Cardiovascular Data Standards

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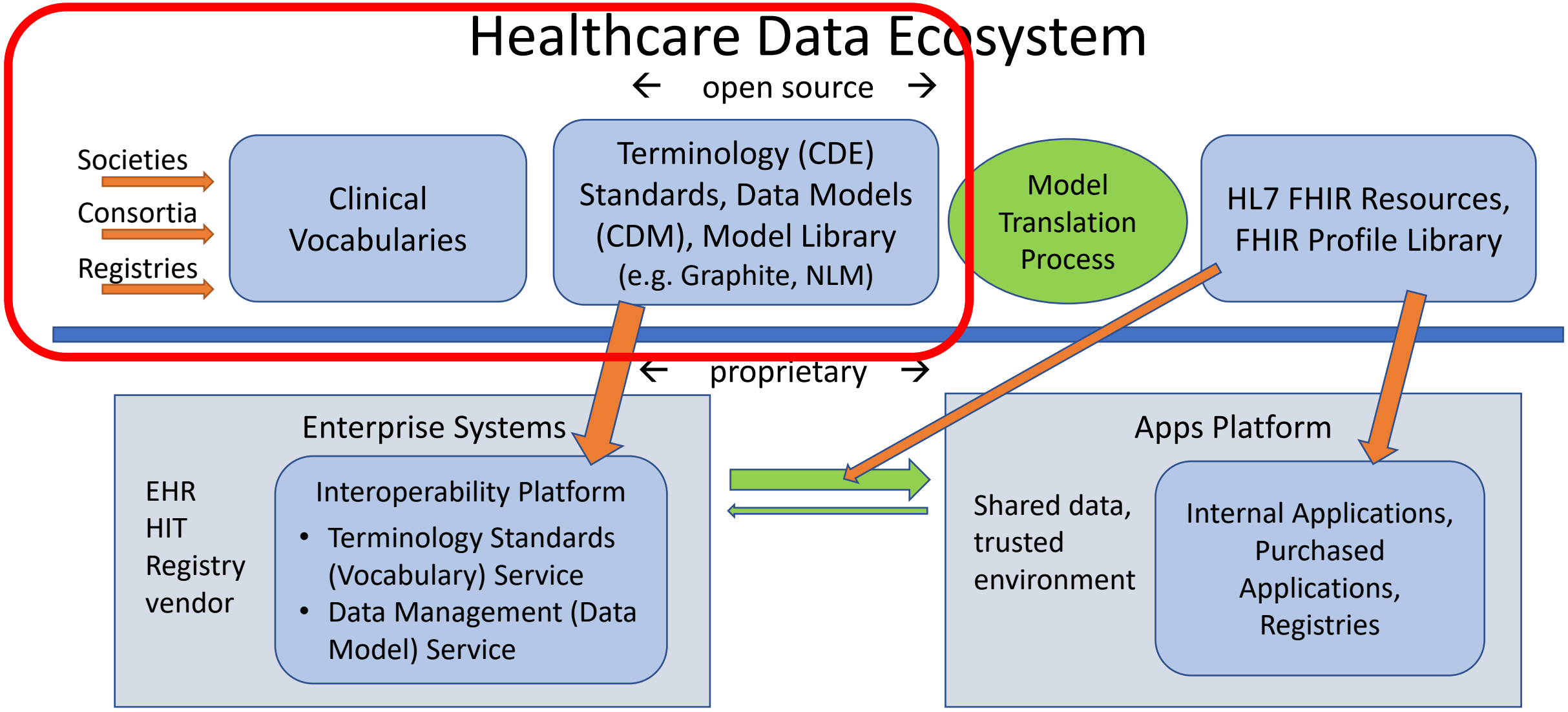
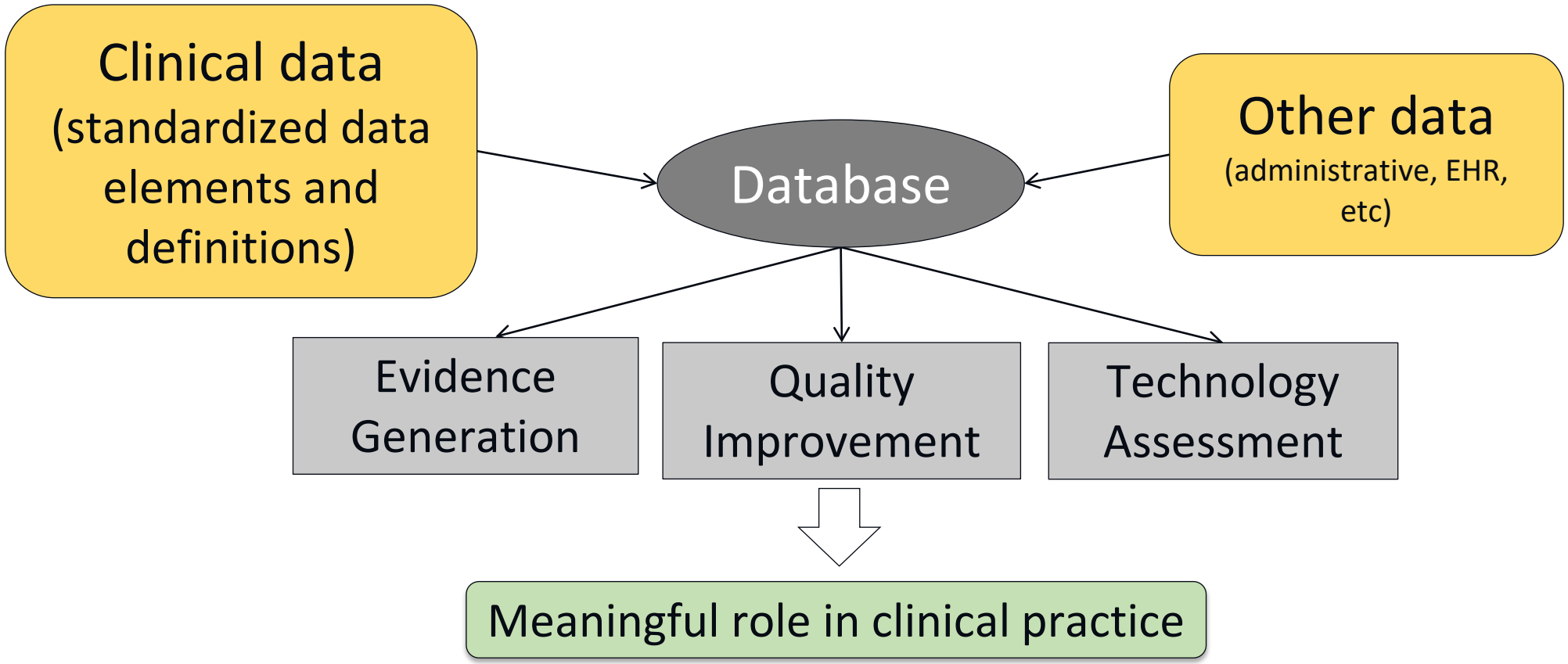
I have no conflicts of interest or other relationships to disclose relevant to this presentation.



Courtesy of Stan Huff, MD

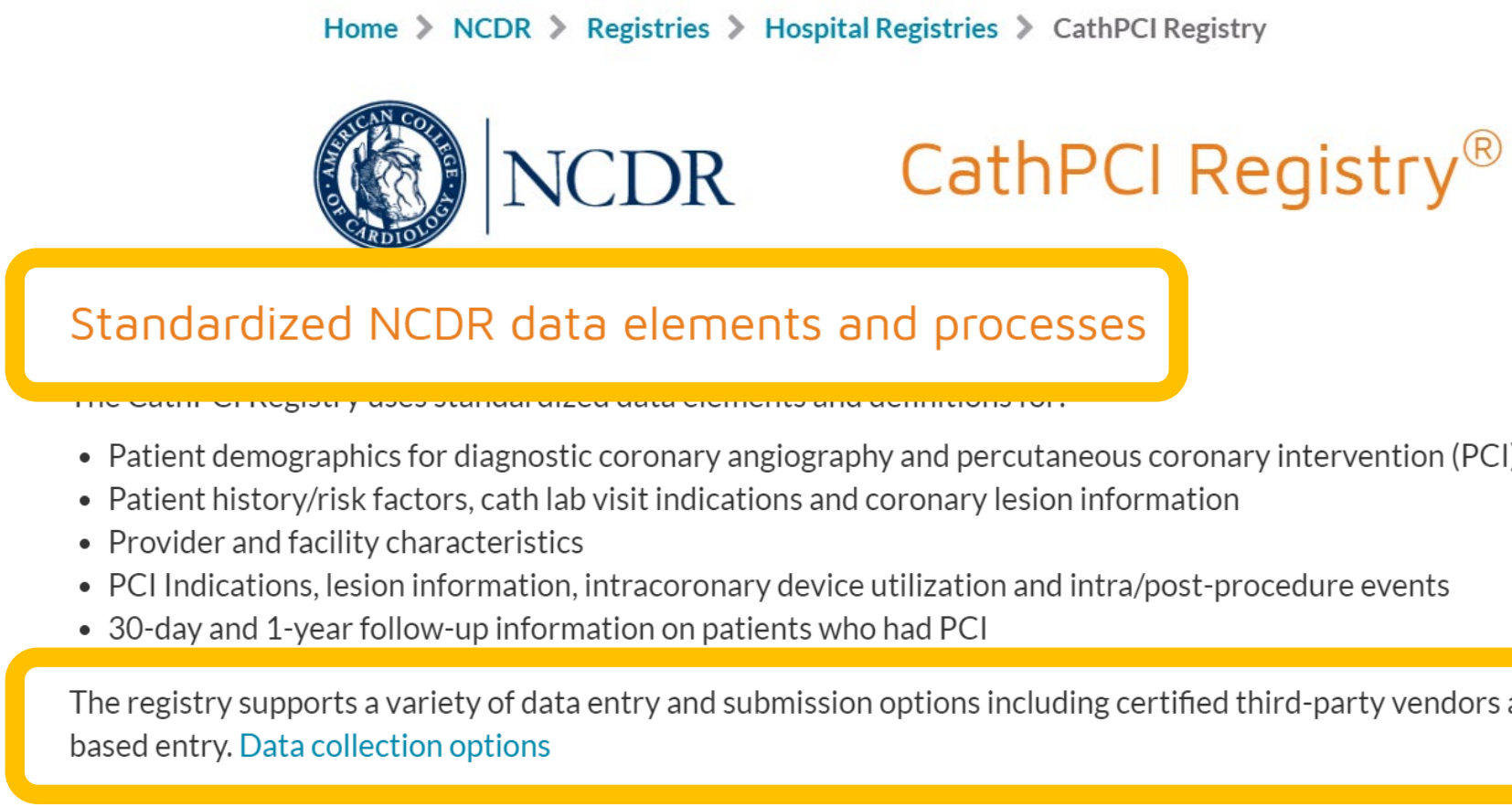
It Starts with Good Data



ACC/AHA/STS Statement on the Future of Registries and The Performance Measurement Enterprise. *J Am Coll Cardiol*; October 2015

NCDR® NATIONAL CARDIOVASCULAR DATA REGISTRY

How Registries Solve the Data Capture Problem

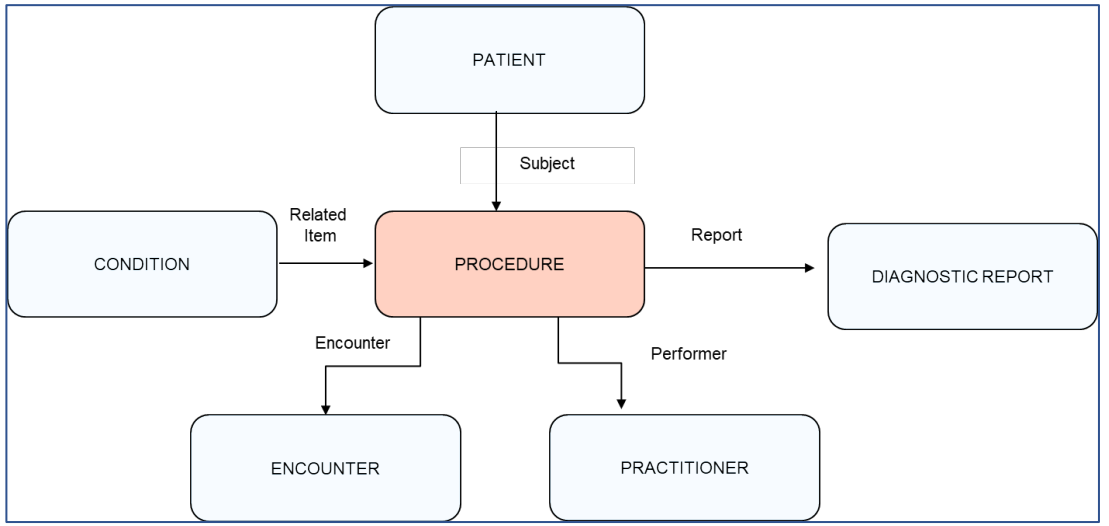


https://cvquality.acc.org/NCDR-Home/registries/hospital-registries/cathpci-registry

The FHIR Specification Provides:

- Healthcare domain resources (content framework)
- Infrastructure for exchanging resources (RESTful API)
- Descriptive and ontological narrative describing relationships
- Framework for determining conformance (testing and safety)
- Resources for management workflows

- References between resources build up the record



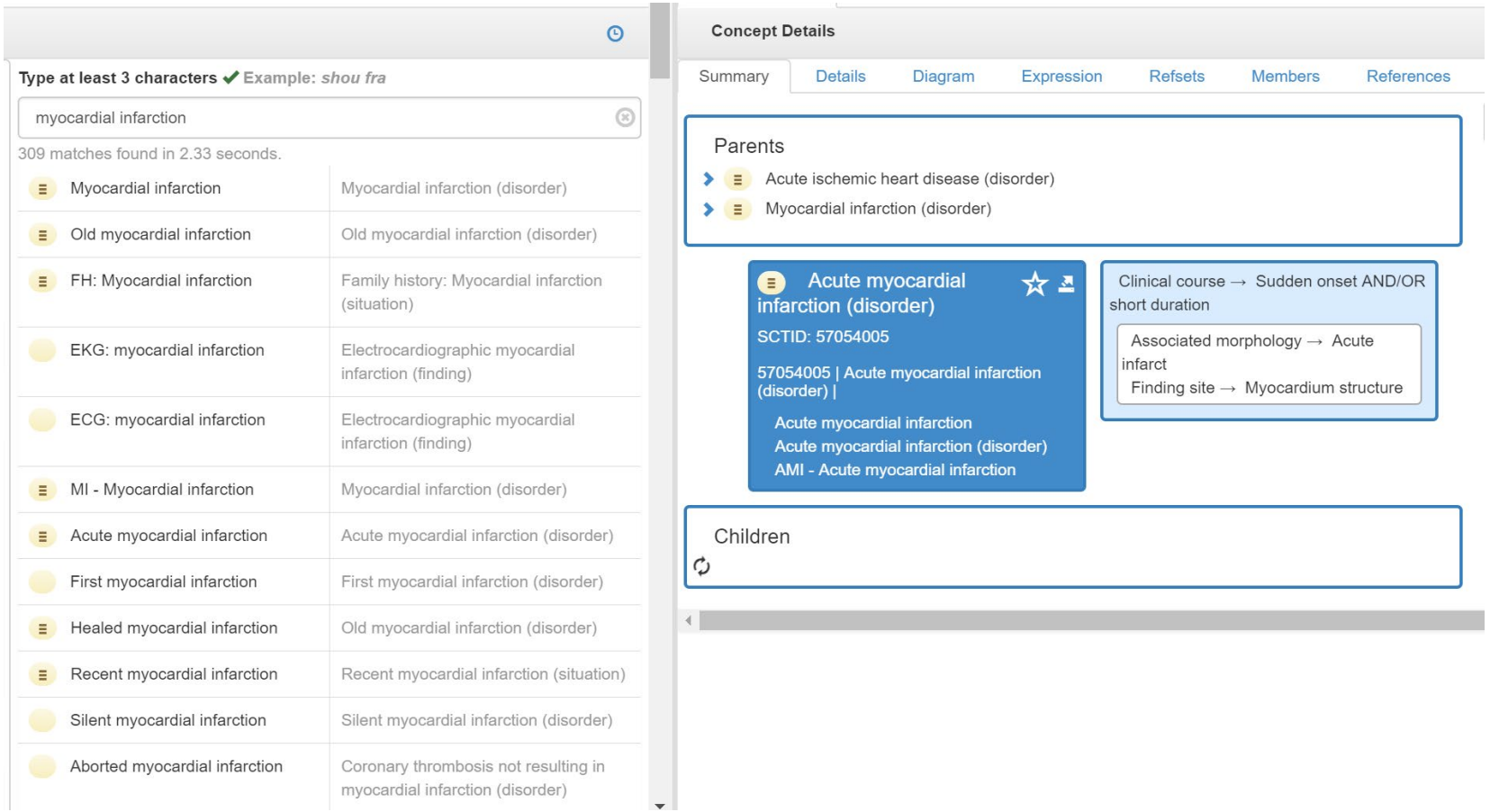
Search Term: myocardial infarction

Returns 308 matches in 2.33 seconds

Terms defined by pathologic, anatomic relationships

No clinical definition

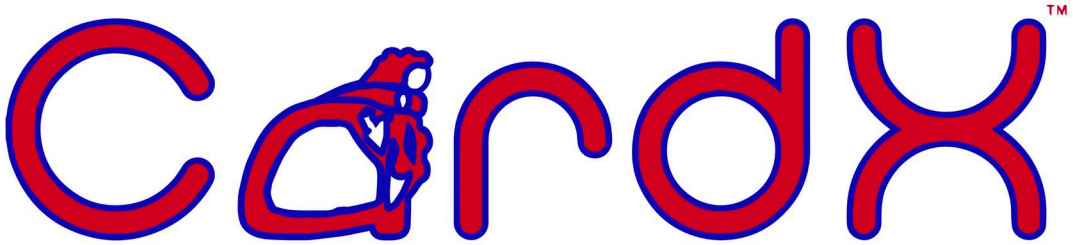
SNOMED-CT



End to End Native Data Interoperability?

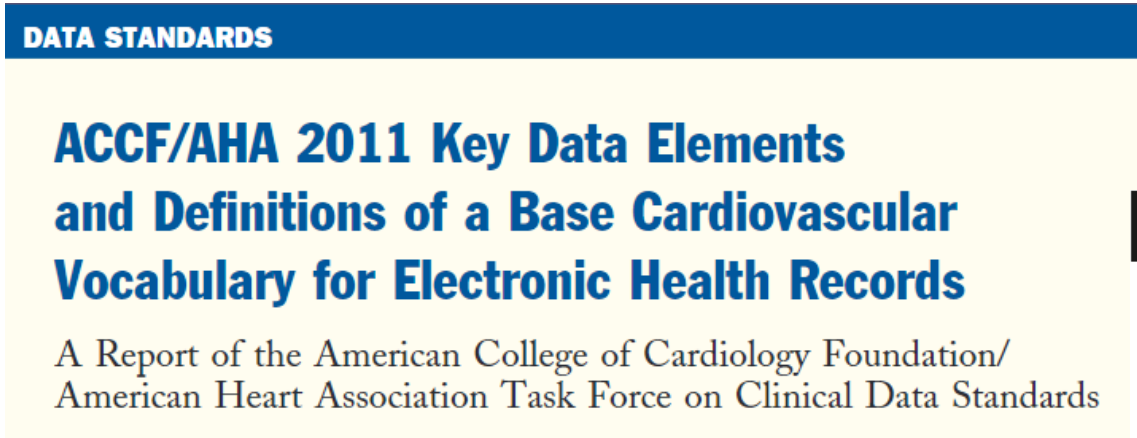
- Identify, define core clinical concepts
- Capture core clinical concepts as data (not text)
- Specify representation of data as data elements in database systems (physical data model)
- Integrate data capture with clinical workflow
- Target direct data transfer (while respecting ETL / boundary-based interoperability)
- Capture once, use many times …

Cardiovascular data eXchange



Why CardX?

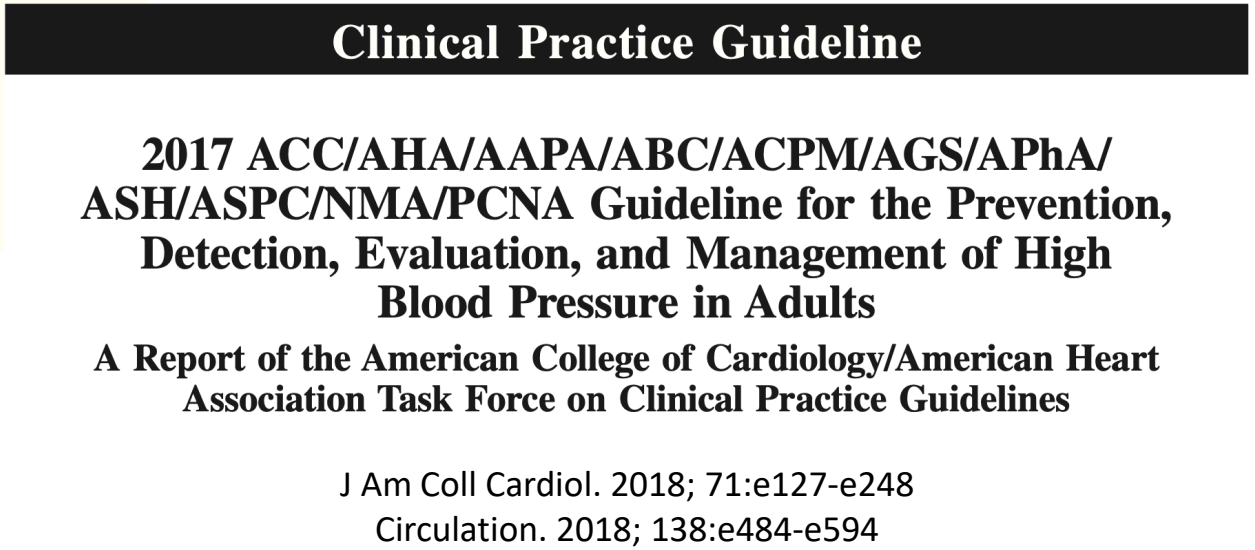
Cardiovascular medicine is rich in consensus, evidence-based guidelines and practice models proven to reduce cardiovascular morbidity and mortality


DATA STANDARDS

ACCF/AHA 2011 Key Data Elements and Definitions of a Base Cardiovascular Vocabulary for Electronic Health Records

A Report of the American College of Cardiology Foundation/ American Heart Association Task Force on Clinical Data Standards

J Am Coll Cardiol. 2011; 58:202-22
Circulation. 2011; 124:103-23


Clinical Practice Guideline

2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults

A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

J Am Coll Cardiol. 2018; 71:e127-e248
Circulation. 2018; 138:e484-e594

CardX

Evidence-Based Medicine

- What is mature?
  - Epidemiology, science – we understand the problems & have solutions
  - Pharmacology, devices – we have therapeutics that improve outcomes
  - Guidelines, policies – we have agreement about what needs to be done
- What is incomplete (or missing)?
  - Guidelines written per computational constructs
  - Device standards: that enables “plug and play” (e.g., home BP devices)
  - Data standards: clinical concepts expressed as (universal) data elements
  - Patient-facing IT: high usability systems that enable patients (e.g., medication reconciliation, guided BP management)

Potential CardX Use Cases

Foundation: core, interoperable cardiovascular lexicon

- Home-based management of hypertension
- Quality and performance measures assessment
- Registry submission
- Medical device assessment and surveillance
- Clinical decision support
- Research and discovery
- …

CardX – Cardiovascular Data eXchange

A set of common data elements for cardiovascular care that is standardized, computable, clinically applicable and available in every electronic health record for patients with a cardiovascular diagnosis

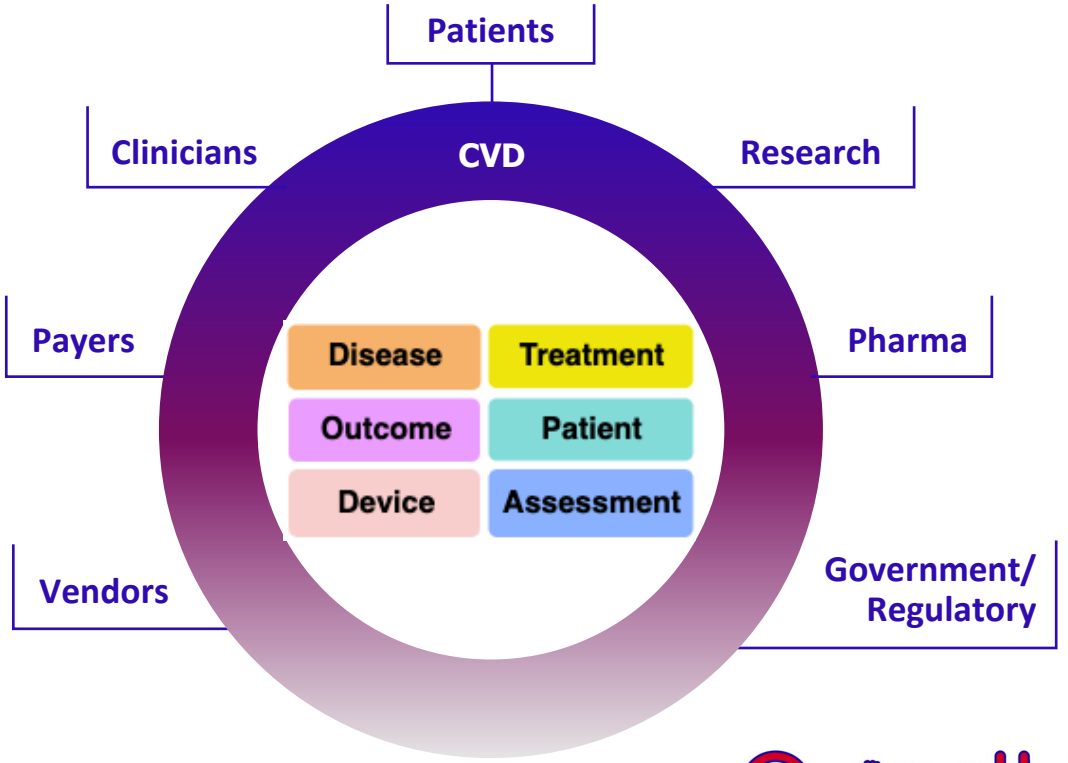
A **standard health record** for cardiology
Builds on the methods and technologies of mCODE

An expert validated **set of data elements** applicable to all cardiovascular conditions, and collected for:

Standardized information exchange

Use-case driven and targeted use

Cardiology data element domains: patient, disease, treatment, outcomes, device, lab/vital



mCODE STU2: http://hl7.org/fhir/us/mcode/

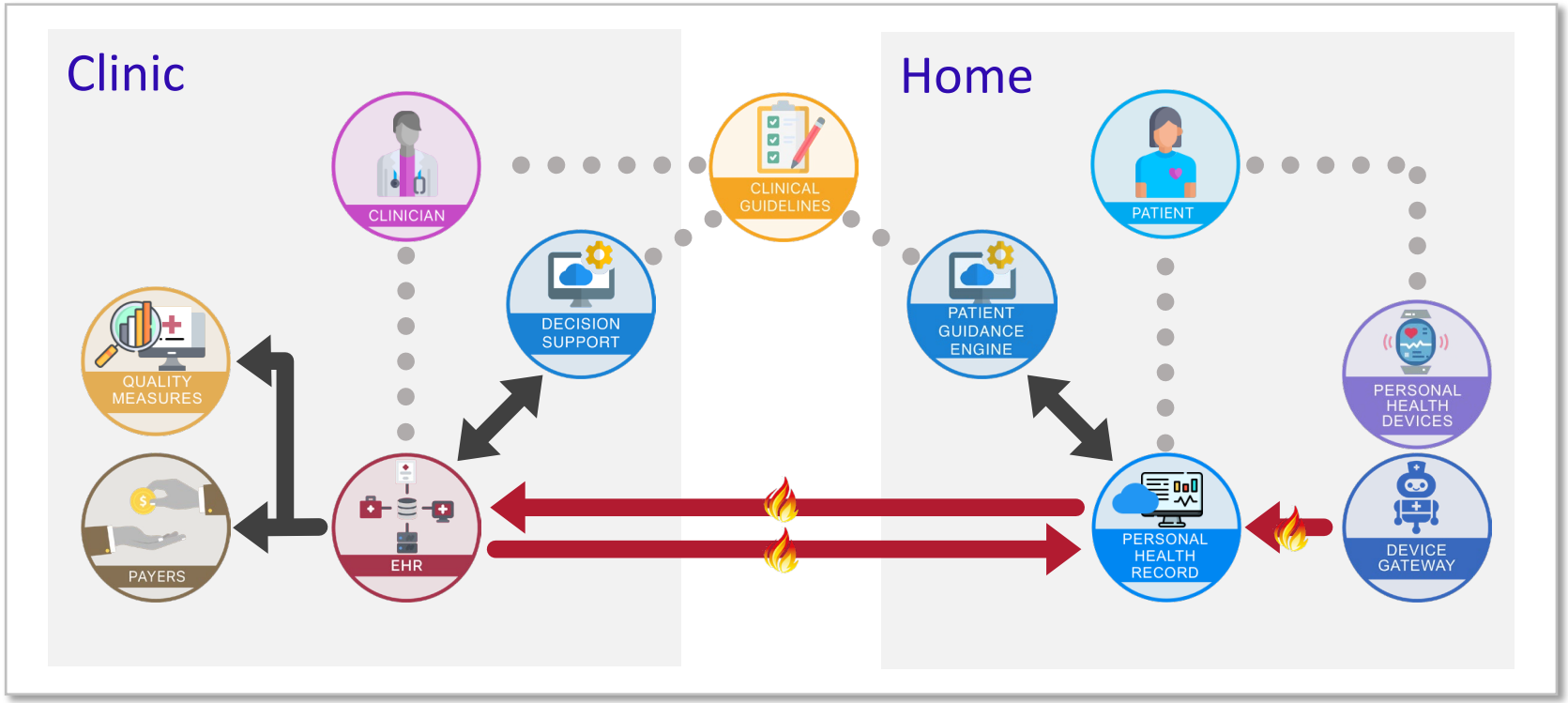
Hypertension Use Case

Problem

- Hypertension affects 115 million adults in America
- Lack of adherence to clinical guidelines to diagnose, treat, and manage hypertension
- Home BP monitoring is the standard for hypertension management, however there are no data exchange standards

Solution

- Integrated standard that enables interoperable, scalable, and accessible HTN management both at home and clinic



Desired Impact

- Provide patients, physicians, APPs, nurses, medical assistants, pharmacists, and dieticians with the tools needed to adhere to hypertension guidelines
- Increase data liquidity between blood pressure measurements captured at home with those captured in the clinic

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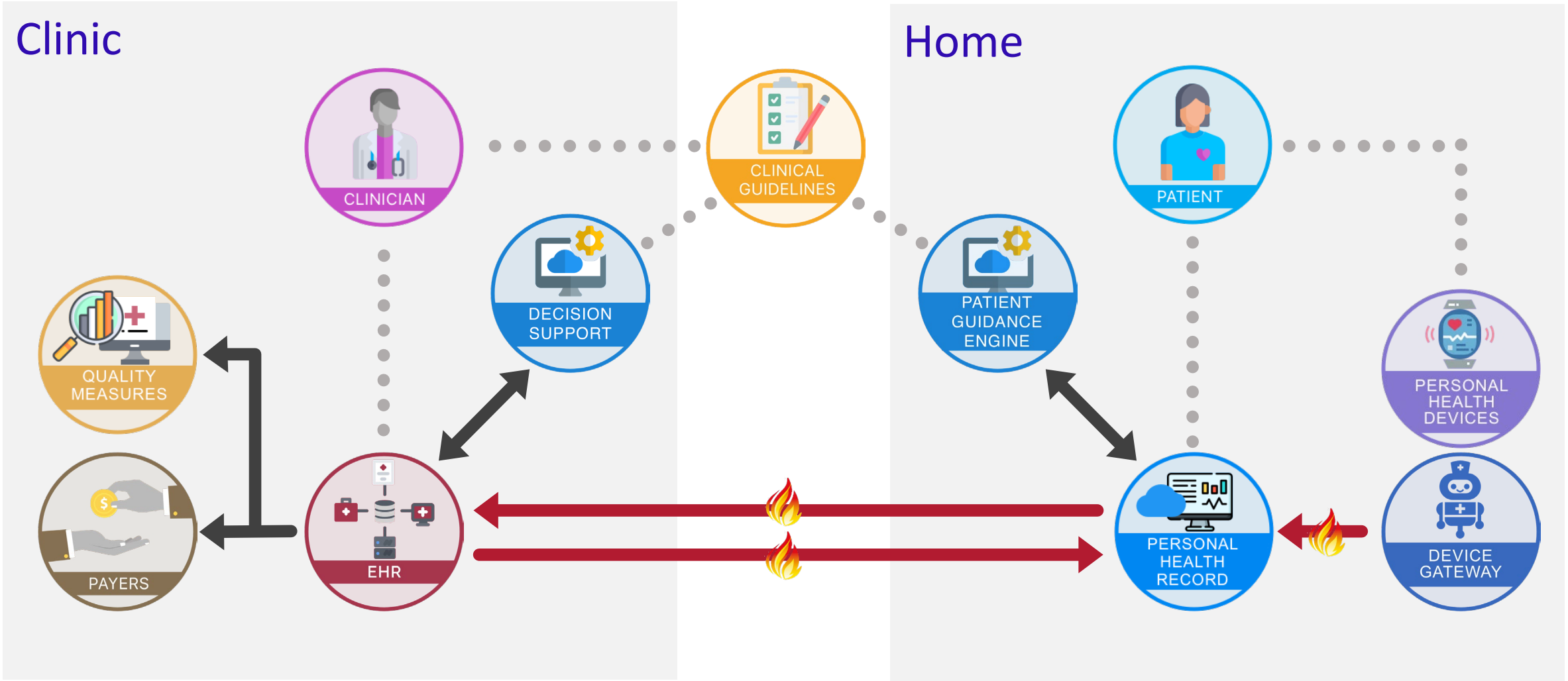
Hypertension Use Case



Clinician Encounter (Outpatient)
(e.g., cardiology, internal medicine, family medicine)

KEY
Purple: not in scope
Orange: our responsibility to define
Dark blue: collaboration with stakeholders at data exchange & implementation levels
Light blue: high level data content

Home Monitoring
(asynchronous, semi-autonomous)

EHR
- Demographics
- Vitals
- Diagnoses
- Prescriptions
- Labs
- Social history
- Care plan

ASCVD Risk Calculator
American College of Cardiology

Clinical Decision Support, Guidelines
- HTN management
- Performance measures
- Clinical documentation

PHR

BP / Health Management Portfolio

Patient

RESTful API

@Home BP Measurement

1 FHIR BP1

2 FHIR BP2

3 FHIR Personal Medical Device

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FHIR BP1 (EHR to PHR: both push to and call from PHR)
- Demographics: patient ID, DOB, MRN, sex, race, ethnicity
- Vitals: SBP, DBP, HR, height, anatomic location, measurement location
- Diagnoses: HTN, DM, CKD, kidney transplant, pregnancy, comorbidities …
- Assessment: EtOH, diet, nicotine, activity, stress
- Labs: cholesterol, HDL
- Meds: ASA, statin, HTN rx, HTN aggravating rx, RxClass (as prescribed)
- Non-pharm rx: diet, tobacco, exercise, stress reduction
- Care plan: HTN target, care plan components, education

2

FHIR BP2 (episodic PHR to EHR: BP data, clinician messaging)
- Demographics: patient ID, DOB, MRN
- Vitals: SBP, DBP, average BP, HR, anatomic location, measurement location, weight
- Meds: ASA, statin, HTN rx, HTN aggravating rx, RxClass (as taken)
- Social: diet, tobacco, EtOH, exercise, behavioral
- Patient-reported outcome measures (PROM)

3

FHIR Personal Medical Device
- Patient ID
- Device ID
- Vitals: SBP, DBP, HR, anatomic location
- Measurement location (home)
- Date and timestamp

Technical Approach

- Map and disambiguate Guidelines and Performance Measures (ACC/AHA, AAFP, NQF, etc.) into core concepts and corresponding data elements
- Identify sources of data in context of processes and workflows
- Specify, build FHIR profiles and implementation guides
  - From device or device gateway, self-monitored BP data will be exchanged with a Patient Data Manager (PHR)
  - Separate FHIR-based exchanges will connect the Patient Data Manager / PHR with the EHR

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Stakeholder Opportunities and Contributions

Linking Clinicians, Patients, Health Systems, Vendors, and Government

Opportunity	▪ Lower barriers to **evidence-based practice** ▪ Reduce burden of **data collection** ▪ Facilitate **actionable data** to inform treatment	▪ Enable **data liquidity** through FHIR ▪ Support development of **next generation care models** for patients with HTN ▪ Focus on the **user experience**	▪ Reduce **death and disability** due to HTN ▪ Decrease **healthcare costs** ▪ Increase **scalability, efficiency,** and **effectiveness** of HTN management
Contribution	▪ Establish **clinical priorities** ▪ Define optimal **workflows** ▪ Validate **clinical concepts and data specifications**	▪ Accomplish proof of value through **real-world implementation**	▪ Demonstrate **proof of use** of FHIR-based interoperability ▪ Validate value of FHIR Accelerator model in improving **HTN management**

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Thank You!

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Visit the Pew Project website:
https://dcri.org/registry-data-standards