

# **Informatics and Analytics: Applications in Healthcare Quality Improvement**

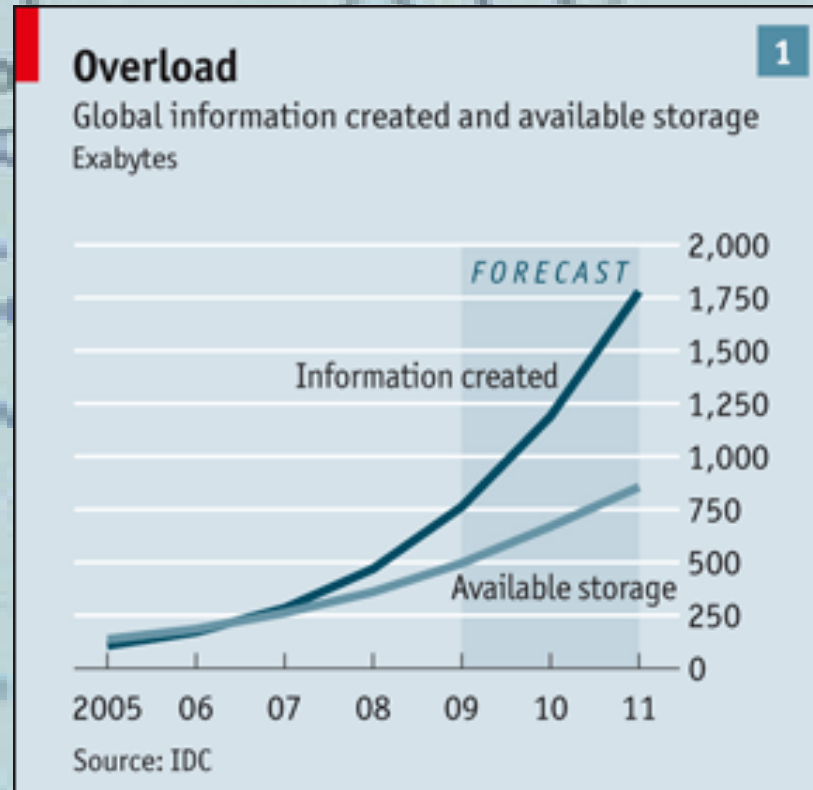
**Abhik Bhattacharya & Tim Kamps**

**University of Wisconsin Hospital & Clinics**

# AGENDA

- **The Case For Informatics in Healthcare**
- **Informatics: A Primer**
  - **Healthcare & Quality Informatics: Definitions and Applications**
- **Case Study: Chronic Disease Management**
- **Evolution & Future of Quality Informatics**
- **Application of Quantitative Analytics**

# The Case For Informatics



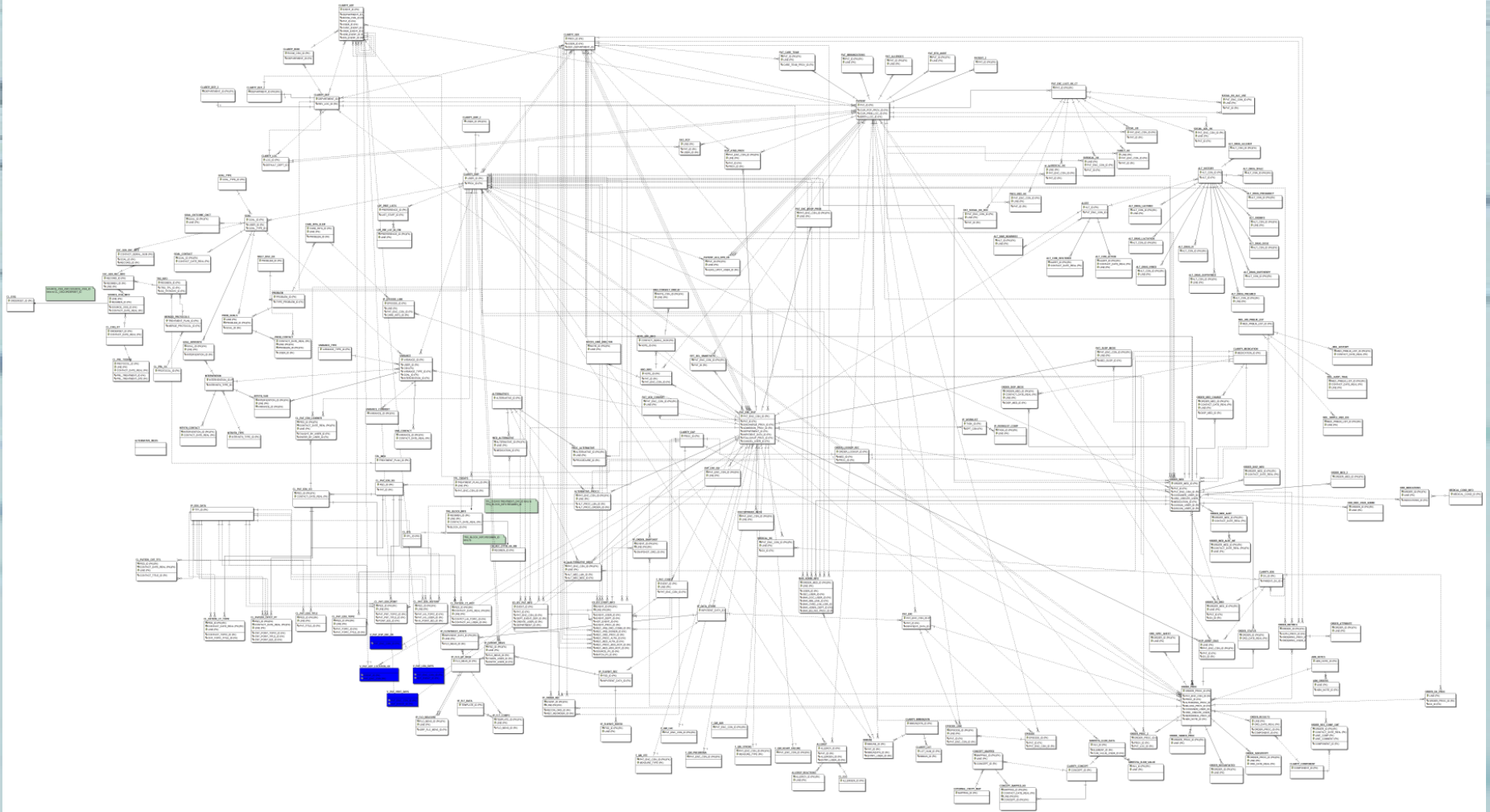
**Data, data, everywhere!**

# The Case For Healthcare Informatics



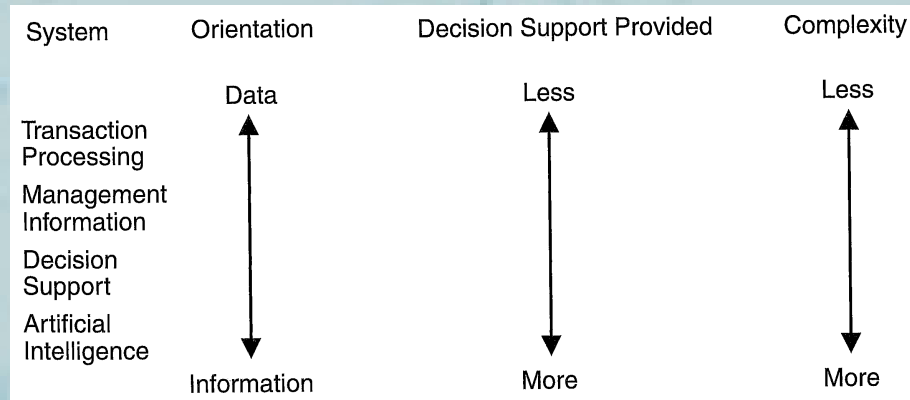
# The Case For Healthcare Informatics

Main Model



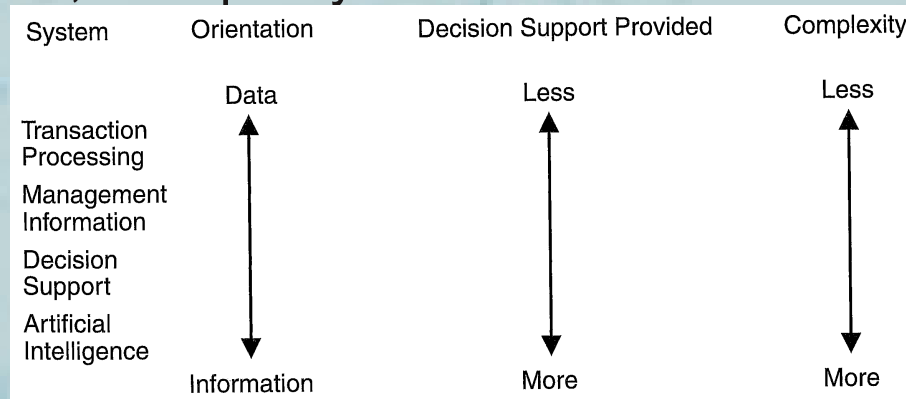
# First Step...Define

- IT: “the study, design, development, implementation, support, or management of computer-based information systems, particularly software applications and computer hardware.” – ITAA



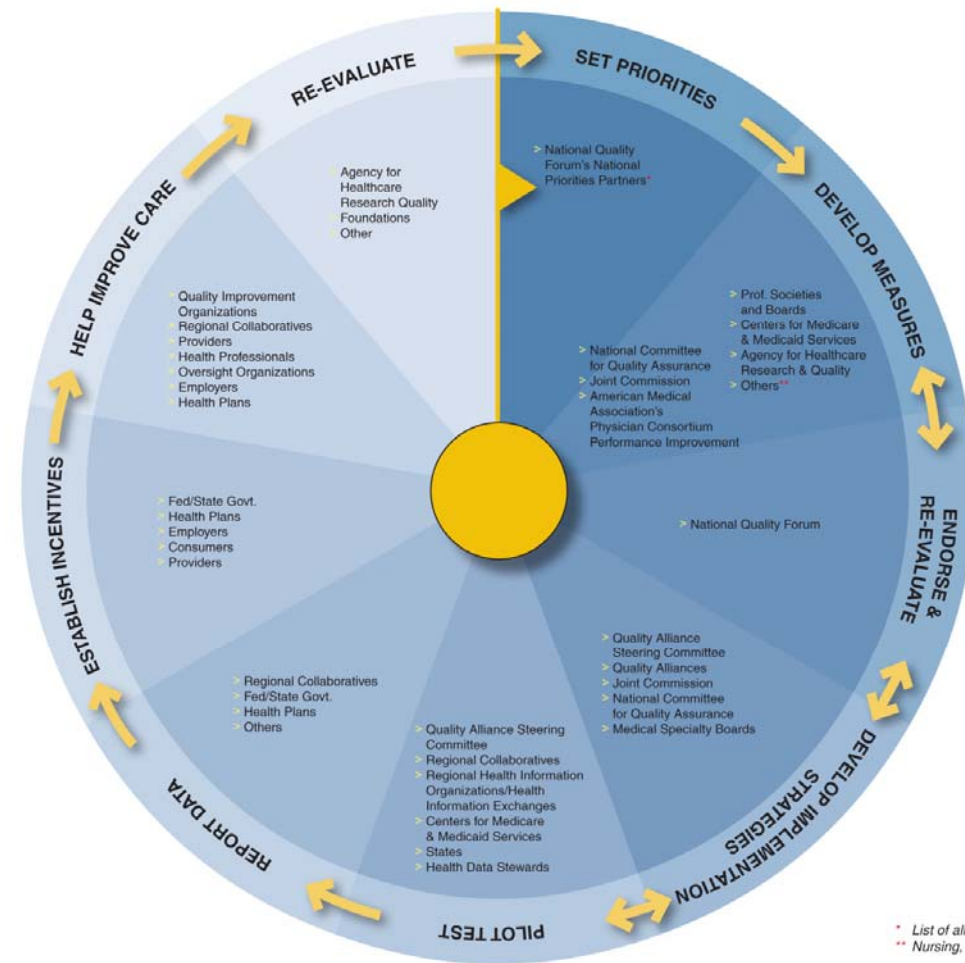
# Define, continued

- **Informatics:** the science of information, the practice of information processing, and the engineering of information systems. Informatics:
  - studies the structure, algorithms, behavior, and interactions of natural and artificial systems that store, process, access and communicate information.
  - impacts and improves all aspects of healthcare: subdisciplines of biomedical informatics include clinical practice, clinical & translational research, consumer, imaging, nursing, pharmacy, public health, and quality.



# Define, continued

- Quality Informatics: using information to improve the structures, processes, and outcomes of healthcare.

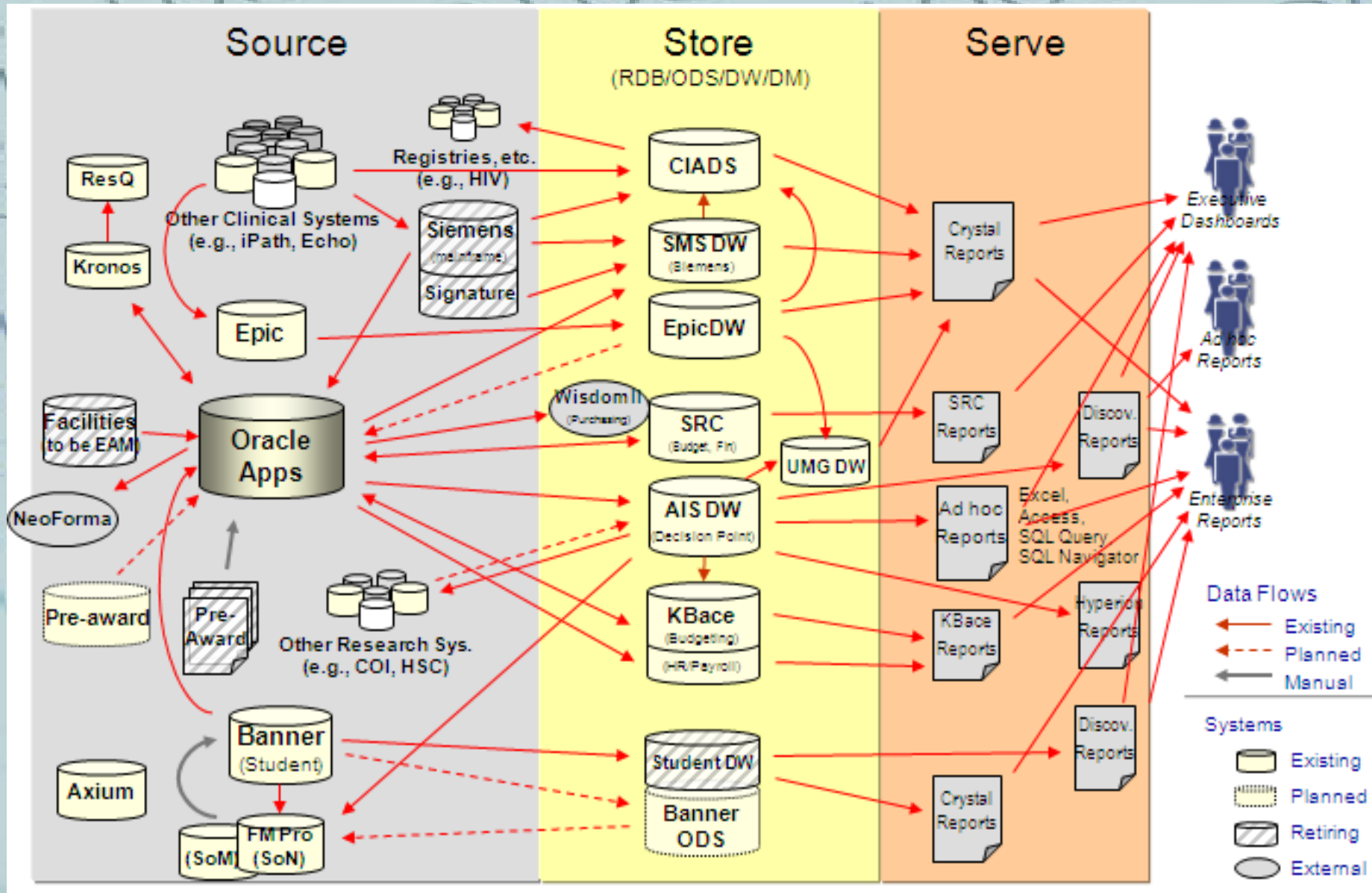


Source: Quality Alliance Steering Committee "Road Map"

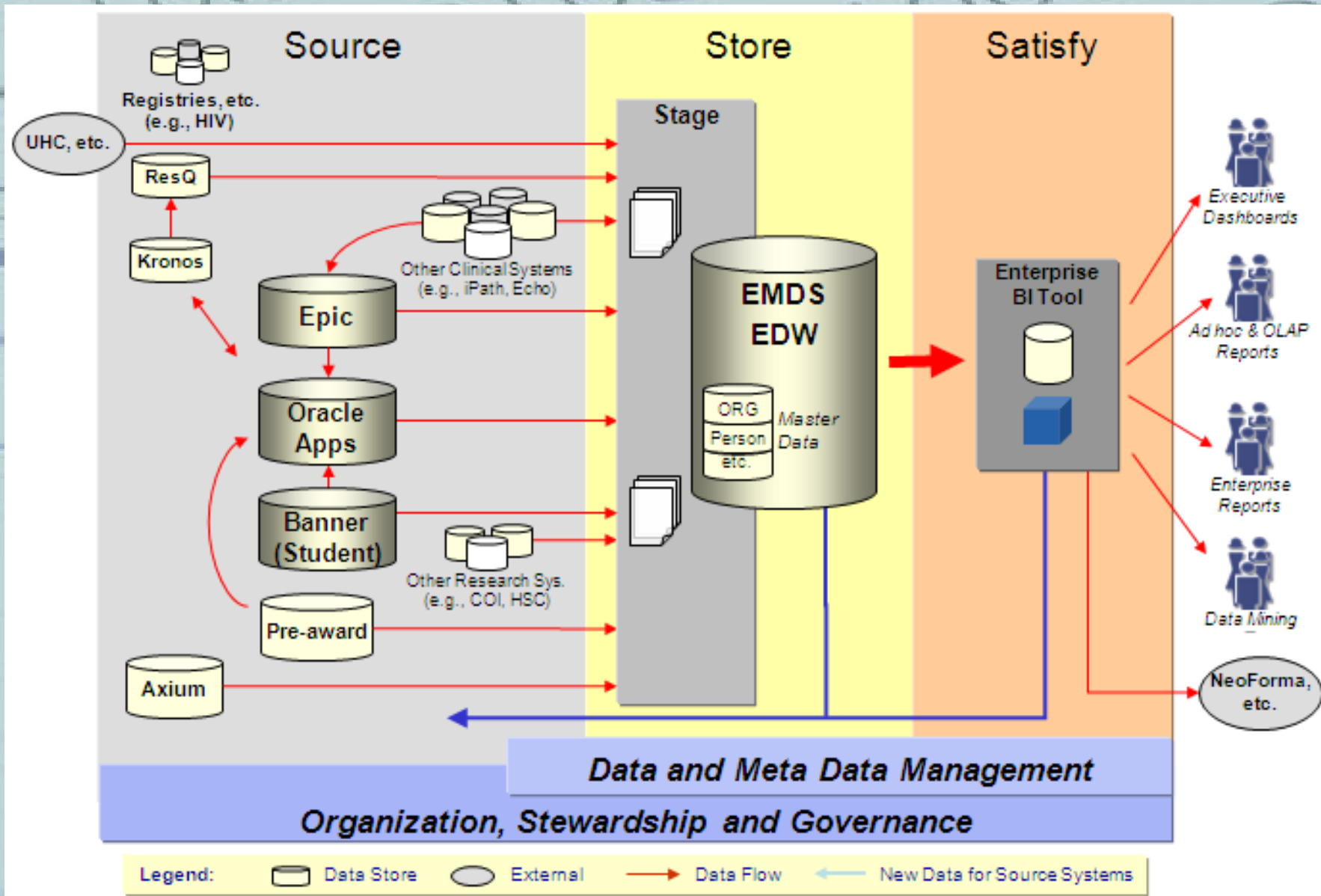
# Applied Informatics: notes from the field

- **Practically: delivering the right information, to the right person in the right place and time, in the right way, by:**
- Developing and applying informatics methods and tools to engender discovery, knowledge dissemination, and improved health and healthcare from the molecular to the global scale;
- Delivering these tools of the knowledge worker to **clinicians**;
- Making interdisciplinary investments in change and flexibility, engaging all relevant stakeholders, and engaging all relevant professionals and non-professionals in communications and data exchange;
- Leveraging data from standardized patient records as a resource for assessing and improving the quality of health care.

# Example: Landscape (current)



# Example: Landscape (vision)



# Application, continued

- Clinicians intercede between the patient and technology; can we optimize the efficacy and use of technology?
- Goal state of informatics optimization: clinicians using information and communication technologies to document and evaluate patient care, advance patient education, and enhance the accessibility of care; and
- Clinicians and interdisciplinary teams making ethical decisions regarding the application of technologies and the acquisition or exchange of data, guarding patient rights, privacy, and safety.
- Adaptive use of technologies to meet patient needs.
  - “What Hi-Fi?”

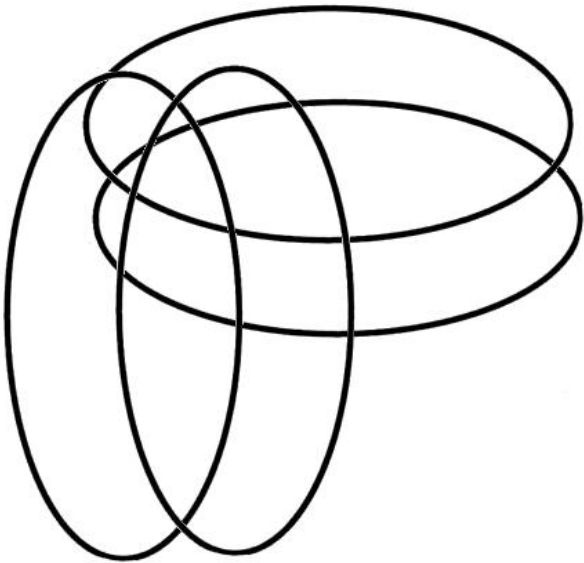
# Crossing the Quality Chasm

- IOM's "new rules" for healthcare in the 21<sup>st</sup> century articulated a vision for quality informatics:
  - Shared knowledge and the free flow of information
  - Evidence-based decision-making
  - Safety as a system property
  - The need for transparency
  - Continuous decrease in waste
  - Collaboration among clinicians
- Or: do no harm; make no waste!

# Case Study

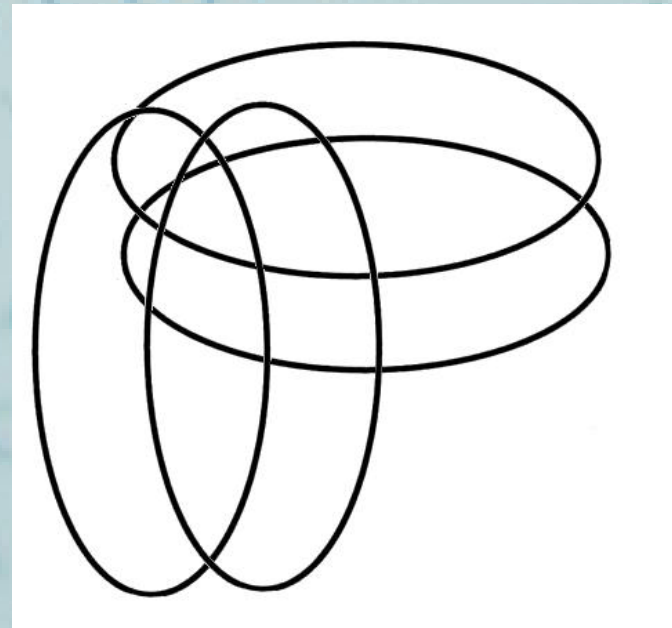
- **Chronic Disease Management**

I'll give you the numerators for free, but the denominators are gonna cost you!



# Case Study

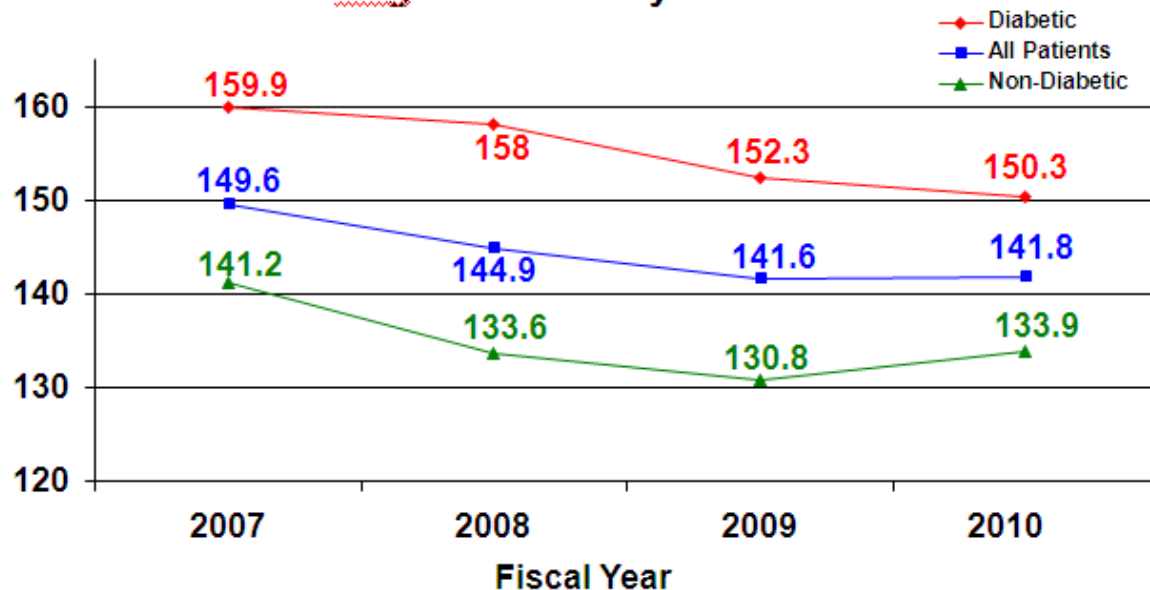
- **Chronic Disease Management: Diabetes**
  - Problem #1: the population
    - Disease diagnosis codes (ICD-9)
    - EMR “master problem list”
    - Patient’s response to diabetes question
    - Hemoglobin A1C > 6.5



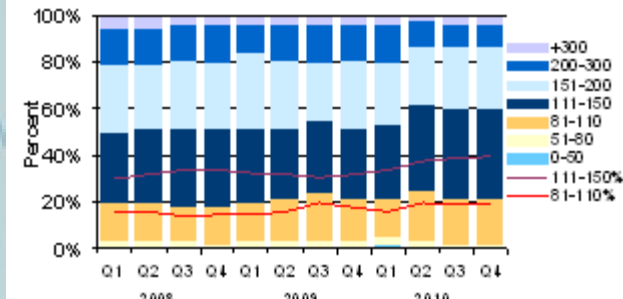
# Case Study

- **Chronic Disease Management: Diabetes**
  - Solution: define the population in the EMR, using existing information stores!
  - Result: able to measure & improve.

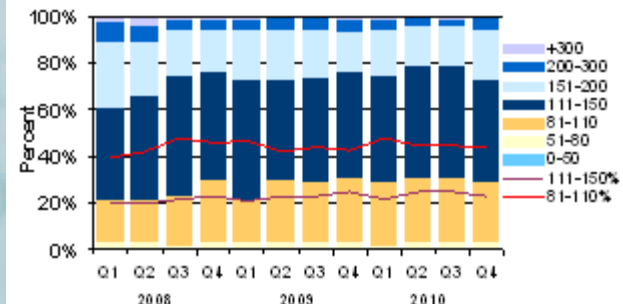
ICU Avg BG Level By Year

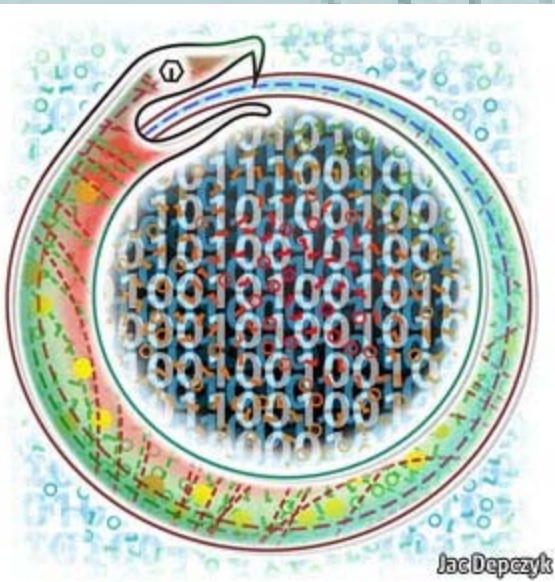


Diabetic Patients



Non-Diabetic Patients





# Questions?

