FINDING WISDOM IN THE INFORMATION:

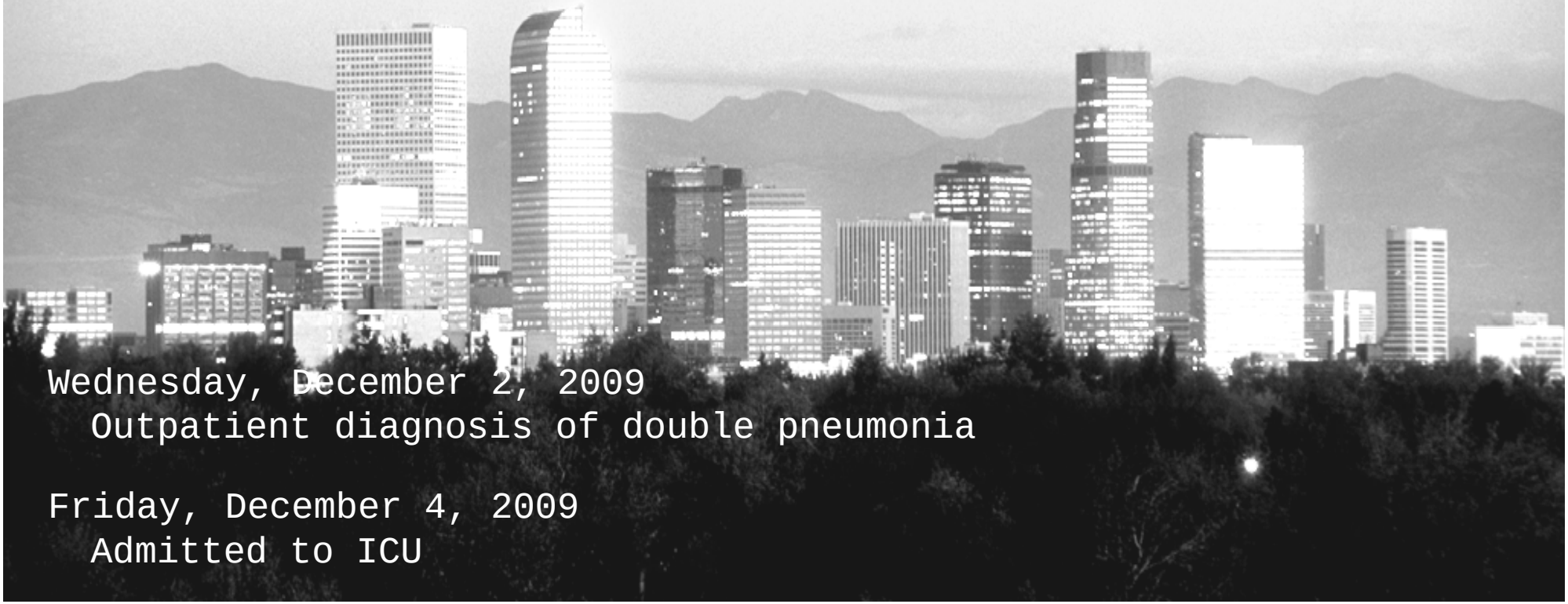
The VA Clinical Assessment, Reporting, and Tracking (CART) Program Approach

Tamára L. Box
Lead, Health IT
CART Program
June 21, 2011

Monday, November 30, 2009

51 year old male with history of Hodgkin's lymphoma
Partially paralyzed diaphragm, reduced lung function

Outpatient diagnosis of bronchitis

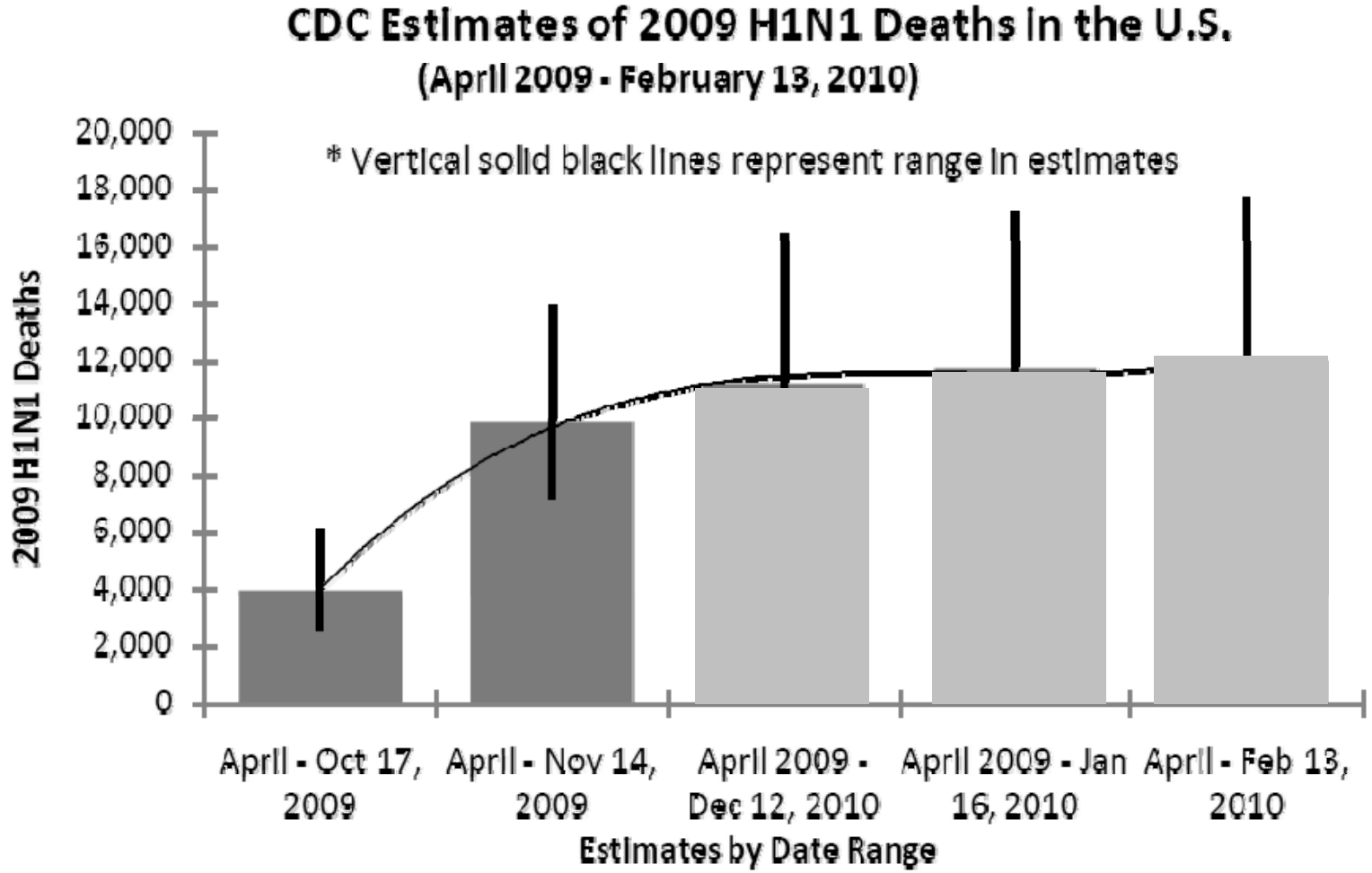


Wednesday, December 2, 2009
Outpatient diagnosis of double pneumonia

Friday, December 4, 2009
Admitted to ICU

Sunday, December 6, 2009
Placed on mechanical ventilation
Acute renal failure and respiratory failure

In late 2009, what knowledge existed?



Data based on CDC estimates of 2009 H1N1 Deaths using statistical modelling http://www.cdc.gov/h1n1flu/estimates_2009_h1n1.htm

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Moving from Information to Wisdom

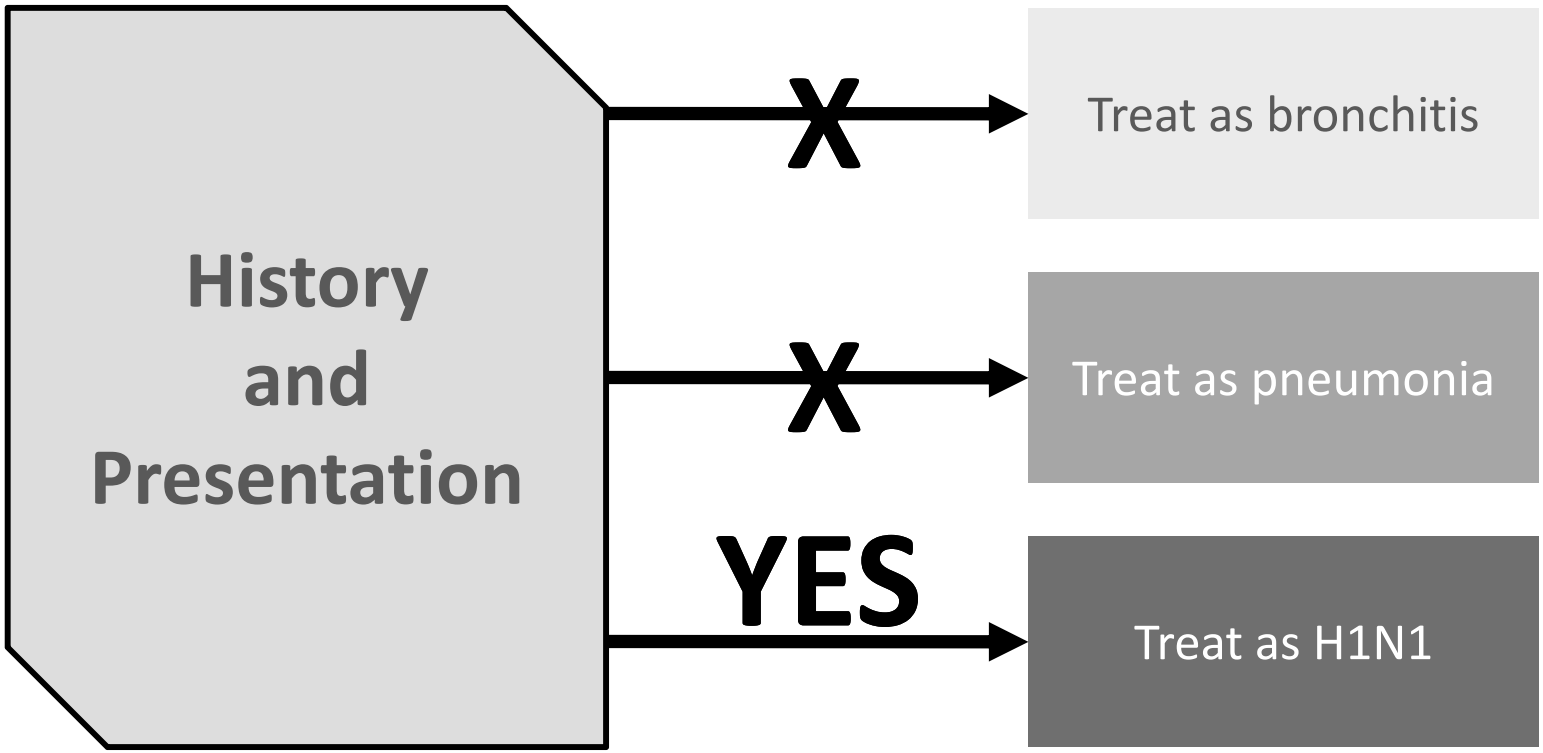
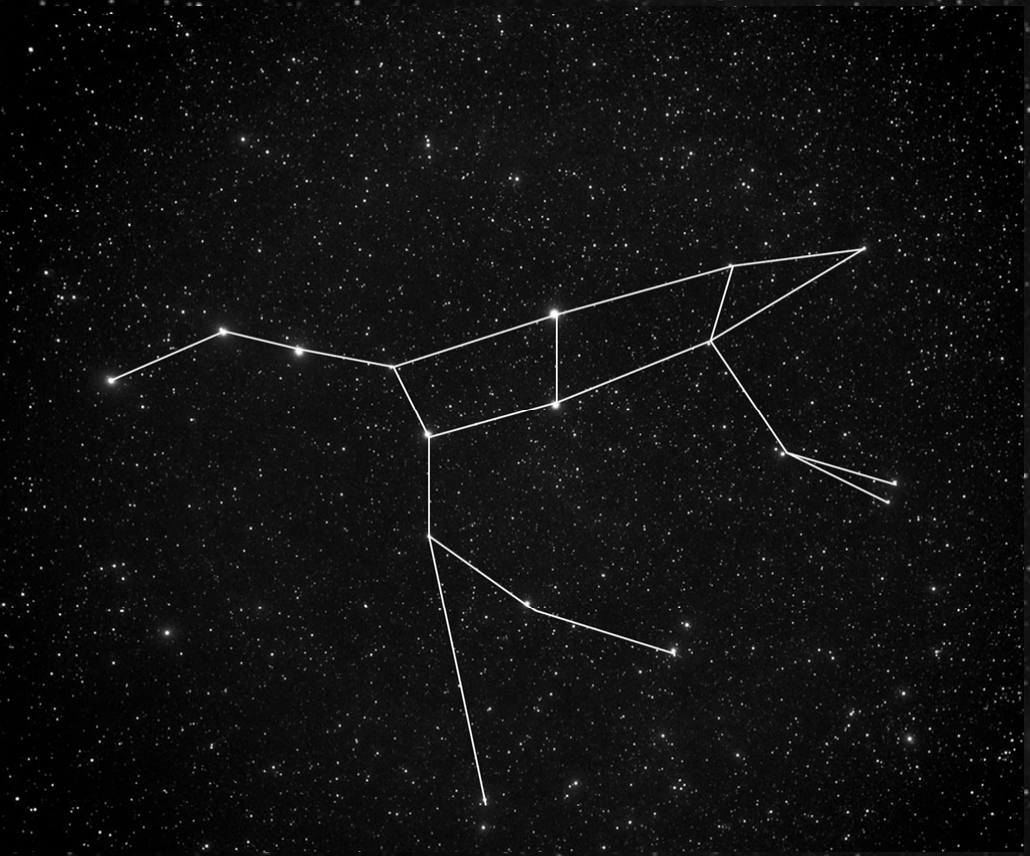
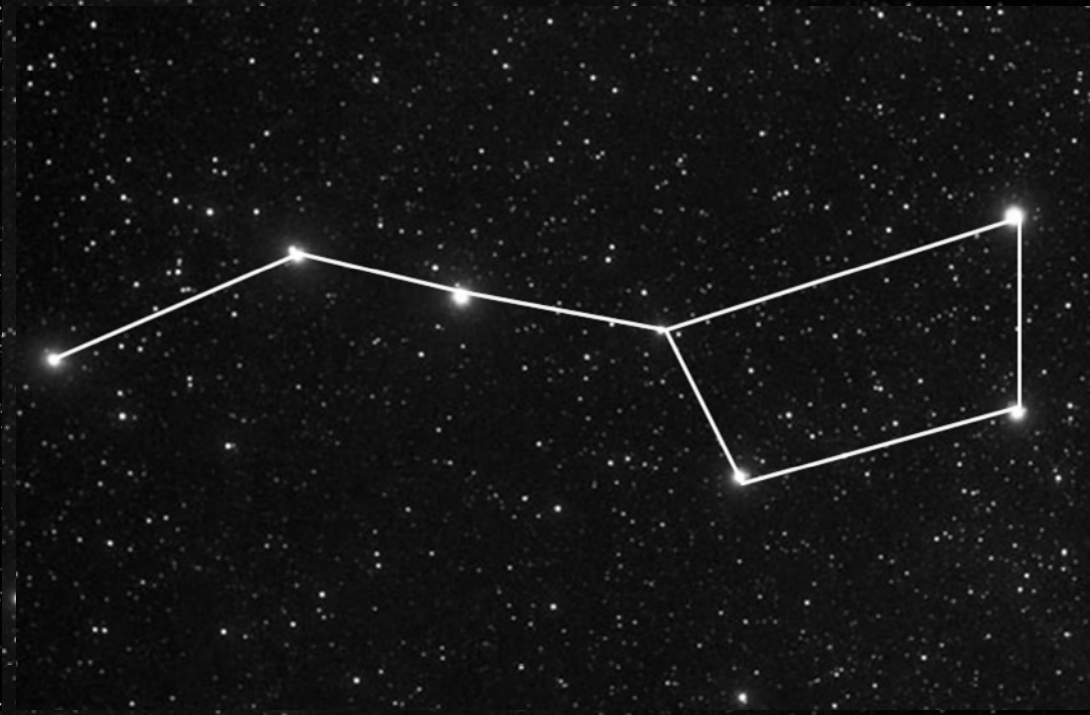


Image used with permission.

Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?

-T.S. Eliot





INFORMATION
IN THE SERVICE OF
DOCUMENTATION

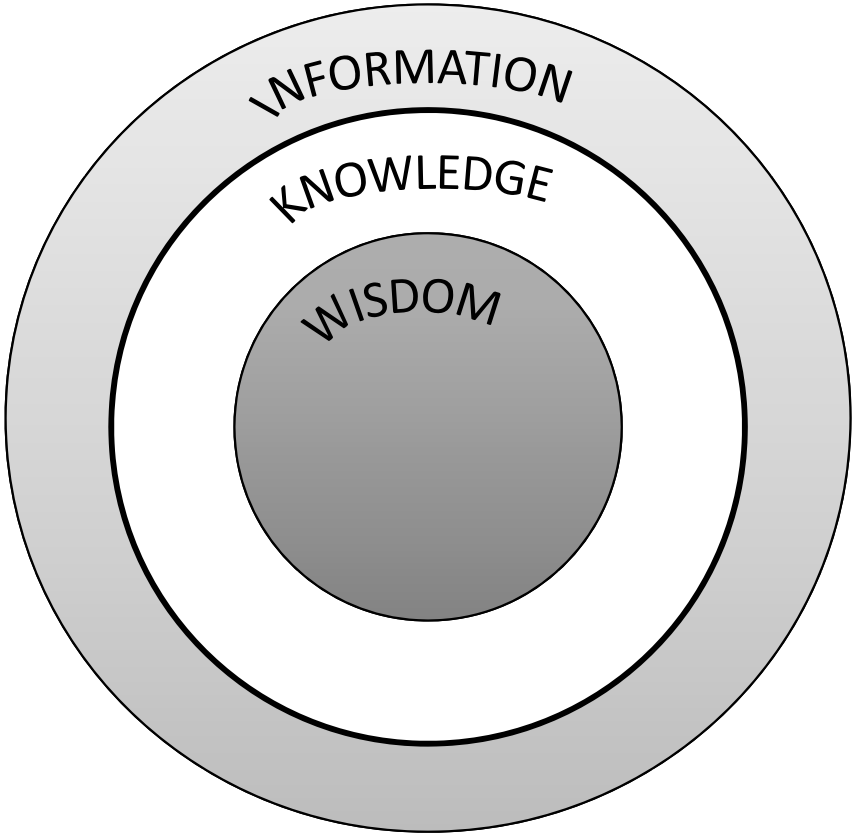
VA Clinical Assessment, Reporting, and Tracking Program

CART

was not designed as a documentation tool or a data registry, but as a

framework
by which
INFORMATION
could be harnessed to create
KNOWLEDGE
and generate
WISDOM
to

- **make operations more efficient**
- **improve quality and safety**
- **and provide better and more targeted care for our Veterans**



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CART Program Mission

To develop and implement a single national VA data repository, reporting system, and quality improvement program for procedures performed in VA cardiac catheterization laboratories.

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BUILDING A CLINICAL INFORMATION SYSTEM

The Clinical Model

REQUIREMENTS:

- Designed by the users
- Standards-based
- Integrated in CPRS
- Faster than dictation
- Improves efficiency
- Part of workflow

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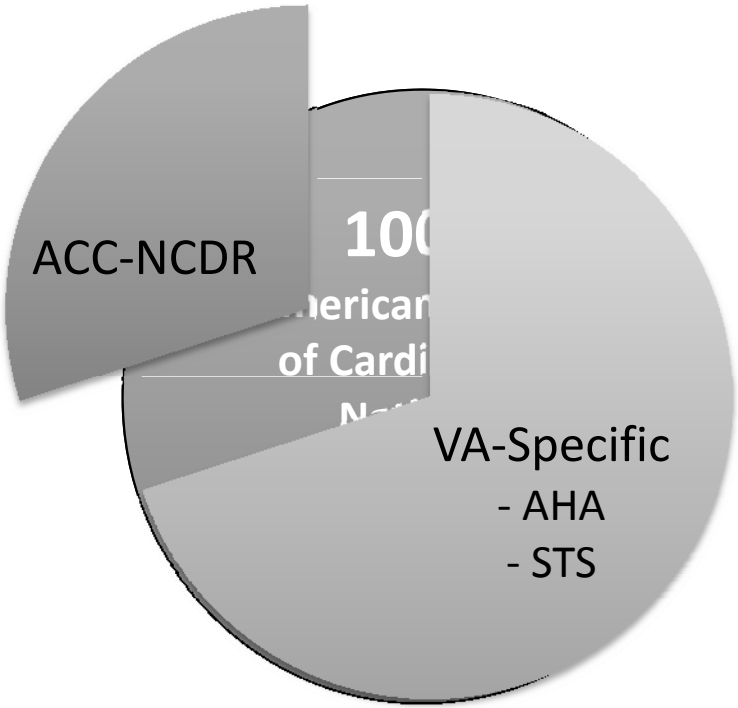
CART Data Standards



NCDR uses ACC/AHA data standards plus NCDR-developed standards, harmonized with other organizations like Society for Thoracic Surgeons

ACC worked with the Office of the National Coordinator on these cardiovascular data standards

Additional harmonization with other standards, such as SNOMED, LOINC, ICD-10, where possible

Submitted to CDISC/HL7 June 2011

NCDR®
National Cardiovascular Data Registry

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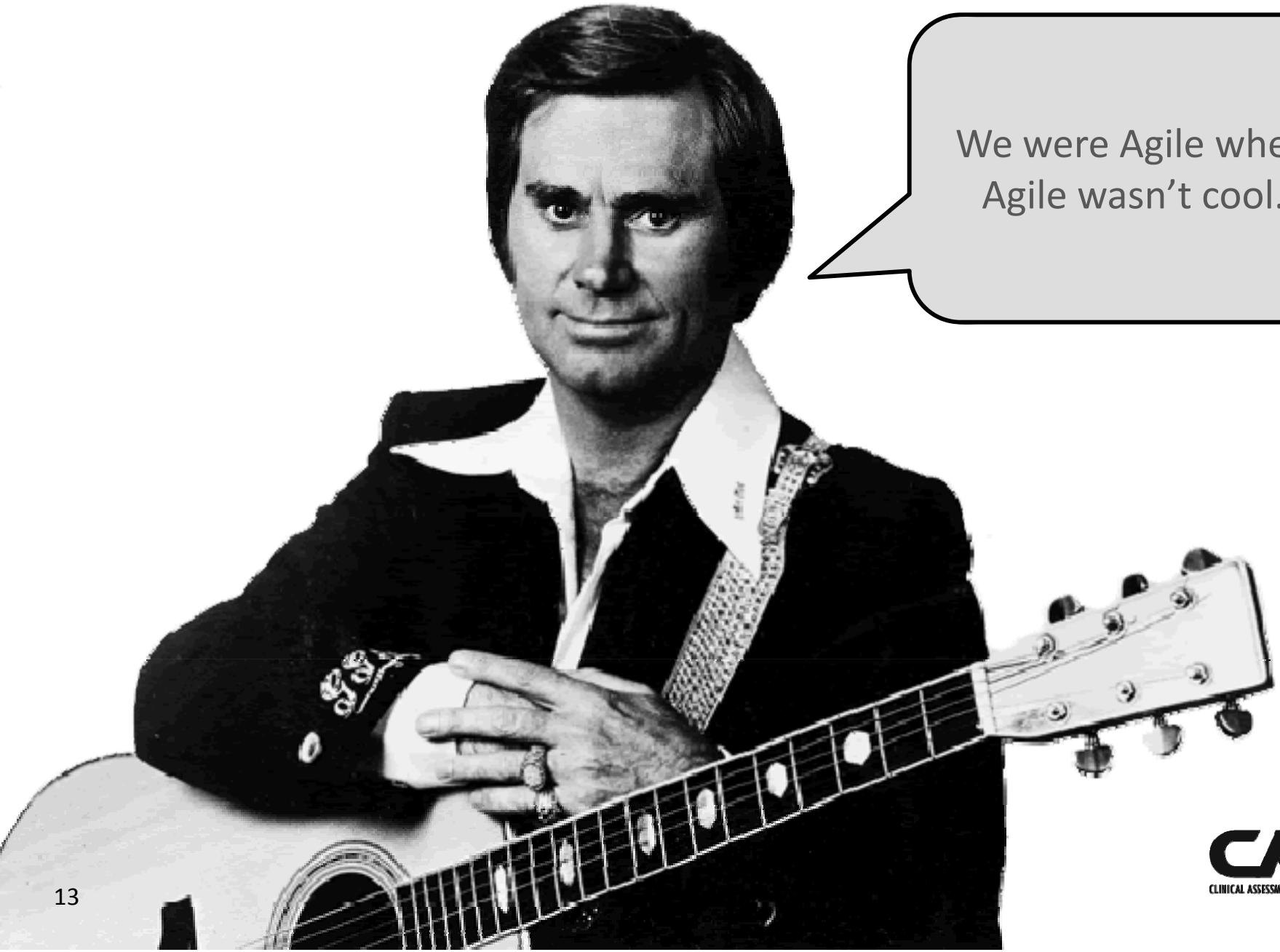
The Technical Model



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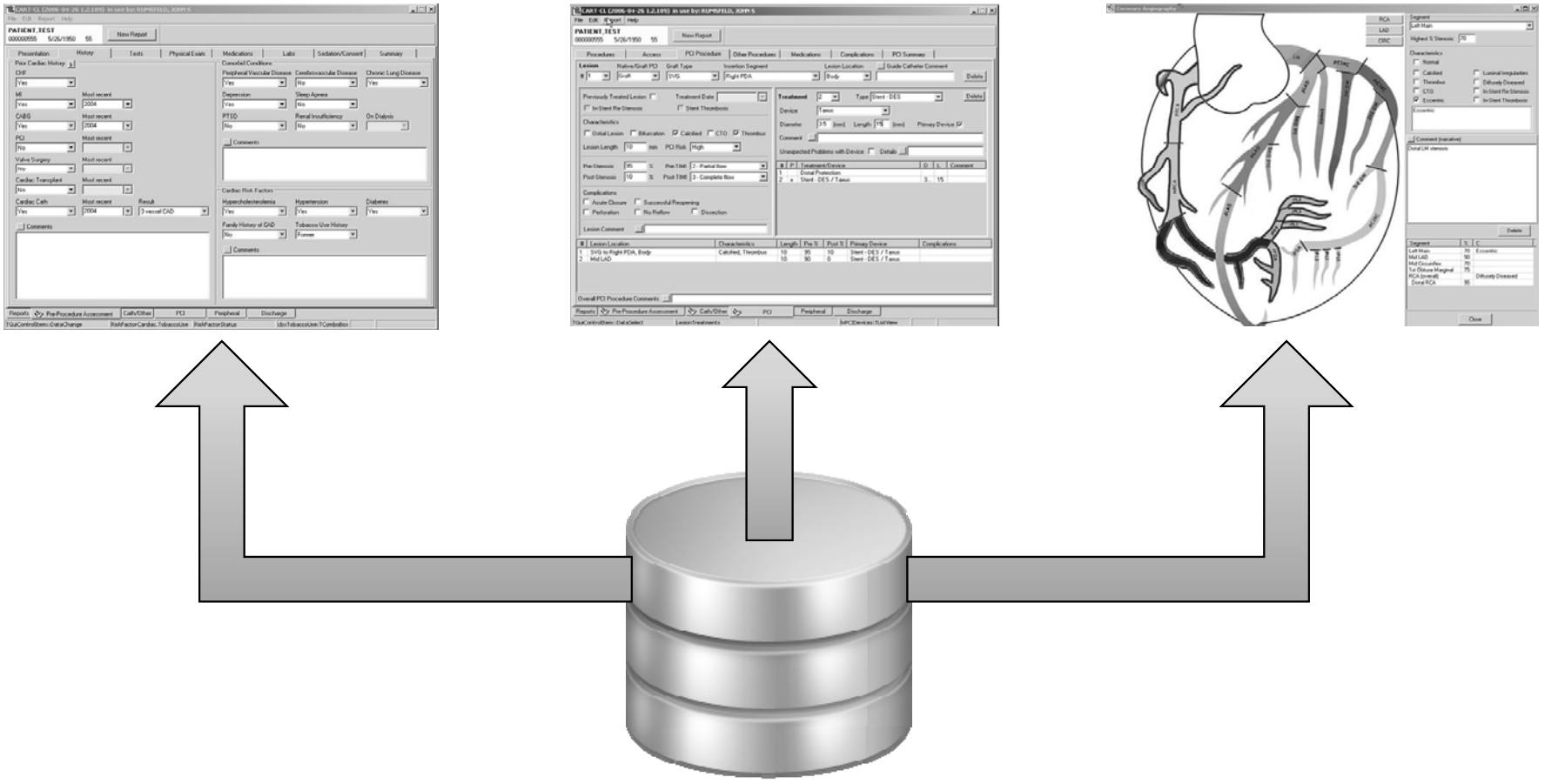
Traditional Model



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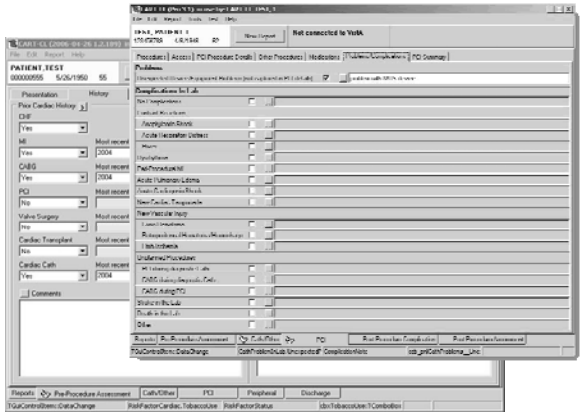
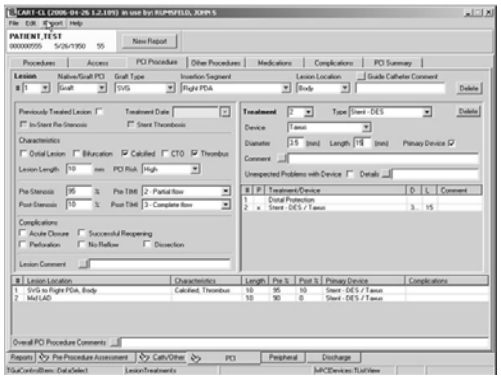
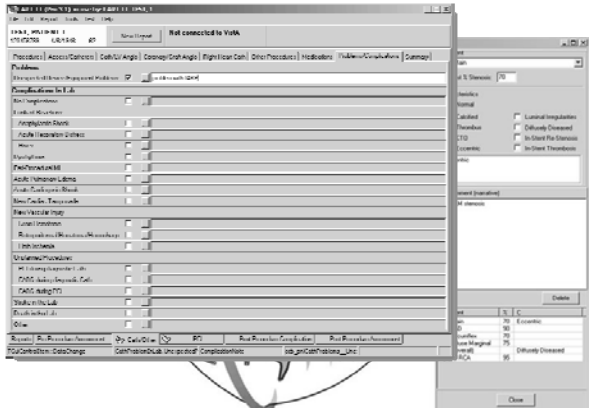
The CART Technical Model







SQL Database

METAMODEL
dynamic construction
of forms through meta objects

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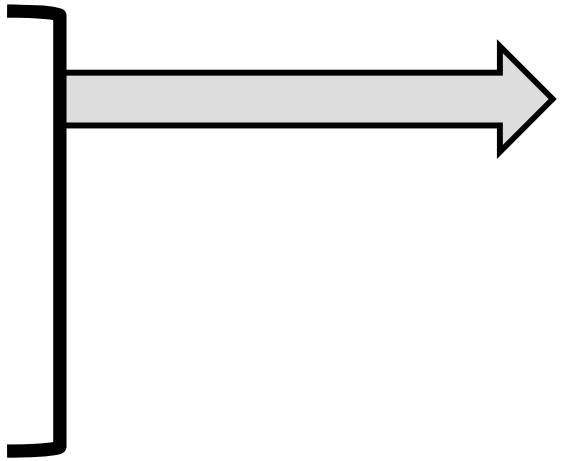
The CART Technical Model

Traditional Object-Oriented Programming

class Provider
    string Name
    string SSN

class Patient
    string Name
    string SSN



Direct coding in a common object-oriented language will result in hundreds of objects and thousands of properties and methods that are all conceptually similar.

3 MAJOR VERSIONS, 20+ Minor Iterations Yearly
(that's more agile than the iPhone)

META MODEL APPROACH

Object <type><name>
    Property <type><name>

Access any property in any object by a single meta-property function:

Object('Patient').Property('SSN')
coded as
getObjectProperty('Patient', 'SSN')

- dynamically extensible
- we do not need any code changes in the meta system to define and access new objects and properties.

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CART SITES

San Juan, Puerto Rico

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CART Utilization

(as of June 20, 2011)

3,312 Providers

206,601 Patients

231,079 Procedural Reports

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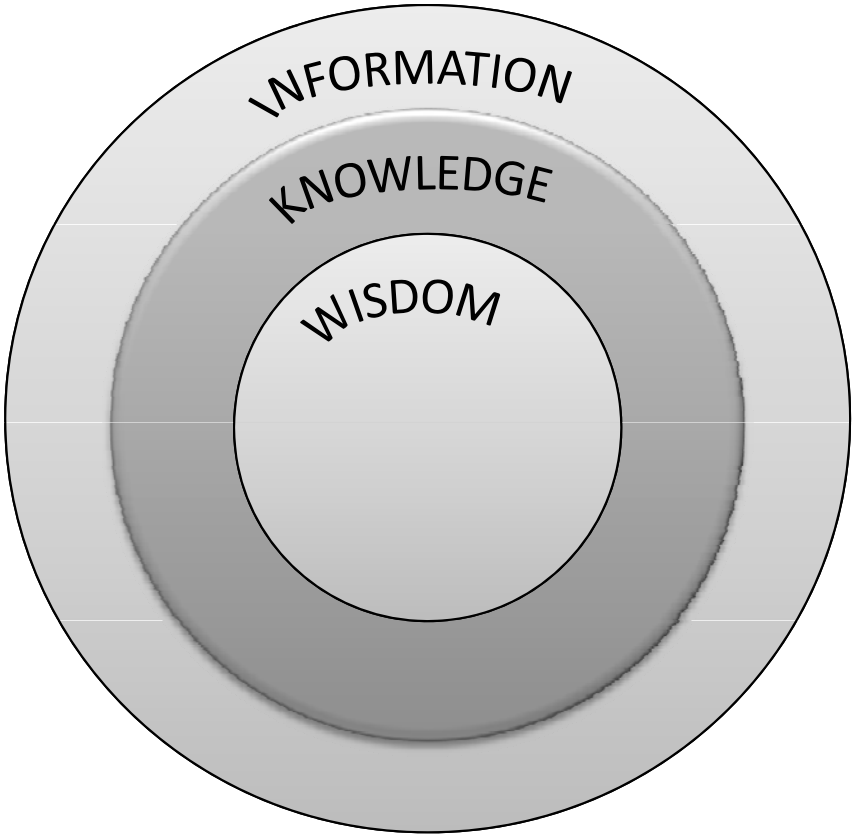
THE HEALTH INFORMATICIST'S PRAYER

Oh, Health IT Infrastructure,

Grant me the data sources to collect valid, discrete data,

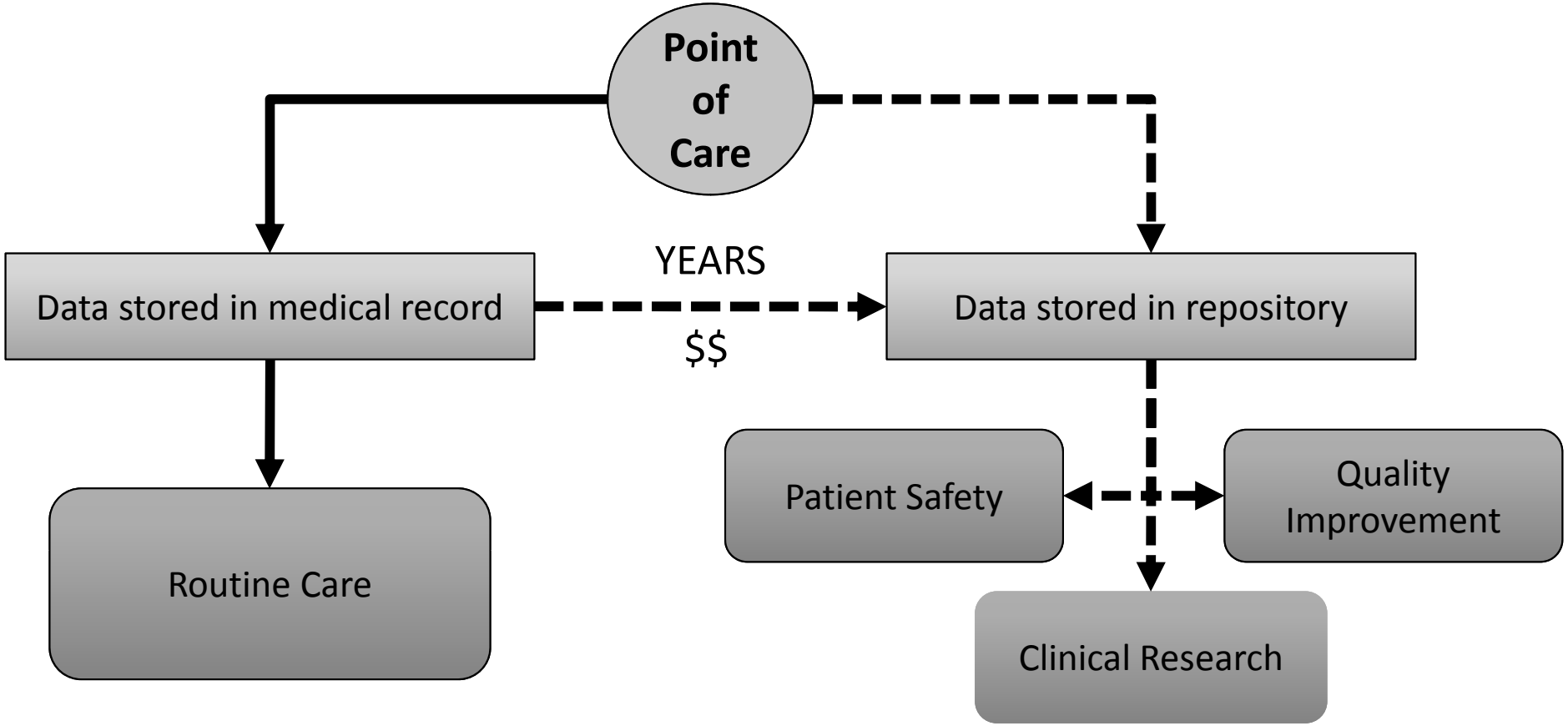
The knowledge to make some kind of sense out of all of that data

And the wisdom to know how much caffeine is required in order for me to apply that knowledge to improve care.



CREATING
KNOWLEDGE AT THE POINT OF CARE

Improving Quality of Care: The Current Model



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ABSTRACTION OF DATA TO IMPROVE QUALITY IS AFTER THE FACT.

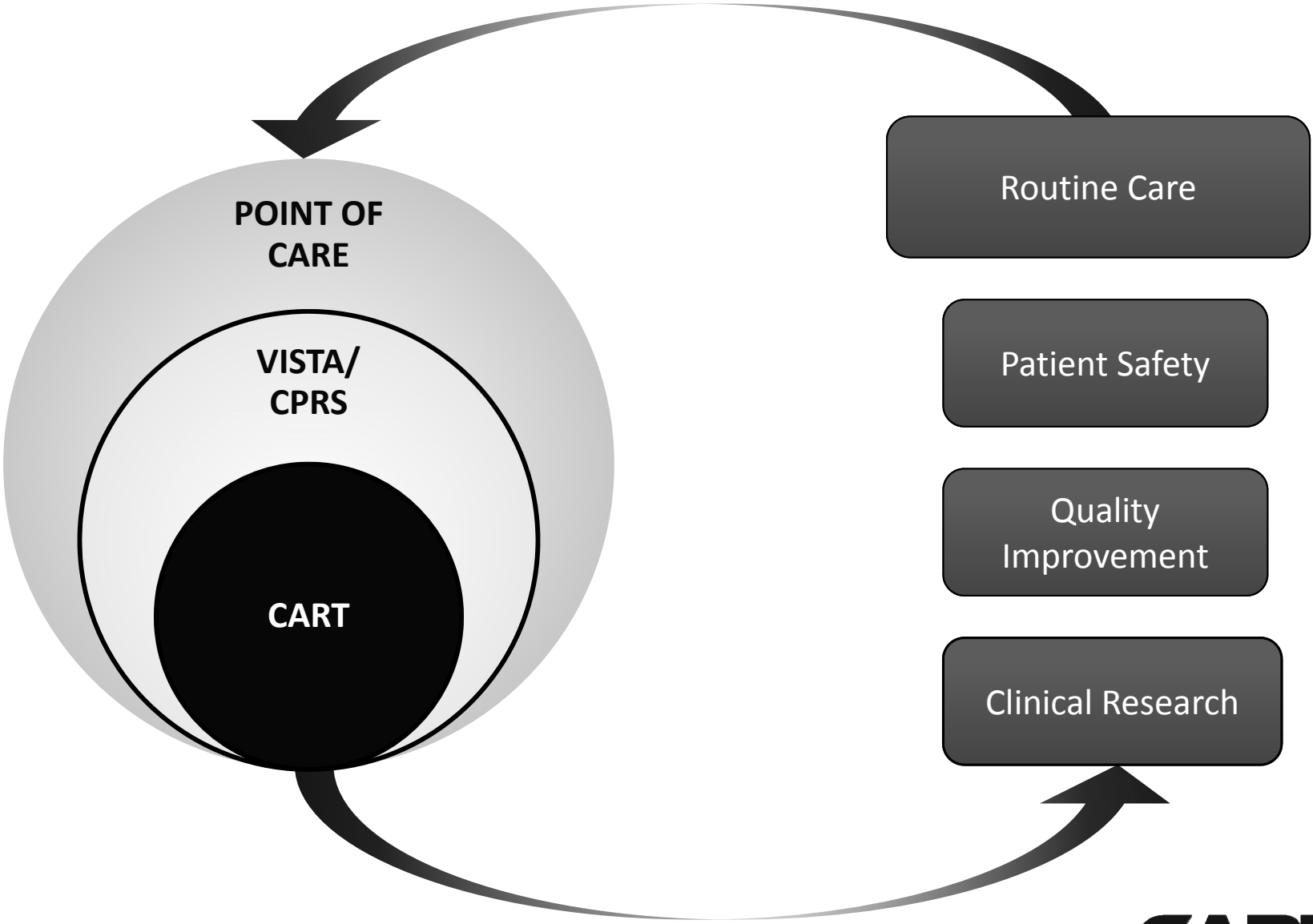
This is necessary because data collection is not integrated into the *process* of clinical care.

TRANSACTIONAL QUALITY AND MANAGEMENT

"If specific data are needed for patient care, to improve quality and increase patient safety, these data should be available and accessible at the point of care and not abstracted after the fact."

Robert Jesse, VA Principal Deputy Undersecretary for Health

Informatics in the Service of Quality



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Informatics in the Service of Quality Improvement

- Major Adverse Event Alerts
- Device Surveillance
- Decision Support and Beyond

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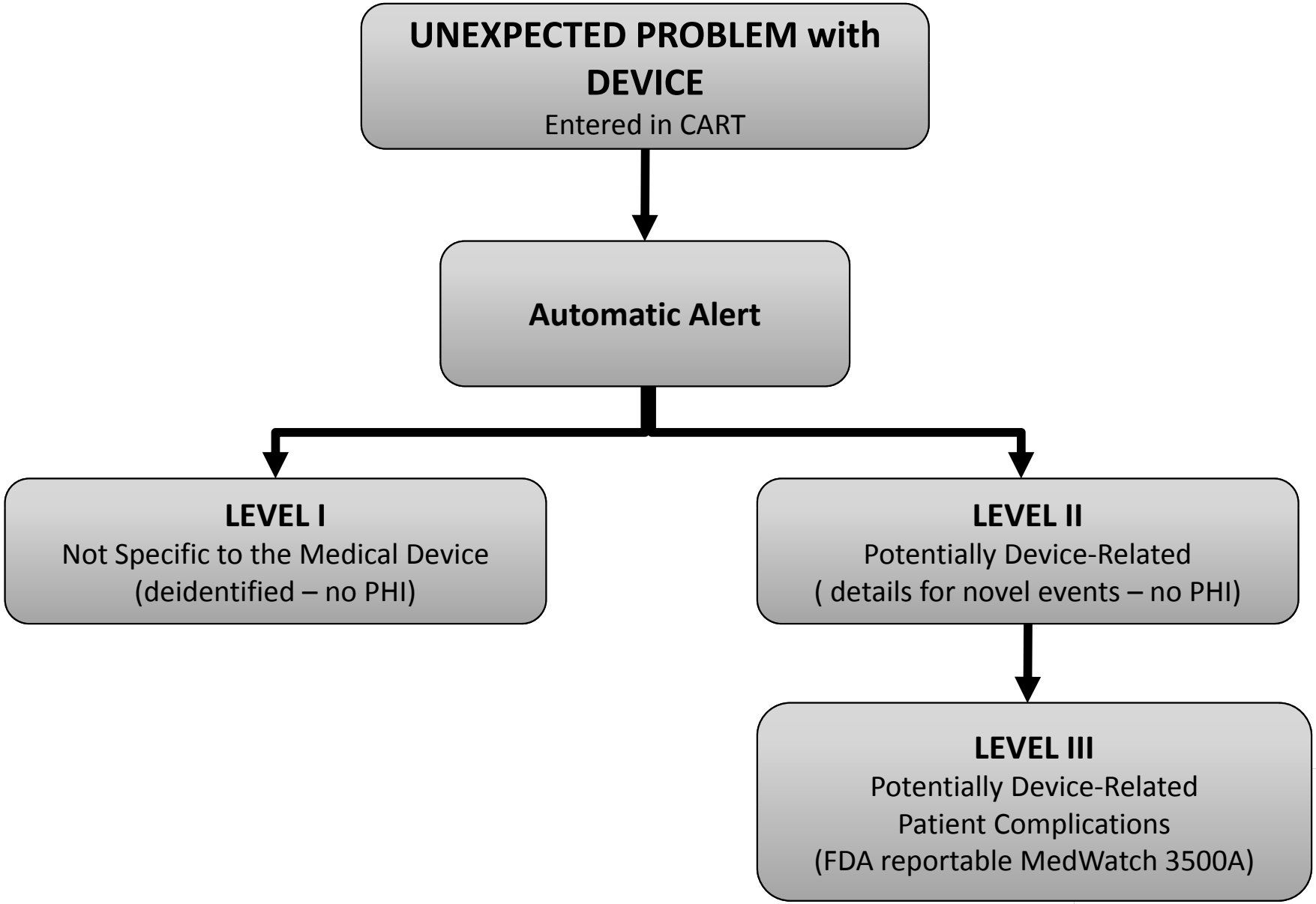
The Problems of Device Surveillance

- Underreporting
- Voluntary = Passive
- Numerators, not denominators

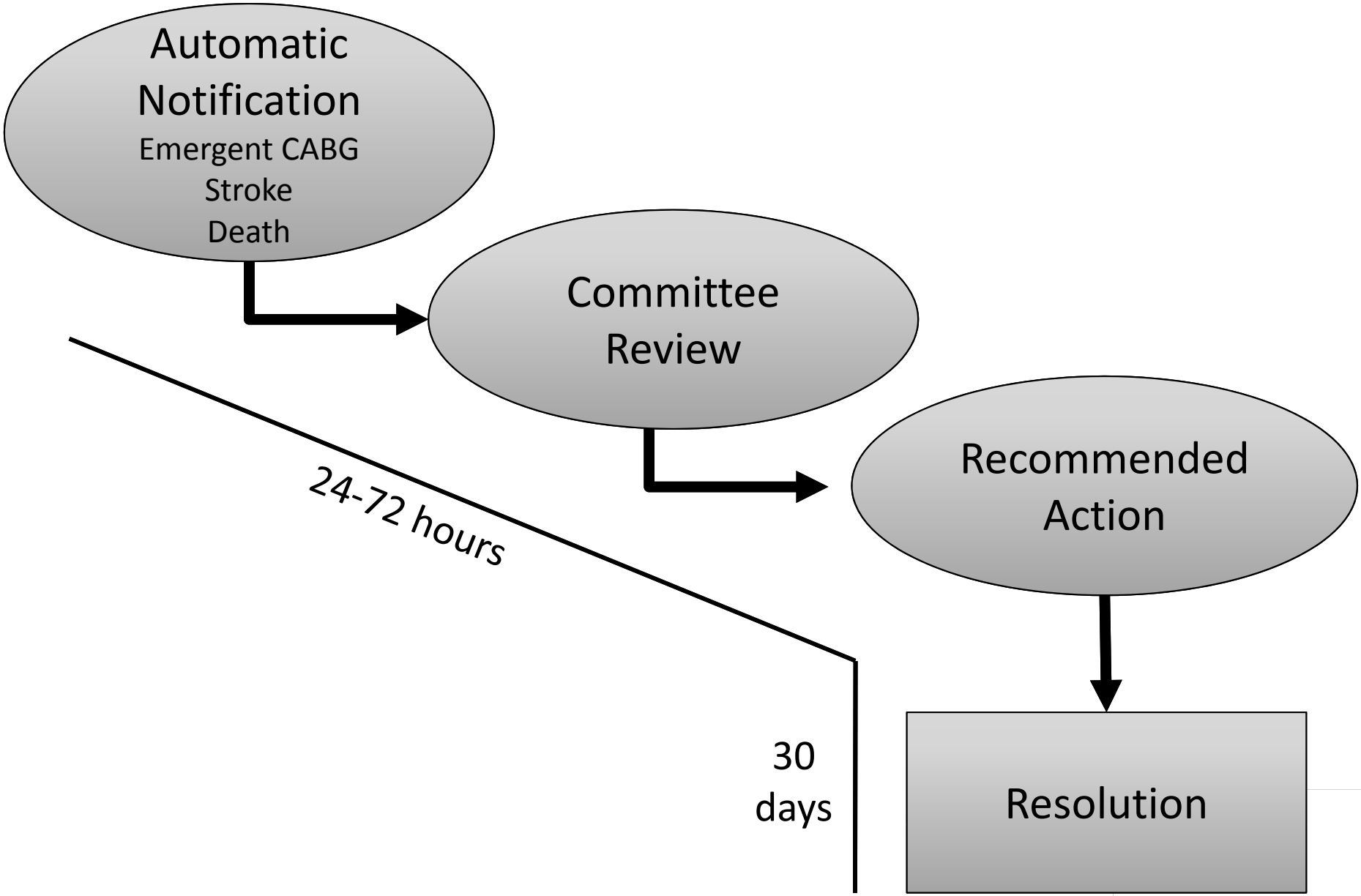
http://www.fda.gov/cdrh/postsurv/medsunappendixa.html
www.fda.gov/cdrh/postsurv/medsun.pdf

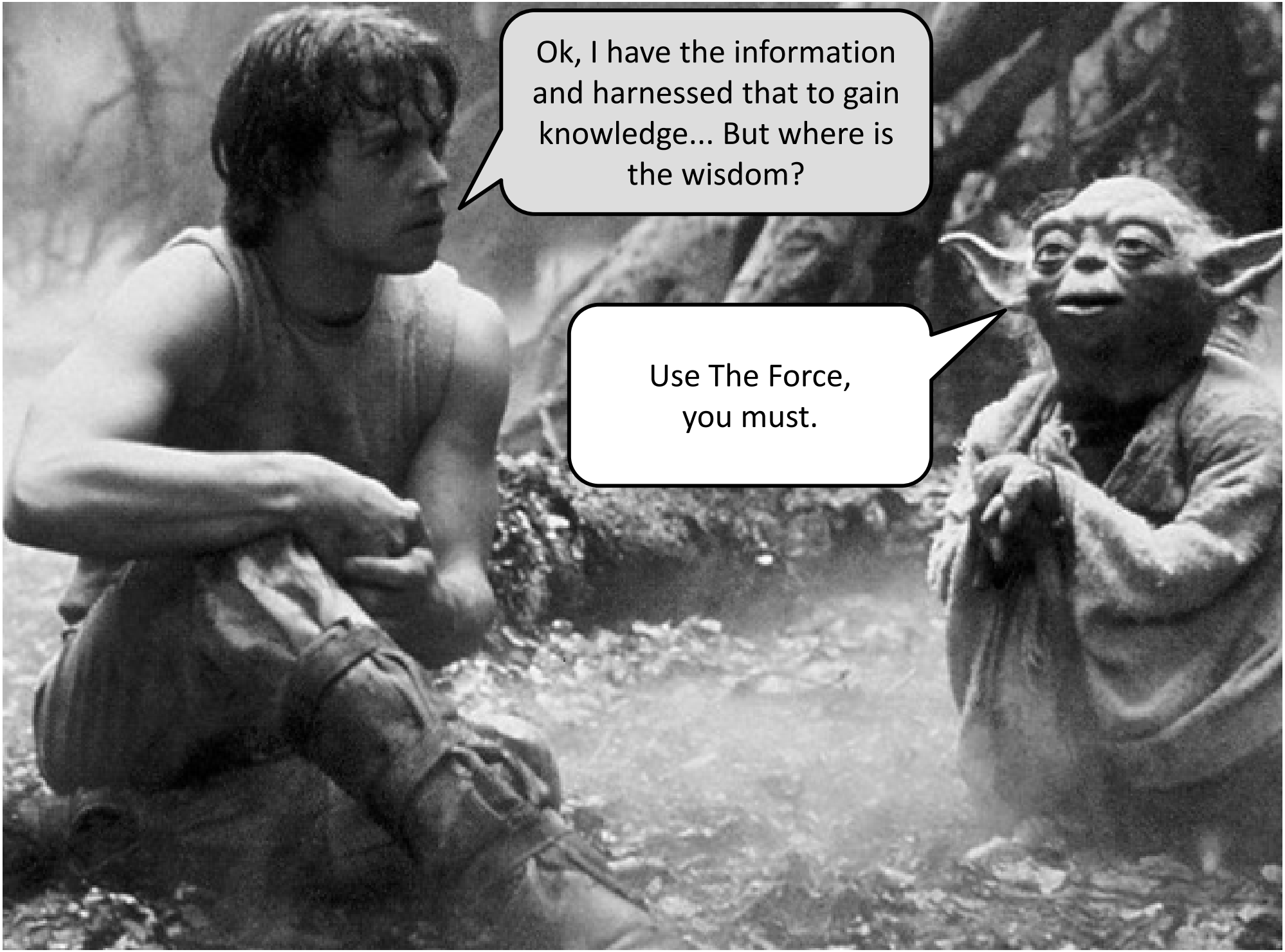
J Gen Intern Med. 2006;21(9):942-948.
Arch Intern Med. 2008;168(1):40-46.

CART-FDA Surveillance



CART Major Adverse Event Review




Ok, I have the information and harnessed that to gain knowledge... But where is the wisdom?
Use The Force, you must.

Informatics in the Service of Quality Improvement

- Reporting and Benchmarks
- Local quality improvement
- Health Services Evaluation
- Targeted Interventions

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CART Quality: Reports

- Monthly Site QA Reports
- National Reports (VACO, CART-QM Committee)
  - Monthly Reports:
    - Procedure counts (including fiscal year to date)
    - Major adverse event counts (including fiscal year to date)
  - Bi-Annual Reports
    - Detailed site and 'roll-up' data; quality metrics
- Quarterly VISN-level Reports
  - VISN CMO's

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Direct Integration with ACC-NCDR

- Contract, data specifications and mapping and certification are complete
- Based on ACC-NCDR v4
- Begin submitting VA data this quarter

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How do I get CART data?

- The CART Program is currently under the Office of Patient Care Services
- Re-organization will move CART to the new Office of Informatics and Analytics, and specifically the Office of Analytics and Business Intelligence

Local Data	Local Performance Metrics	Research
Ex: "I would like to know the total radiation time per patient."	Ex: "We would like to explore our complication rates for X, compared to the national VA average."	Ex: "I want to examine the quality of care for Veterans undergoing saphenous vein grafts."

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How do I get CART data?

LOCAL DATA

- Clarify the type of information your need (not an application process)
- Over 40 requests have been made and filled
- Some take 45 minutes to complete, others weeks

RESEARCH or WORK-PREPARATORY TO RESEARCH

- Proposal to the CART Research and Publications Committee (10 members)
    - Once the transition is complete to OIA, we will merge our research oversight with theirs
- Proposals evaluated based on
    - Clinically important questions, scientific validity
    - Feasibility of answering the question with existing data
    - Strategic priorities

Email our National Site Manager, Alec Arney at alec.arney@va.gov

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Patient-Centered Wisdom

Pre-procedural Care	Procedural Care	Longitudinal Care and Outcomes
Upstream care and testing	Radial, SVG Interventions; Radiation exposure	Medication adherence
Decision support	Device surveillance	Risk factor management
Informed consent	Procedural Complications	Value (outcome / cost)

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Pre-Procedural Care: Collaborations

Pre-Procedural Care

- Upstream care and testing
- Decision support
- Informed consent

- Appropriateness of cath procedures [Maddox]
  Using Interactive Voice Response (IVR) to administer the Seattle Angina Questionnaire
- Radiation Exposure [Tsai]
  Characterize radiation exposure with the goal of developing decision support tools
- Contrast-induced Nephropathy [Matheny]
  Automated risk characterization for patients undergoing procedures and prompts for dosing

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Procedural Care: Collaborations

Procedural Care

Radial, SVG Interventions; Radiation exposure

Device surveillance

Procedural Complications

- Stent Selection [Brilakis]
  Drug-eluting vs bare metal stents

- Future:
  Real Time Locator Services
  Bleeding risk assessment

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Post-Procedural Care: Collaborations

Longitudinal Care & Outcomes

- Clopidogrel (Plavix) Adherence [Ho]
  Improving adherence to Plavix after placement of drug-eluting stent, using automated processes through CART and interactive voice response follow-up.

- Blood pressure and lipid control [Maddox]
  Improving control among coronary artery disease patients in the year following cath.

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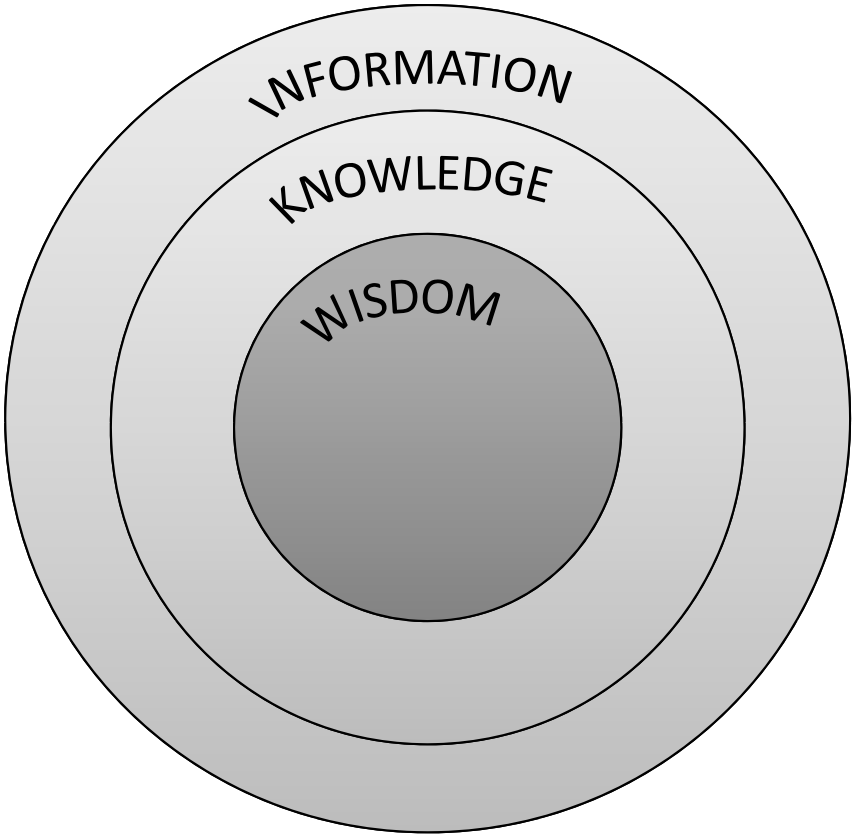

WHAT ELSE?
YOU TELL US.

CART Program Expansion

- **CART-Peripheral**
  - Thomas.Tsai@va.gov
  - Lower extremity intervention, then carotid stenting
- **CART-EP**
  - Paul.Varosy@va.gov
  - ICD, then pacemakers, then ablation procedures
- **CART-CPR**
  - Steve.Bradley@va.gov
  - In-hospital cardiac arrest documentation

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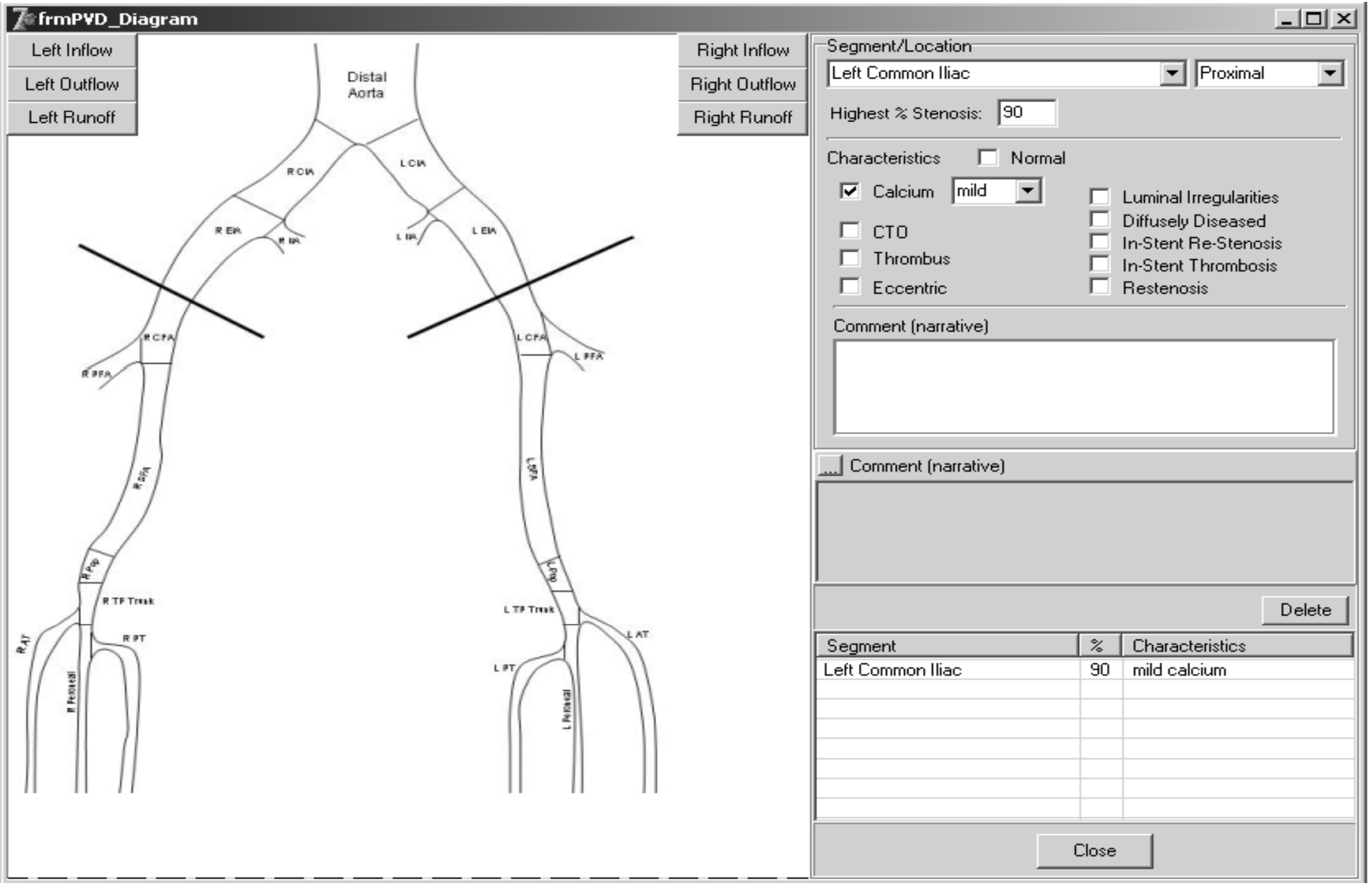
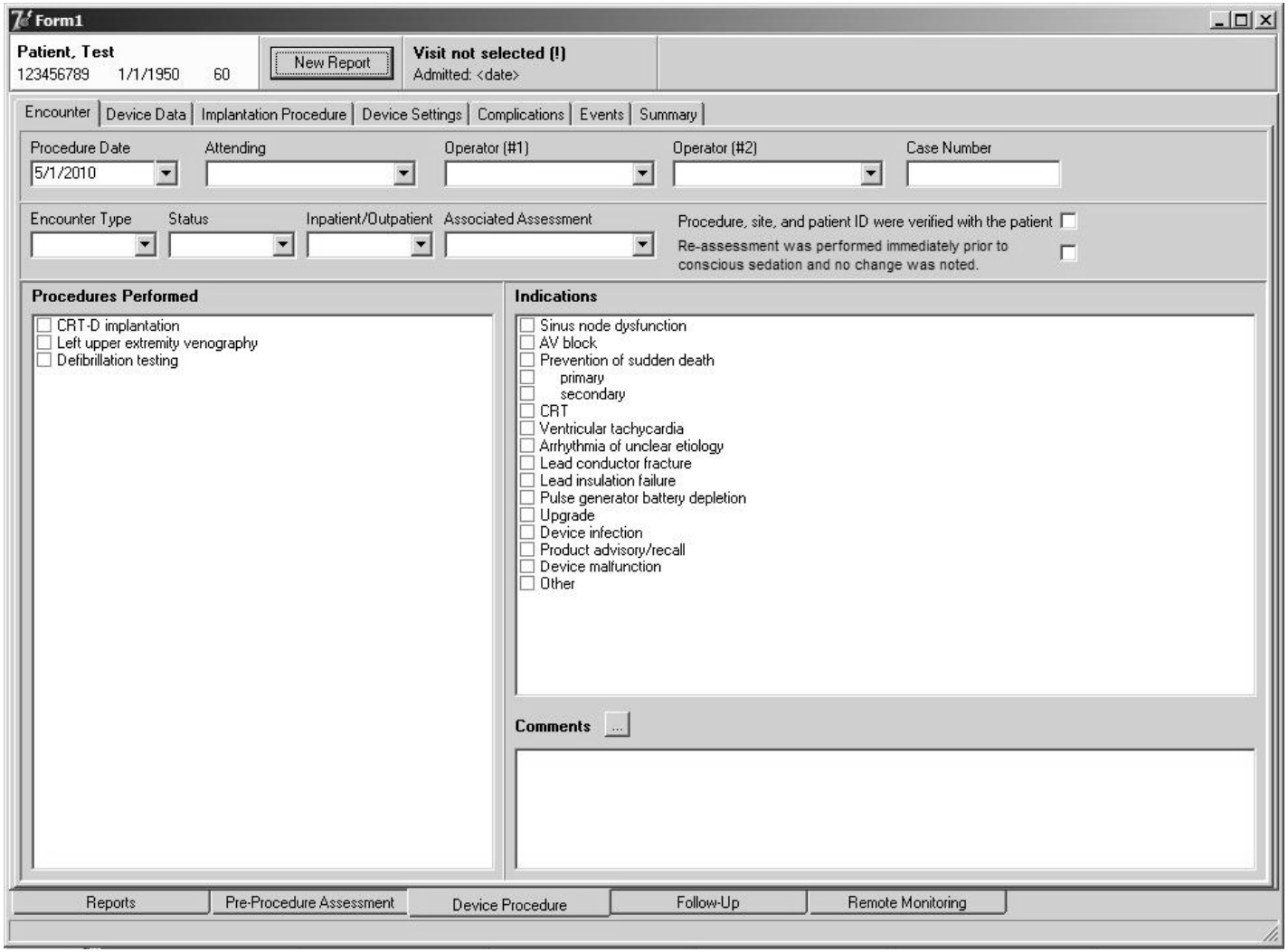
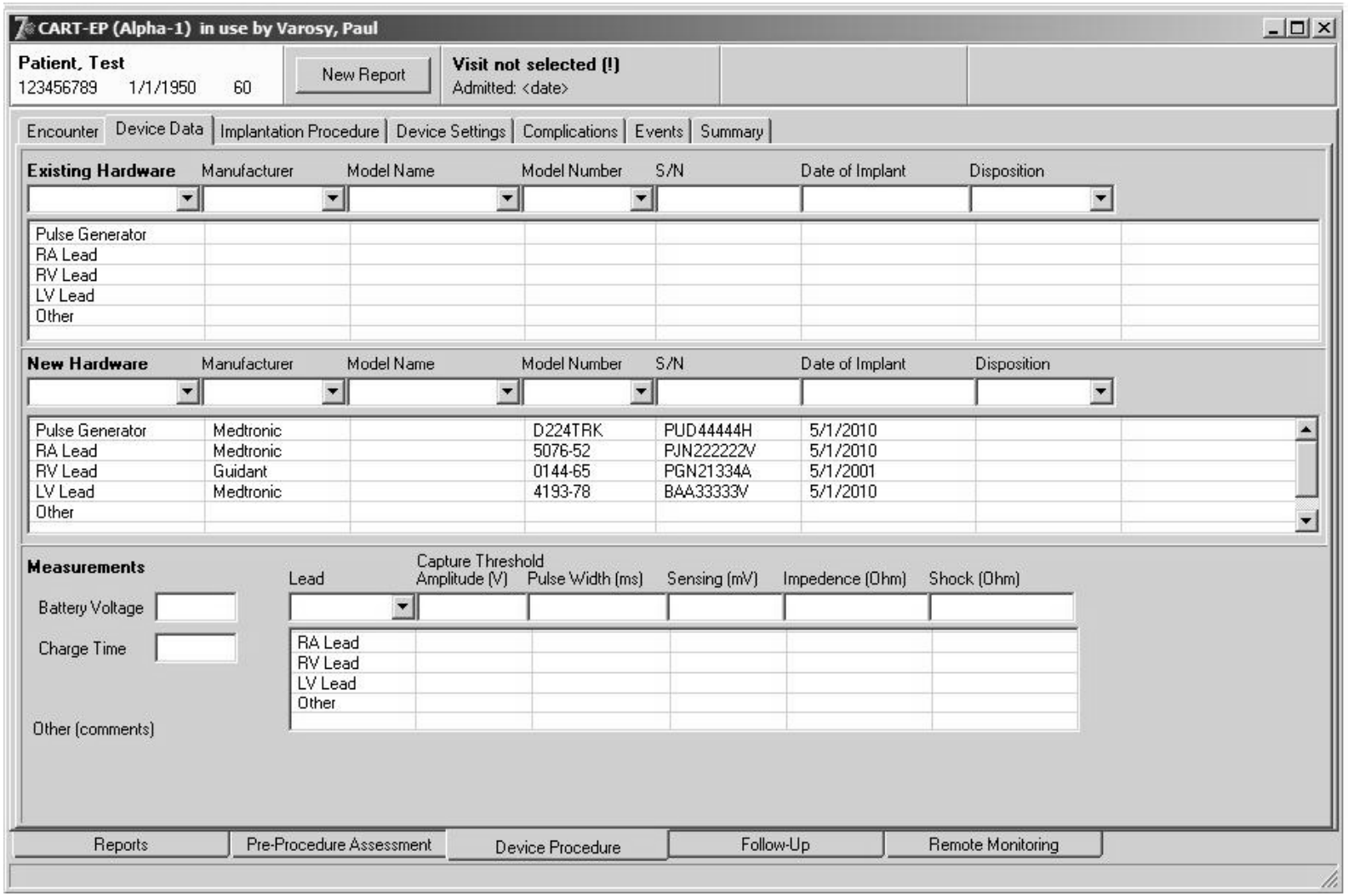
CART-Peripheral: Procedure Details



CART-EP: Encounter Information



CART-EP: Device Data



Collaborations and **Future** Directions

Within VA

- OIA/OABI – Web Solutions Group (MDWS)
- Corporate Data Warehouse (CDW)
- Veterans Implant Tracking and Alert System (VITAS)
- Transformational Initiatives
    - (T15) Health Care Efficiencies (RTLS)
    - (T16) Health Informatics Initiative (AViVA)
- Blue Button

External

- FDA, NCDR, DELTA, Microsoft

THE HEALTH INFORMATICIST'S PRAYER

Oh, Health IT Infrastructure,

Grant me the data sources to collect valid, discrete data,

The knowledge to understand the data

And the wisdom to apply that knowledge to improve care.

“What we call the beginning is often the end. And to make an end is to make a beginning. The end is where we start from.”

-T.S. Eliot

Thank You

With special thanks to the entire CART Program staff:

John S. Rumsfeld, MD, PhD, Program Director and VA Director of Cardiology
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Paul Varosy, MD
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Gary Grunwald, PhD
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