

# eHealth Exchange<sup>TM</sup>

## Improving Data Quality

*With Veterans Administration and eHealth Exchange*

# Introductions

## The Analyst

Sandi Mitchell, RPH, MSIS, FASHP  
VHIE Health Care Clinical Data Quality Analyst



## The eHealth Exchange

Didi Davis, VP Informatics, Conformance & Interoperability



## The Caregiver

Fran Martin, RPh  
Retired Health Care Executive and  
Health Care Consultant



## The Clinician

Maureen Layden MD, MPH



## The Vendor

Jason Vogt, MEDITECH Supervisor  
and Technical Project Manager





# Data Quality Improvement Content Testing Program

eHealth Exchange<sup>TM</sup>

## eHealth Exchange Testing Program Overview



**eHealth Exchange Participant Testing Program:** This process verifies that Systems used by Applicants and Participants comply with the Specifications and satisfy the requirements established by the DURSA.



**eHealth Exchange Validated Product Program:** This process verifies that the Systems developed by Vendors that may be used by Applicants and Participants, comply with the Specifications prior to being implemented in the Applicant's and / or Participant's production environment. The objective is to establish built-in conformance and interoperability into these Systems to minimize variability in System compliance in production.



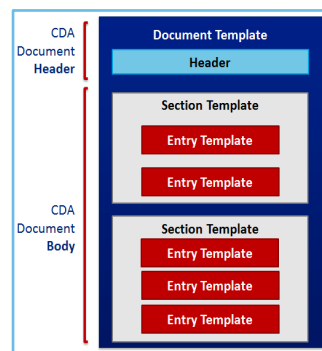
**eHealth Exchange Content Testing Program:** documentation, testing methodology, and test data that will be required for interoperability testing to enable the exchange of clinical content between eHealth Exchange Participants.



## Content Testing Program Background & History

<https://ehealthexchange.org/testing-program/content-testing/>

1. 06/2015 Testing Workgroup approved by the eHealth Exchange Coordinating Committee (CC)
2. 07/2016 Content Testing Pilot Completed
3. 01/2017 Requirements Effective
  - MU 2011 Edition (HL7 CCD/C32)
  - MU 2014 Edition (HL7 C-CDA R1.1) + Companion Guide
  - MU 2015 Edition (HL7 C-CDA R2.1) + Companion Guide
4. 02/2018 Sequoia Interoperability Testing Platform Launched/Available – Content
5. 10/2019 All Existing and New Participants MUST Complete Initial Testing
6. April 30, 2021 All Participants must have remediated all reported errors or received a waiver from the Coordinating Committee (CC)
  - Participants unable to remediate all errors and conformance issues should submit a remediation plan and/or a conformance waiver request to the eHealth Exchange for Coordinating Committee consideration by 2/28/2021
7. Participants onboarded after 10/1/2019 are provided 18 months from date of testing submission to remediate reported issues.



## Content Testing Status

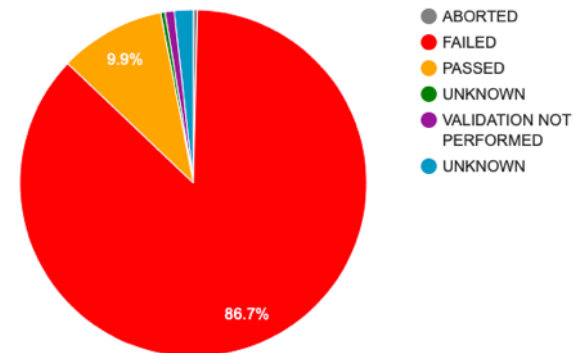
- **10%** of Eligible Participants organizations have **Passed**

– <https://ehealthexchange.org/participants/>  **Content Validated**

- **90%** have Submitted and **Failed** 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

- >14,000 Documents Tested with >70% tested against HL7 C-CDA R2.1 Standards
- Sequoia working with Vendors and their Customers to coordinate remediation





# Quarterly Tooling Updates

## Defects Listing Sample – Issues reported since July 29, 2020



**eHealth Exchange 2018 Content Testing ANNOUNCEMENT:** The Content Testing Tools were updated on July 29, 2020 to remediate issues previously reported by participants. The tooling incorporates the [July 13, 2020 Value Set Release](#) from the Value Set Authority Center (VSAC). Please navigate to the permanent link previously submitted and revalidate your testing report by pressing the "Validate Again" button. This will overwrite your previous report while maintaining the same permanent link for ease of tracking.

The [User Guide](#), video and more information can be found at the [eHealth Exchange website](#). Please note you will be required to register for a participant login to access the wiki and this documentation.

Questions should be emailed to [testing@sequoiaproject.org](mailto:testing@sequoiaproject.org).

- Please note that you need to be logged into this tooling in the upper right corner order to perform content testing.
- This tool is a user-friendly front-end to the validation web services offered by The Sequoia Project as part of the Interoperability Testing Platform (ITP).
- Value Sets reported for eHealth Exchange Content Testing come from <https://vsac.nlm.nih.gov> last updated July 13, 2020.

### KNOWN ISSUES - All Validators

All HL7 CDA R2 Basic Requirements listed in this document: [CDA Basic Requirements Document](#) should be ignored.

**Background:** Sequoia has been working with the HL7 Structured Documents Workgroup (SDWG) to determine the best path forward with regards to all rules that our tooling fires errors for listed in this document: <https://gazelle.ihe.net/cda/cda-basic-req.pdf>.

In summary, these are rules that are part of the base CDA R2 normative specifications that the US Realm C-CDA SHOULD inherit from ([http://www.hl7.org/implement/standards/product\\_brief.cfm?product\\_id=7](http://www.hl7.org/implement/standards/product_brief.cfm?product_id=7)). However, maintenance and errata submitted on this normative edition has not been processed by the HL7 Structured Documents Workgroup (SDWG) and HL7 has not published an updated CDA R2 normative document set as of this date. Sequoia brought this to the SDWG attention and it was discussed on May 1, 2020 where the following guidance was provided as follows:

These rules were discussed with the HL7 Structured Documents Workgroup on May 1, 2020 and the following guidance was provided:

- If validators wish to implement these rules HL7 recommends they be balloted through a formal HL7 standards review process. Some of the rules have been superseded by HL7 M&M guidance and RIM errata not processed by HL7 timely.
- The content testing tooling will be updated in October 2020 to disable these rules that the HL7 Structured Documents Workgroup feel need further vetting for appropriateness.

### KNOWN ISSUES - HL7 C-CDA R2.1

- **CONF: 1098-31579** - This Error should show as a Warning. This has been reported to HL7 as an Errata ([http://www.hl7.org/dstucomments/showdetail\\_comment.cfm?commentid=1856](http://www.hl7.org/dstucomments/showdetail_comment.cfm?commentid=1856)). It appears that VSAC, which is our authoritative source of truth for the testing tooling related to value sets does not contain ALL the UCUM codes. This effectively brings the valueSet validation to a SHOULD (since it's only a fraction of all valid UCUM for current and near-future). We'll be working with HL7 to help improve the valueSet for the UCUM codes, even though the binding was turned down to a warning.
- **CONF: 1198-32323** EncounterTypeCode reporting improper error.
- **CONF: 1098-31928** Smoking Status Reporting improper error.

**KNOWN ISSUES - HL7 C-CDA R1.1** - Please NOTE that this specification is no longer being maintained by HL7 with regards to Errata processing.

- Any Schematron related Errata found [here](#) will likely show as an error that cannot be remediated within the tooling for the foreseeable future as Sequoia depends on HL7 to maintain the Schematron. There are 8 issues logged that are Schematron related.

Sequoia Interoperability Testing Platform (ITP)  
<https://gazellecontent.sequoiaproject.org/EVSCClient/home.seam>

# Content Testing Frequently Asked Questions

<https://ehealthexchange.org/testing-program/content-testing/>

## Sequoia Interoperability Testing Platform (ITP) Access

Is there a cost to access the Sequoia ITP Content Testing Validators? ^

- The Content Testing Tools are free for use by eHealth Exchange Participants and their vendors.
- The Content Testing Tools are free for use by Sequoia Project Member Organizations.
- If your organization does not meet either of the two criteria above, a yearly subscription can be obtained. Please send an email to [testing@sequoiaproject.org](mailto:testing@sequoiaproject.org) for more information.

How do I get access to the Sequoia Interoperability Testing Platform (ITP)? v

I have had a staff member who previously conducted our content testing leave our organization. How do I request for users to be removed from the Sequoia ITP? v

I have lost my password for the Sequoia ITP, how do I reset it? v

What is the URL for the Content Testing Tooling component of the ITP? v

## Documentation & Value Sets

How do I gain access to the eHealth Exchange Wiki to access the content testing documentation? v

I have lost my record of the permanent link references my organization submitted. How can I retrieve the permanent links previously provided? v

Where can we find the value sets or codes used by the content testing tooling? v

## Other

My organization has implemented a Meaningful Use certified product. Why does the Sequoia ITP show errors that the Edge Testing Tool (ETT) and/or the Standards Implementation & Testing Environment (SITE) does not. v

I am concerned that this initiative is taking quite a bit of time from HIE and EHR vendors, why do I need to expend the resource time to remediate issues identified? v

My testing report is only providing information for the first 50 errors and I have more than that according to my testing summary. How do I get information for all the errors to review? v

## Process

How do I submit my results once testing is completed? v

The Content Testing Tooling was updated, what do I need to do to rescore my testing previously submitted? v

We have completed our revalidation with the tooling update, do we need to officially resubmit our results, or does Sequoia watch for the results via the tool? v

How will I know which participants have successfully passed testing? v

How long will we have to remediate issues found in the content testing program? v

What happens if my vendor will not be able to remediate issues by the April 30, 2021 date? v

What is meant by a remediation plan? v

Can I use PHI in the content testing submitted? v

How do I report defects found within the tooling? v

Where can I find known issues that may have already been reported for the Sequoia ITP? v

What is required to be remediated? Are only Errors required? What about warnings? v

I tested my content against the CDA R2 validator, why did you not accept this for formal testing? v



# HL7 Value Set Updates Published Annually

The National Library of Medicine announced the Value Set Authority Center (VSAC) publication and downloadable files of the HL7 Consolidated Clinical Document Architecture (C-CDA) R2.1 value sets, authored by the HL7 Terminology group were made available **July 13, 2020**

- See the FAQ section [here](#) in the [Documentation and Value Sets section](#) for more information on ways to access & download the value sets



## Let's Improve the C-CDA Together!

In response to growing industry pain points surrounding content data quality, the eHealth Exchange launched its Enhanced Content Testing Program on February 5, 2018, supported by the Sequoia Interoperability Testing Platform (ITP) that enables Participants to submit representative samples of the clinical content documents such as C-CDAs or C32s that they share over the eHealth Exchange Network. The ITP provides feedback and reports to Participants regarding conformance to structure, vocabulary and content specifications, drawing on respective HL7 C-DA specifications referenced by Meaningful Use 2011, 2014 and 2015 editions of Meaningful Use requirements.

New Applicants joining the eHealth Exchange, as well as Product vendors wishing to validate their products are required to test as part of the ongoing process.

**\*DEADLINE to pass content testing for ALL participants who tested on or before October 1, 2019 = May 1, 2021**

**\*DEADLINE to pass content testing for participants who tested after October 1, 2019 = 18 months from initial testing report date**  
Participants unable to remediate all errors and conformance issues should submit a remediation plan and/or a conformance waiver request to the eHealth Exchange for Coordinating Committee consideration within 16 months of the date test results are submitted.

## Happening This Month: Webinar on Improving Data Quality



The eHealth Exchange has been collaborating with the

## eHealth Exchange Content Testing FAQs

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### Documentation & Value Sets

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Where can we find the value sets or codes used by the content testing tooling?

- You can find all the value sets available here: <https://vsac.nlm.nih.gov/>. This site does require a UMLS license/account.
- To obtain a UMLS license you need to reference the screenshot below to request an account:
- Watch this video to learn how to download value sets.



## Content Testing Program Communications Plan 2020 - 2021

Date	Description	Media
March 2020	March 29, 2020 – Sequoia Interoperability Testing Platform Validator Update	User Emails & Multi-media
May – April 2021	Monthly Informational Call – Reminder Highlight	PowerPoint/webinar recording
June 2020	Website redesign – Blog, videos, Twitter, LinkedIn Begins	Mailchimp email & Multi-media
July 2020	July 13, 2020 Value Set Authority Center Annual Value Set Update – C-CDA R2.1 July 29, 2020 Sequoia Interoperability Testing Platform Validator Update	Mailchimp email & Multi-media
August 2020	Webinar Content Testing Program Update and VA/VHIE program collaboration update	PowerPoint/webinar recording
October 2020	3 <sup>rd</sup> Quarter tooling update Webinar 6-month milestone reminder – April 30, 2021 – Begin Office Hours every two (2) weeks	Mailchimp email & Multi-media PowerPoint/recording
December 2020/ January 2021	4th Quarter tooling update	Mailchimp email & Multi-media
February 2021	Present remediation plan/waiver requests to CC for approval	Mailchimp email & Multi-media
June 2020 – April 2021	Blog newsletter, YouTube Videos, Twitter, LinkedIn	Mailchimp email & Multi-media



# Collaborating with HL7 and other Industry Partners on Content Pain Points



## **Optionality:**

More than one way to do things and inconsistent implementations across vendors



## **Terminology:**

Inconsistent terminology usage



## **Specification Ambiguity**



## **Complexity:**

The C-CDA standard is difficult to understand and consume and is lacking in clearly documented examples



# VHIE Clinical Data Quality Management Story

Roles Health Care Actors Play in Improving  
Clinical Data Quality

eHealth Exchange<sup>TM</sup>





U.S. Department  
of Veterans Affairs



# Veterans Health Information Exchange (VHIE) – Clinical Data Quality Management Executive Summary

## Who we are

- VA program team including Subject Matter experts (SMEs) in the areas of clinical data, terminologists, and data analytics
- Agnostic, inclusive, and transparent within the health care ecosystem
- Focused on clinical data that adds value to health care decision making for the clinician and patient

## What We Do

- Continuous surveillance monitoring of the nation's largest clinical data exchange of HL7 messages and data exchanges
- Perform complex analytics and scoring across vendors, partners, Health Information Exchanges (HIE)
- Provide opportunities to improve clinical data quality at the source, based on comprehensive analytics
- Develop metrics focused on value added clinical content needs

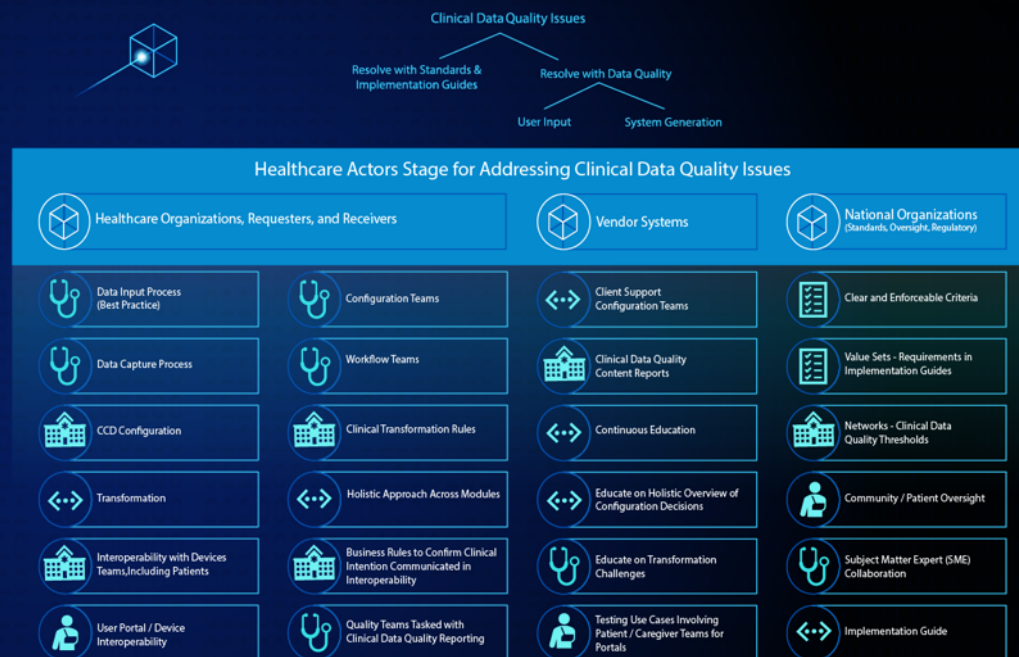
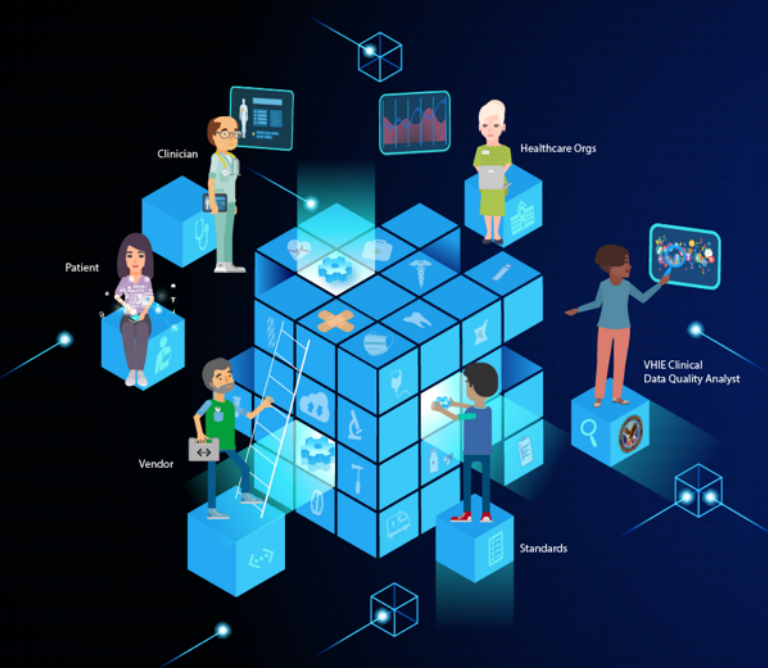
## Why We Do It

- Veterans deserve it
- Increase clinical usage and acceptance of trusted data exchanges to address clinician frustrations
- Improve the data exchanged so clinician can make best health care decisions
- Communicate and educate health care actors across the health care ecosystem on how to improve the data exchange

# Health Care Actors



VETERANS HEALTH INFORMATION EXCHANGE







## Clinical Data Quality Issues

Resolve with Standards & Implementation Guides

Resolve with Data Quality

User Input

System Generation

## Healthcare Actors Stage for Addressing Clinical Data Quality Issues



Healthcare Organizations, Requesters, and Receivers



Vendor Systems



National Organizations  
(Standards, Oversight, Regulatory)



Data Input Process  
(Best Practice)



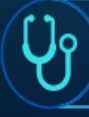
Configuration Teams



Client Support  
Configuration Teams



Clear and Enforceable Criteria



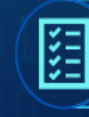
Data Capture Process



Workflow Teams



Clinical Data Quality  
Content Reports



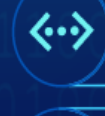
Value Sets - Requirements in  
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CCD Configuration



Clinical Transformation Rules



Continuous Education



Networks - Clinical Data  
Quality Thresholds



Transformation



Holistic Approach Across Modules



Educate on Holistic Overview of  
Configuration Decisions



Community / Patient Oversight



Interoperability with Devices  
Teams, Including Patients



Business Rules to Confirm Clinical  
Intention Communicated in  
Interoperability



Educate on Transformation  
Challenges



Subject Matter Expert (SME)  
Collaboration



User Portal / Device  
Interoperability



Quality Teams Tasked with  
Clinical Data Quality Reporting



Testing Use Cases Involving  
Patient / Caregiver Teams for  
Portals



Implementation Guide

## Health Care Ecosystem Today – Do you know...

90%

### Heavy reliance on outdated technology impacts on communication

90% of health care organizations are still using fax machines

- **9+ Billion** fax pages get exchanged each year in health care
- **30%** of tests are ordered due to lost or missing fax
- **80%** of all serious medical mistakes result from poor or lacking communication, which include fax
- **\$2.5 Million** largest HIPAA fine issued for faxing to the wrong number
- **25%** of faxes do not make it before the patient arrives for their first visit

**Many clinicians unaware of how to share data to an external partner**

### COVID-19 Project Discoveries

- Demographics not captured
- Inconsistent capture
- Standards slow to adapt



### In the U.S. There are an estimated:

- 811,552 Physicians
- 191,168 Dentist
- 5,008 Hospitals
- 5,211 Imaging Centers
- 15,622 Nursing Homes
- 209,499 Laboratories

### Patients are Taking Notice

74% of U.S. Adults who expressed frustrations in a recent hospital stay

Slow discharge/transfer time	31%
Limited time with doctor	22%
Long waiting room wait time	22%
Communication with doctor	19%
Lab results took too long	15%

74%

# Clinical Data Quality Program



VETERANS HEALTH INFORMATION EXCHANGE

## Line of Sight to Value Highlights

The line of sight to value means that the current work is part of the larger vision and the Joint Organization's core strategies.



Improved decision-making



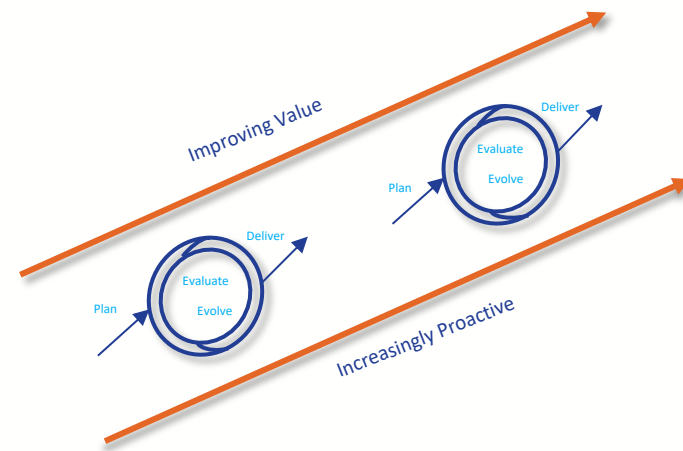
Enhanced patient/clinician time



Increased productivity



Reduced



- Continuous recalibration of resource allocations
- Reprioritization at the speed of life
- Understand the concept of leverage and apply it at every moment

~ from "Leverage" by Tony Jeary



# Interoperability and Data Quality Expectations vs. Reality



## EXPECTATION

### *Patients Expect*

- Complete health record data exchange
- Complete, timely, and current data exchange for comprehensive records



### *Clinicians Expect*

- Complete encounter details
- Available in native EHR
- High-quality, well-coded clinical data content



## EXPERIENCE

### *Patients Experience*

- Missing data domains and encounters
- Missing data records leading to duplicated tests or procedures

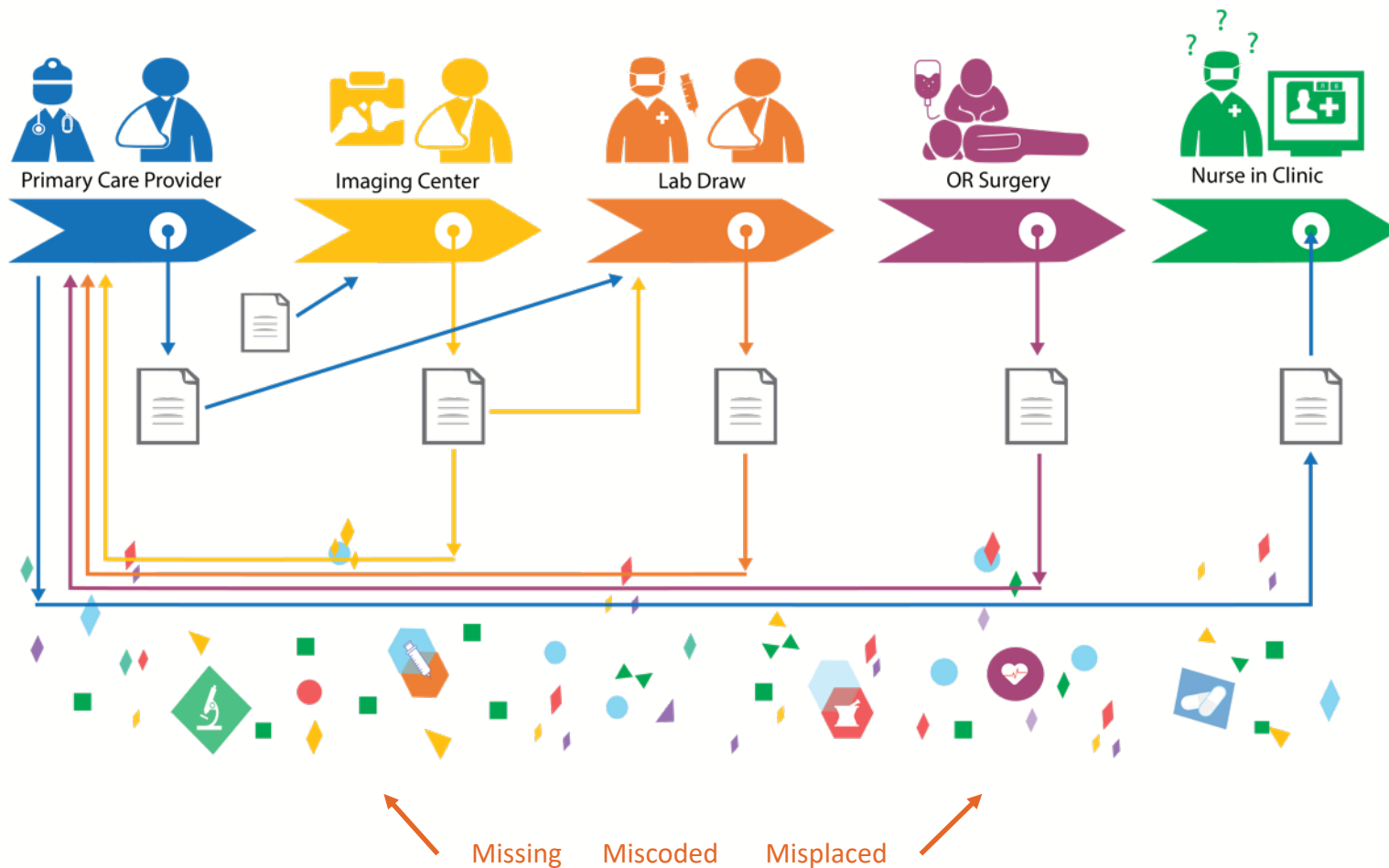
### *Clinicians Experience*

- Missing encounter details
- Hard to find within EHR
- Misplaced / Miscoded clinical data content

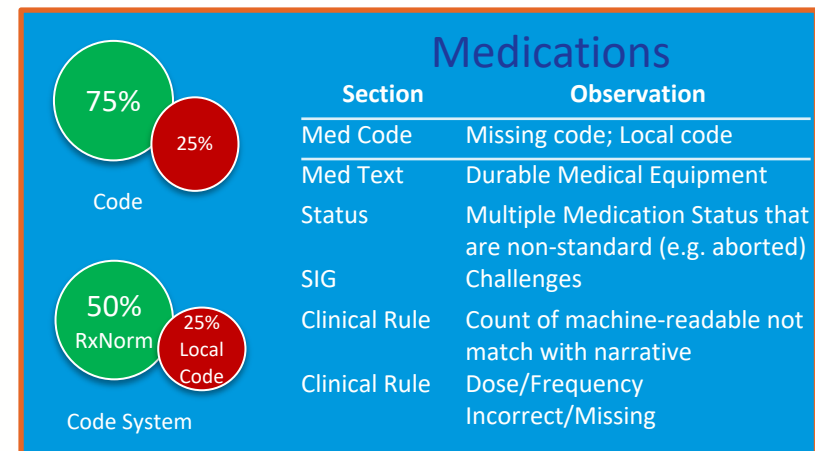
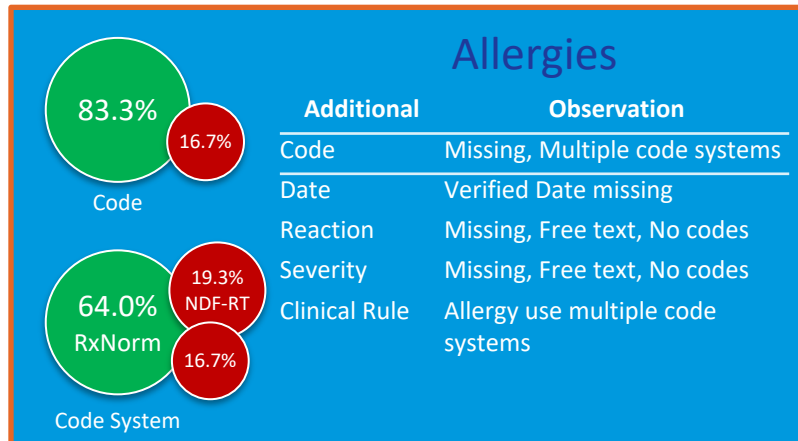
# Data Story



VETERANS HEALTH INFORMATION EXCHANGE



## Example: Health System C-CDA Domain Observations



### Health Care Actors

**Clinician** – Educate Best Practice within local system to indicate date reviewed.

**National Orgs** – Educate challenges for records without codes.

**Vendors** – Configuration Wellness review with data quality reporting discussions

### Health Care Actors

**SME** – Educate - data loss challenges of uncoded data and/or using local codes

**Vendors** – Implementation training about the impact of config decisions

**Health Care Systems** – Educate – holistic approach configurations



Caregiver



# Caregiver Story

## Background

- 95-year old Caucasian male (physician) who fought in WWII
- Retired in an 'independent' living situation with his 93-year old wife
- Problems – thyroid, kidney (stage 3), spinal stenosis, bowel and urinary incontinence, self catheterization, recent glaucoma diagnosis
- Medications – Thyroid, Gabapentin, Amlodipine, Latanoprost, Aspirin, Tylenol
- Has PCP at the VA Raleigh Clinic (Durham VAMC) and uses external health care resources

## Caregiver

- Retired health care executive, Pharmacist, daughter with extensive global clinical research experience



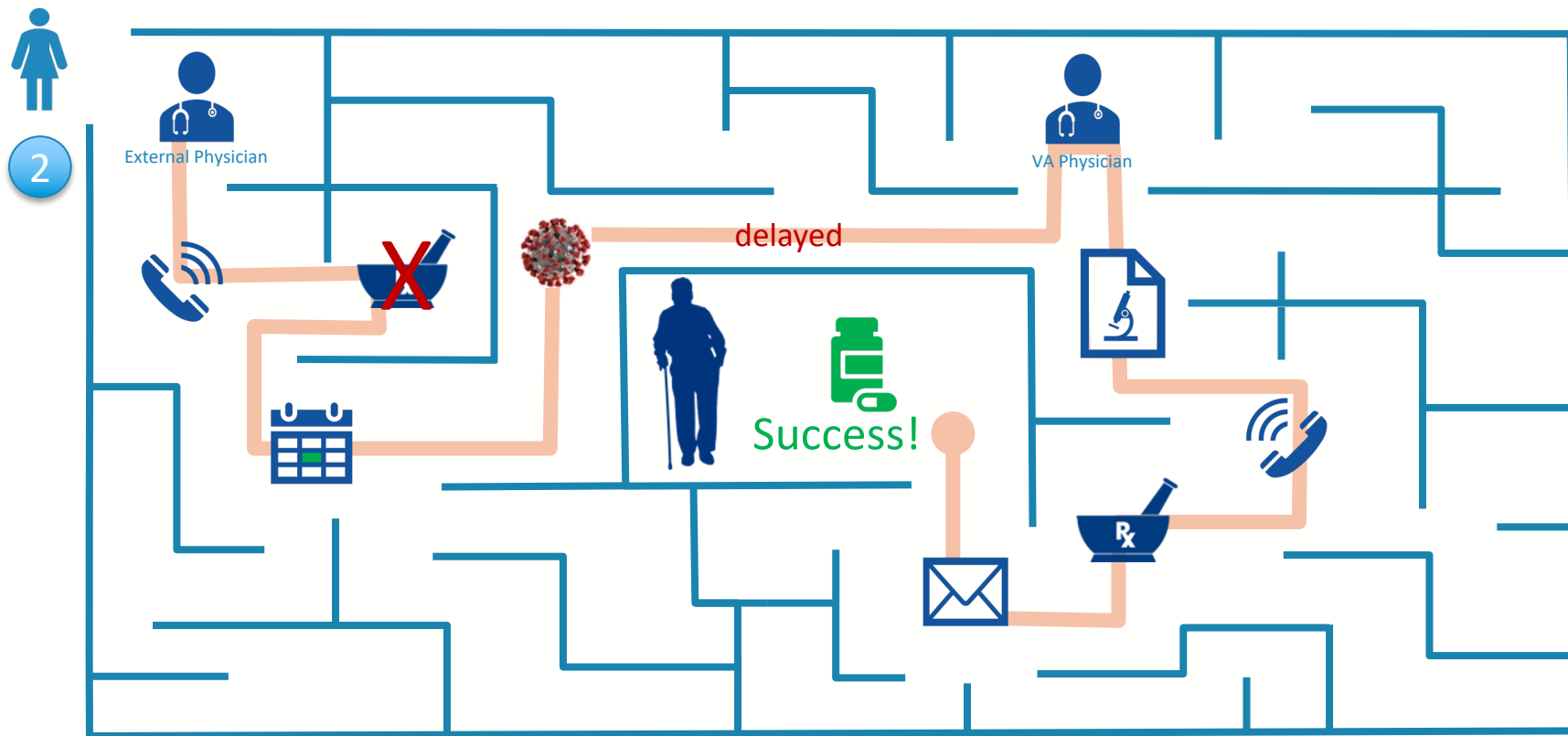
## Lab / Medication

- Routine lab work done at Wake Med for Wellness check
- Thyroid lab values indicated to external health care doctor that adjustments were needed to thyroid medication
- External health care doctor cannot electronically communicate with Raleigh VA doctor

## Palliative Care

- Pain Management and end of life discussions

## EXPERIENCE: What Happened

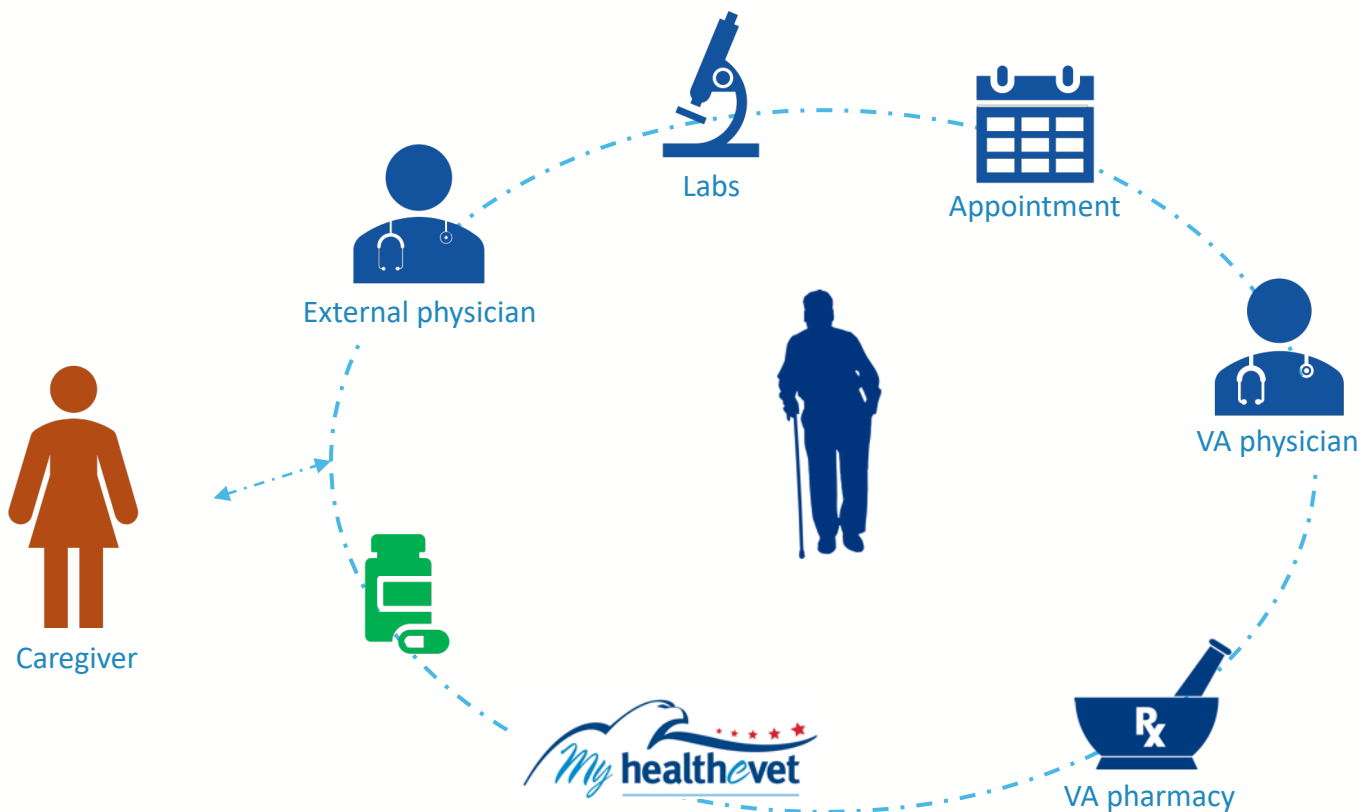




## Caregiver Story – Experience versus Expectation

### EXPECTATION: Best Case Experience

Seamless patient care



Clinician



# Clinician Story

## Background

- VA Program Director for Medication Information Management & Medication Reconciliation
- Family Physician with training in patient safety and quality management
- Extensive committee work including
- VA Policy and Metrics for Medication Information Management Standards
- Patient Centered Medication Information Management
- Advise VA current and future state functionalities to recreate safe, effective, team built, patient centered medication care



## Need

- Veterans and their health care teams are managing their medications virtually, online, or on the phone during the pandemic.
- Veterans are engaged using:
  - My HealtheVet
  - Mobile
  - VA.gov
  - AudioCare
  - Telehealth
  - Call Centers
  - Postal System
  - Etc....

# Clinician Story

## EXPERIENCE: What Happened

Pre COVID-19

Robust and integrated community health center



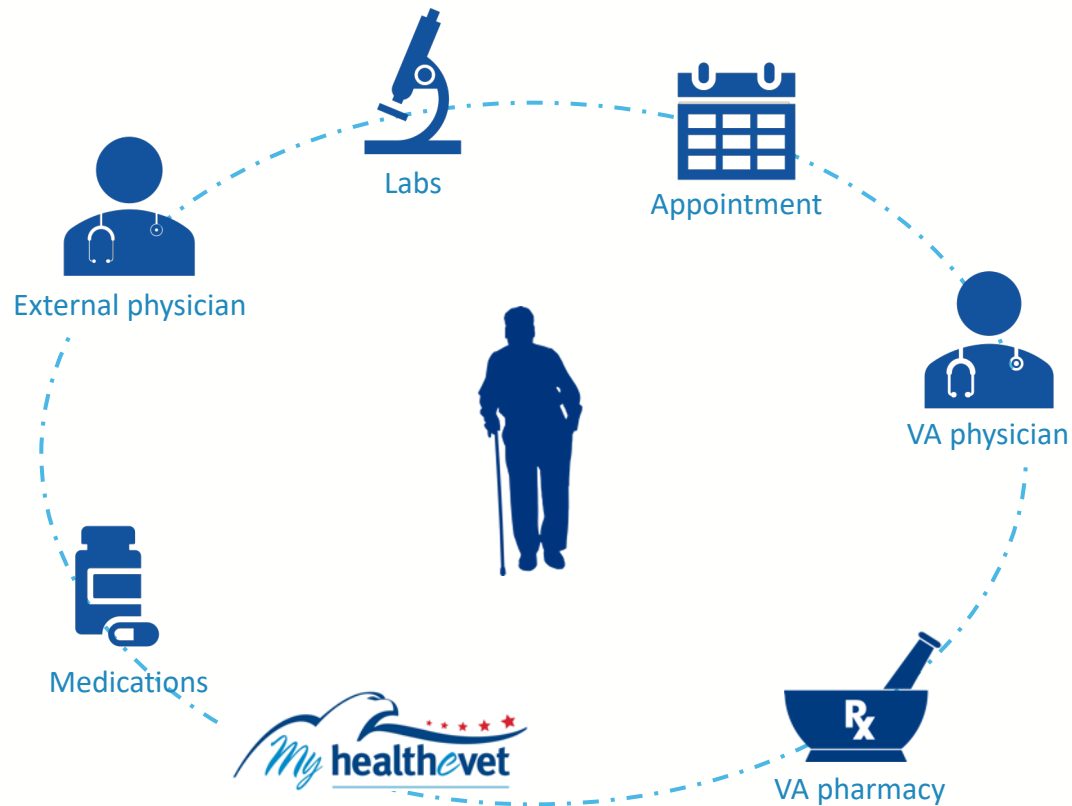
Post COVID-19

Many clinics closed; community dispersed





## Clinician – Experience versus Expectation



Data is the critical Foundation.  
Let's share clinical data the best way possible and help each other!

Vendor



# Vendor Story

## Struggles

- Supporting Legacy Platforms
- Implementation vs Current State
- Adhering to Best Practices
- Data Collection
- Variances in interpretations
- Different certifying bodies
- Data Mapping of Historical Data
- Feedback Loop
  - Where it went
  - Was it well received
  - No repercussion for bad data

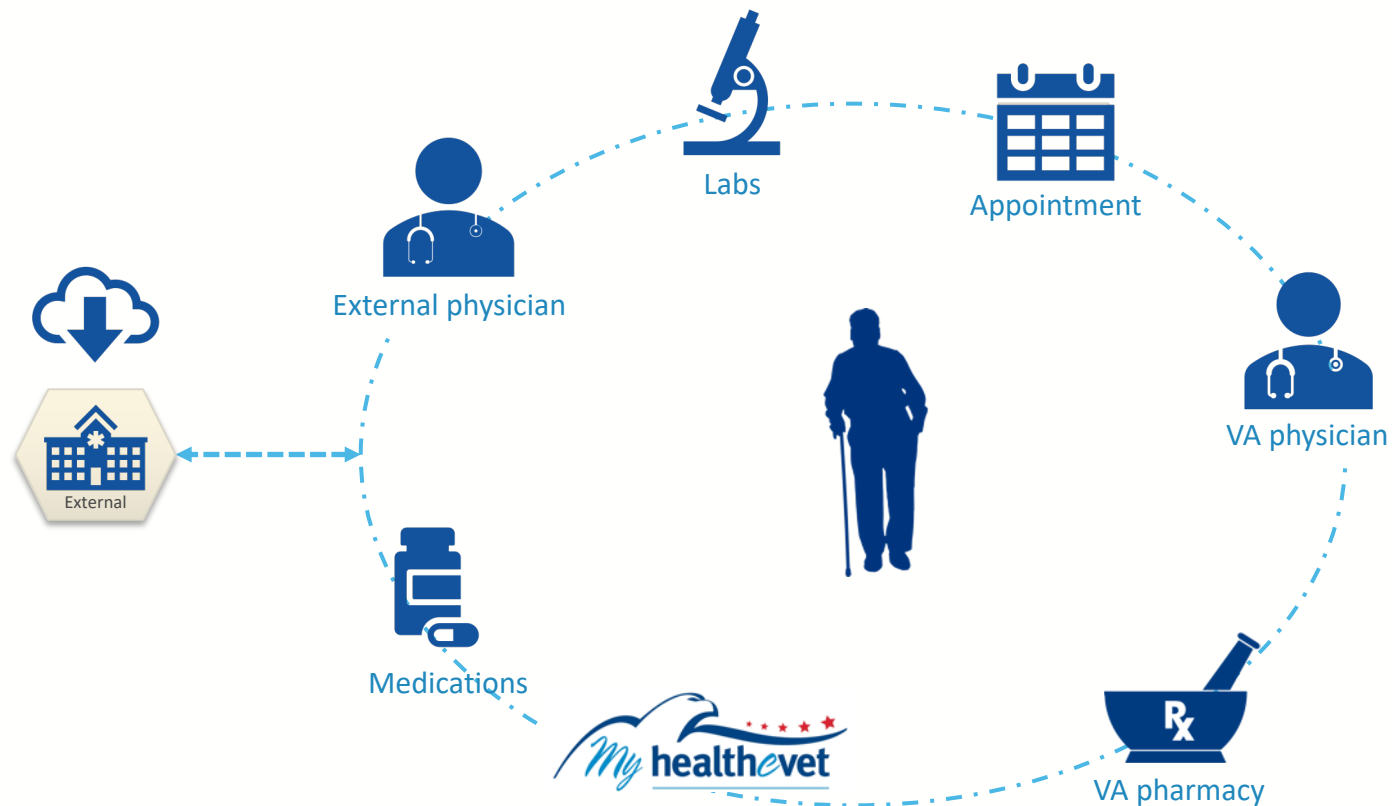


## Need

- Support from industry as a whole
- Tighter standards
- Consensus on implementation standards
- Less data mapping or other adjustments that could potentially get lost in transmission

## Vendor Story – Experience versus Expectation

### EXPECTATION – BEST CASE







## How do we get better?

### CommonWell and Carequality Joint Document Content workgroup

- Initial Workgroup
  - Concise Consolidated CDA: Deploying Encounter Summary CDA Documents with Clinical Notes version 1.0
- Clarifications
  - [Concise Consolidated CDA: Deploying Encounter Summary CDA Documents with Clinical Notes version 1.1](#)
- 2020 Workgroup
  - Dynamic generation, versioning, encounter lifecycle, Labs
- Both Organizations are discussing adoption timeframes

### CommonWell Data Quality Workgroup and Use Case

- Multi-Step Approach to collect, analyze, score/grade and enhance
- Random sampling of production data from every organization
- Use case has been approved by the use case committee
- Alliance consensus on scoring/grading

## Where Do We Go From Here



## Clinical Data Quality Issues

Resolve with Standards & Implementation Guides

Resolve with Data Quality

User Input

System Generation

## Healthcare Actors Stage for Addressing Clinical Data Quality Issues



Healthcare Organizations, Requesters, and Receivers



Vendor Systems



National Organizations  
(Standards, Oversight, Regulatory)



Data Input Process  
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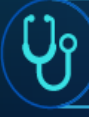
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Client Support  
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Clear and Enforceable Criteria



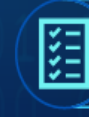
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Implementation Guide

# Final Thoughts

## Key points

- Interoperability can make a big difference in health care decisions for the clinician and patient
- All health care actors are involved

## The one thing

- Now is the time to start

## Future-forward

- Focus directly at the clinical data quality problems and start mitigating across the health care ecosystem





## Contact

Role	Name	E-mail	Phone
VP, Informatics, Conformance & Interoperability	Didi Davis	<a href="mailto:ddavis@sequoiaproject.org">ddavis@sequoiaproject.org</a>	+1-865-671-1624
Data Quality Team Contacts	VHIE Data Quality Team	<a href="mailto:VHIEDATAQUALITYTEAM@va.gov">VHIEDATAQUALITYTEAM@va.gov</a>	
Health Care Data Quality Analyst, SME, DQT Team Leader	Sandra Mitchell	<a href="mailto:Sandra.Mitchell@va.gov">Sandra.Mitchell@va.gov</a>	+1-919-521-5631