

Lessons Learned from Implementing the CDSi Logic



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Agenda

We'll be discussing our experience leveraging the new CDSi logic in our IIS for vaccine evaluation and forecasting:

- History on why the change was needed
- Difference between the old and new logic
- Transition from the old logic
- End user education
- CDSi advantages/disadvantages
- IIS challenges ahead

History

Why was the change needed?

- The old vaccine evaluator/forecaster logic in our IIS is 13 years old
- The architecture and design of the old engine cannot handle the number of uses/calls that are being done today
- The schedule and rules are far more complex today
- Our old evaluator/forecaster logic couldn't pass 100% of the CDSi test cases without significant rewrite effort

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Getting Started

A Joint effort was launched to re-vamp the logic:

- Funded by Envision/Kansas/AFIX Grantees
- Scope of Project:
 - Technology changes to support faster reminder/recall processing
 - Technology changes to incorporate a rule engine
 - Support for the CDSi logic, underlying tables, and test cases

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Differences between the Old and New Evaluation/Forecasting Logic

The architectures are different

- The old logic is based on vaccine series
- The new logic is based on antigens

The new one is far more flexible and scalable

- The new logic processes patients 10 times faster than the old logic did
- The old logic was closely linked to the database and to patients in the database
- The new logic can be used independent of WebIZ patient data (designed to be called as a service internally or externally)

Transition

The new logic was rolled out in two phases to IIS users:





- Phase I: the new CDSi engine can be reviewed and compared to old evaluator/forecaster logic
- Phase II: the new logic is fully incorporated in all parts of the IIS

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Phase I: Comparing Old to New

Selecting the Recommend Button for a Patient

Immunizations Home   Links  Select Action 

[Learn More](#)

☐ Recommended Immunizations for today, 2/7/2017 (27Y 1M 6D)

















Vaccine


Td (adult), adsorbed

Hep B, adult

Varicella

Please do not rely solely on the Recommender to forecast immunizations. Utilize clinical judgment and consult both the ACIP recommended immunization schedules and the CDC Pink Book @ <http://www.cdc.gov/vaccines/pubs/pinkbook/index.html#chapters>

Vaccine	Dose	Date	Age	Clinic			Delete
Tdap, Adsorbed	1	11/08/2016	26Y 10M 7D	MICK 7			Delete
Hep A, adult	1	11/08/2016	26Y 10M 7D	MICK 7			Delete
Hep B, adult	1	02/11/2016	26Y 1M 10D	HK CL 001			Delete
Hep B, adult	2	11/08/2016	26Y 10M 7D	MICK 7			Delete
MMR	1	11/08/2016	26Y 10M 7D	MICK 7			Delete
Varicella	1	11/08/2016	26Y 10M 7D	MICK 7			Delete
Influenza, Seasonal	1	11/08/2016	26Y 10M 7D	MICK 7			Delete



☒ Auto-Populate Add Vaccines Screen

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Phase I: Recommendations

Two Pop Up Windows to Allow for Comparison

Recommendations for SIMPSON, BART (499968) DOB: 01/01/1990 AGE: 27Y 1M 6D

DOB: 01/01/1990 Age: 27Y 1M 6D

Allergy / Risks

▲ This patient does not have any Allergy / Risks

Immunization History

Vaccine	Dose	Date	Age	Clinic	Status	Reason
DTaP / TD / Tdap						
DTaP, Adsorbed	1	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Hep A						
Hep A, adult	1	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Hep B						
Hep B, adult	1	02/11/2016	26Y 1M 10D	HK CL 001	Valid	
Hep B, adult	2	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Influenza						
Influenza, Seasonal	1	11/08/2016	26Y 10M 7D	MICK 7	Valid	
MMR						
MMR	1	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Varicella (CPOX)						
Varicella	1	11/08/2016	26Y 10M 7D	MICK 7	Valid	

Recommended immunizations for today, 2/7/2017 (27Y 1M 6D)

Vaccine

Td (adult), adsorbed
Hep B, adult
Varicella

Old and New

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Phase II: Recommendations

Throughout the IIS, New Logic is Solely Used

Recommendations for SIMPSON, BART (499968) DOB: 01/01/1990 AGE: 27Y 1M 6D

Print Close Audit

DOB: 01/01/1990 Age: 27Y 1M 6D

— Allergy / Risks

▲ This patient does not have any vaccination Allergy / Risks

— Immunization History

Vaccine	Dose	Date	Age	Clinic	Status	Reason
DTaP / TD / Tdap						
Tdap, Adsorbed	1	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Hep A						
Hep A, adult	1	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Hep B						
Hep B, adult	1	02/11/2016	26Y 1M 10D	HK CL 001	Valid	
Hep B, adult	2	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Influenza						
Influenza, Seasonal	1	11/08/2016	26Y 10M 7D	MICK 7	Valid	
MMR						
MMR	1	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Varicella (CPOX)						
Varicella	1	11/08/2016	26Y 10M 7D	MICK 7	Valid	

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End User Education

Completed in Phase I of transition:

- Internal training and review with staff
- Assignment of two experts on staff
- Development of user guide

Completed in Phase II of transition:

- Required webinar that included a live demonstration and question/answer session
- Follow-up survey

Advantages

- The new vaccine evaluation/forecast engine in our IIS leverages all of the CDSi logic and supporting data published by the CDC
- Our IIS is 100% compliant with CDC CDSi 2.3 and follows logic and supporting data strictly
- The new engine passes 100% of the CDSi test cases

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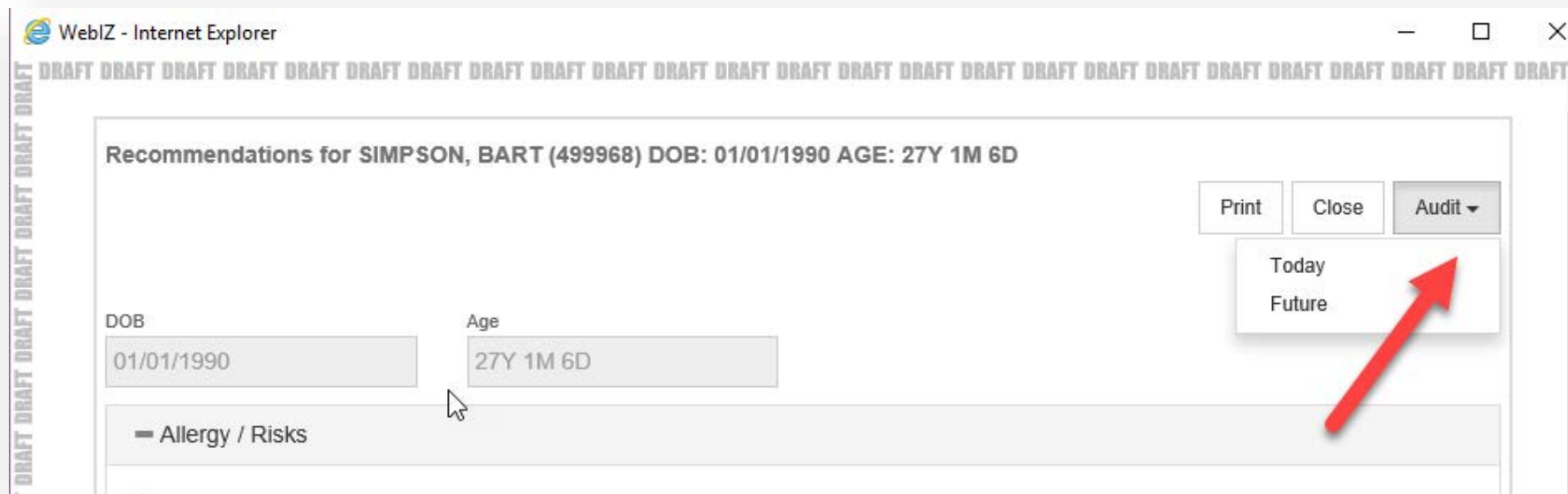


Advantages

- End users reported that the only difference was increased accuracy
- An audit feature is available that explains how validation and forecasts are reached
 - Users who question the evaluation and forecast are pointed to CDSi logic and supporting data

New Audit Functionality

Why is the new vaccine evaluator/forecaster recommending a vaccine? Click on the Audit button to see the logic behind the recommendation:



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Audit – Antigen Logic

WebIZ - Internet Explorer

Recommender Audit for SIMPSON, BART (499968) DOB: 01/01/1990 AGE: 27Y 1M 6D

Audit For: Today
Assessment Date: 02/07/2017
Run Start Time (UTC): 02/07/17, 9:29 PM
Total Run Time: 593.7052 milliseconds
Provider: 11031
Application Version: 16.4.20170127


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Antigen Vaccine Group Vaccination History Vaccine Types

Change antigen: DIPHTHERIA

Diphtheria Standard Series [Best Patient Series](#)

Series Result

Series Name: Diphtheria Standard Series
Is Best: Yes 
Status: Not Complete
Reason: Patient Series is not complete
Score: 0
Target Dose Count: 10
Target Dose Number Forecasted: 7
Forecast Dates:

- Earliest Date: 12/06/2016
- Unadjusted Recommended Date: 01/01/1997
- **Adjusted Recommended Date: 12/06/2016**
- Latest Date:
- Unadjusted Past Due Date: 12/31/1996
- Adjusted Past Due Date: 12/06/2016

Evaluation Results

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Target Dose Number: 1 Administered Doses: 0 Administered: 12/06/2016

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Audit – Vaccine Group

WebIZ - Internet Explorer

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[Antigen](#) **Vaccine Group** [Vaccination History](#) [Vaccine Types](#)

Change Vaccine Group: ZOSTER 

Vaccine Group: Zoster (18)
Status: Not Recommended

[Classify vaccine group, 7.1 - page #: 70](#)
[Single antigen vaccine group, 7.2 - page #: 70](#)





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Audit – Vaccine History

Recommender Audit for SIMPSON, BART (499968) DOB: 01/01/1990 AGE: 27Y 1M 6D

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Antigen

Vaccine Group

Vaccination History

Vaccine Types

Vaccine	Id	Date Administered	Age	Clinic	Status	Reasons
Hep B, adult (43)	121778	02/11/2016	26Y 1M 10D	HK CL 001	Valid	
Tdap, Adsorbed (115)	963665	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Hep A, adult (52)	963666	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Hep B, adult (43)	963667	11/08/2016	26Y 10M 7D	MICK 7	Valid	
MMR (3)	963668	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Varicella (21)	963669	11/08/2016	26Y 10M 7D	MICK 7	Valid	
Influenza, Seasonal (141)	963670	11/08/2016	26Y 10M 7D	MICK 7	Valid	

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Audit – Vaccine Type

Recommender Audit for SIMPSON, BART (499968) DOB: 01/01/1990 AGE: 27Y 1M 6D

Audit For: Today
Assessment Date: 02/07/2017
Run Start Time (UTC): 02/07/17, 9:29 PM
Total Run Time: 593.7052 milliseconds
Provider: 11031
Application Version: 16.4.20170127

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AntigenVaccine GroupVaccination HistoryVaccine Types

Step ⇒ Default Vaccine Types, Custom.3

Description : Sets the recommended Vaccine Types based on provider settings, system defaults, or supporting data

Vaccine Types : 43,133,3,9,21,52

Vaccine Types and Groups: Hep B, adult (43) [Hep B], PCV13 (133) [Pneumococcal], MMR (3) [MMR], Td (adult), adsorbed (9) [DTaP / TD / Tdap], Varicella (21) [Varicella (CPOX)], Hep A, adult (52) [Hep A]

Hep B, adult (43) [Hep B]

PCV13 (133) [Pneumococcal]

Tdap, Adsorbed (115)

MMR (3) [MMR]

Td (adult), adsorbed (9) [DTaP / TD / Tdap]

Varicella (21) [Varicella (CPOX)]

Hep A, adult (52) [Hep A]

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Disadvantages

- The CDSi logic and supporting tables do not yet support rules for TB and historical views of schedules like the August 2009 Polio rule
- If the CDSi logic and supporting tables lag behind the ACIP publishing or other resources, our IIS is slower to adopt the new rules
 - End users reported frustration with delay in receiving new HPV ACIP recommendation in IIS

IIS Challenges Ahead

- What do we do with information that we don't necessarily want to store in the IIS? Examples: Transplantation or Chronic renal Disease
- Communicating indications and contraindications via HL7 along with forecasts
- How well will the CDSi logic and supporting data hold up over time with new vaccines or for outbreak scenarios?
- Is the CDC/CDSi group committed to continuing maintenance for the foreseeable future?

Questions



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