

The Office of the National Coordinator for
Health Information Technology



PUBLIC HEALTH – EHR VENDORS COLLABORATION INITIATIVE
WEBINAR

INTEGRATION OF CDC ZIKA GUIDANCE INTO
CLINICAL WORKFLOW USING OPENINFOBUTTON

SEPTEMBER 19, 2017

Putting the **I** in Health **IT**
www.HealthIT.gov

[HTTPS://WWW.CDC.GOV/EHRMEANINGFULUSE/PUBLIC-HEALTH-EHR-VENDORS-COLLABORATION-INITIATIVE.HTML](https://www.cdc.gov/ehrmeaningfuluse/public-health-ehr-vendors-collaboration-initiative.html)

The screenshot shows a web browser window with the URL <http://www.cdc.gov/ehrmeaningfuluse/public-health-ehr-vendors-collaboration-initiative.html>. The page content includes:

- Meaningful Use** navigation menu on the left with items like Introduction, Calendar, Connect with Others, CDC Meaningful Use ListServ, Meaningful Use Community, Public Health - EHR Vendors Collaboration Initiative, Joint Public Health Forum & CDC Nationwide, Meaningful Use (MU) Public Health (PH) Reporting Requirements Task Force, Community of Practice (CoP), ELR Task Force, Jurisdiction Meaningful Use Websites, S & I Framework, Reportable Conditions Knowledge Management System, and External Links.
- Meaningful Use** header with a word cloud and a photo of a doctor.
- Breadcrumbs: [CDC](#) > [Meaningful Use](#) > [Connect with Others](#) > [Meaningful Use Community](#)
- Public Health - EHR Vendors Collaboration Initiative** section with social media icons for Facebook, Twitter, and a plus sign.
- In Focus** section with the following text:

Special Session # 7-Zika Virus Disease Update

Coming Up! Special Session # 7: Zika Virus Disease Update for Electronic Health Record (EHR) Vendors, Health Information Technology Developers, Public Health, and Clinical Healthcare Partners on Nov 2, 2016 1:00 PM- 2:00 PM EDT

Please pre-register for the webinar by clicking the link below:

<https://attendee.gotowebinar.com/register/3504905897385264131>

Abstract

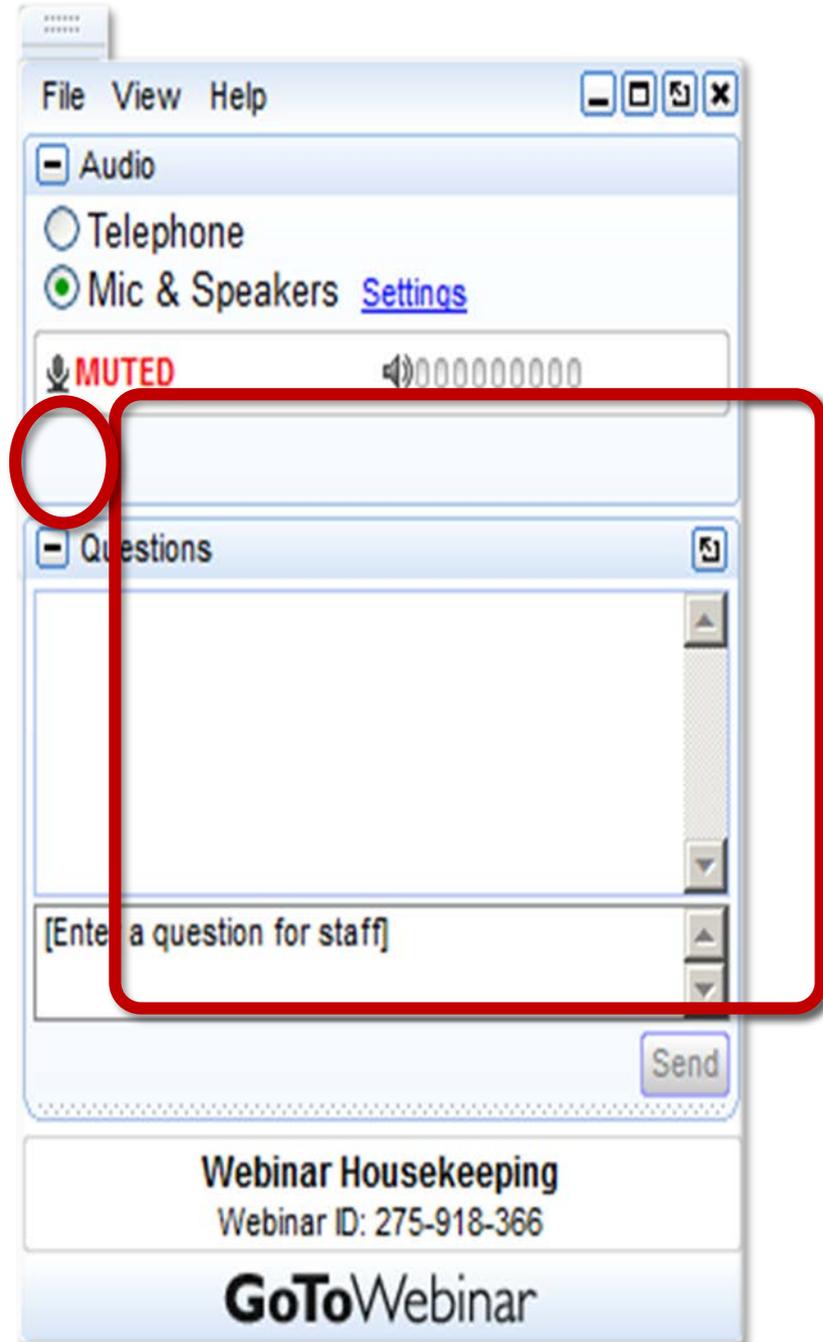
This webinar will be focused on the recommendations around Ask at Order Entry (AOE)* for pregnancy status in Zika virus (ZIKV) laboratory test orders with the possibility of a broader discussion on the capture of pregnancy status in electronic health records, per the clinical workflow and an update on the algorithm for ZIKV risk assessment in pregnant women, based on the latest Centers for Disease Control and Prevention (CDC) guidelines.

Terms explained-

* Ask at Order Entry (AOE)-Some tests, such as microbiology cultures and those that determine heavy metal ion concentration, require additional

QUESTION AND ANSWER SESSION

HOW TO SUBMIT OR ASK QUESTIONS FOR THE PANEL MEMBERS?



Submit or Ask Questions

- Submit your text question and comments using the Question Panel
- Please raise your hand to be unmuted for verbal questions.



INTEGRATION OF CDC ZIKA GUIDANCE INTO CLINICAL WORKFLOW USING OPENINFOBUTTON

GUILHERME DEL FIOL, MD, PHD

JEAN FREDO LOUIS, MIM

CATHERINE STAES, BSN, MPH, PHD

INFOBUTTONS

1 question out of every
2 patients seen

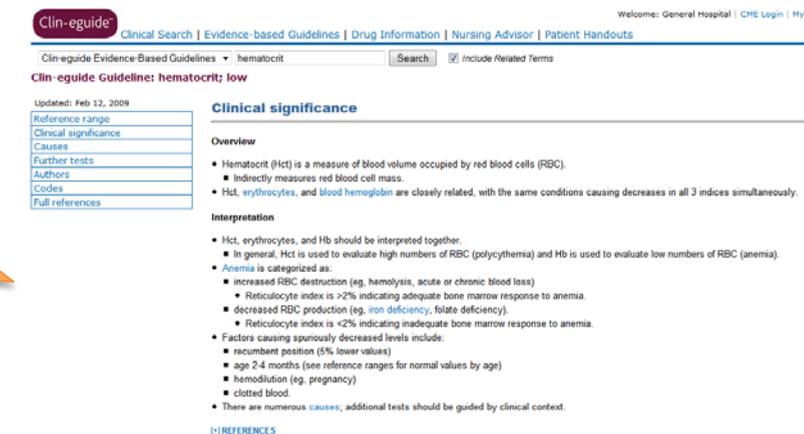
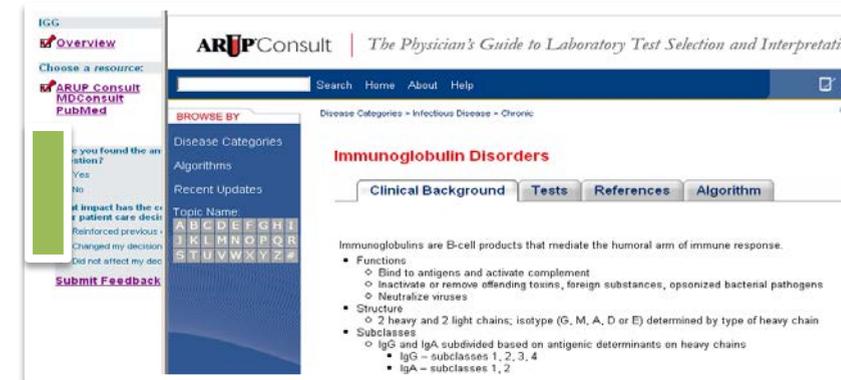
Resources: answer
>90% of questions

Context

EHR



> 60% of questions
left unanswered



Del Fiol G, Workman TE, Gorman PN. Questions raised by clinicians at the point of care. JAMA Int Med. 2014.

WHAT ARE "INFOBUTTONS"

<https://www.powtoon.com/presentations/fh5ISK1UWO8/>



Aricept (Donepezil HCl)

DrugPoint® Summary

Donepezil Hydrochloride [\(see details in DRUGDEX®\)](#)

- Adult Dose**
- [Adverse Effects](#)
- [Contraindications](#)
- [Drug Interaction](#)
- [Pregnancy Category](#)
- [Precautions](#)
- [How Supplied](#)

Topics

Dosing & Indications

[More topics...](#)

Adult Dosing [\(see details in DRUGDEX®\)](#)

Choose a resource:

- [Micromedex](#)
- [UpToDate](#)
- [MDConsult](#)
- [Medline Plus](#)

Resources

- Alzheimer's disease - Dementia (Mild to Moderate): tablets/solution, 5 or 10 mg ORALLY once daily at bedtime, with or without food
- Alzheimer's disease - Dementia (Mild to Moderate): orally disintegrating tablets, 5 or 10 mg dissolve ORALLY on the tongue once daily
- Alzheimer's disease - Dementia (Severe): tablets, 10 mg ORALLY once daily at bedtime, with or without food
- Alzheimer's disease - Dementia (Severe): orally disintegrating tablets, 10 mg dissolve ORALLY on the tongue once daily

BID PRN

Diabetes Mellitus, Type 2

- [Overview](#)
- [Diagnosis](#)
- [Etiology](#)
- [Prognosis](#)
- [Therapy](#)

[Patient education](#)

Choose a resource:

- [IHC Care Process Models](#)
- [UpToDate](#)
- [Clineguide](#)
- [MDConsult](#)
- [PubMed](#)

Have you found the answer to your question?

- Yes
- No

What impact has the content had on your patient care decision?

- Reinforced previous decision
- Changed my decision
- Did not affect my decision

Diabetes Mellitus: Type 2

What is type 2 diabetes mellitus?

Type 2 diabetes is a disorder that happens when your body does not make enough insulin or is unable to use insulin properly. The inability to use your insulin is called insulin resistance. This problem with insulin causes the level of sugar in your blood to become abnormally high.

When you digest food, your body breaks down much of the food into sugar (glucose). Your blood carries the sugar to the cells of your body for energy. The pancreas gland makes insulin, which helps move the sugar from the bloodstream into the cells.

When your body does not have enough insulin or cannot use insulin properly, sugar cannot get into your cells. Sugar builds up in your blood. Too much sugar in your blood can cause many problems. These problems can be life-threatening if they are not treated. However, proper treatment can control your blood-sugar level.

Custom Header

Intermountain Health Care, Inc.

Generic Edition

Physicians Division
36 South State Street #2100
Salt Lake City, Utah 84111
000-000-0000

Context-sensitive decision support (infobuttons) in electronic health records: a systematic review

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REVISED 5 May 2016
ACCEPTED 27 May 2016



OXFORD
UNIVERSITY PRESS

David A Cook,^{1,2,3} Miguel T Teixeira,³ Bret SE Heale,⁴ James J Cimino,⁵ and Guilherme Del Fiol,⁴

ABSTRACT

Objective Infobuttons appear as small icons adjacent to electronic health record (EHR) data (e.g., medications, diagnoses, or test results) that, when clicked, access online knowledge resources tailored to the patient, care setting, or task. Infobuttons are required for “Meaningful Use” certification of US EHRs. We sought to evaluate infobuttons’ impact on clinical practice and identify features associated with improved outcomes.

Methods We conducted a systematic review, searching MEDLINE, EMBASE, and other databases from inception to July 6, 2015. We included and cataloged all original research in any language describing implementation of infobuttons or other context-sensitive links. Studies evaluating clinical implementations with outcomes of usage or impact were reviewed in greater detail. Reviewers worked in duplicate to select articles, evaluate quality, and abstract information.

Results Of 599 potential articles, 77 described infobutton implementation. The 17 studies meriting detailed review, including 3 randomized trials, yielded the following findings. Infobutton usage frequency ranged from 0.3 to 7.4 uses per month per potential user. Usage appeared to be influenced by EHR task. Five studies found that infobuttons are used less often than non–context-sensitive links (proportionate usage 0.20–0.34). In 3 studies, users answered their clinical question in > 69% of infobutton sessions. Seven studies evaluated alternative approaches to infobutton design and implementation. No studies isolated the impact of infobuttons on objectively measured patient outcomes.

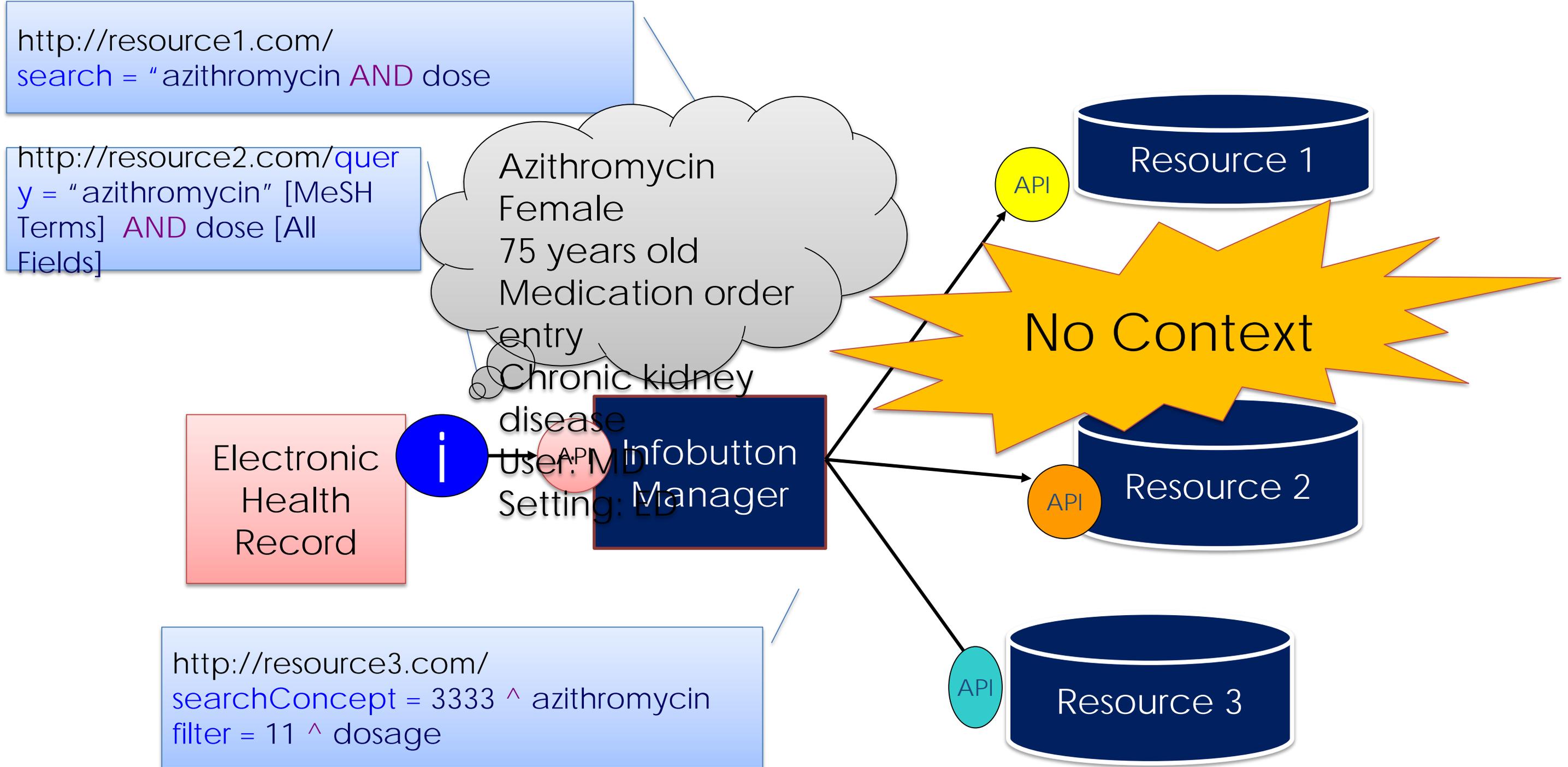
Conclusions Weak evidence suggests that infobuttons can help providers answer clinical questions. Research on optimal infobutton design and implementation, and on the impact on patient outcomes and provider behaviors, is needed.

IMPACT OF INFOBUTTONS

	Infobuttons	Unaided Search
Median Session Time	35 seconds	2 to 8 minutes
Questions Answered	85%	78%

- Decision enhancement or learning
 - Over 62% of sessions
- Slow usage uptake
 - Partners Healthcare: ~100,000 sessions / month
 - Intermountain: ~20,000 sessions / month

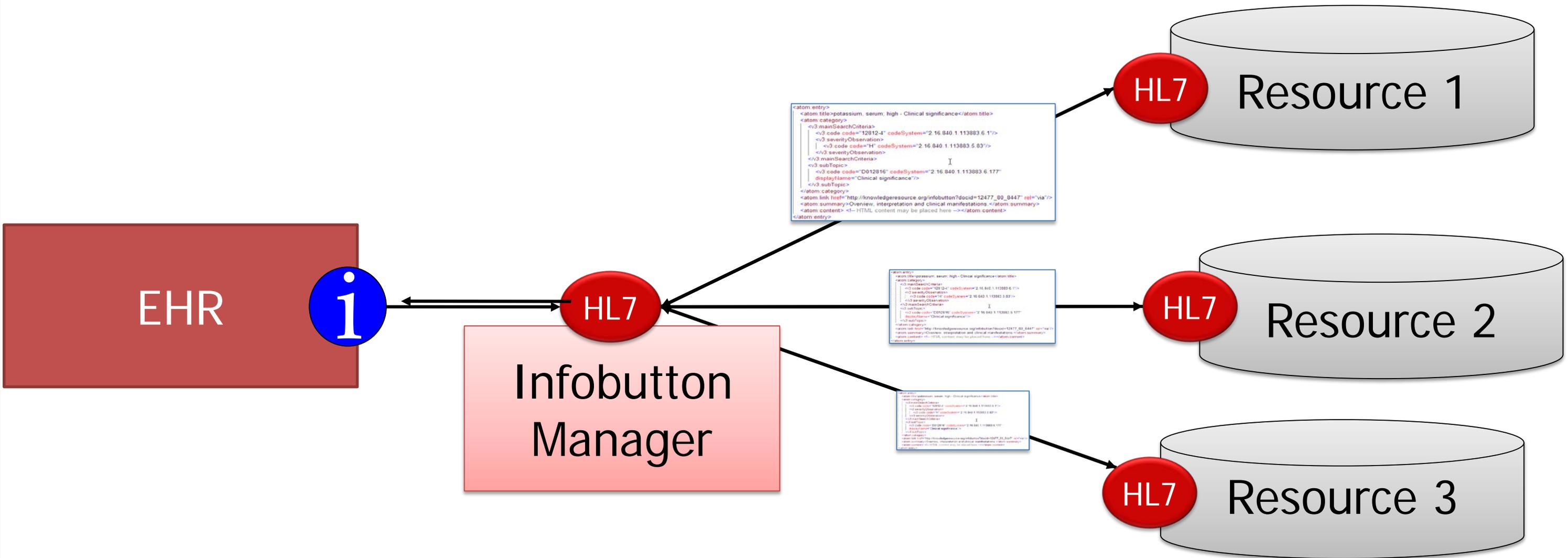
WHY DID WE NEED A STANDARD?



CONTEXT DIMENSIONS

Patient	User
<ul style="list-style-type: none">• Gender• Age group• Concept of interest• Secondary observations	<ul style="list-style-type: none">• Patient vs. provider• Discipline / specialty
EHR	Organization
<ul style="list-style-type: none">• Task (e.g., order entry, problem list entry, lab results review)	<ul style="list-style-type: none">• Care setting• Service delivery location• <u>Location of interest</u>

STANDARDS-BASED APPROACH



OPENINFOBUTTON

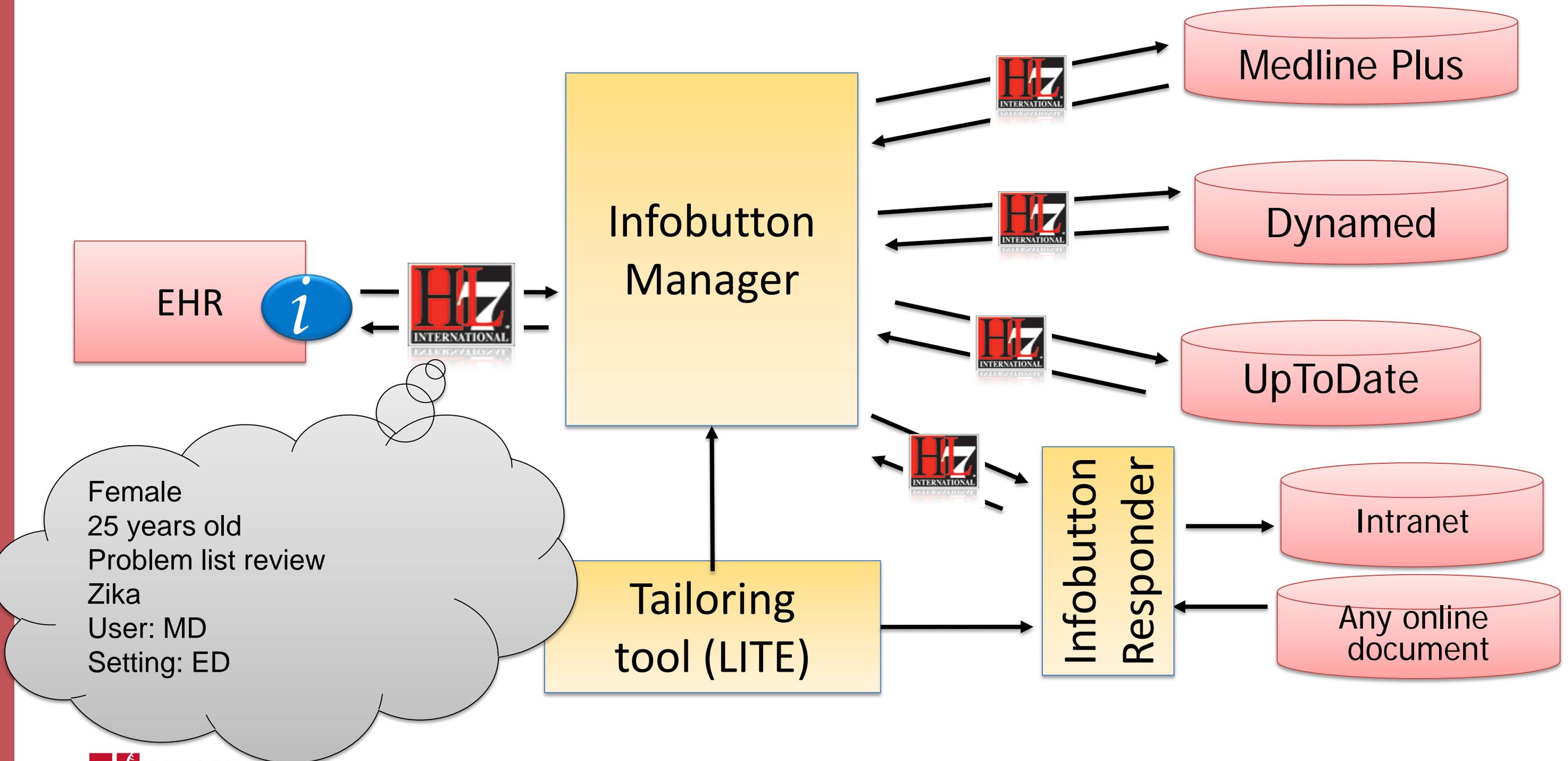


U.S. Department
of Veterans Affairs

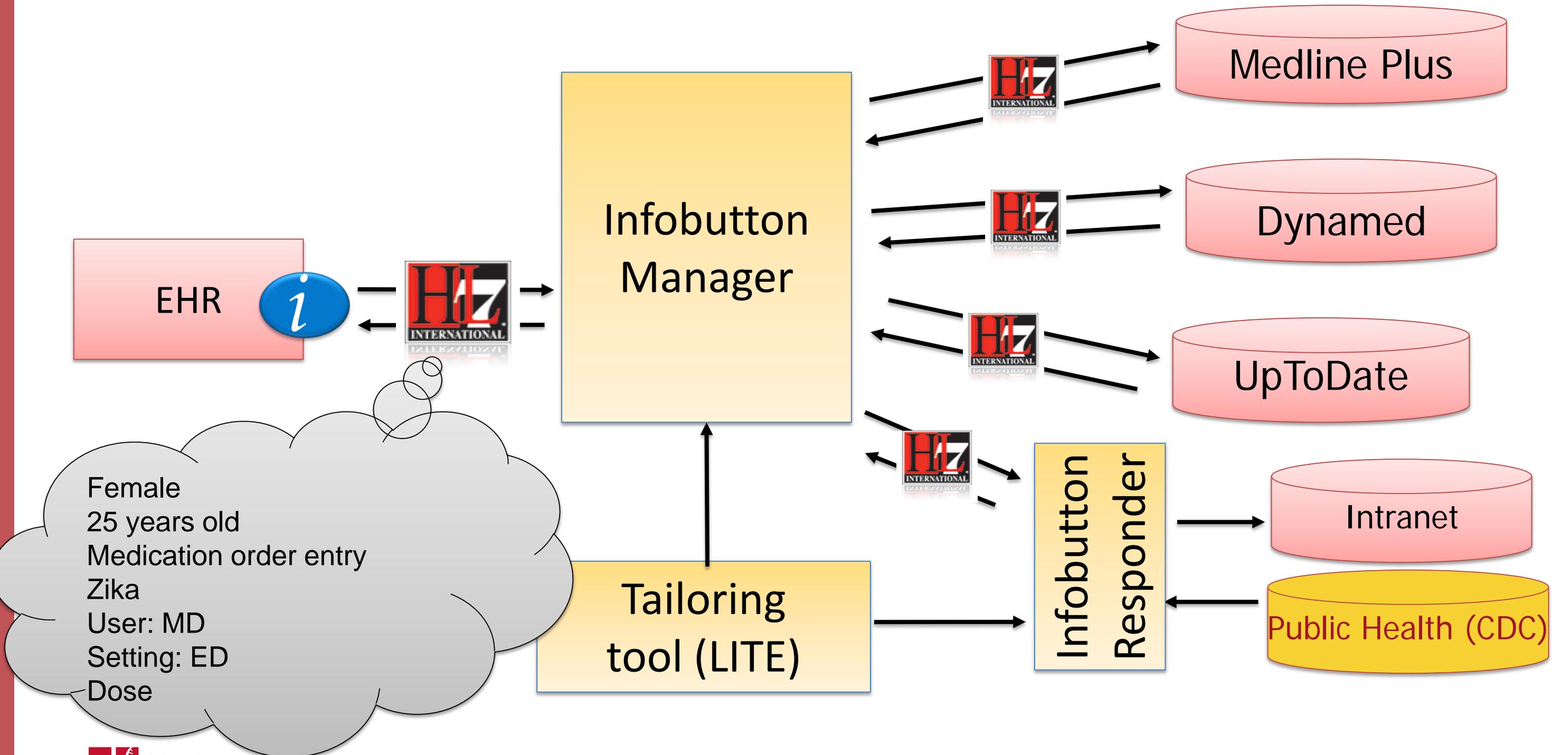


<http://www.OpenInfobutton.org>

OPENINFOBUTTON



OPENINFOBUTTON



INFOBUTTONS FOR PUBLIC HEALTH CDS

- Proof-of-concept - Zika as a use case
 - Patient: Pregnant woman from Florida
 - Setting: outpatient prenatal care clinic
- Scenarios
 1. Nurse seeks educational materials relevant to the patient's pregnancy
 2. Physician seeks guidelines about Zika testing and management
 3. Physician seeks guidelines about interpretation of Zika test results

SCENARIO 1- EDUCATIONAL MATERIALS

Clinic nurse seeks patient educational materials **relevant** to the **patient's pregnancy**

- Nurse opens the patient's problem list and clicks on the infobutton next to "Pregnancy"
- Nurse reviews educational materials from various resources
- Nurse prints a set of handouts and gives them to the patient

http://lite.bmi.utah.edu/OpenInfobuttonDemo_CDC1.html

SCENARIO 1

Open  nfo button

Electronic Health Record		Veterans Administration	Information audience
Age	27	<input checked="" type="checkbox"/> Healthcare provider	<input type="checkbox"/> Patient
Gender	F		
Problem list	Pregnancy 		
Medications	Hydrochlorothiazide (Amturnide), 12.5 Mg, Tablet, Oral  Folic Acid 1.24 Mg, Tablet, Oral 		
Lab results	Beta-hCG, Serum Qualitative Positive  Hematocrit H  Serum Glucose L 		

SCENARIO 1- RESOURCE DISPLAY

The screenshot shows the CDC website for Zika Virus. At the top, it features the Department of Veterans Affairs logo and the CDC logo with the tagline "CDC 24/7: Saving Lives, Protecting People™". A search bar and a "CDC A-Z INDEX" dropdown are visible. The main content area is titled "Zika Virus" and includes a table of contents with expandable sections: "Zika Virus Home", "About Zika", "Prevention", "Transmission", "Symptoms, Testing, & Treatment", "Areas with Risk of Zika", "US Zika Guidance", "Advice for People Living In or Traveling to Brownsville, Texas", "Advice for People Living In or Traveling to South Florida", "South Florida Maps", and "Zika Is In Your Area:". The "Areas with Risk of Zika" section is expanded, showing a list of countries and territories, a "World Map" section, and a "US Zika Guidance" section. A "Key Facts" section lists local mosquito-borne transmission in the continental United States, with specific guidance for Brownsville, Texas, and Miami-Dade County, FL. A "Know Your Zika Risk" section provides information on how travel history and sexual activity affect the risk of getting Zika.

UNITED STATES
DEPARTMENT OF VETERANS AFFAIRS

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

SEARCH

CDC A-Z INDEX

Zika Virus

CDC > Zika Virus Home

Zika Virus Home	
About Zika	+
Prevention	+
Transmission	+
Symptoms, Testing, & Treatment	+
Areas with Risk of Zika	-
All Countries and Territories	
Country Classification	
US Zika Guidance	+
Advice for People Living In or Traveling to Brownsville, Texas	
Advice for People Living In or Traveling to South Florida	
South Florida Maps	
Zika Is In Your Area:	

Areas with Risk of Zika

Language: English (US)

Key Facts

- Local mosquito-borne Zika virus transmission has been reported in the continental United States.
 - CDC has [guidance](#) for people living in or traveling to Brownsville, Texas, a current Zika cautionary (yellow) area.
 - CDC has [guidance](#) for people living in or traveling to Miami-Dade County, FL, a previous Zika cautionary (yellow) area.
- Zika is a risk in [multiple countries and territories](#).

WORLD MAP

Map of all countries and territories throughout the world where Zika is a risk.

US ZIKA GUIDANCE

CDC has issued guidance for travel, prevention, testing, and preconception counseling related to Zika in the United States.

Know Your Zika Risk

Where you live, your travel history, and the travel history of your sex partner(s) can affect your chances of getting Zika. This website can help you learn more about Zika, why you might be at risk of getting it, and how to protect yourself and others.

Many people infected with Zika won't have symptoms, or will only have mild symptoms.

SCENARIO 1- RESOURCE DISPLAY

UNITED STATES
DEPARTMENT OF VETERANS AFFAIRS



CDC - Public Health

- [Areas with Risk of Zika](#)
- [Zika Prevention](#) ✓
- [Insect repellents](#)
- [Zika - Prevention of Sexual Transmission](#)
- [Zika Symptoms](#)
- [Pregnancy and Zika Testing Widget](#)
- [Guidance for infant Testing](#)
- [Know Your Zika Risk Widget](#)
- [Testing Recommendations and Timeframes to Wait Before Trying to Conceive](#)
- [Zika Prevention Measures Widget](#)

MedlinePlus

- [Pregnancy](#)
- [Prenatal Care](#)
- [Prenatal Testing](#)

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

SEARCH

CDC A-Z INDEX ▾

Zika Virus

[Zika Virus Home](#) CDC > [Zika Virus Home](#)

About Zika +

Prevention -

Protect Yourself & Others +

Prevent Mosquito Bites +

Plan for Travel

Protect Yourself During Sex

Transmission +

Symptoms, Testing, & Treatment +

Areas with Risk of Zika +

Reporting and Surveillance +

Mosquito Control +

Health Effects & Risks +

Prevention

Language: English ▾

What we know

- No vaccine exists to prevent Zika.
- Prevent Zika by [avoiding mosquito bites](#).
- Mosquitoes that spread Zika virus bite during the day and night.
- Mosquitoes that spread Zika virus also spread dengue and chikungunya viruses.
- Zika [can be passed through sex](#) from a person who has Zika to his or her sex partners. [Condoms](#) can reduce the chance of getting Zika from sex. Condoms include male and female condoms.
- Local mosquito-borne Zika virus transmission has been reported in [the continental United States](#).



What you can do to protect yourself and others

PROTECT YOURSELF & OTHERS
Prevent mosquito bites, plan for travel, protect during sex and more.

PLAN FOR TRAVEL
Learn what to do before, during, and after your trip to protect yourself and others.

SCENARIO 2 – CLINICAL GUIDANCE

- Pregnant patient diagnosed with Zika
- Zika on her problem list
- Physician wants information about Zika testing and management
- Physician clicks on the infobutton next to Zika in the patient's problem list and finds relevant CDC guidelines

http://lite.bmi.utah.edu/OpenInfobuttonDemo_CDC2.html

SCENARIO 2

Open  nfo button

Electronic Health Record		Veterans Administration	Information audience	Healthcare provider
Age	27			
Gender	F			
Problem list	Pregnancy  Zika Virus Disease  			
Medications	Hydrochlorothiazide (Amturnide), 12.5 Mg, Tablet, Oral  Folic Acid 1.24 Mg, Tablet, Oral 			
Lab results	Beta-hCG, Serum Qualitative Positive  Hematocrit H  Serum Glucose L  Zika Fever Virus Antibody Positive 			

SCENARIO 2 - RESOURCE DISPLAY

The screenshot shows the CDC website for Zika Virus, accessed through the Department of Veterans Affairs portal. The page is titled "Zika Virus" and is specifically for "Healthcare Providers Caring for Pregnant Women".

Navigation and Search: The top of the page features the CDC logo and the tagline "CDC 24/7: Saving Lives, Protecting People™". A search bar is located in the top right corner. A "CDC A-Z INDEX" dropdown menu is also visible.

Left Sidebar (Navigation):

- CDC - Public Health**
 - Zika Guideline for Pregnancy
 - Zika Virus Diagnostic Testing
 - Zika Diagnostic Testing Interpretation
- UpToDate**
 - Diagnosis
 - Treatment
 - Etiology
 - Prognosis
 - Symptoms and Signs
- MedlinePlus**
 - Zika Virus
- PubMed**
 - Systematic reviews
 - Therapy
 - Diagnosis

Main Content Area:

- Zika Virus Home** (selected): CDC > Zika Virus Home > For Healthcare Providers
- About Zika** (+)
- Prevention** (+)
- Transmission** (+)
- Symptoms, Testing, & Treatment** (+)
- Areas with Risk of Zika** (+)
- Reporting and Surveillance** (+)
- Mosquito Control** (+)
- Health Effects & Risks** (+)
- Pregnancy** (+)
- Information for Specific Groups** (+)
- For Healthcare Providers** (-)
- Clinical Evaluation & Disease**

Summary:

- CDC recommends that pregnant women should not travel to areas with risk of Zika virus infection.** This includes all areas with documented or likely Zika virus transmission (see WHO categories for more information). If a pregnant woman must travel to one of these areas, she should be counseled to strictly follow steps to avoid mosquito bites and prevent sexual transmission during and after the trip.
- Symptomatic pregnant women with possible Zika exposure should be tested for Zika virus infection.** Possible Zika exposure includes people who live in or have recently traveled to an area with documented or likely Zika virus transmission, or who have had sex without a condom with a partner (male or female) who lives in or has traveled to an area with risk of Zika virus infection.

Language: English (US)

Related Topics:

- EFFECTS DURING PREGNANCY
- TESTING & DIAGNOSIS
- PATIENT COUNSELING
- PRENATAL CARE
- POSTNATAL CARE

SCENARIO 2 - RESOURCE DISPLAY

UNITED STATES
DEPARTMENT OF VETERANS AFFAIRS



CDC - Public Health

- [Zika Guideline for Pregnancy](#)
- [Zika Virus Diagnostic Testing](#)
- [Zika Diagnostic Testing Interpretation](#)

UpToDate

- [Diagnosis](#)
- [Treatment](#)
- [Etiology](#)
- [Prognosis](#)
- [Symptoms and Signs](#)

MedlinePlus

- [Zika Virus](#)

PubMed

- [Systematic reviews](#)
- [Therapy](#)
- [Diagnosis](#)

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

SEARCH

CDC A-Z INDEX ▾

Zika Virus

Zika Virus Home [CDC > Zika Virus Home > For Healthcare Providers > Pregnant Women](#)

About Zika +

Prevention +

Transmission +

Symptoms, Testing, & Treatment +

Areas with Risk of Zika +

Reporting and Surveillance +

Mosquito Control +

Health Effects & Risks +

Pregnancy +

Information for Specific Groups +

For Healthcare Providers -

Clinical Evaluation & Disease

Testing & Diagnosis

[f](#) [t](#) [+](#)

Assessing Need for Testing

All pregnant women in US states, the District of Columbia, and territories should be [screened](#) [PDF - 250 KB] for possible Zika virus exposure and [symptoms](#) at each prenatal care visit. Possible exposure to Zika virus that might warrant testing includes:

- Recent travel to or residence in an area with risk of Zika (during pregnancy or the periconceptional period [the 6 weeks before last menstrual period or 8 weeks before conception]), or
- Sex (vaginal, anal, or oral sex) or sharing sex toys without a condom during pregnancy with a person who traveled to or lives in an area with risk of Zika.

Testing for Zika Virus

Zika virus testing is performed at CDC, at several state, local, and territorial health departments, and at some commercial laboratories. Several tests are available to help determine if a person is infected with Zika virus. Healthcare providers

Language: English (US) ▾

On This Page

- [Assessing Need for Testing](#)
- [When to Test](#)
- [Testing Symptomatic Pregnant Women](#)
- [Testing Asymptomatic Pregnant Women](#)
- [Testing Partners of Pregnant Women](#)
- [Testing Information](#)
- [Clinician Resources](#)

SCENARIO 3 – LAB RESULT GUIDANCE

- Physician reviews lab results for a pregnant woman with Zika symptoms
- Physician clicks on the infobutton next to the results to retrieve CDC guidelines about the interpretation of the results

http://lite.bmi.utah.edu/OpenInfobuttonDemo_CDC3.html

SCENARIO 3

Open  nfoobutton

Electronic Health Record		Veterans Administration	Information audience	Healthcare provider
Age	27			
Gender	F			
Problem list	Pregnancy  Zika Virus Disease 			
Medications	Hydrochlorothiazide (Amturnide), 12.5 Mg, Tablet, Oral  Folic Acid 1.24 Mg, Tablet, Oral 			
Lab results	Beta-hCG, Serum Qualitative Positive  Hematocrit H  Serum Glucose L  Zika Fever Virus Antibody Positive  			
				OpenInfobutton

SCENARIO 3 - RESOURCE DISPLAY

UNITED STATES
DEPARTMENT OF VETERANS AFFAIRS





Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

CDC A-Z INDEX ▾

Zika Virus

[Zika Virus Home](#)

[About Zika](#) +

[Prevention](#) +

[Transmission](#) +

[Symptoms, Testing, & Treatment](#) +

[Areas with Risk of Zika](#) +

[Reporting and Surveillance](#) +

[Mosquito Control](#) +

[Health Effects & Risks](#) +

[Pregnancy](#) +

[Information for Specific Groups](#) +

[For Healthcare Providers](#) -

[CDC](#) > [Zika Virus Home](#) > [For Healthcare Providers](#) > [Testing for Zika](#)

Understanding Zika Virus Test Results

[f](#) [t](#) [+](#)

Language:

Reporting Test Results

When CDC performs testing, results will typically be sent to the state or local health department within 3 weeks after specimen receipt. Reporting times for test results may be longer during summer months or when arbovirus activity increases. Turnaround time on tissue specimens will vary, depending on testing volume and type of testing required.

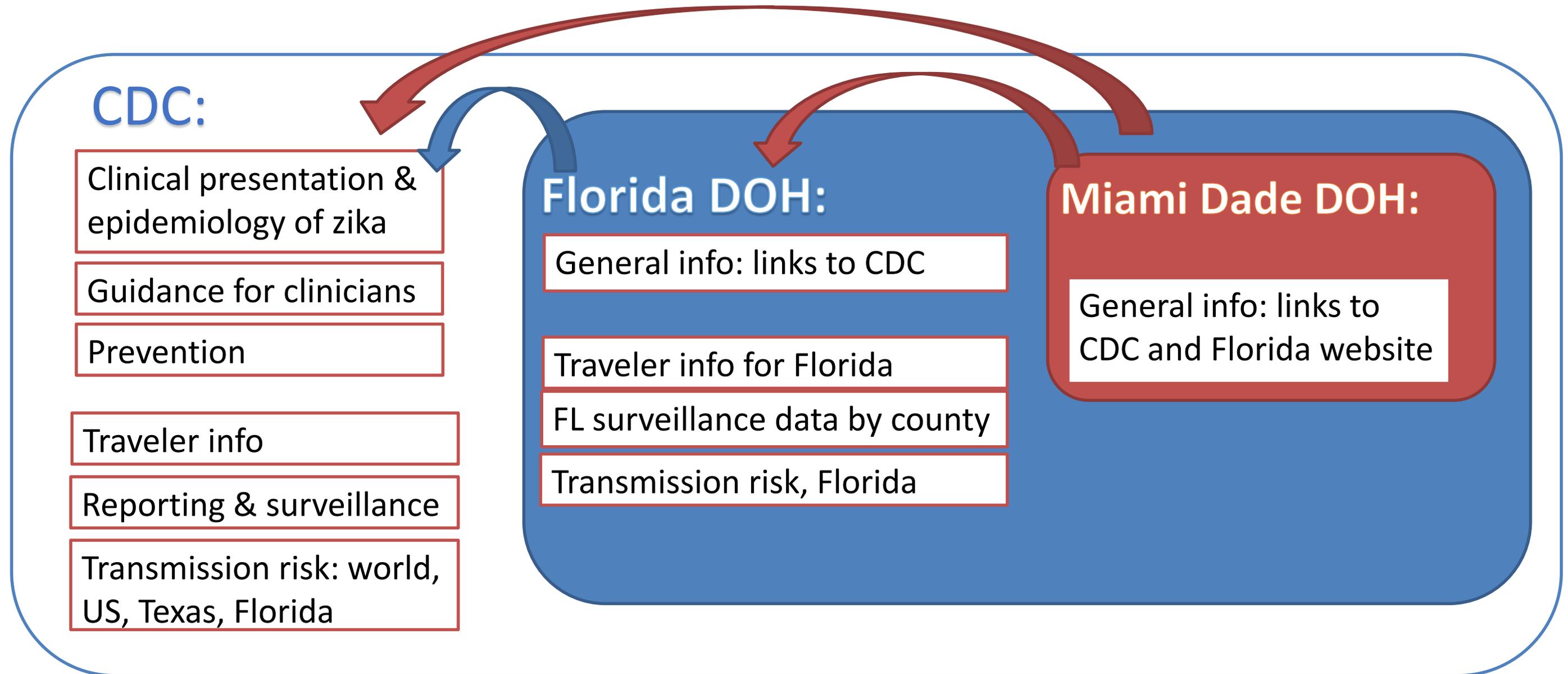
- CDC sends all test results to the appropriate state or local health department.
- State or local health departments report test results to doctors.
- Doctors report test results to patients.

Interpreting Test Results

- [Interim Guidance for Interpretation of Zika Virus Antibody Test Results](#) (MMWR, June 2016)
- Interpreting Zika MAC-ELISA Results: [English](#)  [PDF - 4 pages]
- Interpreting Triplex Real-Time RT-PCR Assay Results: [English](#)  [PDF - 5 pages] | [Spanish](#)  [PDF - 6 pages] | [Portuguese](#)  [PDF - 6 pages]

LOCATION-SPECIFIC INFOBUTTONS

ZIKA INFORMATION ON PUBLIC HEALTH WEBSITES, BY JURISDICTIONAL LEVEL, RELEVANT FOR FLORIDA

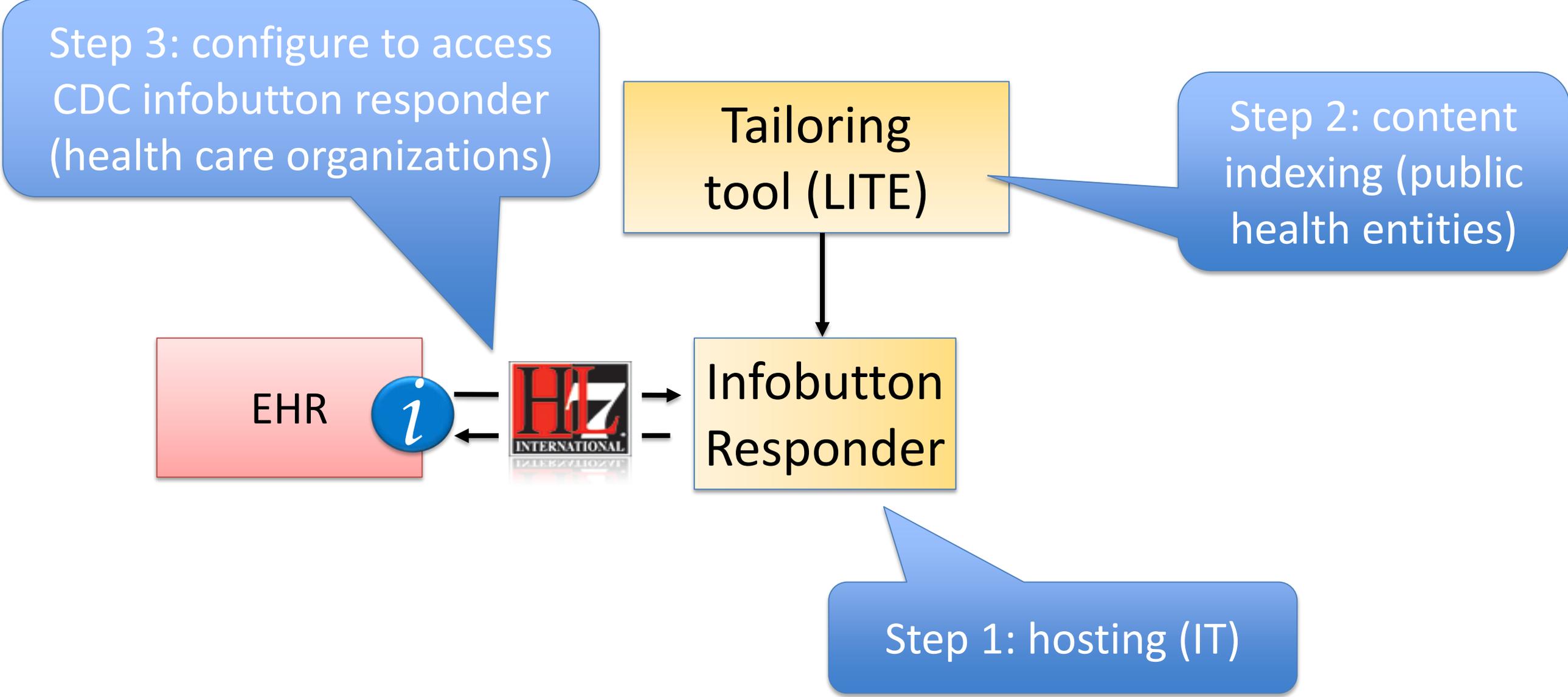


CDC = Centers for Disease Control and Prevention; DOH = Department of Health

NATIONAL SCALABILITY: OPPORTUNITY

- National solution
 - Centralized hosting
 - Decentralized content indexing
 - Support for various use cases
 - Infectious disease outbreaks
 - Opioid management
- Infobutton standard
 - Over 500 EHR vendors certified against Infobutton criteria in Meaningful Use
 - Supports location-specific context

ARCHITECTURE FOR NATIONAL SOLUTION



NATIONAL SCALABILITY: GAPS & QUESTIONS

- Content indexing/management
 - Roles & responsibilities of different public health entities
 - Link permanence
- Hosting and technical support
- Location of interest
 - Supported by HL7 Infobutton standard
 - OpenInfobutton: support to be implemented
 - EHR systems: no/little support



Questions?

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