Founded in 1983, J P Systems, Inc. provides:
- Clinical data quality improvement
- Terminology consultations
- HL7 data standards
- Data architecture
- IT policy and strategy
- Stakeholder engagement
- Interoperability planning
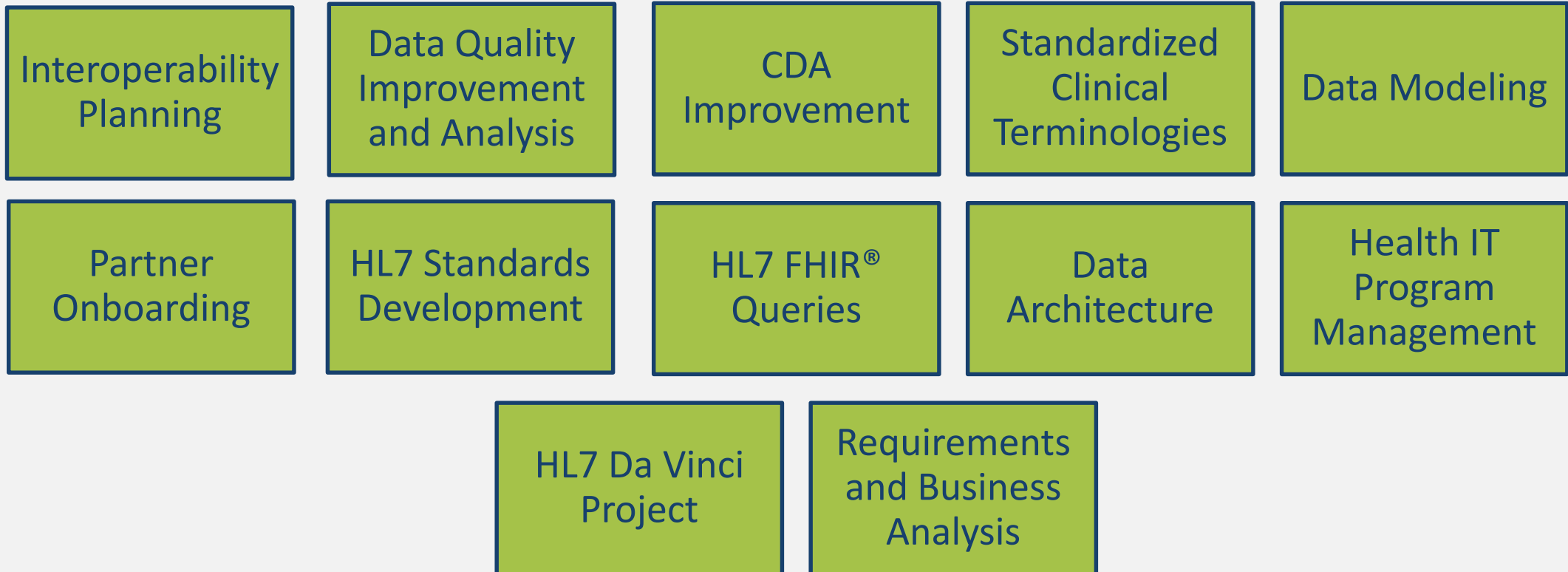
Focus on Data Quality

Questions we will answer:

- **What is a CDA file?**

- **How do we improve Data Quality?**

- **Why is DQ so vital?**

- **How can data quality improve patient care?**

- **How does data quality support patient safety?**

- **How can you improve clinical workflows?**

- **Why are data standards important?**

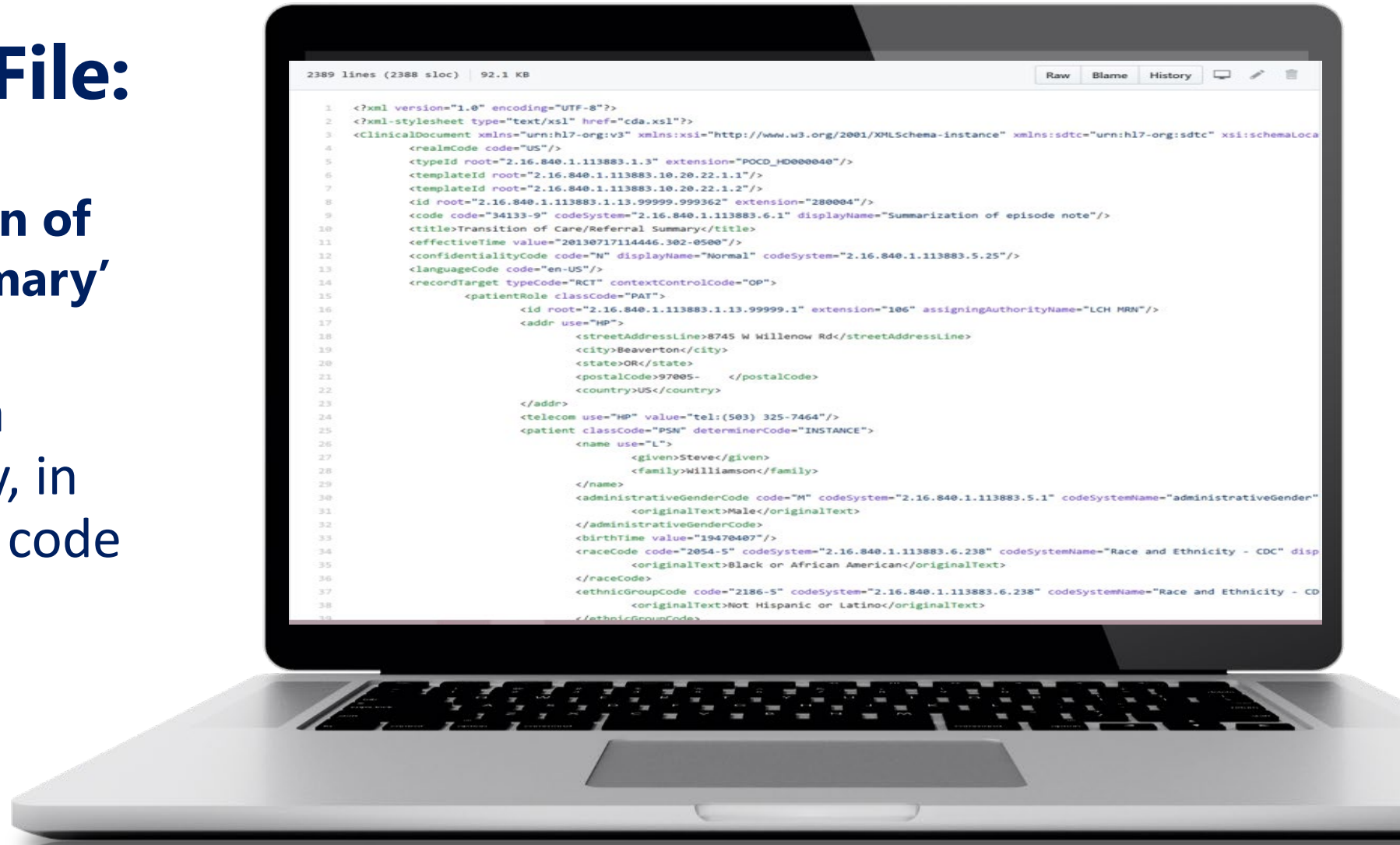# WHAT IS A CDA FILE?
HL7's Clinical Document Architecture

CDA is a data standard for documents designed for the exchange of clinical data. They are composed according to a international standard created by HL7, an international data exchange organization

CDA files are coded in Extensible Markup Language (XML)

Sample CDA File:

A Cerner 'Transition of Care Referral Summary'

The XML points to a specific terminology, in this case a CDC REC code system for race.

Line 34

```
<raceCode code="2054-5" codeSystem="2.16.840.1.113883.6.238" codeSystemName="Race and Ethnicity - CDC" disp
    <originalText>Black or African American</originalText>
</raceCode>
```

```xml
1   <?xml version="1.0" encoding="UTF-8"?>
2   <?xml-stylesheet type="text/xsl" href="cda.xsl"?>
3   <ClinicalDocument xmlns="urn:hl7-org:v3" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:sdtc="urn:hl7-org:sdtc" xsi:schem
4           <realmCode code="US"/>
5           <typeId root="2.16.840.1.113883.1.3" extension="POCD_HD000040"/>
6           <templateId root="2.16.840.1.113883.10.20.22.1.1"/>
7           <templateId root="2.16.840.1.113883.10.20.22.1.2"/>
8           <id root="2.16.840.1.113883.1.13.99999.999362" extension="280004"/>
9           <code code="34133-9" codeSystem="2.16.840.1.113883.6.1" displayName="Summarization of episode note"/>
10          <title>Transition of Care/Referral Summary</title>
11          <effectiveTime value="20130717114446.302-0500"/>
12          <confidentialityCode code="N" displayName="Normal" codeSystem="2.16.840.1.113883.5.25"/>
13          <languageCode code="en-US"/>
14          <recordTarget typeCode="RCT" contextControlCode="OP">
15                  <patientRole classCode="PAT">
16                          <id root="2.16.840.1.113883.1.13.99999.1" extension="106" assigningAuthorityName="LCH MRN"/>
17                          <addr use="HP">
18                                  <streetAddressLine>8745 W Willenow Rd</streetAddressLine>
19                                  <city>Beaverton</city>
20                                  <state>OR</state>
21                                  <postalCode>97005-     </postalCode>
22                                  <country>US</country>
23                          </addr>
24                          <telecom use="HP" value="tel:(503) 325-7464"/>
25                          <patient classCode="PSN" determinerCode="INSTANCE">
26                                  <name use="L">
27                                          <given>Steve</given>
28                                          <family>Williamson</family>
29                                  </name>
30                                  <administrativeGenderCode code="M" codeSystem="2.16.840.1.113883.5.1" codeSystemName="administrativeGe
31                                          <originalText>Male</originalText>
32                                  </administrativeGenderCode>
33                                  <birthTime value="19470407"/>
34                                  <raceCode code="2054-5" codeSystem="2.16.840.1.113883.6.238" codeSystemName="Race and Ethnicity - CDC"
35                                          <originalText>Black or African American</originalText>
36                                  </raceCode>
37                                  <ethnicGroupCode code="2186-5" codeSystem="2.16.840.1.113883.6.238" codeSystemName="Race and Ethnicity
38                                          <originalText>Not Hispanic or Latino</originalText>
39                                  </ethnicGroupCode>
```

HOW WE IMPROVE DATA QUALITY AND CLINICAL WORKFLOWS

Our DQ Process

1. Obtain statistically significant sample data
2. Identify the source of hindrances to data quality
3. We conduct data reviews of internal and external partner data
4. Provide recommendations for troubleshooting so problems can be traced
5. Provide clients a list of tools to use and likely problem sources, such as a clinical workflow issue, a configuration problem, or a vendor app problem
6. Provide interactive trouble shooting sessions with de-identified data
7. Examine the fields in CDAs to see if the data contents match the data fields
8. Verify that CDA contents are compliant with HL7 standards using proprietary automated tooling
9. Verify terminologies are correctly used
10. Identify and add new standard terminologies

Automated Tooling

- We have extensive experience using Model Driven Health Tools, (MDHT), for CCD analytic review and creation of a summary clinical spreadsheet

- We use proprietary tooling to perform domain level analysis. We can load and review over 3000 patient CDA documents at one time in a single session

OUR DATA QUALITY SERVICES FOR CDA FILES

Search for the 3 M's:

- **Missing Data**

- **Misplaced Data**

- **Miscoded Data.**

We Review Your DQ Scorecard

- We evaluate your current data, create a scorecard for various domains, and make recommendations for improvements

- Once improvements are made, we rescore the data and provide a second report

- We evaluate incoming external partner data

- We create a scorecard for various domains and make recommendations for improvements.

- Once improvements are made, we rescore their data and provide a second report

EHR PARTNER DOCUMENT SUMMARY REVIEWS

Recurring Patients Analysis

Legend:
- 1 to 2
- 3 to 5
- 6 to 10
- 11+

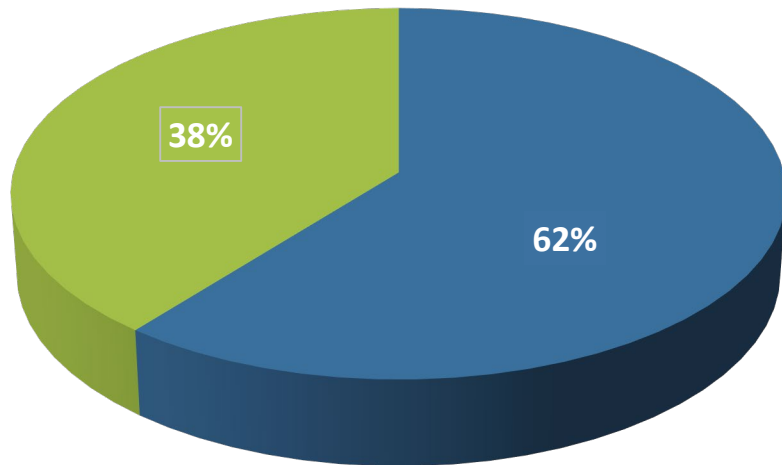Chart values:
- 63%
- 19%
- 12%
- 6%
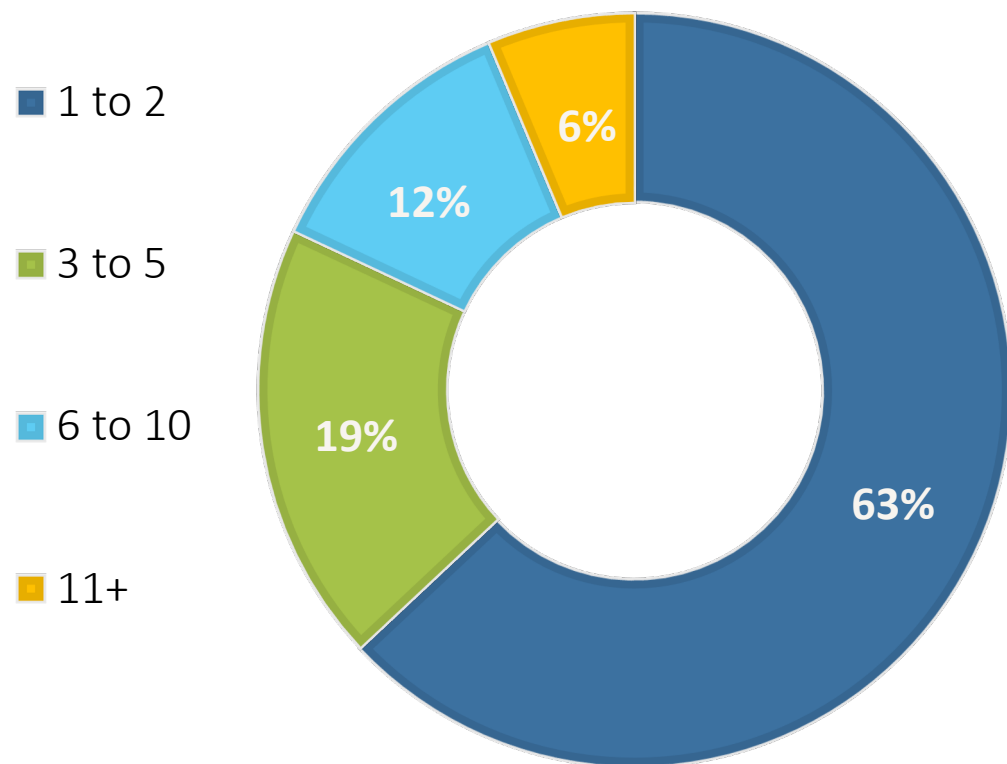
The percentage breakdown of documents per patient:

- 63% have either 1 or 2 documents per patient

- 6% of the documents are represented by patients with more than 10 documents per patient
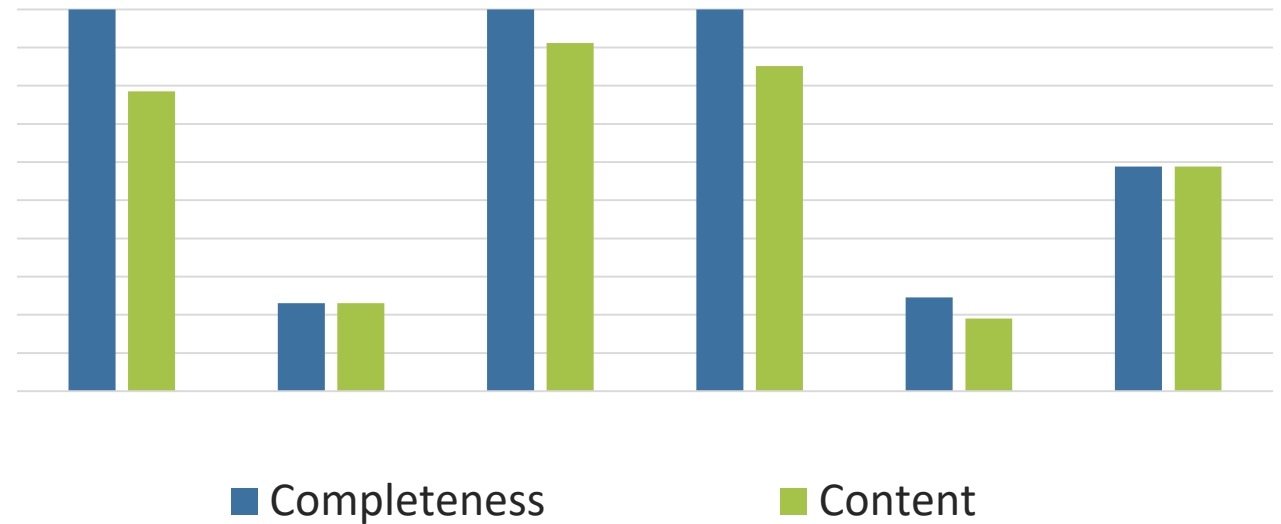
EHR PARTNER DOCUMENT SUMMARY REVIEWS

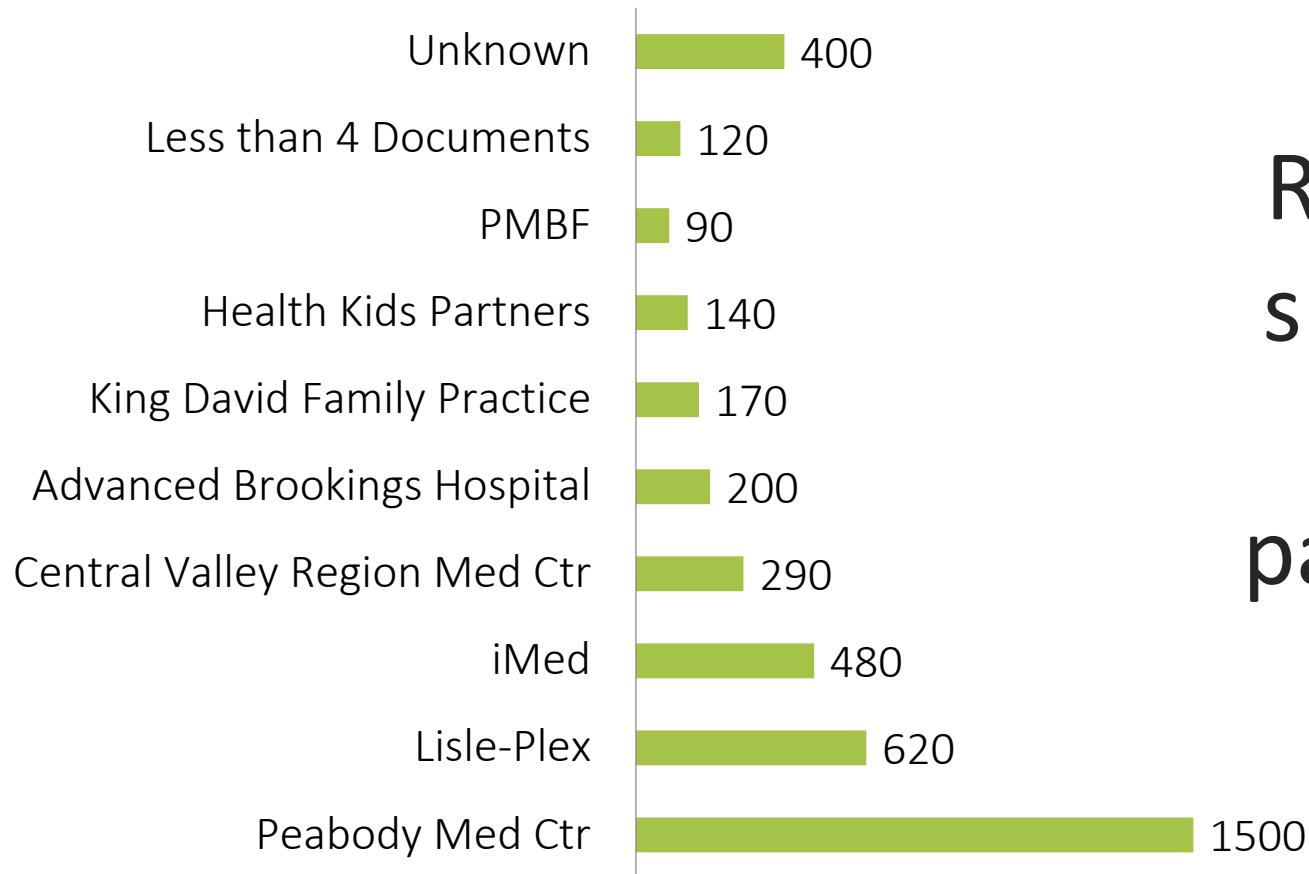## Document Mix Analysis

38%

62%

- Clinical Summary
- Subsequent Evaluation

Clinical Summary Key Indicators Analysis

- Completeness
- Content

o **Allergies:** Verify Date, SNOMED CT Code System, RxNorm Code System
o **Immunizations:** CVX Code System
o **Medications:** Status and Code System
o **Problems :**Date and Code System
o **Procedures:** Code System
o **Vital Signs:** Code System

HIE PARTNER DOCUMENT SUMMARY REVIEWS

Participating Stakeholders

Stakeholder	Value
Unknown	400
Less than 4 Documents	120
PMBF	90
Health Kids Partners	140
King David Family Practice	170
Advanced Brookings Hospital	200
Central Valley Region Med Ctr	290
iMed	480
Lisle-Plex	620
Peabody Med Ctr	1500

Review of the number of submitted documents by each of the HIE's participating stakeholders

WHY IS DATA QUALITY SO VITAL?

- Creates a trusted relationship between the clinician and the data
- Allows healthcare enterprise applications to function optimally
- Patient Safety risks are minimized, duplicative services are reduced, costs are avoided
- Reduces clinician burnout
- Better patient outcomes and customer satisfaction

The need for Interoperability is always increasing:

1. __ONC's Trusted Exchange Framework__ is built on a foundation of data quality assumptions

2. The __Qualified Health Information Networks__, QHINs, will have to meet certain qualifications under ONC's TEFCA

3. __USCDI, US Core Data for Interoperability__ has standardized code sets and a standards harmonization process

4. Builds a more complete and accurate patient record, which can lead to better care coordination, improved patient safety and improved population health reporting

5. Data analytics are improved as the data is more reliable

WHY IS DATA QUALITY SO VITAL?
(CON'T)

HOW CAN DATA QUALITY IMPROVE PATIENT CARE?

The Three R's – Relevance, Robustness and Repercussions

Relevant
Data utilized in entire enterprise. Clinicians need holistic data view

Robust
Standardized data lowers risk of ingestion problems

Repercussions
Patient Safety risks, duplication of services

HOW CAN DATA QUALITY IMPROVE PATIENT SAFETY?

Reliable, interoperable data reduces the risk of bad outcomes through accurate diagnoses, and subsequent treatments

HOW CAN YOU IMPROVE CLINICAL WORKFLOWS?

1. When terminologies are used correctly and data is reliable, AI is empowered to reason over the data and reach useful conclusions.

2. AI can analyze treatment plans to help balance nursing work loads and many other cost saving measures.

3. Data Quality is a bridge to using AI effectively.

WHY ARE DATA STANDARDS IMPORTANT?

HL7 is a Standards Development Organization (SDO) which defines specifications for the data structures for the exchange of clinical messages.

HL7 has many standards: ver. 2, ver. 3, CDA and FHIR®, none of which are interoperable out of the box. All must be made interoperable by parties exchanging the data.

HL7 Mission: to provide standards that empower global health data interoperability.

Data standards answer "How do we format data messages to reliably transmit various kinds of clinical data between providers?"

SAMPLE HL7 VER 2.X XML MESSAGE

WHERE MESSAGE = <LABEL> DATA CONTENTS </END LABEL> <LABEL> DATA CONTENTS </END LABEL> …

In the **HL7** standard, an observation result (**ORU**) is usually in response to an order and provides clinical observations. In **HL7 messaging**, **ORU messages** send structured patient-oriented clinical data between systems (for example, send an EKG result to a physician's office).

```
<?xml version="1.0"?>
<ORU_R01 xsi:schemaLocation="urn:hl7-org:v2xml ORU_R01.xsd" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="urn:hl7-org:v2xml"><MSH><MSH.1>|</MSH.1><MSH.2>^~\&</MSH.2><MSH.3><HD.1>GHH LAB</HD.1></MSH.3><MSH.4><HD.1>ELAB 3</HD.1></MSH.4><MSH.5><HD.1>GHH OE</HD.1></MSH.5><MSH.6><HD.1>BLDG4</HD.1></MSH.6><MSH.7><TS.1>200202150930</TS.1></MSH.7><MSH.9><MSG.1>ORU</MSG.1><MSG.2>R01</MSG.2></MSH.9><MSH.10>CNTRL-3456</MSH.10><MSH.11><PT.1>P</PT.1></MSH.11><MSH.12><VID.1>2.4</VID.1></MSH.12></MSH><ORU_R01.PATIENT_RESULT><ORU_R01.PATIENT><PID><PID.3><CX.1>555-44-4444</CX.1></PID.3><PID.5><XPN.1><FN.1>EVERYWOMAN</FN.1></XPN.1><XPN.2>EVE</XPN.2><XPN.3>E</XPN.3><XPN.7>L</XPN.7></PID.5><PID.6><XPN.1><FN.1>JONES</FN.1></XPN.1></PID.6><PID.7><TS.1>196203520</TS.1></PID.7><PID.8>F</PID.8><PID.11><XAD.1><SAD.1>153 FERNWOOD DR.</SAD.1></XAD.1><XAD.3>STATESVILLE</XAD.3><XAD.4>OH</XAD.4><XAD.5>35292</XAD.5></PID.11><PID.13><XTN.1>(206)3345232</XTN.1></PID.13><PID.14><XTN.1>(206)752-121</XTN.1></PID.14><PID.18><CX.1>AC555444444</CX.1></PID.18><PID.20><DLN.1>67-A4335</DLN.1><DLN.2>OH</DLN.2><DLN.3>20030520</DLN.3></PID.20></PID></ORU_R01.PATIENT><ORU_R01.ORDER_OBSERVATION><OBR><OBR.1>1</OBR.1><OBR.2><EI.1>845439</EI.1><EI.2>GHH OE</EI.2></OBR.2><OBR.3><EI.1>1045813</EI.1><EI.2>GHH LAB</EI.2></OBR.3><OBR.4><CE.1>1554-5</CE.1><CE.2>GLUCOSE</CE.2><CE.3>LN</CE.3></OBR.4><OBR.7><TS.1>200202150730</TS.1></OBR.7><OBR.16><XCN.1>555-55-5555</XCN.1><XCN.2><FN.1>PRIMARY</FN.1></XCN.2><XCN.3>PATRICIA P</XCN.3><XCN.7>MD</XCN.7><XCN.9><HD.1>LEVEL SEVEN HEALTHCARE, INC.</HD.1></XCN.9></OBR.16><OBR.25>F</OBR.25>
…
```

What is HL7's FHIR® standard?

FHIR® stands for **Fast Healthcare interoperability Resources (FHIR®)** and is neither a software package, a database nor a language.   It is an international specification for the exchange of messages with clinical data.

It is revolutionizing healthcare in that it is easy to implement on the web with REST and JAVA has very specific data structures (resources), which are used as 'shipping cartons' for predefined types of data.

It processes queries and returns data, such as "Give me all the patients with a diagnosis of diabetes".

It is general enough to work for the whole world, hence it is not automatically interoperable. It makes use of extensions to accommodate unique or local needs. It must be architected and forced to be interoperable.
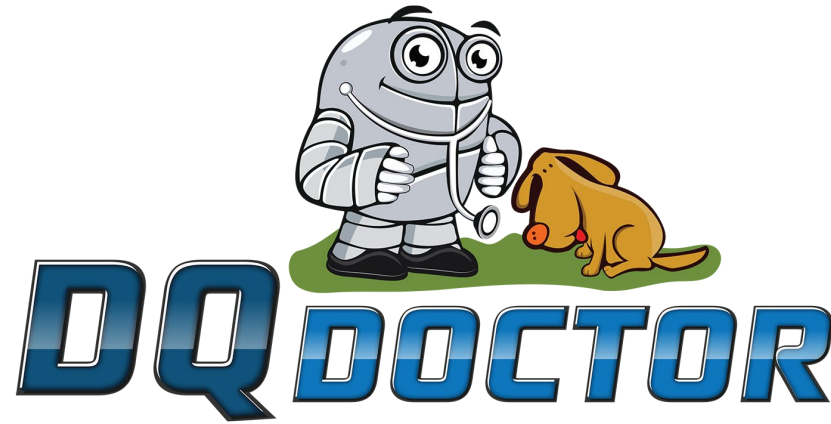
It is used for sending data about orders for prescriptions, Laboratory tests and results, Patient administration notifications (admission, transfer, discharge), Scheduling, Continuity of Care/Discharge summaries, referral letter & consultation notes, Pathology/imaging report, etc.

HL7 offers a **course** on **FHIR Fundamentals**.

Standardized Clinical Terminologies: Creation and maintenance of clinical reference terminologies

Improved Patient Safety: Better data results in improved care coordination between providers and decreased readmissions

DQ DOCTOR

Clinical Terminology Mapping: Match local terms to international clinical data standards to enable data exchanges with precise meanings

HL7 Standards Development: We can establish a new international standard for you or improve an existing one. We voice our clients' needs through the HL7 ballot process

HL7 FHIR® Information Exchange: FHIR® has its own standardized vocabulary for information exchange. We can map your vocabulary to FHIR®'s vocabulary.

Better Data is realized when our team of both Healthcare IT experts and clinicians work with your team.

Better Patient Care is achieved when clinical data is complete and accurate.

Better Outcomes result when Clinical Decision Support systems use reliable and standardized data.

sales@jpsys.com

CONTACT US

Successful Healthcare IT services require both technical and clinical subject matter experts. J P Systems is your best choice for the complexities of clinical data quality improvement.

J P Systems, Inc.

DQDoc.com
HealthcareITInteroperability.com

Sales@jpsys.com

1 703 973-0305 Federal Sales, Orstell Barnett

1 949 533-7888 Commercial Sales, Ron Gluck