

**SINI**  
2013



23rd Summer Institute in Nursing Informatics

BEYOND STAGE 7 AND  
MEANINGFUL USE:  
WHAT'S NEXT?

JULY 17-19, 2013



## ***Analytics to Drive Performance Improvements***

Wednesday, July 17, 2013

# Agenda



1. Why analytics? 5 Good Reasons
2. Describe the difference between data, information, knowledge, and wisdom
3. Understand important definitions
4. Discuss data sources & the difference between operations reporting, clinical reporting, and analytics
5. Self assessment and the 5 Rights of Analytics

# Why Analytics?

## Analytics Provides the Ability to Transform Healthcare

***“Analytics is the next best medical device physicians have to treat patients. It will be the next stethoscope.”*** Dr. William Bria

***“The latest strategic weapon for companies is analytic decision making.”*** Thomas Davenport

***“If your not doing this, you’re out of business.”***

Arno Penzias 1999 Nobel Laureate on Data Mining



# Why Analytics?

Ongoing Policy Changes

Pilots

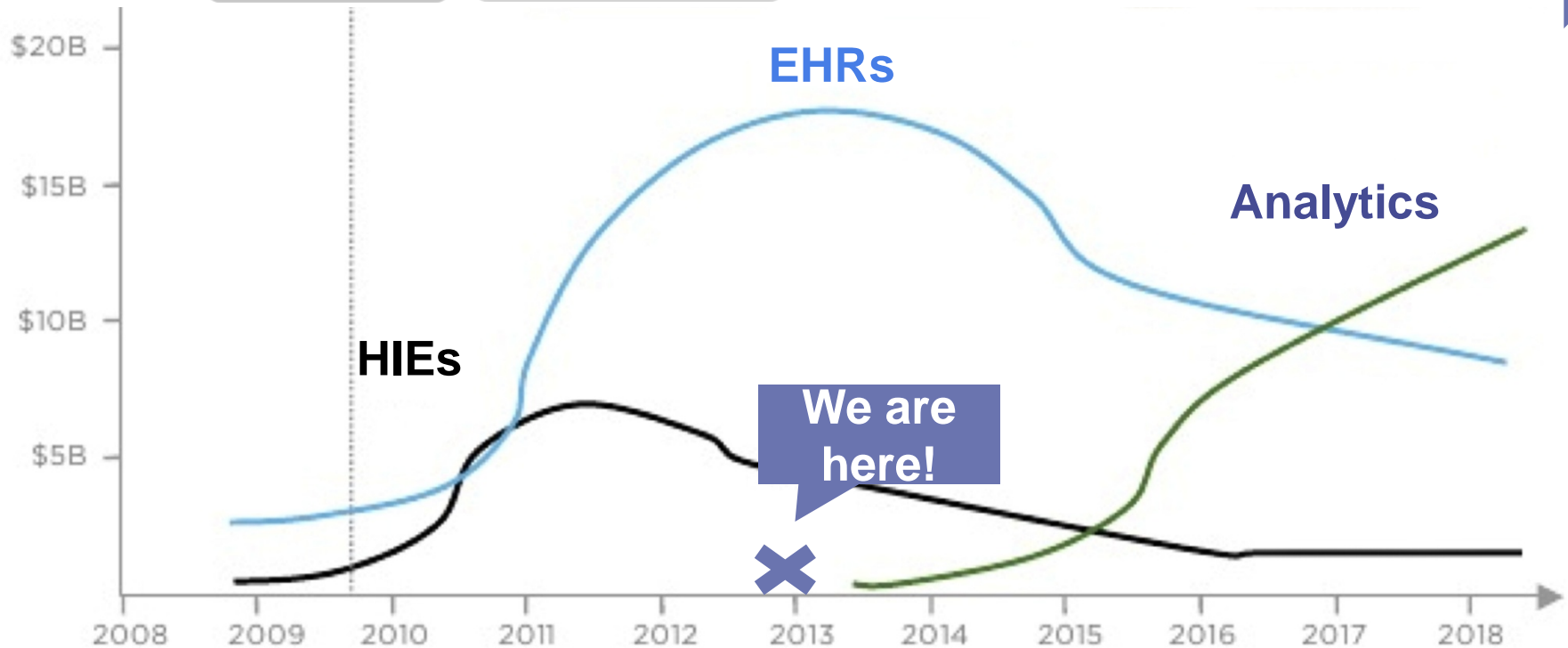
Standards

HIEs

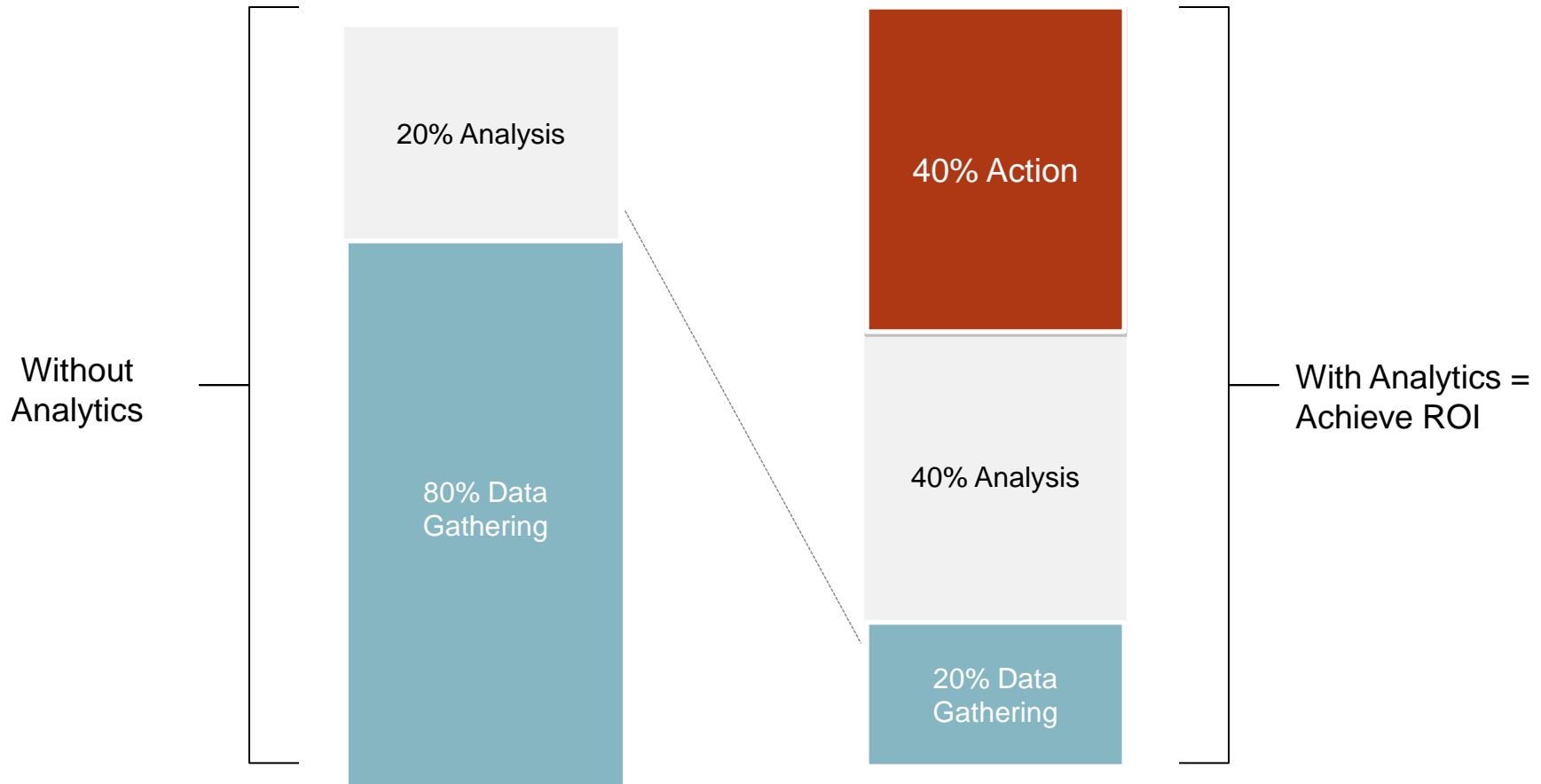
(Health Information Exchanges)

EHR  
Implementations

Population-Based  
Analytics



# Why Analytics: Analytics Changes the 80/20 Rule



***What would decreasing the time it takes for gathering quality, performance and outcomes data from days to minutes mean for your organization?***

# Why analytics?

## Clinical & Business Intelligence feeds rapid-cycle improvement processes

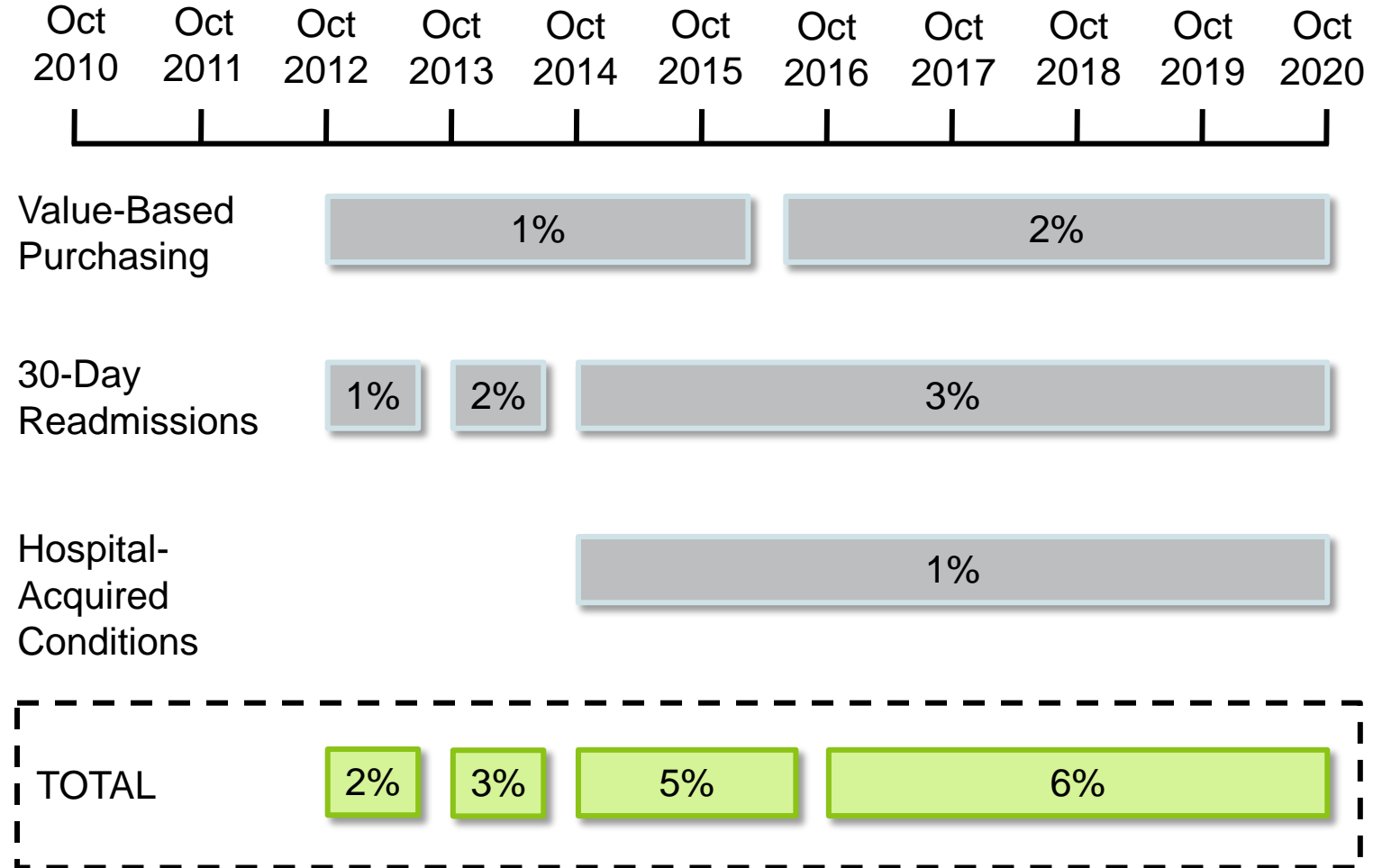
	Brief Definition	Steps	Intersection With EBP
PDCA	Flowchart for process improvement	Plan Do Check Act	Apply Assess Adjust
Six Sigma	Minimization of variation in process; 3.4 defects per million	Define Measure Analyze Improve Control	Ask Apply Assess Adjust
Lean	Process development method with focus on value-added steps and elimination of non-value-added steps	Voice of the customer Value stream mapping Determination of value-added and non-value-added steps Create or revise process	Ask Apply Assess Adjust
RCA	Retrospective analysis of an untoward event	Ask a series of why questions Determine root causes	Ask
FMEA	Prospective risk assessment	Process map current state Identify all potential process failures Estimate the effect of each identified failure Identify top 1 or 2 failures and prospectively mitigate risk	Apply Assess

Abbreviations: EBP, evidence-based practice; FMEA, failure mode effects analysis; PDCA, plan-do-check-act; RCA, root cause analysis.

# Why Analytics?

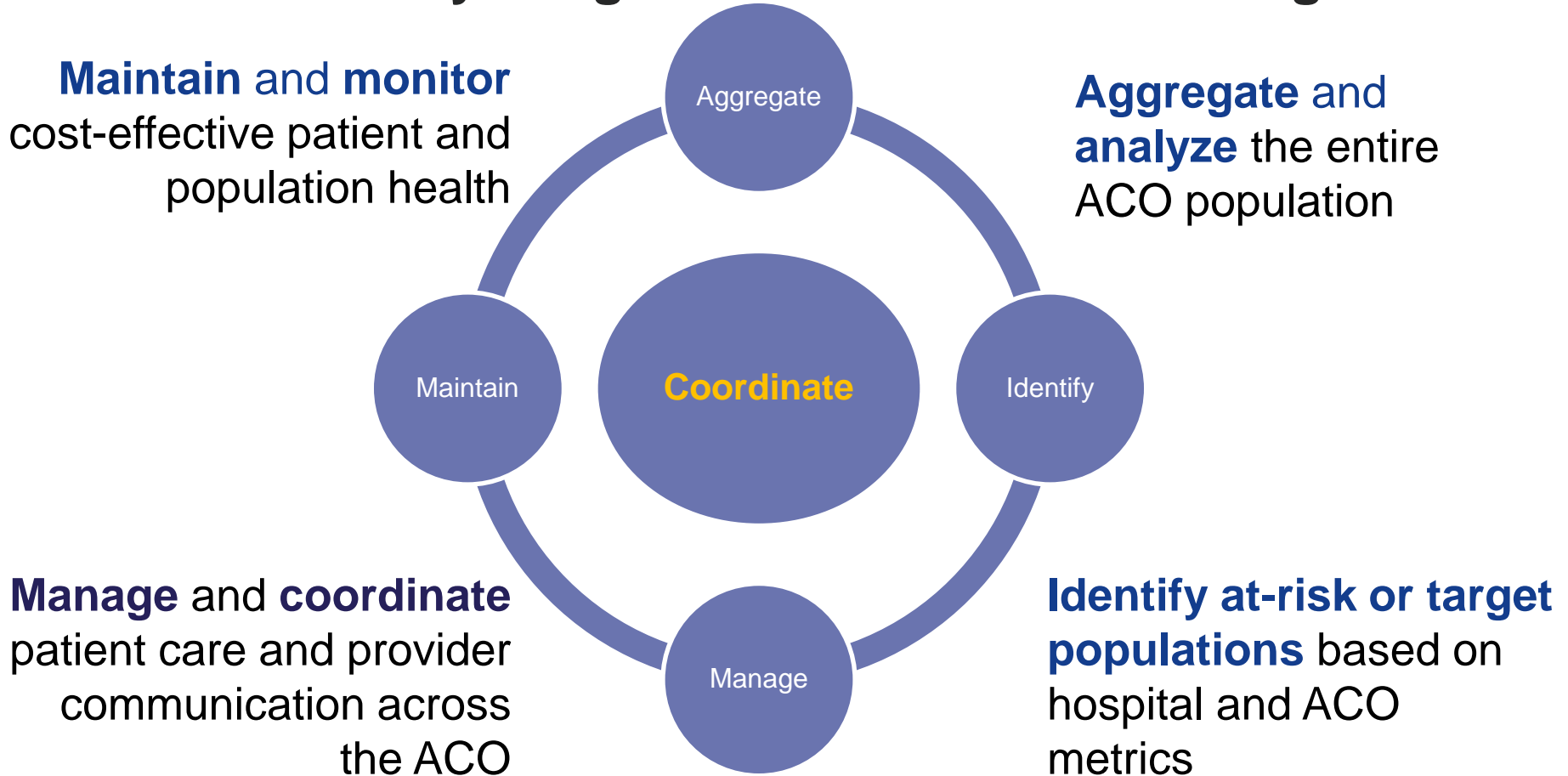
## Analytics is becoming a financial imperative for many hospitals

### Hospital Medicare Payment at Risk, Year by Year



# Why Analytics?

## Accountable Care, Population Health Management and Clinically Integrated Networks are coming!





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# Differences Between Data, Information, and Knowledge

## Data = Map



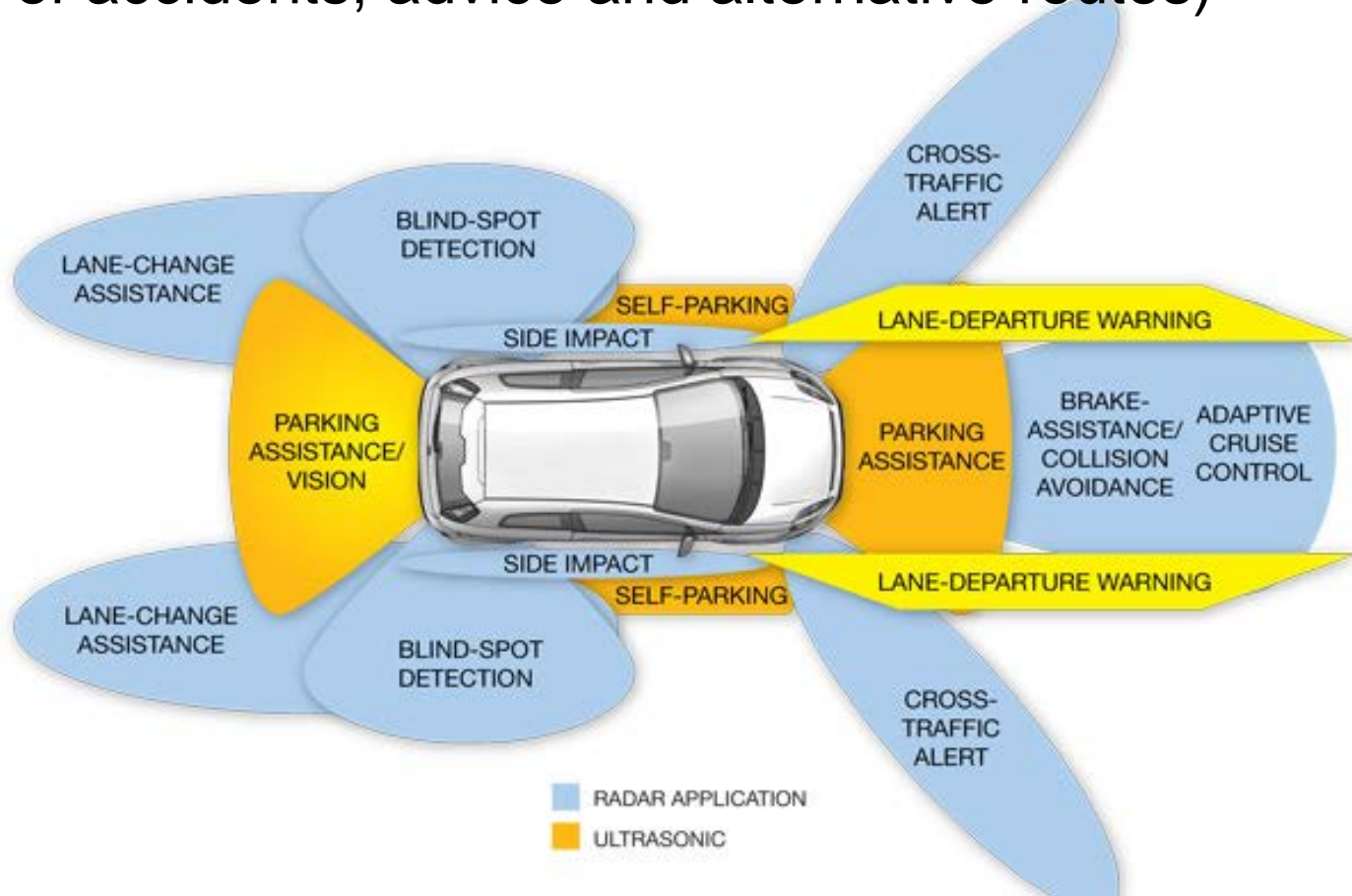
# Differences Between Data, Information, Knowledge & Wisdom

**Information = Simple GPS**



# Differences Between Data, Information, Knowledge & Wisdom

Knowledge = Advanced GPS, self-driving cars, spatial detection (informs user of accidents, advice and alternative routes)

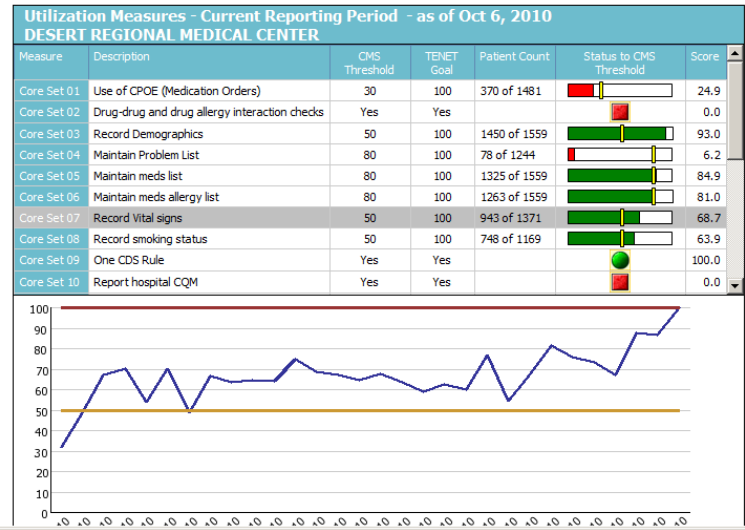
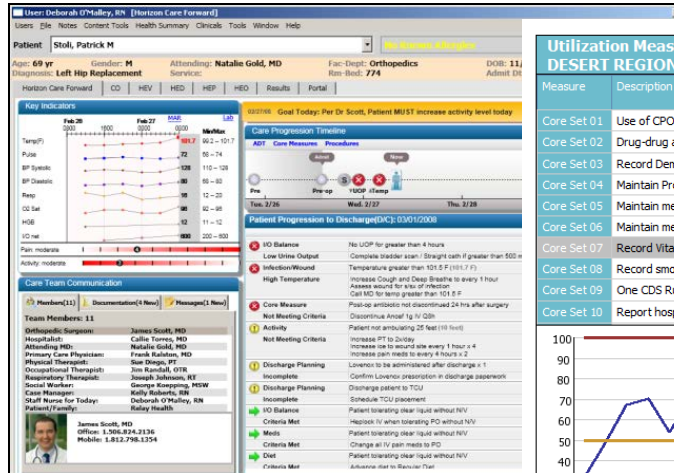


# A Clinical Example

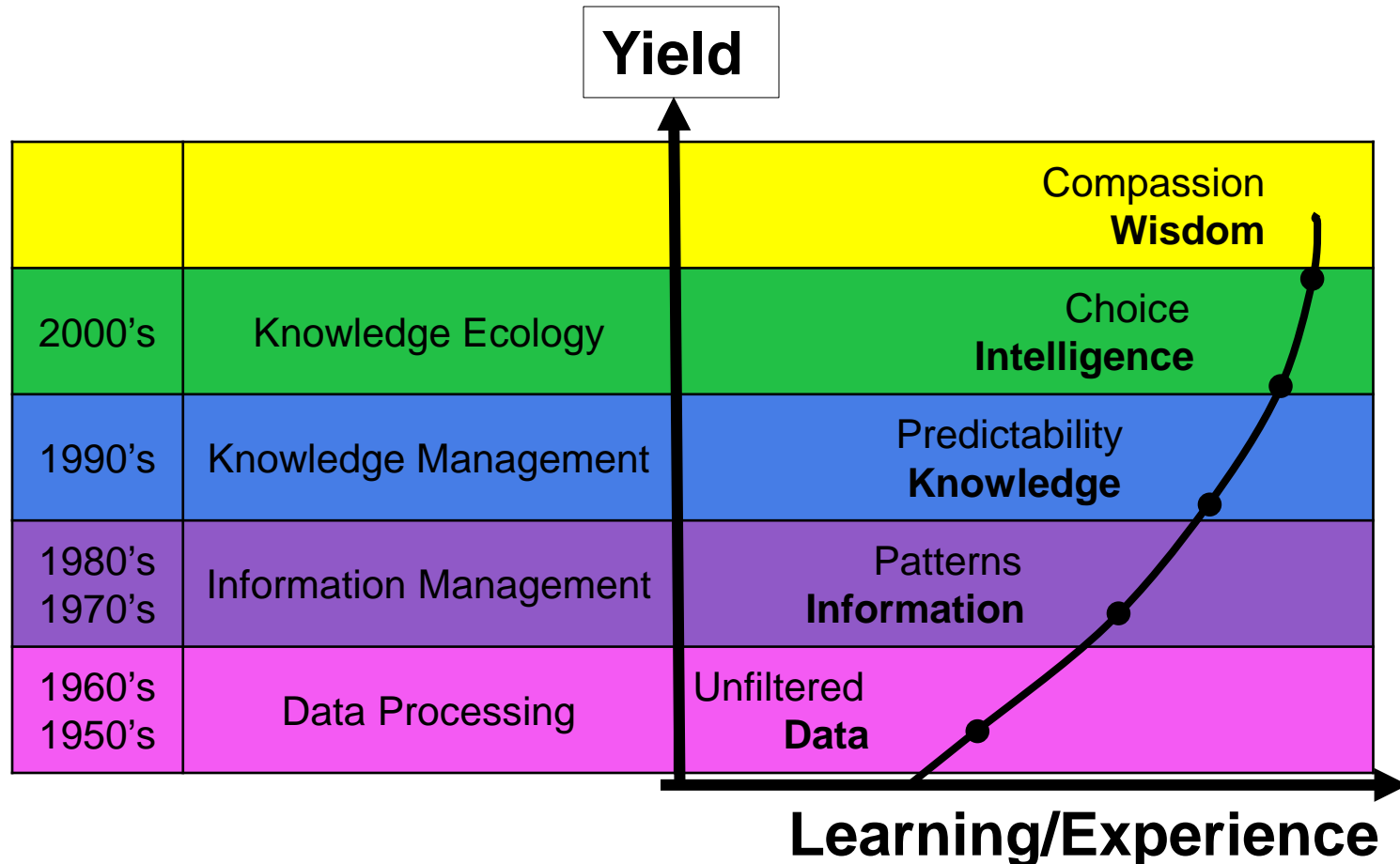
**Data** = vital sign data, static values

**Information** = electronic medical record

**Knowledge** = analytics  
**Wisdom** = application



# Understanding the yield with the DIKW curve



Yield = intellectual dividends per measure of effort invested.  
Examples: increased clarity, deeper understanding.

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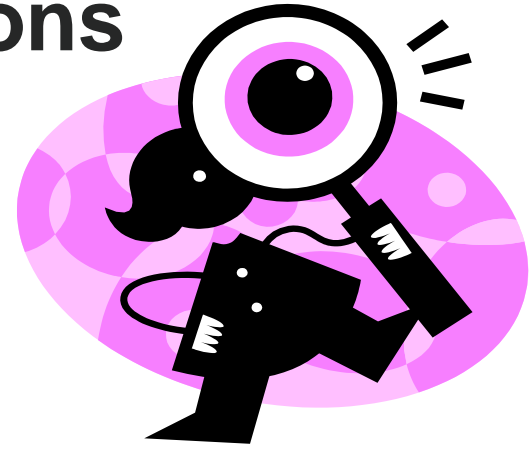
# Some Important Definitions

- **What is the difference between clinical and business intelligence performance management**
  - Performance management uses BI to provide actionable insight that empowers behavioral change and desired outcomes
  - Technology enabling people and process change
    - Prophylactic antibiotic received within one hour prior to surgical incision
    - Door –to–Balloon interval – ED arrival to percutaneous coronary intervention





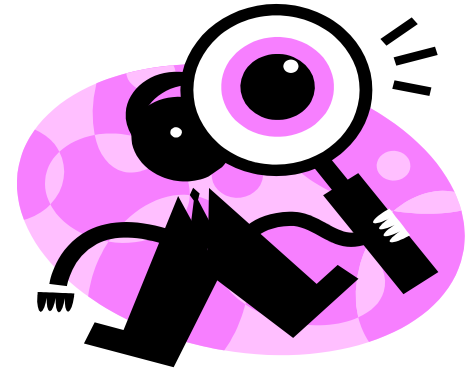
# Some Important Definitions



- **What is computerized decision support?**
  - Technology-based information systems that can assist in decision making.
    - Enabling speedy computations,
    - Providing improved communication and collaboration, Group support systems (GSS)
    - Enabling increased productivity - includes modeling, sensitivity analysis, what-if analysis, goal seeking, decision trees, multicriteria decision making with pairwise comparisons (Analytic Hierarchy Process), and simulation

# Some Important Definitions

- **What is computerized decision support? (continued)**
  - Offering improved data management
  - Providing quality support, forecasting, artificial intelligence, expert systems
  - Managing data warehouses – organizing, searching and mining
  - Supporting the overcoming of cognitive limits by quickly accessing and processing vast amounts of information



# Some Important Definitions



- **Analytics is “the science of analysis”**
  - The process of developing optimal or realistic **decision recommendations based on insights** derived through the application of statistical models and analysis against existing and/or simulated future data
- **Business intelligence and clinical business intelligence**
  - A set of methodologies, processes, architectures, and technologies that **transform raw data into meaningful and useful information used to enable more effective** strategic, tactical, and operational insights and **decision-making**
- **How does analytics differ from decision support?**
  - Managers used to make decisions empirically (observation and experimentation) using educated guesswork based on past experiences—when data is involved in decision making it can be considered analytics

# Agenda

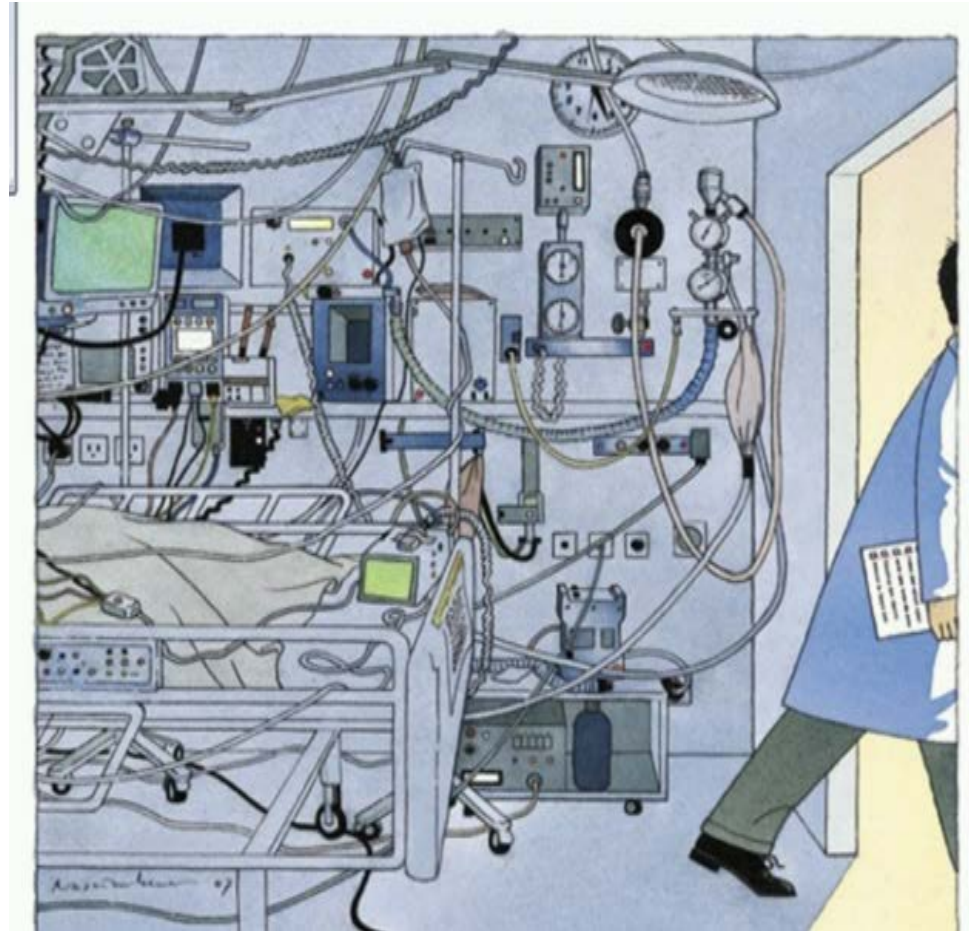


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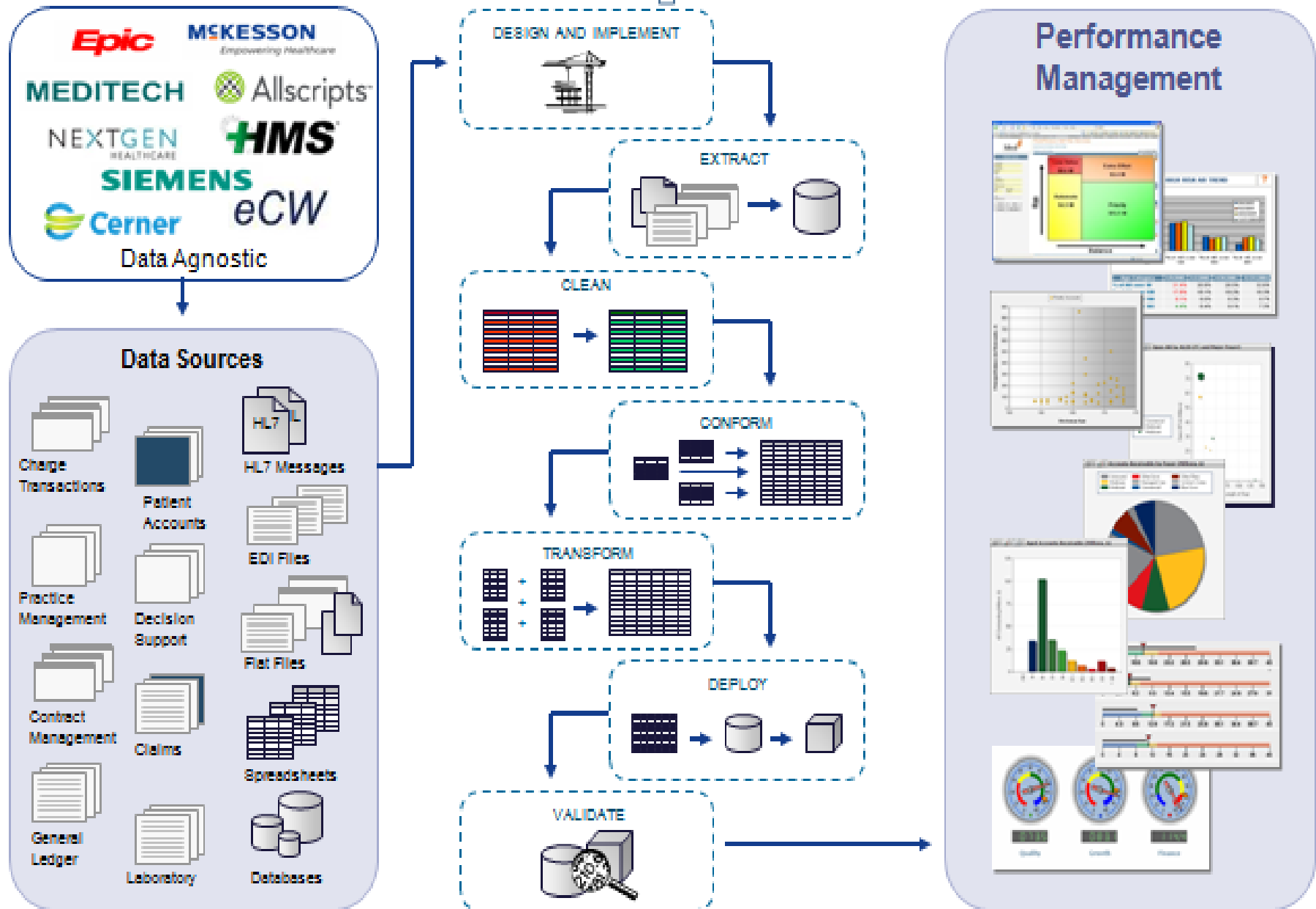
# Different Types of Data Are Required: Patient Care is Complicated

## Where does the patient's information reside?

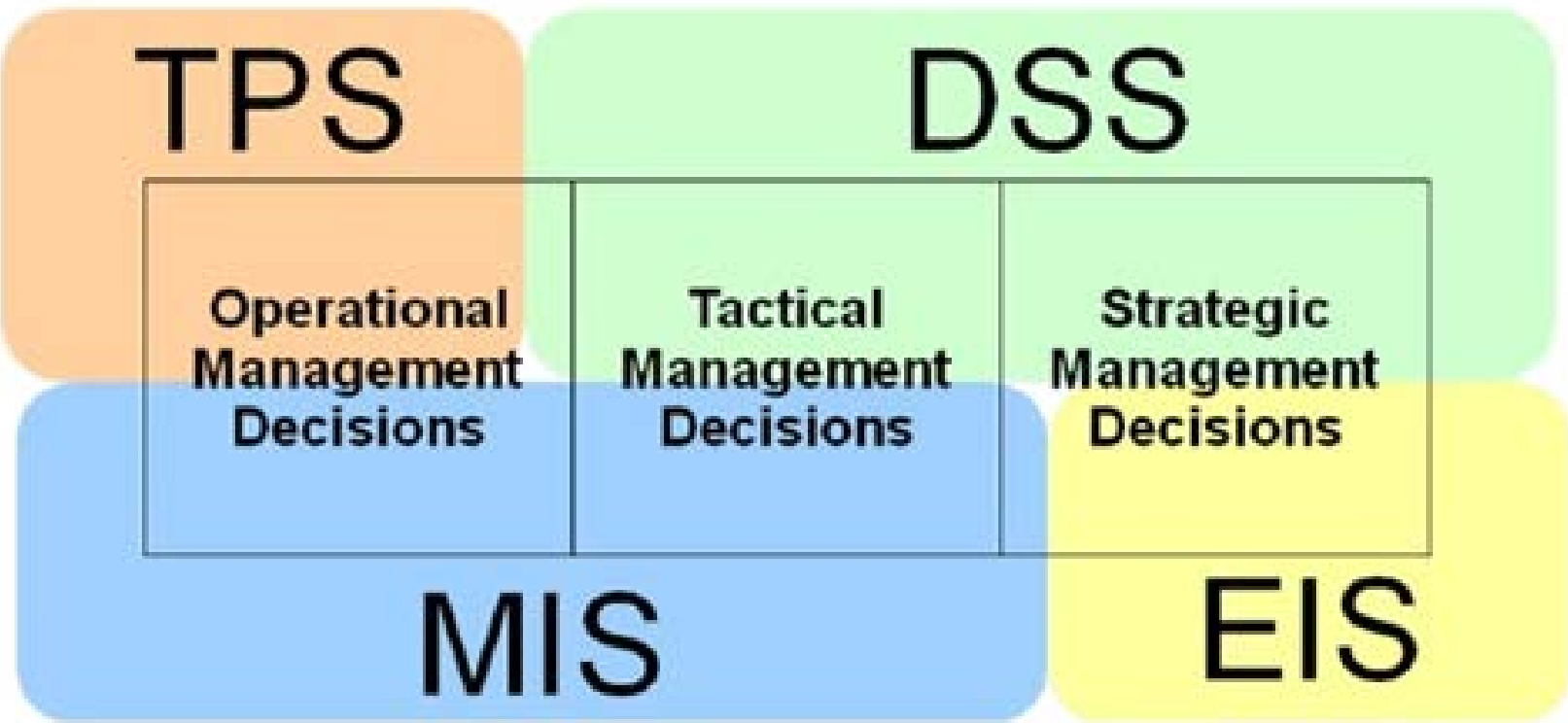
- ADT—registration
- Cost accounting/billing
- Quality system
- Paper
- EHR/EMR
- Ancillaries (lab, radiology, etc.)
- Physicians' offices
- Clinics
- Payers
- PBMs
- Clinical department analytical applications (surgery, OB, cath lab, etc.)



# Examples of Different Sources of Data



# How Decision Support Systems Fit Together: BI and Performance Management



# Different Types of Data and Complexity

Data Types	Easy to Collect	Difficult to Collect
Internal	In data warehouse	Usually missing <ul style="list-style-type: none"><li>• Competitor KPIs</li><li>• Lost business - patients or providers</li></ul>
External	Usually missing <ul style="list-style-type: none"><li>• Government data, census demographics, unemployment rates</li><li>• Consumer reporting from Transunion, Equifax or Experian (consumer credit scores)</li><li>• Consumer business data from Acxiom, Dun &amp; Bradstreet, etc.</li></ul>	Usually missing <ul style="list-style-type: none"><li>• Expert opinions</li><li>• Published survey data</li><li>• Recent technology changes</li></ul>



# Differences Between Reports and Analytics

Reports	Analytics
Static	Dynamic
Linear—also may be dated because of time to research, compile and build	Current and predictive, applies statistics to indicate future trends
Minimally integrated	Integrated—contains combined views from multiple sources (clinical, financial and administrative)
Little value for root cause analysis	Rich data for root cause analysis: <ul style="list-style-type: none"><li>• What are the missed opportunities?</li><li>• What will happen if this continues?</li><li>• What is the optimal solution?</li></ul>

# Agenda

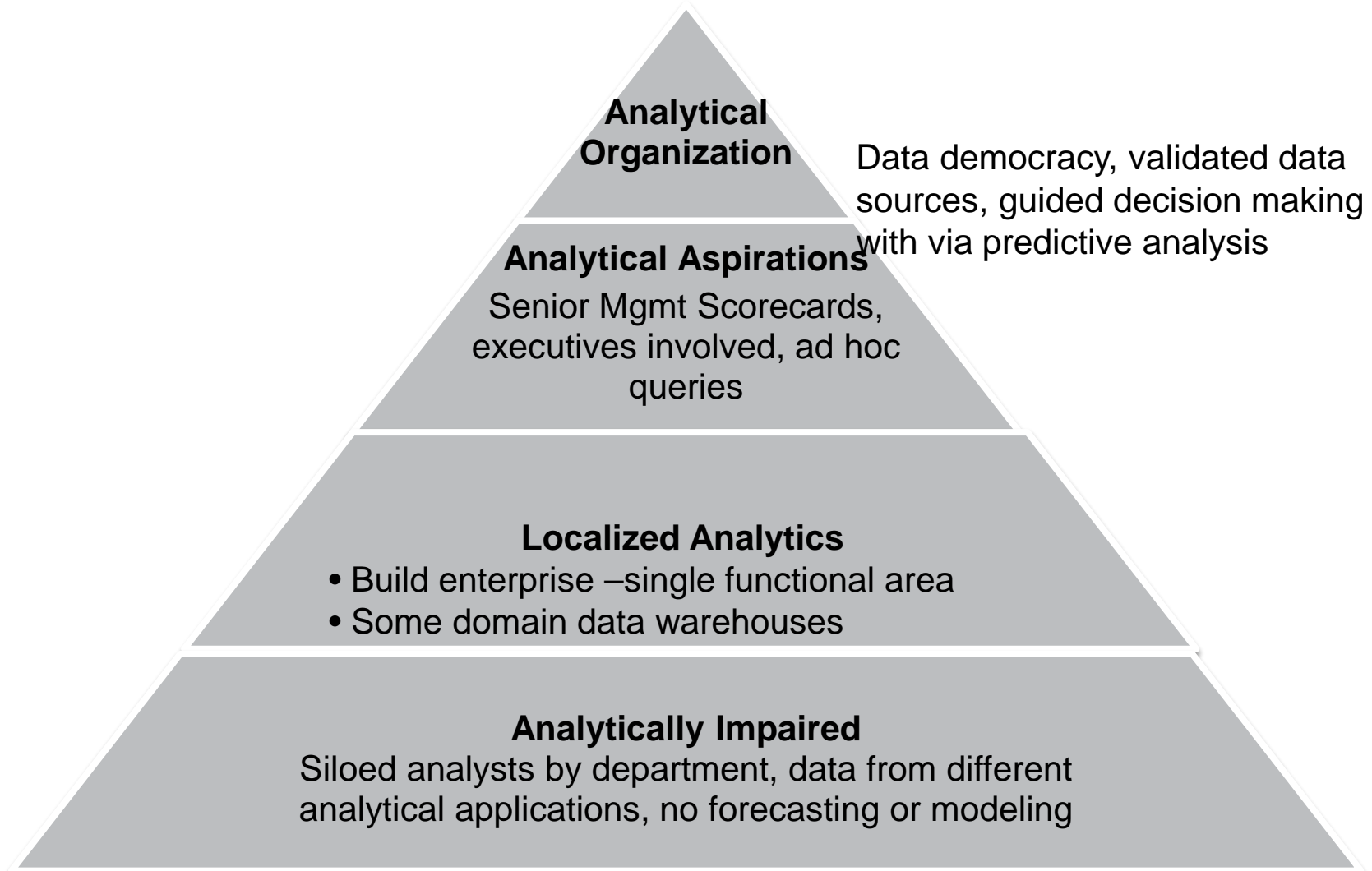


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## Self Assessment

# Where is your organization?



# HIMSS Analytics Version -- DELTA

DELTA stands for **Data**, **Enterprise** orientation, **Leadership**, strategic **Targets**, and **Analytical** resources.



# The DELTA Analytics Maturity Model



# A functionality-based adoption model

## Healthcare Analytic Adoption Model

Data binding grows in complexity with each Level

Increasing complexity of data binding to rules and vocabularies

Level 8	Cost per Unit of Health Reimbursement & Prescriptive Analytics	Contracting for & managing health
Level 7	Cost per Capita Reimbursement & Predictive Analytics	Taking more financial risk & managing it proactively
Level 6	Cost per Case Reimbursement & Data Driven Culture	Taking financial risk and preparing your culture for the next levels of analytics
Level 5	Clinical Effectiveness & Population Management	Measuring & managing evidence based care
Level 4	Automated External Reporting	Efficient, consistent production & agility
Level 3	Automated Internal Reporting	Efficient, consistent production
Level 2	Standardized Vocabulary & Patient Registries	Relating and organizing the core data
Level 1	Data Integration – Enterprise Data Warehouse	Foundation of data and technology
Level 0	Fragmented Point Solutions	Inefficient, inconsistent versions of the truth



## Five Rights of Analytics

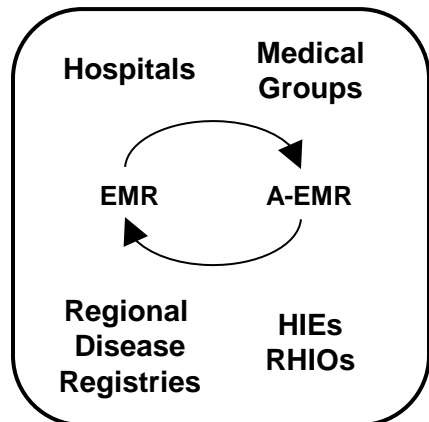


# The Five “Rights Of Analytics”

1. Right Data
2. Right People and stakeholders involved
3. Right Process
4. Right Communication and Right Attitude  
(work together collaboratively and cooperatively)
5. Right Technology to achieve outcomes

# Step1: Data from multiple sources needs to be exchanged and integrated

## Data Sources



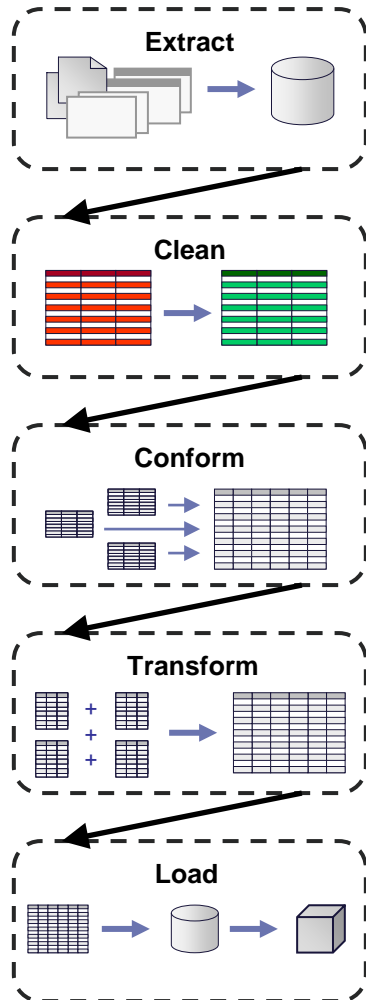
Payer

Other Data Providers

Enrollment  
Authorizations  
Pharmacy  
Claims  
Benchmarks

Clinical  
Registration  
Lab Results  
Radiology  
Registries  
Accounting

## Data Aggregation



## Information Users

ACO Steering Committee

ACO Performance  
Utilization  
Avoidable Care  
Patient Satisfaction

Healthcare Economists

Trend Analysis  
Total Cost of Care  
Forecasting

PCPs, Clinicians

Virtual Health Records  
Gaps in Care  
Referral Guidance

Population Health Managers

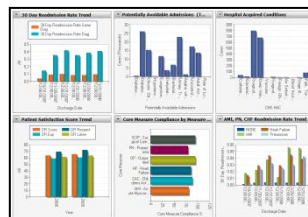
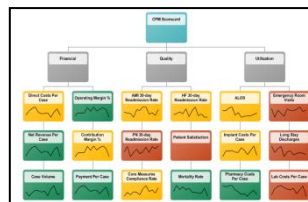
Population Health Analysis  
Disease Registries  
Patient Stratification

Case Managers

Virtual Health Records  
Gaps in Care  
Admit/Discharge Notices

Project Team, Managers

Population Health Analysis  
Practice Pattern Variation  
Physician Scores



Physician	Case	ACU	Total Charge per Case	Total Cost per Case	Adjusted Cost per Case
DR. JOHN W. WELLS	2,800	3,612	\$86,400.78	\$58,360.88	\$6,811.01
DR. JOHN W. WELLS	2,200	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	300	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	200	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	100	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	50	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	25	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	12.5	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	6.25	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	3.125	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.5625	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	0.78125	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	0.390625	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	0.1953125	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	0.09765625	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	0.048828125	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	0.0244140625	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	0.01220703125	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	0.006103515625	4,400	\$88,200.00	\$58,200.00	\$6,800.00
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DR. JOHN W. WELLS	0.000762939453125	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	0.0003814697265625	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	0.00019073486328125	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	9.5367431640625E-05	4,400	\$88,200.00	\$58,200.00	\$6,800.00
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DR. JOHN W. WELLS	4.547473508863449096671875E-11	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	2.2737367544317245483359375E-11	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.13686837721586227416671875E-11	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	5.68434188607931137083359375E-12	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	2.842170943039655685416671875E-12	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.4210854715198278427083359375E-12	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	7.1054273575991142135416671875E-13	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	3.55271367879955710677083359375E-13	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.776356839399778553385416671875E-13	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	8.881784196998892766927083359375E-14	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	4.4408920984994463834635416671875E-14	4,400	\$88,200.00	\$58,200.00	\$6,800.00
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DR. JOHN W. WELLS	5.551115123124307979329427083359375E-15	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	2.7755575615621539896647135416671875E-15	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.38777878078107699483235677083359375E-15	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	6.9388939039053849741661783677083359375E-16	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	3.469446951952692487083088893677083359375E-16	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.73472347597634624354144444683677083359375E-16	4,400	\$88,200.00	\$58,200.00	\$6,800.00
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DR. JOHN W. WELLS	2.1684043449704328044293055586111172222344333888893677083359375E-17	4,400	\$88,200.00	\$58,200.00	\$6,800.00
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DR. JOHN W. WELLS	5.4210108624260820110728263966527793055586111172222344333888893677083359375E-18	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	2.7105054312130410055364131983263966527793055586111172222344333888893677083359375E-18	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.3552527156065205027682065991631983263966527793055586111172222344333888893677083359375E-18	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	6.776263578032602513841032799581631983263966527793055586111172222344333888893677083359375E-19	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	3.38813178901630125692051639979081631983263966527793055586111172222344333888893677083359375E-19	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.6940658945081506284602581998954081631983263966527793055586111172222344333888893677083359375E-19	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	8.47032947254075314230012909497704081631983263966527793055586111172222344333888893677083359375E-20	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	4.2351647362703765711500064724885204081631983263966527793055586111172222344333888893677083359375E-20	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	2.1175823681351882855750032362442604081631983263966527793055586111172222344333888893677083359375E-20	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.0587911840675941427875016181221304081631983263966527793055586111172222344333888893677083359375E-20	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	5.2939559203379707139375008090610565204081631983263966527793055586111172222344333888893677083359375E-21	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	2.64697796016898535696875040453027604081631983263966527793055586111172222344333888893677083359375E-21	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.32348898008449267848437520226513804081631983263966527793055586111172222344333888893677083359375E-21	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	6.6174449004224633924218761132569404081631983263966527793055586111172222344333888893677083359375E-22	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	3.3087224502112316962109380566282704081631983263966527793055586111172222344333888893677083359375E-22	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.65436122510561584810546902831413635204081631983263966527793055586111172222344333888893677083359375E-22	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	8.2718061252527792400527345167068176367604081631983263966527793055586111172222344333888893677083359375E-23	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	4.135903062626388620026367258335136838176367604081631983263966527793055586111172222344333888893677083359375E-23	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	2.067951531313194310013183629166568176367604081631983263966527793055586111172222344333888893677083359375E-23	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	1.03397576565659715500659181458284081631983263966527793055586111172222344333888893677083359375E-23	4,400	\$88,200.00	\$58,200.00	\$6,800.00
DR. JOHN W. WELLS	5.1698788282829857750032959072914104081631983263966527793055586111172222344333888893677083359375E-24	4,400	\$88,200.00	\$58,200.00	\$6

# Step 2: Right People: Roles in Healthcare Analytics



## Chief Medical Officer

- ✓ Reviews key performance indicators and YTD clinical metrics relative to budget. Identify department that have failed to meet targets.



## Nurse Executives

- ✓ Works with Medical Chiefs and CMO to set service lines clinical and financial key performance indicators. Identifies teams that have failed to meet targets.



## Chief Financial Officer

- ✓ Tracks revenue and cost metrics by department to identify most profitable areas for strategic expansion



## Registered Nurse

- ✓ Supports clinical team to execute select process improvements. Conducts training for staff when new processes or initiatives are implemented.



## Performance Improvement Director

- ✓ Monitors internal benchmarks and outlier cases based upon peer comparisons. Ensures clinicians metrics are aligned with other PI initiatives.



## Medical Chiefs

- ✓ Conducts monthly grand round meetings to review teams' performance. Conducts 1:1 physician meetings to identify physician needed services.



## Performance Analyst

- ✓ Analyzes inpatient and outpatient costs and quality for service areas and targets high-cost encounters. Determines if clinician quality outcomes are aligned with benchmarks.



## Physician

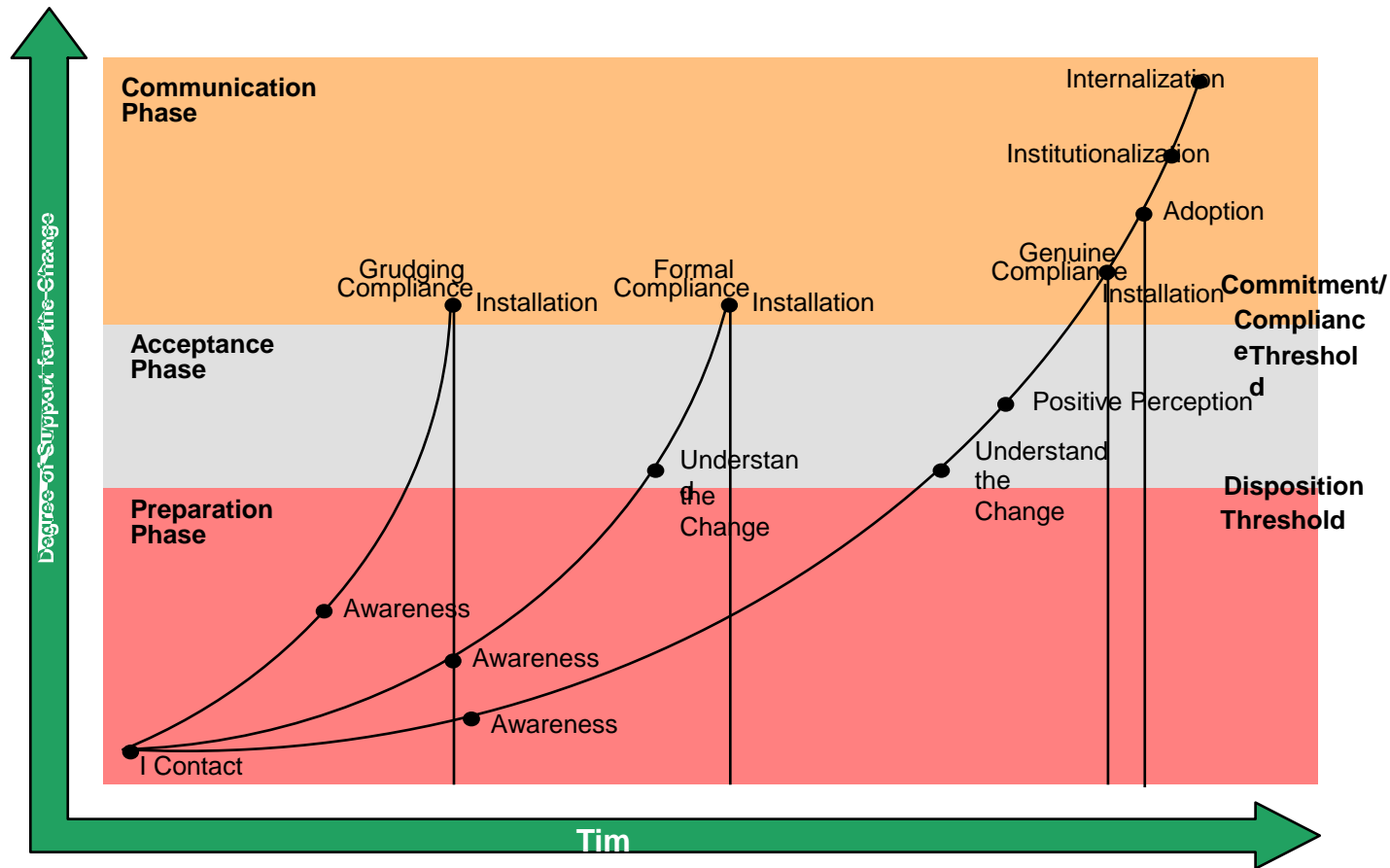
- ✓ Monitors individual performance on physician centric dashboards. Engages executives to initiate process changes to improve patient care and reduce costs.

# Step 3: Right Process



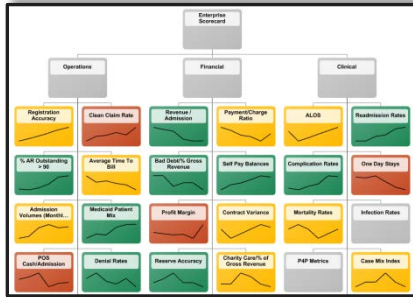
# Step 4: Building Commitment Through Communications

## Is A Process...



# Step 5: Right Technology: Multiple Views Provide Unparalleled Insight

## Strategic View



## Executive Scorecards

- Customized, high-level performance metrics
- Hover for more information or click through to drill into underlying root causes and performance dashboards

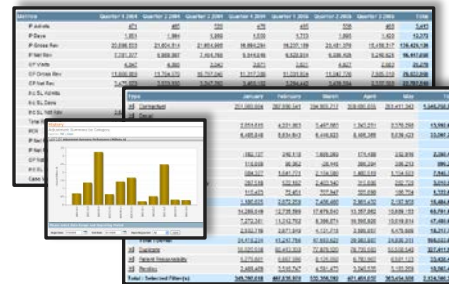
## Performance View



## Personal Dashboards

- Pre-built or customized dashboards built and modified by client
- Targets and alerts set by client
- Hover over any element to drill into it. Hover paths provide guided analysis
- Click on any element to reach the corresponding analytic view

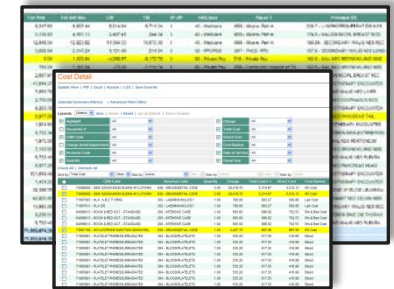
## Analytical Views



## Root Cause Analysis

- Cubes built
- Modified by client
- Charts can be built by client
- Favorites created and saved by client
- Contact account executive or analytic support directly within application using Collaborate feature
- Drill down to claim line level by clicking any underlined element

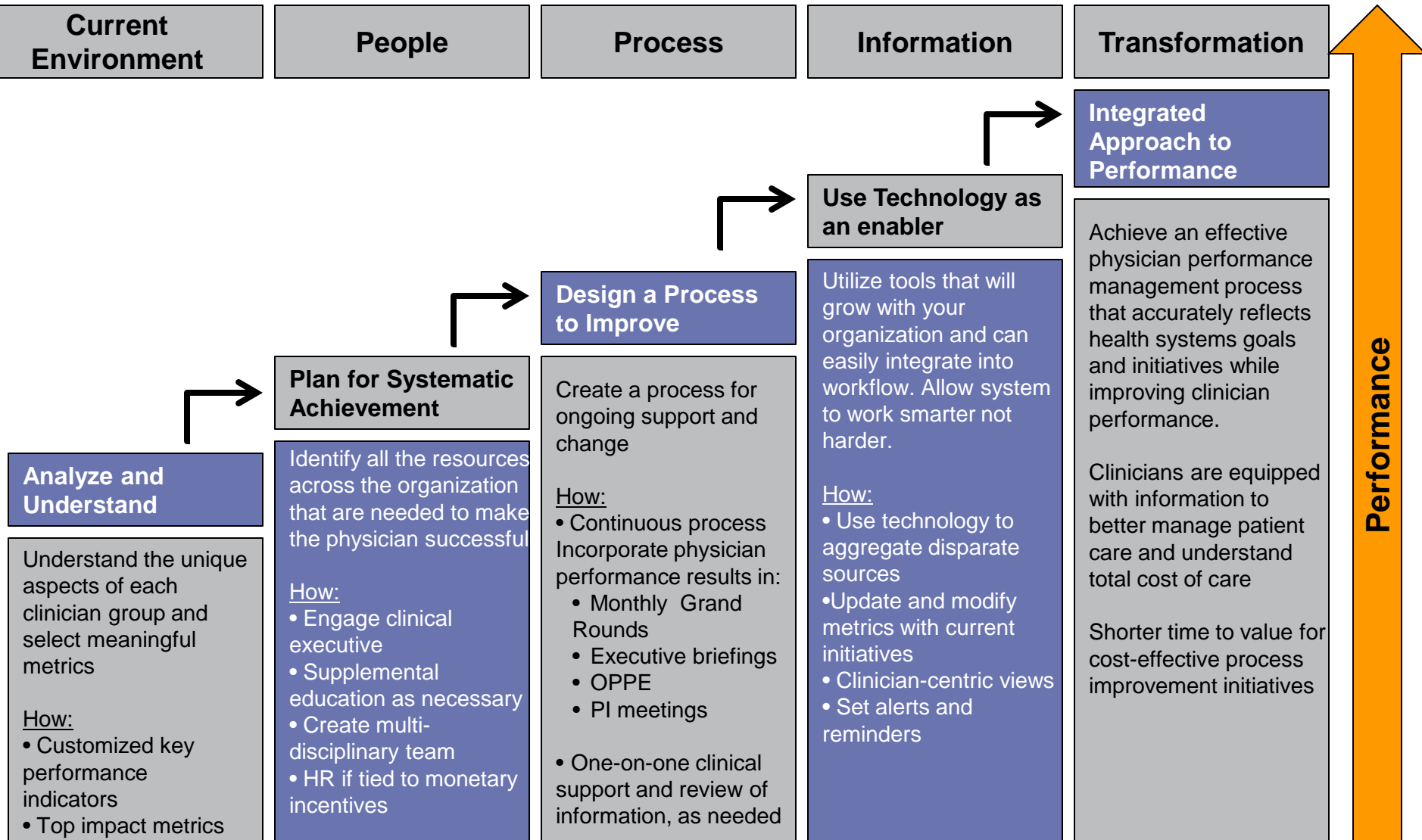
## Claim Line View



## Transaction Detail

- Transaction-level data, integrated through ETL process
- Data definitions consistent with client's internal specifications

# Combining the 5 Steps: People and Process



# Actualizing the 5 Steps

- Shift to a proactive organization:
  - Reliable, single source of truth
  - Aggregate and standardize multiple disparate data sources
  - Push technology with near-real-time alerting
- Engaged clinicians:
  - Clinician-centric views
  - Comprehensive view of clinical, financial, and outcome data
  - Transparent, risk-adjusted, statistically relevant, drillable analytics
- Tying improved clinical performance to financial returns:
  - Increase operating margin
  - Understand total cost of care/encounter/visit/stay
  - Reduce supply cost per encounter
  - Reduce average length of stay
  - Reduce readmissions



# Agenda



- ✓ Why analytics?
- ✓ Describe the difference between data, information, knowledge, and wisdom
- ✓ Understand important definitions
- ✓ Discuss data sources & the difference between operations reporting, clinical reporting, and analytics
- ✓ Self assessment and the 5 Rights of Analytics

# Parting Thoughts



1. Move from *data-to-information-to knowledge-to wisdom* based decision making using analytics
2. Understand your data and metadata
3. Interrogate your data
4. Discern appropriate action
5. Drive performance
6. Master the Five Rights of Analytics and ***Drive Performance Improvements***

# Remember you are not alone!



*Thank you!*

Wishing you all the best on your  
analytics journey

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