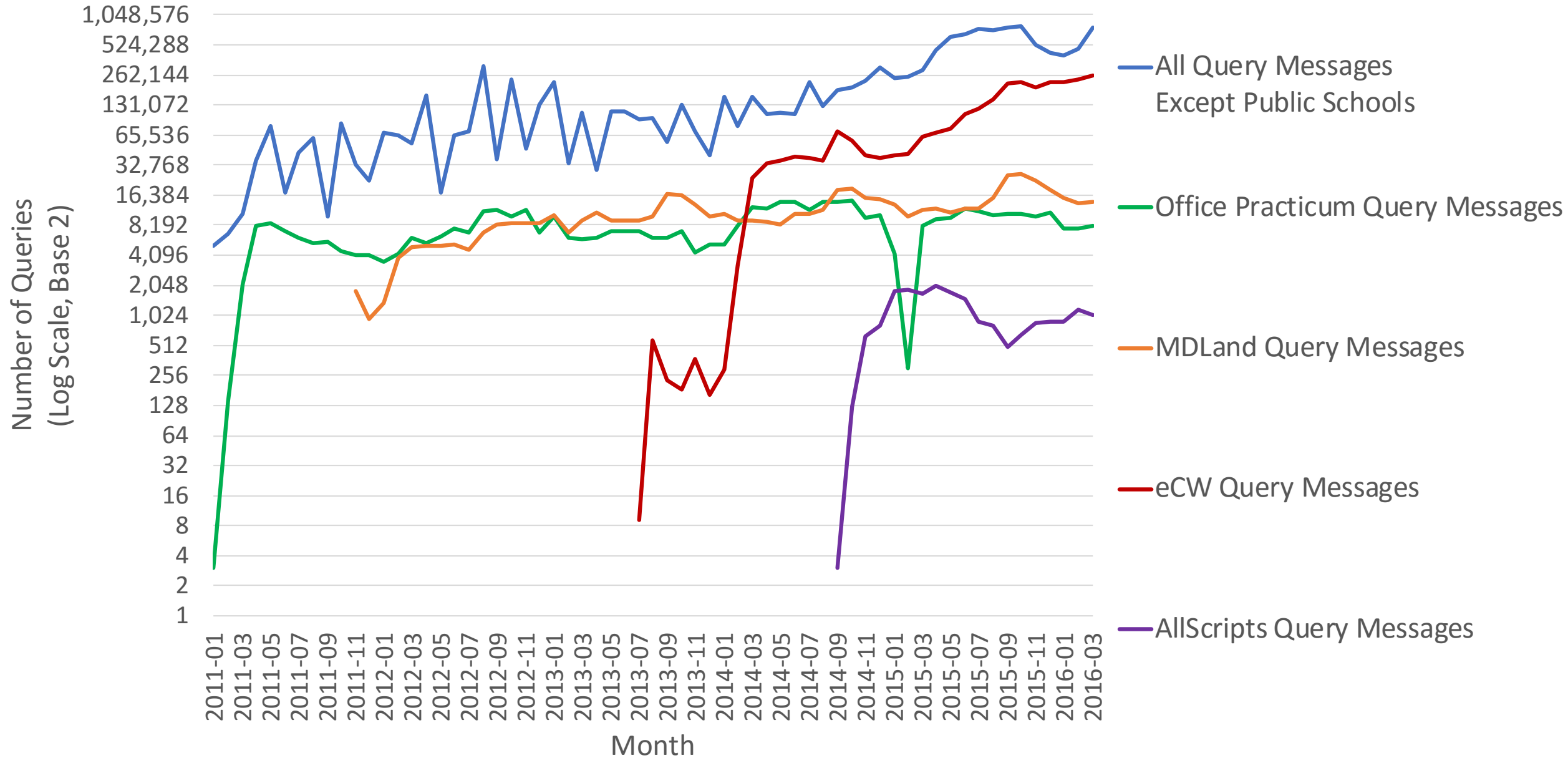
EHR to IIS Integration Features

- Automatic or Manual
  - Immunization queries and uploads
  - Reconciliation of immunization information
  - Decision support update when new information is added to EHR
- EHR or IIS clinical decision support module
- User interface, color coding, and context-sensitive help
  - Immunization information source
  - Valid and invalid shots
  - Shots due now
  - Forecast to schedule appointment for future shots

iClinic by MDLand

- Manual query, **automatic record reconciliation**, manual record upload, **automatic decision support update**

- Uses decision support from NYC CIR HL7 Web Service and **color codes invalid shots**

- Provides immunization forecast for **next vaccine due date**

- **Color coding** for **immunization information source** added to EHR test environment as a result of this presentation.

MDLand iClinic: Download to Empty Immunization Record

MDLand iClinic: Immunizations And Decision Support Downloaded

MDLand iClinic: Add Immunization

New Vaccines Entry Form

Administration Date*	2/29/2016	Patient's Age	
Provider	Medicine, Internal (MI) ▼	Other Provider	
Office Location*	(3202X01) MDLand Demo Acco ▼ Or	Other Location	
Eligibility*	(V01) Not VFC Eligible ▼		
Information Source*	(00) New Immunization Record ▼		
Notes			

Vaccine Group*	Influenza ▼	Vaccine*	Influenza, seasonal, injectable, preservative free (140) ▼
Inventory	▼	Purchase Date	
Funding Source			
Manufacture*	Akorn, Inc ▼	Lot Number* 123456	Expiration* 06/30/2016
VIS Provided Date	Today	Edition Date of the VIS	
Dose(s)* 2	Unit* ml ▼	Site (LA) Left Arm ▼	Next Due

✎ Add more Vaccine >

[Save] [Close]

MDLand iClinic: Upload Immunization to IIS

MDLand iClinic: Updated Decision Support from CIR

eCW

- **Automatic query**, manual record reconciliation, **automatic record upload**, and **automatic decision support update**

- Uses NYC's latest decision support software, ICE3 within EHR and **color codes invalid shots**

- Provides immunization forecast for **next vaccine due date**

eCW: Download to Empty Immunization Record

eCW: Immunizations And Decision Support Downloaded

eCW: Add Immunization

eCW: Updated Decision Support from EHR

Sunrise Clinical Manager by AllScripts

- Manual query, manual record reconciliation, **automatic record upload**, and **automatic decision support update**

- Internal immunization decision support software

- Provides immunization forecast for **next vaccine due date**

- **Immunizations from IIS** are marked with a **green box**; immunizations **administered at the site** are marked with a **green circle**

AllScripts: Empty Immunization Record

AllScripts: Download to Empty Immunization Record

AllScripts: Immunization Download Reconciliation Screen

AllScripts: Immunizations And Decision Support from EHR

AllScripts: Add Immunization

AllScripts: Updated Decision Support from EHR

Office Practicum by Connexin Software

- Manual query, manual record reconciliation, **automatic record upload**, and **automatic decision support update**

- Immunization **information source is color coded** in reconciliation screen

- Internal immunization decision support software, with **color-coding for valid and invalid shots**

- Provides immunization forecast for **next vaccine due date**

Office Practicum: Download to Empty Immunization Record

Office Practicum: Immunization Record Reconciliation Screen

Logged In: admin Administrator (102$AD) on IMP-APATEL1

File   Activities   Reports   Utilities   Log In/Out   Tools   Window   Help   PPE ▼ Location: Primary Location

Sched   Rgstr   Insur   Adr Bk   Tasks   Chart   Chron   Forms   Super   Accnt   Billing   Review   Input   Msgs   Send   IM   e-Rx   Print   Stamp   Pref

🔒 Import   📤 Send   Reconcile   Delete   Refresh   Select ▼   UnSelect   ⚡ Ping

Import selected immunization records from registry into chart

| Immunizations | Indicators | IIS Forecast | Chart Demographics | IIS Demographics |

Sel	Vaccine Name △	Family	CVX	Vac Date △	Lot Number	Exp Date	Manuf	Site	Route	VFC	Prov	Staff
☑	DTaP-HIB-IPV	PENTACEL	120	06/10/2015			UNK			9	0	0
☑	DTaP-HIB-IPV	PENTACEL	120	08/10/2015			UNK			9	0	0
☑	MMR	MMR	03	03/15/2016			UNK			9	0	0

Color Key: | Chart/Registry Match | In Chart, NOT in Registry | In Registry, NOT in Chart | Drop   Registry ID: 788410889

103 OPONEYEAROLD S. SUMMER [M] [DOB:04/10/2015 Age DOV:11 mos. 7 days] SELF-PAY

Office Practicum: Immunizations And Decision Support from EHR

Office Practicum: Add Immunization

Office Practicum: Updated Decision Support from EHR and Forecast from IIS

[F8] Patient Chart

OPONEYEAROLD S. SUMMER (103) Sex: M DOB: 04/10/2015 Age: 11 mos. 7 days

No privacy restrictions

Quick Entry | Sync Registry | Consent Form | Enter Immunization

Forecast | Complete List | Indicators | Notes | Forecast Key

Hep B	Diph Tetanus Pertuss	Hib	Polio	Pneumococcal
03/17/16 DTaP-HepB-IPV	06/10/15 DTaP-HIB-IPV	06/10/15 DTaP-HIB-IPV	06/10/15 DTaP-HIB-IPV	DUE: Pneumococcal.........
	08/10/15 DTaP-HIB-IPV	08/10/15 DTaP-HIB-IPV	08/10/15 DTaP-HIB-IPV	
	03/17/16 DTaP-HepB-IPV	BEHIND: HIB....................	03/17/16 DTaP-HepB-IPV	

Hep A	Td / Tdap Booster	M-M-R-V	Varicella	Meni
	-NA-..........	x03/15/16 MMR		OK mi

Rotavirus	Flu - Seasonal (0)	Miscellaneous	RSV-MAb (Synagis®)	HPV
-NA-..........	DUE: Flu- Seasonal..........	<No data to display>		-NA-..

Total vaccines: 5
VFC eligible: NO

4-day 'grace-period' enabled

VacLogic™ ver. 3-259

Synchronize Immunization Records

Import | Send | Reconcile | Delete | Exit

Immunizations | Indicators | **IIS Forecast** | Chart Demographics | IIS Demographics

Vaccine Name △	CVX	Date	
DTaP	20	09/15/2016	ACIP Schedule
HPV,quadrivalent	62	04/10/2026	ACIP Schedule; Not rec
Hep A, ped/adol, 2 dose	83	04/09/2016	ACIP Schedule
Hep B, adolescent or pediatric	08	04/14/2016	ACIP Schedule; Not rec
Hib (PRP-T)	48	10/09/2015	ACIP Schedule
IPV	10	04/10/2019	ACIP Schedule
MMR	03	04/12/2016	ACIP Schedule
Pneumococcal, PCV-13	133	06/10/2015	ACIP Schedule
influenza, NOS	88	01/05/2016	ACIP Schedule
meningococcal (MCV4)	114	04/10/2026	Recommended for high
varicella	21	04/12/2016	ACIP Schedule

Color Key: Chart/Registry Match | In Chart, NOT in Registry | In Registry, NOT in Chart | Drop

Items Identified During EHR Presentations

- One of the EHRs didn't have a real-time implementation (~40 seconds to query the IIS)
- On-screen error messages ignored during two EHR presentations
- Manual screen refreshes needed in two EHRs
- One EHR added color coding for immunization information source to user interface in response to feedback

EHR Feature Summary

- All 4 EHRs provide
  - Automatic decision support updates
  - Forecasts for future appointments
- 3 out of 4 EHRs perform
  - Manual record download
  - Manual record reconciliation
  - Color code invalid shots
  - Have an on-screen indicator for information source
  - Internal clinical decision support

Vision for EHR to IIS Integration

- Minimize effort for healthcare provider and staff
  - EHRs query IIS automatically
  - EHRs automatically reconcile provider record with IIS
  - EHRs automatically update clinical decision support for immunization records
- IIS is an extension of provider EHR
  - Real-time bi-directional communication
  - EHR shows information source for each shot
  - Standard messages and interfaces facilitate national implementation of EHR to IIS communication

Conclusions

- IIS and healthcare provider community need to provide standard community guidance for EHR query and decision support implementation

- Interoperability teams at IIS need to review EHR immunization record query requirements, design, and implementation for MU3

Future Work

- Standardize more IIS functions for EHR integration
  - School, Camp, Child Care, and more physical forms -> increase reporting
  - VFC enrollment, vaccine ordering and inventory functions -> easier to obtain vaccine
  - Vaccine adverse events -> provide information to providers
  - Reminder/recall and vaccine coverage report functions -> increase vaccine coverage

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- Jillian Allison (NYSTEC)

Contact

- Angel Aponte (aaponte@health.nyc.gov)