Accelerating Evidence Generation for Genomic Technologies in a Learning Health Care System

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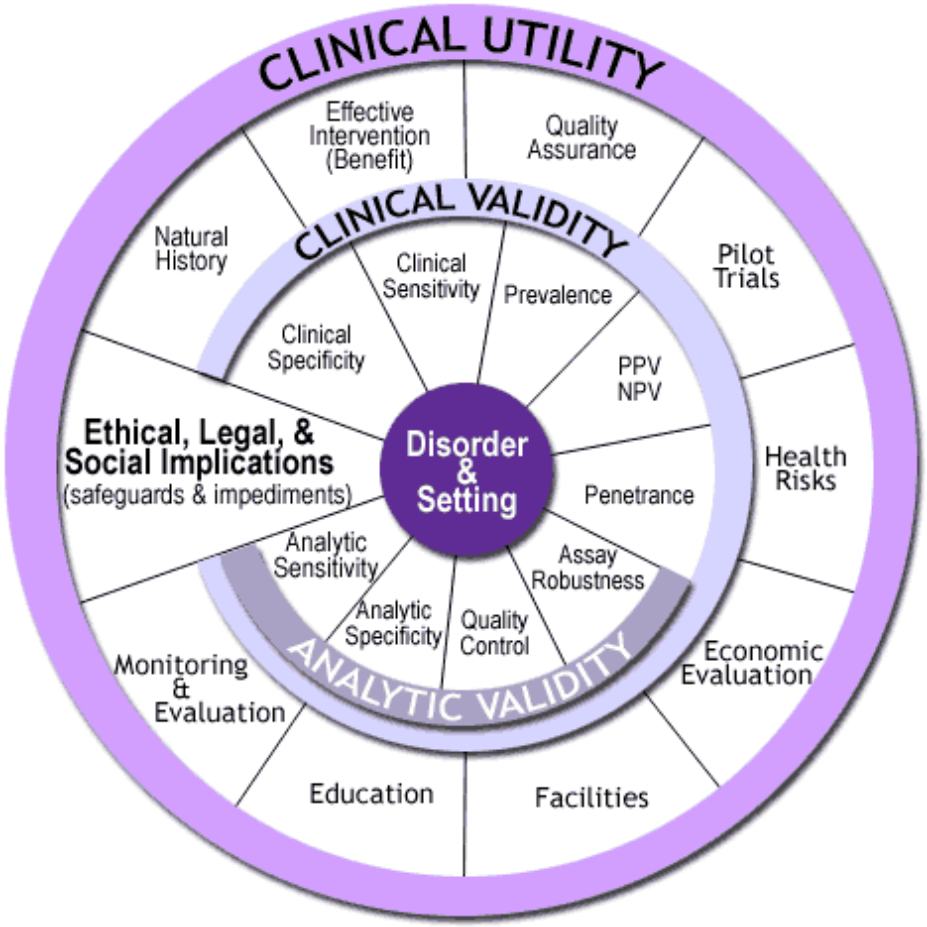
- Disclosure: An epidemiologist for FDA's Sentinel program

Background

- Limited evidence available on the effect of using genomic tests on health outcomes
  - Very few RCTs
  - No funding for RCTs for genomic tests
  - RCTs take too long
  - High cost of archiving specimens from therapeutic clinical trials

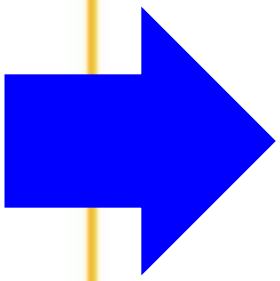
Phillips K, et al. GIM 2017

Purpose of the Model



Analytical Validity	Is the test accurate and reliable?
Clinical Validity	Is the test result medically meaningful?
Clinical Utility	Does the test improve healthcare & health?
Risk classification	% patient reclassified based on test
Therapeutic choice	% patents in whom treatment altered
Patient outcome	Effect on outcomes e.g., adverse effects, QoL
Economic Validity	Cost benefit & cost effectiveness

CDC's ACCE model; http://www.cdc.gov/genomics/gtesting/ACCE/



Green

- FDA label requires use of test to inform choice or dose of a drug
- CMS covers testing
- Clinical practice guideline based on systematic review supports testing

Yellow

- FDA label mentions biomarker*
- CMS coverage with evidence development
- Clinical practice guideline, not based on systematic review, supports use of test
- Clinical practice guideline finds insufficient evidence but does not discourage use of test
- Systematic review, without clinical practice guideline, supports use of test
- Systematic review finds insufficient evidence but does not discourage use of test
- Clinical practice guideline recommends dosage adjustment, but does not address testing

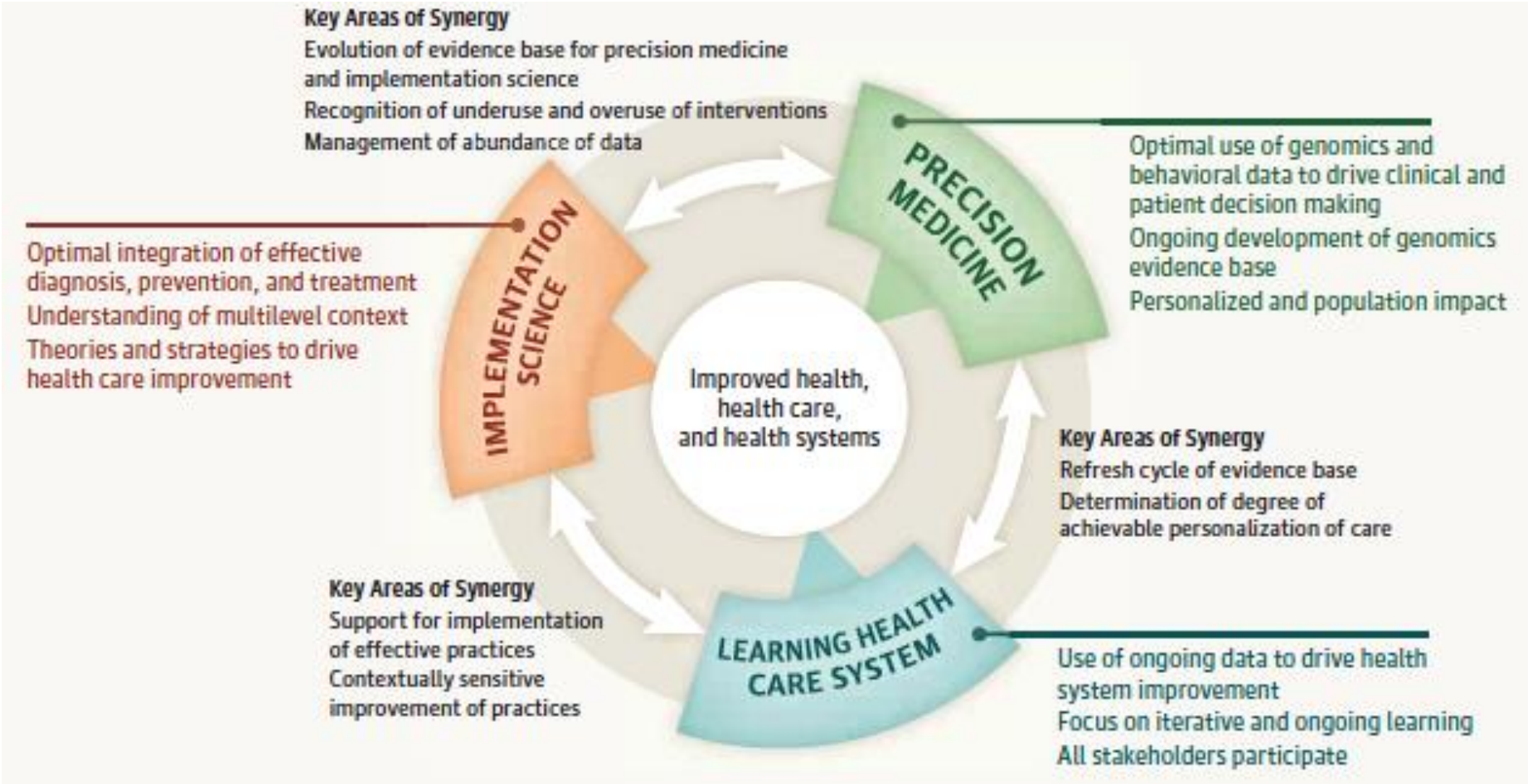
Red

- FDA label cautions against use
- CMS decision against coverage
- Clinical practice guideline recommends against use of test
- Clinical practice guideline finds insufficient evidence and discourages use of test
- Systematic review recommends against use
- Systematic review finds insufficient evidence and discourages use
- Evidence availble only from published studies without systematic reviews, clinical practice guidelines, FDA label or CMS labels coverage decision

*Can be reassigned to Green or Red if one or more conditions in these categories apply

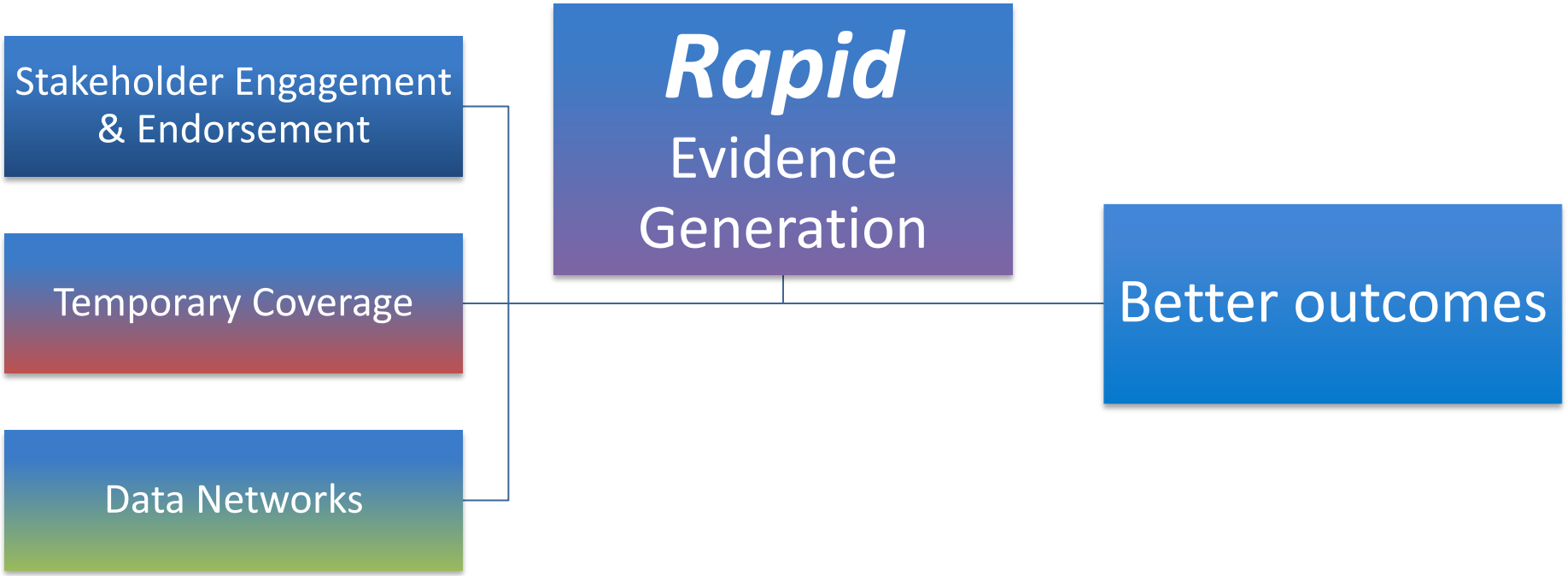
Dotson W et al. Clin Pharmacol Ther. 2014 Apr;95(4):394-402

Learning Health Care System



Chambers D, et al. JAMA 2016

Three Building Blocks of the Model



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Stakeholder Engagement & Endorsement

Temporary Coverage

- Manufacturers
- Payers (& employers who decide on insurance benefits)

Leveraging Data Networks

- Manufacturers
- Payers
- Health systems
- EHR vendors
- Providers
- Patients
- Researchers
- Government agencies

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Temporary Coverage

Risk-sharing agreements / Value-based contracts between manufacturers & payers

- Use of genomic tests captured by claims & EHR data systems
- Not the same as CMS' coverage with evidence development programs
  - Patients must participate in a registry or trial
  - Slow recruitment & data collection
- Costs for evidence generation shared by manufacturers and payers
- Example: Biologics and Biosimilars Collective Intelligence Consortium is a non-profit, collaborative scientific public service initiative

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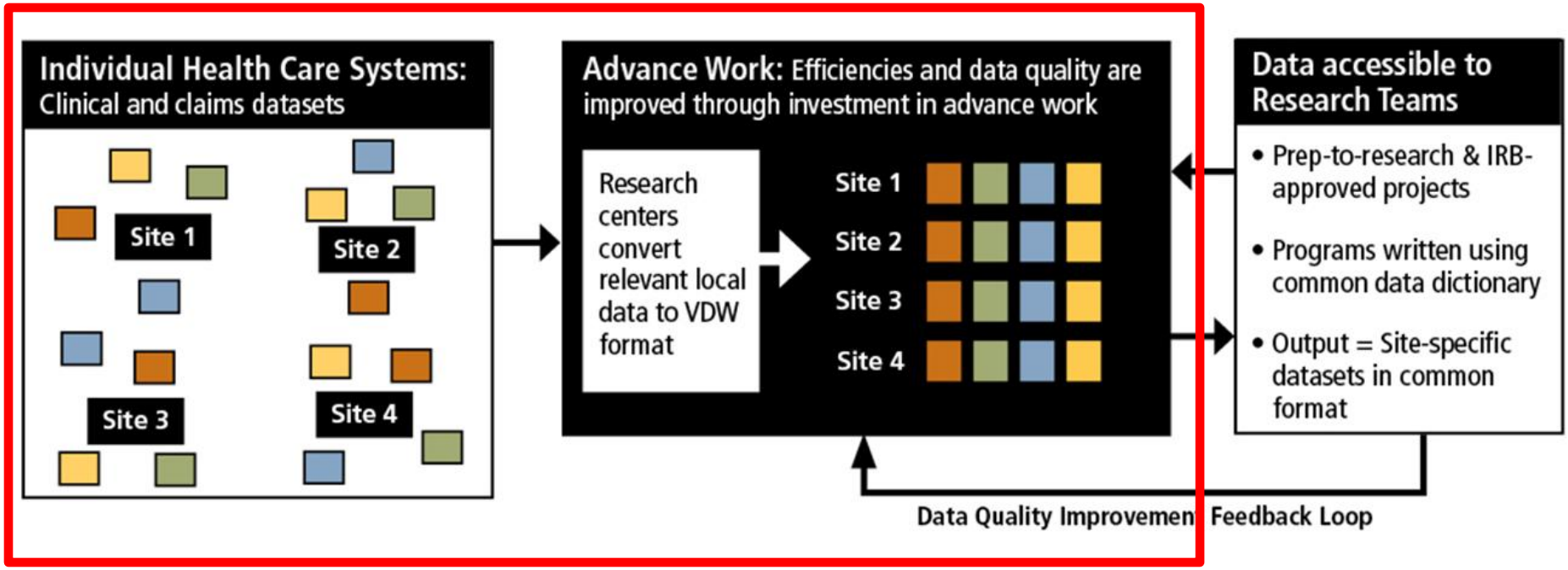
Leveraging Existing Data Networks

- Avoid limitations of multi-site research
  - Pulling together data elements needed from each site on a project by project basis is time-consuming & expensive
  - Each system has its own data specs
  - Data sharing might be a concern
- Data networks (& analytical toolbox) exist
  - Data networks take time & money to develop
  - Sentinel: ~223 million individuals
  - PCORnet: ~10 million individuals

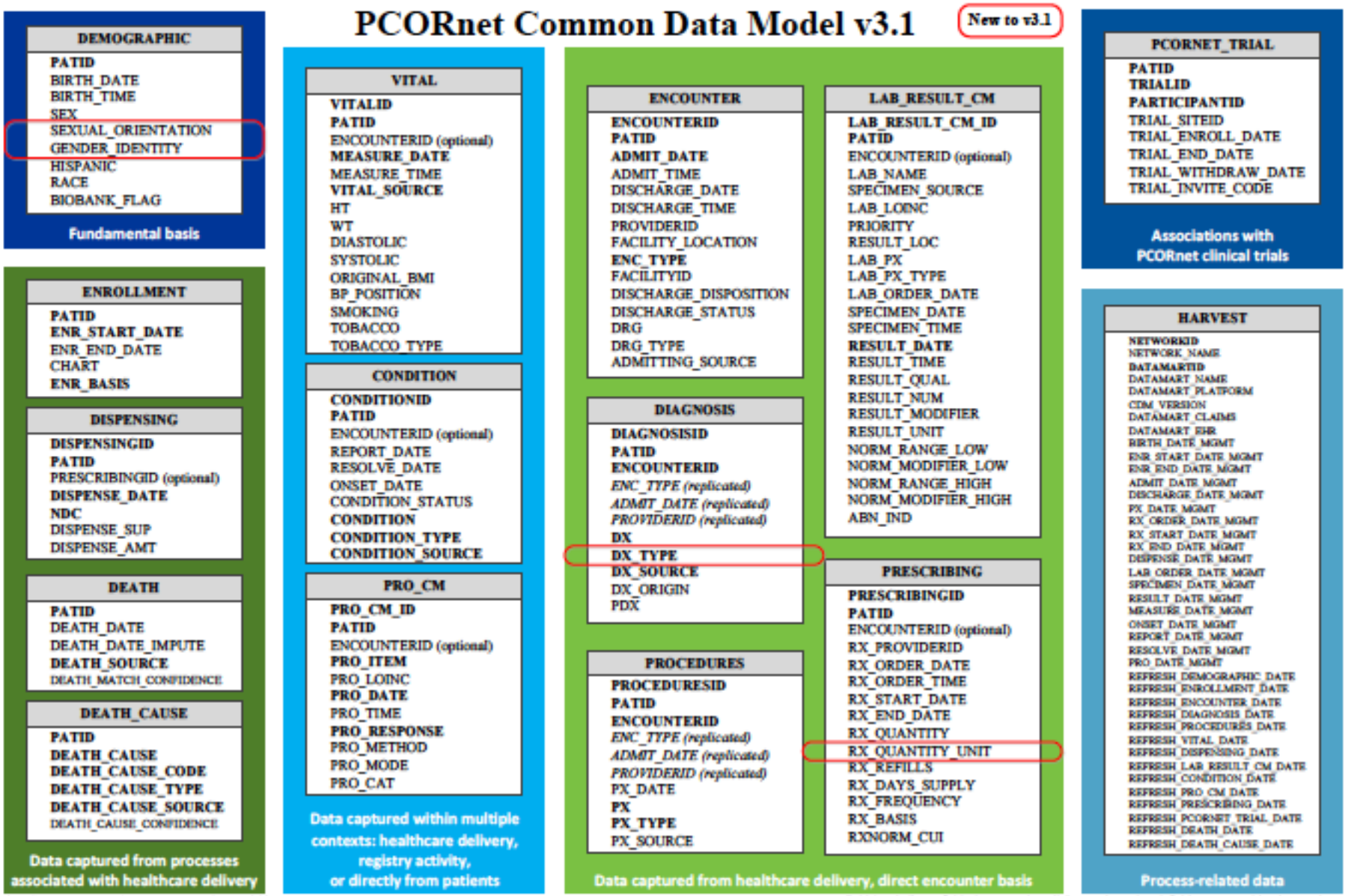
Harmonized multiple databases



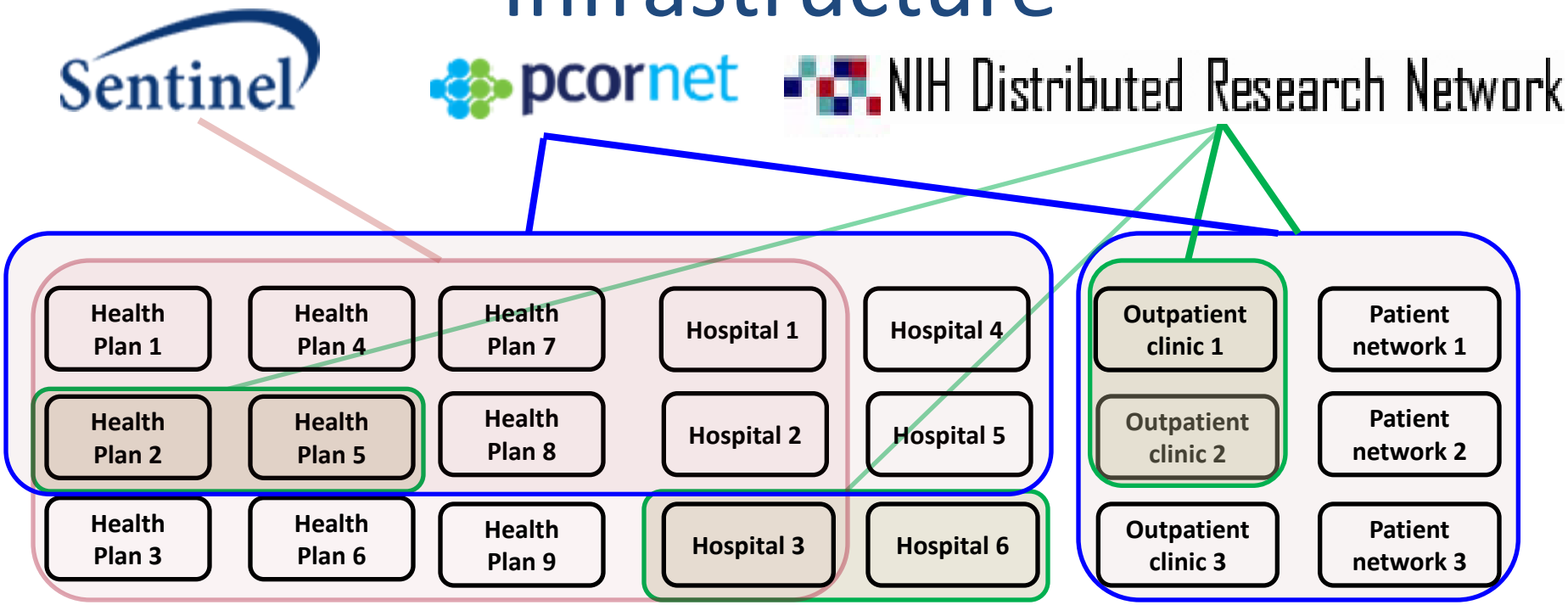
Time & money to develop

Adapted from: http://www.hcsrn.org/asset/b9efb268-eb86-400e-8c74-2d42ac57fa4F/VDW.Infographic031511.jpg

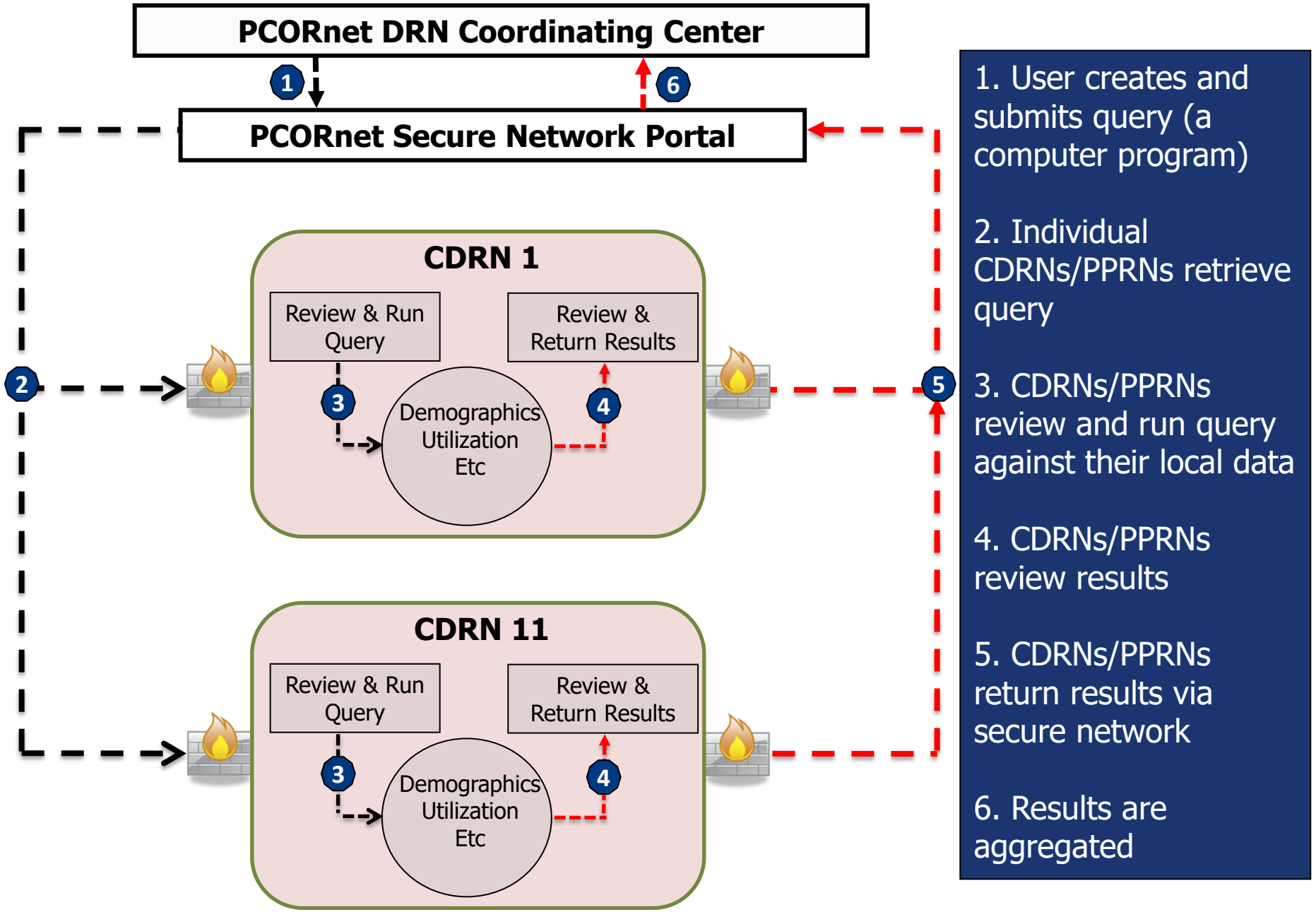
PCORnet Common Data Model v3.1



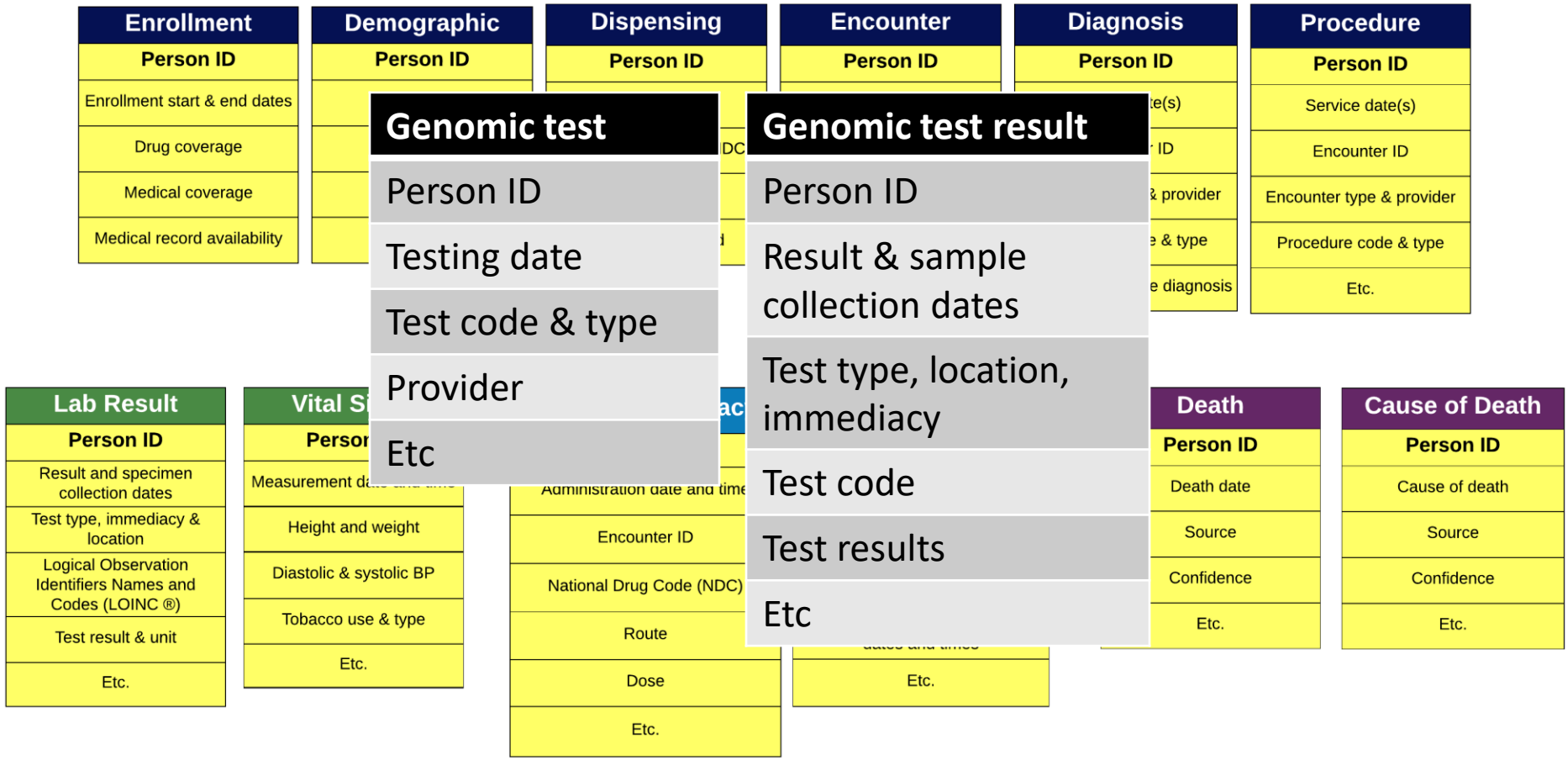
Multiple Networks Sharing Infrastructure



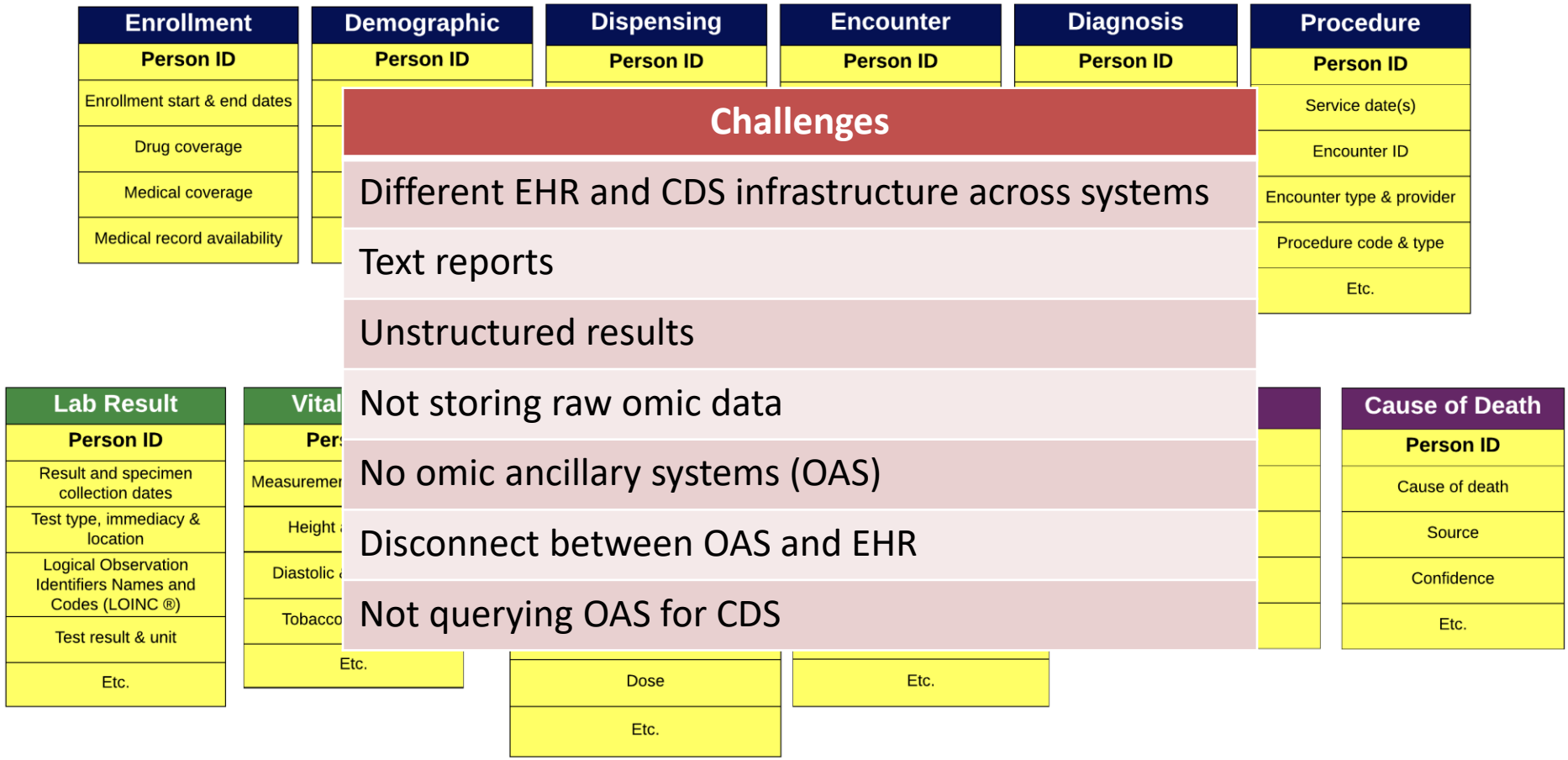
- Each organization can participate in multiple networks
- Each network controls its governance and coordination
- Other networks can participate
- Networks share infrastructure, data curation, analytics, lessons, security, software development


PCORnet DRN Coordinating Center
1
6
PCORnet Secure Network Portal
CDRN 1
Review & Run Query
Review & Return Results
3
4
Demographics Utilization Etc
2
5
CDRN 11
Review & Run Query
Review & Return Results
3
4
Demographics Utilization Etc
1. User creates and submits query (a computer program)
2. Individual CDRNs/PPRNs retrieve query
3. CDRNs/PPRNs review and run query against their local data
4. CDRNs/PPRNs review results
5. CDRNs/PPRNs return results via secure network
6. Results are aggregated

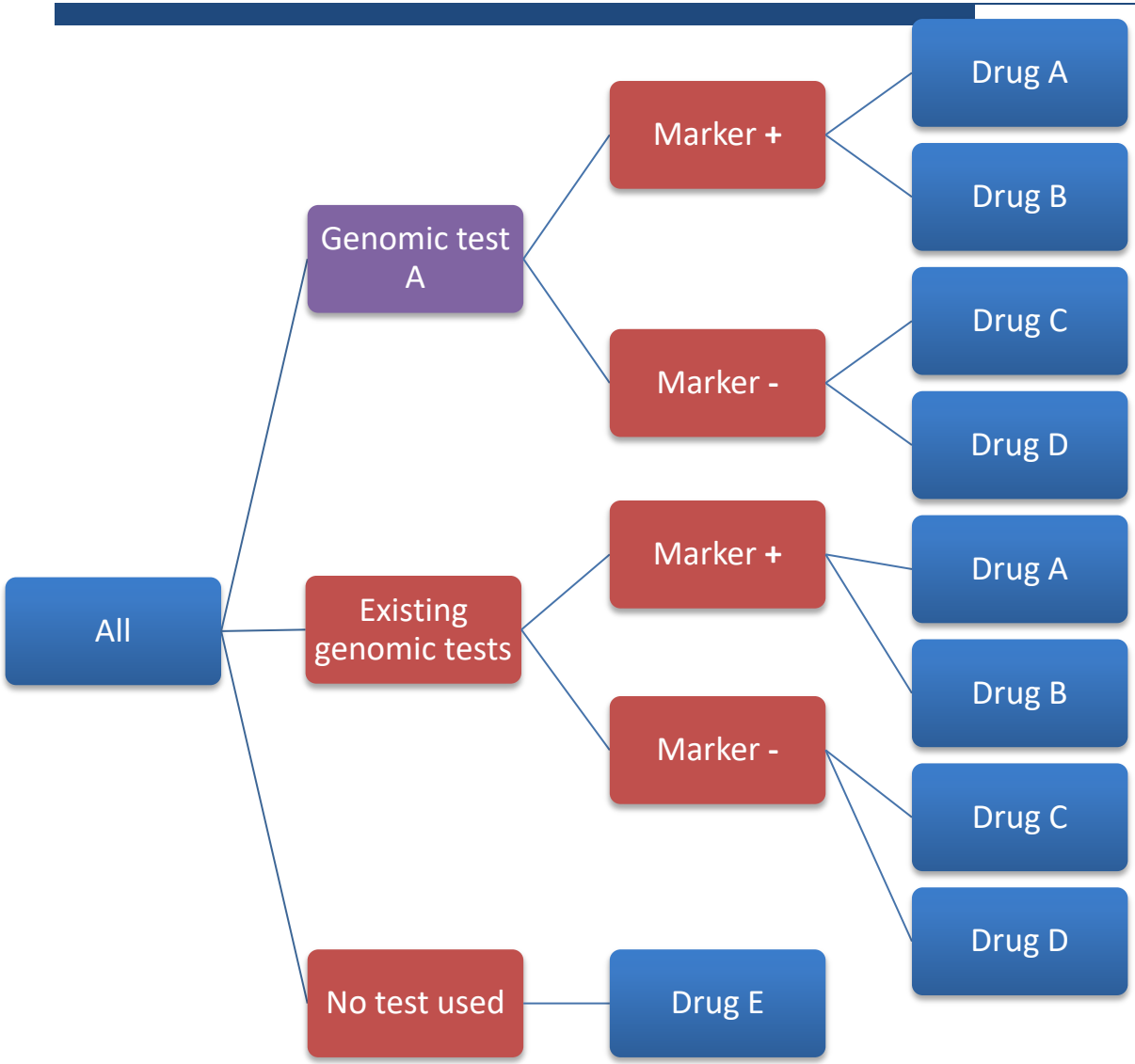
Sentinel Common Data Model v6.0



Sentinel Common Data Model v6.0



Generating Evidence

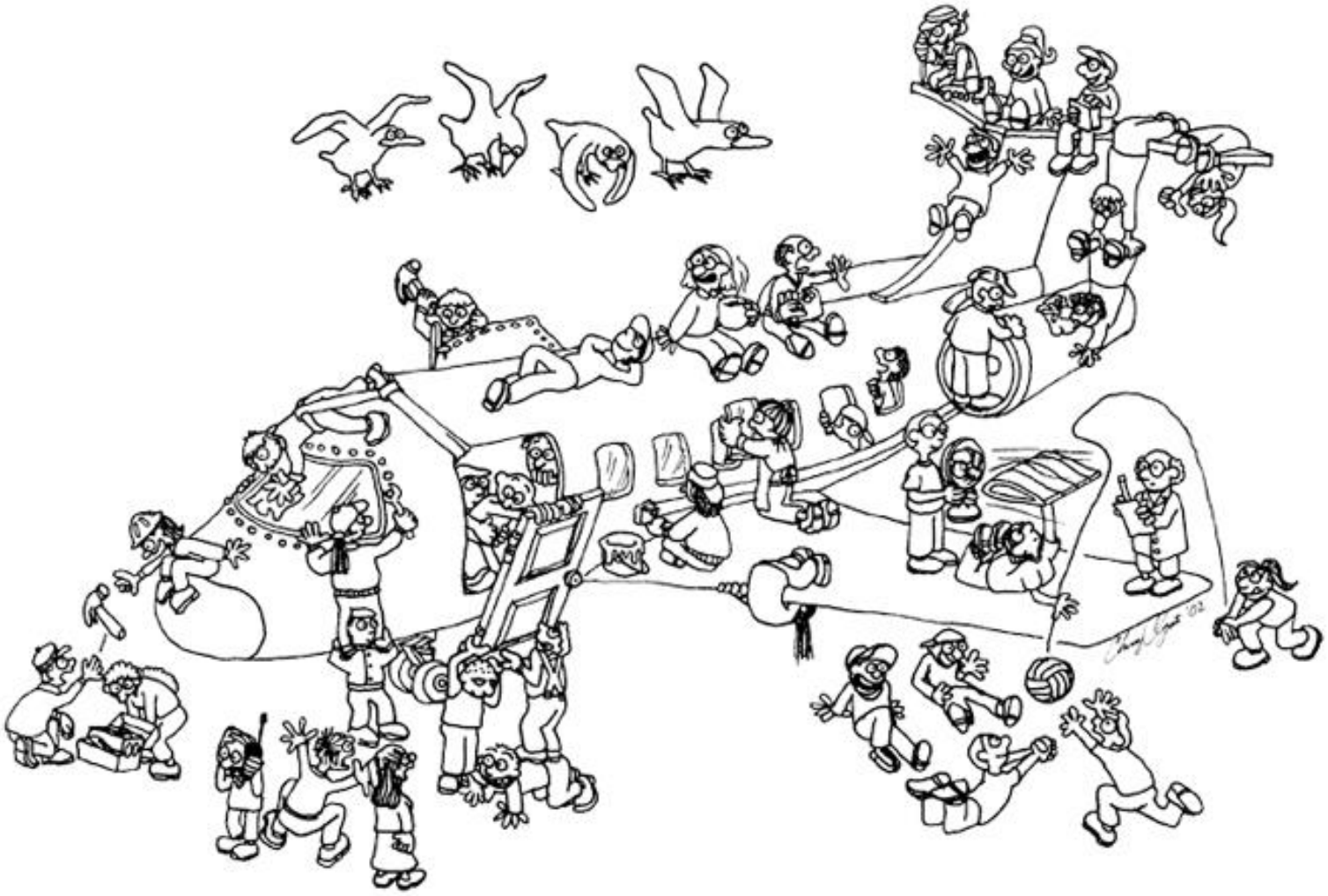


Outcomes:

- Patterns of care
- Clinical outcomes
- Costs of care

Building the plane while flying it!

Let’s go together!
Safer, farther, faster



Thank you!

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