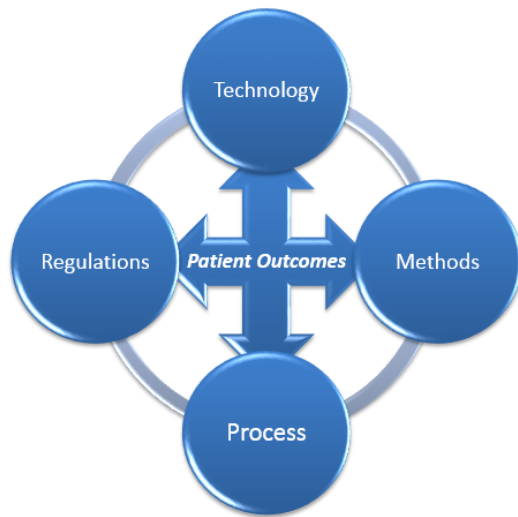


# Upcoming Opportunities in Personalized Healthcare

## Integration of New Methodologies and Techniques



***FOCUS:***  
***Information Management***

CPSA Analytics 2016

Lori Bachmann, Virginia Commonwealth University

Mark Arnold, Bristol-Myers Squibb

# There is a strong desire for **EASY ACCESS** to personalized health data and health education

## Health System Specific Apps



My Chart

## General Health Information Apps



Lab Values Medical Reference  
Heart Murmur Pro  
Physical Exam Essentials  
Drug Information

# Medical providers expect to be able to **EFFICIENTLY MANAGE** healthcare delivery

The screenshot displays a mobile application interface for a patient named Molly Darr, 71-year-old female. The left sidebar lists various medical views: Allergies, Clinical Notes, IOs, Lab Results, Medications, Order Status, Patient Details, and Test Results. The main panel, titled 'Lab Results (1... Panel (7))', shows a 'Chem7' test result from 03/26/10 05:51. A small graph shows trends for Na, K, Cl, HCO3, BUN, Cr, and Glu. Below the graph is a table of test results with values and normal ranges. Values are color-coded: yellow for high/low and red for high/high.

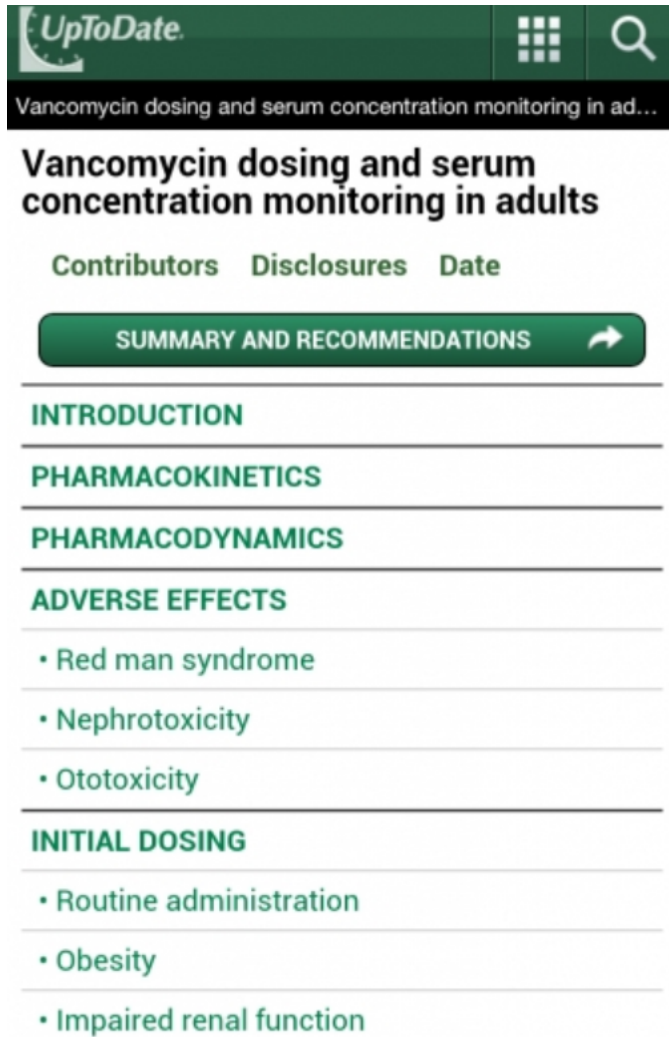
Test	Value	Norm Range
Na	151 H	135 - 148 mEq/L
K	5.8 HH	3.6 - 5.0 mEq/L
Cl	104 N	96 - 109 mEq/L
HCO3	16 L	18 - 23 mEq/L
BUN	32 HH	7.0 - 18.0 mg/dL
Cr	2.2 HH	0.5 - 1.3 mg/dL
Glu	96 N	60 - 109 mg/dL



HL7 Infobutton

“Enabling physicians to focus on patients not technology” - PatientKeeper

# Easy access to **ACCURATE** medical information is expected



UpToDate

Vancomycin dosing and serum concentration monitoring in ad...

## Vancomycin dosing and serum concentration monitoring in adults

Contributors Disclosures Date

**SUMMARY AND RECOMMENDATIONS**

### INTRODUCTION

### PHARMACOKINETICS

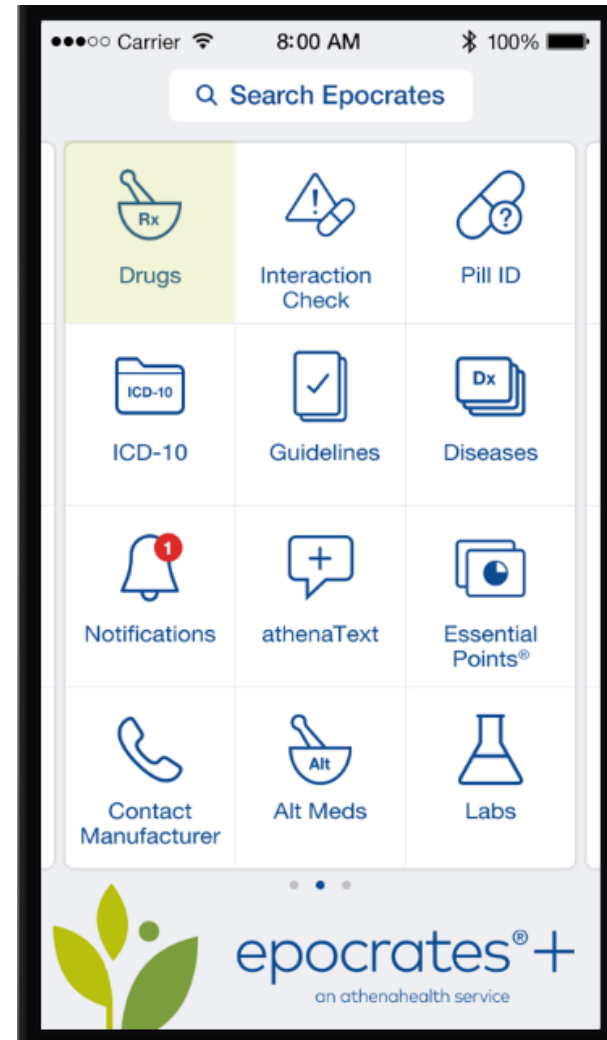
### PHARMACODYNAMICS

### ADVERSE EFFECTS

- Red man syndrome
- Nephrotoxicity
- Ototoxicity













### INITIAL DOSING


- Routine administration
- Obesity
- Impaired renal function



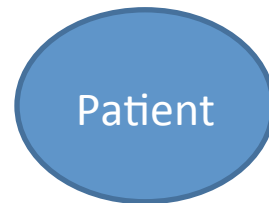
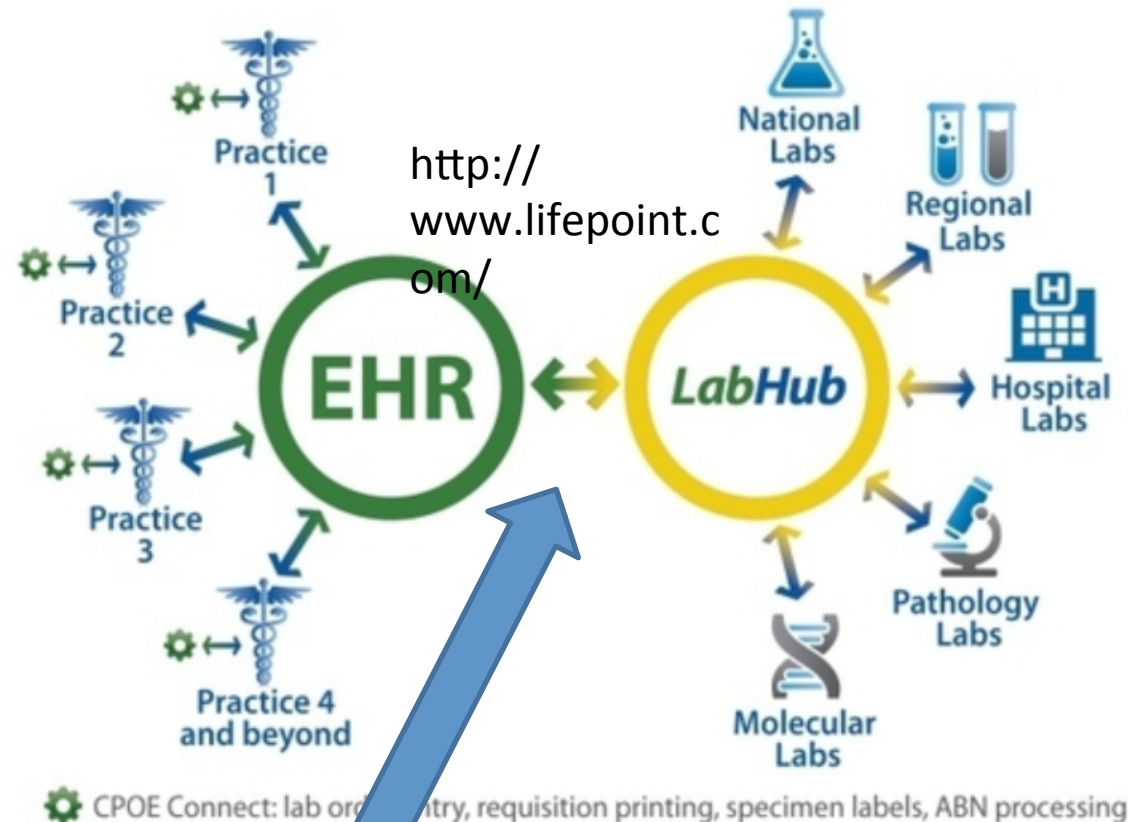
Carrier 8:00 AM 100%

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# Integration of data from many sources is needed



Personal Health and Wellness data

- facilitate health information exchange
- enable successful outreach connectivity
- EMR/EHR integration
- physician portal
- population health management
- quality reporting

# Ability to **EFFICIENTLY MANAGE** personal healthcare is now expected by the patient

myVCUhealth

  
Prescription  
Renewal

  
Messages

  
Appointments

  
Medical Record



LORIN BACHMANN



Allergies

sulfa drugs



Latest Results

SBP/DBP Cuff

BP: Systolic

114 mmHg

Aug 25, 2015

BP: Diastolic

76 mmHg

Aug 25, 2015



# EASY ACCESS to personal health data is also expected



My Health Information

**Vitals/Lab Results**

Other Results

Medications

Procedures

Health Summaries

Radiology

Pathology

Clinical Documents

## Vitals/Lab Results

The information below is from your VCU Medical Center electronic medical when they are available to the provider. Some results may not include all th you have questions please call your health care provider.

For more information about your lab results click [Learn More](#) below the date



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## Most recent results

Filter by date range

Start date

08/18/2015



End date

08/25/2015

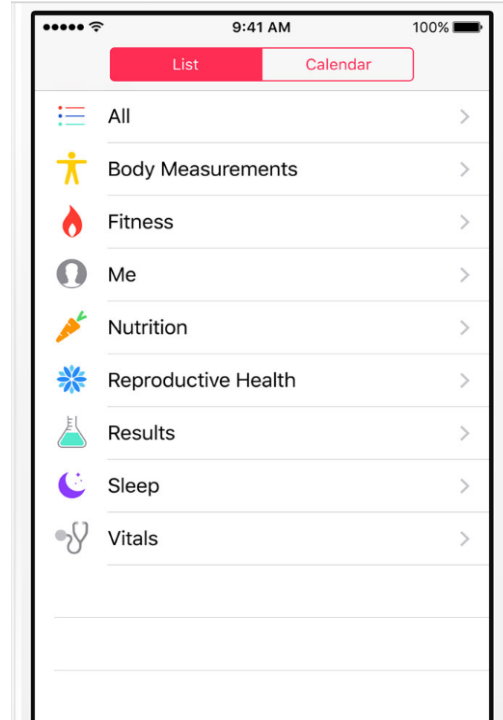
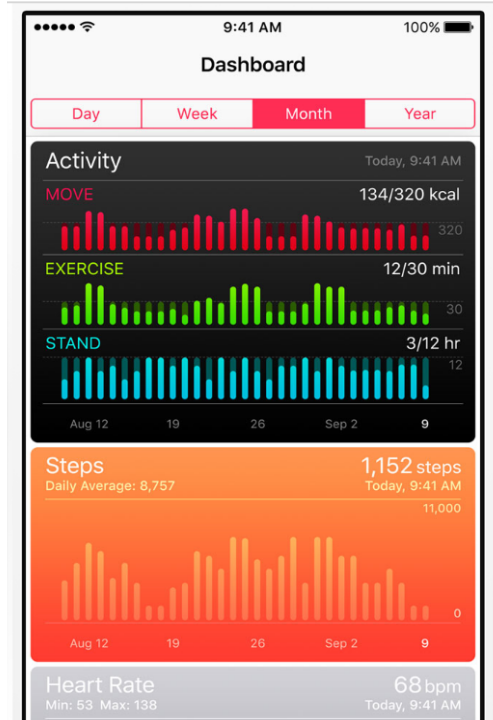


Submit

Enter date in MM/DD/YYYY format.

[Show all results](#)

# Patients now contribute personal health and wellness data back to their physician



\*\*\*increased personal health  
**ACCOUNTABILITY**



# Healthcare data must be:

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Accessible  
Accurate  
Easy to interpret  
Integrated  
Personalized  
Actionable

## AUTOMATED/AUDITABLE:

Data storage  
Data transmission  
Data aggregation  
Data interpretation  
Patient/Provider communication  
  
HIPPA compliant  
Information security

# Regulatory requirements

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Stage 1 meaningful use criteria, focused on **electronically capturing health information in a structured format; using that information to track key clinical conditions and communicating that information for care coordination purposes;** implementing clinical decision support tools to facilitate disease and medication management; using EHRs to engage patients and families and reporting clinical quality measures and public health information. Stage 1 focused heavily on establishing the functionalities in CEHRT (Certified Electronic Health Record Technology) that will allow for continuous quality improvement and ease of information exchange

Stage 2 meaningful use criteria would encourage the **use of health IT for continuous quality improvement at the point of care and the exchange of information in the most structured format possible.** More demanding requirements for eprescribing; **incorporating structured laboratory results;** and the expectation that providers will electronically transmit patient care summaries with each other and with the patient to support transitions in care. Increasingly robust expectations for health information exchange in Stage 2 and Stage 3 would support the goal that information follows the patient.

# Regulatory requirements

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Stage 3: We anticipate that Stage 3 meaningful use criteria will focus on: **promoting improvements in quality, safety and efficiency leading to improved health outcomes; focusing on decision support for national high priority conditions; patient access to self-management tools; access to comprehensive patient data** through robust, secure, patient-centered health information exchange; and **improving population health.**



**NQF 0060 ... Title: Hemoglobin A1c Test for Pediatric Patients ...**

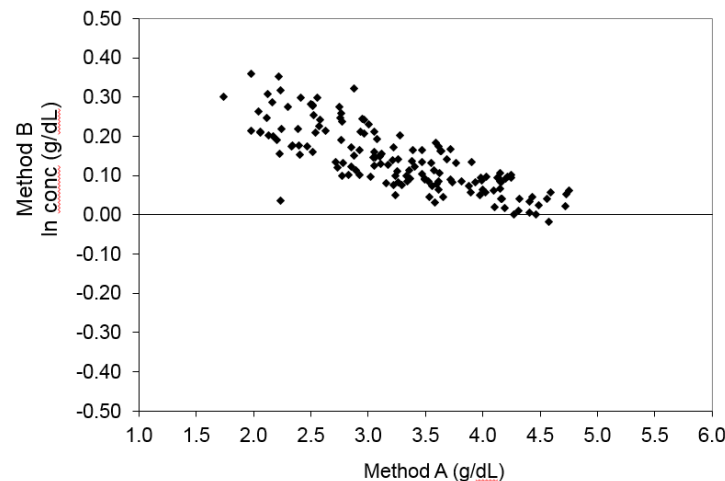
**Description: Percentage of patients 5–17 years of age with diabetes with an HbA1c test during the measurement period.**

# Current issues in information management (from the laboratory testing perspective)

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Data from different labs/test methods for the same analytes do not agree

Serum albumin  
(*unpublished data*)



Lab value reporting is not standardized (units, calculations, algorithms – lack of transparency)

No easy mechanisms to integrate lab data with other health data leading to assess/improve quality of care



# Meaningful Use: Menu Set Objectives

- Menu objectives – may defer 5 of 10
- **Hospitals– 10 Menu Objectives**
  1. Drug-formulary checks
  2. Record advanced directives for patients 65 years or older
  3. Incorporate clinical lab test results as structured data
  4. Generate lists of patients by specific conditions
  5. Use certified EHR technology to identify patient-specific education resources and provide to patient, if appropriate
  6. Medication reconciliation
  7. Summary of care record for each transition of care/referrals
  8. Capability to submit electronic data to immunization registries/systems\*
  9. Capability to provide electronic submission of reportable lab results to public health agencies\*
  10. Capability to provide electronic syndromic surveillance data to public health agencies\*

\* At least 1 public health objective must be selected.

# Future issues in information management (from the laboratory testing perspective)

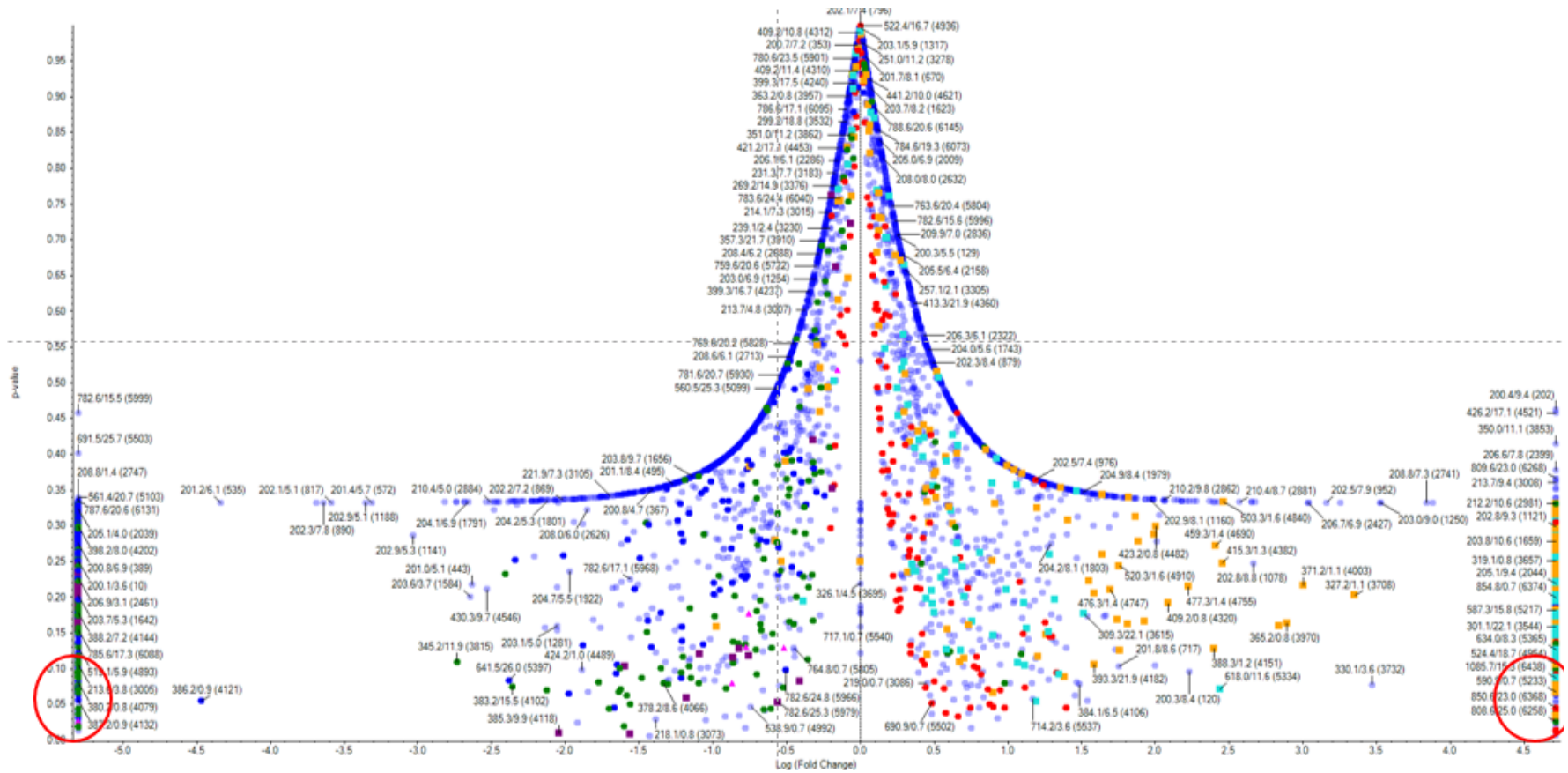
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Results from different lab tests for the same **DISEASES** do not agree

- new technology
- new biomarkers
- new testing algorithms based on multi marker panels

## **More Data = More Interpretation and Synthesis**

- prospective outcomes studies will be needed before data can be used



Metabolomic profiling in sepsis (courtesy of DS Wijesinghe)

# Major problems with “big data” for clinical laboratory testing and real patient care

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## A. The data itself                      impact

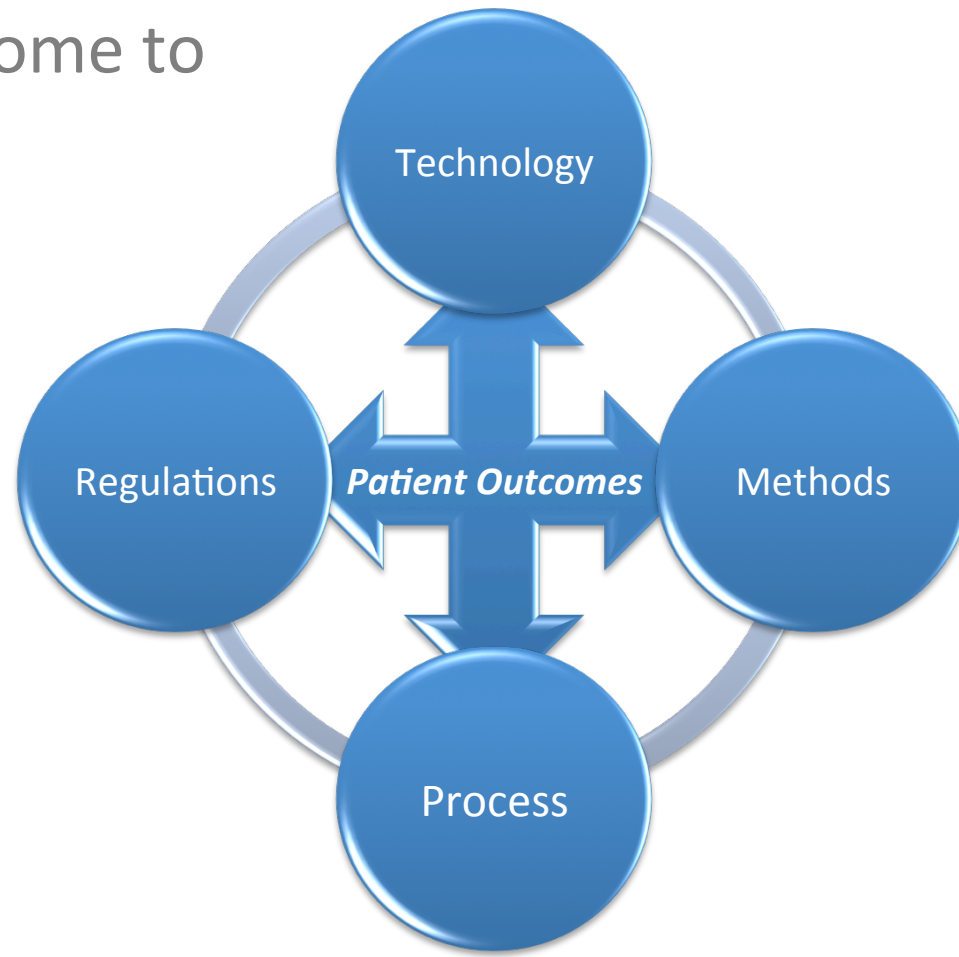
- **Data quality** – Who gets to enter it? How is the quality verified?
- **Data completeness** – Who decides what data is included? How do we ensure all necessary data is included
- **Standardization** of experimental design and methods use to generate data – How can data from different sources be aggregated?
- **Reproducibility and robustness** of each individual data point that comprises an aggregate



## B. How the data is used

- **Over-interpretation** of low quality data
- **Inappropriate statistics** on large datasets (you can design a statistical approach to support almost any claim)
- **Attempt to compare among non-standardized datasets** and draw conclusions
- **Attempt to develop algorithms/interpretations** developed from databases containing **low quality, non-standardized data**
- **Inefficient ability to integrate data from multiple sources** (incompatibility & too many different security measures)
- Application of results obtained from data derived from **populations** to the care of an **INDIVIDUAL**

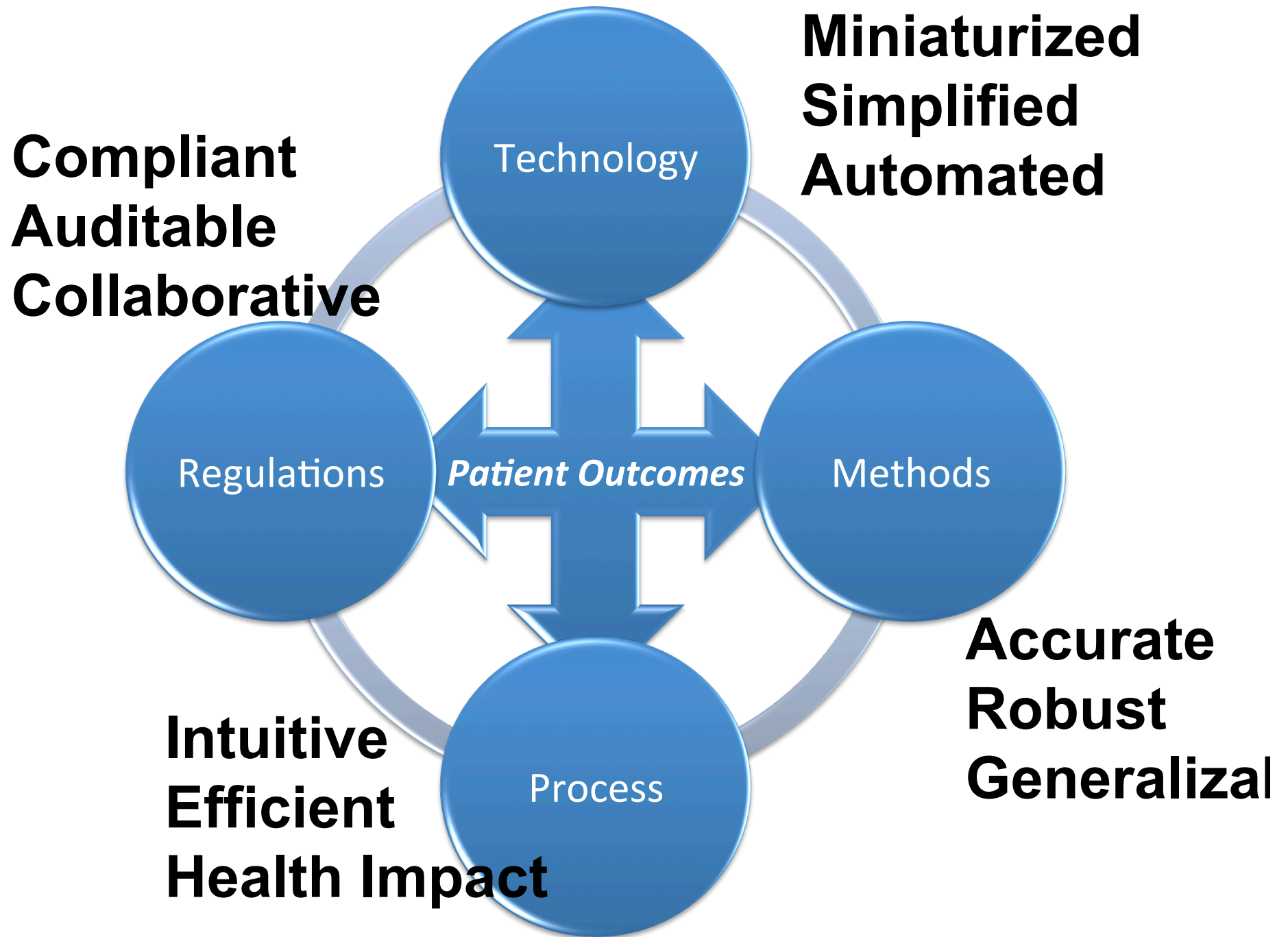
Through **collaborative** scientific **discourse**, develop **integrated processes** to guide development of cutting-edge **technology** and **drive** its translation **directly** into the clinic or home to



**improve personal health and wellbeing**

# People

Mark Arnold	<a href="mailto:mark.arnoldcs@gmail.com">mark.arnoldcs@gmail.com</a> ,
Lorin Bachmann	<a href="mailto:lbachmann@mcvh-vcu.edu">lbachmann@mcvh-vcu.edu</a>
Timothy J Garrett	<a href="mailto:tgarrett@UFL.EDU">tgarrett@UFL.EDU</a>
Gary Valaskovic	<a href="mailto:gary.valaskovic@newobjective.com">gary.valaskovic@newobjective.com</a>
Chad Briscoe	<a href="mailto:BriscoeChad@prahs.com">BriscoeChad@prahs.com</a>
Naidong Weng	<a href="mailto:NWeng@its.jnj.com">NWeng@its.jnj.com</a>
Jim Shen	<a href="mailto:jim.shen@bms.com">jim.shen@bms.com</a>
Shane Needham	<a href="mailto:sneedham@alturasanalytics.com">sneedham@alturasanalytics.com</a>
Paul Corcoran	<a href="mailto:paul.corcoran@mckscientific.com">paul.corcoran@mckscientific.com</a>
Andrey Bondarenko	<a href="mailto:andrey.bondarenko@infoclinika.com">andrey.bondarenko@infoclinika.com</a>
Nathan Yates	<a href="mailto:yatesn@pitt.edu">yatesn@pitt.edu</a>
Joanna Pols	<a href="mailto:joanna.pols@regeneron.com">joanna.pols@regeneron.com</a>
Erik Hansen	<a href="mailto:erik.hansen@newobjective.com">erik.hansen@newobjective.com</a>
Carla Marshall-Waggett	<a href="mailto:carla.marshall-waggett@newobjective.com">carla.marshall-waggett@newobjective.com</a>
Martin Steel	<a href="mailto:martin.steel@mckscientific.com">martin.steel@mckscientific.com</a>
Emily Ehrenfeld	<a href="mailto:emily.ehrenfeld@newobjective.com">emily.ehrenfeld@newobjective.com</a>
Mike Lee	<a href="mailto:mike.lee@milestonedevelopment.com">mike.lee@milestonedevelopment.com</a>



**Compliant**  
**Auditable**  
**Collaborative**



**Miniaturized**  
**Simplified**  
**Automated**



*Business*



**Accurate**  
**Robust**  
**Generalizable**

**Intuitive**  
**Efficient**  
**Health Impact**



How can information management be used within the Four Corners paradigm to add value to patient care?

