

Immunization Calculation Engine (ICE)

**Open-Source Clinical Decision Support
for Immunizations**

April 22, 2015

**Mike Suralik, Senior Project Manager
Daryl Chertcoff, Senior Project Manager
Regina Austin, Business Analyst
Noam Arzt, President
HLN Consulting, LLC**



Agenda

1. Origin and Objectives of ICE Project
2. ICE Software System
3. ICE Wiki
4. Demonstration of “ICE Client” App
5. Utilization of ICE



1. Origin and Objectives of the ICE Project



Obstacles to Implementing and Maintaining CDS for Immunizations

- 36+ immunizations by age 12
- New vaccines coming to market
- Evolving guidelines from the Advisory Committee on Immunization Practices (ACIP)
- Different decision support for different settings
- Dependence on one or two key staff
- Burden of regression testing
- Competing priorities
- Lack of funding



Goal of the ICE Project

Create an immunization decision support system that:

Objective	Achievement
Supports routinely administered vaccine groups	
Promotes clinical best practices	
Adapts to changing requirements	
Easily integrates with IIS and other health systems	
Freely available	



Goal of the ICE Project

Create an immunization decision support system that:

Objective	Achievement
Supports routinely administered vaccine groups	<ul style="list-style-type: none">• Supports 14 vaccine groups from birth thru adulthood
Promotes clinical best practices	
Adapts to changing requirements	
Easily integrates with IIS and other health systems	
Freely available	



Goal of the ICE Project

Create an immunization decision support system that:

Objective	Achievement
Supports routinely administered vaccine groups	<ul style="list-style-type: none">• Supports 14 vaccine groups from birth thru adulthood
Promotes clinical best practices	<ul style="list-style-type: none">• Follows ACIP Recommendations• Informed by CDC CDSi Project
Adapts to changing requirements	
Easily integrates with IIS and other health systems	
Freely available	



Goal of the ICE Project

Create an immunization decision support system that:

Objective	Achievement
Supports routinely administered vaccine groups	<ul style="list-style-type: none">• Supports 14 vaccine groups from birth thru adulthood
Promotes clinical best practices	<ul style="list-style-type: none">• Follows ACIP Recommendations• Informed by CDC CDSi Project
Adapts to changing requirements	<p>GUI tools for non-technical SMEs</p> <ul style="list-style-type: none">• Rule Editing• Automated testing w/ 2,300 test cases
Easily integrates with IIS and other health systems	
Freely available	



Goal of the ICE Project

Create an immunization decision support system that:

Objective	Achievement
Supports routinely administered vaccine groups	<ul style="list-style-type: none">• Supports 14 vaccine groups from birth thru adulthood
Promotes clinical best practices	<ul style="list-style-type: none">• Follows ACIP Recommendations• Informed by CDC CDSi Project
Adapts to changing requirements	<p>GUI tools for non-technical SMEs</p> <ul style="list-style-type: none">• Rule Editing• Automated testing w/ 2,300 test cases
Easily integrates with IIS and other health systems	<ul style="list-style-type: none">• Standards-based, web service interface• Variety of deployment options
Freely available	



Goal of the ICE Project

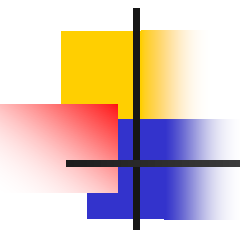
Create an immunization decision support system that:

Objective	Achievement
Supports routinely administered vaccine groups	<ul style="list-style-type: none">• Supports 14 vaccine groups from birth thru adulthood
Promotes clinical best practices	<ul style="list-style-type: none">• Follows ACIP Recommendations• Informed by CDC CDSi Project
Adapts to changing requirements	<p>GUI tools for non-technical SMEs</p> <ul style="list-style-type: none">• Rule Editing• Automated testing w/ 2,300 test cases
Easily integrates with IIS and other health systems	<ul style="list-style-type: none">• Standards-based, web service interface• Variety of deployment options
Freely available	<ul style="list-style-type: none">• Standard Open-Source license• Downloadable from public website



Original ICE Collaborators

- New York City Citywide Immunization Registry
- HLN Consulting, LLC
- Alabama Department of Public Health
- OpenCDS Team



2. The ICE Software System



Inputs to ICE

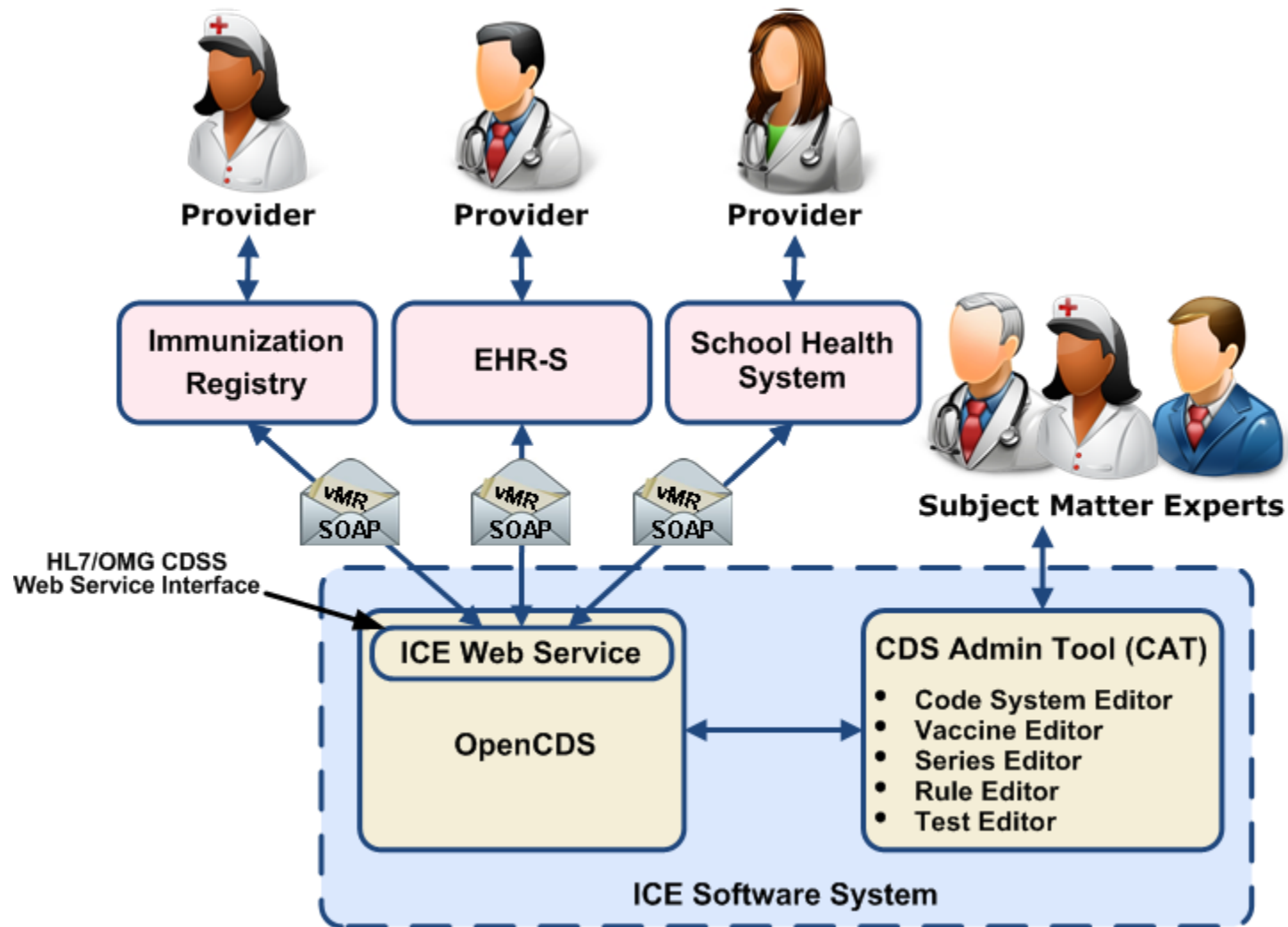
- Patient-specific
 - Date of birth
 - Gender
 - Immunization history
 - Disease immunity
- Situational
 - Immunization schedule identifier
 - Date of evaluation

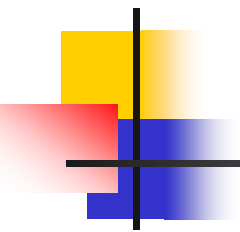


Outputs from ICE

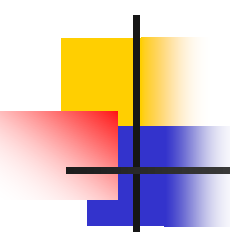
- Validity of immunization history + reasons
- Immunization recommendations + reasons


Sample ICE Deployment






3. ICE Wiki







Spaces ▾


Browse ▾






 Log in ▾

[CDS Framework](#) / [CDS Framework Home](#) / [Solutions](#)

 Tools ▾

ICE

Created by Regina Austin, last modified by Daryl Chertcoff on Apr 23, 2014

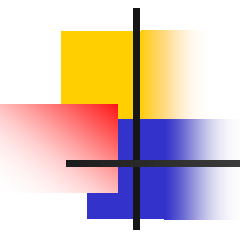


Immunization Calculation Engine

The Immunization Calculation Engine (ICE) is a free, open-source immunization forecasting software system. It has two major components - the **ICE Web Service**, which evaluates a patient's immunization history and generates the appropriate immunization recommendations for the patient, and the **Clinical Decision Support Administration Tool (CAT)**, a web-based GUI tool that enables subject matter experts to manage immunization algorithms, using the CAT's CDS, ICE, and Rule plugins, with little or no intervention from software developers.

Due to its standards-based Web Service interface, its Java-based implementation, and its complete lack of dependence on any commercial software, ICE can be deployed in diverse technical environments and easily integrates with third party clinical systems such as Immunization Information Systems (IIS), Electronic Health Record Systems (EHR-S), and Health Information Exchanges (HIEs).

ICE comes initially configured with a **default immunization schedule**, that address childhood, adolescent, and adult immunizations, based on the recommendations of the Advisory Committee on Immunization Practices (ACIP). However, any organization that deploys ICE can configure ICE to suit its own needs and to adapt as new vaccines come to market and as ACIP recommendations change.

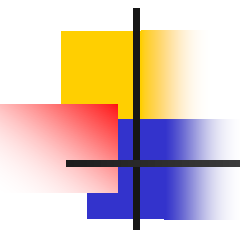


4. The “ICE Client” App



“ICE Client” - Free Tool to Try ICE

- Enables users to try ICE with patient data
- Runs on smart phones, tablets, and browsers
- Shows vMR (input and output)
- Web browser:
 - <http://cds.hln.com/iceweb/>
- Android app for mobile devices:
 - <https://play.google.com>
 - Then search on “OpenCDS”
- iOS app for iPhones/iPads:
 - <https://itunes.apple.com/us/app/ice-opencds-client/id911983938>



5. Utilization of ICE



Production Use of ICE by an EHR System

- eClinicalWorks (eCW) v10 uses ICE to deliver evaluations and recommendations
- Deployed at the end of 2013
- Integrated by eCW developers, with minimal support from ICE team
- No modifications to the default configuration
- ICE is hosted by eCW at central location



Beginning of Efforts to Integrate ICE with VistA

- VistA = open-source EHR system used by the Veteran's Administration (VA), and others
- Open-Source EHR Alliance (OSEHRA), non-profit 501 c6
- Working prototype of VistA integrated w/ ICE
- VA has accepted ICE into its Technical Reference Model (TRM)
- VA has 152 Medical Centers, 1,700 sites of care, serves 8+ million patients per year



Learn More About ICE Through...

- ICE Wiki (cdsframework.org)
- HLN's ICE Webpage (www.hln.com/ice)
- ICE Client Application
- Software Demonstrations
- Executable software distribution
- Source code
- HLN-hosted test instance



Contact Us for More Information

Mike Suralik

856-751-1094

suralik@hln.com

URL: www.hln.com/ice

Email: ice@hln.com