Cognitive Medical Systems

• Transform healthcare through innovative software solutions, platforms and tools
• Specialize in healthcare standards, clinical workflow, decision support, and system integration
• Founded in 2011, headquartered in San Diego, CA
• Professional services currently focused on DoD, VA, and institutional healthcare organizations
• Developing Open Source (Apache 2.0) and commercial products
Development Strategy

• Reuse and contribute to OSS where ever possible
• Sponsor the open source Socratic Grid community
  – Continue research and innovation in clinical decision support, workflow optimization, and data visualization
  – Provide standards-compliant terminology and data transformation services
  – Develop collaborative relationships and integrate domain expertise
• Establish and maintain a reference Clinical Decision Support laboratory for the community, its partners, and academia
Socratic Grid Architecture
Cross Domain Data Aggregation & CDS
Functional Components

• Standards-based Data Transformation Services
  – CTS v2.0 Terminology Service
  – MDWS to HL7 FHIR & vMR structural transformation
  – Triple Store: RXNORM, SNOMED, LOINC, NDFRT and ICD9 SKOS graphs

• Workflow management and flexible inference
  – BPEL processes, production rules, PPML interface

• CCOW enabled portal framework
  – CDS alert “inbox”
Data Transformation Services

Socratic Grid ESB

Transformation Services
- Terminology Service
- Data Transformation

Graph Data Management Framework

EMR
MDWS To FHIR Mappings
Terminology Services

- SKOS ontologies for RXNORM, SNOMED, LOINC, and NDFRT; stored in Jena triple store; searchable using SPARQL; exposed using HL7 CTS2 SOA Service; deployed on iEHR ESB
CDS “Facts”

- Rule Engine
- Portal Inbox
- vMR Observation Result
- vMR Objects
- FHIR Objects
Individual Stateful Rule Sessions
Predictive Analytics
It is recommended that invasive breast cancer patients be offered Breast MRI if there is:

a) discrepancy regarding the extent of disease from clinical examination, mammography or ultrasound assessment

b) if breast density precludes accurate mammographic assessment

c) to assess tumour size if breast conserving surgery is being considered for invasive lobular cancer.
Janus Legacy Viewer Inbox Plugin
CDS Prototype: Drug-Genome Check

Socratic Grid ESB

Transformation Services
- Terminology Service (Jena)
- Data Transformation (Graph)

Graph Data Management Framework

VistA

HL7

RDF
Pharmacogenomic CDS

This patient was prescribed warfarin, but has a genetic preposition (single nucleotide polymorphisms) that is known to be associated with impaired (slow) warfarin metabolism. Given this patient's genotype, increased surveillance is strongly recommended during initial dosing.
Other Exemplar CDS Use Cases

• Drug-disease interaction checks
• Drug-laboratory trending checks
• VA Clinical Reminders
  – BMI calculation
  – Hypertension Reminder
  – HbA1C Reminder
  – Colorectal Cancer Screening Reminder
  – Lipid Panel Reminder
• IHTSDO EL++ Demonstration
Conclusion

• Socratic Grid is a reference implementation for CDS and human process reengineering research

• Goal is to create an open source “stack”, using VistA as the reference EMR, suitable for government, academic, and industry innovation

• Please join the community and help us iteratively improve the architecture, leverage multi-disciplinary perspectives and improve the basic infrastructure available to healthcare
Socratic Grid

• License: Apache 2.0
• Repository: https://github.com/SocraticGrid
• Socratic Grid has joined Open Health Tools
• Stewardship
  – Cognitive Medical Systems, San Diego, CA
  – www.cognitivemedicine.com