


# A Presentation to the AMA House of Delegates

Ray Fabius MD, DFACPE  
November 2015


*Have no fear:  
Big Data Will  
Change the  
Practice of  
Medicine in Many  
Positive Ways !*



**data**

**SUNDAY, NOVEMBER 15, 2015 – 1 - 3 P.M.**  
**AMA INTERIM MEETING**  
**ATLANTA, GA**

**BIG DATA:  
PANACEA OR  
PANDORA'S BOX?**



An explosion of data regarding healthcare has been collecting in our office charts, in hospital records, on computers, and in the cloud. What does that mean to the future practice of healthcare? Will it help us make clinical decisions, or get in our way with legal, ethical, and financial challenges? Listen to how it is shaping up and being tried in some practices and learn about possible changes in the future of practice of medicine.

The FORUM is offering a program to stimulate discussion and give you tools to answer these questions.

**THE FORUM FOR MEDICAL AFFAIRS**

**What is Big Data?**  
Exactly what is the Precision Medicine Initiative? What are potential barriers to its promise?

**D J Patil, PhD**  
US Chief Data Scientist  
White House Office of Science & Technology

**Where is it Leading Us?**  
Data security, ease of use and analytics – helpful or obstacle to patient care?

**Ching-Yung Lin, PhD**  
Adjunct Professor, Department of Electrical Engineering & Computer Science, Columbia University

**Can it Help Me Take Better Care of My Patients?**  
How can the practicing physician use Big Data to enhance patient care?

**Raymond J. Fabius, MD**  
Ab3Health, LLC,  
Co-founder, Health NEXT

**The FORUM for Medical Affairs**  
4307 MacCorkle Avenue, SE  
Charleston, WV 25364

[www.osmspandtheforum.com](http://www.osmspandtheforum.com)



## RAY FABIOUS MD

Honored to be With You Today

- Over 25 years of medical management experience with Thomson Reuters, GE, Walgreens, Aetna, Cigna and others
- Served as front line primary care physician for over a decade
- Published articles, book chapters and three books
- Adjunct Faculty – Harvard, Jefferson, ACOEM
- Distinguished Fellow & Faculty Member of American Association of Physician Leadership
- Co-founder of HealthNEXT
  - Emerging Leader in building organizational cultures of health



THOMSON REUTERS

Harvard School of Public Health



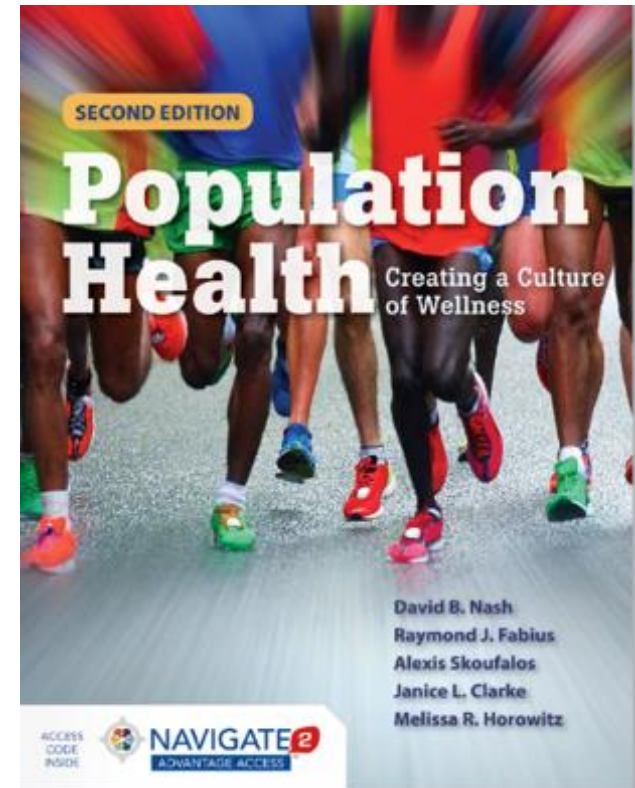
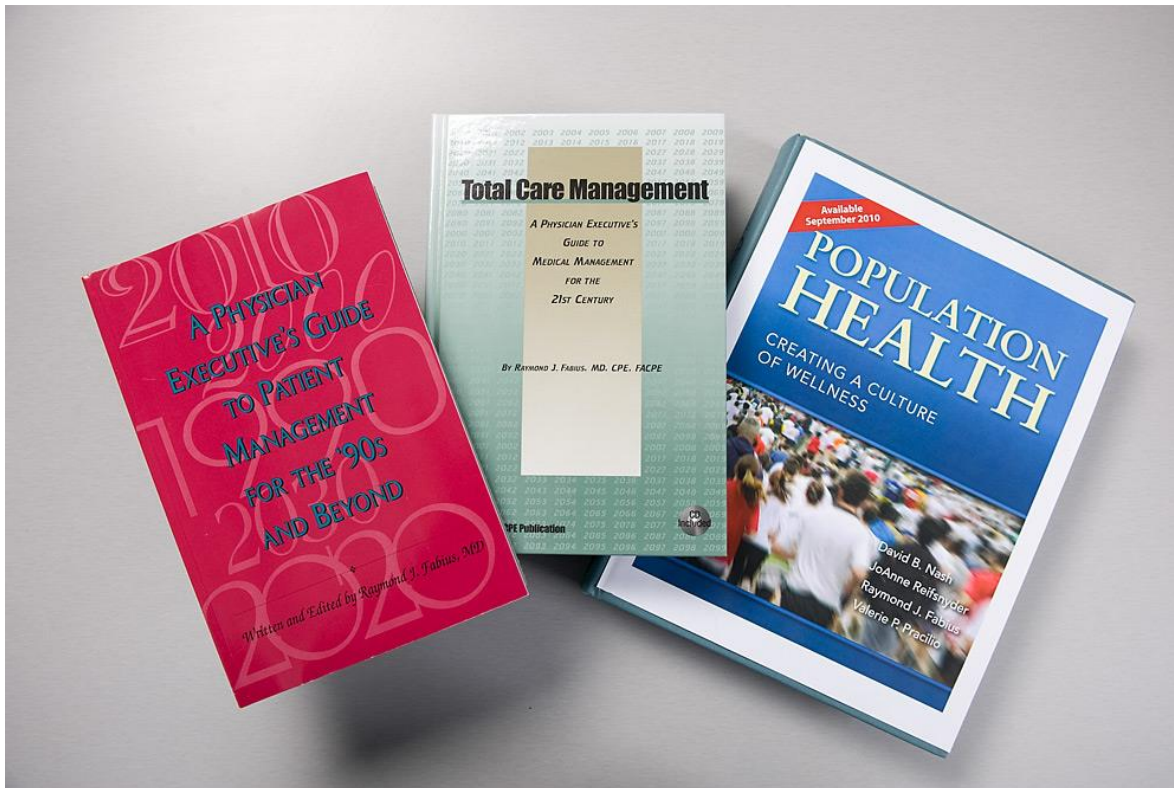
Jefferson School of Population Health



CIGNA



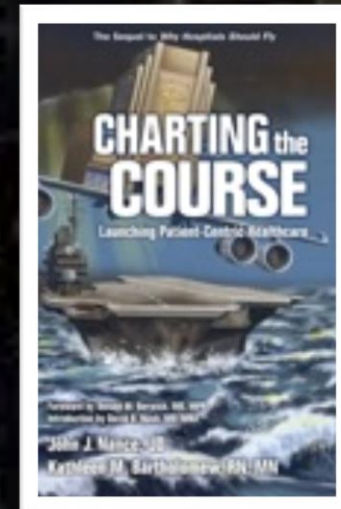
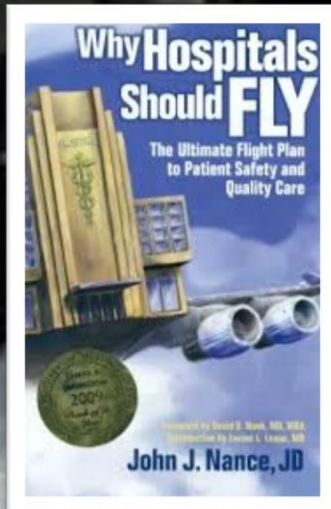
## MY BACKGROUND: A PATIENT, A PROVIDER, A PAYER, A PURCHASER, A VENDOR, A CONSULTANT



***Flying without data and guidance***

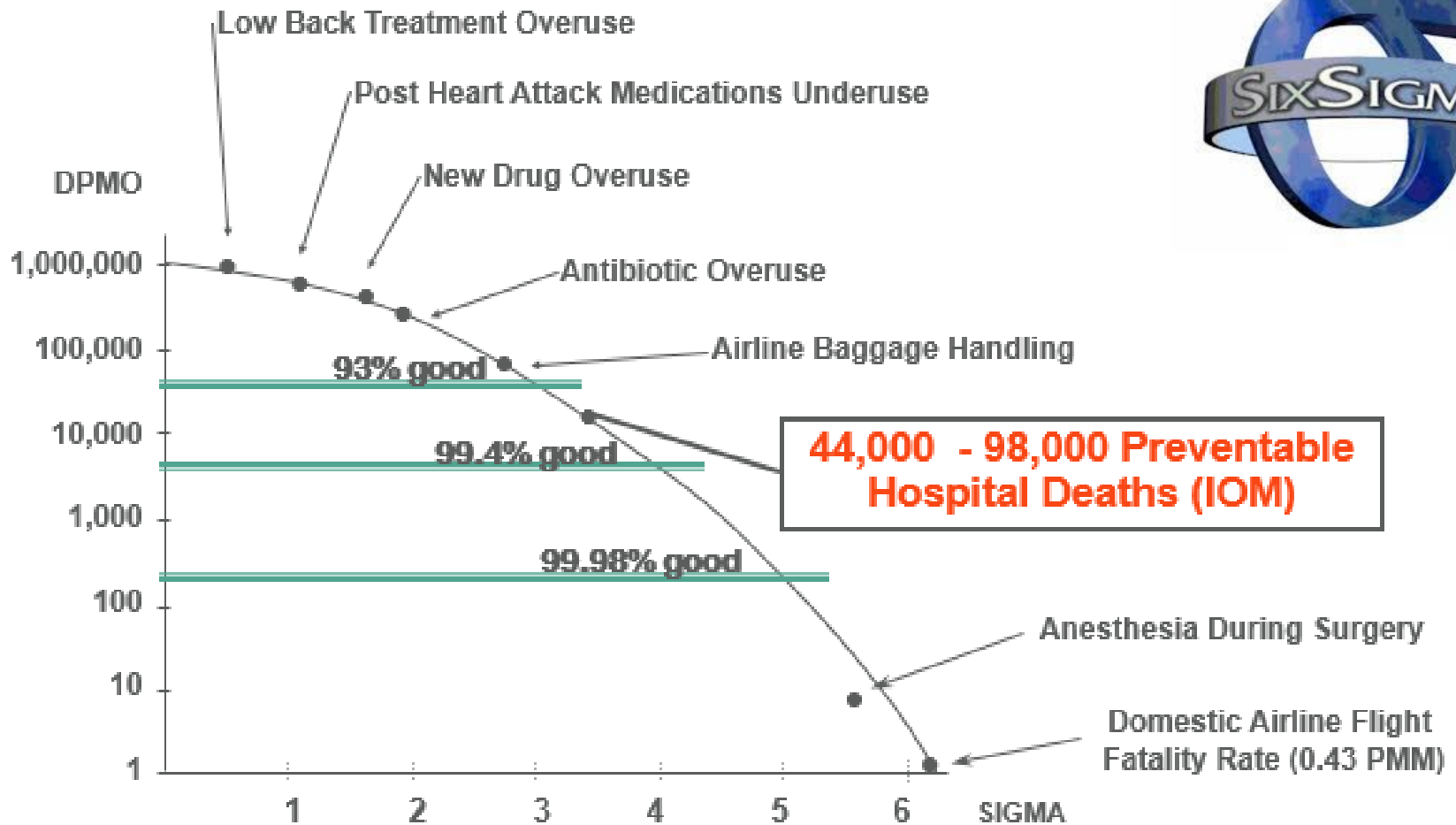


*Flying with data & guidance - Auto Pilot Option*



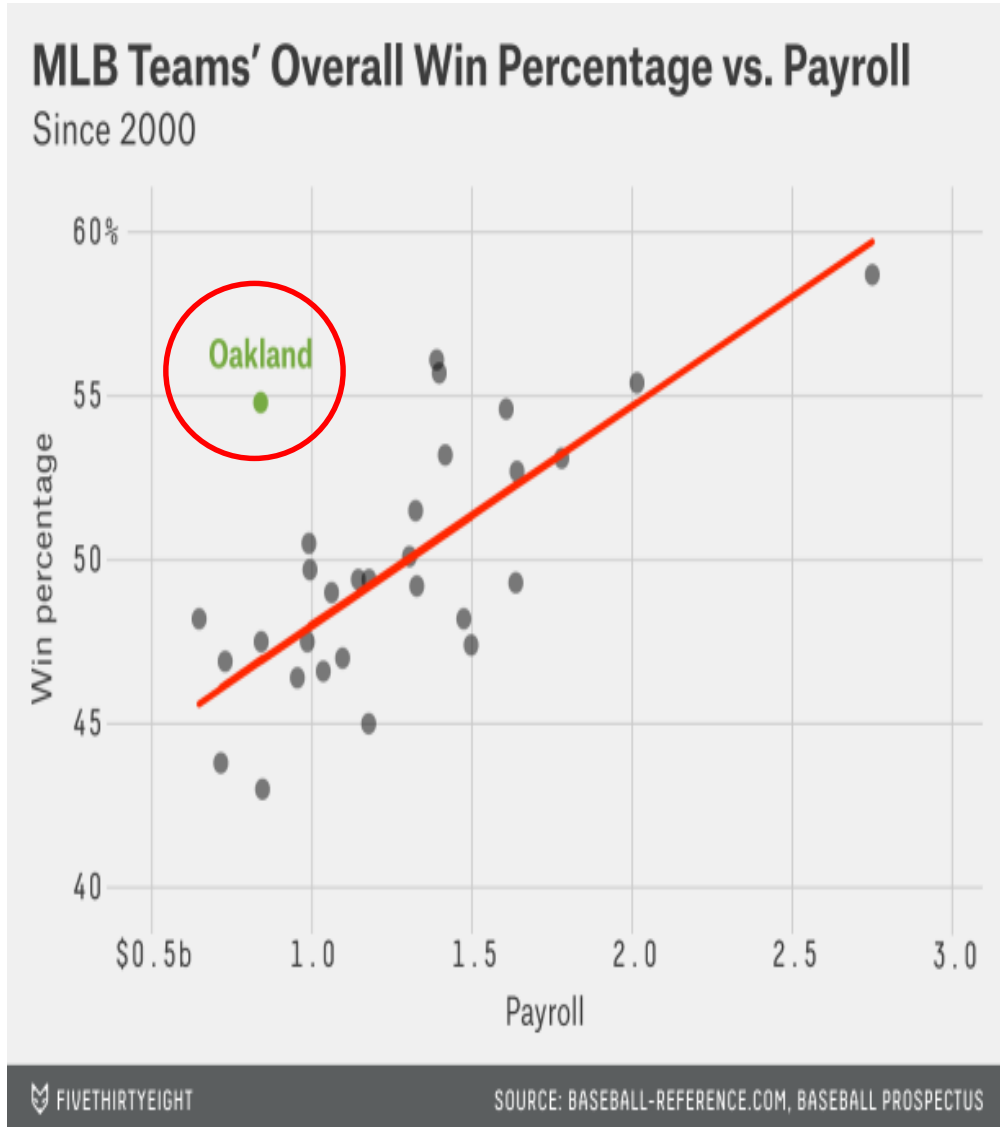
# UNFORTUNATE TRUTH:

*You cannot get to near perfect performance without technology and analytic support*



# BASEBALL BEFORE HEALTHCARE???

## Winning with Big Data & Analytics





## Are the Phillies really starting to embrace analytics?

Perhaps the slowest team in baseball to develop a true analytics department, it appears as if the Phillies are trying to catch up to the rest of Major League Baseball in the use of sabermetrics

National League									
NL Central		W	L	PCT	GB	HOME	AWAY	L10	STRK
Cardinals	100	62	.617	-	55-26	45-36	4-6	L3	
Pirates	98	64	.605	2.0	53-28	45-36	6-4	W1	
Cubs	97	65	.599	3.0	49-32	48-33	8-2	W8	
Brewers	68	94	.420	32.0	34-47	34-47	4-6	L4	
Reds	64	98	.395	36.0	34-47	30-51	1-9	L1	
NL West		W	L	PCT	GB	HOME	AWAY	L10	STRK
Dodgers	92	70	.568	-	55-26	37-44	5-5	W4	
Giants	84	78	.519	8.0	47-34	37-44	5-5	L1	
Diamondbacks	79	83	.488	13.0	39-42	40-41	6-4	W1	
Padres	74	88	.457	18.0	39-42	35-46	3-7	L3	
Rockies	68	94	.420	24.0	36-45	32-49	5-5	W1	
NL East		W	L	PCT	GB	HOME	AWAY	L10	STRK
Mets	90	72	.556	-	49-32	41-40	5-5	W1	
Nationals	83	79	.512	7.0	46-35	37-44	5-5	L1	
Marlins	71	91	.438	19.0	41-40	30-51	6-4	L1	
Braves	67	95	.414	23.0	42-39	25-56	6-4	W3	
Phillies	63	99	.389	27.0	37-44	26-55	6-4	W1	

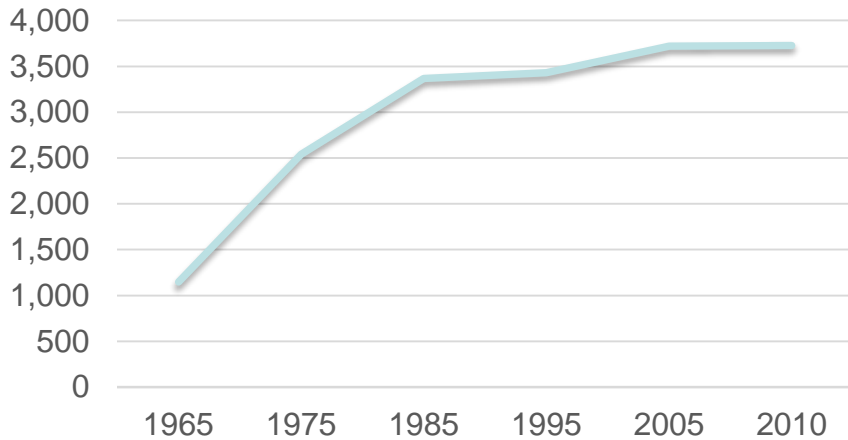


# WE NEED OUR COCKPIT

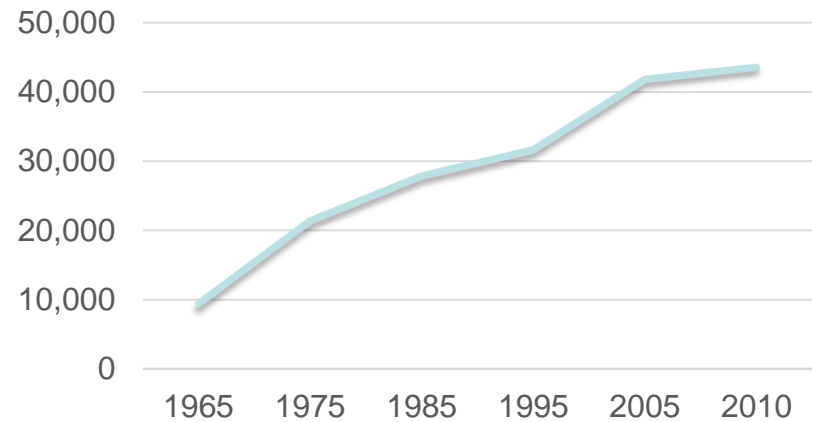
## Overwhelming Medical Information

*Over 3500 Medical Journals, 40,000 issues & One Million Authored Items Annually*

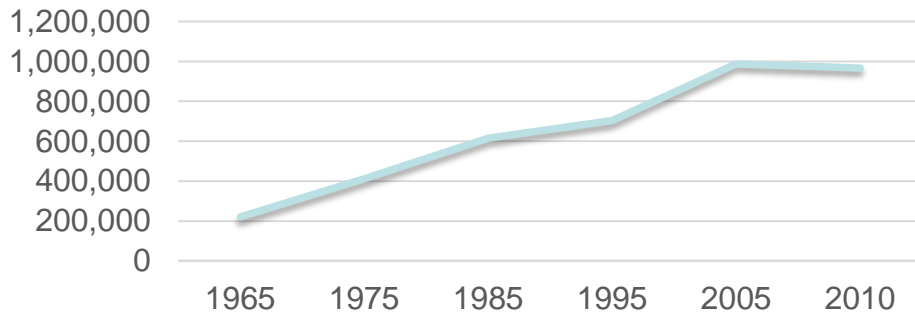
Journals



Issues



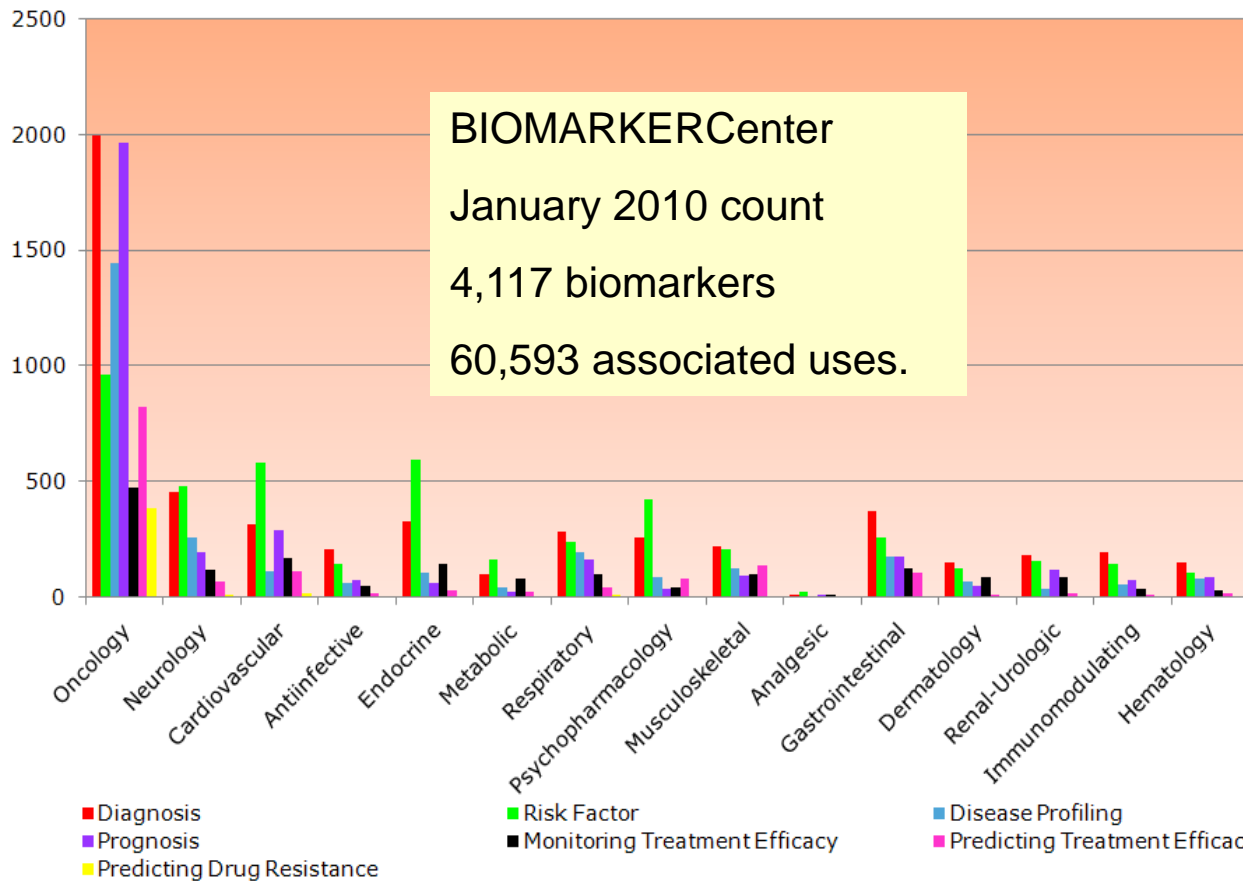
Authored Items



# WE NEED OUR VERSION OF MONEYBALL

## Genomics, Proteomics, Microbiomes, .....

### Over 4000 Biomarkers & Counting



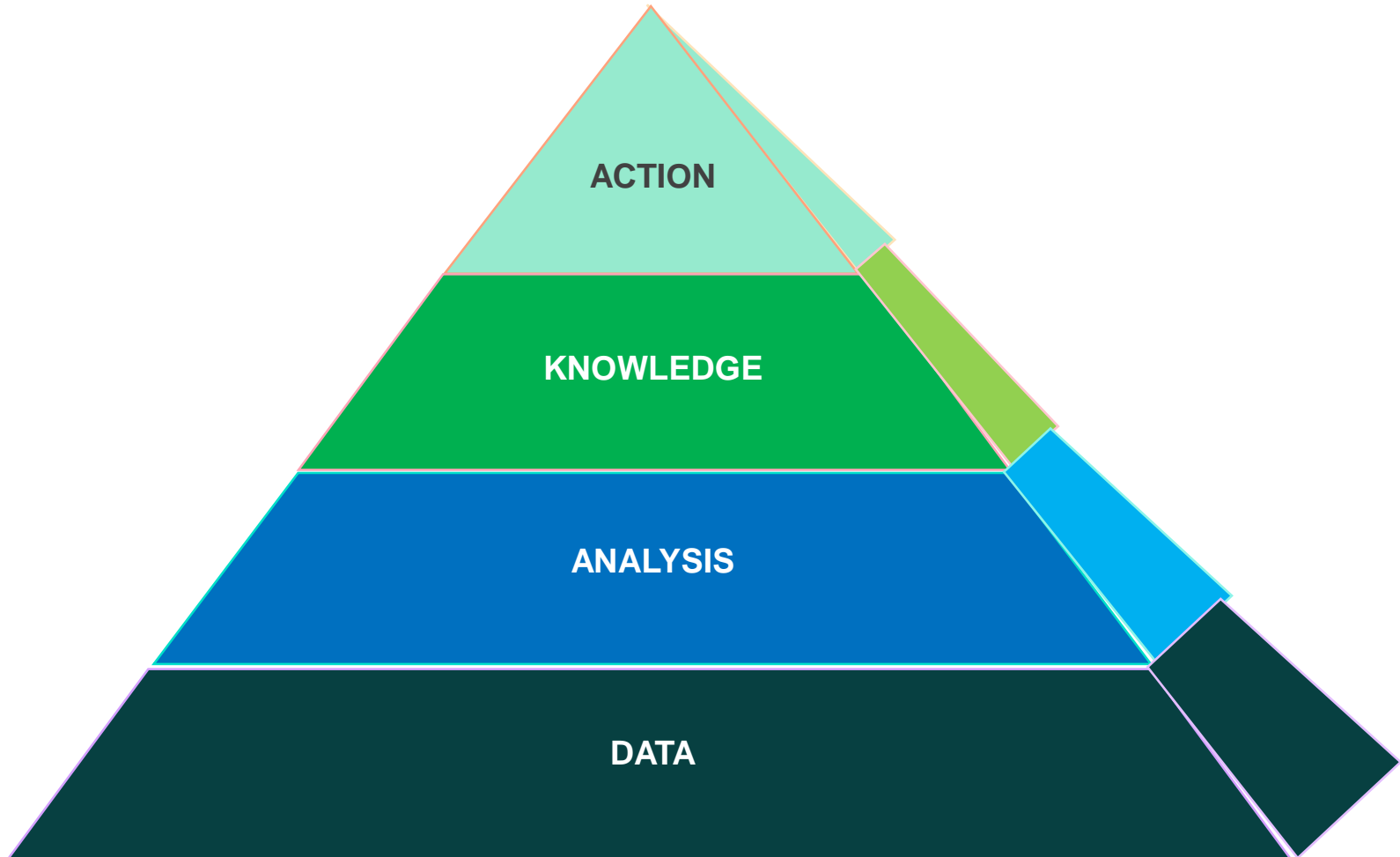
Number Biomarkers by Therapeutic Area up to end of 2009

Source: BIOMARKERcenter



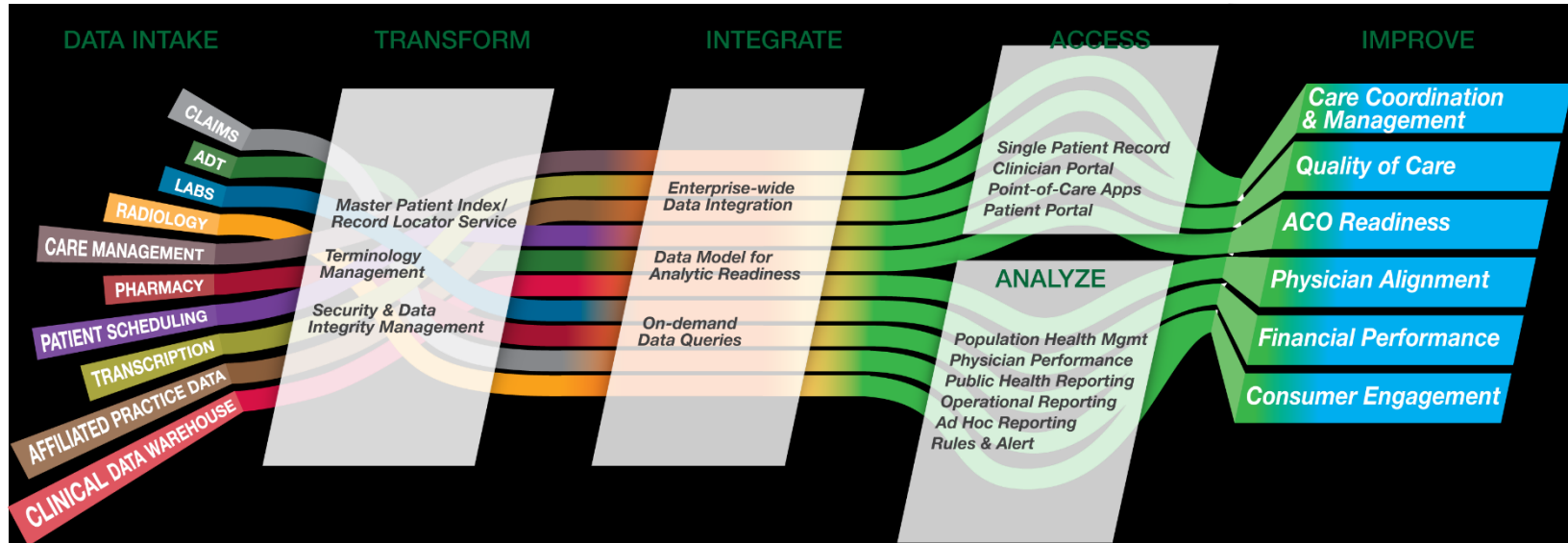
# THE INFORMATICS POWER PYRAMID

*Data Generates Informed Action*



# MERGING CLINICAL & ADMINISTRATIVE DATA

*Intake, Transform, Integrate, Report, Analyze, Improve*

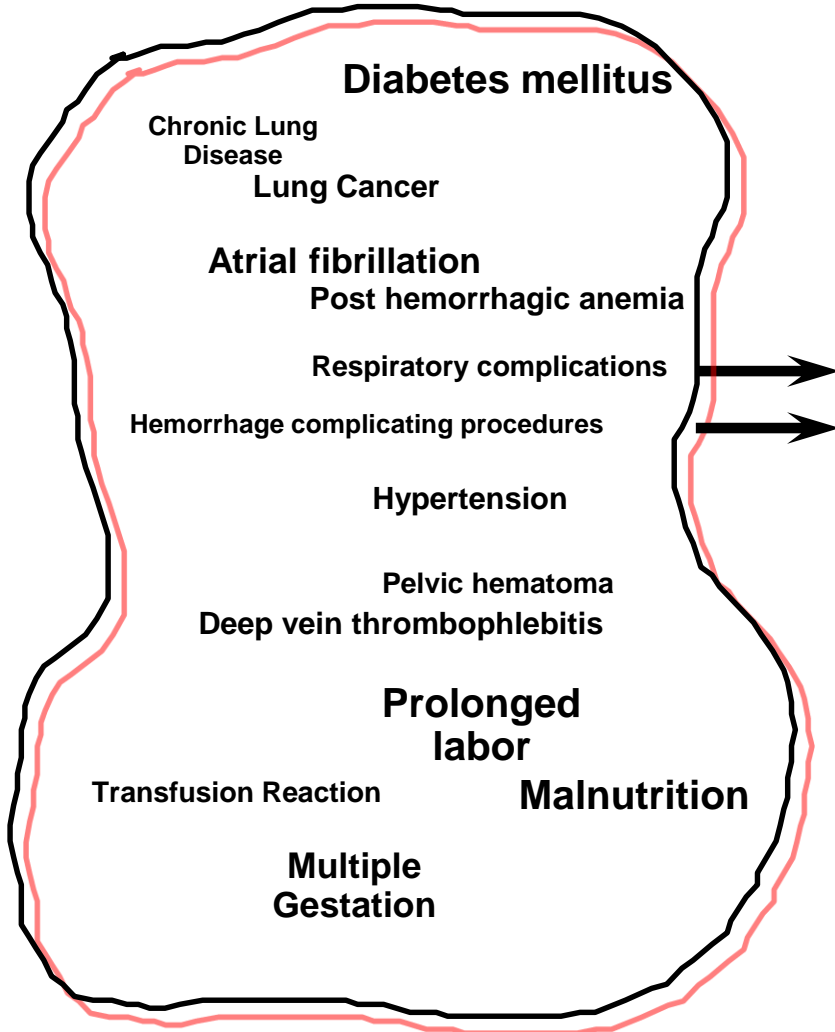


Provided by Truven Health Analytics

**Garbage in / Garbage Out**  
*The process depends on your input*

# TRANSFORMING DATA INTO KNOWLEDGE

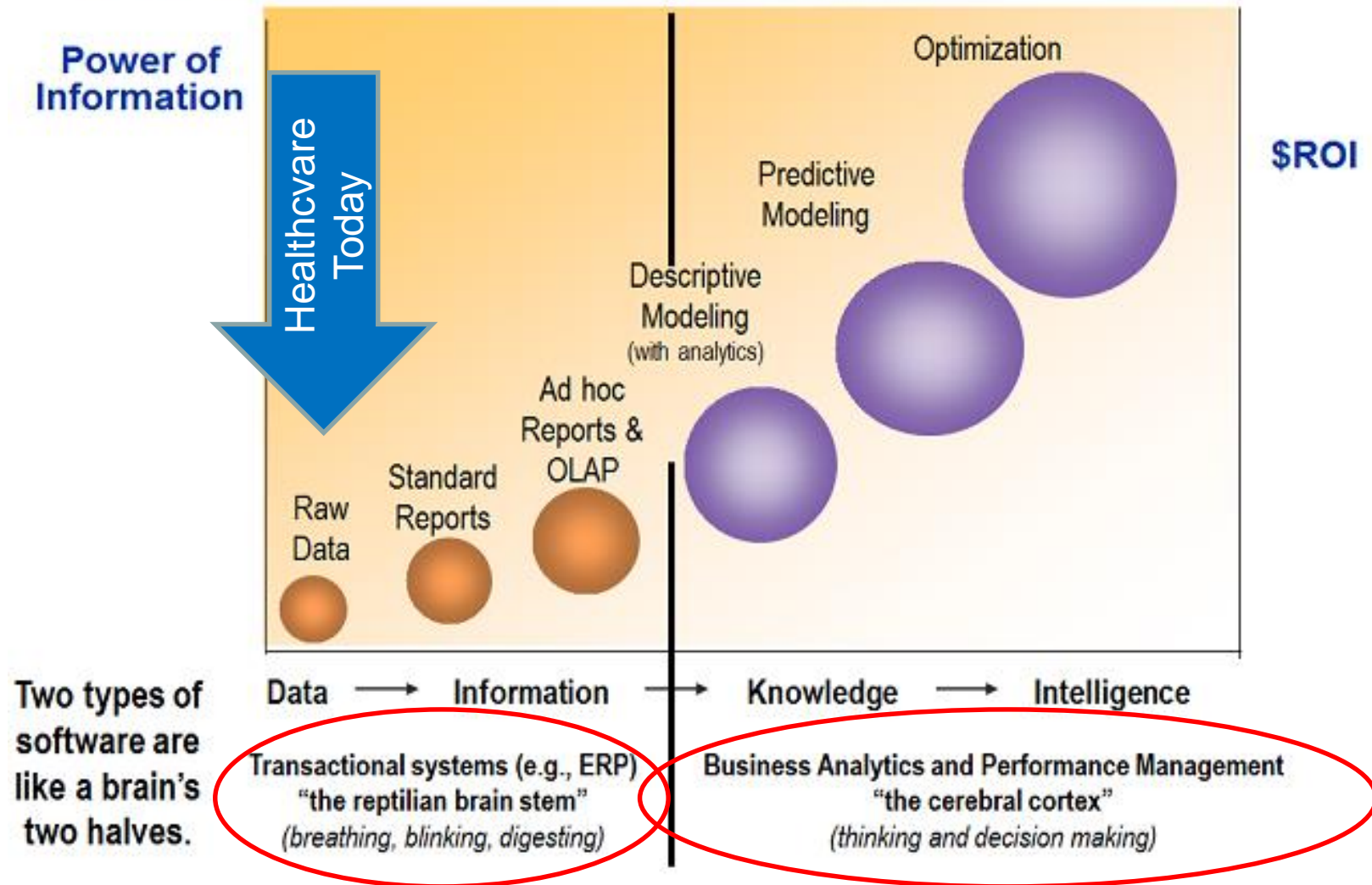
## *Requires Physician Guidance*



Adverse Events	Coexisting Conditions
<b>Obstetrics</b>	
Pelvic Hematoma	Multiple Gestation
Deep Vein Thrombophlebitis	Prolonged Labor
	Diabetes Mellitus
<b>General Surgery</b>	
Transfusion Reaction	Chronic Lung Disease
Hemorrhage Complicating Procedures	Atrial Fibrillation
	Hypertension
<b>Cardiology</b>	
Respiratory Complications	Malnutrition
Post hemorrhagic Anemia	Lung Cancer

# REQUIRES YOUR HELP

## The Intelligence Hierarchy



Two types of software are like a brain's two halves.

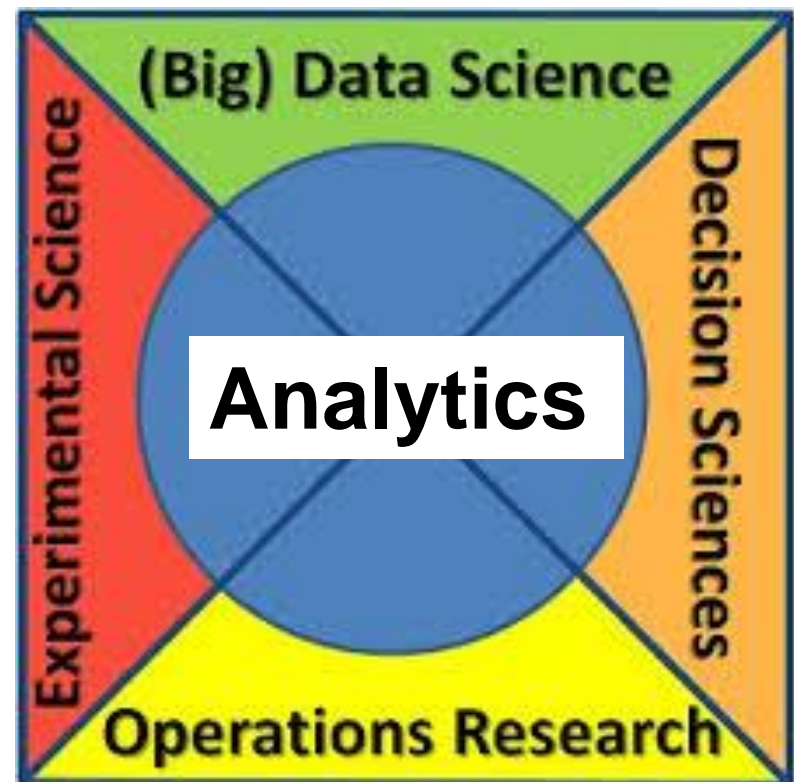
# HAVE NO FEAR:

***Big Data Will Change the Practice of Medicine in Many Positive Ways with OUR Help!***

***Make better decisions***

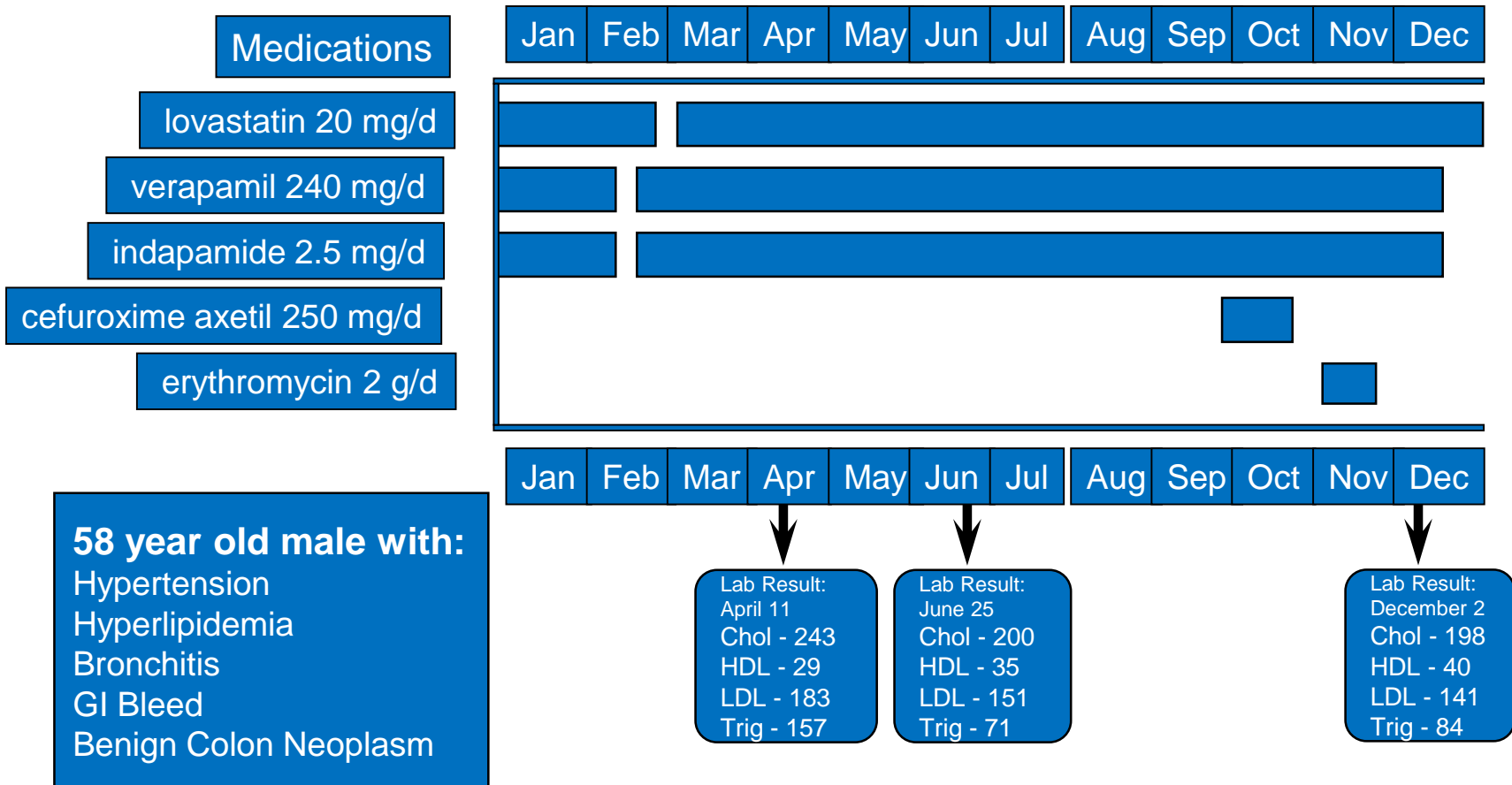
***Enhance care delivery***

***Speed cures to market***



# TRACKING PATIENT PROGRESS

## *Is My Patient Taking His Medications & Is It Working?*





# IDENTIFYING PATIENTS TO HELP

## *Early Warning System Before Catastrophic Event*

- Hospitalization Claims
- Physician Referral
- Self Referral
- ER Usage
- Pharmacy Data
- Laboratory Data
- DME Requests
- Electronic Medical Records
- Health Information Exchanges

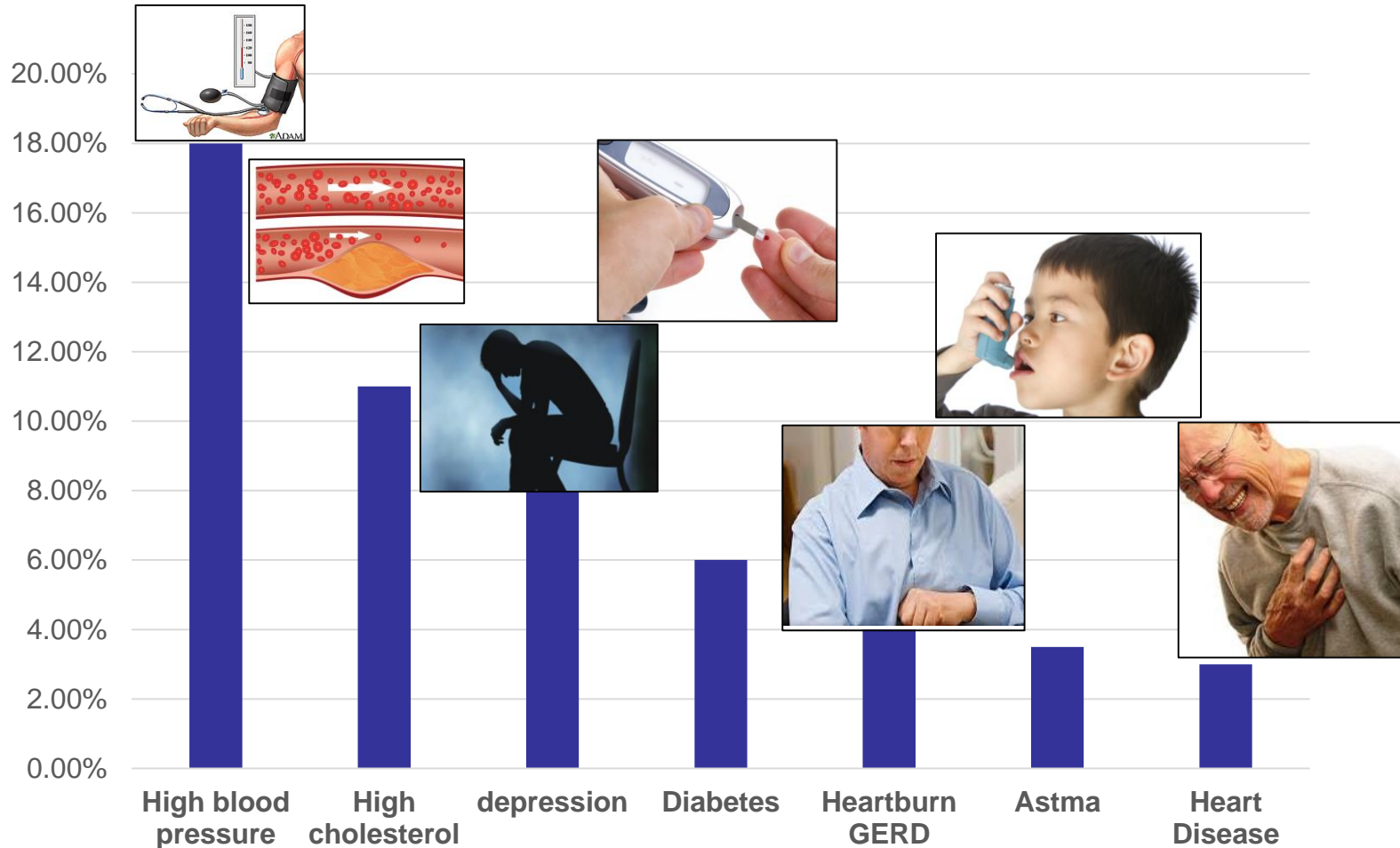


# Define A Population's Health

## Comprehensive Population Health Data Review

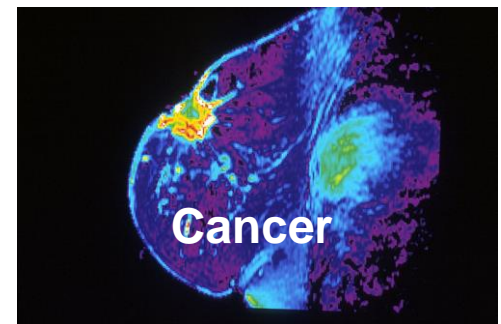
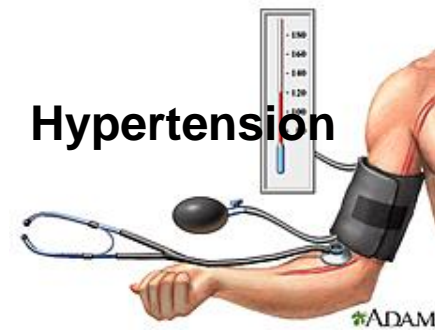
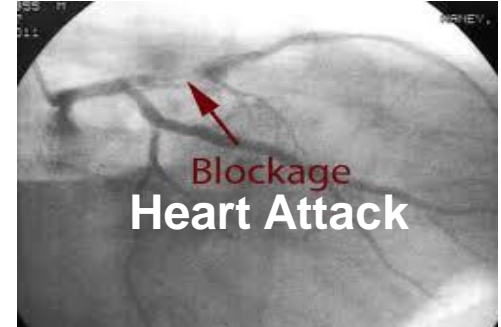
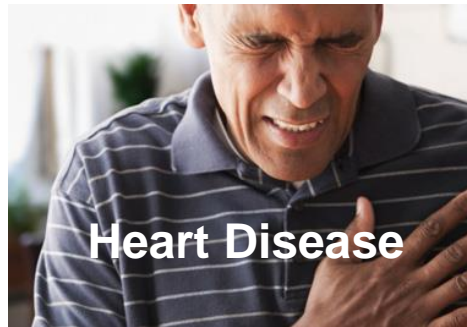
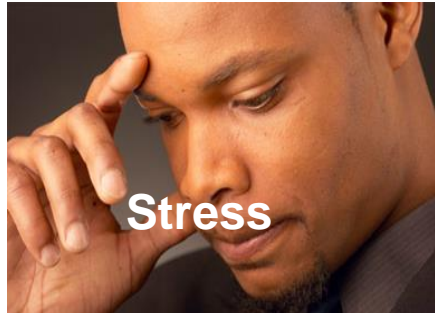
Risk Factors	DX Group Spend	Rx Medicines	Chronic Illness	High Cost
Stress 40%	Pregnancy Newborns	Diabetes	Mus Skel 13%	Newborns
High BP 39%	Muscular Joints	Infection	Asthma 10%	Cancer
Overweight 32%	Cancer	CNS / Mental	High BP 8%	Arthritis
Obesity 13%	Respiratory	Gastro Intestinal	Heart Disease 5.7%	Heart Failure
Sedentary 30%	Cardiac	Respiratory	Depression 7%	Renal Failure
High CHOL 22%	Gastro Intestinal	Cancer	Diabetes 5%	Sepsis
High BS 4%		Arthritis		

# ESTABLISHING THE CHRONIC ILLNESS BURDEN Of Your Patient Population



# Explain Disease Progression

*Dictates Population Health Continuum of Care*



# Let us Know How We Are Doing?

## Comparison to Normative Data

Rate of readmission for heart attack patients			
U.S. national 30-day readmission rate	19.7		
Spectrum Health Butterworth Hospital (Meijer Heart Center)	16.3	Better than U.S. National Rate	Based on 704 patients
Saint Mary's Health Care	19.3	No Different than U.S. National Rate	Based on 108 patients
Metro Health Hospital	20.2	No Different than U.S. National Rate	Based on 94 patients

Death rate for heart attack patients			
U.S. national 30-day death rate	15.5		
Spectrum Health Butterworth Hospital (Meijer Heart Center)	16.3	No Different than U.S. National Rate	Based on 598 patients
Saint Mary's Health Care	16.2	No Different than U.S. National Rate	Based on 146 patients
Metro Health Hospital	15.7	No Different than U.S. National Rate	Based on 119 patients

Rate of readmission for pneumonia patients			
U.S. national 30-day readmission rate	18.5		
Spectrum Health Butterworth and Blodgett hospitals	17.4	No Different than U.S. National Rate	Based on 1,131 patients
Saint Mary's Health Care	16.9	No Different than U.S. National Rate	Based on 236 patients
Metro Health Hospital	19.4	No Different than U.S. National Rate	Based on 195 patients
Mercy Health Partners - Mercy Campus	17.4	No Different than U.S. National Rate	Based on 304 patients

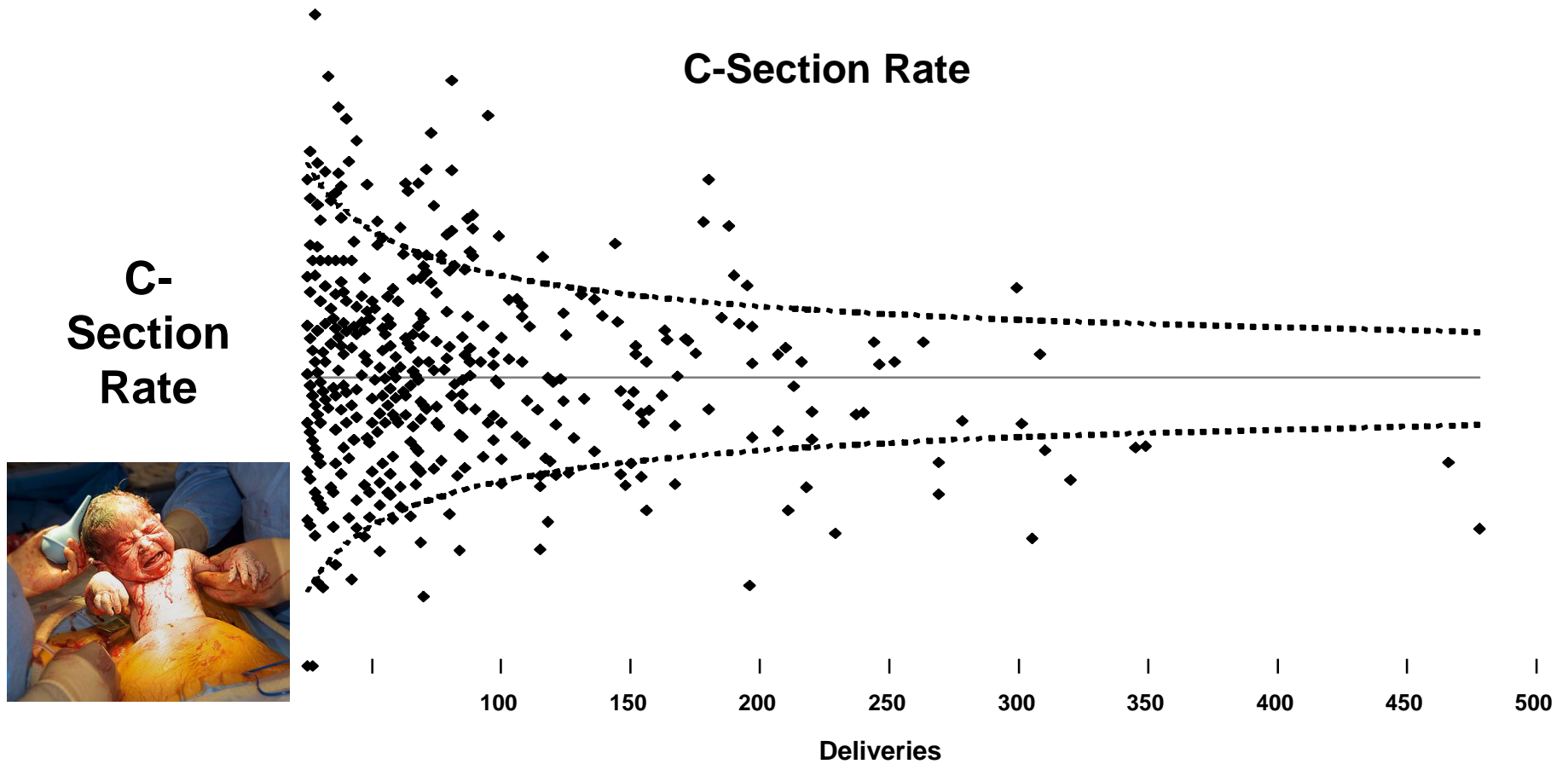
Death rate for pneumonia patients			
U.S. national 30-day death rate	12.0		
Spectrum Health Butterworth and Blodgett hospitals	10.5	No Different than U.S. National Rate	Based on 1,118 patients
Saint Mary's Health Care	12.9	No Different than U.S. National Rate	Based on 224 patients
Metro Health Hospital	11.4	No Different than U.S. National Rate	Based on 187 patients
Mercy Health Partners - Mercy Campus	11.4	No Different than U.S. National Rate	Based on 293 patients

These percentages were calculated from Medicare data on patients discharged between July 1, 2008 and June 30, 2011.

**Hospitals are posting their own results on their websites**

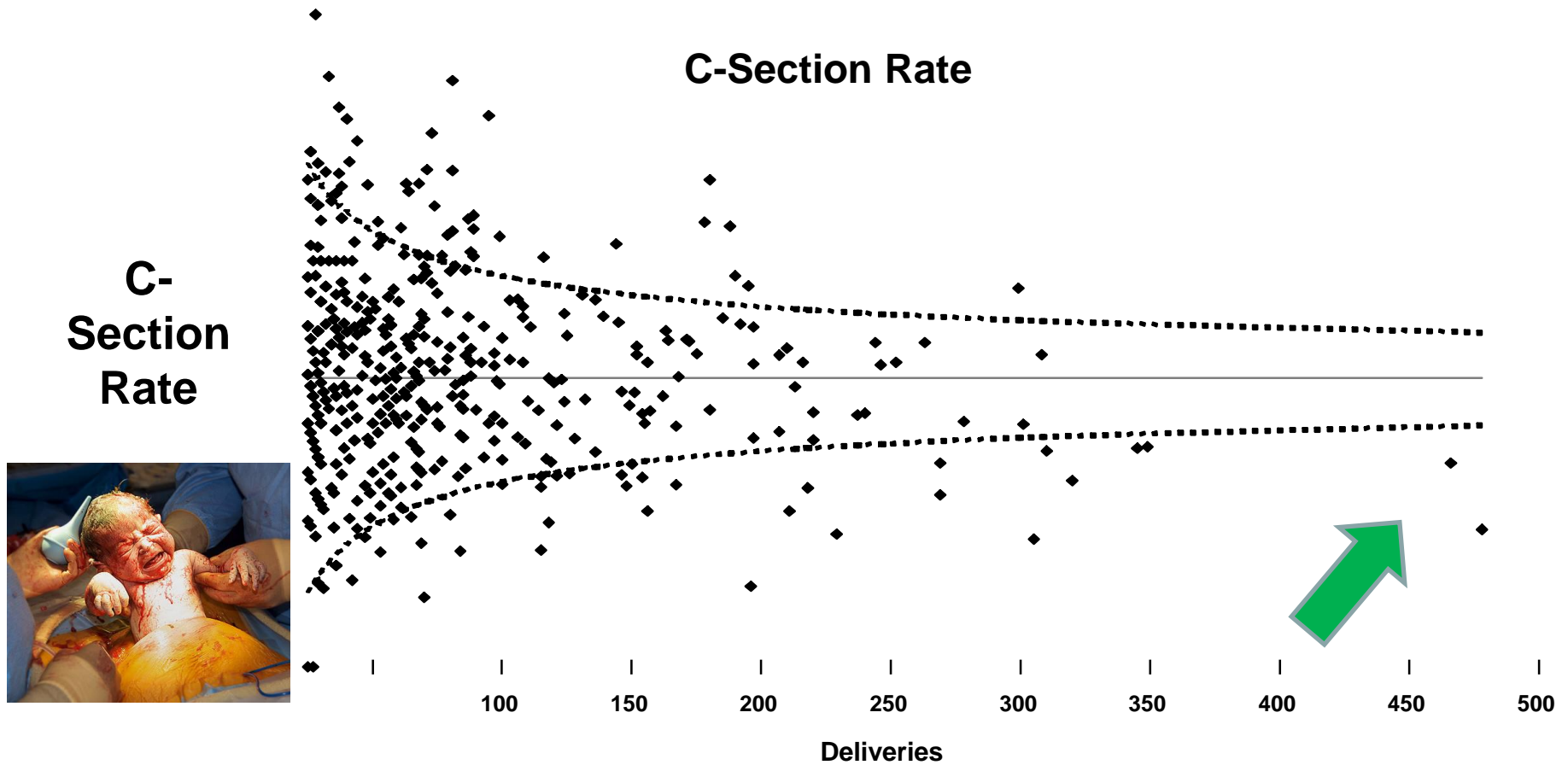
# Identifying Benchmarks to Emulate

*Peer Comparison to an agreed upon standard*



# Identifying Benchmarks to Emulate

*Peer Comparison to an agreed upon standard*



## Big Data Timeline



**PHASE IV - INTELLIGENT**  
**PERSONALIZED PRECISION MEDICINE**  
COMPARATIVE EFFECTIVENESS  
GENOMICS, PROTIENOMICS, MICROBIOMES  
SOCIAL NETWORKING  
PREDICTIVE MODELING  
SEVERITY INDEXING

**PHASE III COLLABORATIVE**  
HEALTH INFORMATION EXCHANGES  
POPULATION HEALTH MESSAGING  
TRANSPARENCY  
INCOME FOR OUTCOME

**PHASE II - CLINICAL**  
**E-PRESCRIBING**  
**ELECTRONIC MEDICAL RECORDS (EMR)**  
REGISTRIES  
CLINICAL DECISION SUPPORT (CDS)  
PERSONAL HEALTH RECORDS (PHR)



✓ **PHASE I - ADMINISTRATIVE**  
HEALTH INSURANCE COVERAGE  
MEDICAL TREATMENT CODING  
ELECTRONIC BILLING  
ELECTRONIC DATA INTERCHANGE  
PRACTICE MANAGEMENT SYSTEMS

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1990      1995      2000      2005      2010      2015      2020      2025      2030



# Building Evidence into Practice

## *Clinical Decision Support – the 5 Rights*

To improve care outcomes with CDS you must provide:

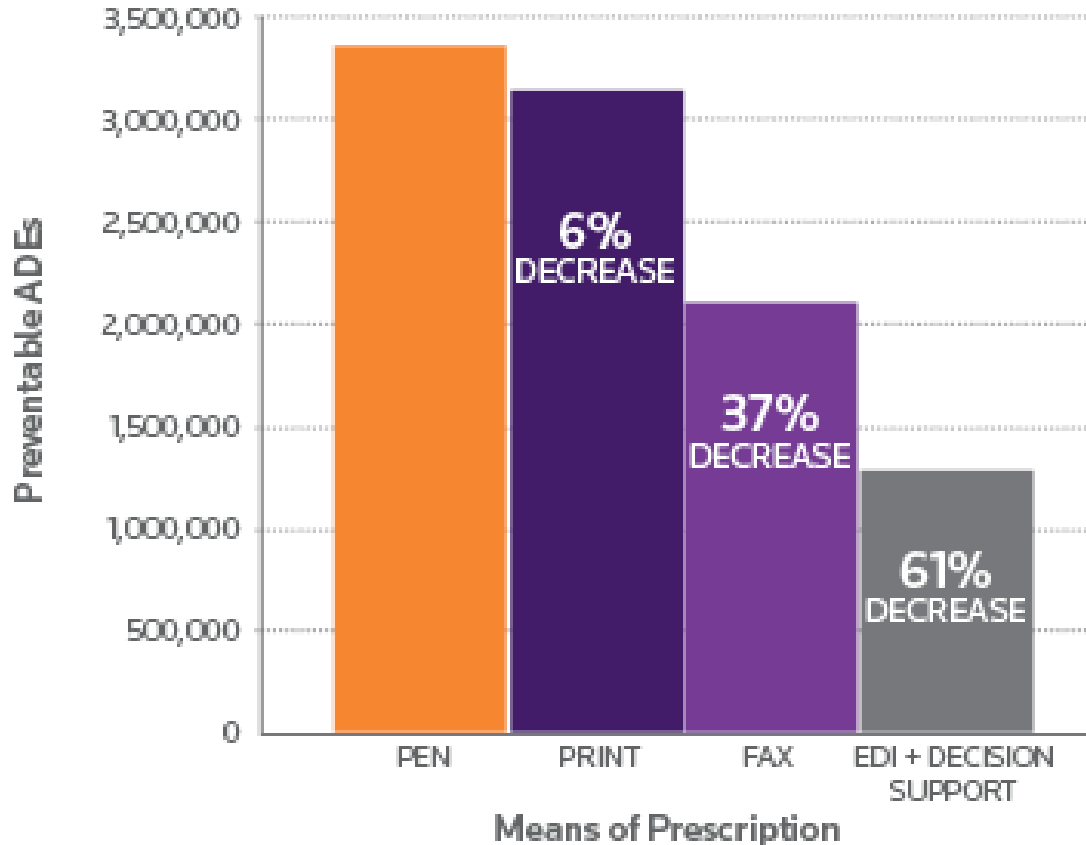
- the **Right Information...**  
Evidence-based, useful for guiding action and answering questions
- ...to the **Right Stakeholder...**  
Both clinicians and patients
- ...in the **Right Format...**  
Alerts, Order Sets, answers, etc.
- ...through the **Right Channel...**  
Internet, mobile devices, clinical information systems
- ...at the **Right Point in the Workflow**  
to influence key decisions/actions



## BUILDING CDS INTO CARE: EVIDENCE OF EFFECTIVENESS

### *E-prescribing & CDS Reduce Drug Misadventures By 61%*

Ambulatory Computerized Physician Order Entry (ACPOE)



- No ACPOE
- Basic ACPOE
- Intermediate ACPOE
- Advanced ACPOE

e-Rx

Allen Johnson, MD 233 Fernwood Road Bethesda, MD 20815	
Name: Joe Dobson DOB September 3, 1959	Date: September 1, 2006
<b>Rx</b> PRAVACHOL 40mg, Tablets Take 1 Tablet orally daily	
Refills: 2 Doctor Allen Johnson	Dispense as written: NO DEAF: 1123456

Rx

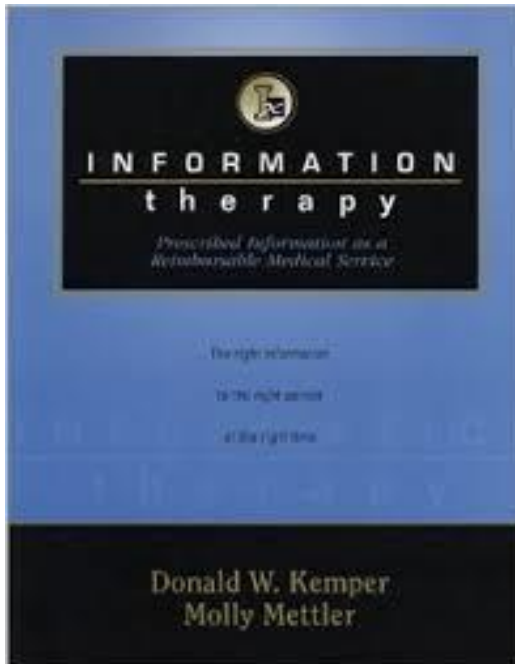
ALLEN JOHNSON, M.D.  
PHYSICIAN ASSISTANT  
ALL RIGHTS RESERVED  
BETHESDA, MD 20815

*Johnson*  
R Pravachol 40mg qd '30  
Sig: T&D  
Date: 9/1/06  
GPH

# Information Therapy - 5 Rights

## Strengthening the Doctor-Patient Relationship

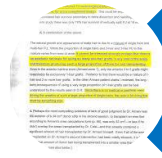
Getting the **right** content  
to the **right** patient  
at the **right** time  
in the **right** channel  
from the **right** provider



Patient Visit



Diagnosis Coding



Linked Content to Code



E-mail Sent to Patient



From Caring Provider

# PERSONALIZED HEALTH REMINDERS

## Employee Engagement

- Personalized reminders increase compliance
- Identify health improvement opportunities by mining individuals' claims data
- Personalize message text and change tone by leveraging consumer behavior research and make more compelling message
- Address barriers to getting the service
- Use humor effectively



HEALTH & WELLNESS TODAY

**Wendy,**  
in complex times,  
here's something  
refreshingly simple.

Lots of things are hard to protect yourself against. Luckily, breast cancer isn't one of them. Get regular mammograms.

#### Why get regular mammograms?

Breast cancer is one of the leading causes of cancer death among American women. But when caught early, it's highly treatable. That's why the American Cancer Society says it's important for every woman over the age of 40 to get regular mammograms.

#### What the test can do for you

Once you turn 40, getting a mammogram every year or two should be part of your routine medical care. They'll increase your chance of surviving if you do get breast cancer. And they're safe and easy.

**Next Step:** Call your doctor today and get a refreshing dose of cancer prevention.

Get regular mammograms.  
Protect yourself.

#### Your Benefits

You are in the Preferred Health PPO plan. Your office co-pay for preventive services is \$0.

#### Your Information

##### Medications:

- Paxil
- Abilify

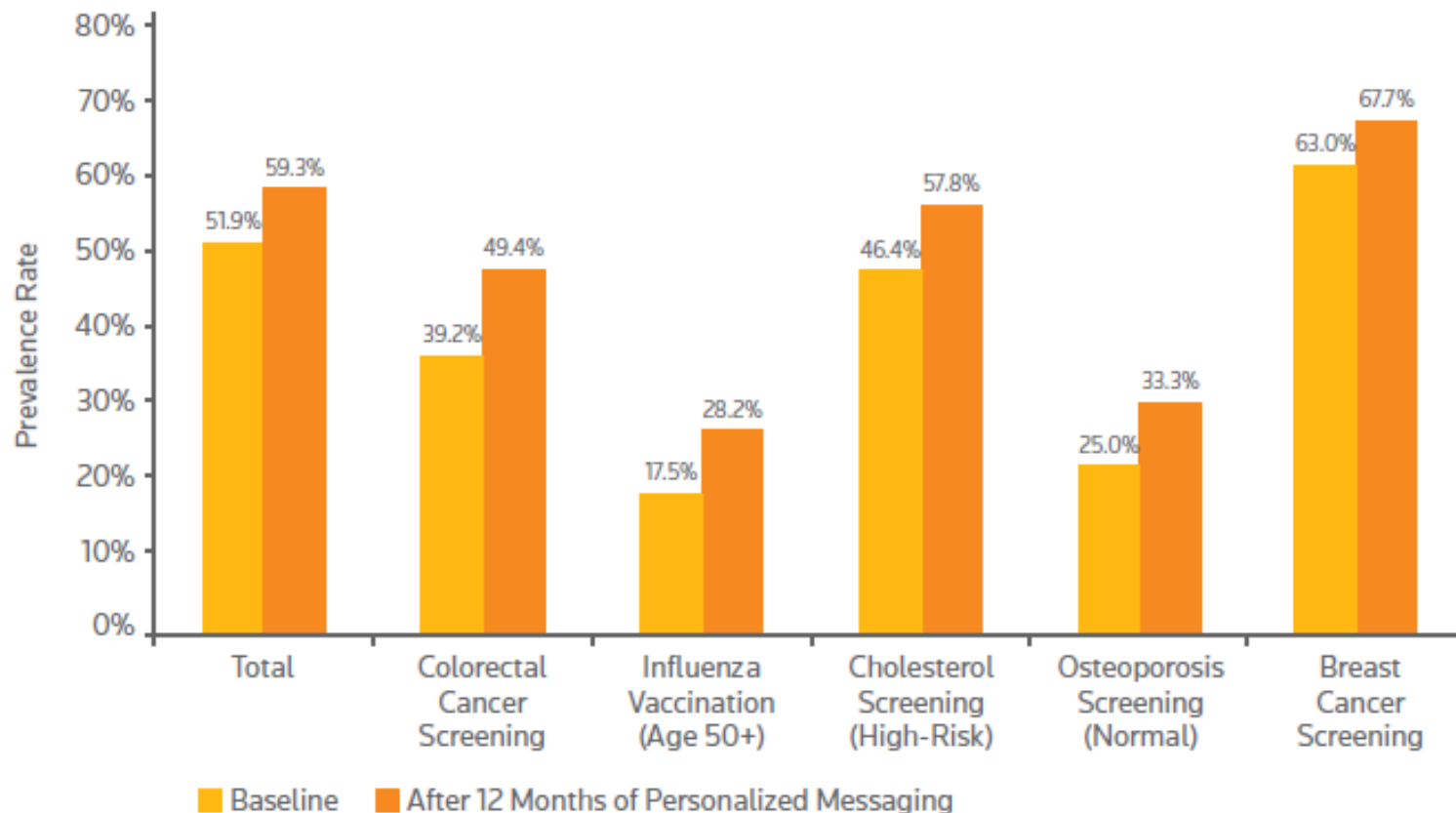
##### Doctor:

To find an in-network provider near you, call (800) 466-5000.

# PROMOTING ACCOUNTABILITY

## *Population Health Messaging Works*

FIGURE 42: Personalized Messaging Improves Preventive Service Compliance



Source: Thomson Reuters Case Study, "Tailored Messages Motivate Employees and Improve Health," 2010

# PERSONALIZED HEALTH DASHBOARD

## Getting Your Patients Activated

- Reinforce health goals with a personalized health dashboard
- Helps people monitor their health – understand what they need and when they last received care
- Raises health literacy and provides a simple tool to share with physicians

### Type 2 Diabetes Care Guidelines

Care guideline	Frequency	Status	Last managed
<a href="#">Cholesterol test</a>	Once a year	✓ Done	03/18/2010
<a href="#">Diabetic eye exam</a>	Once a year	! Overdue	05/14/2009
<a href="#">HbA1c (hemoglobin) test</a>	Twice a year	! Overdue	11/19/2009
<a href="#">Microalbumin test</a>	Once a year	✓ Done	06/16/2010

Source: American Diabetes Association recommended care guidelines.

### Preventive Care Checklist

These are the recommendations for a 44-year-old woman:

Care guideline	Frequency	Status	Last managed
<a href="#">Blood pressure screening</a>	At least every 2 years	✓ Done	06/16/2010
<a href="#">Cholesterol screening</a>	Every 5 years	✓ Done	03/18/2010
<a href="#">Mammogram</a>	Every 1-2 years	✓ Done	06/30/2010
<a href="#">Pap smear</a>	Every 1-3 years	! Overdue	02/22/2007

# PRACTICAL INFORMATICS

## *Two Important Advances to Refine & Expand the Use of Data*

### Severity Indexing

- **Prioritize & categorize registry based on illness burden**
  - Severe – Care Management
  - Moderate – Coordinated Care
  - Mild – Patient Education
- **Achieving fairness when comparing**



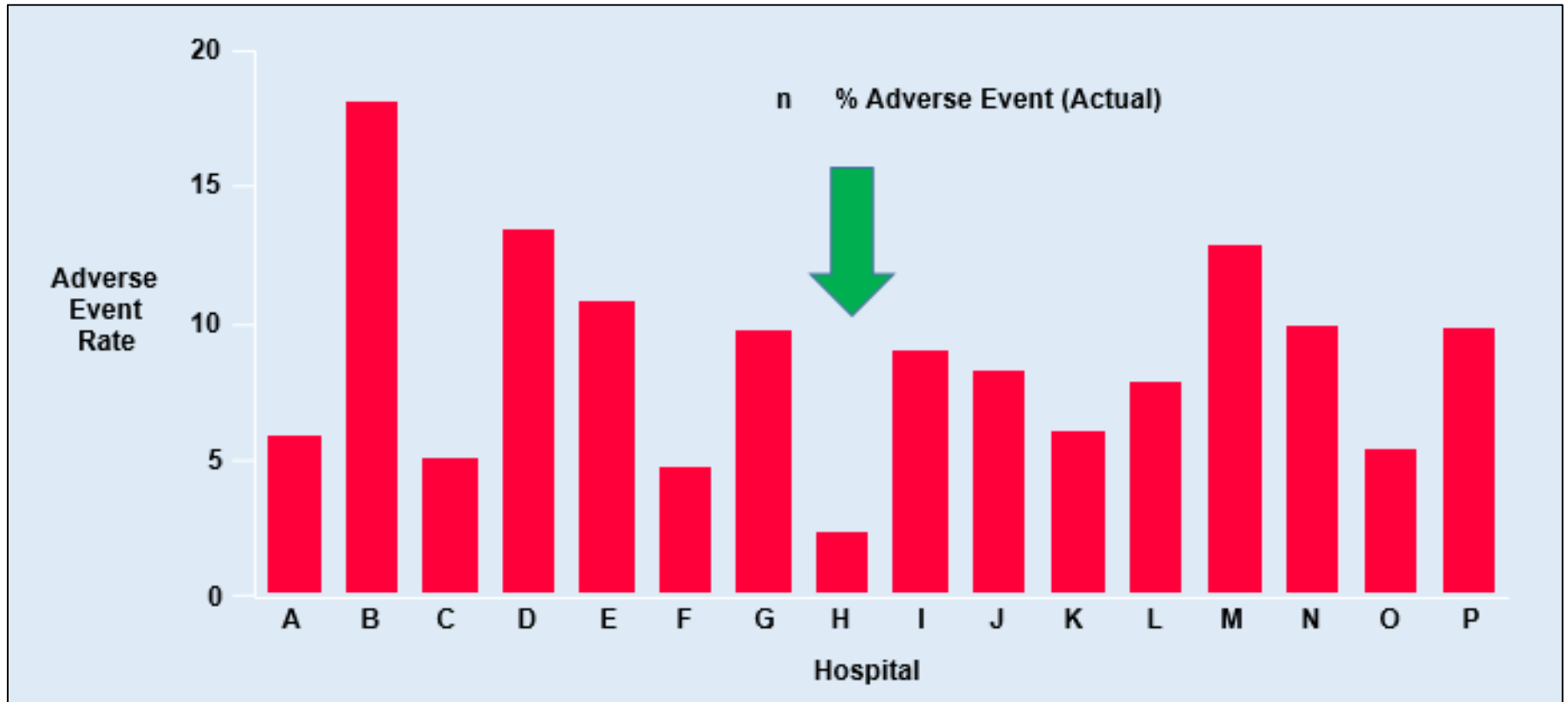
### Predictive Modeling

- **Identify patients before the catastrophic event**
- **Predict future trends**
- **Prove that things did not happen**



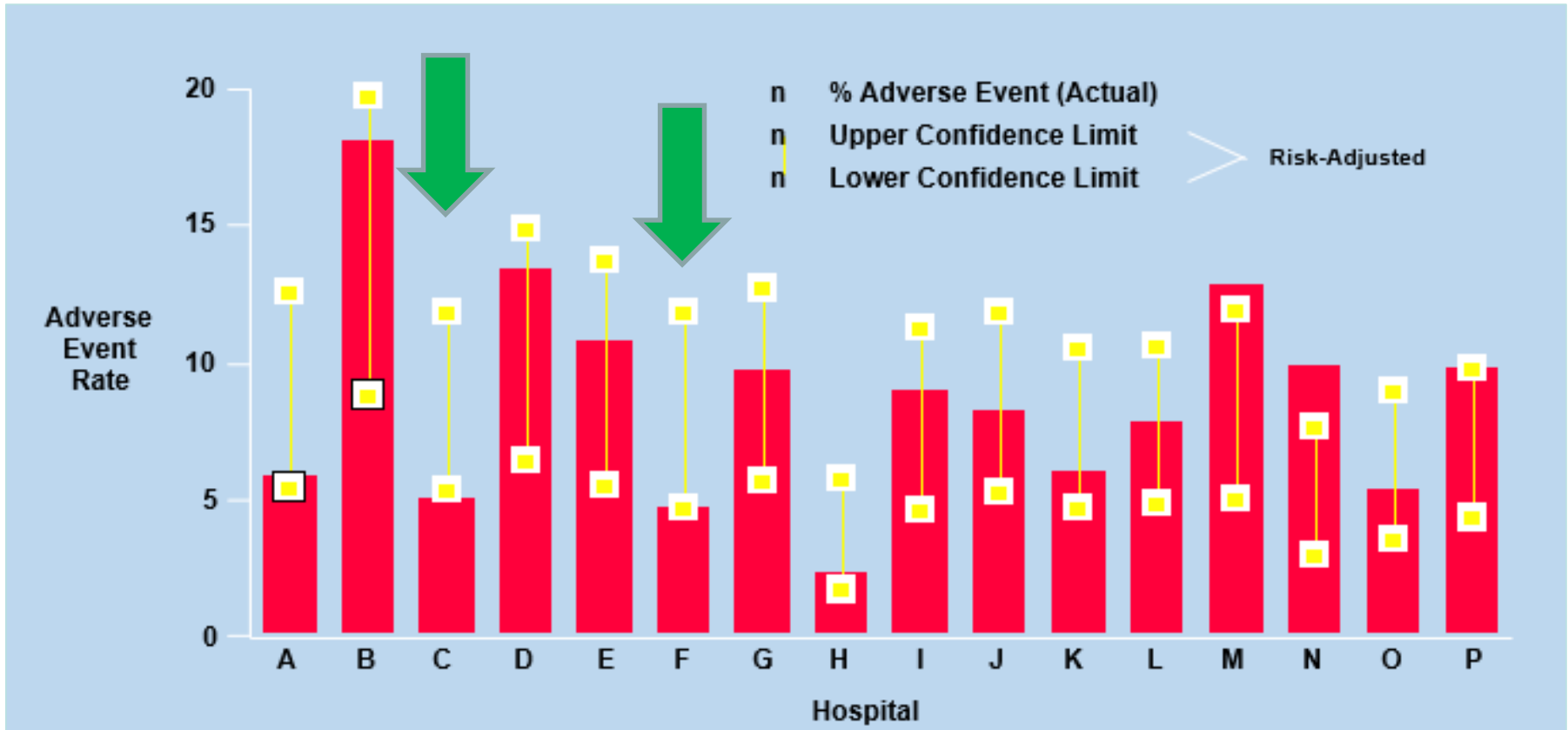
# Adverse Event Rates

## Department Comparison Across a Multi-Hospital System





# Adverse Event Rates Severity Adjusted *Department Comparison Across a Multi-Hospital System*



Which Hospitals are performing the best ?

# Proving What You Prevented from Happening

## *Predictive Modeling*

Process Indicators Correlate with Outcomes (N = 336)			
LAB Value	2003 Year 1	2005 Year 3	Variance
HbA1C	9.1	7.8	-14.0%
HDL Cholesterol	43	47	+9.3%
LDL Cholesterol	138	108	-21.7%
Triglycerides	288	201	-30.0%
Systolic BP	131	126	-3.8%

**Calculating the impact of a medical invention program will be an important part of future practice**

# Proving What You Prevented from Happening

## Predictive Modeling

	Projected Cases Per 336 Patients with Diabetes (10 Year Period)		Avoided Costs (10 Years)
	Risk Year 1	Risk Year 3	
Lower extremity amputation	10.7	7.0	\$156,600
Blindness	4.7	3.0	\$54,400
End stage renal disease	7.0	1.3	\$4,934,200
MI or stroke	84	40	\$1,094,000
<b>Total Medical*</b>			<b>\$6,238,600</b>

**Prevented:**  
 3 Amputations  
 2 Episodes of Blindness  
 6 Dialysis Patients  
 44 Heart Attacks & Strokes

**\$1,800 of avoided medical costs per patient per year (before inflation adjustment)**  
**Saved over 6 Million Dollars**

**For Illustrative Purposes Only**

# ADVANCING MEDICAL BREAKTHROUGHS

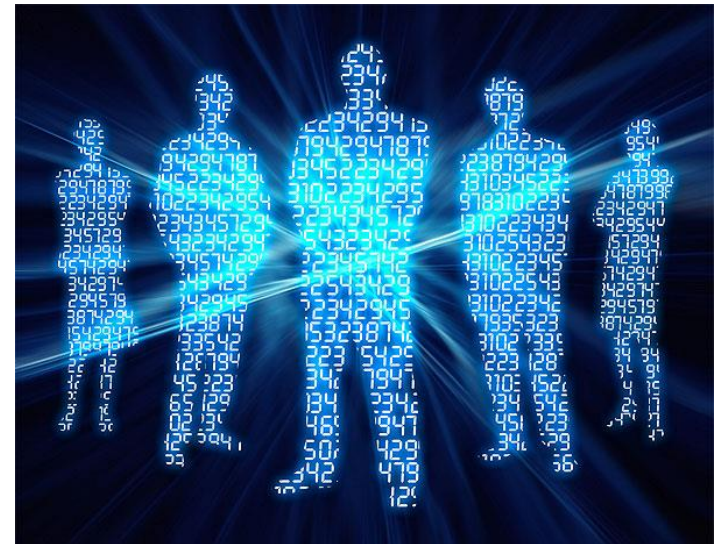
*Connect Medical Scientists To Data & Knowledge*

- Existing Research Database
  - Clinical Trials Enhancement
  - Biomarkers Registry
  - Genomic Library
  - Outcome Research
  - Treatment Pathways
  - Disease Profiles
  - Evaluate Economic Impact
- 
- The known
  - Expedite Cures
  - Identify Cohorts
  - Coding our Species
  - Proving What Works
  - Real World Tracking
  - Assess Progress
  - Justify Costs



## DATA & ANALYTICS WILL ASSIST YOU IN :

- Guiding your care
- Informing your patients
- Validating expert opinion
- Finding medical breakthroughs
- Measuring your impact



## To Promote Health and Wellness AND....

# MEETING TRIPLE AIM

## Goals

- Better Resource Allocation
- Improving Constituent Satisfaction
  - Provider
  - Purchaser
  - Patient
  - Health Consumer
- Improving Health Status



## Aspirations

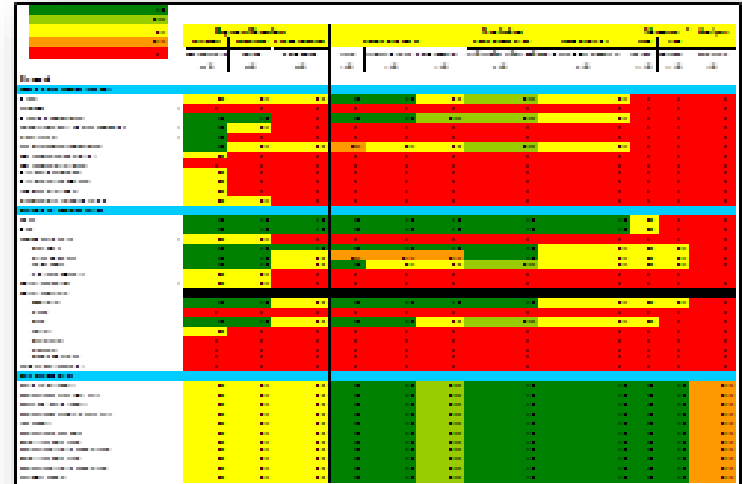


# MEASURING A CULTURE OF HEALTH

## *Employer Health Opportunity Assessment*

### *10 Weighted Assessment Categories*

- People & management
- Marketing & communications
- Data warehousing
- Health & wellness plan design
- Environment
- On-site health activities
- Health & wellness activities
- Incentives and benefits design
- Engagement & navigation
- Vendor integration



- 218 “Elements”
- In 10 “Categories”
- 11 “Thresholds” of implementation
- 5 “Degrees” of completion





# COMPANIES THAT HAVE A CULTURE OF HEALTH OUTPERFORM ON THE STOCK MARKET

## Marketplace rewards companies who achieve cultures of health:

- Used the ACOEM Corporate Health Achievement Award (CHAA) culture of health award winners as a stock portfolio
- A portfolio of approximately twenty publicly traded award winners; over nearly two decades
- Published September 2013 in the *JOEM*
- The portfolio outperformed the market significantly; in all four test scenarios



FAST TRACK ARTICLE

### The Link Between Workforce Health and Safety and the Health of the Bottom Line

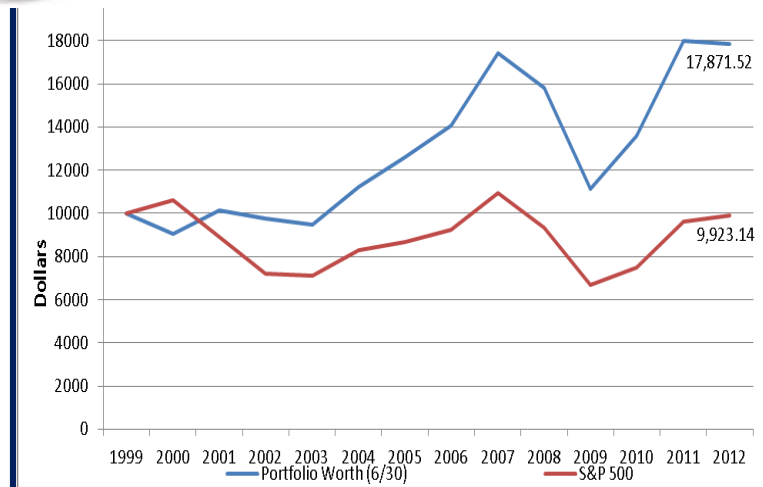
*Tracking Market Performance of Companies That Nurture a "Culture of Health"*

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**Objective:** To test the hypothesis that comprehensive efforts to reduce a workforce's health and safety risks can be associated with a company's stock market performance. **Methods:** Stock market performance of Corporate Health Achievement Award winners was tracked under four different scenarios using simulation and past market performance. **Results:** A portfolio of companies recognized as award winning for their approach to the health and safety of their workforce outperformed the market. Evidence seems to support that building cultures of health and safety provides a competitive advantage in the marketplace. This research may have also identified an association between companies that focus on health and safety and companies that manage other aspects of their business equally well. **Conclusions:** Companies that build a culture of health by focusing on the well-being and safety of their workforce yield greater value for their investors.

Recently, an article by Loeppke and colleagues,<sup>4</sup> reported that for every dollar of medical and pharmaceutical costs spent, an employer lost an additional \$2.30 of health-related productivity costs. Health-related presenteeism (health risks and medical conditions impacting work performance) was shown to have a larger impact on lost productivity than absenteeism, with executives and managers suffering higher losses. Comorbidities demonstrated the largest effects on productivity loss.<sup>4</sup>

These facts led to a hypothesis: Companies that create an environment for their employees and dependents that reinforces both conscious and unconscious safer and healthier lifestyle choices as well as provides more effective accessing of appropriate health care (ie, surround them with a "culture of health") should be more productive and that productivity should drive business performance and be reflected in the price of their stock.



To more objectively test this hypothesis, we tracked the stock with proven health, safety, and different scenarios. To find such of the American College of (3)'s Corporate Health Achievement and past market performance in publicly traded 97 to 2012 under one scenario. companies are recognized for healthy workforce, and a healthy costs and improved productivity, al portfolio of these companies

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y as the American College of medicine began in 1916 as the physicians and Surgeons. As the