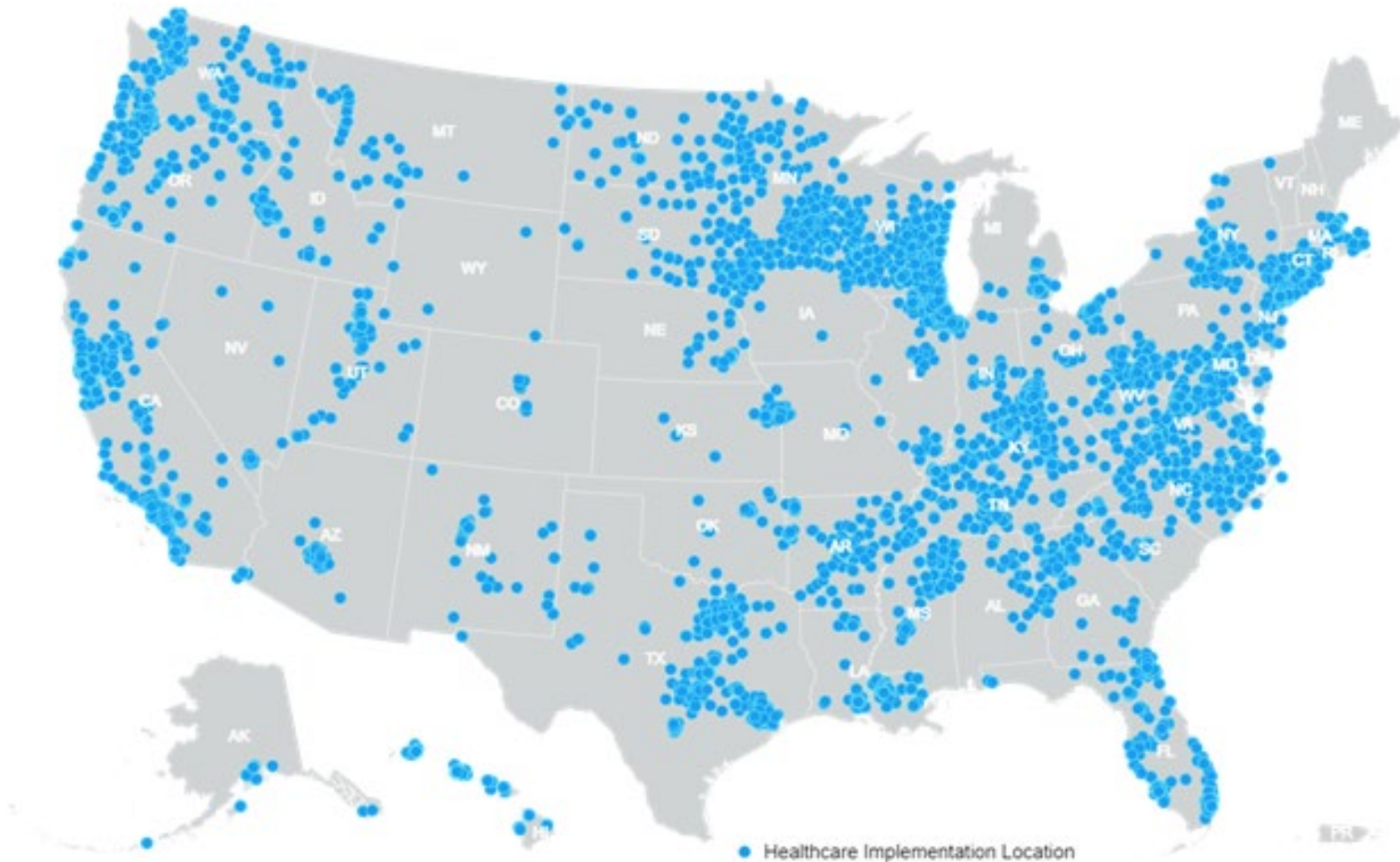# Electronic Case Reporting (eCR)
Interoperability and Standards Needs

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Adjunct Associate Professor,
Johns Hopkins Schools of Medicine and Public Health

eCR in Production Nationwide

>12,200

Facilities are in production for eCR (mostly for COVID-19)
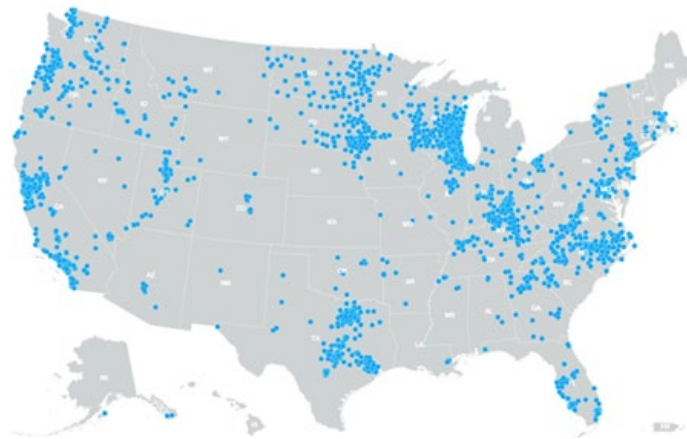
As of May 2, 2022

Source: CDC eCR Team
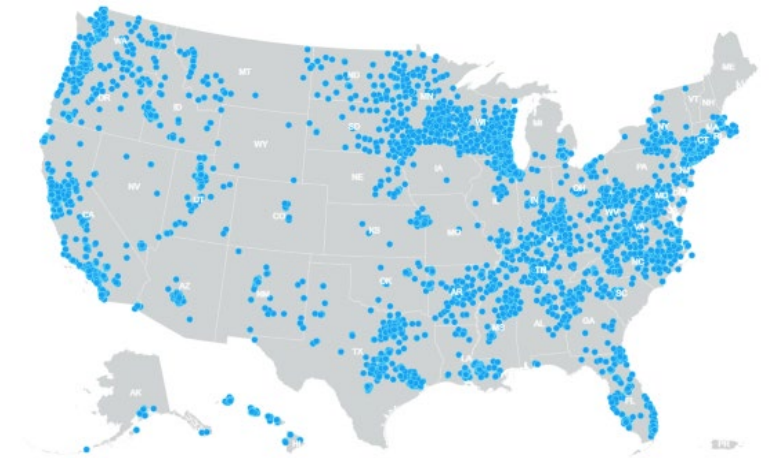
Healthcare's Use of eCR Widens Nationwide

On January 20, 2020,
187 facilities were using eCR for
5 pilot conditions

At the end of 2020,
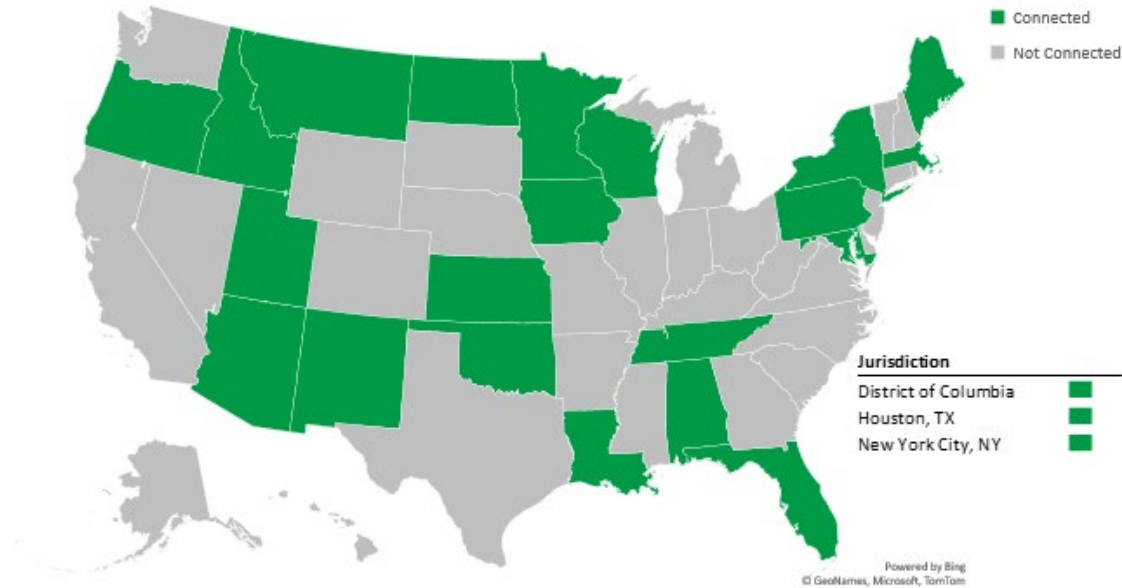over **6,500 facilities**
were using eCR for COVID-19

As of May 2, 2022,
over **12,000 facilities**
are using eCR for COVID-19

Over 19.1 million initial case reports have been sent from healthcare as of May 1, 2022
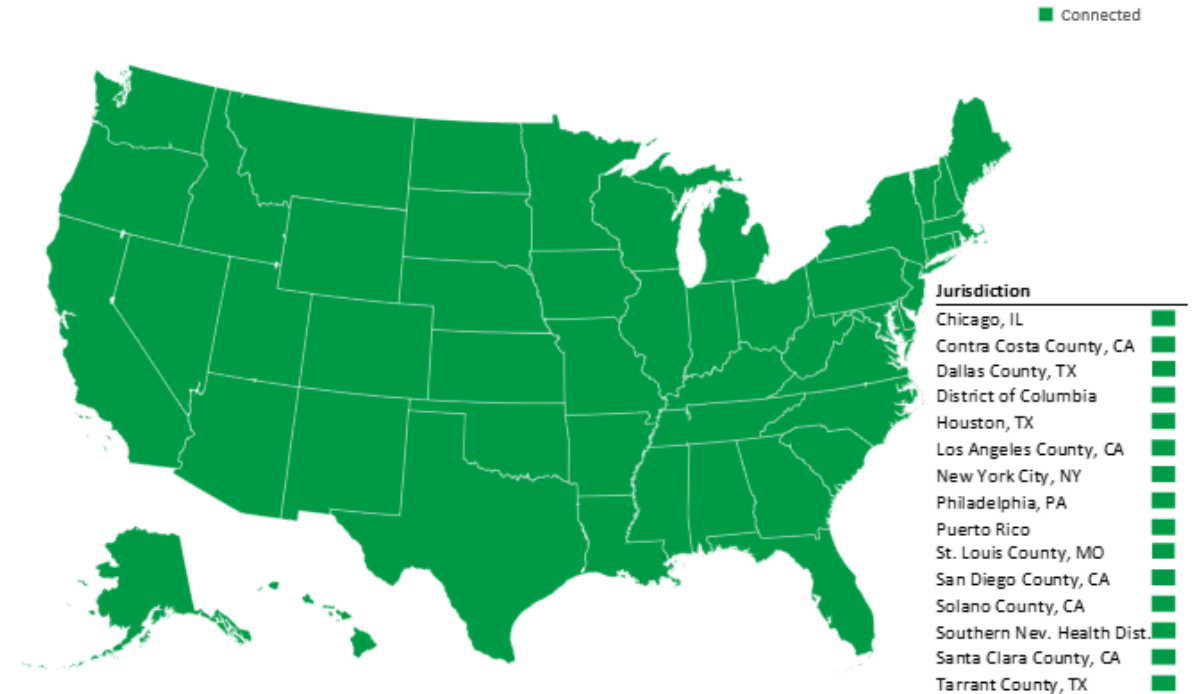
Public Health Agencies Expand eCR Capabilities

January 2020

Connected
Not Connected

Jurisdiction
District of Columbia
Houston, TX
New York City, NY

Powered by Bing
© GeoNames, Microsoft, TomTom

**21 states, Washington D.C., and
2 local jurisdictions**

August 2021

Connected

Jurisdiction
Chicago, IL
Contra Costa County, CA
Dallas County, TX
District of Columbia
Houston, TX
Los Angeles County, CA
New York City, NY
Philadelphia, PA
Puerto Rico
St. Louis County, MO
San Diego County, CA
Solano County, CA
Southern Nev. Health Dist.
Santa Clara County, CA
Tarrant County, TX

**All 50 states, Washington D.C.,
Puerto Rico, and 13 local jurisdictions**

Source: CDC eCR Team

eRSD - Triggering and Reporting Set-Up

Electronic Case Reporting (eCR)

Provider (EHR)

eCR Now FHIR App

eICR

RR

Health Information Networks and Health Information Exchanges for trust policy and, at times, data transport

Provider (EHR)

eICR

RR

eRSD System

CSTE / CDC Decision Support Engine (RCKMS)

APHL Platform (AIMS)

eICR

RR

Public Health Agency

Where care was provided

eICR

RR

Public Health Agency

Patient residence
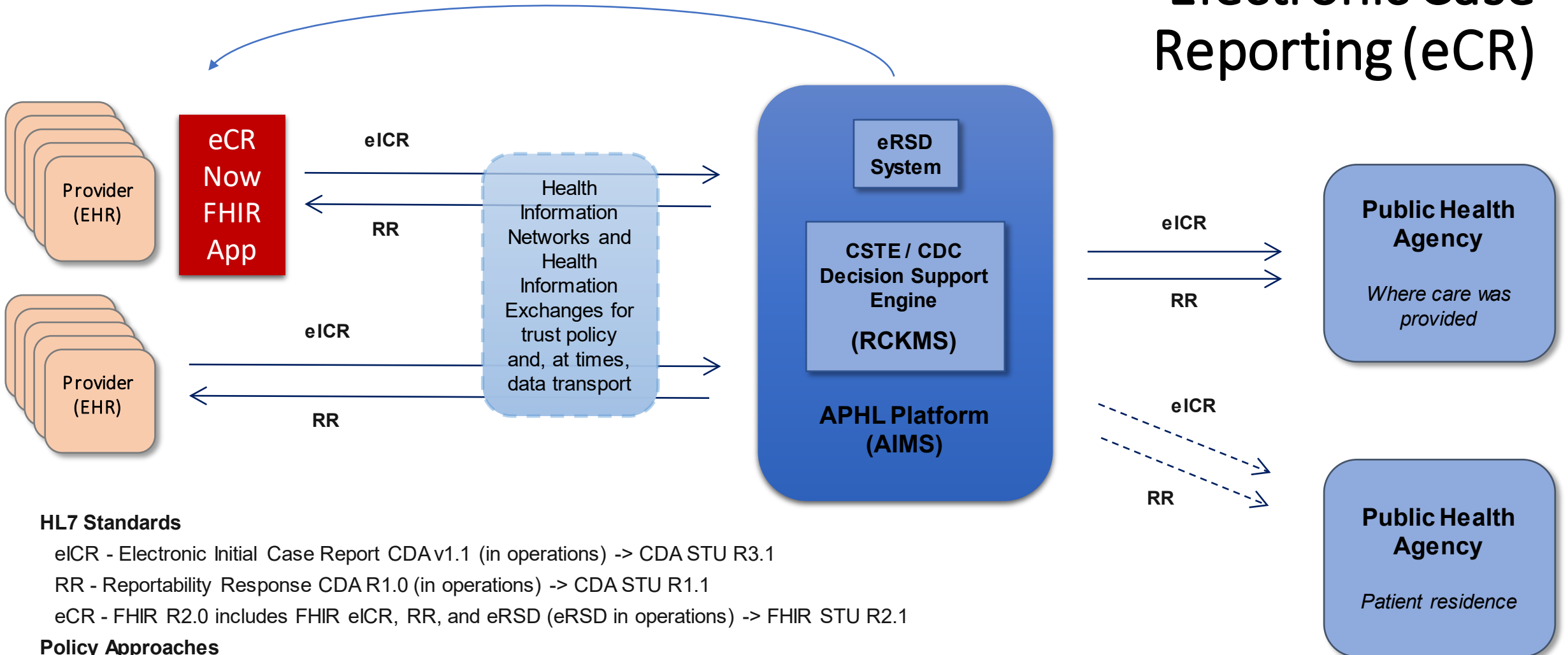
HL7 Standards

eICR - Electronic Initial Case Report CDA v1.1 (in operations) -> CDA STU R3.1

RR - Reportability Response CDA R1.0 (in operations) -> CDA STU R1.1

eCR - FHIR R2.0 includes FHIR eICR, RR, and eRSD (eRSD in operations) -> FHIR STU R2.1

Policy Approaches

eHealth Exchange, Carequality and CommonWell associated organizations, APHL participation agreement

Other Terms

RCKMS - Reportable Conditon Knowledge Management System

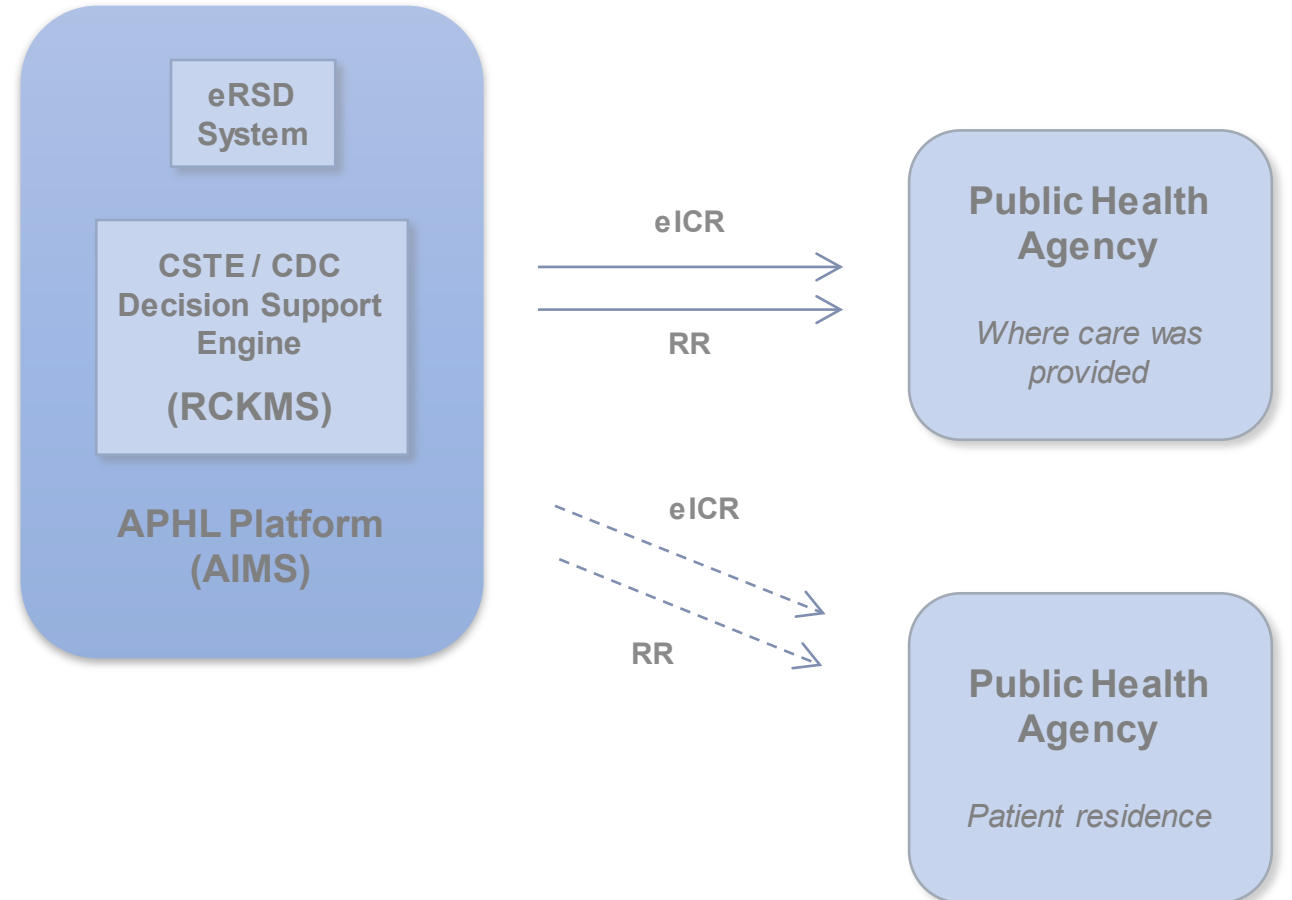eRSD – Electronic Reporting and Surveillance Distribution

eCR Outcomes

- Public Health Agencies (PHAs) need data to support reportable condition case ascertainment, investigation, classification, management, and further reporting

- For this, the surveillance systems:
  - Track and manage cases
  - Support additional information retrieval
  - Facilitate contact tracing
  - Identify trends and changes
  - Report anonymized "notifications" to the CDC

- To do this, public health "surveillance systems" and associated databases strive to electronically consume data on an element-by-element basis using interface engines and native surveillance system mapping capabilities

- **PHAs need 1) consistent data structures to support mapping and consumption as well as 2) reliable content coding for electronic processing and use**

Electronic Case Reporting (eCR)

eICR

RR

Public Health Agency

Where care was provided

eICR

RR

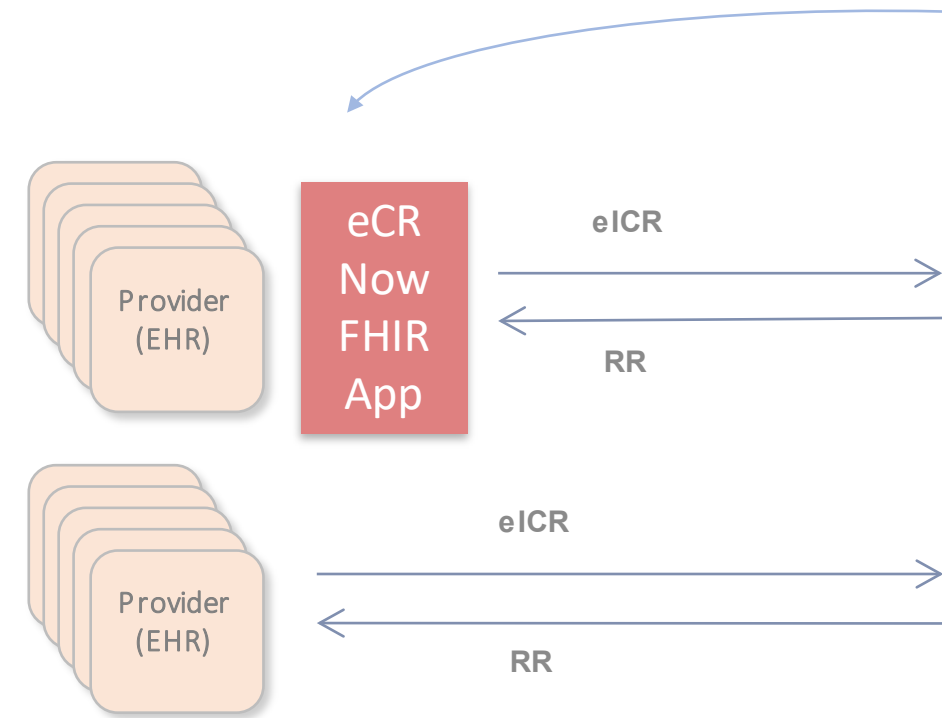**Public Health Agency**

Patient residence
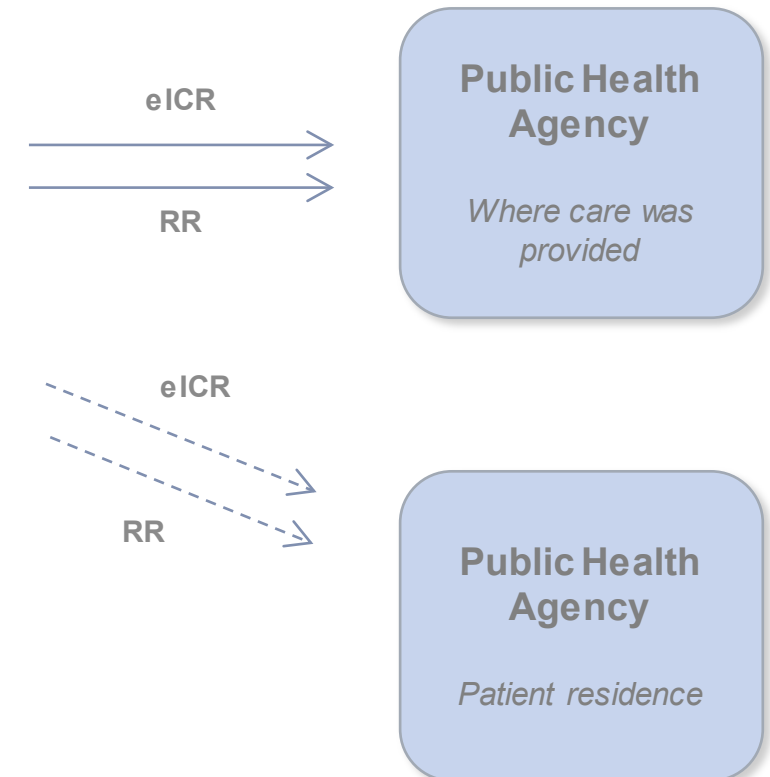
eCR Process

- The variability in state laws and systems have historically created health care provider reporting burden

- eCR provides a single interface for health care organizations to provide electronic Initial Case Reports (eICRs) in support of currently 132 conditions

- RCKMS decision support has rules, authored by the public health agencies (PHAs), to represent the different reporting laws and support eICR delivery to all appropriate PHAs

- **Consistently structured, coded data, enables RCKMS to process eICRs, automate reporting, and minimize provider burden**

Electronic Case Reporting (eCR)

eRSD System

CSTE / CDC Decision Support Engine

(RCKMS)

APHL Platform (AIMS)

eICR

RR

Public Health Agency

Where care was provided

eICR

RR

Public Health Agency

Patient residence

eCR
Now
FHIR
App

Provider
(EHR)

Provider
(EHR)

eICR

RR

eICR

RR

eCR Standards

- HL7 consensus-based, eCR standards development began in 2015

- EHR certification has no specific eCR standards yet

- Over 30 states have published their desire to use eICR for eCR to minimize other formats used

- eICR was built on C-CDA templates / CCDS / USCDI wherever possible to minimize the effort needed to construct

- eCR needs specific standards to:
  - provide consistent EHR data
  - to support conformance testing at multiple levels
  - to enable PHA and RCKMS processing
  - to mechanically enable EHR eCR operations including bi-directional communications with public health

eCR Interoperability and Standards Needs

- eICR - a "public health summary record" and a means of conveying data required by states for case reporting

- RR - Conduit for bidirectional communications including information on what conditions have been reported and to where, on the reportable conditions themselves, and on errors and warnings in reporting process

- eRSD – Conveys trigger codes and reporting guidance for both emergent and routine use cases, helps automate code distribution

- CDA standards are operational, the FHIR standards and related transforms will allow PHAs to migrate to FHIR as health care does

HL7 Consensus-Based, eCR Standards	Format	In Operations	July 2022 Publication
Electronic Initial Case Report (eICR)	CDA	R 1.1	R 3.1
Reportability Response (RR)	CDA	R 1.0	R 1.1
Electronic Case Reporting (eCR)			
• Electronic Reporting and Surveillance Distribution (eRSD)	FHIR	R 2.0	R 2.1
• Electronic Initial Case Report (eICR)	FHIR	-	R 2.1
• Reportability Response (RR)	FHIR	-	R 2.1

# eCR Interoperability and Standards Needs

- Identify the specific eCR standards in ISA and EHR certification (specific ISA edits / suggestions are in appendix)

- We are on-ramping some 19 EHR products now, but there are many more "out there." If they send case data in inconsistent formats and without RCKMS processing of jurisdiction-specific laws there will be inappropriate disclosures

- Use all levers (e.g. CLIA, etc.) as well as USCDI to ensure that data in EHRs are required to be well-structured and coded for exchange

- Push for inclusion of data required by state laws as well as federal regulations

Appendix

Case Reporting to Public Health Agencies

Type	Standard / Implementation Specification	Standards Process Maturity	Implementation Maturity	Adoption Level	Federally required	Cost	Test Tool Availability
Standard	Direct (Applicability Statement for Secure Health Transport v1.2)	Final	Production	●●●○○	Yes	Free	Yes
Implementation Specification	HL7 CDA® R2 Implementation Guide: Public Health Case Report, Release 2: the Electronic Initial Case Report (eICR), Release 1, STU Release 1.1	Balloted Draft	Production	●●●●○	No	Free	Yes
Implementation Specification	HL7 CDA® R2 Implementation Guide: Reportability Response,	Balloted Draft	Production	●●●●○	No	Free	Yes – Open

Goal is to have EHR certification require the specific eCR standards rather than just functions.
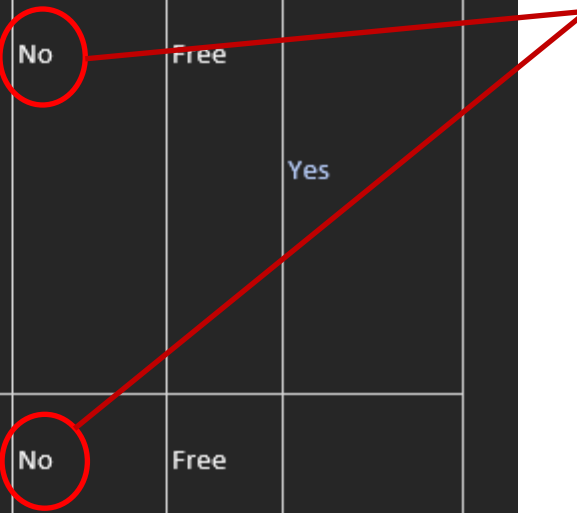
Type	Standard / Implementation Specification	Standards Process Maturity	Implementation Maturity	Adoption Level	Federally required	Cost	Test Tool Availability
	Release 1, STU Release 1.0 - US Realm						
Implementation Specification	IHE IT Infrastructure Technical Framework, Volume 1 (ITI TF-1): Integration Profiles, Section 17: Retrieve Form for Data Capture (RFD)	Balloted Draft	Pilot	●◻◻◻◻◻◻	No	Free	No
Implementation Specification	IHE Quality, Research, and Public Health Technical Framework Supplement, Structured Data Capture, Trial Implementation	Balloted Draft	Pilot	●◻◻◻◻◻◻	No	Free	No

These standards are not being used for eCR implementation.

Type	Standard / Implementation Specification	Standards Process Maturity	Implementation Maturity	Adoption Level	Federally required	Cost	Test Tool Availability
~~Emerging Standard~~Implementation Specification	*~~Electronic Reporting and Surveillance Distribution:~~ HL7 FHIR® Implementation Guide: Electronic Case Reporting (eCR) Release 2.0.0 ~~v1.0.0~~: STU ~~2~~1 - US Realm ~~(Balloted Draft)~~* *~~FHIR electronic Case Reporting (eCR) Implementation Guide (Continuous Integration Build)~~*	*~~In Development~~Balloted Draft*	*~~Pilot~~Production*	●●●●○	*No*	*Free*	*No*
Implementation Specification	*Electronic Initial Case Report (eICR):* *HL7 FHIR® Implementation Guide: Electronic Case*	*Balloted Draft*	*Pilot*	●○○○○	*No*	*Free*	*No*

There are 3 transactions specified in the FHIR eCR IG, we suggest using 3 separate rows: 1) eRSD (in production), 2) FHIR eICR (in pilot), and 3) FHIR RR (in pilot)

Goal is to have EHR certification require the specific eCR standards rather than just functions.

Type	Standard / Implementation Specification	Standards Process Maturity	Implementation Maturity	Adoption Level	Federally required	Cost	Test Tool Availability
	Reporting (eCR) Release 2.0,0 STU 2 - US Realm						
Implementation Specification	*Reportability Response (RR):* *HL7 FHIR® Implementation Guide: Electronic Case Reporting (eCR) Release 2.0,0 STU 2 - US Realm*	*Balloted Draft*	*Pilot*	●○○○○	*No*	*Free*	*No*
Implementation Specification	HL7 CDA® R2 Implementation Guide: Public Health Case Report - the Electronic Initial Case Report (eICR) Release 2, STU Release 3.0 - US Realm	Balloted Draft	Pilot	●○○○○	*No*	*Free*	*No*

Goal is to have EHR certification require the specific eCR standards rather than just functions.

Type	Standard / Implementation Specification	Standards Process Maturity	Implementation Maturity	Adoption Level	Federally required	Cost	Test Tool Availability

Limitations, Dependencies, and Preconditions for Consideration	Applicable Security Patterns for Consideration
- Electronic Initial Case Report (eICR) and the Reportability Response are paired together in pilot implementations to build a complete workflow. - Retrieve Form for Data Capture and Structured Data Capture are paired together in pilot implementation to build a complete workflow. - Electronic case reporting involves reporting to State and/or Local jurisdictions. It is not yet widespread. - Structured Data Capture Implementation Guide does not currently restrict vocabulary to standard vocabulary sets	

These standards are not being used for eCR implementation.

Limitations, Dependencies, and Preconditions for Consideration	Applicable Security Patterns for Consideration
and may require further implementation guidance for case reporting purposes. • The IHE Quality, Research, and Public Health Technical Framework Supplement, Structured Data Capture, Trial Implementation Guide does not support automated initiation of sending of case reports. It can support manual entry into an electronic form as follow-up to an initial case report submission. • The FHIR electronic Case Reporting (eCR) Implementation Guide is included with both its balloted implementation guide and a link to the FHIR continuous build. The later, as a continuous integration build, may at any point in time be unavailable, incoherent, or undergoing rapid change. • Some additional implementation guides related to public health reporting follow. Reporting is often captured under a specialized registry with associated standards when not specified as a separate measure. These include:	

We suggest these items be moved out of "case reporting" and into a more generic section for "public health reporting"

Limitations, Dependencies, and Preconditions for Consideration	Applicable Security Patterns for Consideration
• Early Hearing Detection and Intervention (EHDI) • Office of Populations Affairs (OPA) Family Planning Reporting IHE Profile ▪ Note that the maturity level of FHIR resources may vary. The FHIR Maturity Model and each of the levels is described on the HL7 wiki. ▪ See FHIR and IHE projects in the Interoperability Proving Ground. ▪ Direct is used as the transport for performing an unsolicited push for Case Reporting to Public Health Agencies in some jurisdictions. See An Unsolicited "Push" of Clinical Health Information to a Known Destination Between Systems.	

We suggest these items be moved out of "case reporting" and into a more generic section for "public health reporting"

eICR Data

eICR Data Elements, Release 1.1

Patient	Patient	Provider	Facility	Encounter	Provenance
• **Identity** • Patient Id • Patient Name • Parent/Guardian Name • **Contact** • Patient or Parent/ Guardian Phone • Patient or Parent/ Guardian Email • **Location** • Patient Address	• **Demographics** • Patient DOB • Patient Administrative Sex • Patient Birth Sex • Patient Race • Patient Ethnicity • Patient Preferred Language	• **Identity** • Provider Id • Provider Name • **Contact** • Provider Phone • Provider Fax • Provider Email • **Location** • Provider Office/Facility Name • Provider Address	• **Identity** • Facility ID Number • Facility Name • Facility Type/ Hospital Unit • **Contact** • Facility Phone • Facility Fax • **Location** • Facility Address	• Encounter Type • Visit Date/Time (outpatient) • Admission Date/Time • Discharge Date/Time	• **When** • Date of Report • Report Submission Date/Time • **Where** • Sending application

eICR elements are aligned with the USCDI.

eICR Data Elements, Release 1.1 (Continued)

Clinical: Notes, Symptoms, & Diagnoses

- History of Present Illness
- Reason for Visit
- Symptom List
- Problem List
  - **Problem (Diagnosis) Trigger**
- Encounter Diagnoses
  - **Problem (Diagnosis) Trigger**
- Diagnosis Date
- Date of Onset

Clinical: Lab

- Lab Order Code (Ordered test)
  - **Lab Order Code Trigger**
- Placer Order Number
- Lab Order Code (Resulted test)
  - **Lab Order Code Trigger**
- Lab Result
  - **Lab Result Code Trigger**
- Filler Order Number

Clinical: Medication

- Medications Administered (list)
- Immunization Status (list)

Clinical: Risk Factors - Pregnancy

- Pregnancy Status

Clinical: Risk Factors - Other

- Patient Occupation
- Travel History Dates
- Travel History Location

Clinical: Other

- Death Date

eICR elements are aligned with the USCDI.

New Elements in eICR 3.0*

Patient

- Gender identity
- Tribal Affiliation
- Tribal Enrollment Status
- Country of Nationality
- Country of Residence

Clinical: Lab

- Lab Result Status
- Specimen Source
- Specimen Type
- Specimen Id
- Specimen Collection Date

Clinical: Medication

- Medications: Admission
- Medications: Administered
- Medications: Historical
- Medications: Planned
- Immunization Status
- Vaccine Credential Patient Assertion

Clinical: Risk Factors - Pregnancy

- Pregnancy Status
- Pregnancy Status Determination Date and Method
- Estimated Date of Delivery and Determination Method
- Estimated Gestational Age of Pregnancy
- Estimated Gestational Age Determination Date and Method
- Last Menstrual Period
- Pregnancy Outcome and Date
- Postpartum Status

Clinical: Risk Factors - Other

- Present/Usual Industry
- Present/Usual Occupation
- Current Job Title
- Current Employer Name, Phone, Address
- Occupational Exposure
- Emergency Outbreak Information
- Exposure/Contact Information
- Travel History: Purpose and details
- Homelessness Status
- Disability Status

Clinical: Other

- Therapeutic Medication Response
- Vital Signs
- Chief Complaint
- Past Medical History
- Review of Systems
- Procedure
- Planned Procedure

*Release 3.0 adds these additional data elements.