Clinical Decision Support Technologies for Oncologic Pathology

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Clinical Decision Support (CDS)

Information presented to assist clinicians in appropriately interpreting and acting on diagnostic testing results.

> "…knowledge and person-specific or population information, intelligently filtered or presented at appropriate times, to foster better health…"

Osheroff et al, 2007. JAMIA

CDS for Guidelines and Appropriate Use

- Guidelines can take years to disseminate
- Even with effective dissemination, implementation may be variable

- Clinical decision support can be an ideal way to:
  - Educate
  - Remind
  - Assist

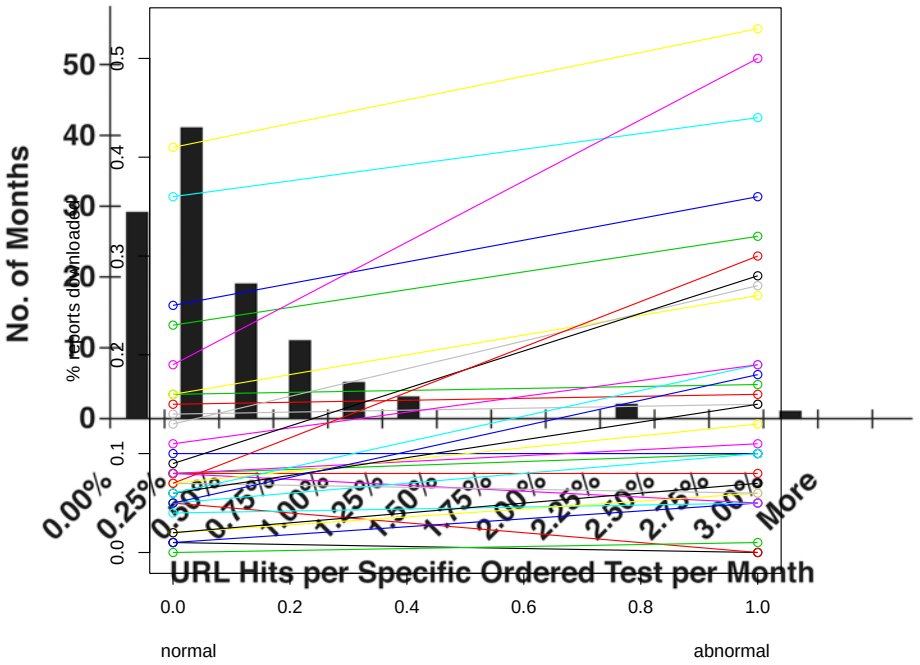
Passive and Active CDS

- Passive – require user effort to access or interpret
  - Reference ranges
  - Dose or risk calculators
  - URLs with links to additional information
  - Infobuttons
- Active – situation or action specific triggers
  - Flags
  - Pop-ups
  - Diagnostic Management Teams

Passive Clinical Decision Support

What makes clinicians use passive CDS?

- In general passive CDS used infrequently
- Accessed for abnormal findings more often
- Accessed for unusual situations more often
- Accessed more often when there are changes in process



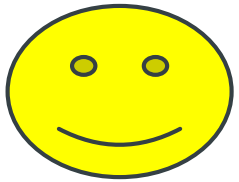
Shirts et al. (2009) Am J. Clin Path. Dec;132(6):818-23

Shirts et al. (2012) J Pathol Inform. 2012;3:26.

Active Clinical Decision Support

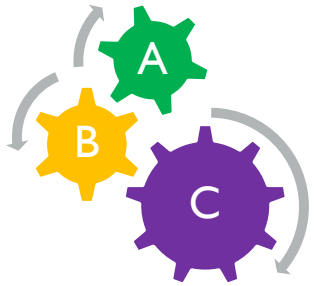
Barriers to Active CDS

- Physician Acceptance



- Coding molecular and pathology information for electronic health record

- Interoperability

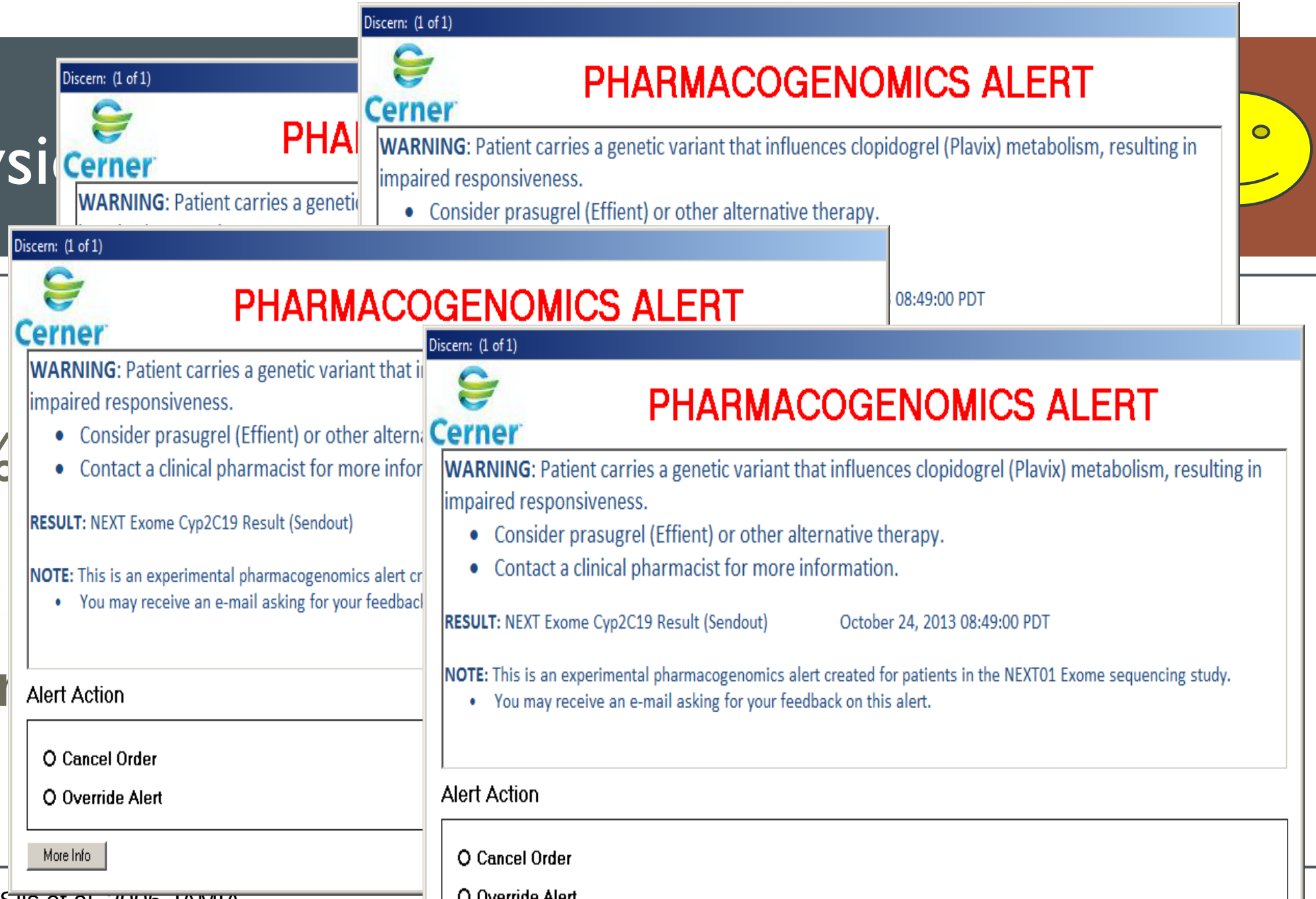


- Cost

Physi

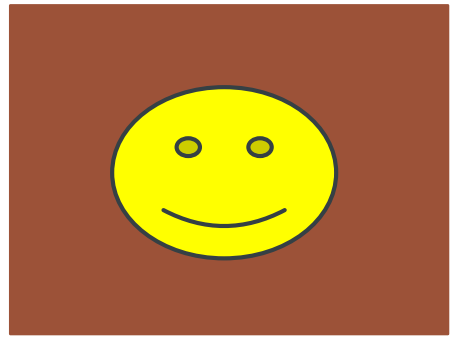
52%

Aler



Sijs et al, 2006 JAMIA

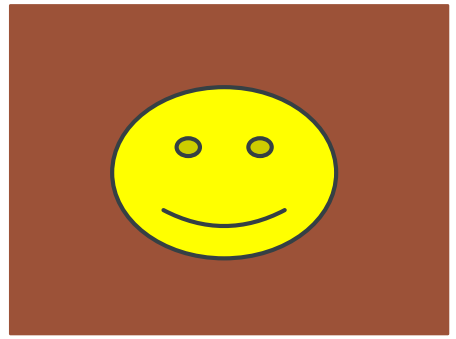
Not All Alerts are Created Equal



- Process Questions
  - Do alerts cause providers to change medication or management?
  - What percent of providers override alerts?
- Usability Questions
  - What do providers like/dislike about CDS alerts?
  - What makes a CDS alert more likely to be used?

Nishimura et al Genet Med. 2015 Nov;17(11):939-42.

Quality Active CDS



Specificity

Good design

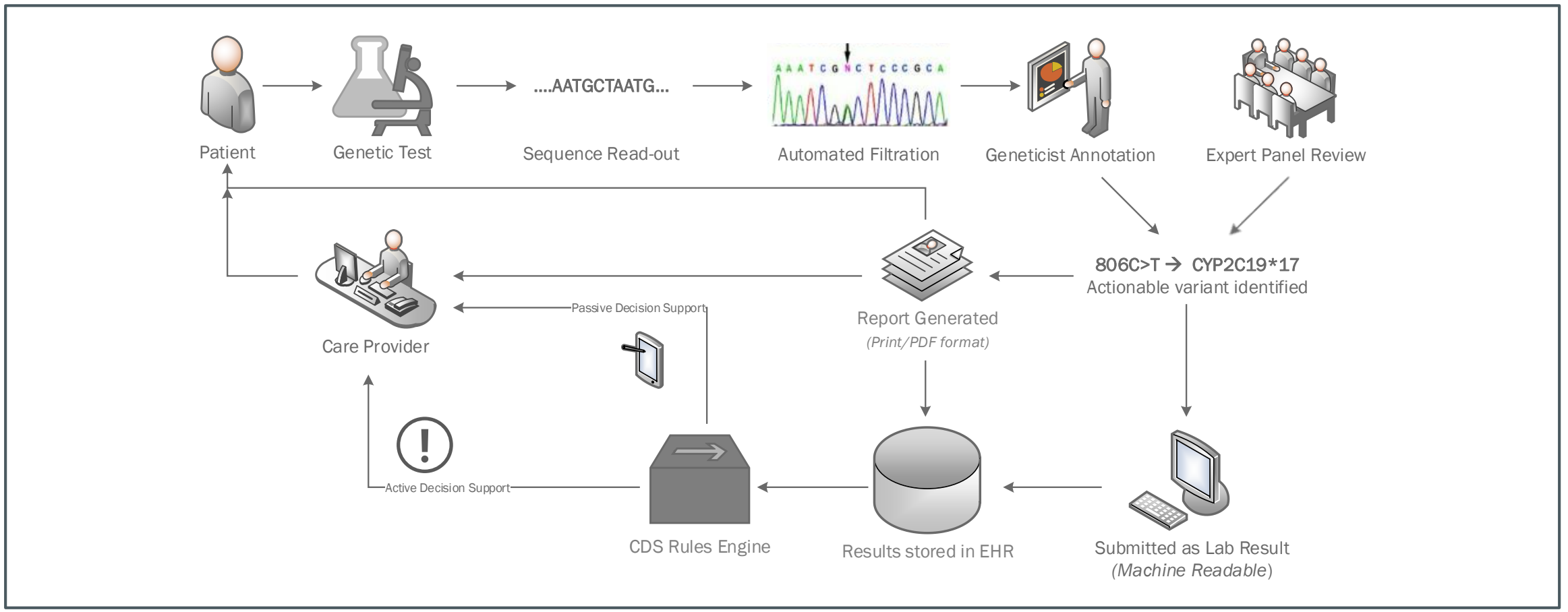
Clinical Evidence

Stakeholder Acceptance

Ash et al, 2007. JAMIA

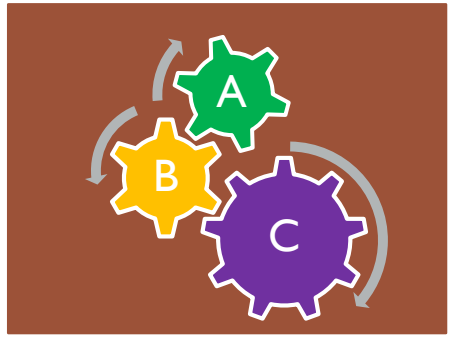
Hartzler et al 2014

Coding for Active CDS



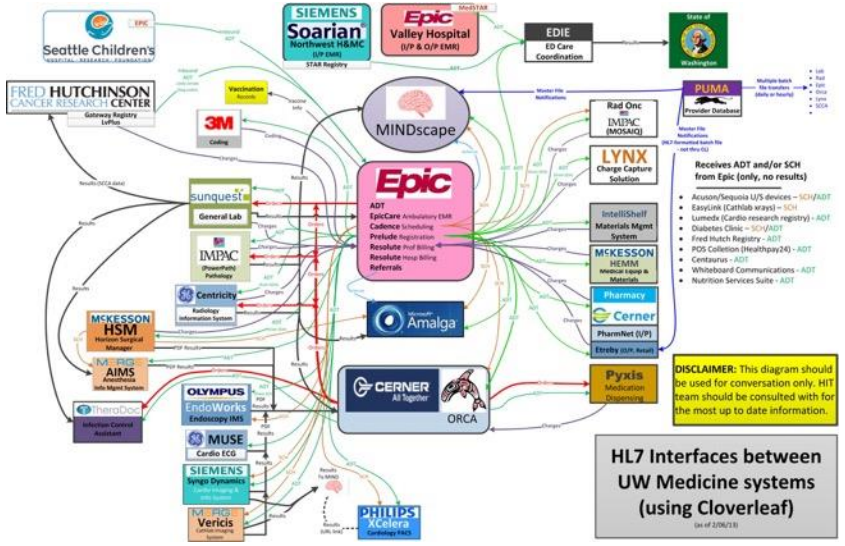
Nishimura et al. Curr Genet Med Rep. 2014 Dec 1;2(4):201-211.

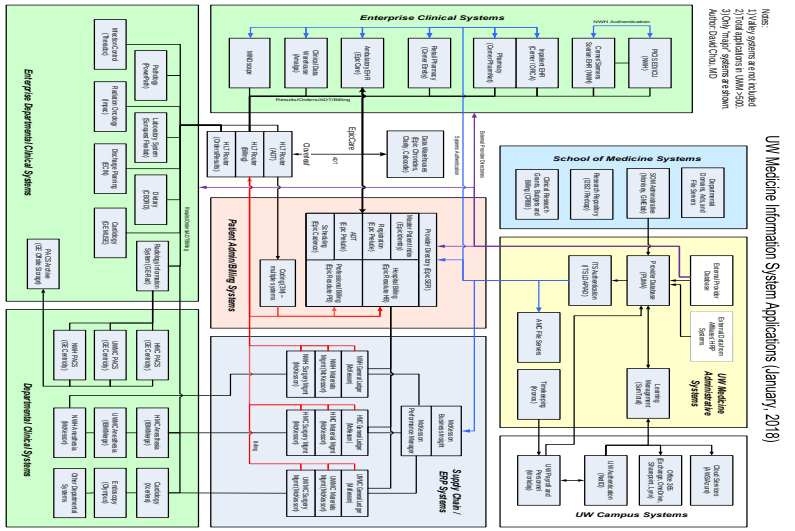
Interoperability for Active CDS



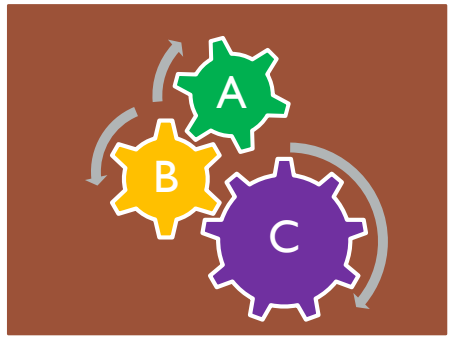
- "Interoperability is the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged."

http://www.himss.org/library/interoperability-standards/what-is





Interoperability for Active CDS



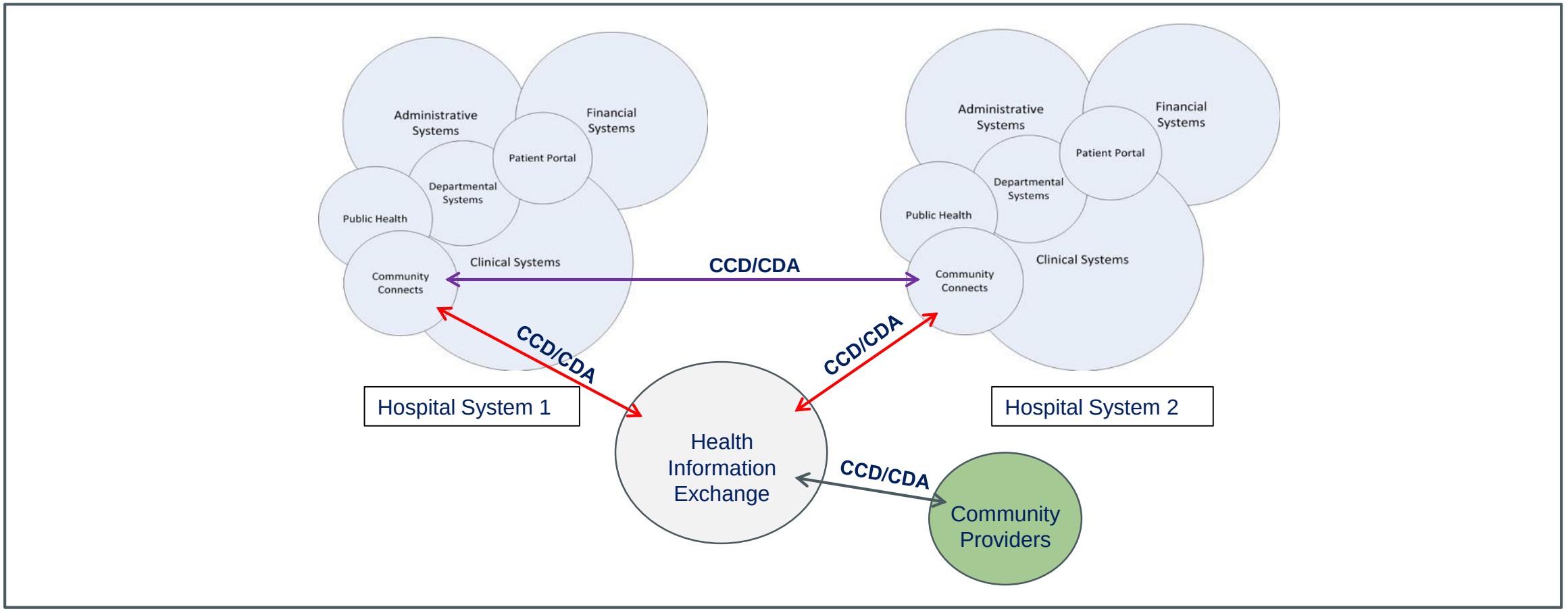


Figure courtesy of David Chou

Draft 10 Year CMS/ONC Interoperability Roadmap

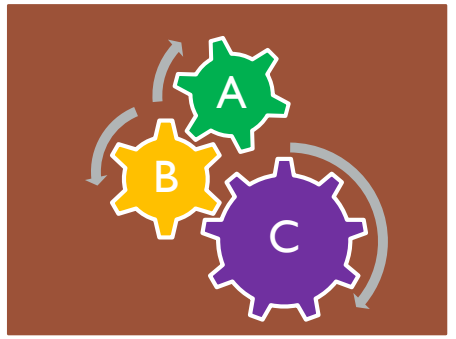
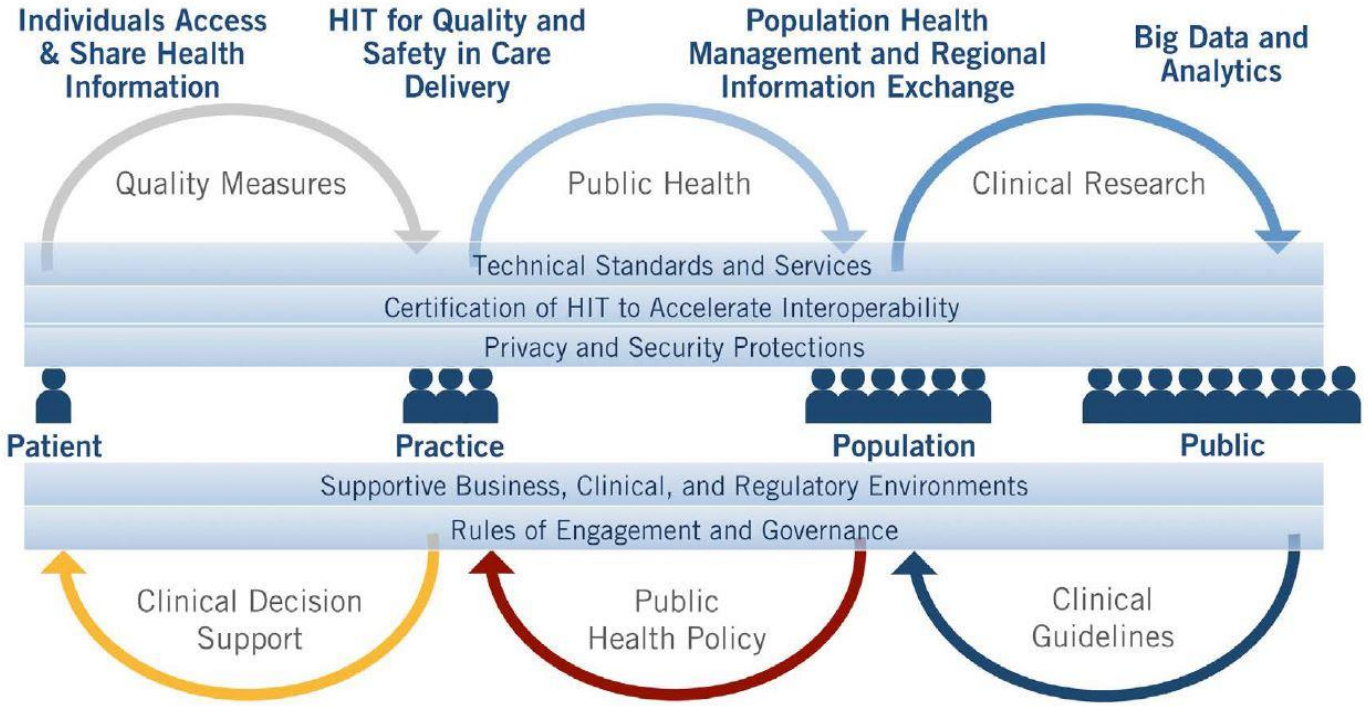


Figure 1. Health IT Ecosystem



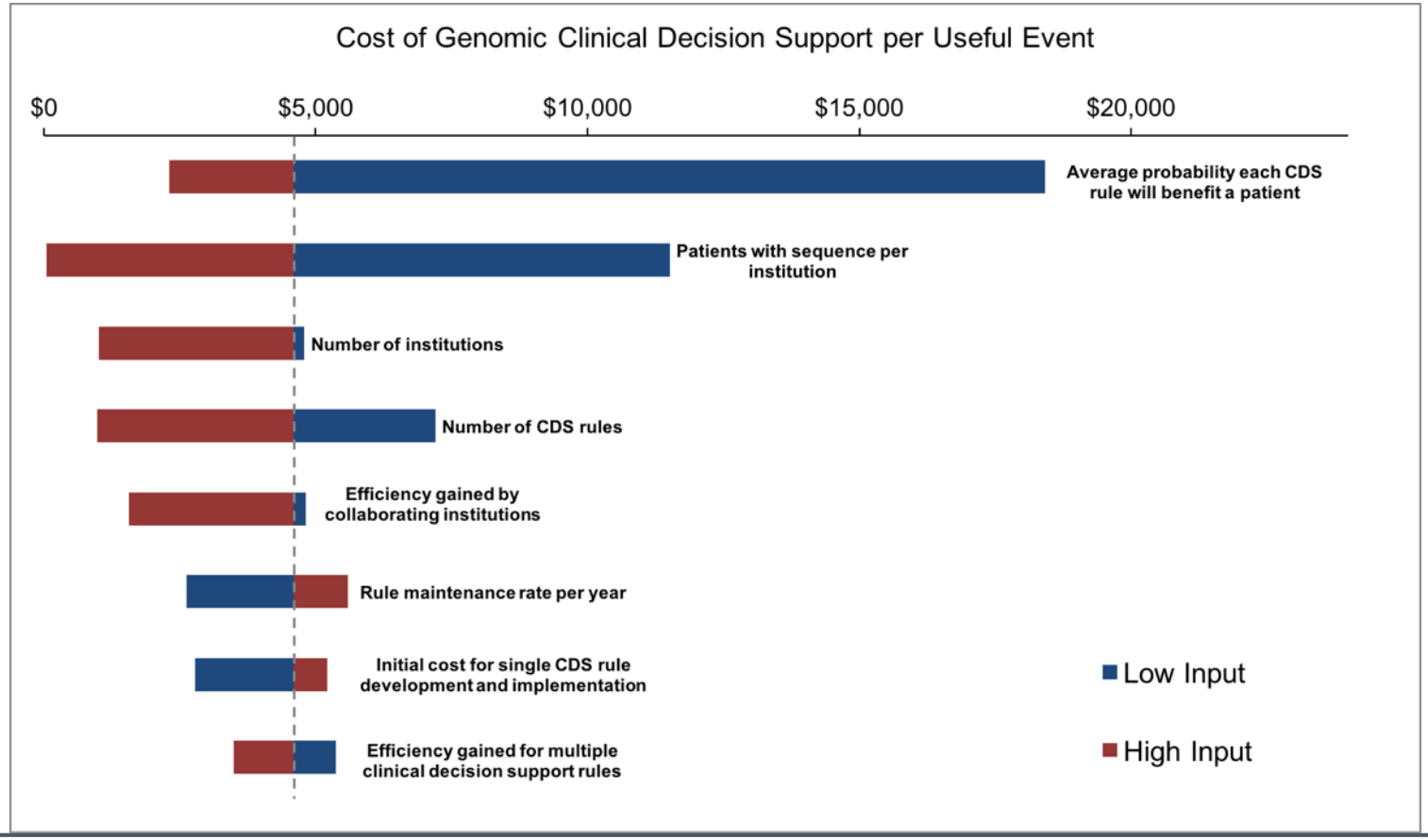
Connecting Health and Care for the Nation, A Shared Nationwide Interoperability Roadmap, October, 2015; https://www.healthit.gov/sites/default/files/hie-interoperability/nationwide-interoperability-roadmap-final-version-1.0.pdf

Active CDS costs

- What was the estimated development, implementation, and maintenance cost for active pharmacogenetic CDS at the University of Washington expressed as cost per alert?
  - $ 0
  - $46
  - $460
  - $4,600
  - $46,000
  - ∞

Mathias et al. AMIA Jt Summits Transl Sci Proc. 2016 Jul 20;2016:60-4

Active CDS costs



Mathias et al. AMIA Jt Summits Transl Sci Proc. 2016 Jul 20;2016:60-4

Take Home Points

- Most pathology reports, including molecular pathology reports, are currently not formatted to facilitate pathology data sharing and effective electronic clinical decision support. Improvements are needed.
- The costs of building and maintaining clinical decision support networks are often ignored or minimized; however, these costs can be substantial, especially if clinical decision support is implemented independently at each health care institution. Dramatic improvements in data interoperability and inter-institution collaboration will be necessary to drive decision support costs down.