October 19, 2022

USING EHR DATA TO ACHIEVE PERSONALIZED UNDERWRITING DECISIONS – A POSSIBILITY OR PIPE DREAM?

DIAMETER HEALTH™

RUTGERS
New Jersey Medical School

THE AMERICAN ACADEMY OF INSURANCE MEDICINE

DISCLOSURES

- **Paulo Pinho, MD** is VP and Medical Director of Innovation at Diameter Health, a Farmington, CT based company that semantically normalizes clinical data into longitudinal care summaries for Health Payers, Federal and State Governments, Health Information Technologies, Health Information Exchanges, and Life Insurance Organizations
- He is Chair of the Scientific Committee for the 2022 AAIM Triennial
- **Owais Aftab, BS, M2** is a Second Year Medical Student with nothing to declare as a disclosure

ACKNOWLEDGEMENTS

- **Speakers**
  - Paulo B. Pinho, MD, FAAP, FACP, Vice President and Medical Director*
  - Owais M. Aftab, BS, 2nd Year Medical Student ¥
- **Contributors**
  - Jennifer C. Lee, BS, 2nd Year Medical Student ¥
  - Harrison L. Chiu, BA, 2nd Year Medical Student ¥
  - Kyle Meadors, President ǂ
  - Don Burt*
  - Sharon Pickett*

*Diameter Health (Farmington, CT)

¥Rutgers New Jersey Medical School (Newark, NJ)

ǂChart Lux Consulting (Nashville, TN)

DIAMETER HEALTH

1. Pace of Medical Change – The Foundation of Personalized Underwriting
2. Value of Data; What's Wrong with Healthcare?
3. Where Do We Go From the APS?
4. Standards and Government Initiatives
5. Provider documentation patterns
6. EHR – More Than Meets the Eye – Complexity of Medical Illness and Social Factors
   - Question 1 – Do certification criteria ascertain data quality?
   - Question 2 – How well is demographic data captured?
   - Question 3 – How does race influence document size, counts and data quality?
   - Question 4 – How does ethnicity influence document size, counts and data quality?
   - Question 5 – How does language spoken influence document size, counts and data quality?
   - Question 6 – How does age influence document size, counts and data quality?
   - Question 7 – What other demographic, social elements were studied?

OBJECTIVES

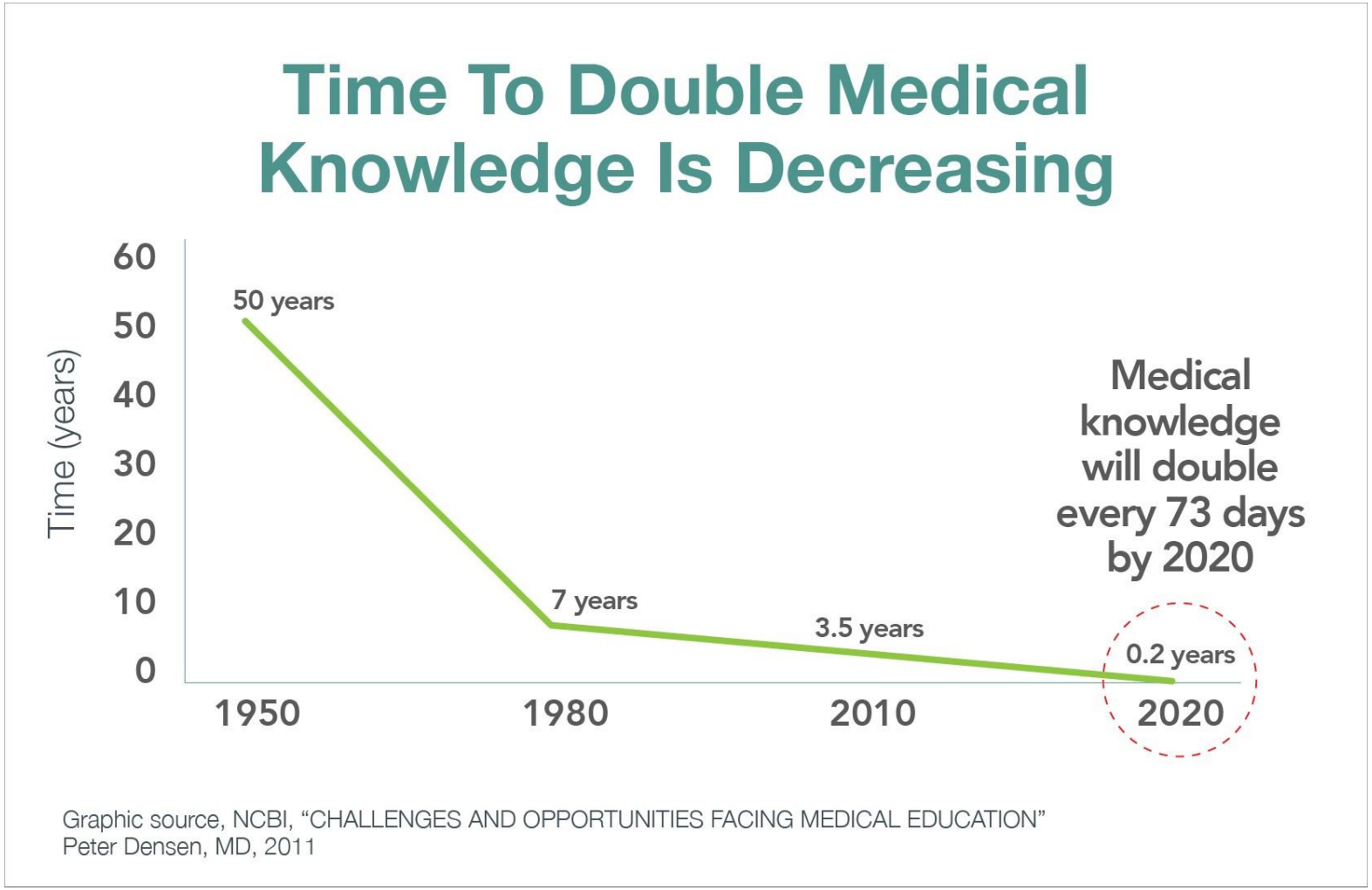
Upon completion of this presentation, the attendee will:

- ❑ Understand the regulatory landscape that has made EHRs commonplace in medical care documentation and how it will impact care outcomes and insights provided to underwriting and claims in life insurance.
- ❑ Explore the challenges of clinical care documentation due to the volume, velocity and variety of data.
- ❑ Study how EHR documentation varies by platform, provider and demographic cohorts and its influence on individual and population-based care patterns.

DIAMETER HEALTH

PACE OF MEDICAL CHANGE –THE FOUNDATION FOR PERSONALIZED UNDERWRITING

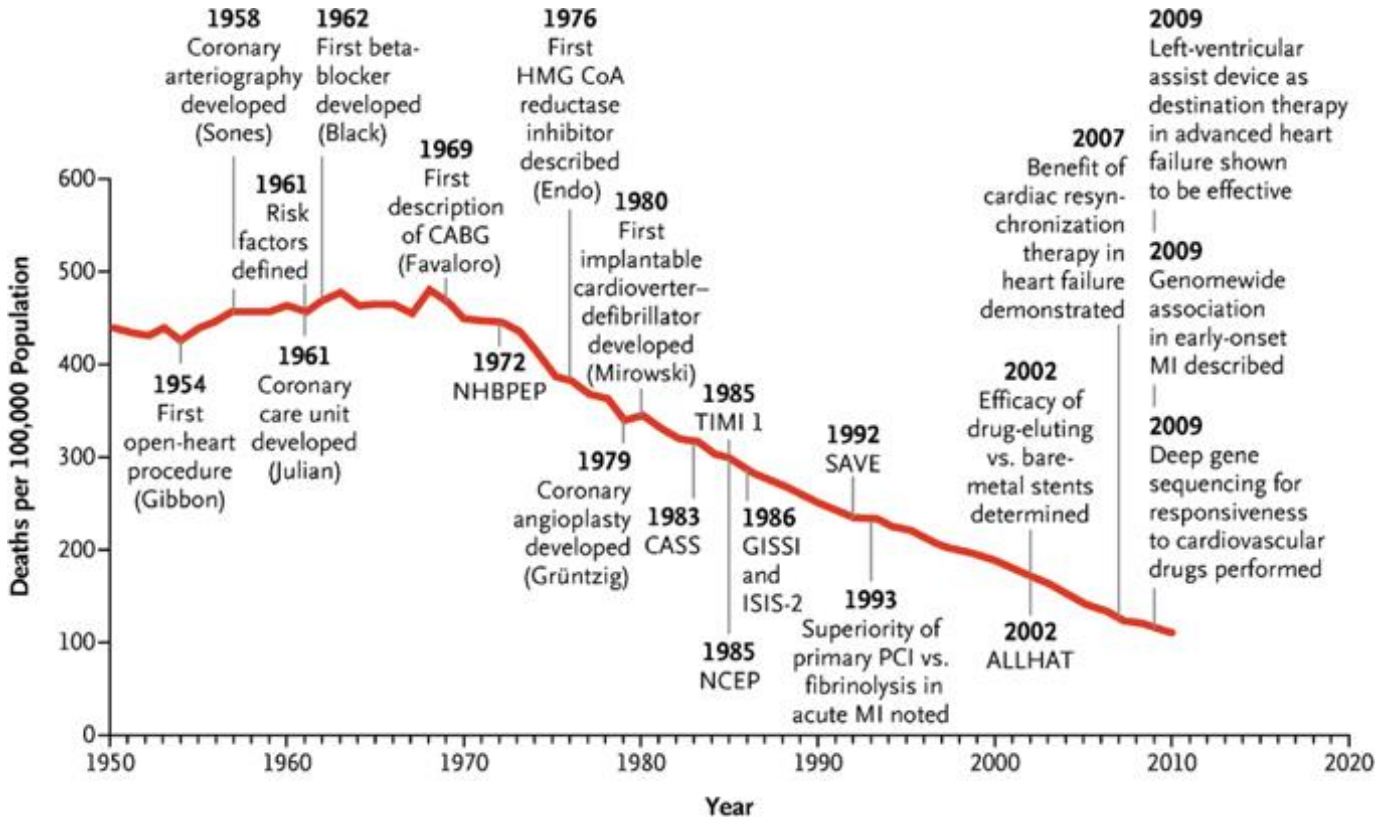
MEDICAL KNOWLEDGE DOUBLING TIME



Students starting medical school in 2010 will master 6% of the knowledge available in 2020.

DIAMETER HEALTH

TECHNOLOGY, TIME AND CV DISEASE MORTALITY

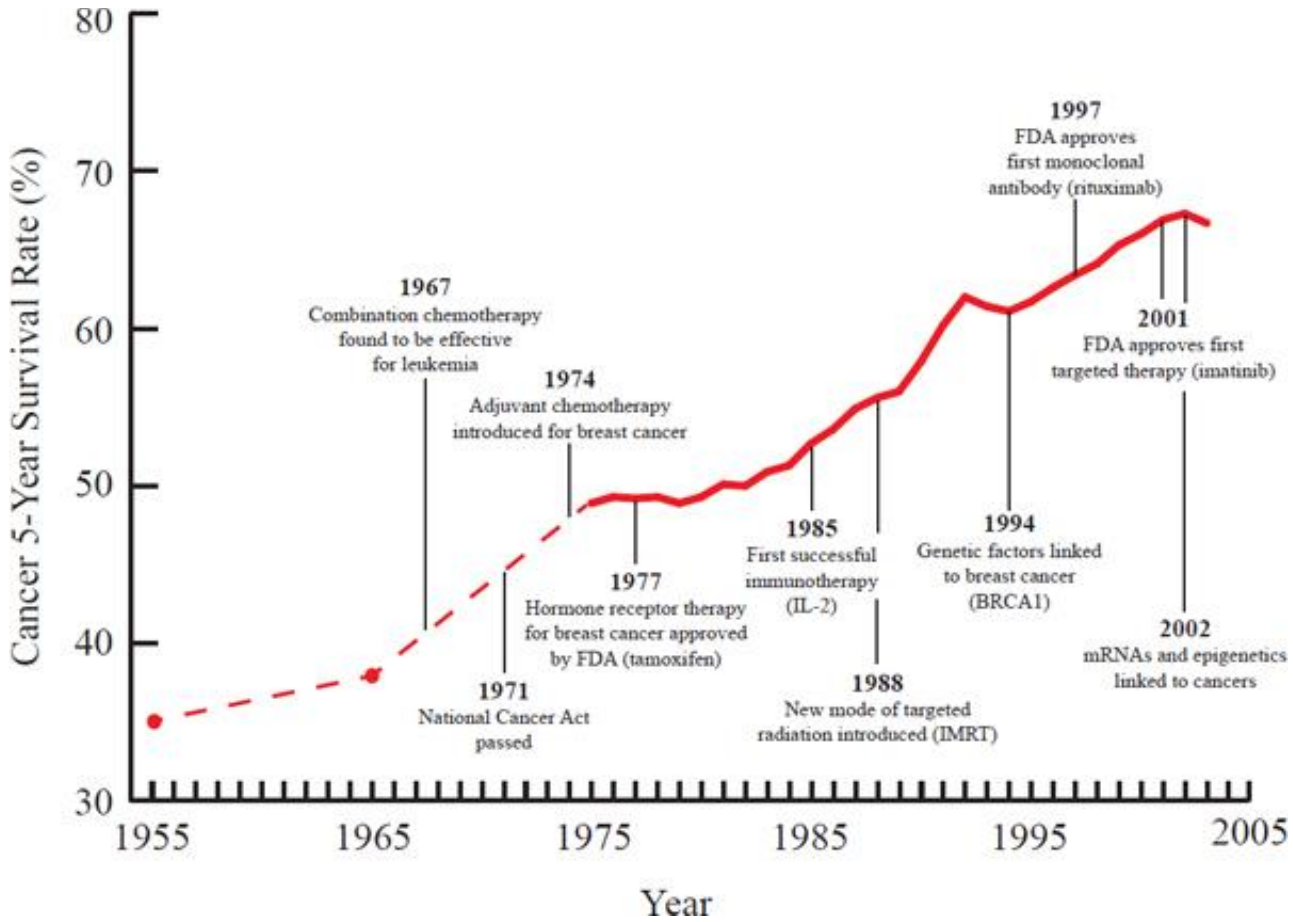


For Context –

1983 – CASS was surgery vs. nonsurgery in CAD
1985 – NCEP – Set National Cholesterol Guideline
1985 – TIMI – Thrombolysis in Myocardial infractions
1986 – GISSI and ISIS-2 deal with thrombolysis
2002 – ALLHAT – Hypertension

DIAMETER HEALTH

TECHNOLOGY, TIME AND CANCER 5-YEAR SURVIVAL



DIAMETER HEALTH

VALUE OF DATA; WHAT'S WRONG WITH HEALTHCARE?

THE VALUE OF DATA

"Information is the oil of the 21st century, and analytics is the combustion engine."

Peter Sondergaard

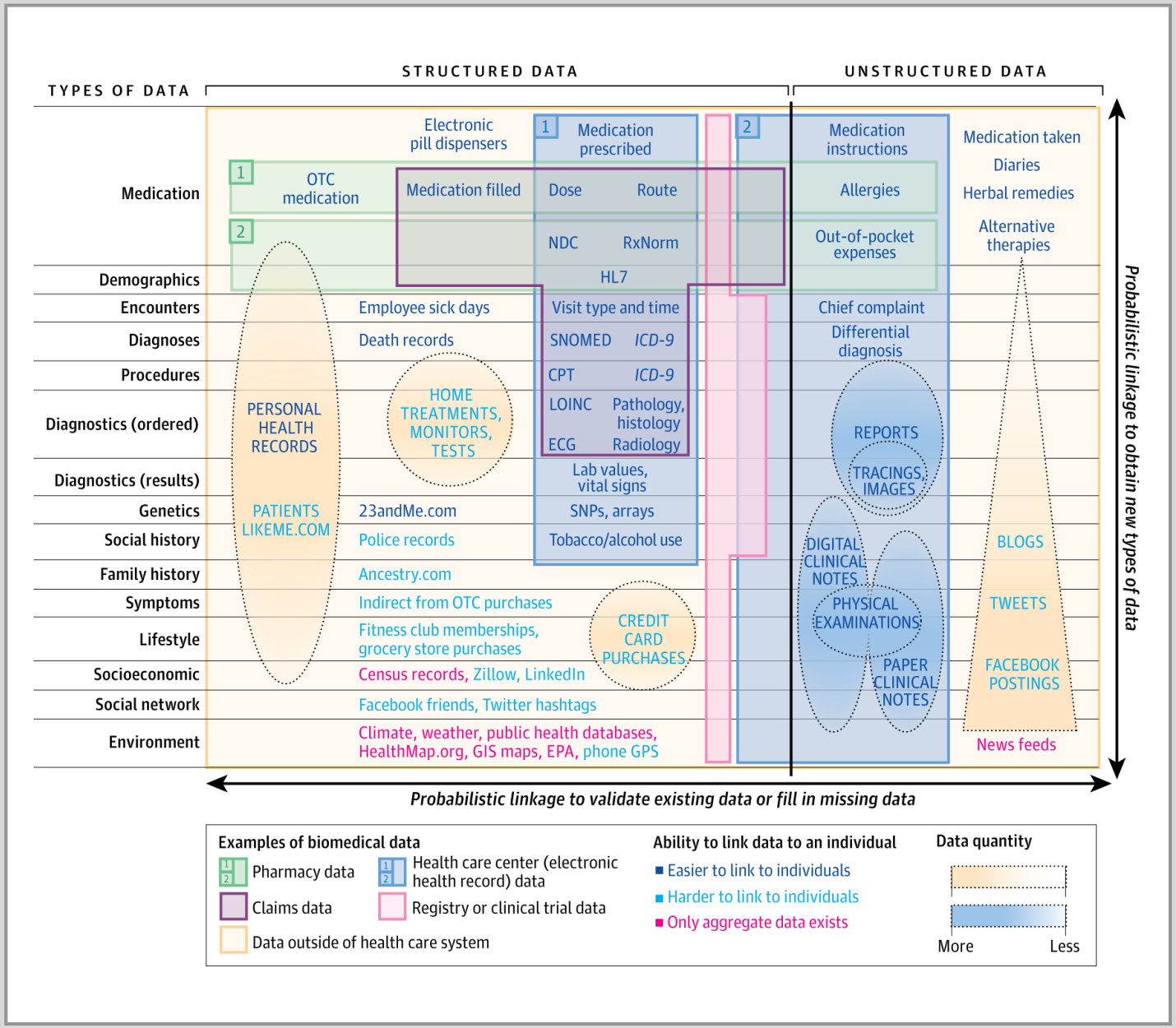
Why can't humans have flight plans that allow for predictive, proactive and personalized decision making?

Data collected on one plane's engine alone extrapolated to the population of planes

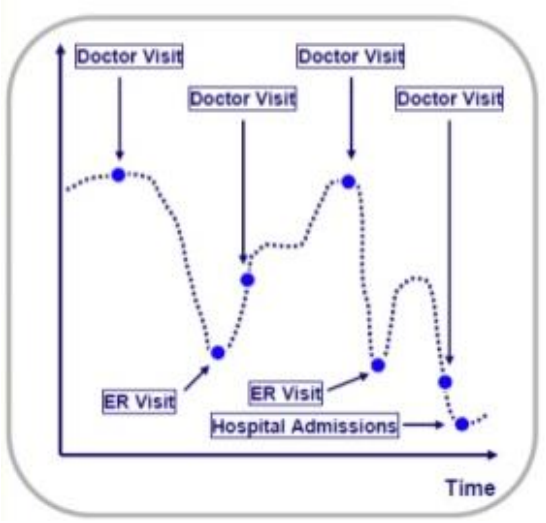
Flight paths collect a massive amount of data used to adjust flight and path

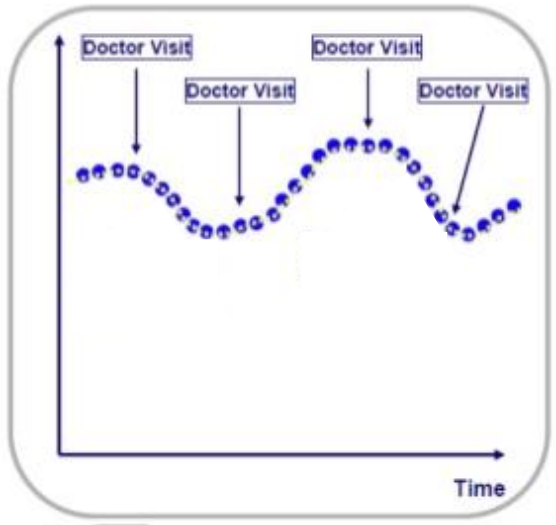
What if healthcare used multivariate, multiformat data to predict an individual patient's health trajectory for a year?

Big Data In The Aviation Industry - Wikibon



https://jama.jamanetwork.com/article.aspx?articleid=1875648
https://georgevanantwerp.com/2014/05/27/great-bigdata-jama-image-missing-some-data-sources/

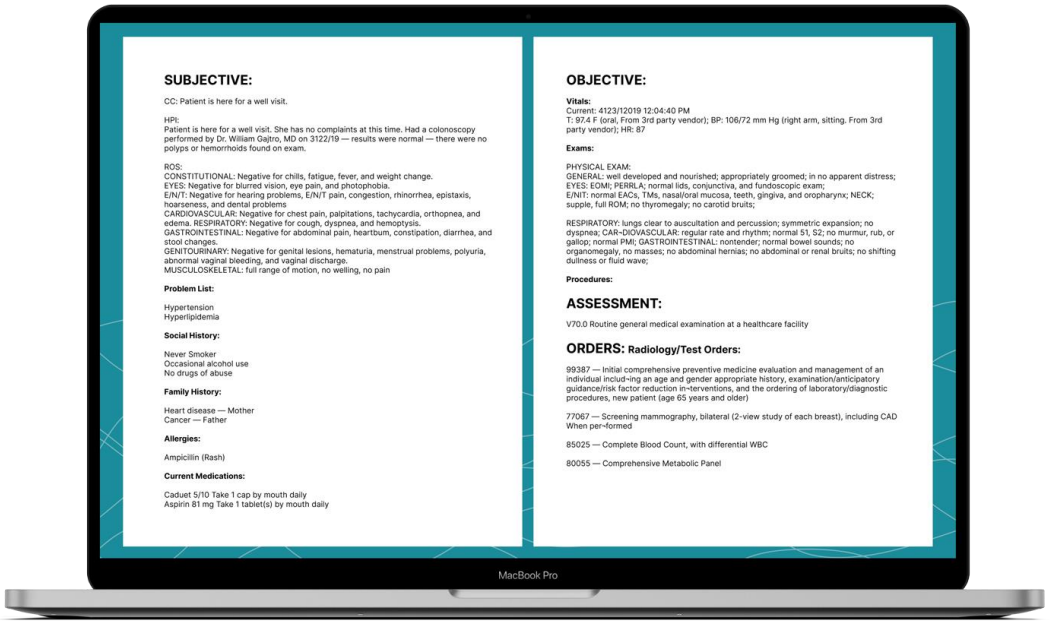


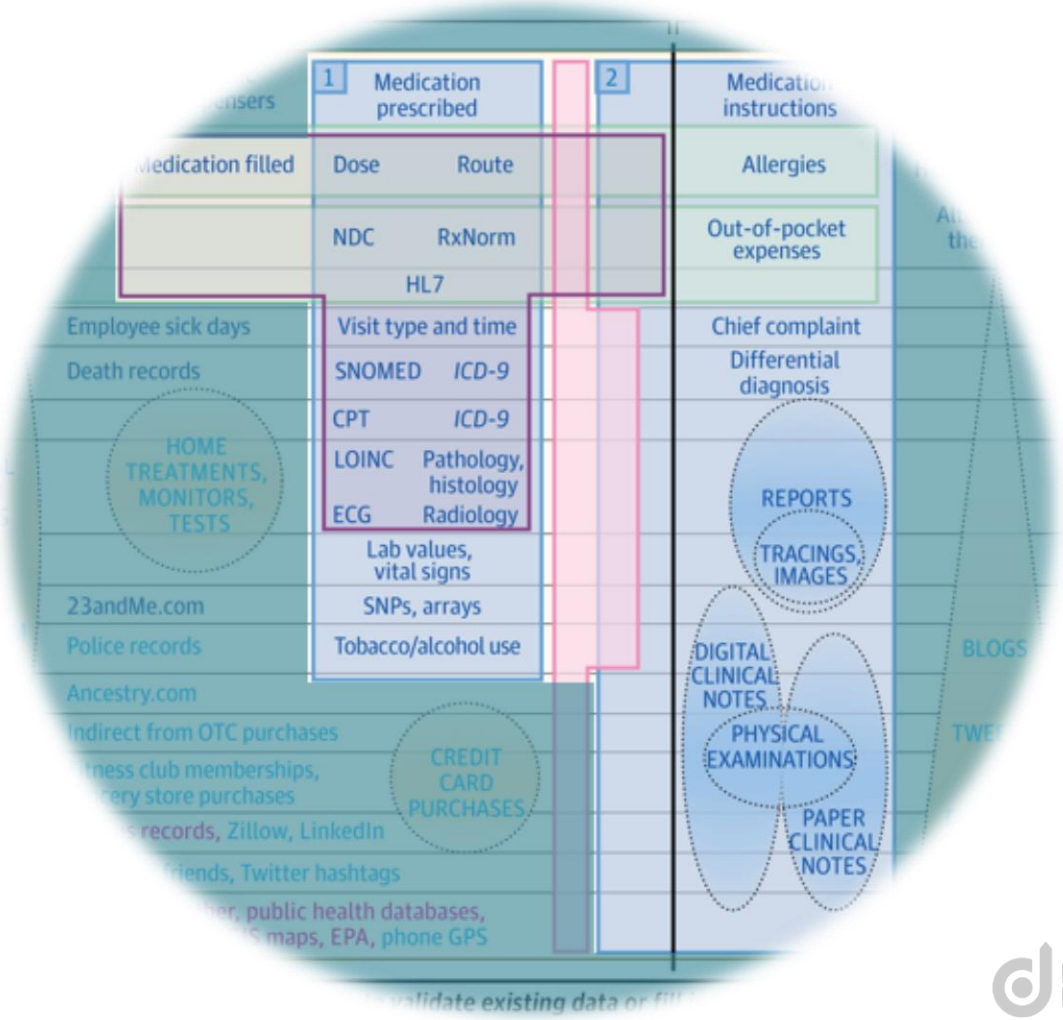


https://www.slideshare.net/HowardRosen129/the-future-of-mhealth-jay-srini-march-2011

WHERE DO WE GO FROM THE APS?

CURRENT GLIMPSE AT AN APS





DIAMETER HEALTH

TODAY'S PROCESSES ARE COSTLY & ABRASIVE

$70+

for each medical chart retrieval – more on complex patients, does not include the cost of other underwriting data sets

Up to 50%

of an underwriter's time is spent on collecting and collating applicant data

3-5 hours

on avg for manual resources to improve data quality and create a longitudinal client journey

THAT'S NOW, BUT WHAT HAPPENS AS DATA VOLUMES INCREASE?

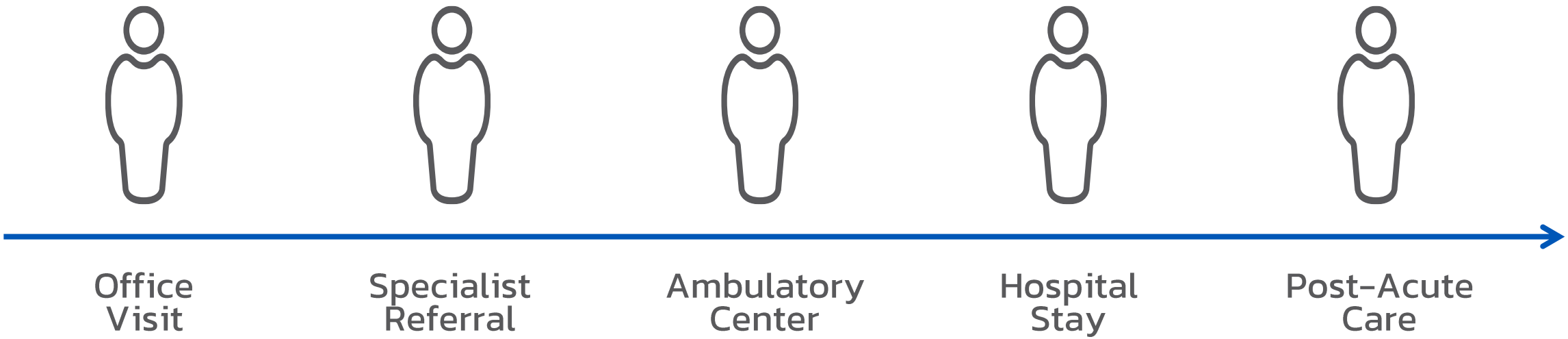
>878%

increase in volume of healthcare data since 2016 (1B healthcare encounters/year)

UNDERWRITING

FRAGMENTED

Complex patients see many providers
annually with data spread across care settings



STANDARDS AND GOVERNMENT INITIATIVES

THE APS REIMAGINED AND INTERACTIVE

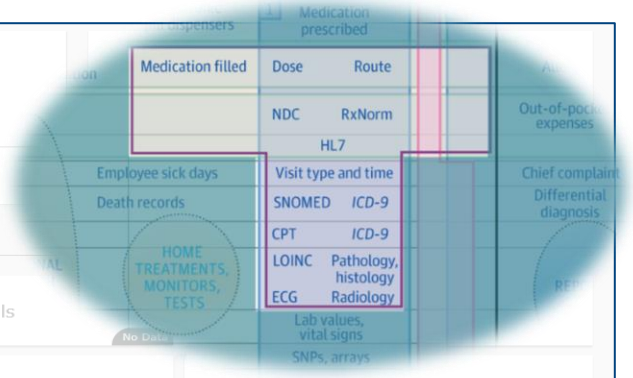
Jane Spangle

Patient Summarization (C-CDA 2.1 CCD)
Generated on July 22, 2021, 18:13:33 -0400

DOB: February 28, 1953 Gender: Female Race / Ethnicity: White/Hispanic or Latino

Table of Contents

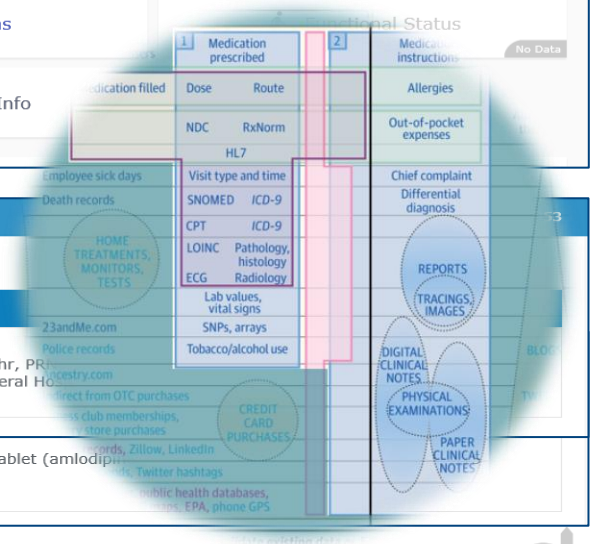
- Allergies
- Encounters
- Medical Equipment (No Data)
- Goals (No Data)
- Interventions (No Data)
- Medications
- Payers (No Data)
- Plan Of Treatment
- Problems
- Procedures
- Results (No Data)
- Social History
- Vital Signs
- Functional Status (No Data)
- Mental Status (No Data)
- Consult Note
- Additional Source Comments
- Document Info



Jane Spangle

Current Medications

Medication	Drug Class(es)	Dates	Sig (Normalized)	
aspirin 325 mg oral tablet (1 source)	Platelet Aggregation Inhibitor, Nonsteroidal Anti-inflammatory Drug	Start: 08-05-2011	take 1 tablet by mouth every four hours as needed for pain	aspirin 325 mg, PO, q4hr, PR 08/05/2011 Mercy General Ho
amLODIPine 10 mg / atorvastatin 10 mg oral tablet (1 source)	Dihydropyridine Calcium Channel Blocker, HMG-CoA Reductase Inhibitor	Start: 06-23-2015 End: 06-23-2018	take 1 tablet by mouth once daily	Caduet 5/10 MG Oral Tablet (amlodip 06/23/2018



DIAMETER HEALTH

MEANINGFUL USE & EHR CERTIFICATION

- In 2009, the American Reinvestment and Recovery Act (ARRA) provided over $30 billion for adoption of electronic health records (EHRs) by US Hospitals and Ambulatory Providers
- EHRs needed to be certified to ensure
  - Data was appropriately structured and codified
  - There is a standard extract summarizing care
- To date, virtually every hospital and most ambulatory providers have adopted a certified EHRs
- The CCD ("Continuity of Care Document") was the first format to exchange care summaries.
- In Stage 2/3 this was expanded to multiple document formats in the C-CDA (Consolidated Clinical Document Architecture)

HL7v2 vs. CCD vs. FHIR

Bender, Duane & Sartipi, Kamran. (2013). HL7 FHIR: An agile and RESTful approach to healthcare information exchange. Proceedings of CBMS 2013 - 26th IEEE International Symposium on Computer-Based Medical Systems. 326-331. 10.1109/CBMS.2013.662781x.

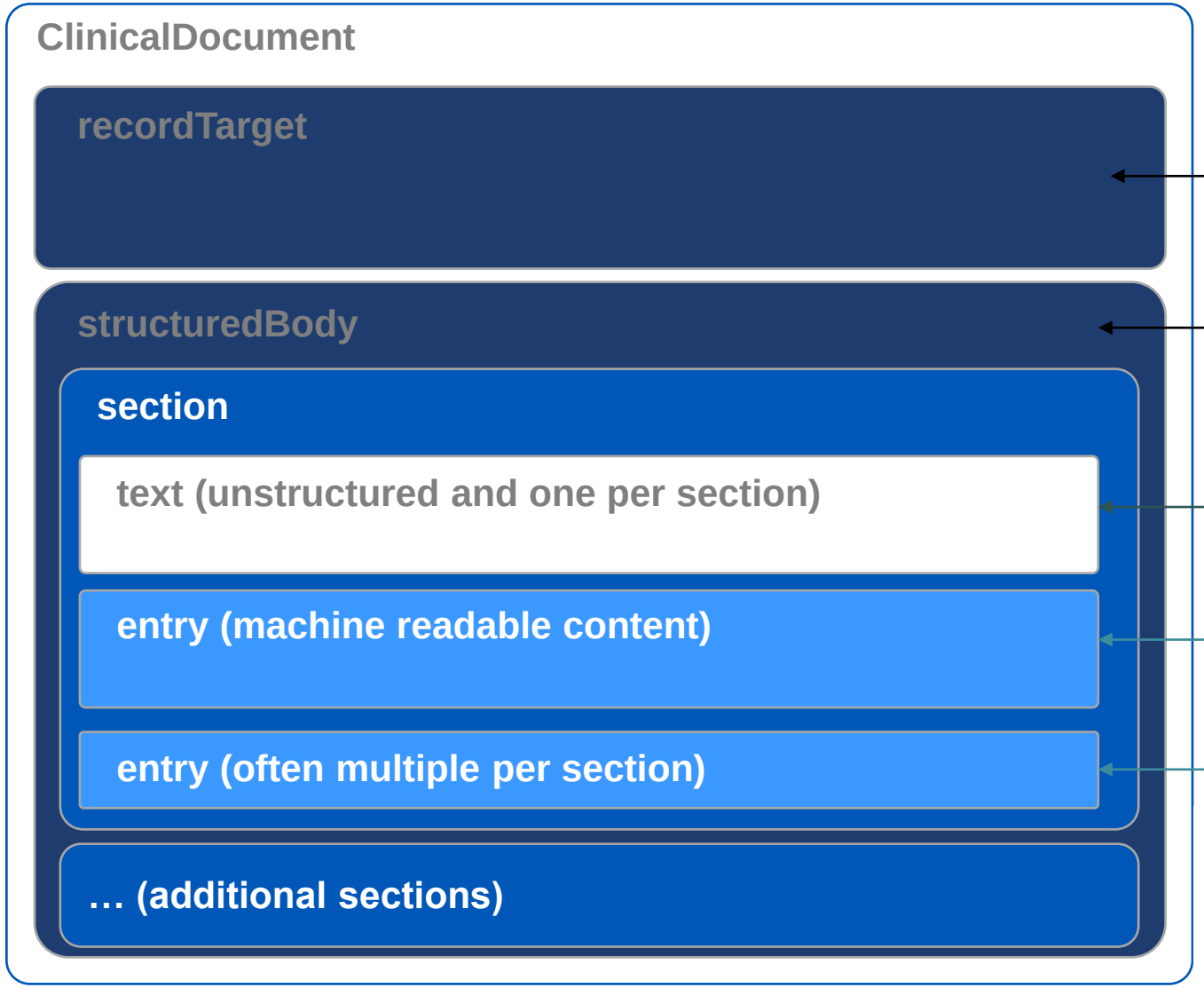
Property	HL7 v2	C-CDA	FHIR
Year initiated	1989	2005	2014
Architectural paradigm	Messages, Fields and Records	Message-Oriented Documents	Resources
Semantic Ontology	No	Yes	Yes?
Learning	Order of weeks	Order of months	Order of weeks
Specialized tooling required?	Yes- parser	Yes – model complier	No
Order of size of specification	Hundreds of pages	Thousands of pages	Hundreds of pages
Reference implementations from HL7	No	No	Yes
Mobile devices	No	No	Yes
Current adoption	Very High	Very Low	Growing
Information model type	Ad hoc	Constrained RIM	Resources with the ability to extend

Property	C-CDA
Year initiated	2005
Architectural paradigm	Message-Oriented Documents
Semantic Ontology	Yes
Learning	Order of months
Specialized tooling required?	Yes – model complier
Order of size of specification	Thousands of pages
Reference implementations from HL7	No
Mobile devices	No
Current adoption	Very Low
Information model type	Constrained RIM

```
<section>
    <templateId root="2.16.840.1.113883.10.20.22.2.3.1" extension="2015-08-01"/>
    <code code="30954-2" displayName="Results" codeSystem="2.16.840.1.113883.6.1"/>
    <title>Results</title>
    <text>
        <table border="1" width="100%">
            <colgroup>
                <col width="20%"/>
                <col width="45%"/>
                <col width="10%"/>
                <col width="10%"/>
                <col width="15%"/>
            </colgroup>
            <thead>
                <tr>
                    <th>Test Name</th>
                    <th>Value</th>
                    <th>Interpretation</th>
                    <th>Reference Range</th>
                    <th>Facility</th>
                </tr>
            </thead>
            <tbody>
                <tr styleCode="split-section">
                    <th colspan="100%">SARS coronavirus 2 RNA

                        <content> Ordered By: Manish Man on 06-15-2021</content>
                    </th>
                </tr>
                <tr ID="results00001">
                    <td ID="results00001code">SARS-CoV-2 (COVID-19) RNA NAA+probe Ql (Resp)</td>
                    <td>Detected</td>
                    <td>Invalid Interpretation Code</td>
                    <td/>
                    <td>BioLab_05D1022222</td>
                </tr>
```

WHAT IS A CCD DOCUMENT?



This identifies patient and has demographic info

Sections break up different clinical content

This shows up for human display

This machine readable content can be used for exchange & apps

Sections can be added and re-used between different documents

DIAMETER HEALTH

TYPES OF C-CDA DOCUMENTS

AN INSIGHT TO SIZE

Document	1.1	2.1	Notes
Continuity of Care Document (CCD)	P	P	**Used since Stage 1 and primary document for MU exchange**
Care Plan		P	Care planning has been significantly uplifted in C-CDA 2.1
Consult Note	P	P	*Mostly narrative text*
Diagnostic Imaging Report	P	P	*Mostly narrative text*
Discharge Summary	P	P	
History & Physical	P	P	
Operative Note	P	P	
Procedure Note	P	P	
Progress Note	P	P	*Mostly narrative text*
Referral Note		P	*Mostly narrative text*
Transfer Summary		P	
Unstructured Document	P	P	**Not eligible for MU**

MU: Meaningful Use program for Electronic Health Records
Based on HL7 C-CDA 1.1 & 2.1 Implementation Guides & Meaningful Use regulations

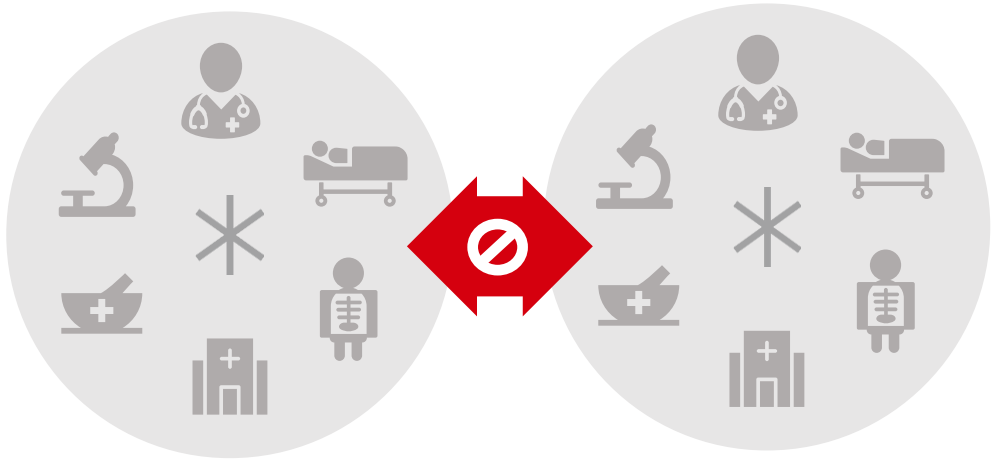
Modern Technologies are Mandated Moving Forward

1

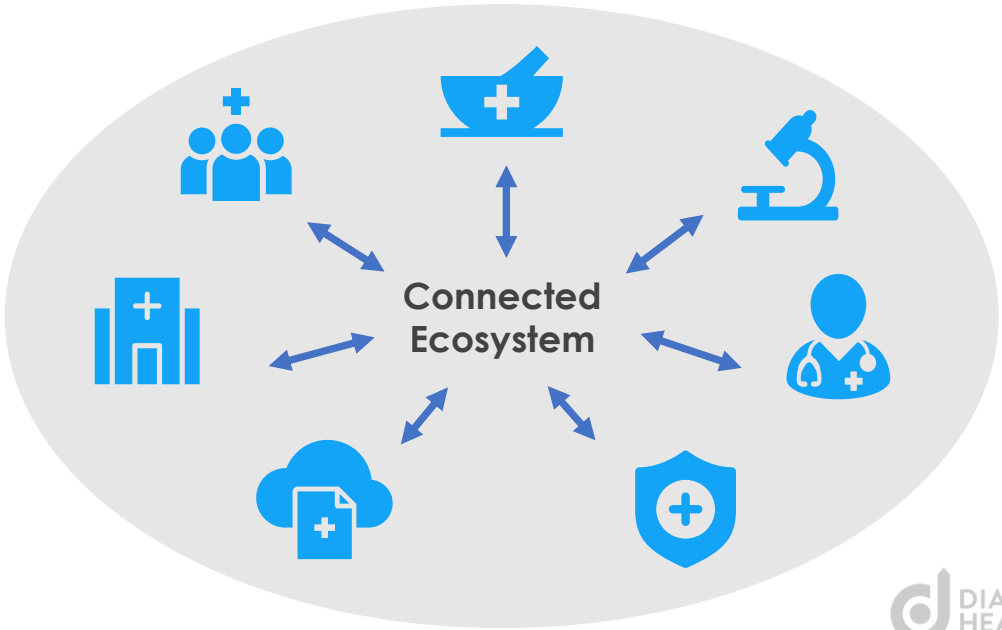
Patient Health Data Exchange

Make member Health information available to members through APIs connecting Third party software apps

Meaningful Use drove the industry electronic, but true interoperability is lacking

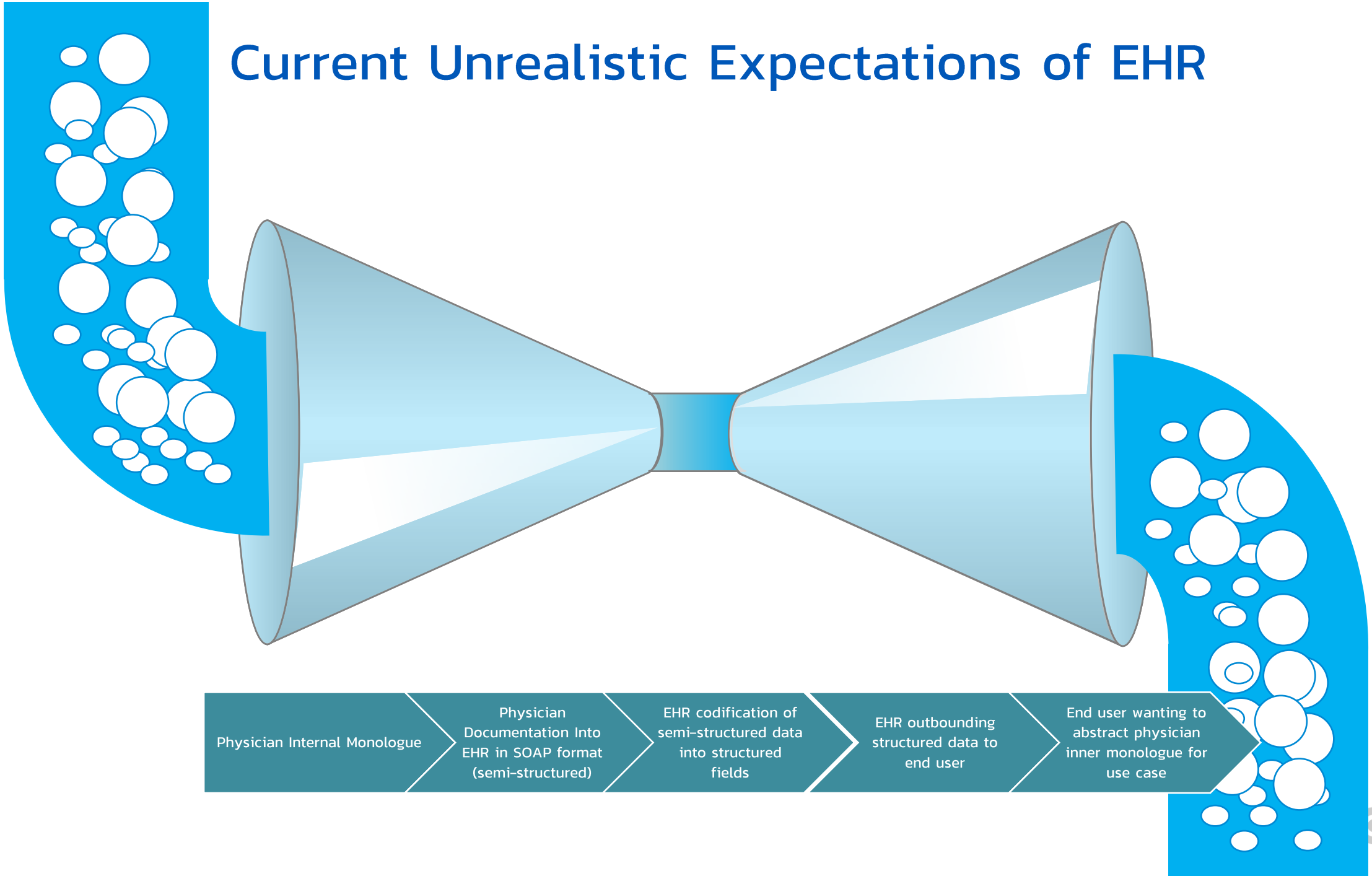


The 2020 CMS Rule enforces API connectivity and modern standards



PROVIDER DOCUMENTATION PATTERNS

Current Unrealistic Expectations of EHR



Actual EHR Experience

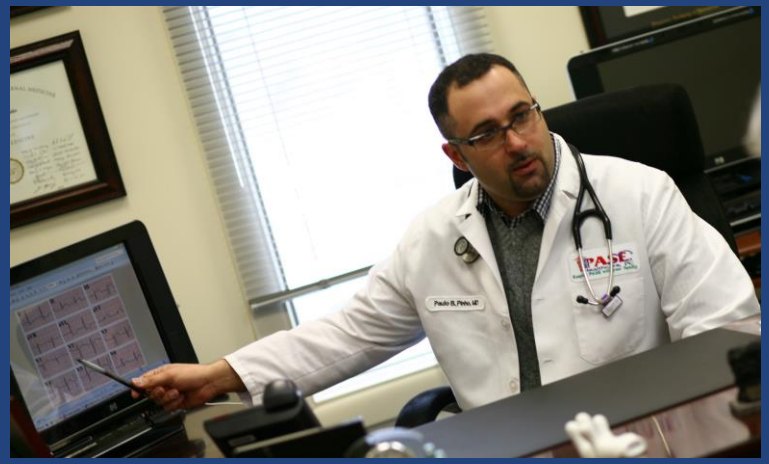
Physician Internal Monologue → Physician Documentation Into EHR in SOAP format (semi-structured) → EHR codification of semi-structured data into structured fields → EHR outbounding structured data to end user → End user wanting to abstract physician inner monologue for use case

LET'S TALK ABOUT DOCUMENTATION

A 58-year-old male

- with **Past Medical History of Hypertension** reported
- **Medications**: Amlodipine 5 mg PO QD
- presents to an urgent care center on a Saturday morning at 9:30 AM with **Chief Complaint of a Head Laceration**
- **History of present Illness** – he sustained it during a fall at home "while gardening." He states that he was walking in the back yard when he tripped on a brick in his pavers that was sticking up. He had no dizziness or lightheadedness, had no chest pain, shortness of breath, he denies weakness. He was able to get up under his own power and other than a bleeding head laceration, has no symptoms.
- With the exception of the above – **Review Of Systems** was negative

JAKE SMITH



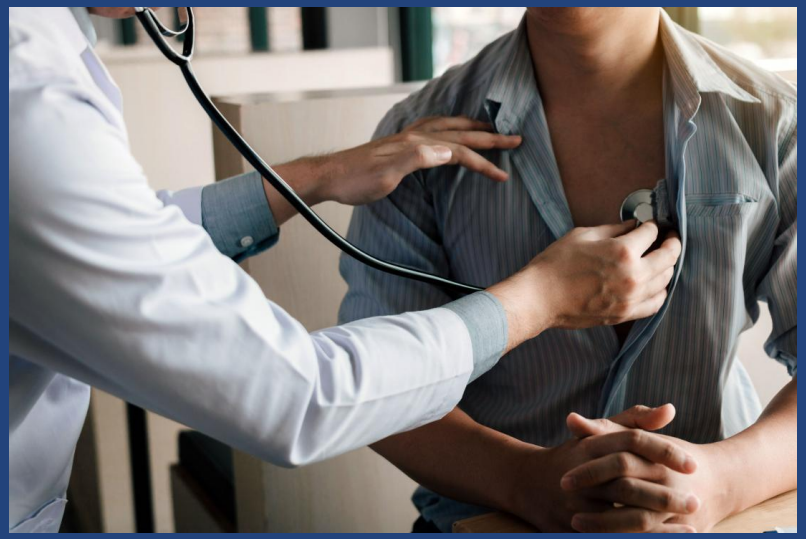
DIAMETER HEALTH

THE EXAM

Vitals:

Current: 6/16/2022 12:04:40 PM
T: 97.4 F (oral, From 3rd party vendor); BP: 106/72 mm Hg (right arm, sitting. From 3rd party vendor); HR: 87

Exams:
PHYSICAL EXAM:
GENERAL: well developed and nourished; appropriately groomed; in no apparent distress;
EYES: EOMI; PERRLA; normal lids, conjunctiva, and fundoscopic exam;
E/N/T: normal EACs, TMs, nasal/oral mucosa, teeth, gingiva, and oropharynx;
NECK; supple, full ROM; no thyromegaly; no carotid bruits;
RESPIRATORY: lungs clear to auscultation and percussion; symmetric expansion; no dyspnea;
CARDIOVASCULAR: regular rate and rhythm; normal 51, S2; no murmur, rub, or gallop; normal PMI;
GASTROINTESTINAL: nontender; normal bowel sounds; no organomegaly, no masses; no abdominal hernias; no abdominal or renal bruits; no shifting dullness or fluid wave;
NEUROLOGIC: symmetrical exam from motor and sensory standpoint, symmetrical DTRs
SKIN: **3 cm clean laceration on right frontal scalp**



DIAMETER HEALTH

WOUND REPAIR AND NOTE COMPLETION

The wound is repaired, and a procedure note is documented with simple interrupted sutures and the visit is coded:

Diagnosis:

S01.81XA – Laceration without foreign body of other part of head, initial encounter

Procedure:

12013 – Simple/Superficial–Scalp, Neck, Axillae, External Genitalia, Trunk, Extremities, 2.6 cm to 5.0 cm

Plan of Care:

He is advised to follow up in 1 week for suture removal

M3300779-View_of_a_sutured_laceration_on_a_man_s_scalp.jpg (400×279) (sciencephoto.com)

DIAMETER HEALTH

ANOTHER OBSERVATION

While suturing the patient, the provider notes that while it is 9:30AM on a Saturday morning, the patient wreaks of alcohol. Looking to protect himself medicolegally, bill appropriately and maintain his superb patient satisfaction scores he documents:

"While suturing Mr. Smith, the intense smell of ethanol was noted on his breath and in the room. No other stigmata of alcohol use/abuse were noted on history of physical exam."

THE TRUTH ABOUT EHRS

	Underwriting Implications	Attending Physician Statement	Patient Portal	Claims	Electronic Healthcare Data
Hypertension (SNOMED)	+++				
Amlodipine (Rx NORM)	++ (evidence of treatment important)				
CC - "Head Laceration" (SNOMED)	+				
HPI Narrative (some SNOMED)	+++ (in the negative)				
ROS (some SNOMED)	+++ (in the negative)				
Vitals (LOINC)	+ (the fact they are normal)				
Physical Exam (some SNOMED)	+ (the fact it is normal)				
Head Laceration (ICD10)	++				
Laceration Repair (CPT)	+				
Plan of Care (SNOMED)	+ (evidence of medical follow up)				
"The smell of alcohol" (Unstructured)	+++++				

A 58-year-old male

- with **Past Medical History of Hypertension** reported
- **Medications**: Amlodipine 5 mg PO QD
- presents to an urgent care center on a Saturday morning at 9:30 AM with **Chief Complaint of a Head Laceration**
- **History of present Illness** – he sustained it during a fall at home "while gardening." He states that he was walking in the back yard when he tripped on a brick in his pavers that was sticking up. He had no dizziness or lightheadedness, had no chest pain, shortness of breath, he denies weakness. He was able to get up under his own power and other than a bleeding head laceration, has no symptoms.
- With the exception of the above – **Review Of Systems** was ne

Vitals:

Current: 6/16/2022 12:04:40 PM
T: 97.4 F (oral, From 3rd party vendor); BP: 106/72 mm Hg (right arm, sitting. From 3rd party vendor); HR: 87

Exams:
SKIN: **3 cm clean laceration on right frontal scalp**

Diagnosis:

S01.81XA – Laceration without foreign body of other part of head, initial encounter

Procedure:

12013 – Simple/Superficial-Scalp, Neck, Axillae, External Genitalia, Trunk, Extremities, 2.6 cm to 5.0 cm

Plan of Care:

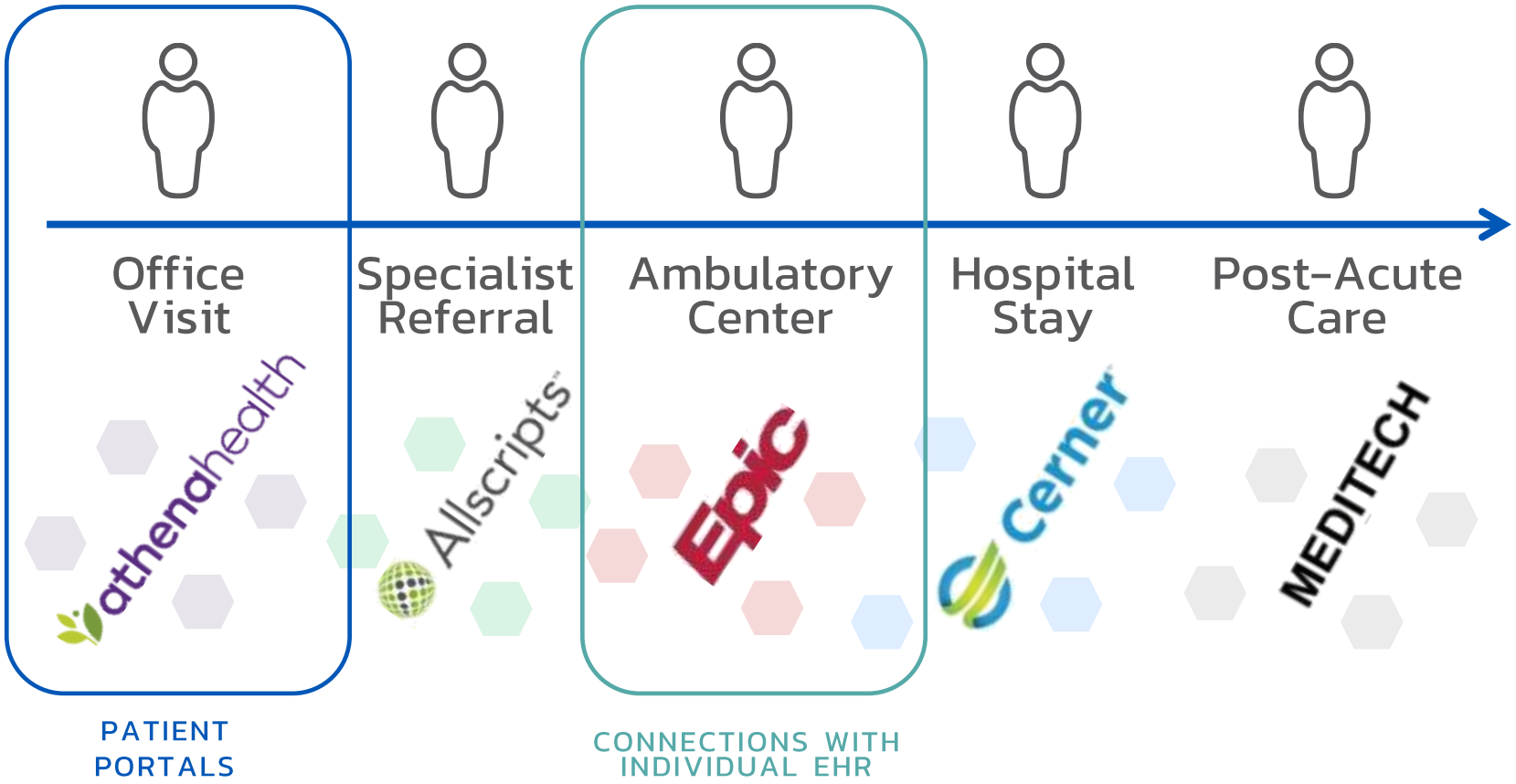
He is advised to follow up in 1 week for suture removal

"While suturing Mr. Smith, the intense smell of ethanol was noted on his breath and in the room. No other stigmata of alcohol use/abuse were noted on history of physical exam."

DIAMETER HEALTH

UNDERWRITING | FRAGMENTED

Complex patients see many providers annually with data spread across care settings



Disparate, dirty and non-normalized clinical data creates gaps in care and underwriting insights

The EHR connections of the life insurance industry perpetuate gaps in data:

1. Patient Portals
2. Connections with individual EHR

DIAMETER HEALTH

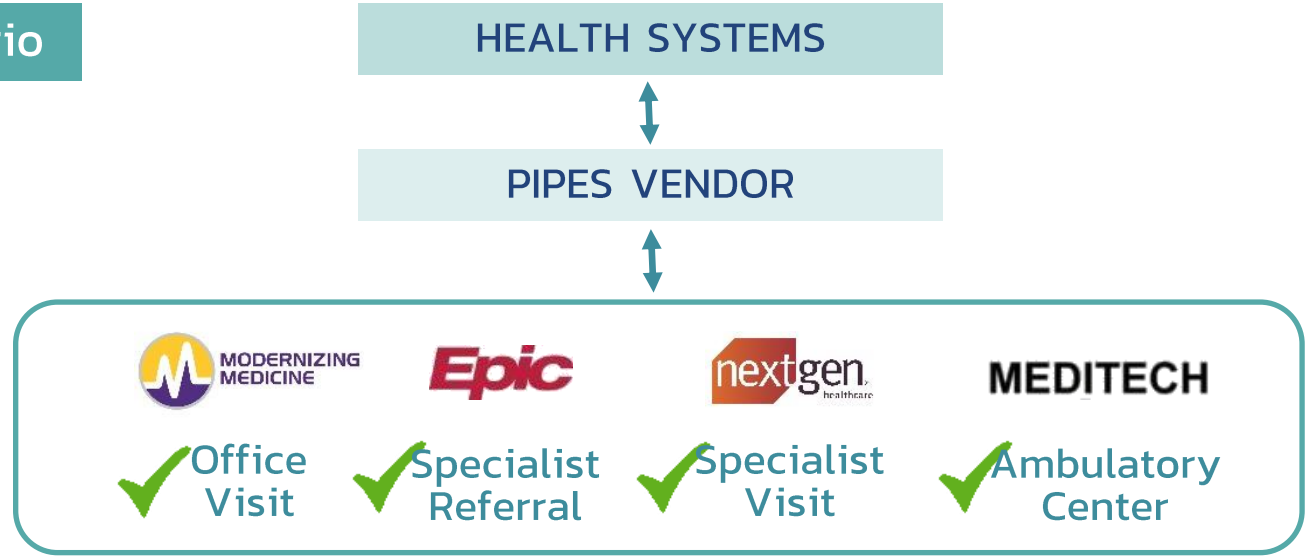
THE NEED FOR COMPLETE AMBULATORY EHR DATA

LIFE INSUREDS SKEW HEALTHIER AND ARE MORE LIKELY TO RECEIVE AMBULATORY CARE (VS INPATIENT CARE)

Nov 2021 Rank	Vendor	Ambulatory Market Share
1	Epic	28.21%
2	Allscripts	9.21%
3	eClinicalWorks	6.57%
4	athenahealth	6.03%
5	NextGen	5.37%
6	GE Healthcare	5.00%
7	Cerner	4.32%
8	Greenway	2.91%
9	eMDs	1.12%
10	Modernizing Med	1.09%

Scenario 1

Scenario



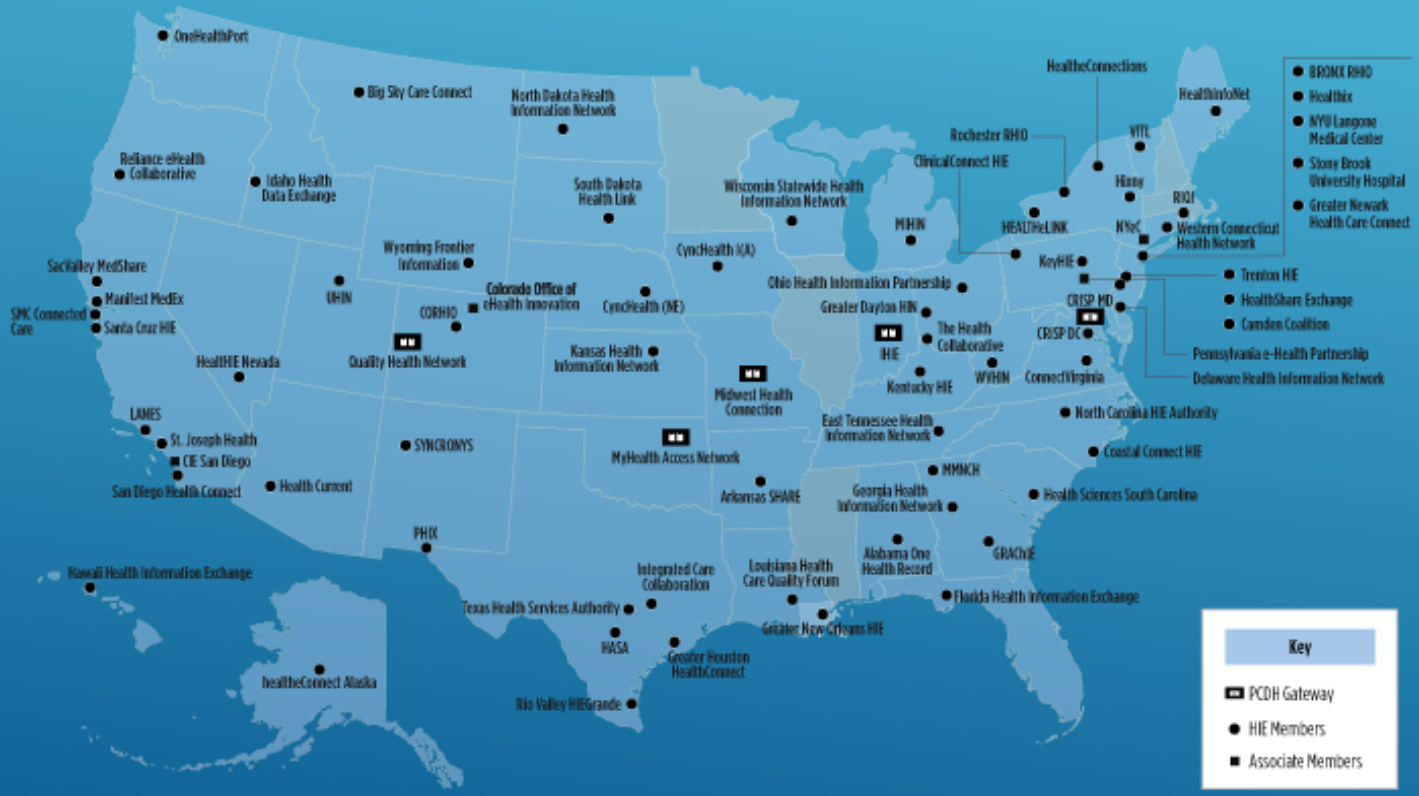
* Data from EHR In Practice, Nov 12, 2021

DIAMETER HEALTH

EHR ADOPTION

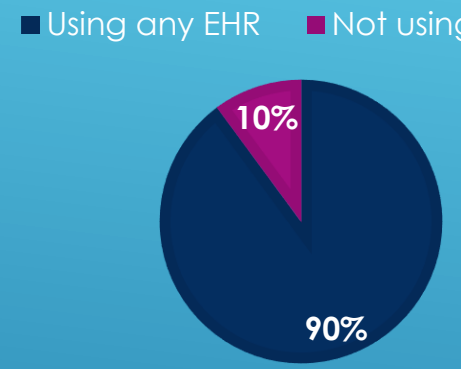
HIT RATES ARE A PIPES PROBLEM, NOT A DATA PRESENCE PROBLEM

76 HIEs that together cover more than 92% of the United States population

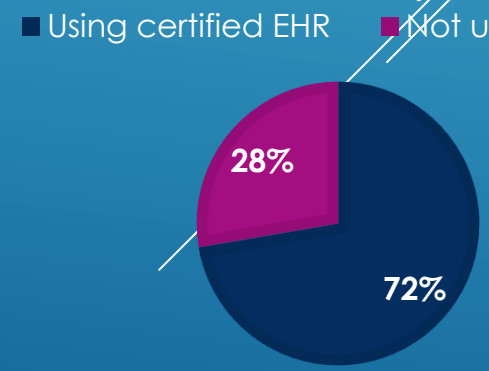


https://www.cdc.gov/nchs/data/nehrs/2019NEHRS-PUF-weighted-estimates-508.pdf
Strategic Health Information Exchange Collaborative (SHIEC) – SHIEC (strategichie.com)

PERCENT OFFICE PHYSICIANS USING ANY EHR



PERCENT OFFICE PHYSICIANS USING CERTIFIED EHR



TURNING DATA CHALLENGES INTO OPPORTUNITIES

50%

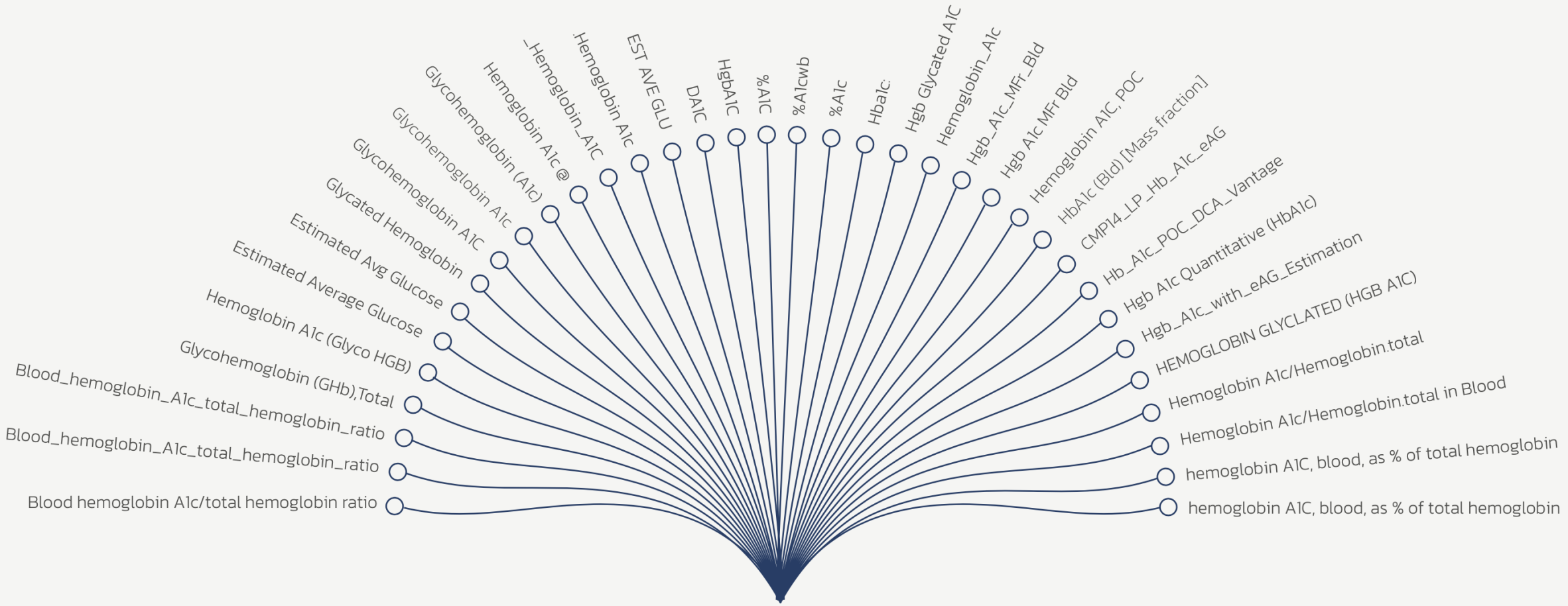
of raw clinical data on average is unusable and inconsistent (>1 million different codes)

>$30B

waste in annual U.S. healthcare cost due to lack of interoperability

https://hitinfrastructure.com/news/organizations-see-878-health-data-growth-rate-since-2016; https://www.ncbi.nlm.nih.gov/books/NBK225187/
https://www.fiercehealthcare.com/tech/industry-voices-interoperability-can-reduce-healthcare-costs-by-30b-here-s-how

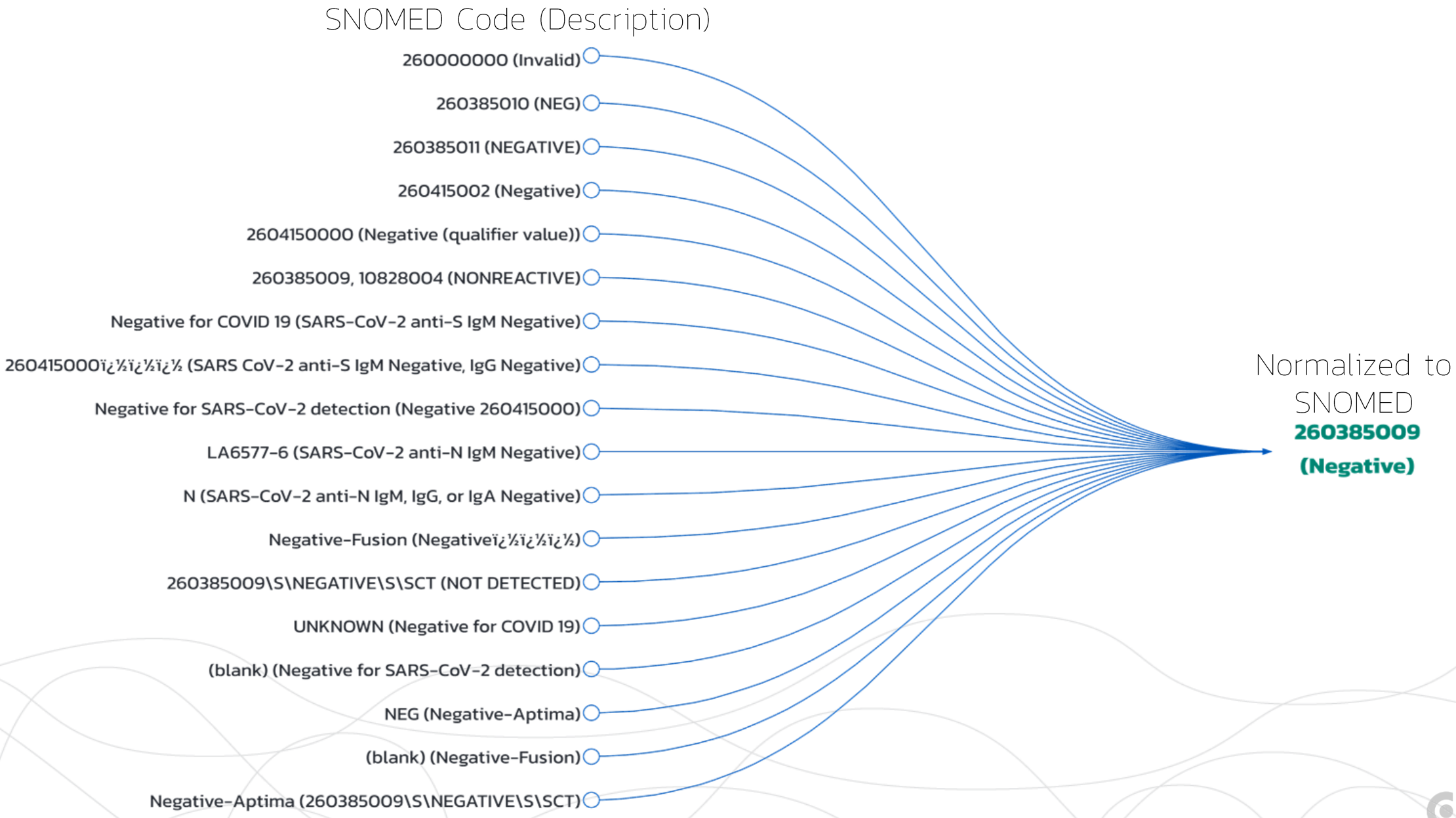
CODING VARIATION ACROSS MULTIPLE EHRS



LOINC 4548-4, Hemoglobin A1c

38 of ~150 possible examples

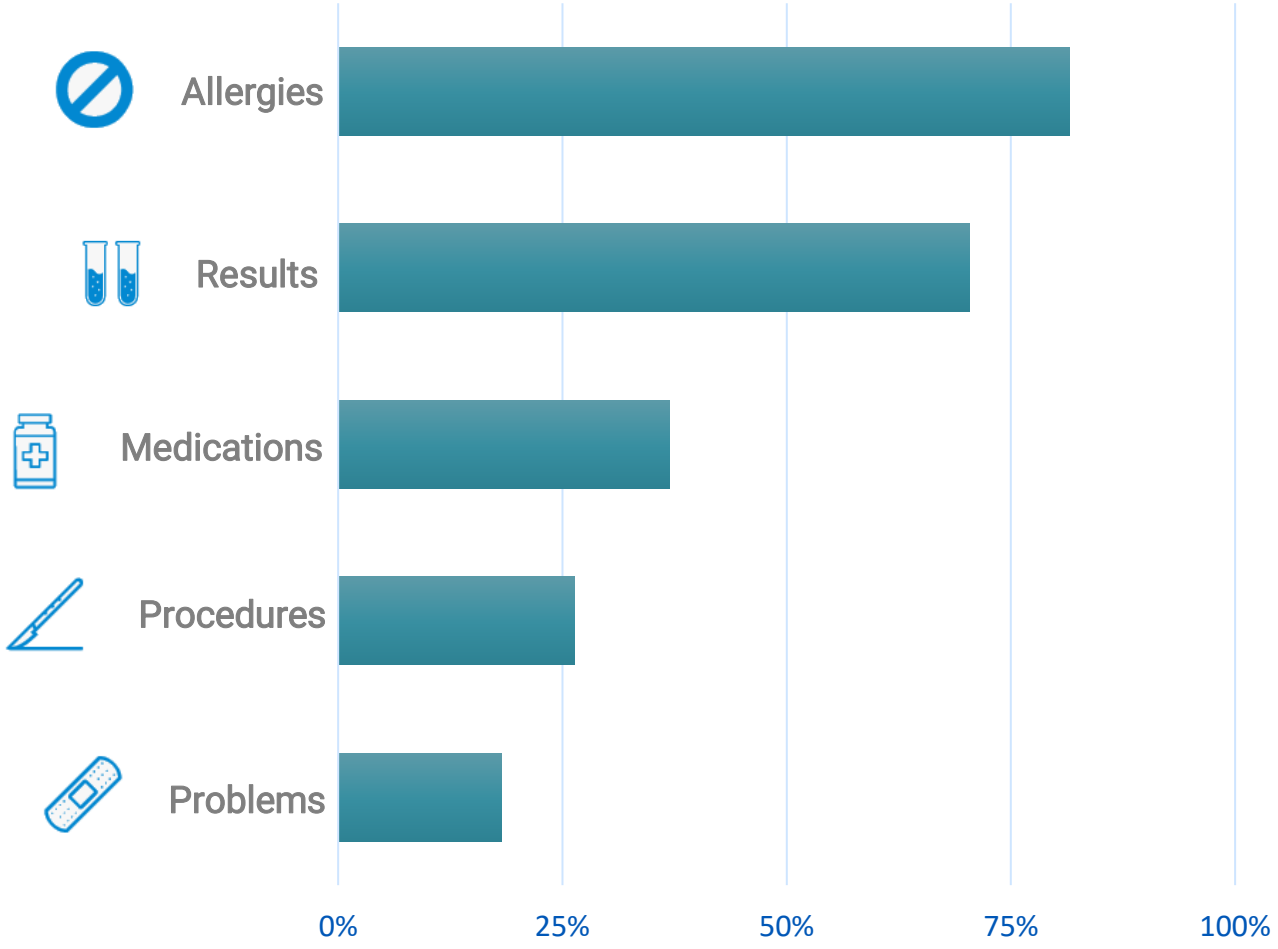
VARIATION IN "NEGATIVE" FOR COVID-19 TESTING



18 of ~40 possible examples

DIAMETER HEALTH

CLINICAL DATA GAPS



1. D'Amore et al. Using Clinical Data Standards to Measure Quality: A New Approach. *Applied Clinical Informatics.* 2018

How can we improve healthcare when

- 80% of allergies aren't coded appropriately (30% no code at all)
- 70% of lab results don't use right vocabulary or units (45% = no LOINC)
- Nearly 40% of medications don't have right coding for quality measures[1]

DIAMETER HEALTH

UNDERWRITING | DEFRAGMENTED

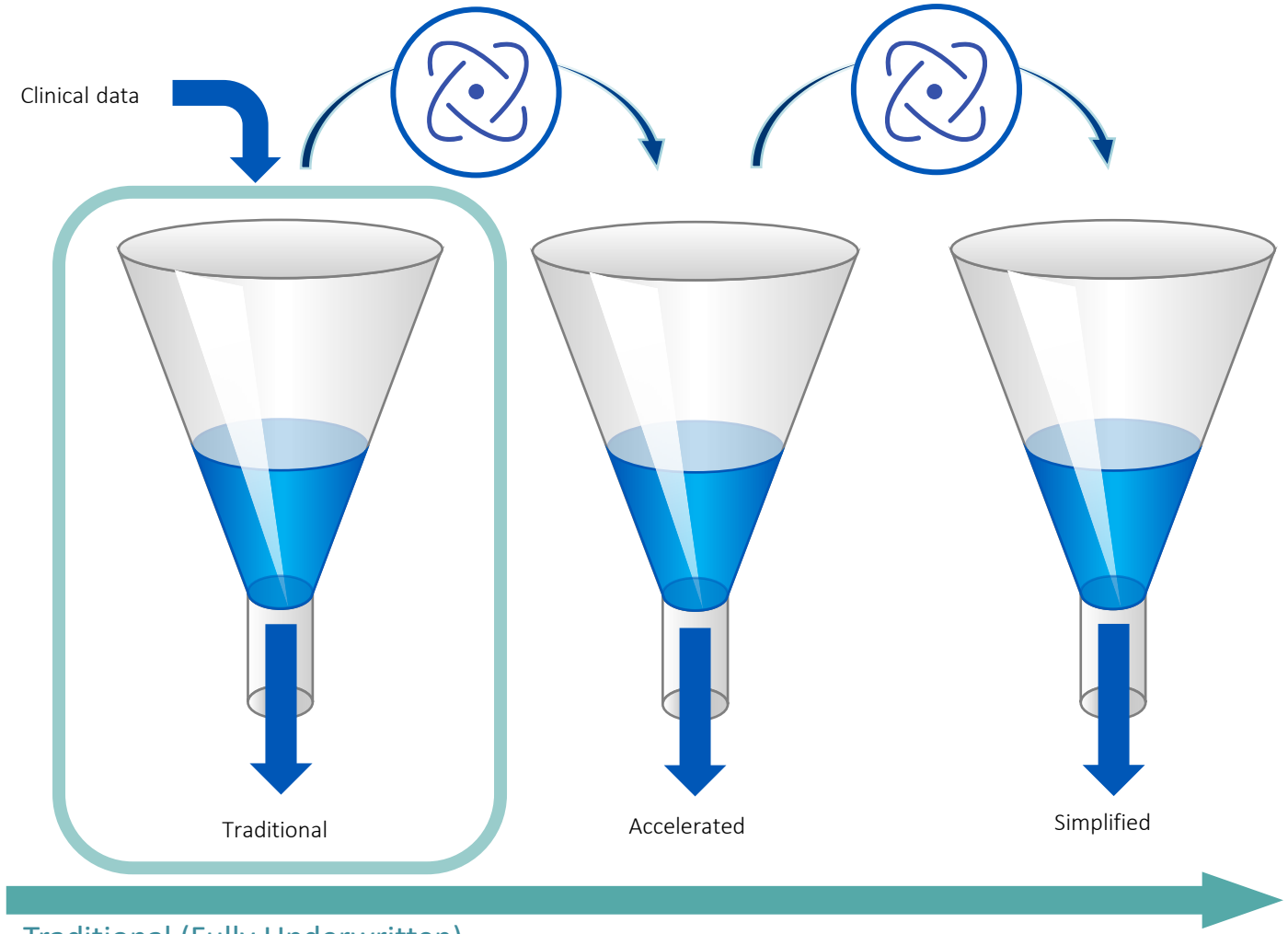
Unified and normalized clinical data, ready for improved patient outcomes and underwriting

Complex patients see many providers annually with data spread across care settings

Office Visit | Specialist Referral | Ambulatory Center | Hospital Stay | Post-Acute Care

athenahealth | Allscripts | Epic | Cerner | MEDITECH

CAPITALIZING ON EHR DATA FOR UNDERWRITING



- Improve Speed, Digitization, Automation and Cost
- Evidence Based
- Augment Ecosystem for Technology Partners
- Increasing Rule Complexity
- AI, ML, Predictive Models
- Personalized/Dynamic
- Frictionless – Reduce Need for Exam, Blood, Urine, APS
- Improved price point for client (/$ insured) – reduce loading
- Underwriting Consistency
- Education/Knowledge Management
- Talent Reconfiguration

DIAMETER HEALTH

EHR – MORE THAN MEETS THE EYE – COMPLEXITY OF MEDICAL ILLNESS AND SOCIAL FACTORS

EXAMPLE OF A SCHEMA AND A SCHEMATRON

CERTIFICATION MEASURES OF DOCUMENT QUALITY

Owais spoke at the AAIM 2022 Triennial about demographic variations in EHR documentation

```
<observation classCode="OBS" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.22.4.2" />
  <templateId root="2.16.840.1.113883.10.20.22.4.2"
extension="2015-08-01" />
  <id root="963f3543-3266-41ea-b9d4-ddaf254c567f" />
  <code code="UNK" codeSystem="2.16.840.1.113883.6.1"
codeSystemName="LOINC" />
  <text>
    <reference value="#ResultDescription1" />
  </text>
  <statusCode code="completed" />
  <effectiveTime nullFlavor="UNK" />
  <value xsi:type="PQ" value="10" unit="%" />
</observation>
```

Schema <templateId> before <id> before <code>

Schema violation – wrong structure

Spoke Owais at the AAIM 2022 Triennial about demographic variations in EHR documentation

Schematron violation – wrong tense

Owais speak at the AAIM 2022 Triennial about demographic variations in EHR documentation

Schematron When a lab result, use LOINC as the codeSystem

DIAMETER HEALTH

EXAMPLE OF A SCHEMATRON

CERTIFICATION MEASURE OF DOCUMENT QUALITY – THIS ONE IS ON PAGE 792

3.92 Result Observation (V3)

`[observation: identifier urn:hl7ii:2.16.840.1.113883.10.20.22.4.2:2015-08-01 (open)]`

Table 453: Result Observation (V3) Contexts

Contained By:	Contains:
Health Concern Act (V2) (optional) Result Organizer (V3) (required) Risk Concern Act (V2) (optional)	Author Participation

SHALL contain exactly one [1..1] **code**, which **SHOULD** be selected from CodeSystem `LOINC (urn:oid:2.16.840.1.113883.6.1)` (CONF:1198-7133).

a. This code **SHOULD** be a code from the LOINC that identifies the result observation. If an appropriate LOINC code does not exist, then the local code for this result **SHALL** be sent (CONF:1198-19212).

COMPLETENESS AND SYNTAX RULES APPLIED TO MEDICATIONS

>400 CLINICAL RULES SUPPORTING INTEROPERABILITY

40	r139	vitalSigns	Syntax	Significant	Entry identifiers should be present and unique (CDA 2.15.1).	N	5.0	TRUE
41	r140	demograph...	Syntax	Minor	Excess time precision in birthdate (Best Practice).	N	2.0	TRUE
42	r141	immunizati...	Syntax	Critical	An immunization should use a CVX code (C-CDA 1098-9007).	N	10.0	TRUE
43	r142	immunizati...	Completeness	Significant	Immunizations should have a date of record (C-CDA 1198-8834).	N	5.0	TRUE
44	r143	immunizati...	Completeness	Significant	Immunization should have a reference (Best Practice).	N	5.0	TRUE
45	r144	medications	Syntax	Critical	Institution specified administration timing should be false for this sig (Best ...	N	10.0	TRUE
46	r145	medications	Syntax	Significant	Medications should not repeat on medication list (Best Practice).	N	5.0	TRUE
47	r146	medications	Syntax	Critical	Medication should be encoded in RxNorm (C-CDA 1098-7412).	N	10.0	TRUE
48	r147	medications	Completeness	Significant	Medication should reference narrative in <text> (Best Practice).	N	5.0	TRUE
49	r148	medications	Completeness	Significant	Medications should have a date of record (C-CDA 1098-7508).	N	5.0	TRUE
50	r149	medications	Completeness	Significant	Medications should have a reference or name present (Best Practice).	N	5.0	TRUE
51	r150	medications	Completeness	Minor	Medications should have a route (C-CDA 1098-7514).	N	2.0	TRUE
52	r151	medications	Syntax	Significant	Medications with PRN in sig should have precondition (Best Practice).	N	5.0	TRUE
53	r152	allergies	Syntax	Significant	Allergies within same clinical grouping should only be listed once (Best Prac...	N	5.0	TRUE
54	r153	procedures	Syntax	Significant	This is not likely a surgical procedure. Use actitivty or observation (Best Prac...	N	5.0	TRUE
55	r154	demograph...	Completeness	Critical	Patient address (street) should be present (C-CDA 81-7291 & 81-7292).	N	10.0	TRUE
56	r155	demograph...	Syntax	Significant	Patient ethnicity should use an acceptable code set (C-CDA 1198-5323).	N	5.0	TRUE
57	r156	demograph...	Syntax	Critical	Patient genders should be in an accepted format (C-CDA 1198-6394).	N	10.0	TRUE

So, if a 1 MB document has 300 rules for completeness that fire and 100 of these are violated:

Completeness Violations/Size = 100 violations/1MB
Completeness Violations/Count = 100 violations/300 rules = 33%

Same applies to syntax rules
Lower scores = Better Document

- **Completeness** refers to the presence of required data. For example: Does the clinical document include key sections? Were the necessary data included within a section or an entry of the clinical document?
- **Syntax**, also referred to as **Content**, refers to whether the included data supported semantic interoperability. For example: Were appropriate coding systems and units of measure used? Were recorded dates and times in a logical sequence?

DIAMETER HEALTH

COMPLETENESS AND SYNTAX RULES

APPLIED TO OUR SENTENCE

Completeness violation – qualifying data is missing

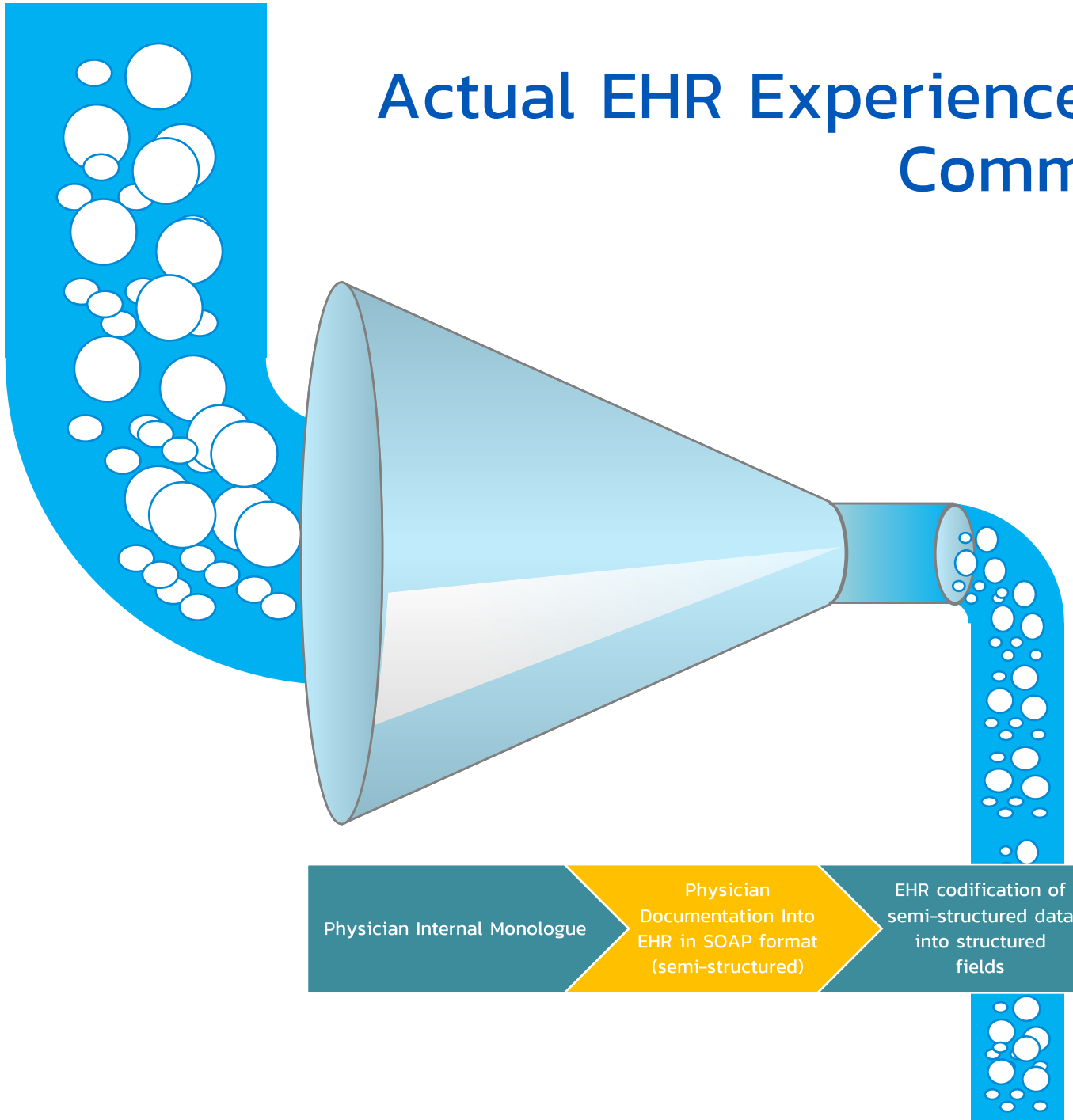
Owais spoke at the AAIM 2022 Triennial. ~~about demographic variations in EHR documentation~~

Syntax violation – proprietary language doesn't lend to interoperability

Owais falou no AAIM 2022 Triennial about demographic variations in EHR documentation

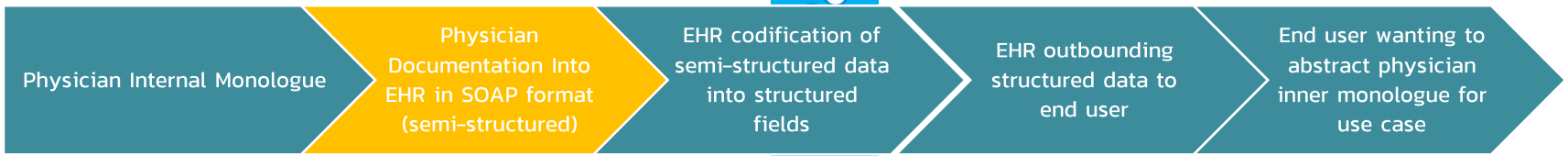
- **Completeness** refers to the presence of required data. For example: Does the clinical document include key sections? Were the necessary data included within a section or an entry of the clinical document?
- **Syntax**, also referred to as **Content**, refers to whether the included data supported semantic interoperability. For example: Were appropriate coding systems and units of measure used? Were recorded dates and times in a logical sequence?

Actual EHR Experience for Non – Marginalized Communities



A 58-year-old male

- with **Past Medical History of Hypertension** reported
- **Medications**: Amlodipine 5 mg PO QD
- presents to an urgent care center on a Saturday morning at 9:30 AM with **Chief Complaint of a Head Laceration**
- **History of present Illness** - he sustained it during a fall at home "while gardening." He states that he was walking in the back yard when he tripped on a brick in his pavers that was sticking up. He had no dizziness or lightheadedness, had no chest pain, shortness of breath, he denies weakness. He was able to get up under his own power and other than a bleeding head laceration, has no symptoms.
- With the exception of the above – **Review Of Systems** was negative



DIAMETER HEALTH

Actual EHR Experience for Marginalized Communities

A 58-year-old male

- with **Past Medical History of Hypertension** reported
- **Medications**: Amlodipine
- **Chief Complaint of a Head Laceration**
- **History of present Illness** – Head Laceration after fall
- **Review Of Systems** neg

RESEARCH REMOVED – HIGH LEVEL INSIGHTS PROVIDED BELOW

DATA OBSERVATIONS

- 40,242 CCDs studied
- Spread across races, ethnicities, age groups, religions, genders, and languages
- Represented various care settings (ER, specialty care, primary care)
- Represented various zip codes (urban, suburban, rural) in various states

- Marginalized communities are impacted by:
  - Increased patient volumes per provider, less time to document when 6 patients an hour vs. 4 patients an hour
  - Lack of consistent primary care in these communities – continuity impacts data capture
  - Less medical literacy and less literacy and numeracy in general; perhaps non-English speaking
  - Care settings which are more urgent and episodic (ER, urgent care)

CONCLUSIONS

1. Medical knowledge is doubling at breakneck speed leading to improvements in mortality of critical conditions like cardiovascular disease and cancer
2. "Information is the oil of the 21st century, and analytics is the combustion engine." – *Peter Sondergaard* – healthcare needs to capitalize on the use of this oil and underwriting can benefit
3. The APS requires a considerable amount of cost, both financially and time and effort of limited human resources
4. C-CDA (through certified EHRs) provides a structured way to help reduce cost and time particular for complex patients receiving multisource/multiformat care documentation – legislation will increase adoption and availability of data
5. EHRs and providers inject a fair amount of variability in documentation leading to fragmentation of insights
6. Certification of an EHR doesn't always equate to the transaction of quality data with captured clinical intent
7. Race, ethnicity, language, age impact data quality for a myriad of reasons

OBJECTIVES

Upon completion of this presentation, the attendee will:

- ❑ Understand the regulatory landscape that has made EHRs commonplace in medical care documentation and how it will impact care outcomes and insights provided to underwriting and claims in life insurance.
- ❑ Explore the challenges of clinical care documentation due to the volume, velocity and variety of data.
- ❑ Study how EHR documentation varies by platform, provider and demographic cohorts and its influence on individual and population-based care patterns.

DIAMETER HEALTH

THANK YOU!