

PUBLIC HEALTH
INFORMATICS
CONFERENCE

ACCESS
ANALYSIS
ACTION

AUGUST 21 - 24, 2016 | ATLANTA, GEORGIA

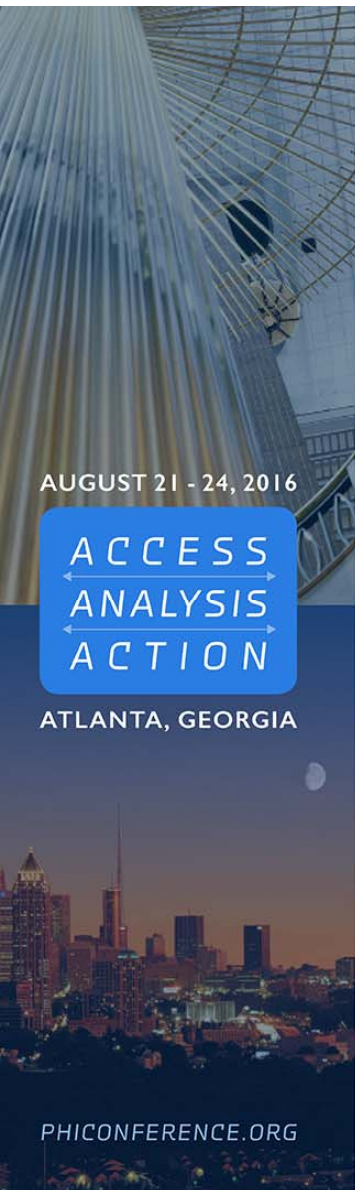


Trying on the RCKMS Glass Slipper: How Well Do Jurisdictional Reporting Criteria Fit?

Moderator: Janet Hui, MPH

Tuesday, August 23, 2016 10:30 AM – 12:00 PM

- Presenter: Rita Altamore, MD, MPH – Epidemiologist, Washington State Department of Health
- Presenter: Catherine Staes, BSN, MPH, PhD – Faculty, Department of Biomedical Informatics, University of Utah
- Presenter: Maiko Minami, BA – Project Manager, HLN Consulting, LLC
- Presenter: Shu McGarvey, CBAP, CSM – Informatics SME Northrop Grumman Technology Services Sector



....but I'm unique...
a jurisdiction's-eye view of RCKMS



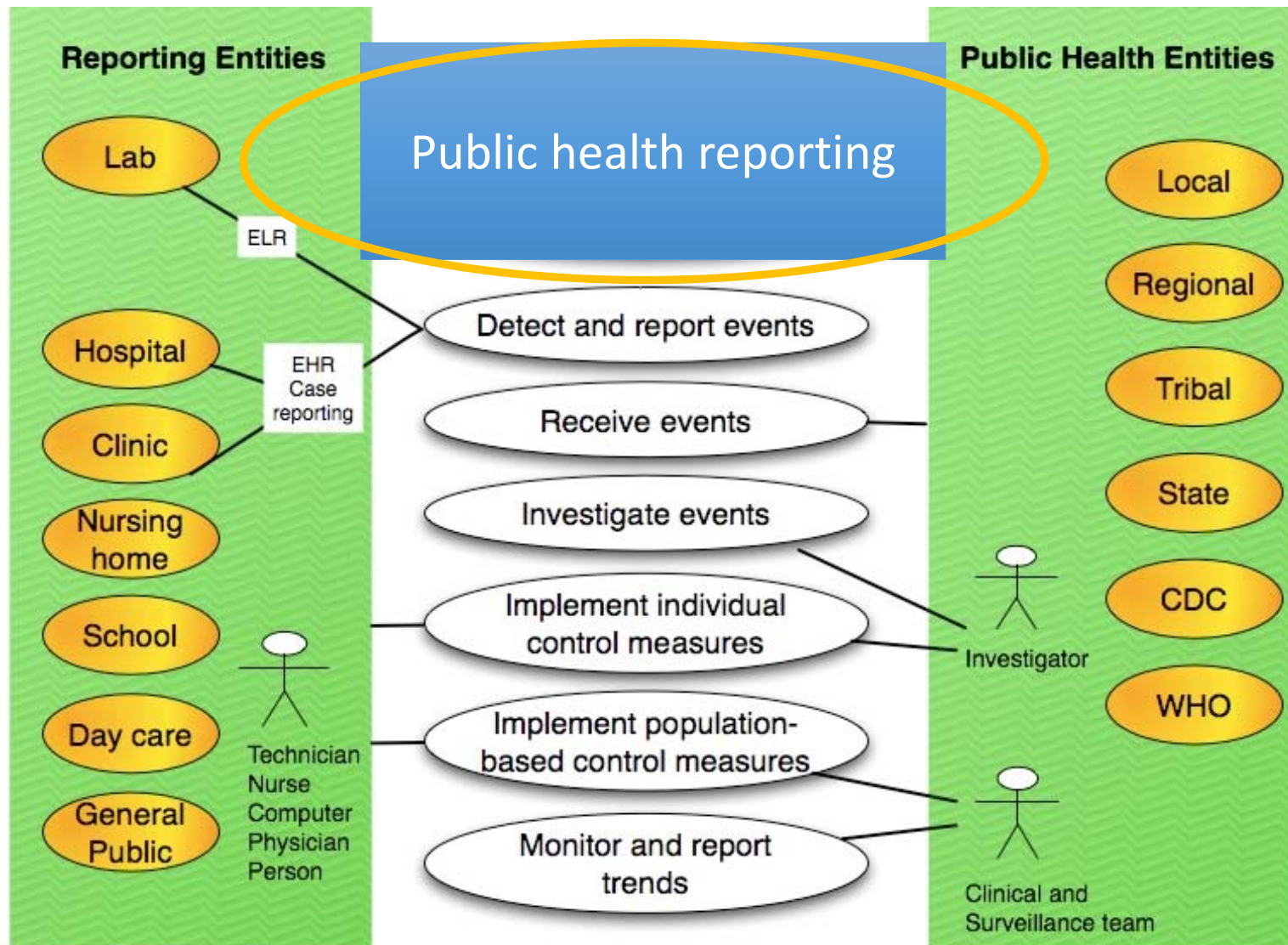
Council of State and Territorial Epidemiologists

“R-C-K-M-S ?”



Reportable Conditions Knowledge Management System

An authoritative, real-time portal
to enhance disease surveillance,
by providing comprehensive information
to reporters and others
about the “who, what, where, when, why, and how”
of reporting to public health.



Reporting: current challenges



- No easy access to reporting requirements
 - No single place to find reporting requirements
 - No single way to get updates to reporting requirements
 - Reporting requirements scattered across various websites and places, in various formats

Reporting: current challenges



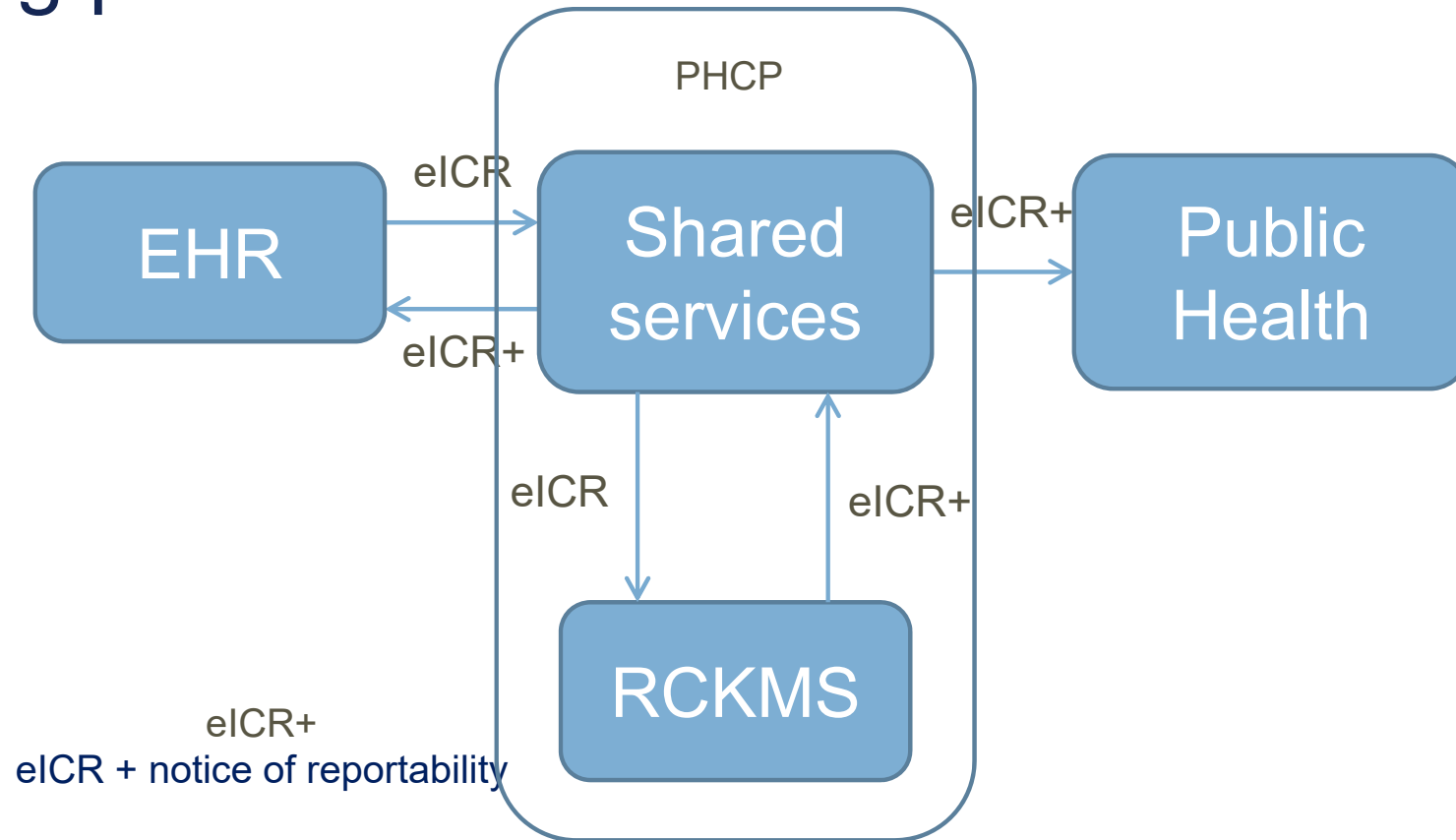
- Nature of reporting requirements
 - Complex
 - Changing
 - Vary among jurisdictions
- Not easy to automate
 - Requirements not in machine-processable format

RCKMS: benefits



- Easier access to reporting specifications
 - Single portal, real time information
 - Reporters can automatically receive updates
 - Single authoring interface for jurisdictions to manage requirements
 - Base content: pre-populated set of requirements
- Easier automation of reporting
 - Machine-processable reporting specifications provided

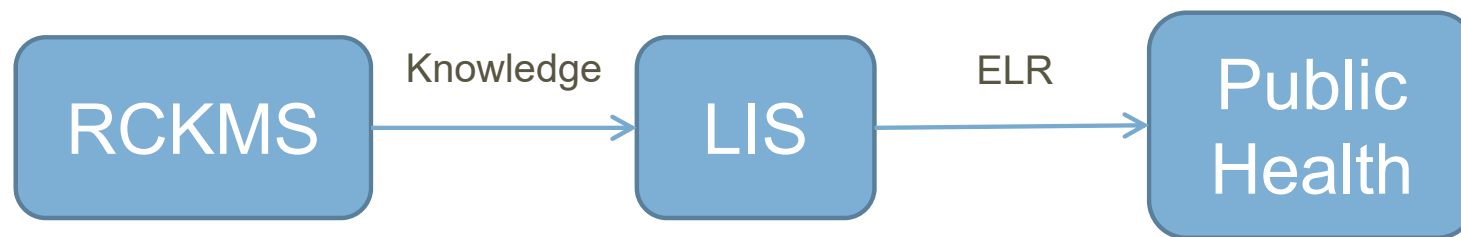
RCKMS and eCR: the big picture



RCKMS and eCR: alternate visions?



RCKMS and ELR



RCKMS: the challenges



- Effective use requires [new] understanding
- Decision support systems relatively new to public health
- Express rules as logic
 - Position statements table VI-B
- Understand construction of value sets
 - Use of standard terminologies
 - LOINC, SNOMED, ICD, RxNorm



RKCMS: the challenges



- Effective use requires learning new tools: RCKMS authoring software
- Understanding and using base content
- Building business processes
 - Authoring
 - Review and authorization
 - Publishing



RCKMS: the challenges



- Expressing jurisdictional reporting requirements in new ways
 - Collecting the information
 - Identifying the gaps
 - Closing the gaps
 - Modifying base content

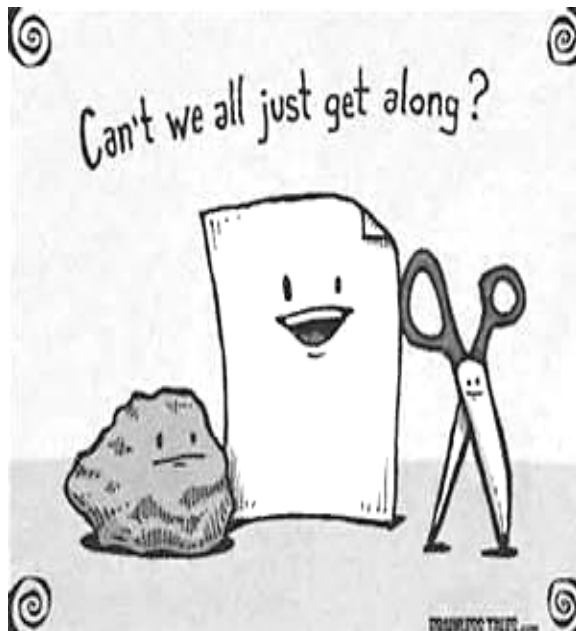
RCKMS: the challenges



- Supplying content: the work is never done
- The world keeps changing
 - Conditions and diseases change
 - Populations change
 - Science changes
 - Politics change
 - Resources change
 - Jurisdictional rules change



Jurisdictional variation



Why does variation exist?

How far are we willing to go
to minimize it?

RCKMS: the challenges



- **Some** reasons variation in reporting requirements exists
 - Differences in local incidence/prevalence of conditions
 - Differences in available resources
 - Different political interests/mandates
 - Different decisions about appropriate public health action (and, therefore, need for surveillance)
 - Different need for/desire for denominators
 - Reporting “negatives”

RCKMS: implications of variation



- Some kinds of variation are harder for computers to deal with
- Easy
 - Blood lead level > 10 ug/dl vs. > 5 ug/dl
- Harder
 - Herpes simplex, genital (initial infection only)
 - Influenza, novel or unsubtypeable strain



Dealing with variation



- “Fixing” variation
 - Coming to consensus
 - Experience in content vetting sessions
- Accommodating variation
 - Jurisdiction-specific rules in RCKMS
 - Jurisdictional permissiveness/filtering

The bottom line



You don't
need to
cut off
your toes

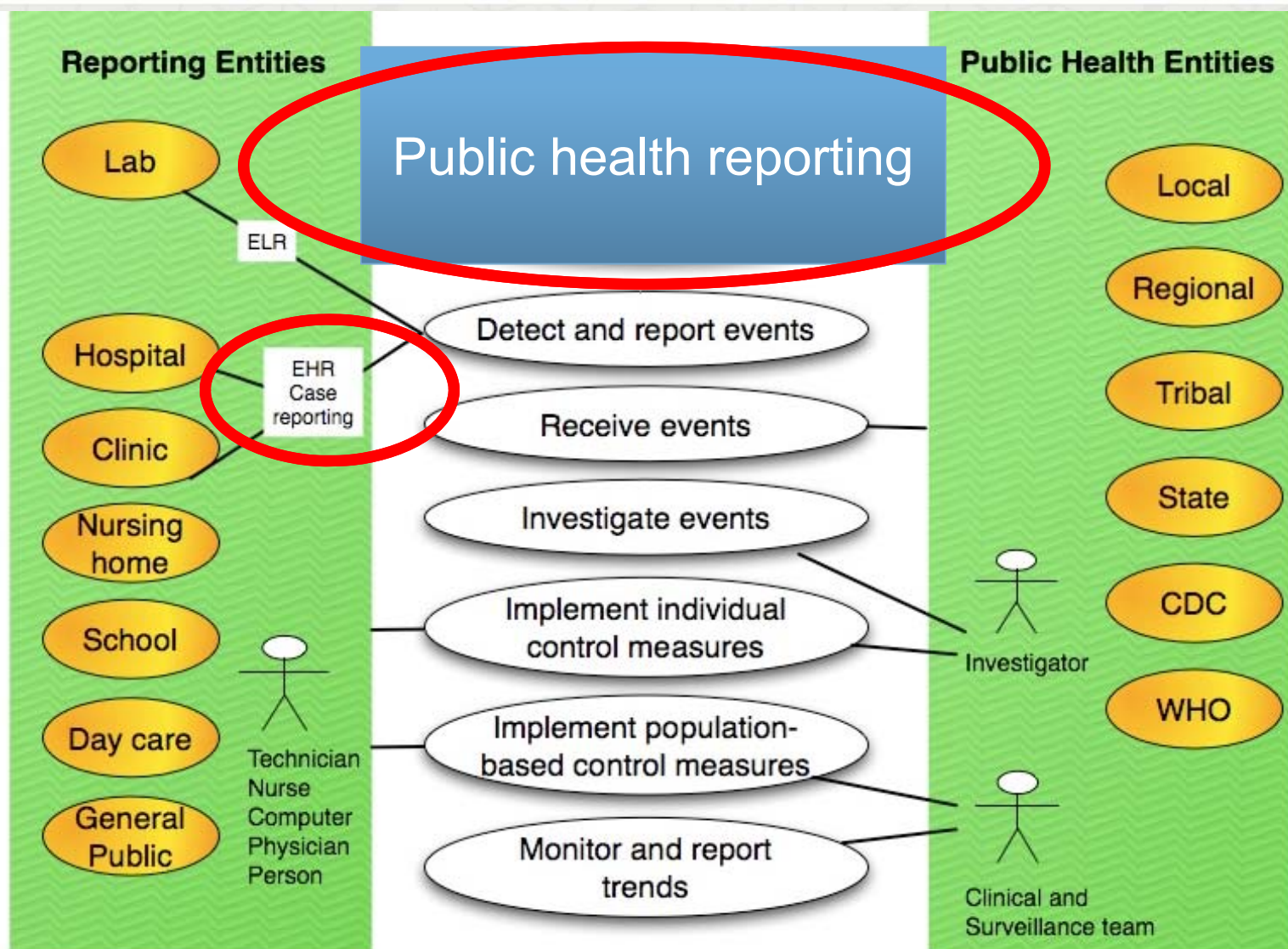
The bottom line



RCKMS – Knowledge Development Process



- What do we mean by knowledge development?
- Who is involved and what are the steps?
- What does the knowledge look like?



Typical Presentation

Utah.gov Services Agencies

UTAH DEPARTMENT OF HEALTH

Home Health Services A-Z List FAQ

Bureau of Epidemiology

A-Z Disease List Diseases & Conditions Community & Environment Healthy People & Families

Epidemiology > Disease Reporting

Services

- Disease Plans/Report Forms
- Disease Prevention
- Disease Testing
- Disease Treatment
- Find Disease Information
- Foodborne Illness Complaints
- Immunization Records

Information for:

- General Public
- Healthcare Providers
- Media
- Public Health Departments
- Schools & Childcare

Disease Reporting

Utah law requires that certain diseases and conditions be reported to the Department of Health. Some diseases must be reported immediately, while others can be reported within a certain number of days after identification.

To find out which diseases are reportable and the time frame for reporting, see the Utah Reportable Diseases.

Diseases may be reported to either a local health department or the Bureau of Epidemiology.

Reports to Bureau of Epidemiology can be submitted by:

- Secure fax: **801-538-9923**
- Secure email: **epi@utah.gov**
- Phone: **1-888-EPI-UTAH**

The following information is required to be reported with each report (see the Communicable Disease Rule (R386-702)):

- Patient's name, address, phone number, age or date of birth
- The diagnosed or laboratory confirmed disease or injury
- Date of onset for disease or date injury occurred
- Your (person reporting) name and phone number
- The laboratory results if available and the laboratory that performed the test
- All other information requested by the health department

For questions about disease reporting, email the Bureau of Epidemiology. Your patient information will be included in the communication, please do not include patient information in the communication, please do not include patient information in the communication.

Printable Reference Materials

- Disease Reporting Flyer
- Immediately Reportable Diseases: Two-sided Card
- Mandatory Submission of Isolates to Public Health

Mass.gov State Offices & Courts State A-Z Topics State Forms

The Official Website of the Executive Office of Health and Human Services

Health and Human Services

Departments & Divisions

A-Z Topic Index Health Care & Insurance Consumer

Home > Government Agencies > Departments & Divisions > Public Health & Human Services > Reportable Diseases, Isolation & Quarantine > Reporting Diseases and Surveillance Information

Reporting Diseases and Surveillance Information

Welcome to the Massachusetts Department of Public Health (MDPH) Reporting Diseases and Surveillance Information page. This page provides information on how to report diseases and conditions that are reportable to the state. It also provides information on the surveillance of diseases and conditions.

Utah law requires that certain diseases and conditions be reported to the Department of Health. Some diseases must be reported immediately, while others can be reported within a certain number of days after identification.

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- All other information requested by the health department

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Lists of Infectious Diseases Reportable by Law

- List of Diseases Reportable by Healthcare Providers
- List of Diseases Reportable by Laboratories
- List of Diseases Reportable to Local Boards of Health

Regulations and Amendments

- 105 CMR 300.000: Reportable Diseases, Surveillance, and Isolation and Quarantine Requirements
- Summary of Significant Amendments to 105 CMR 300.000: Reportable Diseases, Surveillance, and Isolation and Quarantine Requirements
- Memo about the Regulations Directing the use of MAVEN by Local Boards of Health
- Letter Re-Approved Amendments to 105 CMR 300.000 to Enhance HIV/AIDS Reporting

Guide to Surveillance, Reporting and Control

- Guide to Surveillance, Reporting and Control: A Massachusetts-specific manual for the surveillance and control of reportable infectious diseases. Contains basic isolation and quarantine requirements for each reportable disease. (2006)

Documents Pertaining to Privacy and Confidentiality

Notifiable Conditions & the Health Care Provider



The following conditions are notifiable to public health authorities in accordance with WAC 246-101

- Report to the local health jurisdiction of the patient's residence within the timeframe indicated by footnote (except for conditions followed by a reporting phone number)
- Immediately notifiable conditions (Bold) must be reported as soon as clinically suspected

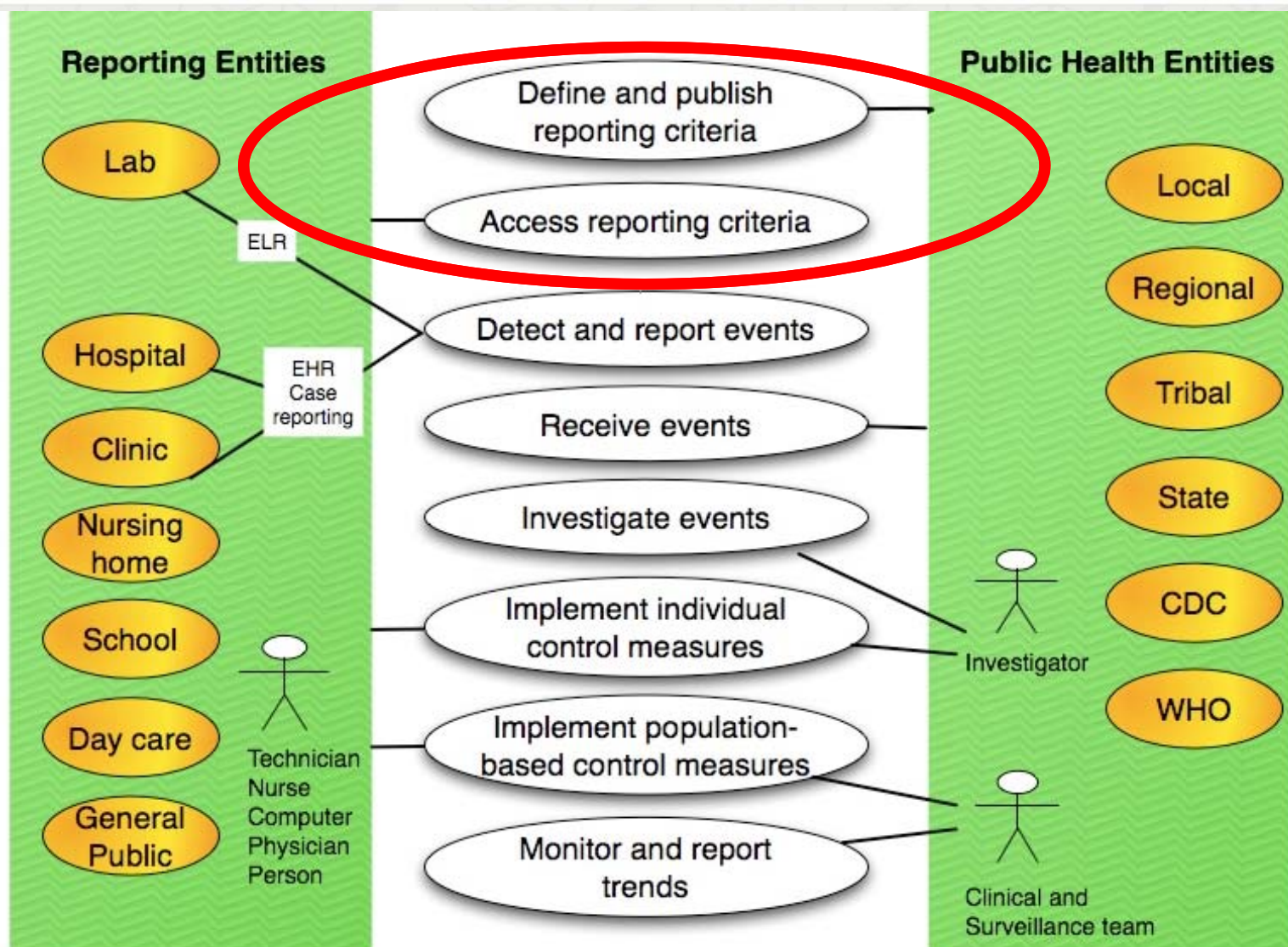
Acquired immunodeficiency syndrome (AIDS) ^{3d} (including AIDS in persons previously reported with HIV infection) ^{3d}	Lymphogranuloma venereum ^{3d}
Animal bites (when human exposure to rabies is suspected) ^{imm}	Malaria ^{3d}
Anthrax ^{imm}	Measles (rubeola) acute disease only ^{imm}
Arboviral disease ^{3d} (West Nile virus disease, dengue, Eastern & Western equine encephalitis, St Louis encephalitis, and Powassan) ^{3d}	Meningococcal disease (invasive) ^{imm}
Asthma, occupational (suspected or confirmed) ^{Mo} 1-888-66SHARP	Monkeypox ^{imm}
Birth Defects ^{Mo} ; autism spectrum disorders, cerebral palsy, alcohol related birth defects ^{Mo} 360-236-3533	Mumps (acute disease only) ^{24h}
Botulism (foodborne, wound and infant) ^{imm}	Outbreaks of suspected foodborne origin ^{imm}
Brucellosis (Brucella species) ^{24h}	Outbreaks of suspected waterborne origin ^{imm}
Burkholderia mallei (Glanders) ^{imm} and pseudomallei (Meliodiosis) ^{imm}	Paralytic shellfish poisoning ^{imm}
Campylobacteriosis ^{3d}	Pertussis ^{24h}
Chancroid ^{3d}	Pesticide poisoning ¹⁻⁸⁰⁰⁻²²²⁻¹²²²
Chlamydia trachomatis infection ^{3d}	Hospitalized, fatal, or cluster ^{imm}
Cholera ^{imm}	Pesticide poisoning, all other ^{3d}
Cryptosporidiosis ^{3d}	Plague ^{imm}
Cyclosporiasis ^{3d}	Polio myelitis ^{imm}
Diphtheria ^{imm}	Prion disease ^{3d}
Disease of suspected bioterrorism origin ^{imm}	Psittacosis ^{24h}
Domoic acid poisoning ^{imm}	Q fever ^{24h}
E. coli - Refer to "Shiga toxin producing E. coli" ^{imm}	Rabies (confirmed human or animal) ^{imm}
Emerging condition with Outbreak potential ^{imm}	Rabies, suspected human exposure ^{imm}
Giardiasis ^{3d}	Relapsing fever (borreliosis) ^{24h}
Gonorrhea ^{3d}	Rubella (include congenital rubella syndrome) ^{imm}
Granuloma inguinale ^{3d}	(acute disease only)
Haemophilus influenzae (invasive disease, children < age 5) ^{imm}	Salmonellosis ^{24h}
Hantavirus pulmonary syndrome ^{24h}	SARS ^{imm}
Hepatitis A, acute infection ^{24h}	Shiga toxin-producing E. coli infections ^{imm}
Hepatitis B, acute ^{24h}	(enterohemorrhagic E. coli including, but not limited to, E. coli 0157:H7; also includes post-diarrheal hemolytic uremic syndrome)
Hepatitis B, chronic (initial diagnosis/previously unreported cases) ^{Mo}	Shigellosis ^{24h}
Hepatitis B, surface antigen positive pregnant women ^{3d}	Smallpox ^{imm}
Hepatitis C, acute ^{3d} and chronic ^{Mo} (initial diagnosis only)	Syphilis (including congenital) ^{3d}
Hepatitis D (acute and chronic infections) ^{3d}	Tetanus ^{3d}
Hepatitis E (acute infection) ^{24h}	Trichinosis ^{3d}
Herpes simplex, neonatal and genital (initial infection only) ^{3d}	Tuberculosis ^{imm}
HIV infection ^{3d}	Tularemia ^{imm}
Immunization reactions ^{3d} (severe, adverse)	Vaccinia transmission ^{imm}
Influenza, novel or unsubtypeable strain ^{imm}	Vancomycin-resistant <i>Staphylococcus aureus</i> ^{24h}
Influenza-associated death (lab confirmed) ^{3d}	(not to include vancomycin intermediate)
Legionellosis ^{24h}	Varicella-associated death ^{3d}
Leptospirosis ^{24h}	Vibriosis ^{24h}
Listeriosis ^{24h}	Viral hemorrhagic fever ^{imm}
Lyme disease ^{3d}	Yellow fever ^{imm}
	Yersiniosis ^{24h}
	Other rare diseases of public health significance ^{24h}
	Unexplained critical illness or death ^{24h}

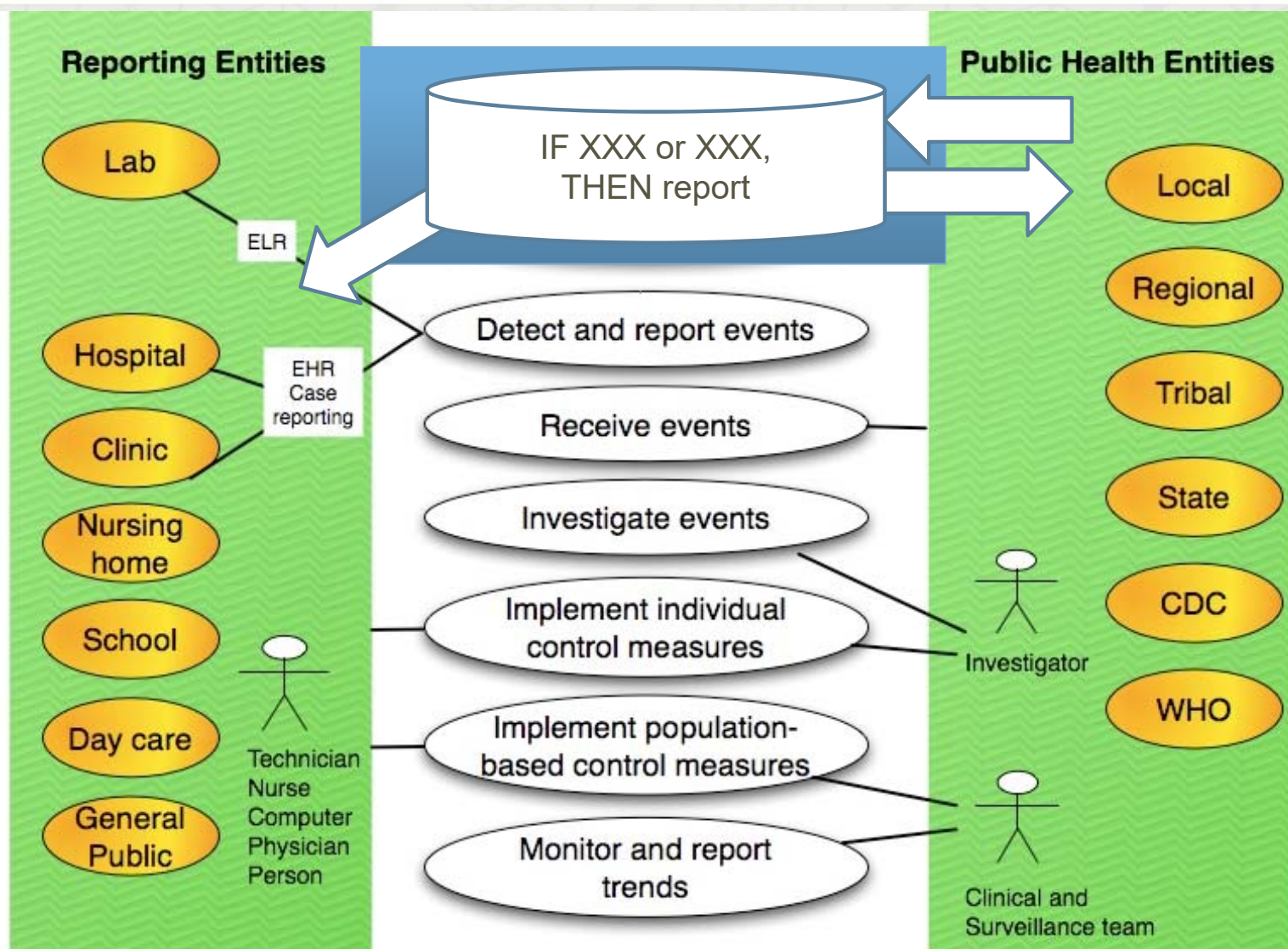
CODE LEGEND

- ^{imm} Immediately – Requires a phone call to reach a live person at the local health jurisdiction, 24/7
- ^{24h} Within 24 hours – Requires a phone call if reporting after normal public health business hours
- ^{3d} Within 3 business days
- ^{Mo} Monthly

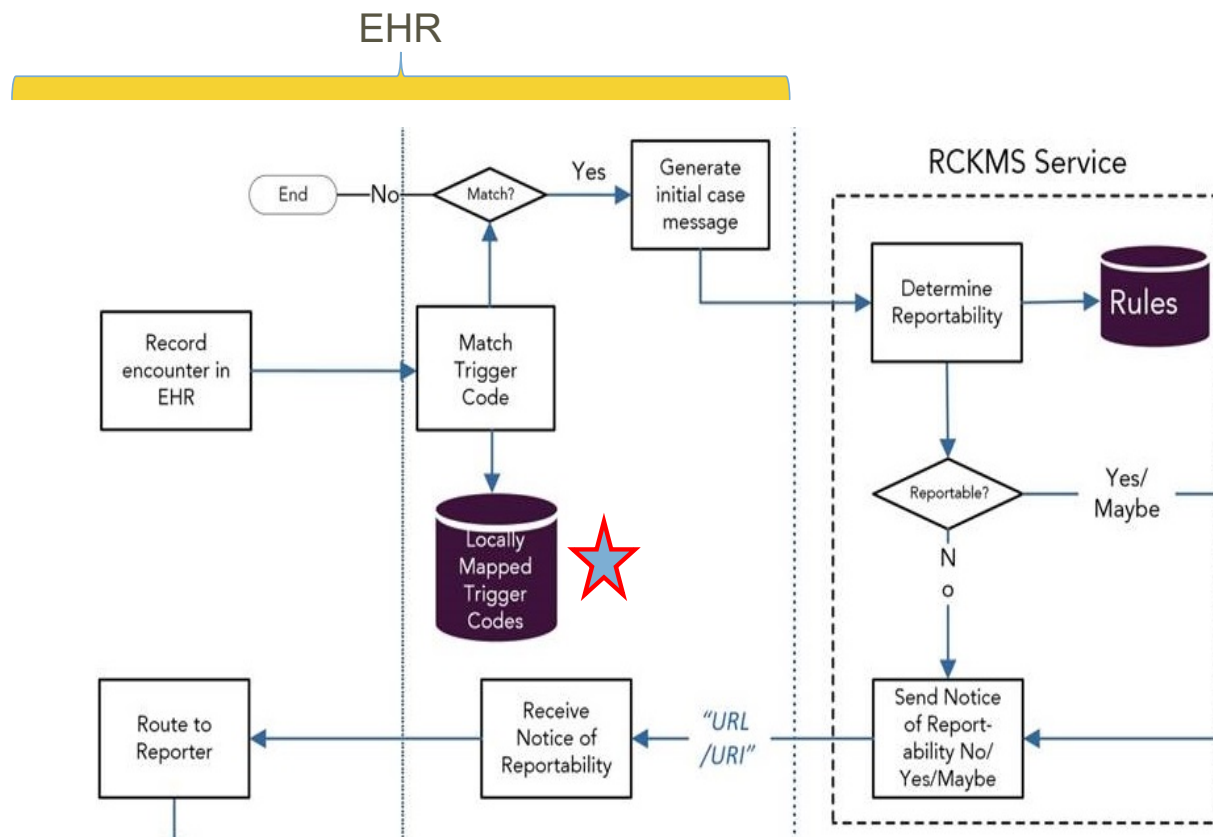
Phone numbers by county: <http://www.doh.wa.gov/Portals/1/Documents/1200/phsd-LHJ.pdf> If no one is available at the local health jurisdiction, call 1-877-539-4344

For more information, see WAC 246-101 or <http://www.doh.wa.gov/PublicHealthandHealthcareProviders/NotifiableConditions.aspx>
Last Updated January 16, 2013 DOH 210-001 (2/11)

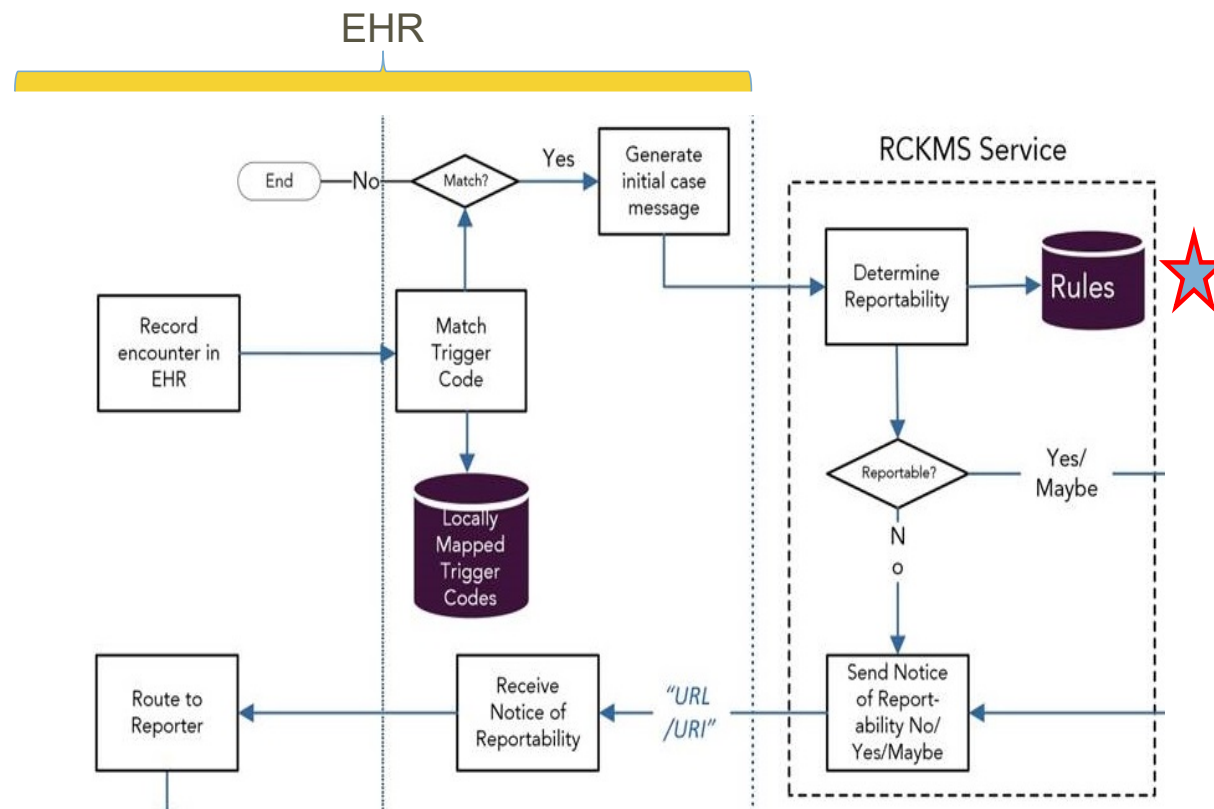





'Trigger' codes – broad filter applied to data saved in the EHR



Decision support logic- applied to EHR extract (eICR)



Knowledge Development Process



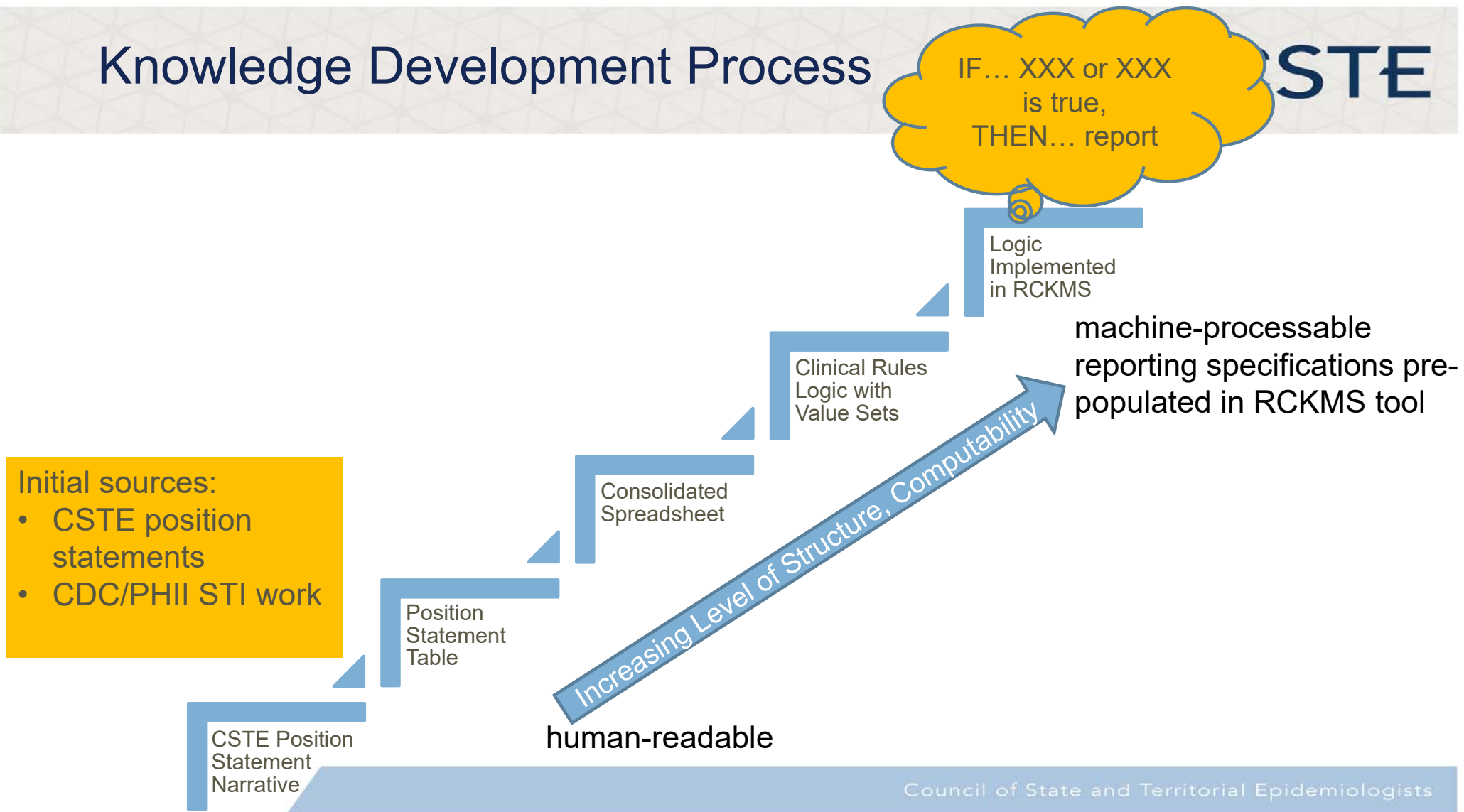
IF... XXX or XXX
is true,
THEN... report

STE

- Develop knowledge content that
 - is sufficiently computable
 - meets jurisdictional needs
- Implement knowledge content
- Evaluate knowledge content

Knowledge Development Process

CSTE



‘Internal’ Content Development Team



Agile Approach to Project Management

- *Content Product Owners* – Janet Hui (CSTE), Laura Conn (CDC)
- *Scrum Master* – Shu McGarvey
- *Content Drafting*
 - Knowledge Engineer/Epi SME: Catherine Staes
 - Informatics Business Analysts: Denisha Abrams, Julie Lipstein
 - Clinical Lab SME: Sarita Sadhwani
 - Lab Vocab SME: Jerry Sable, APHL
 - Clinical Epi Vocab SME: Mary Hamilton, Heather Patrick (NG)

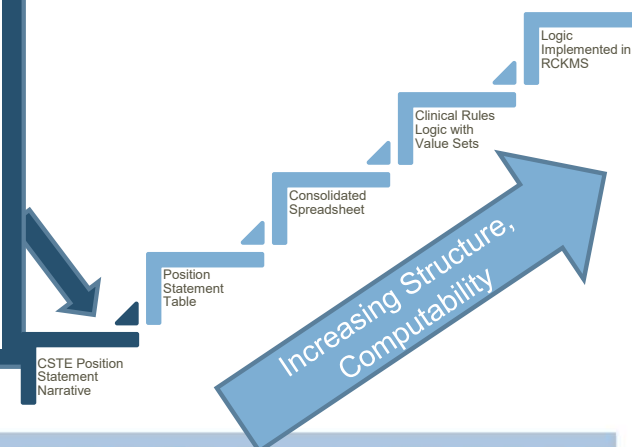
Step 1: Review CSTE Position Statement narrative



VI. Criteria for case identification

A. Narrative: A description of suggested criteria for case ascertainment of a specific condition. Report any illness to public health authorities that meets any of the following criteria:

1. An acute cough illness of any duration with an inspiratory whoop
2. Any person with isolation of *B. pertussis* from a clinical specimen or a positive PCR test for pertussis.
3. An acute cough illness of any duration in a person who is a contact of a laboratory-confirmed pertussis case.
4. An acute cough illness of any duration in a person who is a member of a defined risk group during an outbreak.
5. A person whose healthcare record contains a diagnosis of pertussis.
6. A person whose death certificate lists pertussis as a cause of death or a significant condition contributing to death.

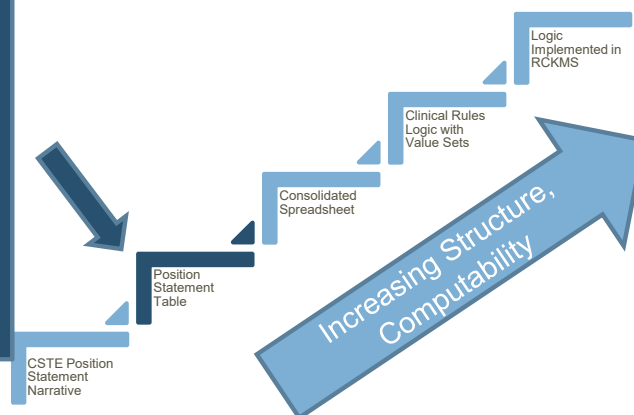


Step 2: Review CSTE Position Statement table 6-B



Table VI-B. Table of criteria to determine whether a case should be reported to public health authorities.

Criterion	Reporting			
<i>Clinical Evidence</i>				
Cough (any duration)	N		N	
Cough ≥2 weeks duration				
Inspiratory whoop	N			
Healthcare record contains diagnosis of pertussis				S
Death certificate lists pertussis as a cause of death or a significant condition contributing to death				S
<i>Laboratory Evidence</i>				
Isolation of <i>B. pertussis</i> from a clinical specimen		S		
Positive PCR for pertussis		S		
<i>Epidemiological Evidence</i>				
Contact with a lab-confirmed pertussis case			O	
Member of a defined risk group during an outbreak			O	



Step 3: Identify unique and needed criteria



Criterion
<i>Clinical Evidence</i>
Cough (any duration)
Cough ≥ 2 weeks duration
Inspiratory whoop
Healthcare record contains diagnosis of pertussis
Death certificate lists pertussis as a cause of death or a significant condition contributing to death
<i>Laboratory Evidence</i>
Isolation of <i>B. pertussis</i> from a clinical specimen
Positive PCR for pertussis
<i>Epidemiological Evidence</i>
Contact with a lab-confirmed pertussis case
Member of a defined risk group during an outbreak

Remove because not used in any reporting logic

This is part of the case classification criteria

Step 4: Transform criteria using template – clinical example



Criterion
<i>Clinical Evidence</i>
Cough (any duration)
Cough ≥ 2 weeks duration
Inspiratory whoop
Healthcare record contains diagnosis of pertussis
Death certificate lists pertussis as a cause of death or a significant condition contributing to death
<i>Laboratory Evidence</i>
Isolation of <i>B. pertussis</i> from a clinical specimen
Positive PCR for pertussis
<i>Epidemiological Evidence</i>
Contact with a lab-confirmed pertussis case
Member of a defined risk group during an outbreak

Transform to our template:

Pertussis

↓
“[condition] (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)”

Step 4: transform criteria using template



Laboratory Evidence	
Isolation of <i>B. pertussis</i> from a clinical specimen	
Positive PCR for pertussis	

Bordetella
Pertussis

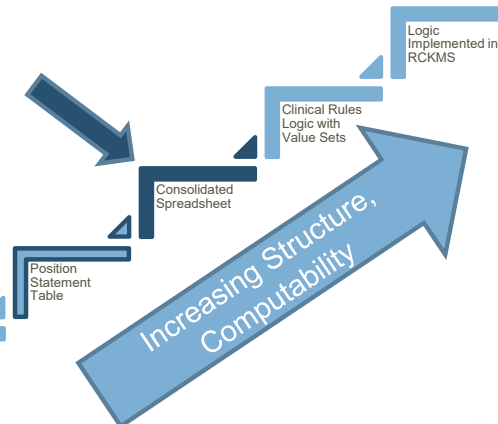


“Isolation of [organism] by any method in a clinical specimen”

Step 5: Create consolidated spreadsheet



		PROPOSED DEFAULT - LOGIC SETS					
		Lab Reporting	Provider / Facility Reporting				Vital Records
Patient record being evaluated contains evidence of:			(1)	(2)	(3)	(4)	
		LAB	DX	CLIN	CLIN + EPI		
Criterion Description	Sta						
Clinical	C						
Pertussis (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	P			S			
Cough (any duration)	N;P				N	N	
At least one of the following symptoms: Inspiratory Whoop, paroxysmal cough, or post-tussive vomiting	P				N		
Laboratory	C						
Isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen	P	S	S				
Detection of <i>Bordetella Pertussis</i> nucleic acid by any method in a clinical specimen	P	S	S				
Detection of <i>Bordetella pertussis</i> antigen by any method in a clinical specimen	P	S	S				
Detection of <i>Bordetella pertussis</i> antibodies by any method in a clinical specimen	P	S	S				
Demographic	C						
Epidemiologic	C						
Contact of a person diagnosed with pertussis	P					O	
Member of a defined risk group during an outbreak	N;P					O	
Vital Records	C						
Death certificate lists pertussis as a cause of death or a significant condition contributing to death	N;P						S



and Territorial Epidemiologists

Organized by reporter type



Lab reporting
(ELR)

Case reporting

Vital records

		PROPOSED DEFAULT LOGIC SETS					
Patient record being evaluated contains evidence of:		Lab Reporting	Provider / Facility Reporting				Vital Record:
			(1) LAB	(2) DX	(3) CLIN	(4) CLIN + EPI	
Criterion Description	~	Sta					
Clinical		C					
Pertussis (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)		P		S			
Cough (any duration)		N;P			N	N	
At least one of the following symptoms: Inspiratory Whoop, paroxysmal cough, or post-tussive vomiting		P			N		
Laboratory		C					
Isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen		P	S	S			
Detection of <i>Bordetella Pertussis</i> nucleic acid by any method in a clinical specimen		P	S	S			
Detection of <i>Bordetella pertussis</i> antigen by any method in a clinical specimen		P	S	S			
Detection of <i>Bordetella pertussis</i> antibodies by any method in a clinical specimen		P	S	S			

Uses criteria and logic (S,N, O) to build reporting specifications



Criteria

Logic set

		PROPOSED DEFAULT - LOGIC SETS				
		Lab Reporting	Provider / Facility Reporting			
			(1)	(2)	(3)	(4)
			LAB	DX	CLIN	CLIN + EPI
Patient record being evaluated contains evidence of:						
Criterion Description	Sta					
Clinical	C					
Pertussis (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	P			S		
Cough (any duration)	N;P				N	N
At least one of the following symptoms: Inspiratory Whoop, paroxysmal cough, or post-tussive vomiting	P				N	
Laboratory	C					
Isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen	P	S	S			
Detection of <i>Bordetella Pertussis</i> nucleic acid by any method in a clinical specimen	P	S	S			
Detection of <i>Bordetella pertussis</i> antigen by any method in a clinical specimen	P	S	S			
Detection of <i>Bordetella pertussis</i> antibodies by any method in a clinical specimen	P	S	S			

Content Vetting Workgroup engagement



When

- 31 weekly web-based meetings, Oct 29, 2015 through Aug 18, 2016

Who

- Subject matter experts, particularly epidemiologists, from local and state public health and CDC
- At least 21 different jurisdictions participated overall, from Virgin Islands to Multnomah County, Washington
- Each call included representation from 7-21 jurisdictions
- Most calls included representation from CDC.

What

- Review and provide feedback on the proposed criteria and logic.
- Recommend 'default' specifications and identify optional logic that should be included to meet jurisdictional needs

Step 6: Vet Spreadsheet



Do the standardized labels accurately convey the criteria?

Patient record being evaluated contains evidence of:		Lab Reporting	(1)	(2)	CLIN	DEM + CLIN?
Criterion Description	Status					
Clinical	C					
Apnea	P					
Cough (any duration)	N; P					
Cough > 2 weeks duration	N					
Inspiratory Whoop	N; P					
Paroxysmal cough	?P					
Post-tussive vomiting	?P					
Pertussis (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	N					
Healthcare record contains diagnosis of pertussis						
Laboratory	C					
Isolation of Bordetella pertussis by any method from a clinical specimen	P	S	S			
Detection of Bordetella pertussis nucleic acid by any method in a clinical specimen	P	S	S			
Positive PCR for Pertussis	N					
Detection of Bordetella pertussis antigen by any method in a clinical specimen	?P	?S	?S			
Detection of Bordetella pertussis IgM antibodies by any method in a clinical specimen	?P	?S	?S			
Lab test ordered for Isolation of Bordetella pertussis by any method in a clinical specimen	?P	?S	?S			
Lab test ordered for Detection of Bordetella pertussis nucleic acid, antigen, or IgM by any method in a clinical specimen	?P	?S	?S			
Demographic	C					
Age <= 2 years	?P					
Epidemiologic	C					
Contact of a person diagnosed with pertussis	P					
Contact with a laboratory-confirmed pertussis case	N					
Member of a defined risk group during an outbreak	N; P					
Vital Records	C					
Death certificate lists pertussis as a cause of death or a significant condition contributing to death	N; P					

Does PH want to receive reports when labs for B Pertussis are ordered? If so, what lab orders would PH want to hear about?

AZ/MA/GA/MD/WA - would investigate positives only

Step 7: Disposition & Log feedback and identify unresolved questions



C	D	E	F	G	H	I
DATE CREATED	CREATED BY	DESCRIPTION	DATE RESOLVED	RESOLVED BY	NOTES	FINAL RESOLUTION
2/18/16	Janet	3. For infant reporting, an age cutoff of <=2 yo was suggested by the pilot. Is this acceptable? (Column K)	3/5/16	Janet	- GA: chage to <1, bc of case definition - MD, NYS, WA agree	FOLLOW UP/DECISION: WG wants to change age cutoff to <1 vs <2 suggested by pilot; need to reconcile differences
2/18/16	Janet	3. Do we want to hear about any and all positive results, regardless of method and specimen type? (Row 16, 18, 20, 21) - Do we need to limit methods or specimens? - What specimens would you want: BAL, blood, body fluid, bone marrow, CSF, isolate, serum, serum/plasma, skin, amnio fluid, eye, tissue, urine - The pilot jurisdictions wanted to include "any lab test 'positive' for B. Pertussis"	3/5/16	Janet	- MA: any clinical specimen, but would not want IgA or IgM - WA: IgG anti-PT would be the only serology they accept - NYC: does not accept serology but investigates as providers often order wrong tests - NYS, GA agrees: don't accept but do follow up - In response to question whether jurisdictions would accept all positives for all serology, as pilot jurisdictions did, NYC, GA, NYS could accept all positives for serology; MN would accept IgA/IgM - AZ concerned broadening serology would capture immunity? - NYS: accepts broader set, informs local PH after - WA: commercial labs using variety of tests	FOLLOW UP/DECISION: WG wanted serology to be more specific to IgG, but multiple jurisdictions indicated would also accept all positive results for all serology, as pilot suggested
2/18/16	Janet	4. Does PH want to receive reports when labs for B Pertussis are ordered? If so, what lab orders would PH want to hear about? - Suggested Isolation tests (Row 22) and NA, antigen, IgM detection methods (Row 23) - Are orders for IgG tests needed?	3/5/16	Janet	- MA, AZ, GA, MD, WA would not want the lab orders	FOLLOW UP/DECISION: WG wanted to remove lab orders, pilot wanted to keep them STAES proposal: create option to add orders for the specific tests that are diagnostic - ie cultures and nucleic acid tests. This may be very useful during an outbreak. Then create the second order set in case someone requests all tests
2/18/16	Janet	5. Are there any tests being performed by reporters missing here? E.g. - IgG and IgM antibodies - Would PH want to receive reports based on "condition suspected" e.g. documented as a reason for study?	3/5/16	Janet	- WA would want to receive reports based on condition specific but only for high risk groups (<1, pregnant)	Proposed Decision: build this criteria into the optional logic.
4/28/16	Catherine	I created the lab value sets. Should bordetella sp tests be included as well as the B pertussis lab tests?				FOLLOW-UP NEEDED: Need SME review. Should bordetella sp tests be included as well as the B pertussis lab tests?
4/28/16	Catherine	They are currently NOT included in the lab test name valuesets created. question about the epi and clinical criteria				FOLLOW-UP NEEDED: re epi and clinical criteria

Step 8: Draft rules logic - clinical criteria example

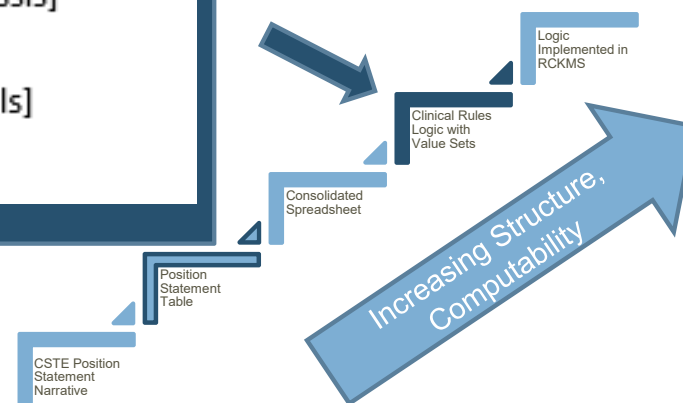


Pertussis (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)

IF

- Patient has a diagnosis of [VS: Pertussis]
OR
- Patient has an active problem list entry of [VS: Pertussis]
OR
- Patient has a death recorded as [VS: Pertussis_Literals]

THEN report



Step 8: Draft rules logic – lab criteria example

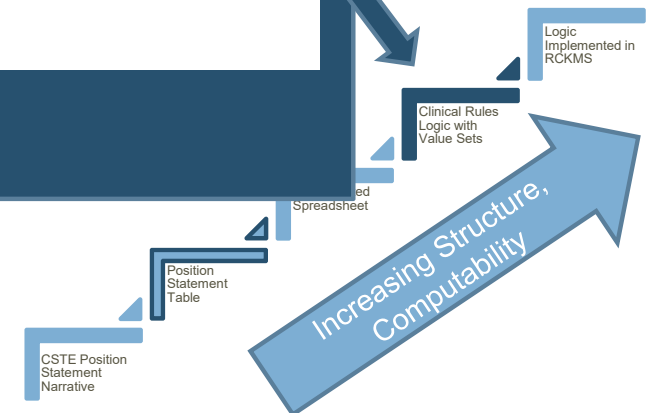


Detection of *Bordetella pertussis* nucleic acid by any method in a clinical specimen

IF

- Patient has lab result with (test name of [VS: Bordetella pertussis nucleic acid Detection Test]) and
(
(lab result value of [VS:Positive qualitative lab result]or [VS:Lab result value (Pertussis)])
or
(Interpretation of [VS:Abnormal interpretation]))
)

THEN report



Step 8: Draft rules logic – lab criteria example



Isolation of *Bordetella pertussis* by any method in a clinical specimen

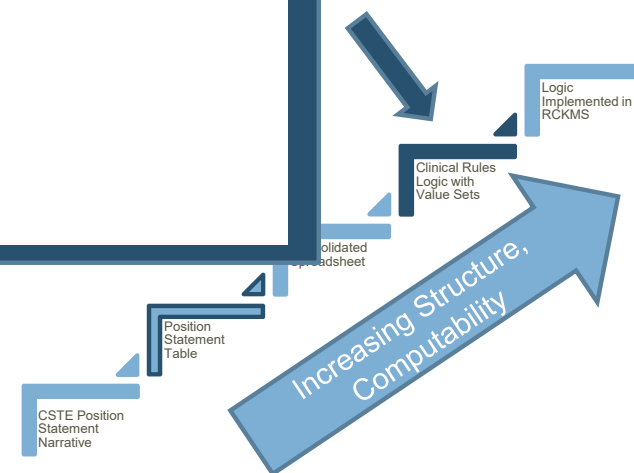
IF

- Patient has lab result with (test name of [VS: Bordetella pertussis Organism Identification Test]) and
(
(lab result value of [VS:Positive qualitative lab result]or [VS:Lab result value (Pertussis)])
or
(Interpretation of [VS:Abnormal interpretation])
)

OR

- Patient has lab results with (test name of [VS: Lab Test Name (Virus)]) and
(lab result value of [VS:Lab result value (Pertussis)])

THEN report



Step 9: Develop value sets in VSAC



Welcome							
Search Value Sets							
Authoring							
Collaboration Management							
Download							
Help							
Welcome to the NLM Value Set Authority Center (VSAC)							
My Value Sets							
Download Excel Refresh Clear Filter Assign Keyword Create Site Page 1 of 1 20							
	Name	Type	Code System	Steward	Author	OID	Keyword
<input type="checkbox"/>	pertussis						
<input type="checkbox"/>	Bordetella pertussis Antibody Detection Test	Extensional	LOINC	CSTE Stew	CSTE Auth	2.16.840.1.113762.1.4.1146.216	G_Vaccine,Pertussis
<input type="checkbox"/>	Bordetella pertussis Antigen Detection Test	Extensional	LOINC	CSTE Stew	CSTE Auth	2.16.840.1.113762.1.4.1146.215	G_Vaccine,Pertussis
<input type="checkbox"/>	Bordetella pertussis Nucleic Acid Detection Tests	Extensional	LOINC	CSTE Stew	CSTE Auth	2.16.840.1.113762.1.4.1146.58	G_Vaccine,Pertussis
<input type="checkbox"/>	Bordetella pertussis Organism Identification Test	Extensional	LOINC	CSTE Stew	CSTE Auth	2.16.840.1.113762.1.4.1146.220	G_Vaccine,Pertussis
<input type="checkbox"/>	Lab Result Value (Pertussis)	Extensional	SNOMEDCT	CSTE Stew	CSTE Auth	2.16.840.1.113762.1.4.1146.100	G_Vaccine,Pertussis,Trigg
<input type="checkbox"/>	Pertussis	Extensional	ICD10CM	CSTE Stew	CSTE Auth	2.16.840.1.113762.1.4.1146.36	G_Vaccine,Pertussis
<input type="checkbox"/>	Pertussis	Extensional	SNOMEDCT	CSTE Stew	CSTE Auth	2.16.840.1.113762.1.4.1146.35	G_Vaccine,Pertussis
<input type="checkbox"/>	Pertussis	Grouping	ICD10CM SNOMEDCT	CSTE Stew	CSTE Auth	2.16.840.1.113762.1.4.1146.37	G_Vaccine,Pertussis

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[Freedom of Information Act](#), [Contact Us](#)



Last updated: March 8, 2016
First published: October 25, 2012
Version: 2.10.8

Step 9: Develop value sets



My Value Sets						
Download Excel Refresh Clear Filter Assign Keyword Create Site Page <input type="text" value="1"/> of 1 <input type="text" value="20"/>						
<input type="checkbox"/>	Name	Type	Code System	Steward	Author	OID
<input type="checkbox"/>	<input type="text" value="pertussis"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	Bordetella pertussis Antibody Detection Test	Extensional	LOINC	CSTE Stew.	CSTE Auth	2.16.840.1.113762.1.4.1146.216
<input type="checkbox"/>	Bordetella pertussis Antigen Detection Test	Extensional	LOINC	CSTE Stew.	CSTE Auth	2.16.840.1.113762.1.4.1146.215
<input type="checkbox"/>	Bordetella pertussis Nucleic Acid Detection Tests	Extensional	LOINC	CSTE Stew.	CSTE Auth	2.16.840.1.113762.1.4.1146.58
<input type="checkbox"/>	Bordetella pertussis Organism Identification Test	Extensional	LOINC	CSTE Stew.	CSTE Auth	2.16.840.1.113762.1.4.1146.220
<input type="checkbox"/>	Lab Result Value (Pertussis)	Extensional	SNOMEDCT	CSTE Stew.	CSTE Auth	2.16.840.1.113762.1.4.1146.100
<input type="checkbox"/>	Pertussis	Extensional	ICD10CM	CSTE Stew.	CSTE Auth	2.16.840.1.113762.1.4.1146.36
<input type="checkbox"/>	Pertussis	Extensional	SNOMEDCT	CSTE Stew.	CSTE Auth	2.16.840.1.113762.1.4.1146.35
<input type="checkbox"/>	Pertussis	Grouping	ICD10CM SNOMEDCT	CSTE Stew.	CSTE Auth	2.16.840.1.113762.1.4.1146.37

Step 9: Develop value sets



<input type="checkbox"/>	Code	Descriptor
<input type="checkbox"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	192650000	Meningitis caused by pertussis (disorder)
<input type="checkbox"/>	271567008	Whooping cough-like syndrome (disorder)
<input type="checkbox"/>	27836007	Pertussis (disorder)
<input type="checkbox"/>	408682005	Healthcare associated pertussis (disorder)
<input type="checkbox"/>	59475000	Pneumonia in pertussis (disorder)

Withdraw

Clone

Value Sets
Pertussis...

Collaboration
Harmonization
Report

Name: Pertussis
Definition Version: Draft
Status: Ready To Publish
Publication Date: 08/20/2016

OID: 2.16.840.1.113762.1.4.1146.35
Note:

Keywords Assigned to this Value Set: Hide
Adding or Deleting Keywords

Purpose: Hide

Clinical Focus: This set of values contains diagnoses or problems that
Data Element Scope: Diagnoses or problems documented in a clinical record.

Inclusion Criteria: Root1 = Pertussis (disorder); Root1 children included = Yes
Exclusion Criteria: Child of root1 excluded = Conjunctivitis due to Bordetella

Type: Extensional
Steward: CSTE Steward
Author: CSTE Author

Code System: SNOMEDCT
Code System Version: 2016-03

Step 8: Draft rules logic - clinical criteria example



Pertussis (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)

IF

- Patient has a diagnosis of [VS: Pertussis]
- OR
- Patient has an active problem list entry of [VS: Pertussis]
- OR
- Patient has a death recorded as [VS: Pertussis_Literals]

THEN report

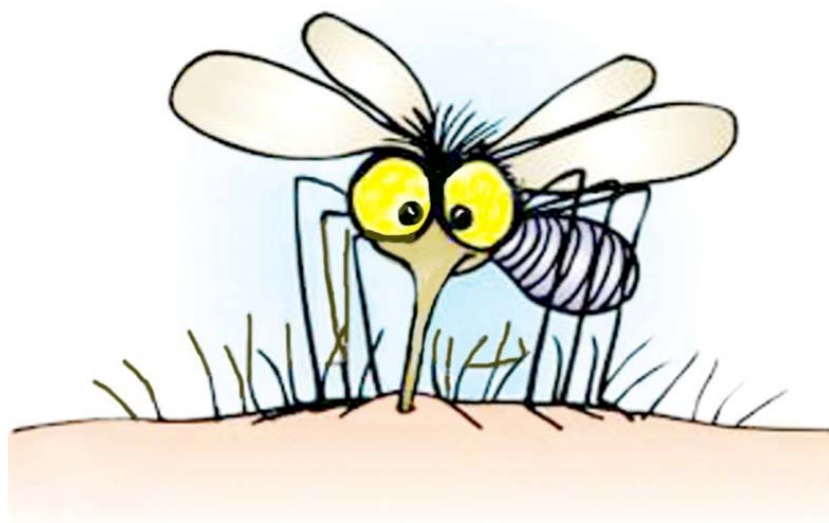
Pertussis
diagnoses

Pertussis
terms

List of
ICD-10
and
SNOMED
CT codes

List of
synonyms
for NLP

Step 9: Review conditions expected to have similar criteria – arboviral example



Questions regarding Reporting Criteria for Arbovirals



	Culture		Antigen	Antigen (NS1)	NAT	Single IgM	Fourfold Rise (IgG/Total)	Seroconversion (IgG/Total)	Single IgG
	No Prelim. Results	Prelim. Results							optional
Arboviral Disease	X		X		X	X	X	X	X
West Nile Virus	X		X		X	X	X	X	X
St. Louis Encephalitis Virus Disease	X		X		X	X	X	X	X
Yellow Fever	X		X		X	X	X	X	?
Dengue		X*	X*	X*	X*	X*	X*	?	?

* Orders of lab test also requested

Questions regarding Reporting Criteria for Arbovirals



	Culture		Antigen	Antigen (NS1)	NAT	Single IgM	Fourfold Rise (IgG/Total)	Seroconversion (IgG/Total)	Single IgG
	No Prelim. Results	Prelim. Results							optional
Arboviral Disease	X → X		X		X	X	X	X	X
West Nile Virus	X → X		X		X	X	X	X	X
St. Louis Encephalitis Virus Disease	X → X		X		X	X	X	X	X
Yellow Fever	X → X		X		X	X	X	X	? → X
Dengue		X*	X*	X*	X*	X*	X*	? → X	? → X

* Orders of lab test also requested

Status Update: Content Vetting WG (1st Round)



Category	Month Vetted	# of Conditions Vetted*
Sexually Transmitted Diseases	July – August 2016	5 / 5
Bloodborne Diseases	Nov – Dec 2015	4 / 4
Enteric Diseases	Dec 2015 – Jan 2016	13 / 13
Vaccine-Preventable Conditions	Feb – March 2016	18 / 18
Respiratory Conditions (Infectious)	February 2016, August 2016	5 / 5
Neurologic and Toxin-Mediated Conditions	March 2016	1 / 1
Zoonotic and Vectorborne Diseases	March - April 2016	
	July 2016	20 / 20
Toxic Effects of Non-Medicinal Substances	May 2016	4 / 4
Systemic Conditions	May 2016	4 / 4
Total		74 / 74 (100%)

Some conditions may be re-vetted to get additional feedback.

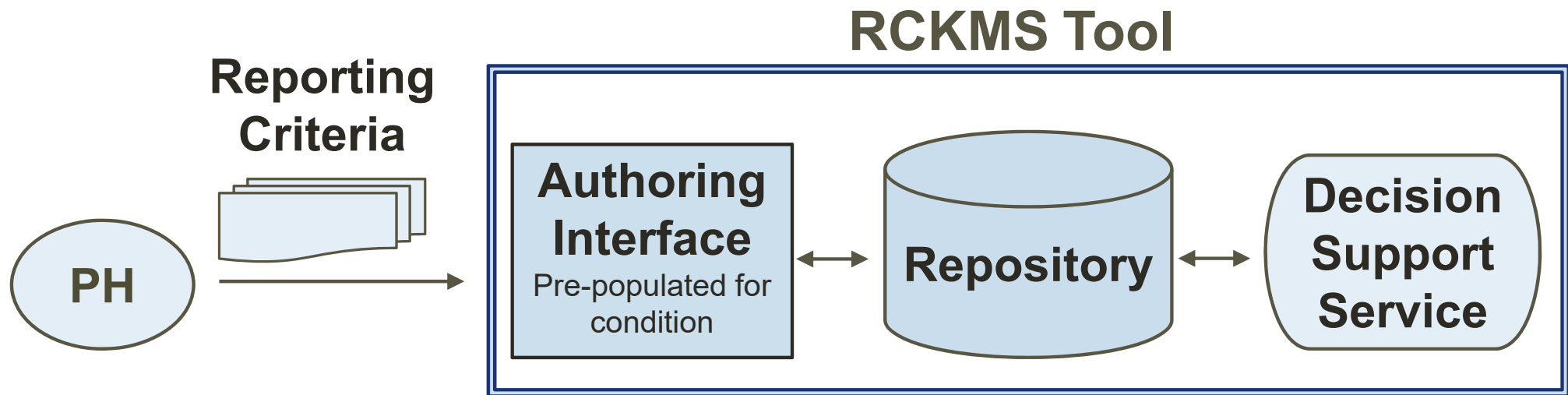
SARS was vetted but will be grouped with a 'Novel Coronavirus' reporting criteria in Round 2

RCKMS – Technical



Transforming Reporting Specifications From Paper to Software

How the RCKMS Authoring Tool works



1. **Authoring Interface**: Jurisdiction enters reporting criteria into authoring interface (website)

RCKMS tool comes pre-populated with **default reporting criteria** that jurisdictions can choose to use or customize to meet

2. **Reporting Criteria** → Stored in repository → Linked to decision support service

3. **Test Manager**: Jurisdiction can test whether criteria entered correctly by using test manager

Components provided from the Content Vetting WG

- **Value Sets**: Value Sets with Codes in VSAC
- **Criteria Definitions**: What do the criteria mean?
- **Reporting Specifications**: What combination of criteria are needed to consider a condition reportable?

Transforming From 'Paper' to Software CSTE

Reporting Specifications

from Content Vetting WG

1) Value Sets 2) Criteria Definitions 3) Reporting Specifications



Transforming to Software

Value Sets:

Import Value Set &
Codes from VSAC



Concepts:

Map Value Sets to
Concepts
(Representation of VS)



Criteria:

Identify / Create Standardized Criteria Templates
Assign and Define Criteria for Conditions
Populate Concepts for Condition-specific Criteria



Reportable Specifications:

Populate Rules (Sufficient, Necessary,
Optional)



Test Cases:

Create Test Cases to test
reporting specifications

Value Set Import in RCKMS Tool



Value Sets:
Import Value Set &
Codes from VSAC

Manage Value Sets

Value Set Search

Enter or select search criteria, then click the Search button to perform your search.

Note: You may e

Test S

Value Set Import

OID:

Value Set Type:

☐

Published

☒

Draft

Import by Profile:

Choose one ...

Import Value Set

Close

Value Set Search

Name

Abnormal interpret

Administrative Gen
(HL7 V3)

Apnea

Bordetella pertussi
antibody detection

Bordetella pertussi
antigen detection t

Bordetella pertussi
acid detection test

Bordetella pertussi

Show All

Delete



Time: 201608192017 Plugin List: CORE/CDS/RULE/RCKMS

Status: Complete

Isolation of *Bordetella pertussis* by any method in a clinical specimen

IF

- Patient has lab result with (test name of [VS: Bordetella pertussis Organism Identification Test]) and ((lab result value of [VS:Positive qualitative lab result]or [VS:Lab result value (Pertussis)) or (Interpretation of [VS:Abnormal interpretation]))

OR

- Patient has lab results with (test name of [VS: Lab Test Name (Virus)]) and (lab result value of [VS:Lab result value (Pertussis)])

THEN report

Criteria in RCKMS Tool



Condition Criteria Editor - [Save Option 3]

ID: 4ba533a446d38d127ff1a02ca3a1a9d4

Source Criteria Name: Detection of [organism] [component] by any method in a clinical specimen

Label: Detection of Bordetella pertussis|nucleic acid by any method in a clinical sp

Criteria Predicate List (# of Results: 4)

Predicate

Patient has an organism-specific lab test performed of == Bordetella pertussis Nucleic Acid Detection Test (RCKMSQ13)

AND

▼ Group 1 {

Lab Result Value (ordinal) == Positive qualitative lab result (RCKMS4a)

OR

Lab Result Value (nominal) == Lab Result Value (Pertussis) (RCKMS1d)

OR

Interpretation == Abnormal Interpretation (RCKMS5a)

}

Reporting Specifications on Paper



		PROPOSED DEFAULT - LOGIC				
		Lab Reporting	Provider / Facility Report			
		(1)	(2)	(3)	(4)	(5)
		LAB	DX	CLIN	CLIN+ EPI	
Patient record being evaluated contains evidence of:						
Criterion Description	Sta					
Clinical	C					
Pertussis (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	P		S			
Cough (any duration)	N;P			N	N	
At least one of the following symptoms: Inspiratory Whoop, paroxysmal cough, or post-tussive vomiting	P			N		
Laboratory	C					
Isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen	P	S	S			
Detection of <i>Bordetella Pertussis</i> nucleic acid by any method in a clinical specimen	P	S	S			
Detection of <i>Bordetella pertussis</i> antigen by any method in a clinical specimen	P	S	S			
Detection of <i>Bordetella pertussis</i> antibodies by any method in a clinical specimen	P	S	S			

Reporting Specifications in RCKMS Tool



Manage Reportable Condition - [Save Option 3]

Condition Details

Setup Reporting Criteria

Define Reporting Specifications

Links and References

Test Cases

Manage Default Logic Sets

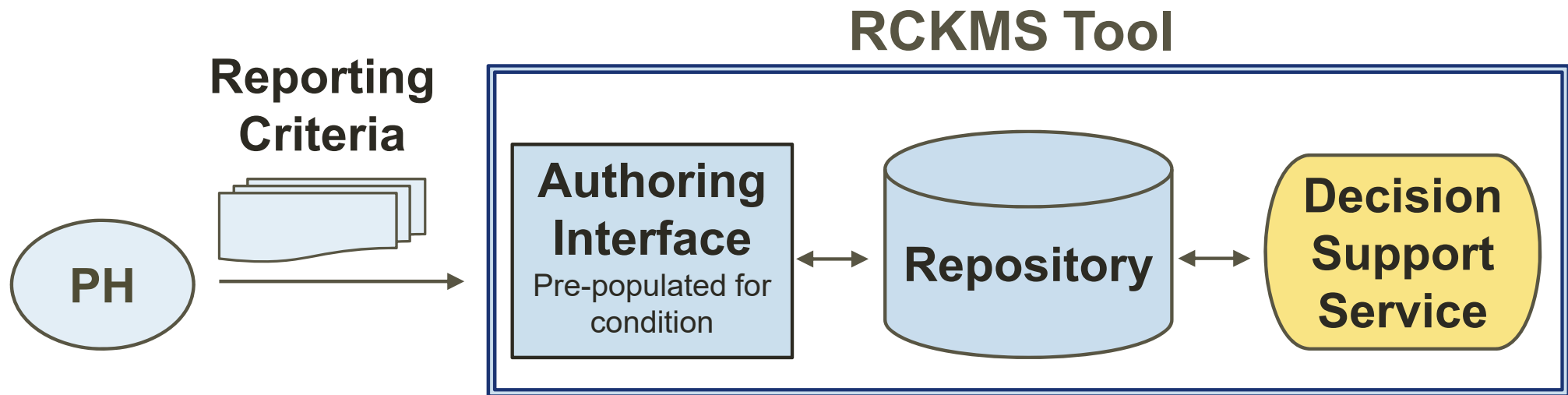
Logic Set Properties	Lab Reporting Logic Sets		Provider/Facility Log	
	Lab1	Lab	DX	
Reporting Timeframe	1 day(s)	3 day(s)	3 day(s)	

Define Default Reporting Specifications

Clinical

Apnea			
At least one of the following symptoms: Inspiratory Whoop, paroxysmal cough, or post-tussive vomiting			
Cough (\geq 14 days)			
Cough (any duration)			
Currently pregnant			
Pertussis			Sufficient

How the RCKMS Authoring Tool works



1. **Authoring Interface**: Jurisdiction enters reporting criteria into authoring interface (website)

RCKMS tool comes pre-populated with **default reporting criteria** that jurisdictions can choose to use or customize to meet

2. **Reporting Criteria** → Stored in repository → Linked to decision support service

3. **Test Manager**: Jurisdiction can test whether criteria entered correctly by using test manager

- **RCKMS PH-DSS built atop the [OpenCDS](#)**
 - Freely available Clinical Decision Support (CDS) software: “multi-institutional, collaborative effort to develop scalable, CDS tools and resources”
 - Facilitate widespread availability of advanced CDS capabilities through collaborative development of standards-based DSS infrastructure and tooling
 - Open Source
- **Lower barriers to adoption; foster interoperability between public health and other clinical systems**
 - [HL7 Decision Support Service Standard](#) for standard functionality and interfaces
 - [HL7 Virtual Medical Record \(vMR\)](#) for consistent modeling of the rules
 - [HL7 Clinical Quality Language \(CQL\)](#) and [Drools](#) as executable representation of rules
 - Evolve to future models and payloads (e.g. FHIR) if needed

Reporting Specifications: Deployment to RCKMS PH-DSS



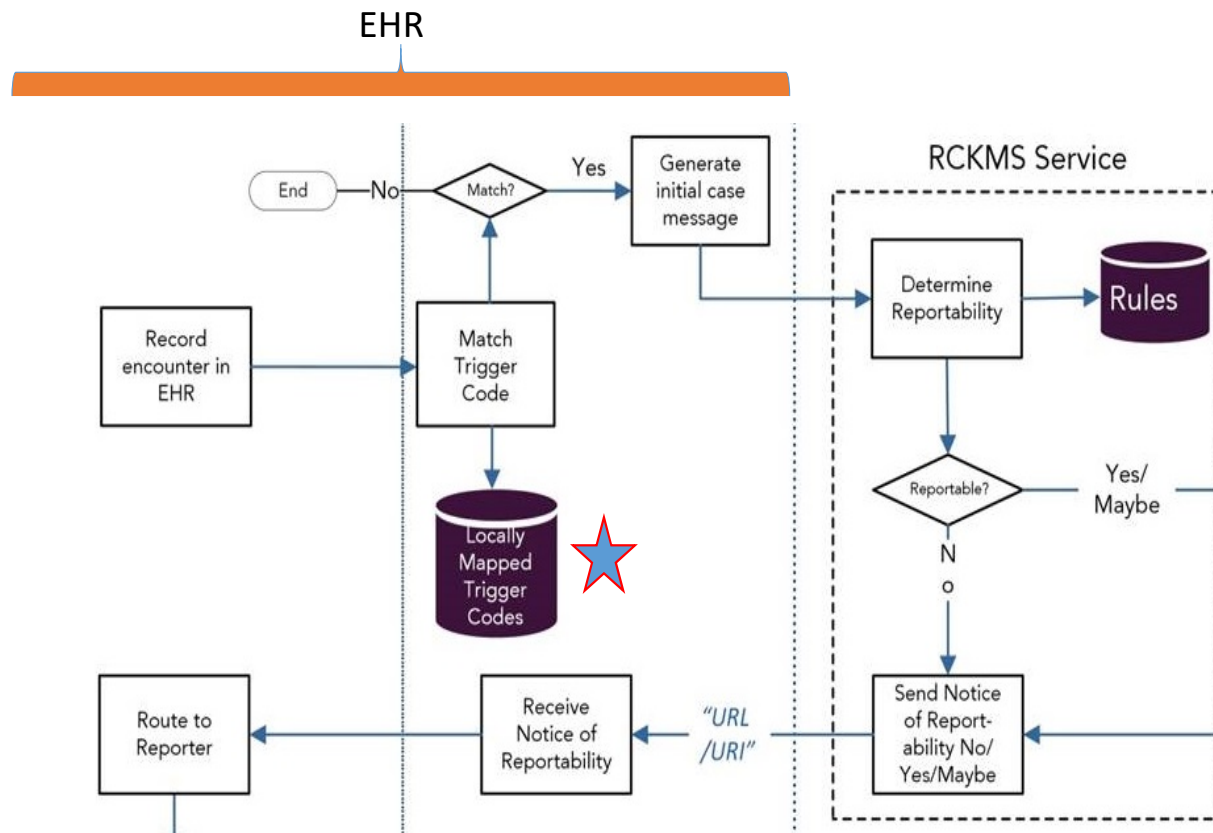
- Deployment: Scheduled or On-Demand
- Concepts and Mappings (value sets, codes, and concepts) packaged up and deployed to PH-DSS (via REST service)
- Intermediate representation of the rules as HL7 Clinical Quality Language (CQL) Expression Logical Model format (XML)
 - Standards-based, technology-agnostic, sharable representation
 - Facilitates additional validation of the rules, race condition checks
- Final executable representation of rules as Drools

“A Day in the Life of a Case Report”

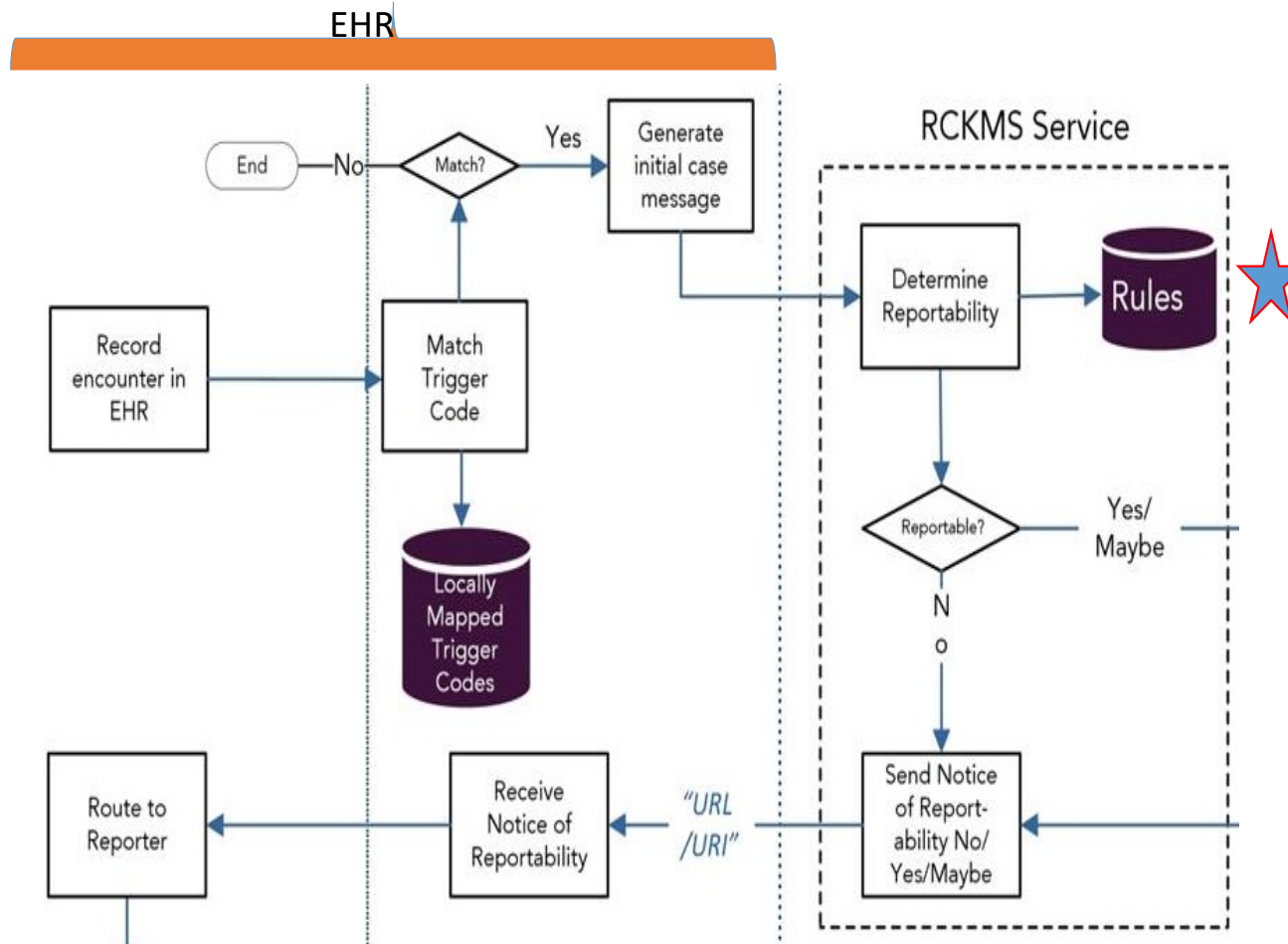
Shu McGarvey



'Trigger' codes – broad filter applied to data saved in the EHR



Decision support logic- applied to EHR extract (eICR)



RCTC

What are they?



- A National Set of codes to be implemented in the EHR and matched against encounter information to initiate generation of an eICR
- Codes Include:
 - Diagnosis codes (ICD 10 and SNOMED-CT)
 - Test Name from Lab Results Report (LOINC)
 - Test Result from Lab Results Report (SNOMED-CT)
 - Test Order Placed (LOINC)
- Draft set of codes for 5 reportable conditions – chlamydia, gonorrhea, pertussis, salmonellosis, Zika

Scope

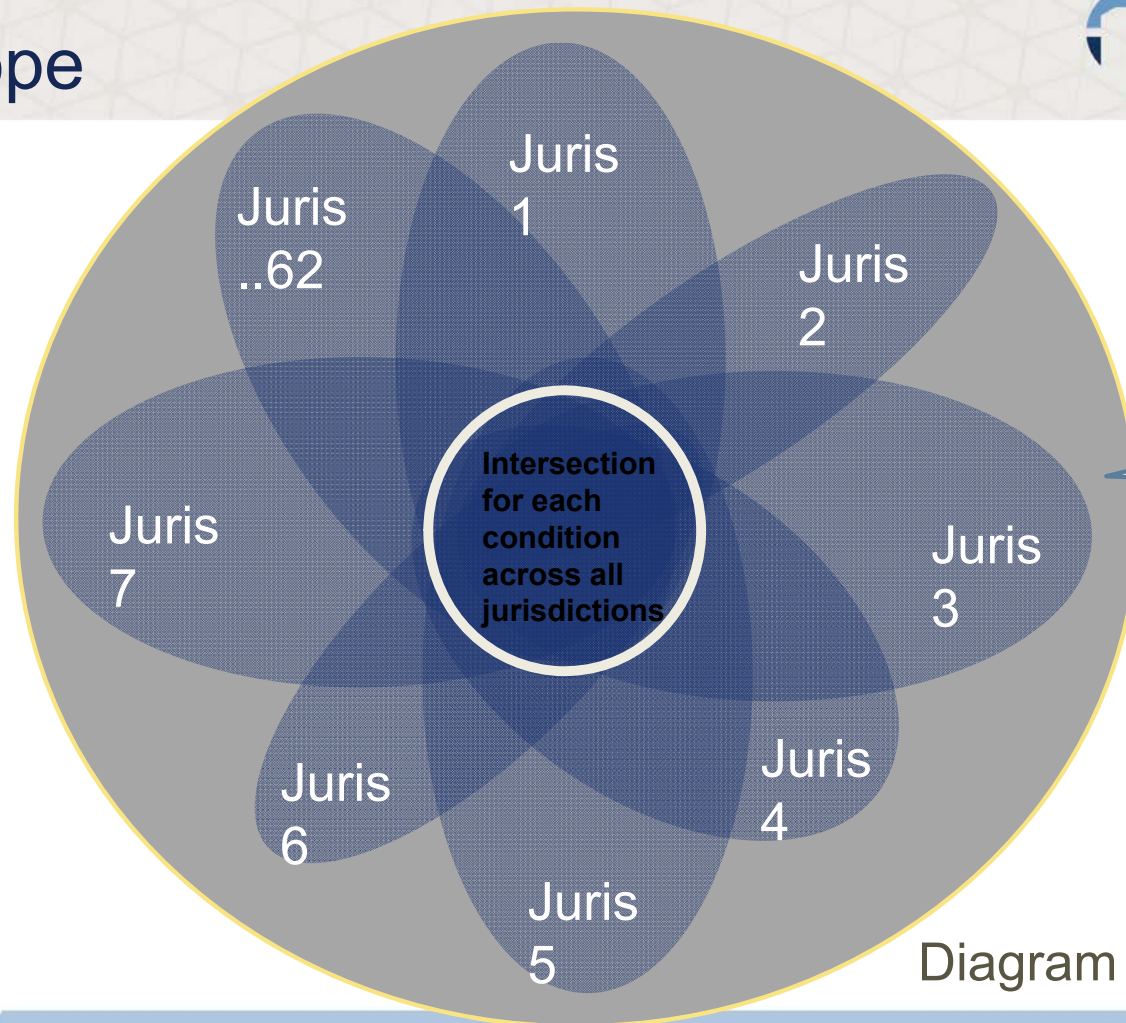
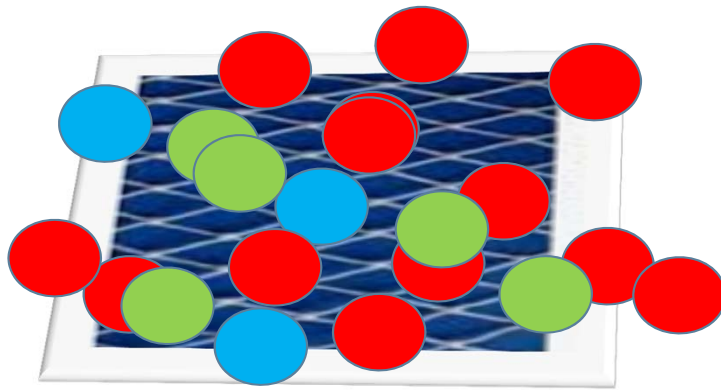
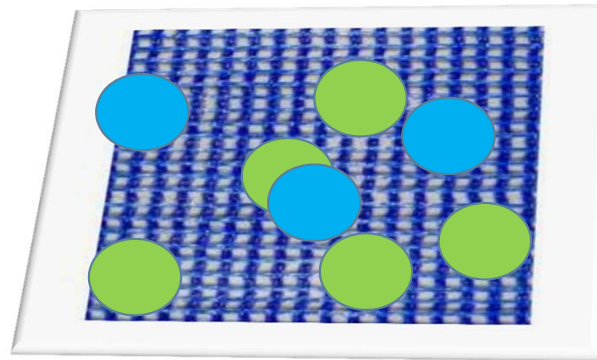


Diagram is Not to Scale

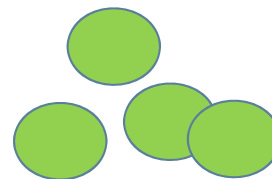


Clinical Care

- RCTC Course Net
- Looks at all encounter records and Filters for conditions that may be reportable



- PHDS Fine Net
- Determines reportability & jurisdiction(s) to receive report
- Determination returned to reporter (and PH when requested)



- Received by PHD
- Reports that meet the jurisdiction's requirements

Where Can I Get It? PHIN VADS



<https://phinvads.cdc.gov/vads/SearchVocab.action>

The screenshot shows the PHIN VADS SearchVocab.action page. The page has a dark blue header with the 'RCMT' logo and a 'Quick Search' button. Below the header, there are navigation links: 'All Vocabulary', 'Views (Msg. Guides)', 'Value Sets', 'Value Set Concepts', 'Code Systems', 'Code System Concepts', and 'Groups'. A search bar with a magnifying glass icon and a 'Search All Vocabulary' button is also present. On the left side, there is a sidebar with 'Related Links' (PHIN Vocabulary Services, Quick Links / Mapping Tools, Community of Practice (VMCoP), External Standards Resources, Message Guides, Developer's Guide) and 'Downloads' (Code System Representation [PDF-420KB], CSTE Technical Implementation Guide, Vocabulary Review [ZIP]). The main content area is titled 'PHIN VADS Hot Topics' and features a list of topics with expand/collapse buttons. The topics are: Arboviral Case Notification, Zika virus disease associated Lab Vocabulary (ELR), Zika vocabulary for EHR and Health IT vendors, RCMT, Reportable Conditions Trigger Codes (RCTC), ICD-10, and Meaningful Use Healthcare Provider Reporting to Central Cancer Registries. The 'Reportable Conditions Trigger Codes (RCTC)' item is circled in red.

Content Version: 2016.02.18

[Release Notes](#) [PDF-80KB]

[Contact Us](#)

[Subscribe](#)

Related Links

- PHIN Vocabulary Services
- Quick Links / Mapping Tools
- Community of Practice (VMCoP)
- External Standards Resources
- Message Guides
- Developer's Guide

Downloads

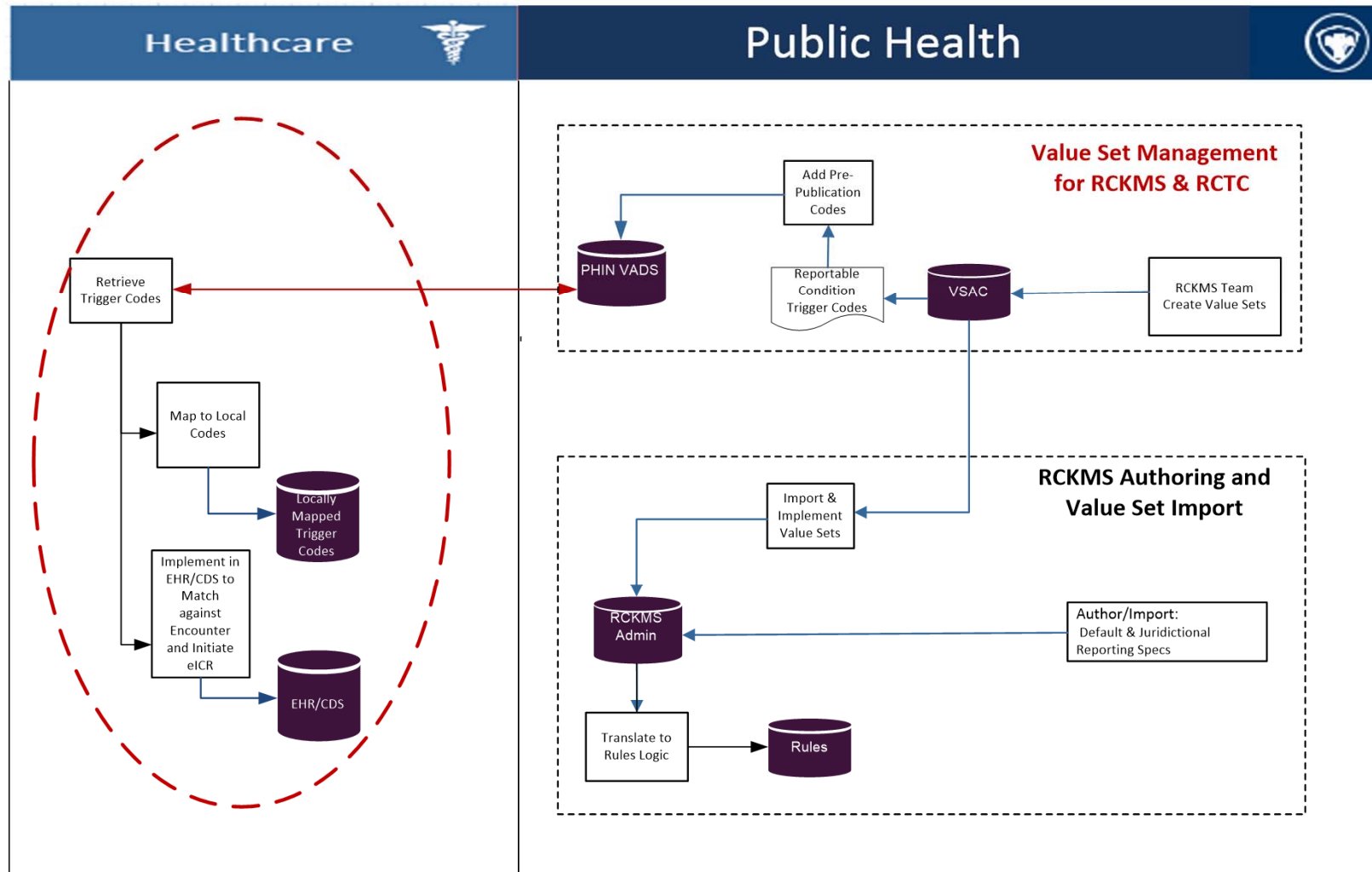
- Code System Representation [PDF-420KB]
- CSTE Technical Implementation Guide
- Vocabulary Review [ZIP]

PHIN VADS Hot Topics

[Expand All +](#) [Collapse All -](#)

- Arboviral Case Notification +
- Zika virus disease associated Lab Vocabulary (ELR) +
- Zika vocabulary for EHR and Health IT vendors +
- RCMT +
- Reportable Conditions Trigger Codes (RCTC) +**
- ICD-10 +
- Meaningful Use Healthcare Provider Reporting to Central Cancer Registries +

EHR Implementation of Trigger Codes



Scenario



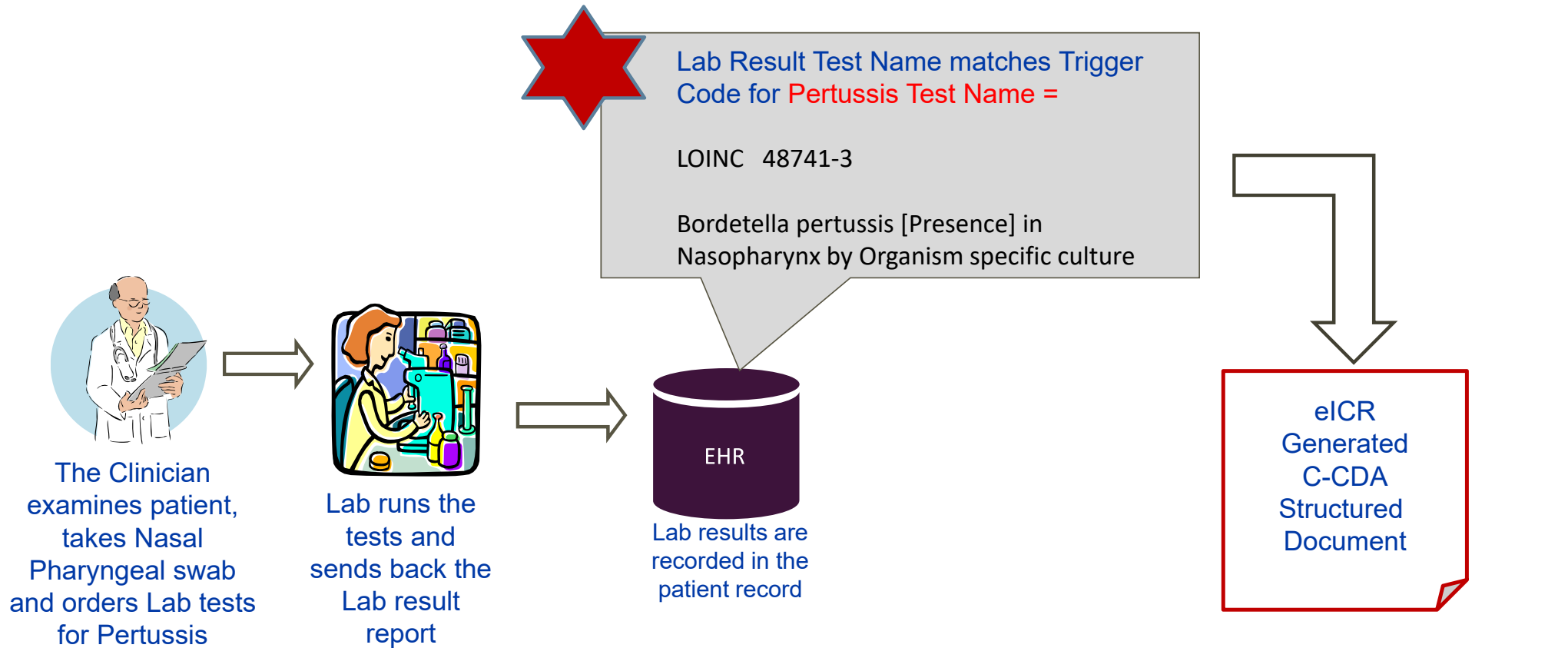
Scenario



On 8/2/2016, a 5 year old male Asian child Ravi Roy

- Birth date 12/27/2010 in US
- 75.44 cm tall
- Weighs 37 kg.
- The child resides at 497 E. Tussis Lane, Montgomery, AL 36105.
- Presents to the pediatrician with a persistent cough.
 - The cough has persisted for 17 days.
 - The child does not exhibit post-tussive vomiting
 - Paroxysmal cough was not reported.
- Pediatrician, Dr. Barry Smith:
 - Suspects pertussis
- Nasal pharyngeal swab sample is collected
- 8/2/2016 - Places an order for Bordetella Pertussis culture, which is sent to reference lab.
- ❖ 8/8/2016 – Results are returned from the lab and recorded in the patient's encounter record
- ❖ 8/9/2016 – The clinician reviews the lab results and records a final diagnosis of Whooping Cough Due to Bordetella Pertussis

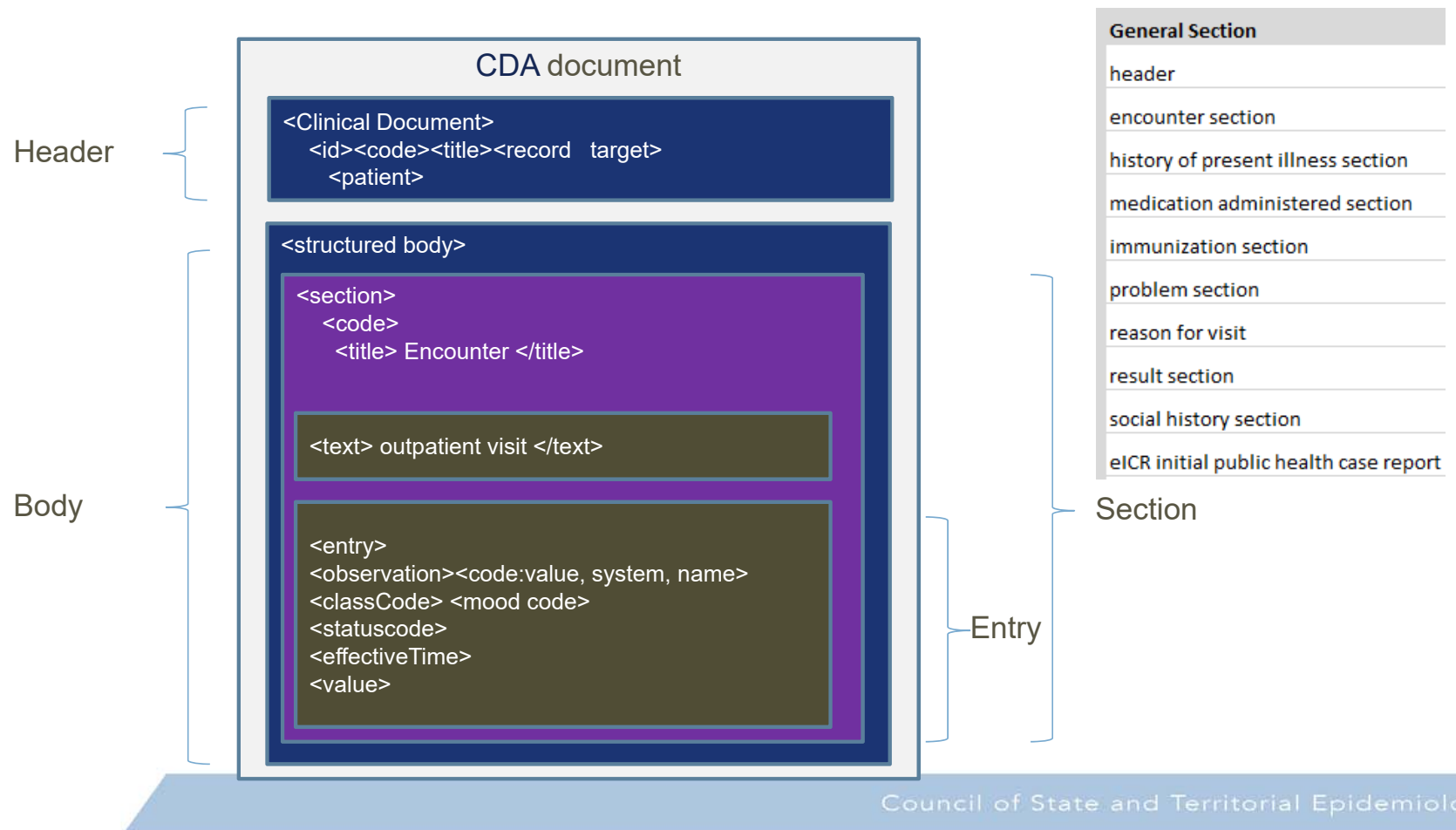
PHCR Use Case

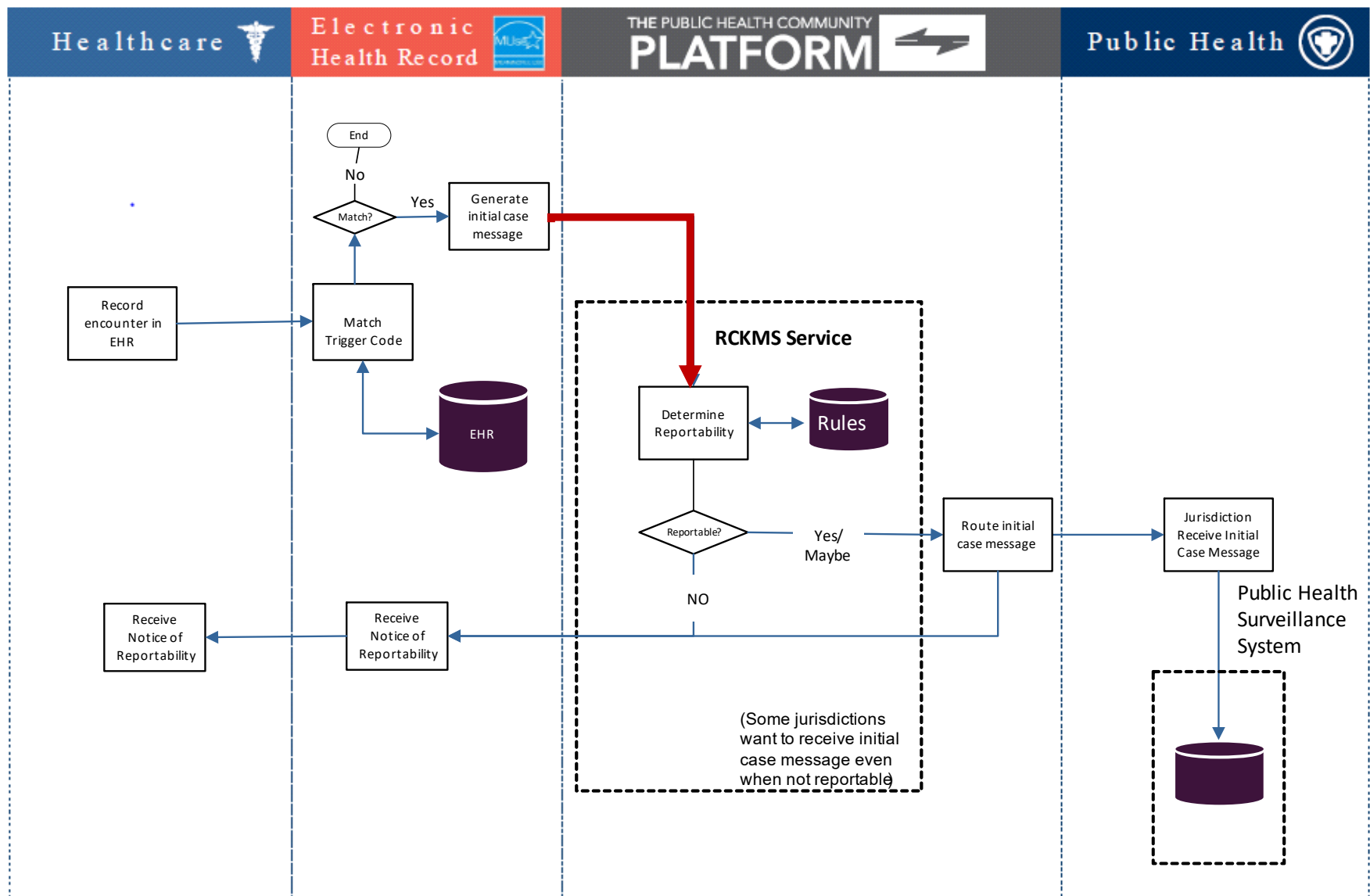


eICR Data

Question (Name) (LOINC codes)	Answer (Value)	Data Type	Code System
HEADER			
Last name	Roy	Text	
Date of birth	08/02/2011	date	
Race	Asian	coded	Race & ethnicity - CDC
Gender	Male	coded	HL7 Administrative Gender
City	Montgomery	coded	
State	Alabama	coded	FIPS 5-2 (State)
Zip	36105	coded	
Facility			
Facility name	Community Health and Hospitals	coded	
Facility street address	11000 Lakeside Drive	coded	
Facility city	Montgomery	coded	
Facility state	AL	coded	FIPS 5-2 (State)
Facility zip	Montgomery	coded	
Facility city	36105	coded	
Encounter			
History of Encounters 46240-8	Office outpatient visit 15 minutes	coded	CPT-4
Diagnosis		coded	SNOMED-CT /IDC-10
problem		coded	SNOMED-CT
Reason for visit 29299-5			
	Persistent Cough	text	
Relevant diagnostic tests and/or laboratory data 30954-2			
Bordetella pertussis [Presence] in Nasopharynx by Organism specific culture 48741-3	positive	coded	SNOMED-CT

The eICR





Processing eICR through RCKMS Tool

eICR Data

Question (Name) (LOINC codes)	Answer (Value)	Data Type	Code System
HEADER			
Last name	Roy	Text	
Date of birth	08/02/2011	date	
Race	Asian	coded	Race & ethnicity - CDC
Gender	Male	coded	HL7 Administrative Gender
City	Montgomery	coded	
State	Alabama	coded	FIPS 5-2 (State)
Zip	36105	coded	
Facility			
Facility name	Community Health and Hospitals	coded	
Facility street address	11000 Lakeside Drive	coded	
Facility city	Montgomery	coded	
Facility state	AL	coded	FIPS 5-2 (State)
Facility zip	Montgomery	coded	
Facility city	36105	coded	
Encounter			
History of Encounters 46240-8	Office outpatient visit 15 minutes	coded	CPT-4
Diagnosis		coded	SNOMED-CT /IDC-10
problem		coded	SNOMED-CT
Reason for visit 29299-5			
	Persistent Cough	text	
Relevant diagnostic tests and/or laboratory data 30954-2			
Bordetella pertussis [Presence] in Nasopharynx by Organism specific culture 48741-3	positive	coded	SNOMED-CT

Key Data and Steps for RCKMS Tool



- Translate **eICR to vMR** (used by OpenCDS)
- Determine **Reporter Type** (Lab, Provider/Facility, Vital Records)
- Identify **Jurisdictions**
- Determine **Jurisdiction Reporting Preferences**
 - Report if Patient is a Resident of Jurisdiction
 - Report if Care is Provided in Jurisdiction
 - Report if Lab is Located in Jurisdiction
- Run Jurisdiction's **Reporting Specifications** for Reporter Type
- Identify **Conditions** that are Reportable for the applicable Jurisdictions
- Return **Notice of Reportability (NOR)** back to Reporter and Jurisdiction

eICR to vMR Translation



- OpenCDS uses HL7 Virtual Medical Record (vMR) for modeling of rules
- RCKMS conducts an eICR to vMR Translation

HEADER			vMR
Facility name	Community Health and Hospitals	coded	N/A
Facility street address	11000 Lakeside Drive	coded	<facility><address>
Facility city	Montgomery	coded	
Facility state	AL	coded	
Facility zip	Montgomery	coded	
Facility city	36105	coded	
Encounter			
Diagnosis Encounter		coded	<encounterEvent> <relatedClinicalStatement> <problem>
problem		coded	
Relevant diagnostic tests and/or laboratory data 30954-2			
Bordetella pertussis [Presence] in Nasopharynx by Organism specific culture 48741-3	positive	coded	<observationOrders> <observationOrder> <relatedClinicalStatement> <observationResult>

Determine Reporter Type



- Method of determination yet to be finalized
- For now, RCKMS Tool maps HL7 Facility Code <location> <healthCareFacility> <code> to vMR PROVIDER_FACILITY or LAB_FACILITY for <cdsSystemUserType>

HL7 Level	HL7 Facility Code	HL7 Facility Code Display	vMR cdsSystemUser Type
4	<u>DX</u>	Diagnostics or therapeutics unit	PROVIDER_FACILITY
5	<u>CVDX</u>	Cardiovascular diagnostics or therapeutics unit	PROVIDER_FACILITY
6	<u>CATH</u>	Cardiac catheterization lab	LAB_FACILITY
6	<u>ECHO</u>	Echocardiography lab	LAB_FACILITY
5	<u>GIDX</u>	Gastroenterology diagnostics or therapeutics lab	LAB_FACILITY
6	<u>ENDOS</u>	Endoscopy lab	LAB_FACILITY
5	<u>RADDX</u>	Radiology diagnostics or therapeutics unit	PROVIDER_FACILITY
6	<u>RADO</u>	Radiation oncology unit	PROVIDER_FACILITY
6	<u>RNEU</u>	Neuroradiology unit	PROVIDER_FACILITY
4	<u>HOSP</u>	Hospital	PROVIDER_FACILITY
5	<u>CHR</u>	Chronic Care Facility	

Epidemiologists

Determine Jurisdiction



- Determine Jurisdictions by Patient Address and Reporter Address

Question (Name) (LOINC codes)	Answer (Value)	Data Type	Code System
HEADER			
Last name	Roy	Text	
Date of birth	08/02/2011	date	
Race	Asian	coded	Race & ethnicity - CDC
Gender	Male	coded	HL7 Administrative Gender
City	Montgomery	coded	
State	Alabama	coded	FIPS 5-2 (State)
Zip	36105	coded	
Facility			
Facility name	Community Health and Hospitals	coded	
Facility street address	11000 Lakeside Drive	coded	
Facility city	Montgomery	coded	
Facility state	AL	coded	FIPS 5-2 (State)
Facility zip	Montgomery	coded	
Facility city	36105	coded	
Encounter			
History of Encounters 46240-8	Office outpatient visit 15 minutes	coded	CPT-4

Alabama Reporting Preferences



- **Determine Jurisdiction Reporting Preferences**

- Report if Patient is a Resident of Jurisdiction = Yes
- Report if Care is Provided in Jurisdiction = Yes
- Report if Lab is Provided in Jurisdiction = No

Reportable Condition Details

Status: Active (Published) ▼

Effective Start Date: 08/21/2016



Assigned To: Maiko Minami ▼

Effective End Date:



Report if Care Provided in Your Jurisdiction? ☒

Report if Performing Lab Located in Your Jurisdiction? ☐

Report if Patient Resident of Your Jurisdiction? ☒

Alabama Reporting Criteria

Patient record being evaluated contains evidence of:		(1)	(2)	(3)	(4)	
Criterion Description		LAB	DX	CLIN	CLIN + EPI	
Clinical	C					
Pertussis (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	D		S			
Pertussis suspected (i.e., documented as a 'reason for study')	J			S		
Cough (any duration)	D			N	N	
At least one of the following symptoms: Inspiratory Whoop, paroxysmal cough, or post-tussive vomiting	D			N		
Apnea	J					
Currently pregnant	J					
Laboratory	C					
Isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen	D	S	S			
Detection of <i>Bordetella Pertussis</i> nucleic acid by any method in a clinical specimen	D	S	S			
Detection of <i>Bordetella pertussis</i> antigen by any method in a clinical specimen	D	S	S			
Detection of <i>Bordetella pertussis</i> antibody by any method in a clinical specimen	D	S	S			
All result values for laboratory tests specific for detecting <i>Bordetella Pertussis</i> species organisms, nucleic acid, or antigen by any method in a clinical specimen (i.e., 'negative' and 'positive' results)	J	S				
Lab test ordered for isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen (i.e., diagnostic tests)	J	S				
Lab test ordered for detection of <i>Bordetella Pertussis</i> nucleic acid by any method from a clinical specimen (i.e., diagnostic tests)	J	S				
Lab test ordered for detection of <i>Bordetella Pertussis</i> antigen by any method from a clinical specimen	J	S				
Lab test ordered for detection of <i>Bordetella Pertussis</i> antibody by any method from a clinical specimen	J	S				
Demographic	C					
Age < = 1 years	J					
Age < = 2 years	J					
Epidemiologic	C					
Contact of a person diagnosed with pertussis	D				O	
Member of a defined risk group during an outbreak	D				O	
Vital Records	C					
Death certificate lists pertussis as a cause of death or a significant condition contributing to death	D					S

Report based on
Test Results

Alabama Reporting Specifications



Laboratory	C			
Isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen	D	S	S	
Detection of <i>Bordetella Pertussis</i> nucleic acid by any method in a clinical specimen	D	S	S	
Detection of <i>Bordetella pertussis</i> antigen by any method in a clinical specimen	D	S	S	
Detection of <i>Bordetella pertussis</i> antibody by any method in a clinical specimen	D	S	S	

Report based
on Test Results

Reporting Specifications in RCKMS Tool



Manage Reportable Condition - [Save Option 3]

Condition Details

Setup Reporting Criteria

Define Reporting Specifications

Links and References

Test Cases

Manage Default Logic Sets

Logic Set Properties	Lab Reporting Logic Sets		Provider/Facility Log	
	Lab1	Lab	DX	
Reporting Timeframe	1 day(s)	3 day(s)	3 day(s)	

Define Default Reporting Specifications

Clinical

Apnea			
At least one of the following symptoms: Inspiratory Whoop, paroxysmal cough, or post-tussive vomiting			
Cough (≥ 14 days)			
Cough (any duration)			
Currently pregnant			
Pertussis			Sufficient

Criteria and Rule Fired in RCKMS Tool



Condition Criteria Editor - [Save Option 3]

ID: 7dc633a41e2a672644ee9ecdea136f63

Source Criteria Name: Isolation of [organism] by any method in a clinical specimen

Label:

Criteria Predicate List (# of Results: 5)

Predicate

▼ Group 1 {


Patient has an organism-specific lab test performed ==  Bordetella pertussis Organism Identification Test (RCKMSQ12)

AND


▼ {

Lab Result Value (ordinal) ==  Positive qualitative lab result (RCKMS4a)

OR

Lab Result Value (nominal) ==  Lab Result Value (Pertussis) (RCKMS1d)

OR

Interpretation ==  Abnormal Interpretation (RCKMS5a)

}

}

OR

▼ {

Drill Down to Value Set and Code in RCKMS



Value Set Editor - [Save Option 3]

Value Set Details

Version Info

Related Code System Codes

Subvalue Set

Code System Code Relationships (# of Results: 6) - [Lazy Loaded Inline]

New

Code System	Code	Options
LOINC 2.16.840.1.113883.6.1	43890-3 - Bordetella pertussis [Presence] in Sputum by Organism specif p	🗑
LOINC 2.16.840.1.113883.6.1	43896-0 - Bordetella pertussis [Presence] in Pleural fluid by Organism p	🗑
LOINC 2.16.840.1.113883.6.1	48741-3 - Bordetella pertussis [Presence] in Nasopharynx by Organism s p	🗑
LOINC 2.16.840.1.113883.6.1	548-8 - Bordetella pertussis [Presence] in Throat by Organism specif p	🗑
LOINC 2.16.840.1.113883.6.1	549-6 - Bordetella pertussis [Presence] in Unspecified specimen by O p	🗑
LOINC 2.16.840.1.113883.6.1	78921-4 - Bordetella pertussis and Bordetella parapertussis DNA and cu p	🗑

15 ▼



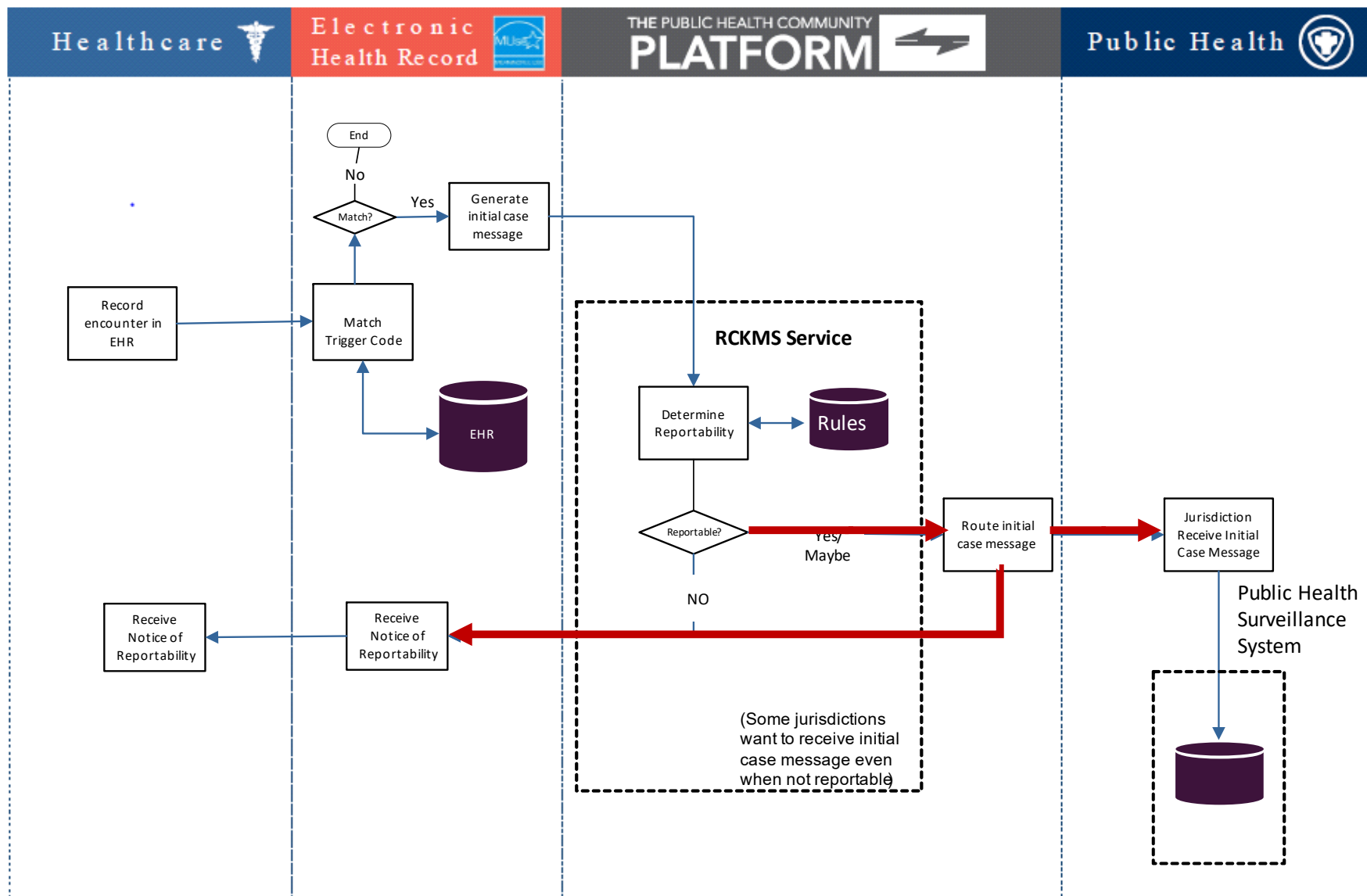
(1 of 1)



Notice of Reportability (NOR) from RCKMS



```
<rckmsOutput xmlns="org.cdsframework.rckms.output" requestDate="2016-08-23-04:00">
  <reportingJurisdiction jurisdiction="Alabama">
    <criteriaId>Isolation of Bordetella pertussis by any method in a clinical specimen</criteriaId>
    <serviceResponseCode>200</serviceResponseCode>
    <serviceResponseMessage>Jurisdiction request completed successfully for Alabama</serviceResponseMe
    <output>PD94bWwgdmVyc2lrbj0iMS4wIiBlbmNvZGluZz0iVVRGLTgiIHN0YW5kYWxvbmU9InllcyI/Pgo8bnMzMzOmNkc091dH
    <reportingCondition reportable="Yes">
      <conditionCode>10190</conditionCode>
      <conditionDisplayName>Pertussis</conditionDisplayName>
      <conditionCodeSystem>2.16.840.1.114222.4.5.277</conditionCodeSystem>
    </reportingCondition>
```

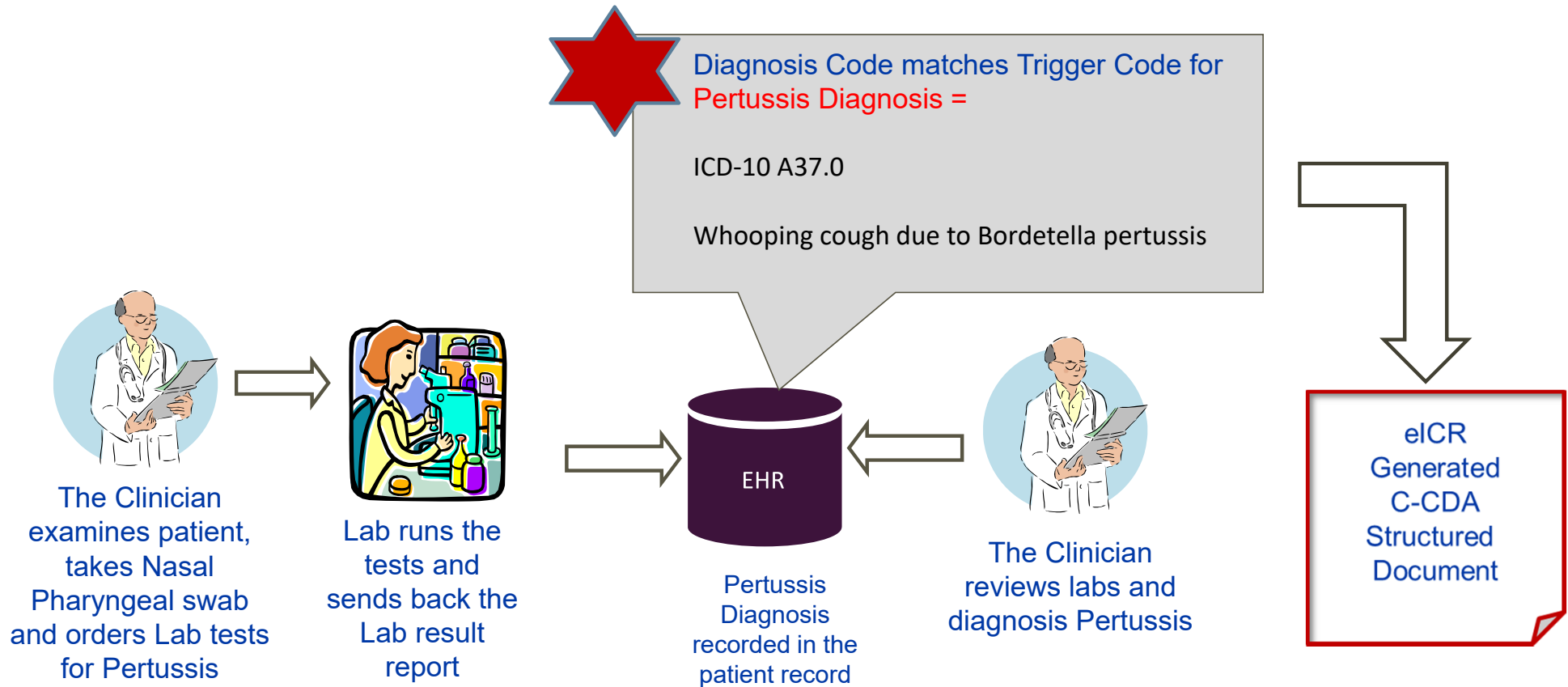


Alabama Reporting Criteria

Patient record being evaluated contains evidence of:		(1)	(2)	(3)	(4)	
Criterion Description		LAB	DX	CLIN	CLIN + EPI	
Patient record being evaluated contains evidence of:		LAB	DX	CLIN	CLIN + EPI	
Criterion Description		LAB	DX	CLIN	CLIN + EPI	
Clinical	C					
Pertussis (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	D		S			
Cough (any duration)	D			N	N	
At least one of the following symptoms: Inspiratory Whoop, paroxysmal cough, or post-tussive vomiting	D			N		
Currently pregnant	J					
Isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen	D	S	S			
Detection of <i>Bordetella Pertussis</i> nucleic acid by any method in a clinical specimen	D	S	S			
Detection of <i>Bordetella pertussis</i> antigen by any method in a clinical specimen	D	S	S			
Detection of <i>Bordetella pertussis</i> antibody by any method in a clinical specimen	D	S	S			
Lab test ordered for isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen (i.e., diagnostic tests)	J		S			
Lab test ordered for detection of <i>Bordetella Pertussis</i> antigen by any method from a clinical specimen	J		S			
Lab test ordered for detection of <i>Bordetella Pertussis</i> antibody by any method from a clinical specimen	J		S			
Demographic	C					
Age <= 1 years	J					
Age <= 2 years	J					
Epidemiologic	C					
Contact of a person diagnosed with pertussis	D				O	
Member of a defined risk group during an outbreak	D				O	
Vital Records	C					
Death certificate lists pertussis as a cause of death or a significant condition contributing to death	D					S

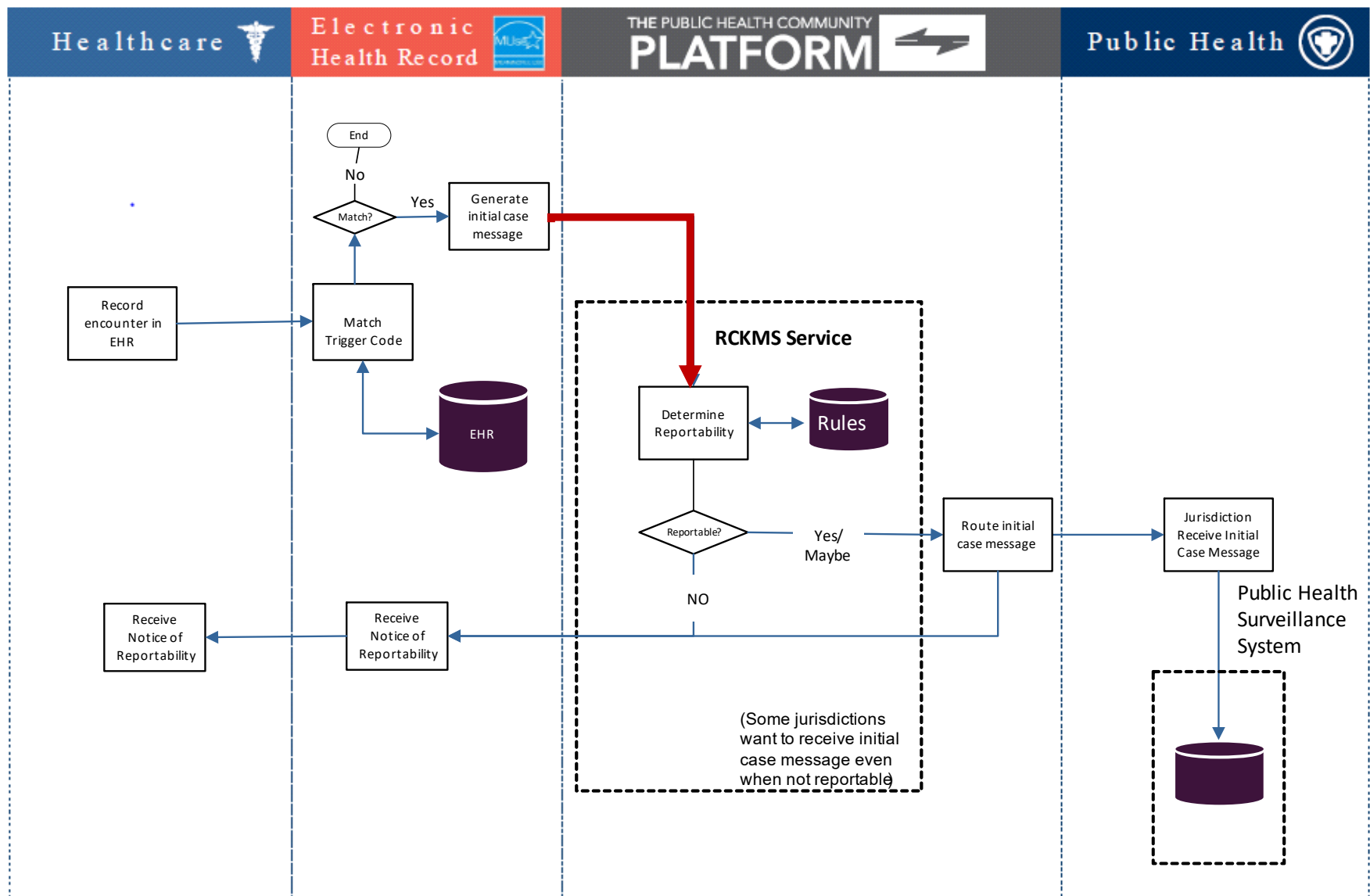
Report based on
Test Results

PHCR Use Case



eICR Data

Question (Name) (LOINC codes)	Answer (Value)	Data Type	Code System
HEADER			
Last name	Roy	Text	
Date of birth	08/02/2011	date	
Race	Asian	coded	Race & ethnicity - CDC
Gender	Male	coded	HL7 Administrative Gender
City	Montgomery	coded	
State	Alabama	coded	FIPS 5-2 (State)
Zip	36105	coded	
Facility			
Facility name	Community Health and Hospitals	coded	
Facility street address	11000 Lakeside Drive	coded	
Facility city	Montgomery	coded	
Facility state	AL	coded	FIPS 5-2 (State)
Facility zip	Montgomery	coded	
Facility city	36105	coded	
Encounter			
History of Encounters 46240-8	Office outpatient visit 15 minutes	coded	CPT-4
Diagnosis A37.0	Whooping cough due to Bordetella pertussis [A37.0]	coded	IDC-10
problem		coded	SNOMED-CT
Reason for visit 29299-5			
	Persistent Cough	text	
Relevant diagnostic tests and/or laboratory data 30954-2			
Bordetella pertussis [Presence] in Nasopharynx by Organism specific culture 48741-3	positive	coded	SNOMED-CT



Criteria and Rule Fired in RCKMS Tool



Condition Criteria Editor - [Save Option 3]

ID: d28d6fac97536e05a745eb7b4be96160

Source Criteria Name: [Reportable condition]

Label:

Criteria Predicate List (# of Results: 3)

Predicate

Patient Record Contains a Diagnosis or Problem Entry ==  Pertussis (RCKMS5d)

AND

Status ==  Active (active)

Drill Down to Value Set and Code in RCKMS



Value Set Editor - [Save Option 3]

Value Set Details

Version Info

Related Code System Codes

Subvalue Set

Code System Code Relationships (# of Results: 11) - [Lazy Loaded Inline]

New

Code System	Code	Options
SNOMED-CT 2.16.840.1.113883.6.96	192650000 - Meningitis caused by pertussis (disorder) P	P
SNOMED-CT 2.16.840.1.113883.6.96	27836007 - Pertussis (disorder) P	P
SNOMED-CT 2.16.840.1.113883.6.96	408682005 - Healthcare associated pertussis (disorder) P	P
SNOMED-CT 2.16.840.1.113883.6.96	59475000 - Pneumonia in pertussis (disorder) P	P
ICD-10 CM Diagnosis 2.16.840.1.113883.6.90	A37.0 - Whooping cough due to Bordetella pertussis P	P
ICD-10 CM Diagnosis 2.16.840.1.113883.6.90	A37.00 - Whooping cough due to Bordetella pertussis without pneumonia P	P
ICD-10 CM Diagnosis 2.16.840.1.113883.6.90	A37.01 - Whooping cough due to Bordetella pertussis with pneumonia P	P
ICD-10 CM Diagnosis 2.16.840.1.113883.6.90	A37.9 - Whooping cough, unspecified species P	P
ICD-10 CM Diagnosis 2.16.840.1.113883.6.90	A37.90 - Whooping cough, unspecified species without pneumonia P	P
ICD-10 CM Diagnosis 2.16.840.1.113883.6.90	A37.91 - Whooping cough, unspecified species with pneumonia P	P
SNOMED-CT 2.16.840.1.113883.6.96	271567008 - Whooping cough-like syndrome (disorder) P	P

15 ▾



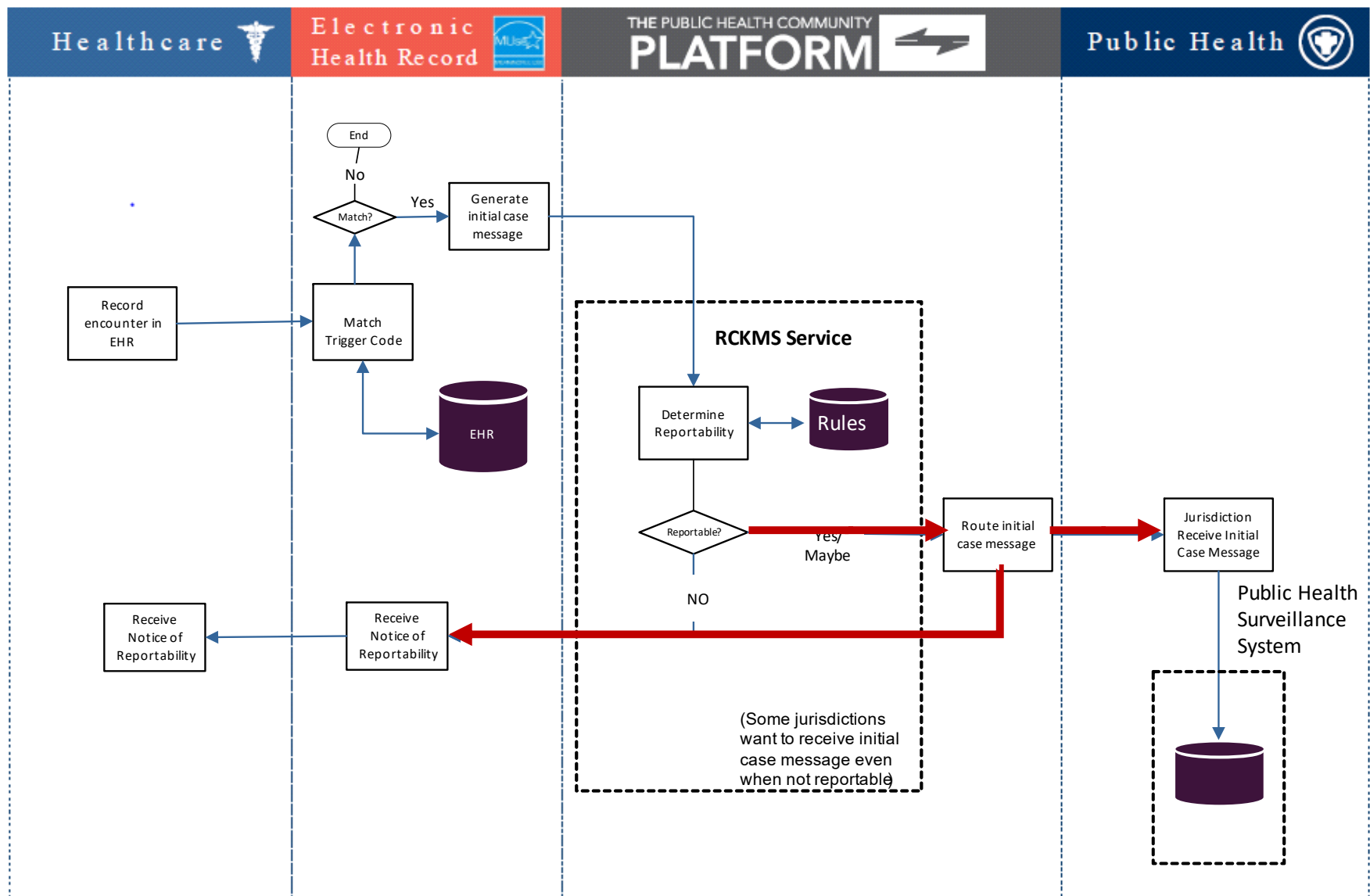
(1 of 1)



Notice of Reportability (NOR) from RCKMS



```
<rckmsOutput xmlns="org.cdsframework.rckms.output" requestDate="2016-08-23-04:00">
  <reportingJurisdiction jurisdiction="Alabama">
    <criteriaId>The patient record being evaluated contains evidence of Pertussis</criteriaId>
    <serviceResponseCode>200</serviceResponseCode>
    <serviceResponseMessage>Jurisdiction request completed successfully for Alabama</serviceRes
    <output>PD94bWwgdmVyc2lvdj0iMS4wIiBlbmNvZGluZz0iVVRGLTgiIHN0YW5kYWxvbmU9InllcyI/Pgo8bnMzOmM
    <reportingCondition reportable="Yes">
      <conditionCode>10190</conditionCode>
      <conditionDisplayName>Pertussis</conditionDisplayName>
      <conditionCodeSystem>2.16.840.1.114222.4.5.277</conditionCodeSystem>
    </reportingCondition>
```

Alabama Reporting Criteria

Patient record being evaluated contains evidence of:		(1)	(2)	(3)	(4)	
Criterion Description		LAB	DX	CLIN	CLIN + EPI	
Clinical	C					
Pertussis (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	D		S			
Pertussis suspected (i.e., documented as a 'reason for study')	J			S		
Cough (any duration)	D			N	N	
At least one of the following symptoms: Inspiratory Whoop, paroxysmal cough, or post-tussive vomiting	D			N		
Apnea	J					
Currently pregnant	J					
Laboratory	C					
Isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen	D	S	S			
Detection of <i>Bordetella Pertussis</i> nucleic acid by any method in a clinical specimen	D	S	S			
Detection of <i>Bordetella pertussis</i> antigen by any method in a clinical specimen	D	S	S			
Detection of <i>Bordetella pertussis</i> antibody by any method in a clinical specimen	D	S	S			
All result values for laboratory tests specific for detecting <i>Bordetella Pertussis</i> species organisms, nucleic acid, or antigen by any method in a clinical specimen (i.e., 'negative' and 'positive' results)	J	S				
Lab test ordered for isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen (i.e., diagnostic tests)	J	S				
Lab test ordered for detection of <i>Bordetella Pertussis</i> nucleic acid by any method from a clinical specimen (i.e., diagnostic tests)	J	S				
Lab test ordered for detection of <i>Bordetella Pertussis</i> antigen by any method from a clinical specimen	J	S				
Lab test ordered for detection of <i>Bordetella Pertussis</i> antibody by any method from a clinical specimen	J	S				
Demographic	C					
Age < = 1 years	J					
Age < = 2 years	J					
Epidemiologic	C					
Contact of a person diagnosed with pertussis	D				O	
Member of a defined risk group during an outbreak	D				O	
Vital Records	C					
Death certificate lists pertussis as a cause of death or a significant condition contributing to death	D					S

Report based on
Diagnosis

Jurisdictional Localizations



- In the 2014/2015 pilot, lab test orders for Bordetella Pertussis were of interest to PH
- In to 2015/2016 Content Vetting of Pertussis lab order criteria were determined to be optional – wanted by some jurisdictions, but not by others
 1. Variation existed across jurisdictions
 2. Criterion for orders was activated during an outbreak



Is this encounter done?

Timeline and Next Steps



Timeline & Next Steps



- August - RCKMS deployed on AIMS Platform!!!
- September - On-boarding prioritized for pilot jurisdictions
- September – Value Set and Rules Logic = round two vetting
- October – Value Sets for current reportable ready for vetting
- October/November – New version of RCTC
- October – December
 - Default logic established iteratively for subsequent sets of conditions in RCKMS
- Fall/Winter 2016 Training of Jurisdictions
- Jan-Mar – Entry of specifications for first 5 conditions

RCKMS Focus Group



Meeting Schedule

- Introductory Webinar 1, 8/2
- Introductory Webinar 2, 8/8
- RCKMS Focus Group Working Session, 8/21

13 Jurisdictions

- Alabama
- Arizona
- California
- Florida
- Houston (2)
- Illinois
- Massachusetts (3)
- New York City
- Southern Nevada Health District
- Utah (2)
- Virginia
- Washington (2)
- Wisconsin

Workshop Objectives



By the end of the session, workshop participants will be able to:

- Understand how to use the default reporting specifications provided by RCKMS
- Run test cases against the default reporting specifications provided by RCKMS
- Use the Authoring Interface to accept default specifications or author jurisdictional reporting specifications

Usability Feedback



Recommendations for additional functionality

- Enhancements to Authoring Reporting Specifications grid
 - Freezing top row to retain context
 - Greying out clinical parts of grid to prevent invalid entries for lab logic sets
 - Adding intra-logic set validation to prevent invalid entries
 - Add additional “flavors” of Optional
 - Allow copying of logic sets
 - Support moving of criteria to different logic set

Usability Feedback, cont.



Recommendations for additional functionality

- More user guidance within tool – balloon help, online help
- Clarification of what information is to provide to reporters, versus what is for jurisdictional reference
- Test Manager - recommend Wizard for creating test cases
- Implement hierarchy for determination of jurisdiction(s)
 - Support for sub-state jurisdictional reporting
 - Address hierarchy for determining jurisdiction (e.g., if patient provider address missing, look at facility address)
- Reference document portal – internal and/or external sharing
- Include ability to report on criteria of any status and to revision history in reports

Other Feedback



- Guidance needed on how to translate human-readable reporting specifications to machine-processable ones
- Ability to see into value sets
- Balance between more “nimble” tool with less specific logic vs less nimble tool with more specific logic?
 - Depends on disease
 - For rare condition, with few false positives, may want broader reporting criteria (e.g., smallpox)
 - For common condition, with more false positives, may want to be more specific; concerns of volume (e.g., Lyme Disease)

Other Feedback, cont.



- Apply lessons learned from ELR
- “Realistic expectations”
 - Not all information will be automatable
 - Need for flexibility – regulations not always created with automated reporting in mind (Ex., new Zika regulations in Florida)
 - Need for immediate PH reporting via phone will persist (Ex., Still Zika in Florida)

Jurisdiction Input on Criteria



Pertussis Default + Jurisdictional Reporting Criteria

Patient record being evaluated contains evidence of:		(1)	(2)	(3)	(4)	
Criterion Description		LAB	DX	CLIN	CLIN + EPI	
Patient record being evaluated contains evidence of:		LAB	DX	CLIN	CLIN + EPI	
Criterion Description						
Clinical	C					
Pertussis (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	D		S			
Cough (any duration)	D			N	N	
At least one of the following symptoms: Inspiratory Whoop, paroxysmal cough, or post-tussive vomiting	D			N		
Currently pregnant	J					
Isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen	D	S	S			
Detection of <i>Bordetella Pertussis</i> nucleic acid by any method in a clinical specimen	D	S	S			
Detection of <i>Bordetella pertussis</i> antigen by any method in a clinical specimen	D	S	S			
Detection of <i>Bordetella pertussis</i> antibody by any method in a clinical specimen	D	S	S			
Lab test ordered for isolation of <i>Bordetella pertussis</i> by any method from a clinical specimen (i.e., diagnostic tests)	J					
Lab test ordered for detection of <i>Bordetella Pertussis</i> antigen by any method from a clinical specimen	J					
Lab test ordered for detection of <i>Bordetella Pertussis</i> antibody by any method from a clinical specimen	J					
Demographic	C					
Age <= 1 years	J					
Age <= 2 years	J					
Epidemiologic	C					
Contact of a person diagnosed with pertussis	D				O	
Member of a defined risk group during an outbreak	D				O	
Vital Records	C					
Death certificate lists pertussis as a cause of death or a significant condition contributing to death	D					S

For those of you who brought your specifications for Pertussis....



- Do the current default criteria for Pertussis meet your needs?
 - If not, do the current jurisdictional criteria meet your needs?
 - If not, what additional criteria do you need?

STEC Criteria

		PROPOSED - LOGIC SET					
		Lab Reporting	Provider / Facility Reporting				Vital Records
		(1)	(2)	(3)		(4)	
		LAB	DX	CLIN	CLIN +lab	EPI	
The patient record being evaluated contains evidence of:							
Criterion Description	Status						
Clinical	C						
Shiga toxin-producing <i>E. coli</i> (STEC) infection (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	P		S				
Diarrhea-associated Hemolytic uremic syndrome (HUS) (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	P		S				
Diarrhea, within 3 weeks prior to the current encounter	P			N			
Hemolytic uremic syndrome (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	P			O			
Thrombotic thrombocytopenic purpura (i.e., as a Diagnosis or active Problem or mentioned in text as a cause of death or a significant condition contributing to death)	P			O			
Diarrhea	N; P				N	N	
Laboratory	C						
Isolation of <i>E. coli</i> O157:H7 or O157 or Shiga toxin-producing <i>E. coli</i> by culture methods in a clinical specimen	R; P	S	S				
Detection of Escherichia coli shiga toxin or shiga-like toxin by Enzyme Immune Assay (EIA) methods in a stool specimen	P	S	S				
Detection of Shiga toxin-producing <i>E. coli</i> or <i>E. coli</i> O157 nucleic acid by any method in a clinical specimen	P	S	S				
Detection of Shiga toxin antigen by Enzyme Immune Assay (EIA) methods in a stool specimen	P	S	S				
Detection of 'elevated' Shiga toxin-producing serotype of <i>E. coli</i> antibodies by any method	?P				?N		
Demographic	C						
Epidemiologic	C						
Contact of a person diagnosed with STEC infection	N; P					O	

- Do the current default criteria for STEC meet your needs?
 - If not, what additional criteria do you need?

Thank you!

For any questions, contact rckms@cdc.gov