FHIR®: Advancing Interoperability Standards in the API Economy
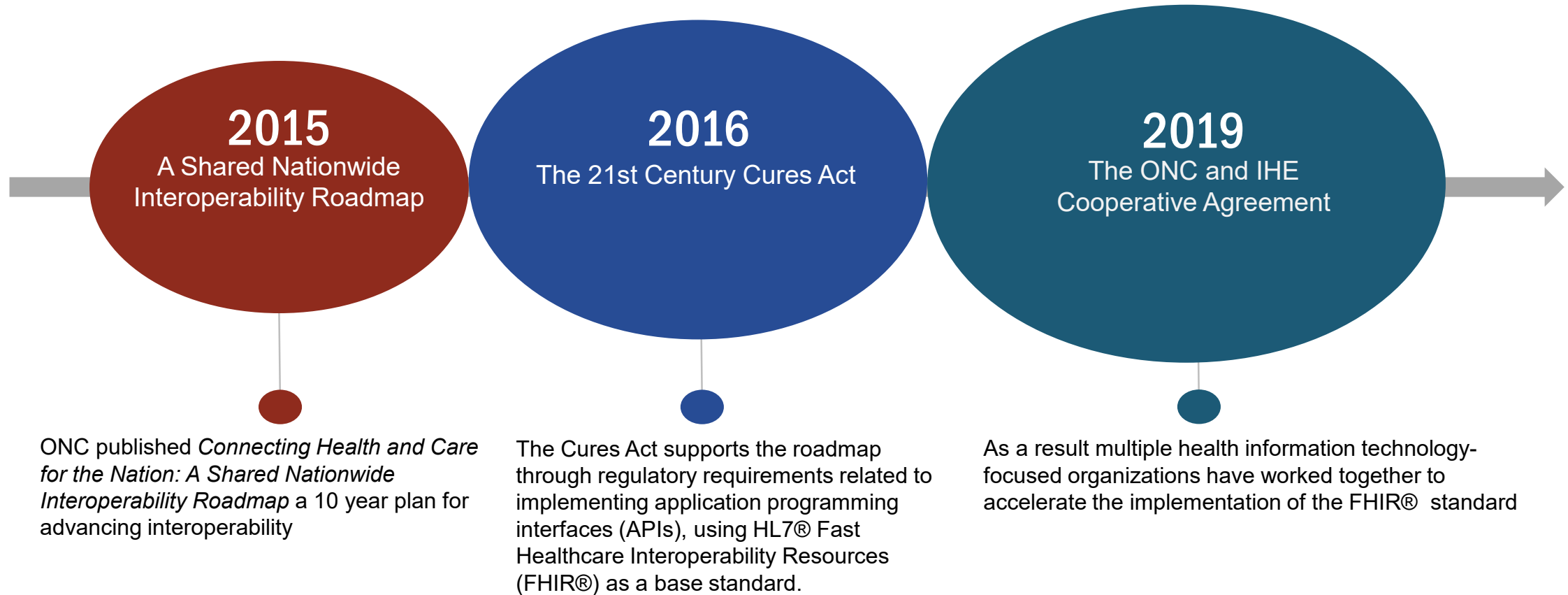
The Office of the National Coordinator for Health Information Technology (ONC) and Integrating the Health Care Enterprise (IHE) Cooperative Agreement

Daniel (Dan) Chaput, IT Specialist, ONC

The Office of the National Coordinator for
Health Information Technology

Agenda

- Background

- Scope

- Approach

- Timeline

Background

2015
A Shared Nationwide
Interoperability Roadmap

2016
The 21st Century Cures Act

2019
The ONC and IHE
Cooperative Agreement

ONC published *Connecting Health and Care for the Nation: A Shared Nationwide Interoperability Roadmap* a 10 year plan for advancing interoperability

The Cures Act supports the roadmap through regulatory requirements related to implementing application programming interfaces (APIs), using HL7® Fast Healthcare Interoperability Resources (FHIR®) as a base standard.

As a result multiple health information technology-focused organizations have worked together to accelerate the implementation of the FHIR® standard

Interoperability: *the ability of a system to exchange electronic health information with and use electronic health information from other systems without special efforts on the part of the user.*

What is the ONC IHE USA Cooperative Agreement?

The ONC and IHE USA are collaborating to accelerate the creation of new and updated IHE profiles to support the use of the HL7® FHIR® standard.

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What is IHE USA ?

- IHE USA, a national deployment committee of IHE International, engages and supports the health IT community by promoting the adoption and use of IHE and other world-class standards, tools, and services for interoperability

- IHE International oversees the development and publication of IHE Technical Frameworks worldwide.

IHE USA
CONNECTING THE WORLD.

IHE INTERNATIONAL
Integrating the Healthcare Enterprise

Why is this Cooperative Agreement Important?

- This cooperative agreement reflects the ONC's strategic goal to promote the use of the HL7® FHIR® standard, as well as advancing standardization through profiling, in support of better interoperability.

- This agreement will also strengthen cross-organizational collaboration efforts between standards developing organizations (SDO), interoperability test tool developers, FHIR champions and other vital stakeholders.

ONC IHE Cooperative Agreement's Scope

- The IHE Cooperative Agreement team's objectives are to:
  - Catalog IHE Profiles that utilize the FHIR standard to enable cross community health information exchange

  - Identify and prioritize new profiling opportunities to leverage the FHIR standard

  - Accelerate the development of robust, real world testing processes and adoption of the updated FHIR-focused IHE profile and HL7 implementation guides

  - Actively engage with HL7 and IHE International on lessons learned through profiling improvements and real-world testing

ONC / IHE-USA

Gap assessment and improvement

John Moehrke -- IHE Co-Chair ITI-Plan & ITI-Tech workgroup

By Light Professional IT Consulting

The Ask:

- The ask for the **environmental scan and gap analysis** was to:
  - Identify potential gaps that may inhibit the RESTful exchange of health information using FHIR
  - Identify ways for IHE USA and ONC to collaborate with HL7, IHE members, and industry partners to promote the adoption of the FHIR standard.
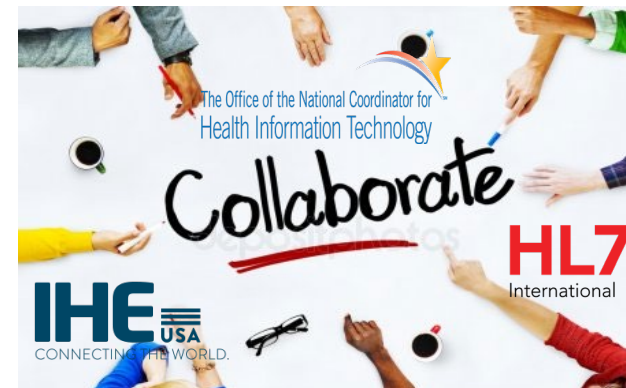
https://st2.depositphotos.com/3591429/5246/i/950/depositphotos_52464859-stock-photo-people-and-collaboration-concepts.jpg

IHE Profiles using FHIR

- Positives
  - 31 Profiles are already available leveraging FHIR
  - 4 are FHIR-Documents
  - Complete set of Document Sharing – See MHDS
    - All existing Document Content (e.g. CDA, XDW, etc.) are MHD usable
  - Equivalent (International) of US-Core using MHD, QEDm, and PDQm
  - 9 of these Profiles have complete set of FHIR conformance resources on IHE GitHub

- Gaps
  - 11 of these Profiles are not yet upgraded to FHIR R4
  - 22 of these Profiles do not have FHIR conformance resources

A Mobile Health Document System - All on FHIR

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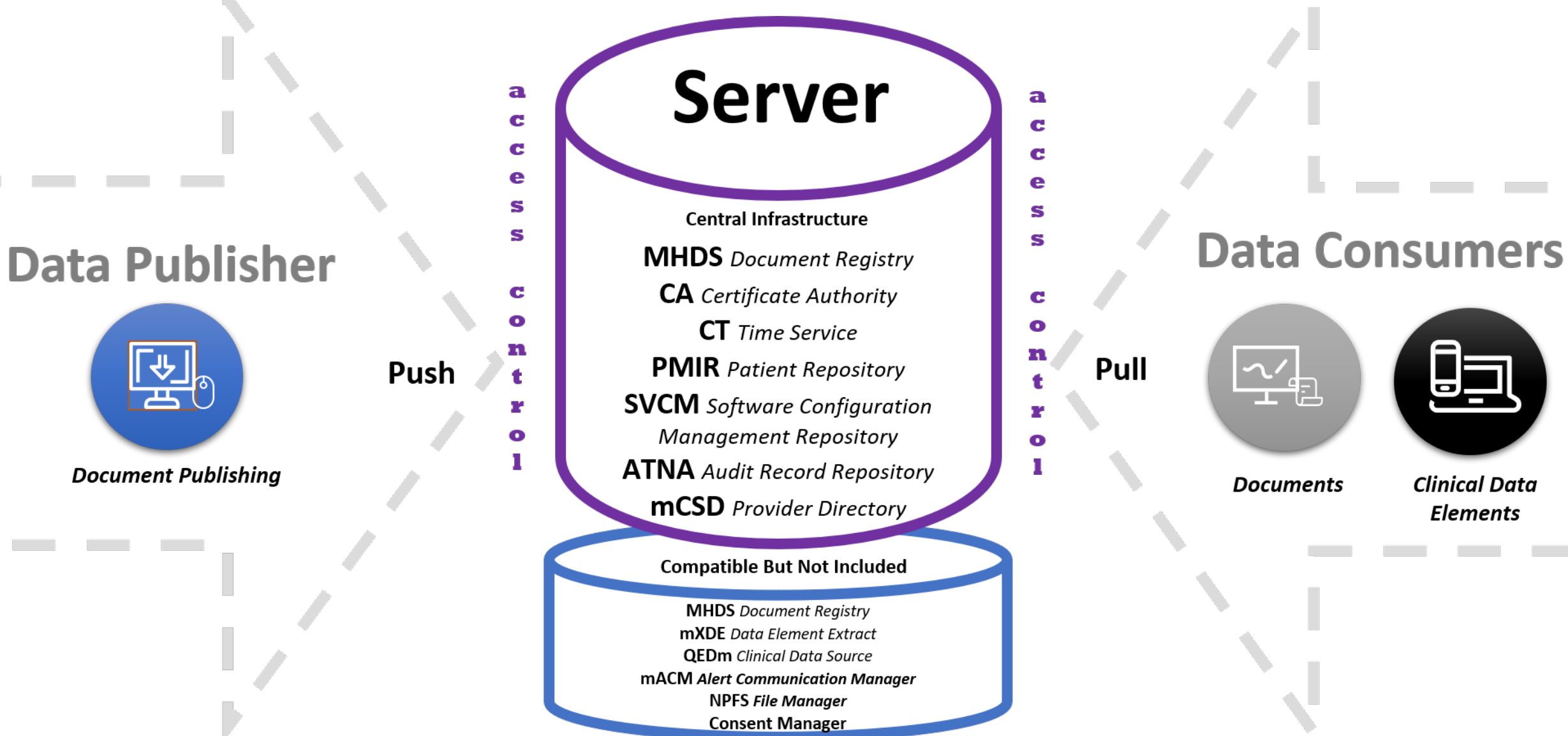
IHE Process Improvement Analysis

Strengths

- Globally focused, locally deployed
- Open, freely available assets
- Formal test plans and test tools assets

Connectathon & IHE Conformity Assessment Program testing provide the market with formal process

Availability of multi-architecture document sharing solutions for the marketplace

Opportunities for Improvement

- Promote document sharing and element access to document sharing
- Promote adoption of CarePlan

Improve IHE's formal mechanisms for product testing, including both the testing process and tools used as part of that process

Develop stronger feedback mechanisms using experience working with implementation community

Next Steps
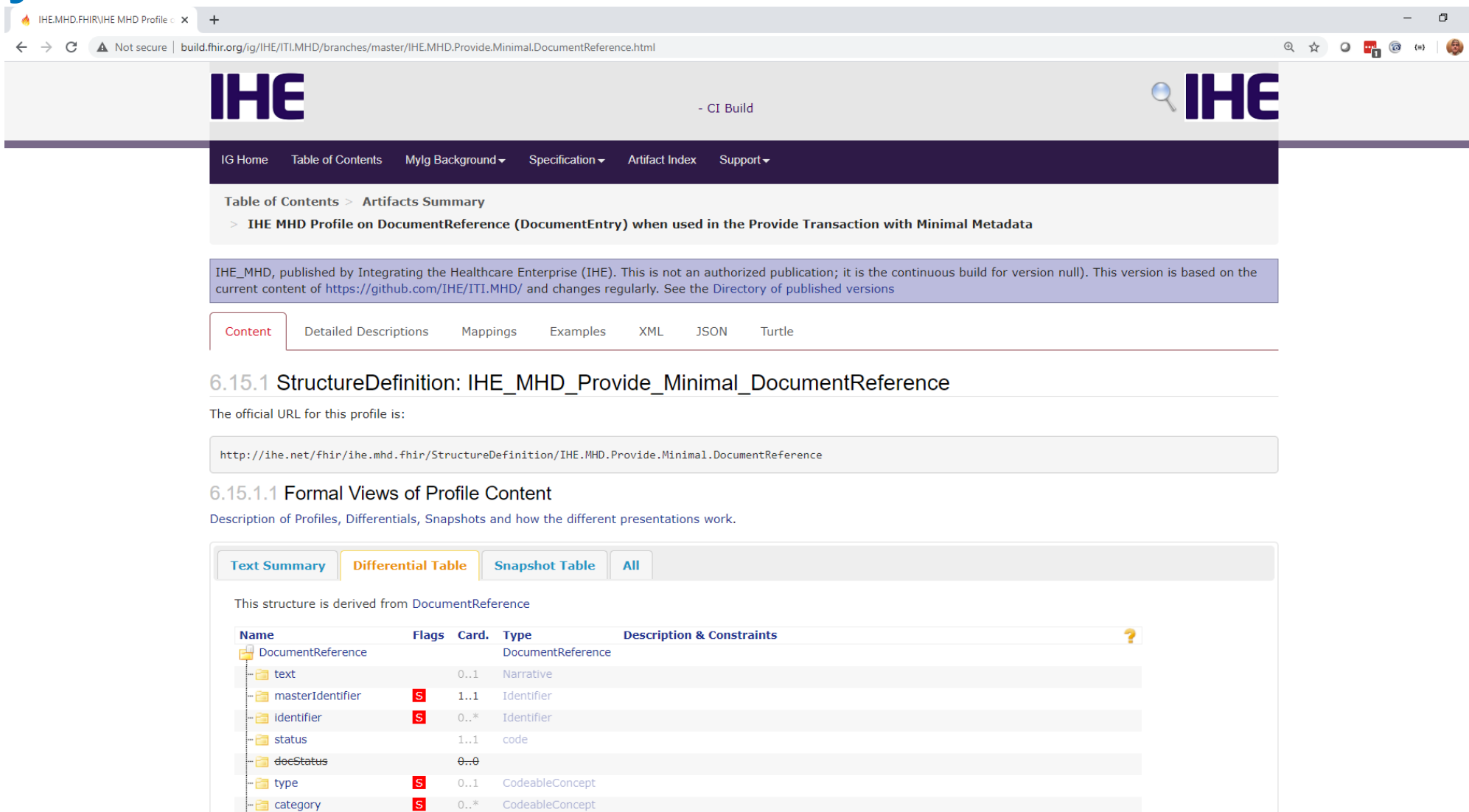
The IHE team plans to focus on four work stream and improve the identified gaps in these process to accelerate the uptake and adoption of FHIR profiles.

Next Steps

- Revise current IHE Profiles on FHIR to be aligned with FHIR R4

- Publish validated conformance resources for all current IHE Profiles on FHIR

- Evaluate existing CDA document content profiles as candidates for FHIR-Document format

- Transition from publishing IHE profiles as a word document

- Execute an outreach plan to explain new and current IHE initiatives as they relate to FHIR, working with HL7, and Document Sharing

- Consider developing pilot to explore transitioning from wiki-based sites to align with HL7 and use Atlassian suite of products to support the profiling community (Confluence, JIRA, etc.) and the adoption of IHE profiles within the wider healthcare industry

IHE using HL7 Implementation Guide Publishing System

The Role of the IHE Cooperative Agreement in Advancing Emerging Health Care Models

ONC Annual Meeting

January 28, 2020

Evelyn Gallego, MBA, MPH, CPHIMS

CEO & Founder, EMI Advisors LLC

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IHE Cooperative Agreement Scope

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Why is the ONC IHE Cooperative Agreement Important for Emerging Health Models?

Need common approach for representing and exchanging health data:

- Those who collect it from outside sources

- Those who enter it into electronic format

- Those who analyze it (e.g., for research, population health, quality improvement)

- Those who verify the findings

- Those that communicate the information for treatment and interventions (health, public health, and community-based services rendered)

Source: Public Health Informatics http://slideplayer.com/slide/7341838/

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Why is the ONC IHE Cooperative Agreement Important for Emerging Health Care Models?

Supports the steadfast transition of Provider Centric Fee-for-Service Models to Person Centric Value-Based Care Models
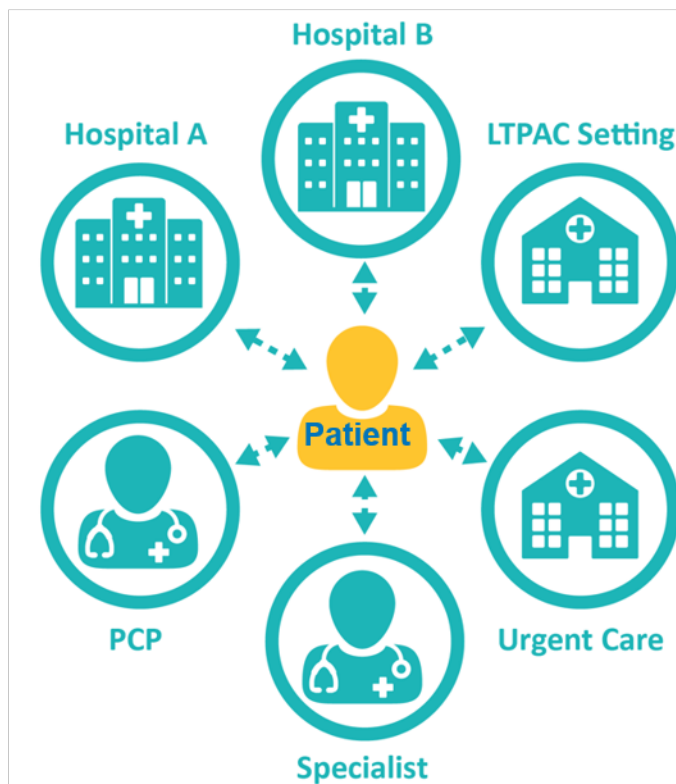
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Capability Areas for Emerging Health Care Models

1. CARE PLANNING
Ability to develop, receive, find, access, use, update and monitor standardized electronic care plans and/or their respective components.

2. CLOSED LOOP REFERRAL
Ability to electronically submit standardized documents to support referrals, track the status of referrals and send consultation notes back to referring provider to close the referral loop.

3. NOTIFICATIONS
Ability to electronically send notifications to care team members.
Ability to notify ordering providers of results of tests or interventions.

4. PATIENT REPORTED OUTCOMES (PROs)
Ability to electronically capture, receive, find, access, use, and monitor PROs

5. DATA EXTRACTION & NORMALIZATION
Ability to extract data electronically in standardized format and integrate into distinct systems.

6. Remote Device Interoperability
Ability for remote monitoring devices to exchange data with Health IT systems

7. QUALITY PERFORMANCE MEASUREMENT
Ability to generate timely reports based on real-time data.
Ability to accurately calculate, aggregate and store quality measure data.

Capability Areas for Emerging Health Care Models

Social Determinants of Health (SDOH) Data Integration
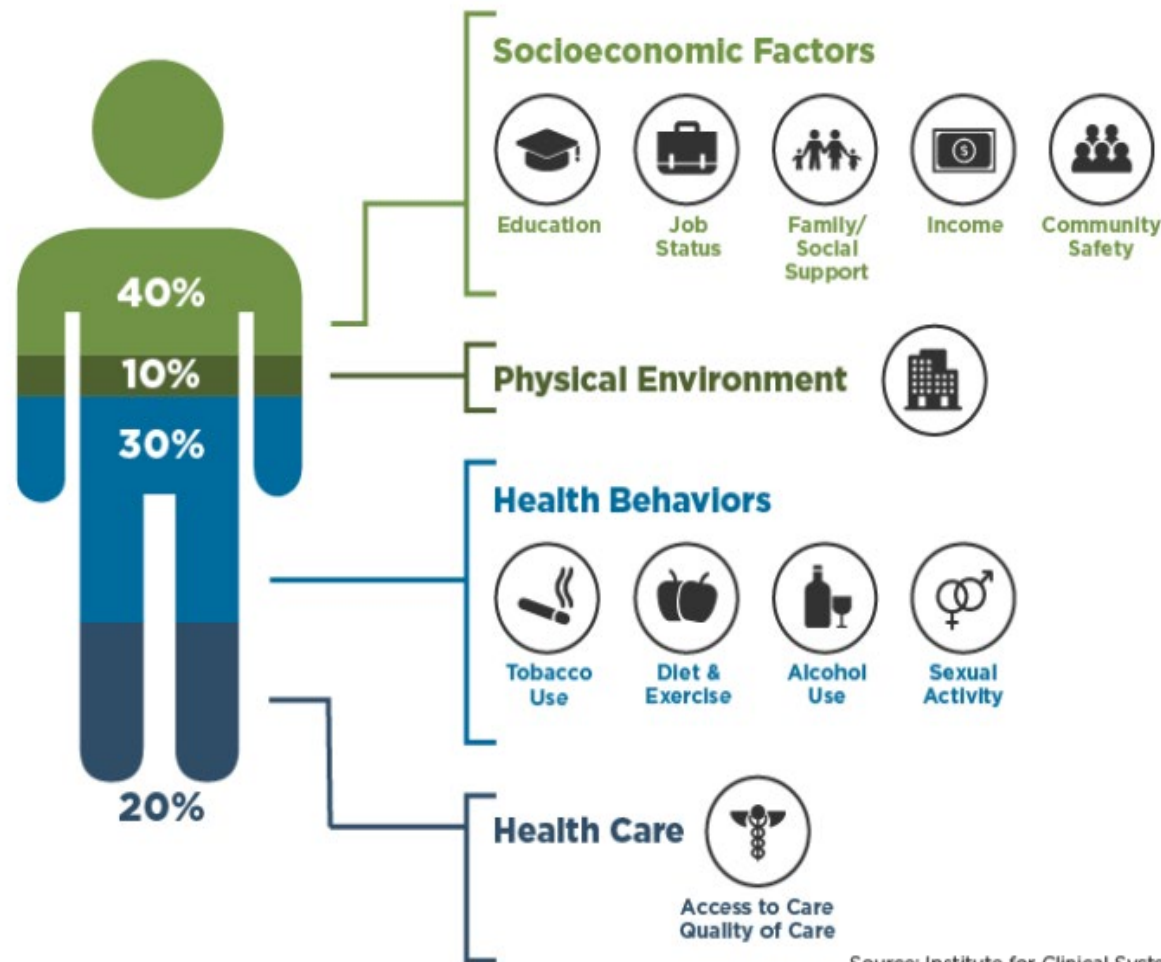
Source: Institute for Clinical Systems Improvement, Going Beyond Clinical Walls: Solving Complex Problems (October 2014)

Adapted from The Bridgespan Group

What Standards Exist to Support the Capabilities?

Capability Area	Applicable Health IT Standards
Care Planning	• IHE Dynamic Care Plan
Closed Loop Referral	• IHE 360x • HL7 FHIR Bidirectional Services for electronic Referrals Implementation Guide
SDOH Data Integration	• IHE 360x • HL7 FHIR Bidirectional Services for electronic Referrals Implementation Guide • *HL7 FHIR SDOH Implementation Guide

IHE Dynamic Care Planning (DCP) Profile

- One of the 18 evaluated IHE Profiles that currently leverages FHIR R4

- Provides the structures and transactions for care planning and sharing care plans that meet the needs of many, such as providers, patients, and payers

- Defines the interactions needed to target appropriate services and to coordinate care over time across multiple clinicians with the engagement of the individual

- Uses FHIR Resources (CarePlan, CareTeam) and transactions

https://ihe.net/uploadedFiles/Documents/PCC/IHE_PCC_Suppl_DCP.pdf

Integrating the Healthcare Enterprise

IHE

5

IHE Patient Care Coordination
Technical Framework Supplement

10

Dynamic Care Planning
(DCP)

HL7® FHIR® STU 4
Using Resources at FMM Level 2-3

Revision 3.1 – Trial Implementation

15

20   Date: September 27, 2019
      Author: PCC Technical Committee
      Email: pcc@ihe.net

25   **Please verify that you have the most recent version of this document.** See here for Trial
      Implementation and Final Text versions and here for Public Comment versions.

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How will IHE Cooperative Agreement Advance the DCP Profile?

Sharing Patient Care Plans for Multiple Clinical Contexts

Type	Standard / Implementation Specification	Standards Process Maturity	Implementation Maturity	Adoption Level	Federally required	Cost	Test Tool Availability
Implementation Specification	IHE Dynamic Care Planning (DCP), Rev 1.2 Trial Implementation	Balloted Draft	Pilot	●○○○○	No	Free	No
Implementation Specification	IHE Dynamic Care Team Management (DCTM), Rev 1.1 Trial Implementation	Balloted Draft	Pilot	●○○○○	No	Free	
Implementation Specification	HL7 Implementation Guide for CDA® Release 2: Consolidated CDA Templates for Clinical Notes (US Realm), Draft Standard for Trial Use, Release 2.1	Balloted Draft	Production	●●●○○	Yes	Free	Yes
Emerging Implementation Specification	HL7® C-CDA on FHIR® Care Plan	In Development	Feedback requested	Feedback Requested	No	Free	

https://www.healthit.gov/isa/sharing-patient-care-plans-multiple-clinical-contexts

It will help us move the dial in testing and implementation of dynamic shared care plan exchange across clinical and non-clinical systems and users--a key capability for emerging value-based payment models.

How DCP is informing the new Multiple Chronic Conditions (MCC) eCare Plan Project

The MCC eCare Plan Project was launched in October 2019 by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and the Agency for Healthcare Research and Quality (AHRQ).

It will build data capacity to conduct pragmatic Patient Centered Outcomes Research (PCOR) by developing an interoperable electronic care plan (eCare) to facilitate aggregation and sharing of person-centered data across home, community, clinic, and research-based settings
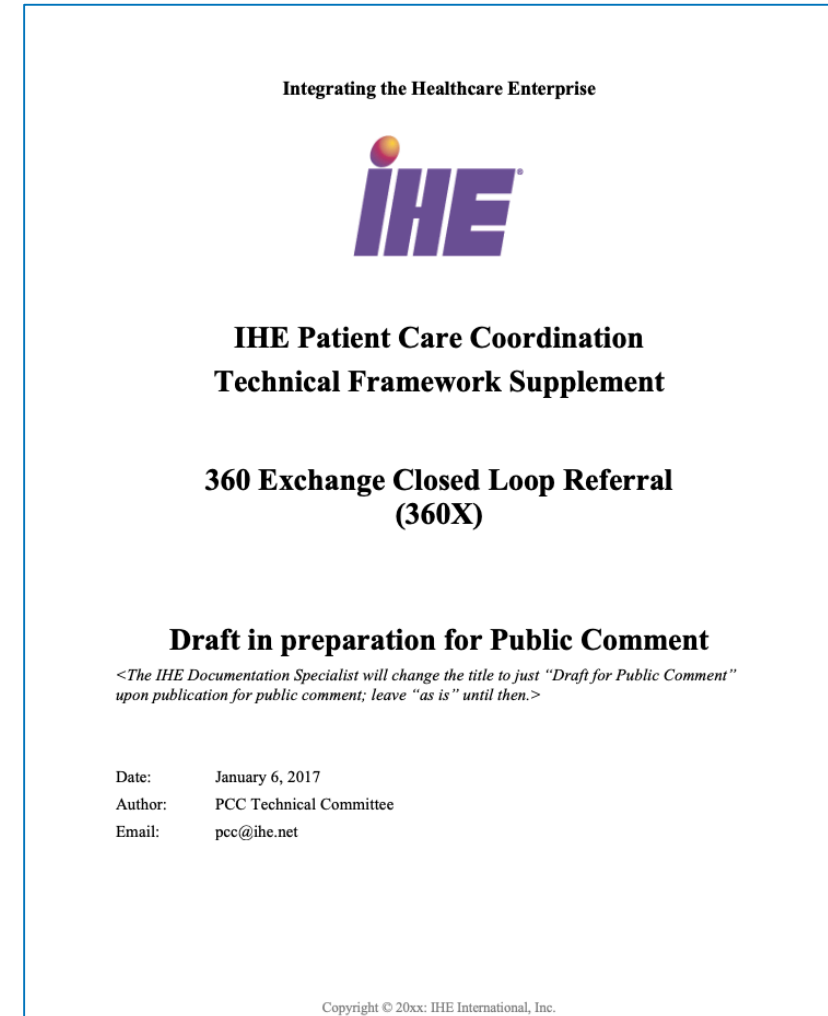
The project will develop and test an open source SMART on FHIR eCare Plan app and accompanying HL7 FHIR Implementation Guide

The MCC eCare Plan IG will leverage and reference the IHE DCP Profile.

https://aspe.hhs.gov/data-capacity-patient-centered-outcomes-research-through-creation-electronic-care-plan-people-multiple-chronic-conditions

IHE 360 Exchange Closed Loop Referral (360X)

- Defines the transactions to support referral requests and results of referrals across disparate health IT systems

- C-CDA Content standards referenced:
  - Referral Note
  - Consultation Note
  - Continuity of Care (CCD)

- Transport is DIRECT SMTP or XDR/SOAP

- Identified as one of the IHE Profiles to be updated to support FHIR based exchange

https://wiki.ihe.net/index.php/Closed_Loop_Referral_360X

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Technical Framework Supplement

360 Exchange Closed Loop Referral (360X)

Draft in preparation for Public Comment
<The IHE Documentation Specialist will change the title to just "Draft for Public Comment" upon publication for public comment; leave "as is" until then.>

Date: January 6, 2017
Author: PCC Technical Committee
Email: pcc@ihe.net

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How 360x is informing other National Care Coordination Interoperability Initiatives

- The **Bidirectional Services Electronic Referrals (BSeR) FHIR IG** was initiated by the National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) with Centers for Disease Control and Prevention (CDC)

  - Provides guidance for using FHIR as an exchange format for clinical and non-clinical service requests

  - Builds on the closed loop transactions defined within IHE 360x and provides pathway for 360x implementers to use FHIR based exchange

http://www.hl7.org/fhir/us/bser/history.html

How 360x is informing other National Care Coordination Interoperability Initiatives Cont'd

- In May 2019, the Gravity Project was launched by the Social Interventions Research & Evaluation Network (SIREN) as a multi-stakeholder public collaborative with the goal to develop, test, and validate standardized SDOH data for use in patient care, care coordination between health and human services sectors, population health management, public health, value-based payment, and clinical research.

- Data Standards:
  - New Codes (LOINC, SNOMED CT, ICD-10) to represent data elements specific to three domains: Food Insecurity, Housing Instability and Quality, and Transportation Access
  - New FHIR IG that builds on existing FHIR specifications to include BSeR

- Gravity stakeholders include entities that have already invested in Direct based exchange and thereby can be supported by the 360x defined transactions for a C-CDA based payload

https://confluence.hl7.org/display/GRAV/The+Gravity+Project

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Evelyn Gallego

Email: evelyn.Gallego@emiadvisors.net

Contact ONC

📞 **Phone:** 202-690-7151

💬 **Health IT Feedback Form:**
https://www.healthit.gov/form/
healthit-feedback-form

🐦 **Twitter:** @onc_healthIT

in **LinkedIn:** Search "Office of the National Coordinator for Health Information Technology"

HealthIT.gov

Subscribe to our weekly eblast at healthit.gov for the latest updates!

The Sequoia Project Supports Real World Interoperability Testing

Supporting Production Transport, Security and Data Quality Testing

Didi Davis VP, Informatics, Conformance & Interoperability, The Sequoia Project

Board Member, Integrating the Healthcare Enterprise (IHE) International

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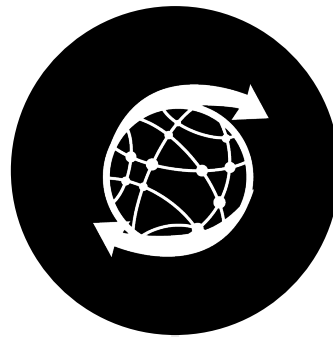Health Information Technology

The Sequoia Project's Role

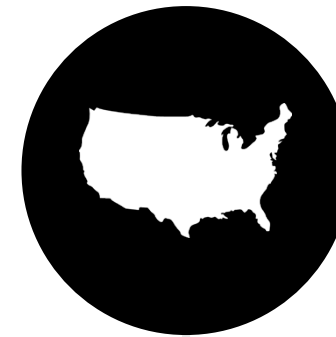The Sequoia Project is a trusted, independent convener of industry and government

Supports multiple independent initiatives, each with their own mission, governance, membership and structure.

SECURE **INTEROPERABLE** **NATIONWIDE**

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Sequoia Provides Support Services to:

eHealth Exchange is a nationwide public-private health information network

Carequality operates a nationwide interoperability framework to link health information networks

Current Sequoia Project Initiatives

PULSE is a system which provides disaster healthcare volunteers access to information to treat individuals injured or displaced by disasters

RSNA Image Share Validation Program is an interoperability testing program to enable seamless sharing of medical images

Interoperability Matters is an interoperability leadership forum

Interoperability Matters

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21st Century Cures Act – Section 4003(b)

*"[T]he National Coordinator shall convene appropriate public and private stakeholders to develop or support a **trusted exchange framework** for trust policies and practices and for a **common agreement** for exchange between health information networks."*
[emphasis added]

https://rce.sequoiaproject.org/wp-content/uploads/2019/10/RCE-Public-Kickoff-Call-10.7.2019-Web-Final.pdf

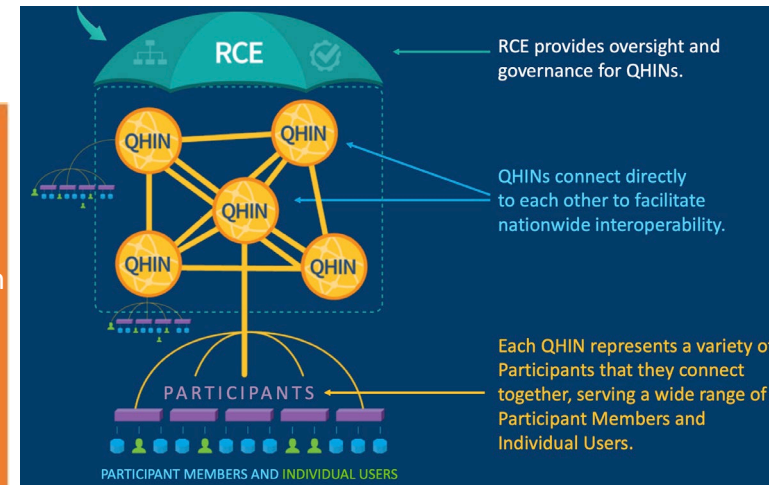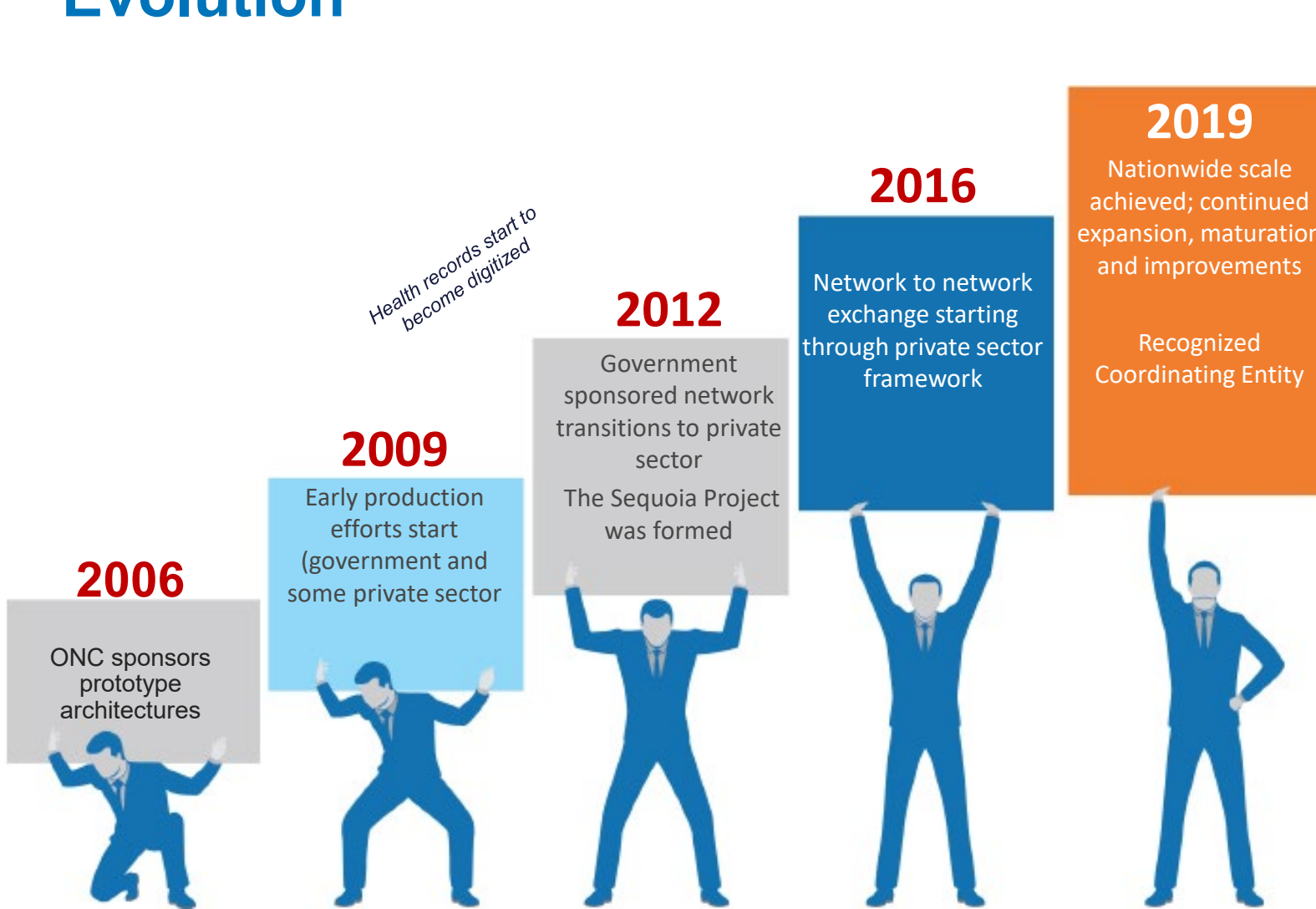# ONC Selection of Recognized Coordinating Entity

- ONC posted a Notice of Funding Opportunity

- The Sequoia Project applied, with support from 55+ organizations

- The Sequoia Project was selected 8/29/19

- News Release: https://www.hhs.gov/about/news/2019/09/03/onc-awards-the-sequoia-project-cooperative-agreement.html

rce.sequoiaproject.org

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Evolution

2006

ONC sponsors prototype architectures

2009

Early production efforts start (government and some private sector

Health records start to become digitized

2012

Government sponsored network transitions to private sector

The Sequoia Project was formed

2016

Network to network exchange starting through private sector framework

2019

Nationwide scale achieved; continued expansion, maturation and improvements

Recognized Coordinating Entity

RCE provides oversight and governance for QHINs.

QHINs connect directly to each other to facilitate nationwide interoperability.

Each QHIN represents a variety of Participants that they connect together, serving a wide range of Participant Members and Individual Users.

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Sequoia Interoperability Testing Platform (ITP)

Tooling Leverages Gazelle Platform Hosted by IHE Services

Content Testing VM

- Tooling updated 11/29/19 – Erratum, Value Sets, Reported Defects
- Working with Partner Organizations and Vendors to support Data Quality Improvements for Industry (RCE/USCDI Coordinated strategy)
- EVS Client (UI for Systems Under Test) https://gazellecontent.sequoiaproject.org/EVSClient/home.seam

Sequoia Transport & Security Testing VM https://validation.sequoiaproject.org/

- Gazelle Test Management (User Management)
- Gazelle Security Suite (Security Testing)
- Assertion Manager (Checklist Testing)
- EVS Client (UI for Systems Under Test)
- Patient Manager (PD Testing)
- Gazelle Webservice Tester
- XDS Toolkit (QD & RD Testing)
- Tooling updated 11/29/19 – Latest Versions

Content Testing Status

- **15 or 5%** of Eligible Participants organizations have **<u>Passed</u>**
  - https://ehealthexchange.org/participants/ ✔ **Content** Validated
- **95%** have Submitted and **<u>Failed</u>** for various reasons, the most common are:
  - Vocabulary issues such as incorrect code system reference or incorrect value from value set referenced in the Value Set Authority Center (VSAC)
  - Required fields missing such as Street Address or other required CCDS data classes – US Realm Header Requirements
- >7000 Documents Tested with >70% tested against HL7 C-CDA R2.1 Standards
- No known defects in the tooling at the present time
  - Issues as they are identified will be documented on the tooling home screen
  - Validators were last rebuilt and tested 11/29/2019
- Sequoia working with Vendors and their Customers to coordinate remediation
- Sequoia drives HL7 Specification Improvements with Testing feedback since 2017

Sequoia Clinical Data Quality/Standards Feedback Loop

- Sequoia drives IHE Profile Improvements since 2009

- Sequoia drives HL7 Specification Improvements Yearly since 2017

- HL7 C-CDA Specifications
  - Testing Tools Launched in 2018 with clean published specs
  - Sequoia Pushed for two 2018 (May, December) and one 2019 (June) Errata Publications
  - Errata continues to be contributed to HL7 as spec issues are identified

- Value Sets
  - HL7 published Value Sets for industry for first time in 2018 with yearly updates expected
  - Sequoia funded NLM Value Set Authority Center (VSAC) 2019 Value Set Updates June 28, 2019
  - Need to determine industry cadence for Value Set Updates

- Collaboration with industry groups for data quality improvement

RSNA Image Share Validation Program

- **Fills a national Standards Gap**
  - Product conformity assessment testing

- **IHE profiles provide specifications for testing**

- **Modular Standards/Specifications/Test Cases**
  - Cross-Enterprise Document Sharing for Imaging (XDS-I)
    - Document Source and Document Consumer
    - Registry and Repository
  - Cross-Community Access for Imaging (XCA-I)
    - Initiating Gateway
    - Responding Gateway

SPECS

RSNA Image Share Validated Products

http://sequoiaproject.org/rsna/validated-products/

The Solution

Carequality creates a standardized, national-level interoperability framework to link all data sharing networks

Carequality has created a web of interconnected networks

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Carequality

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IHE Radiology Technical Framework (IHE XCA-I)
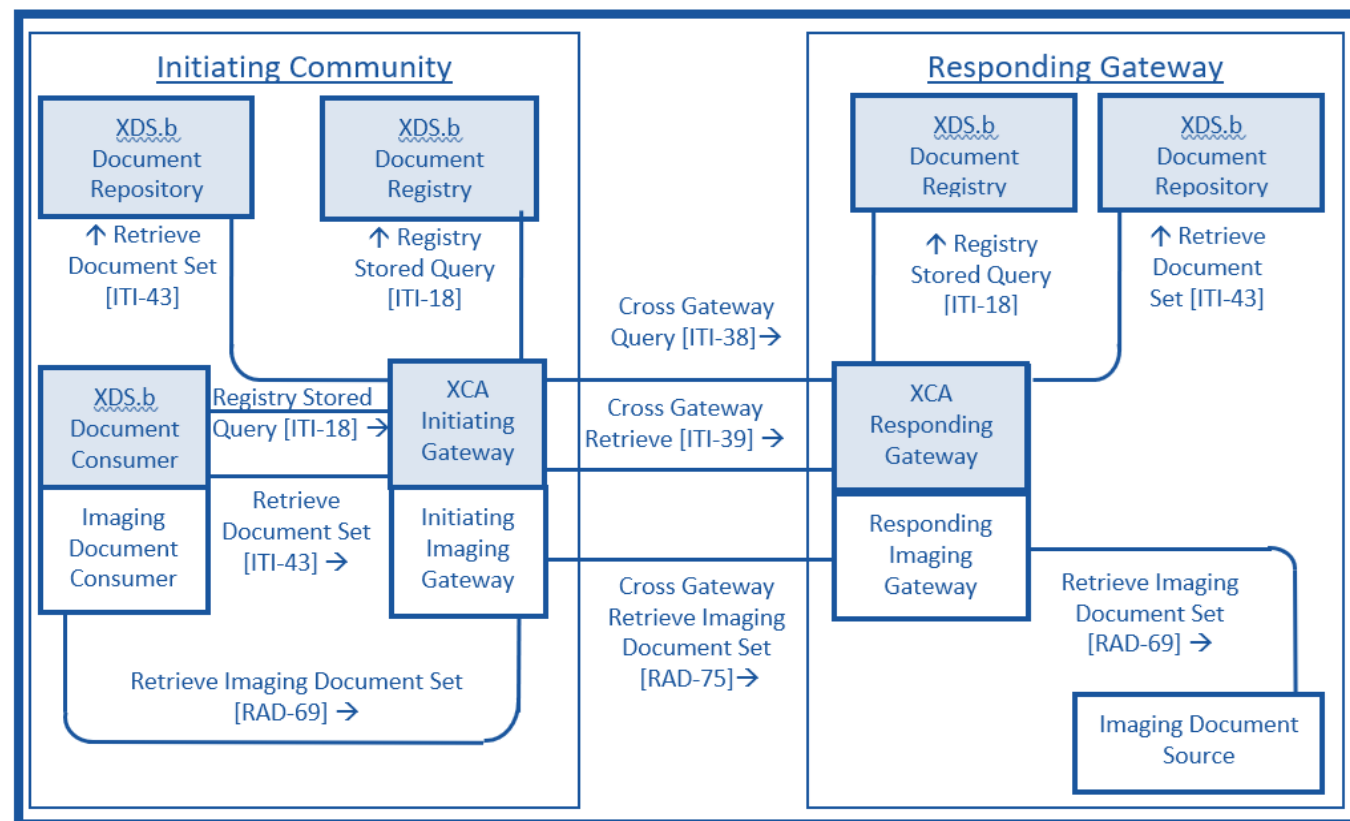
Figure 29.1-1: Cross-Community Access for Imaging Actor Diagram

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Welcome to Three New CCA Signees – Image Exchange

Nationwide Health Information Network Started by Government and Supported by Private Sector

Formerly known as Nationwide Health Information Network (NHIN)

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Charting a Course for the Future

SOURCE: https://www.healthit.gov/infographic/shared-nationwide-interoperability-roadmap-journey-better-health-and-care

For more information on Sequoia http://www.sequoiaproject.org/

For more information on eHealth Exchange http://www.ehealthexchange.org/

For more information on Carequality http://www.carequality.org/

Join the interoperability movement:
https://sequoiaproject.org/interoperability-matters/

RCE Web Site: https://rce.sequoiaproject.org/