

# Data Analytics: A Roadmap to Actionable Data

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**hfma™**

healthcare financial management association

# Presenters bio



Jeff Lambert, FHFMA, CMA

- COO & Founder – Organizational Intelligence



Blaise Ruffing

- Senior Consultant, DHG Healthcare



Kent Thompson

- Senior Manager, DHG Healthcare

# Data Analytics: A Roadmap to Actionable Data

After this session, attendees will be able to:

- **IDENTIFY:** The approach and technology needed to succeed in today's digital, data-driven world.
- **EXPLAIN:** The role of data analytics in quality and performance efforts.
- **DESCRIBE:** The tools and techniques used for data analytics in healthcare organizations.
- **VISUALIZE:** Review a case study that identifies how an organization is able to turn data into actionable data – providing key insights for improved performance, service line profitability, physician performance benchmarking, and improved contract negotiations.

# Covid-19 - thank you for all our healthcare providers!

## COVID-19 Considerations

- KPI Monitoring
  - Days Cash on Hand
- Forecasting
  - Utilization Changes
- Margin Analysis
  - At Risk Contracts

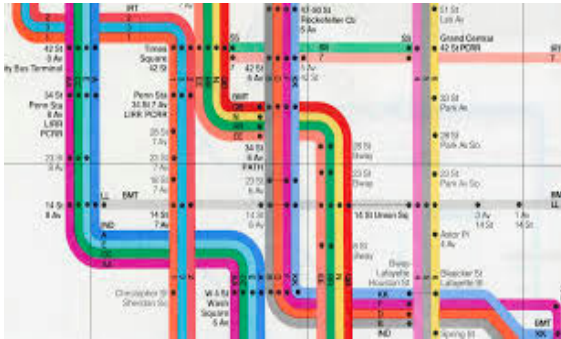


# Most Valuable Asset = Data

Data Driven:

Being Compelled by Data,  
Rather than by Intuition,  
Personal Preference,  
Or by Experience

# Inform



# Ignite



# Encourage





# Data Driven Culture

- Data savvy People
- Quality Data
- Appropriate Tools
- Processes and Incentives

# Polling Question 1

What would be the biggest benefit of being data driven for your organization?

- A) Spending more time on analysis and less on compilation
- B) Leveraging new analytic capabilities and discovering unseen patterns
- C) Combining all the data in the organization in one tool to effect and support major changes



# Data Struggles

Quality

Tools

Dependencies

Data Effectiveness

Data Reality



But the reality is that the data we have available is often in poor shape

**Identify the approach and technology  
needed to succeed in today's digital, data-  
driven world**

# Leverage Technology

Communicate Implications

Link Shareholders

Identify and Present Easy Wins



## Polling Question 2



Are  
accountants/financial  
analysts good  
operators?

A) Yes

B) No

C) Undecided

# Changing Role of Financial Analysts/Accountants

Find opportunities for improvement

Craft a shared vision for product stakeholders



# Accountants Toolset

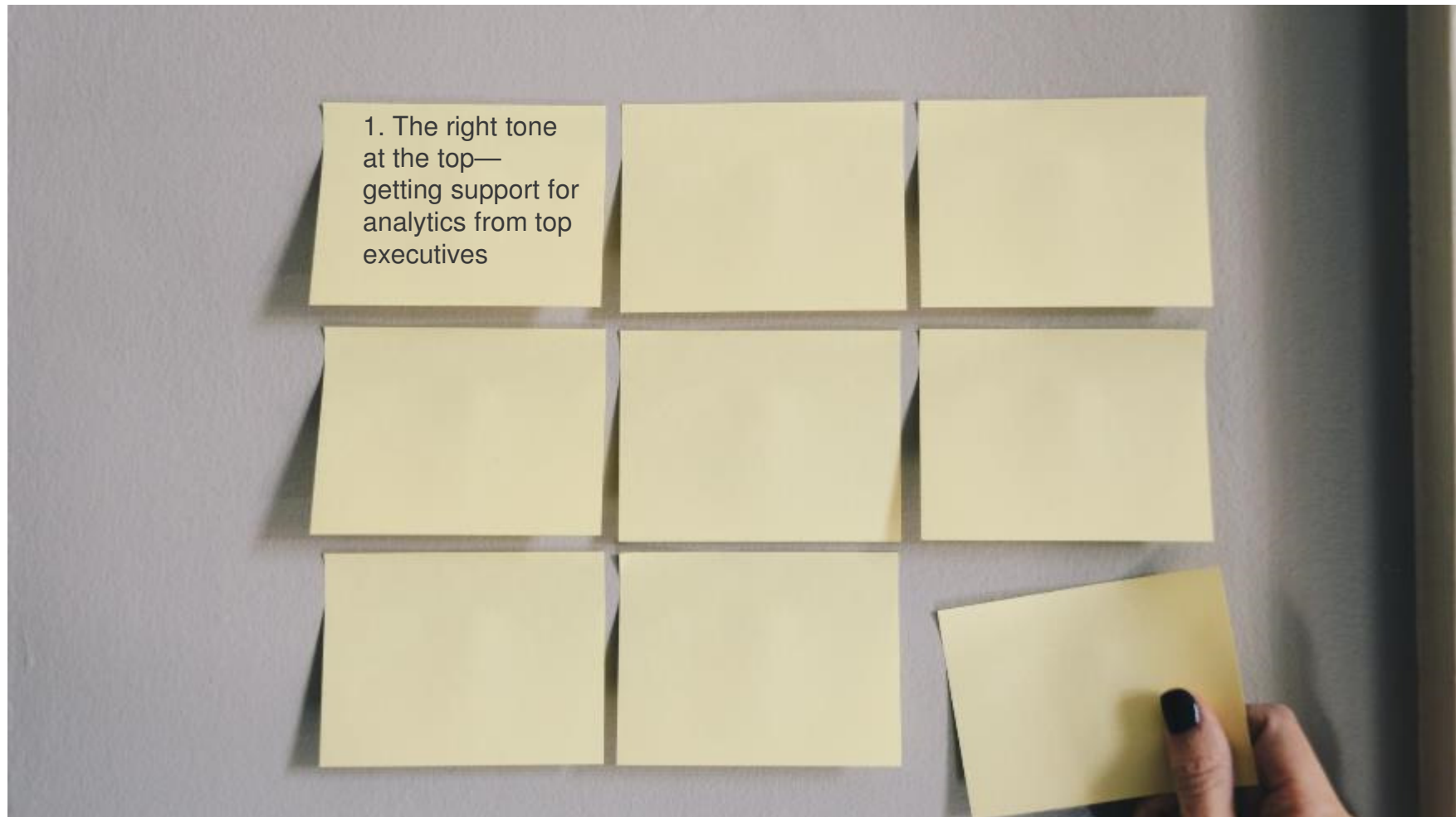


Holistic view of business and operations

Understanding of the interrelation between financial and strategic business decisions

Strong written and verbal communication skills

# KEY FACTORS





# Factors for a Data-Driven Culture

- Effective Use of Technology
- Internal/External Sources
- Monetary/Nonmonetary Rewards
- Resources for Analytic Efforts
- Alignment of Analytic Efforts





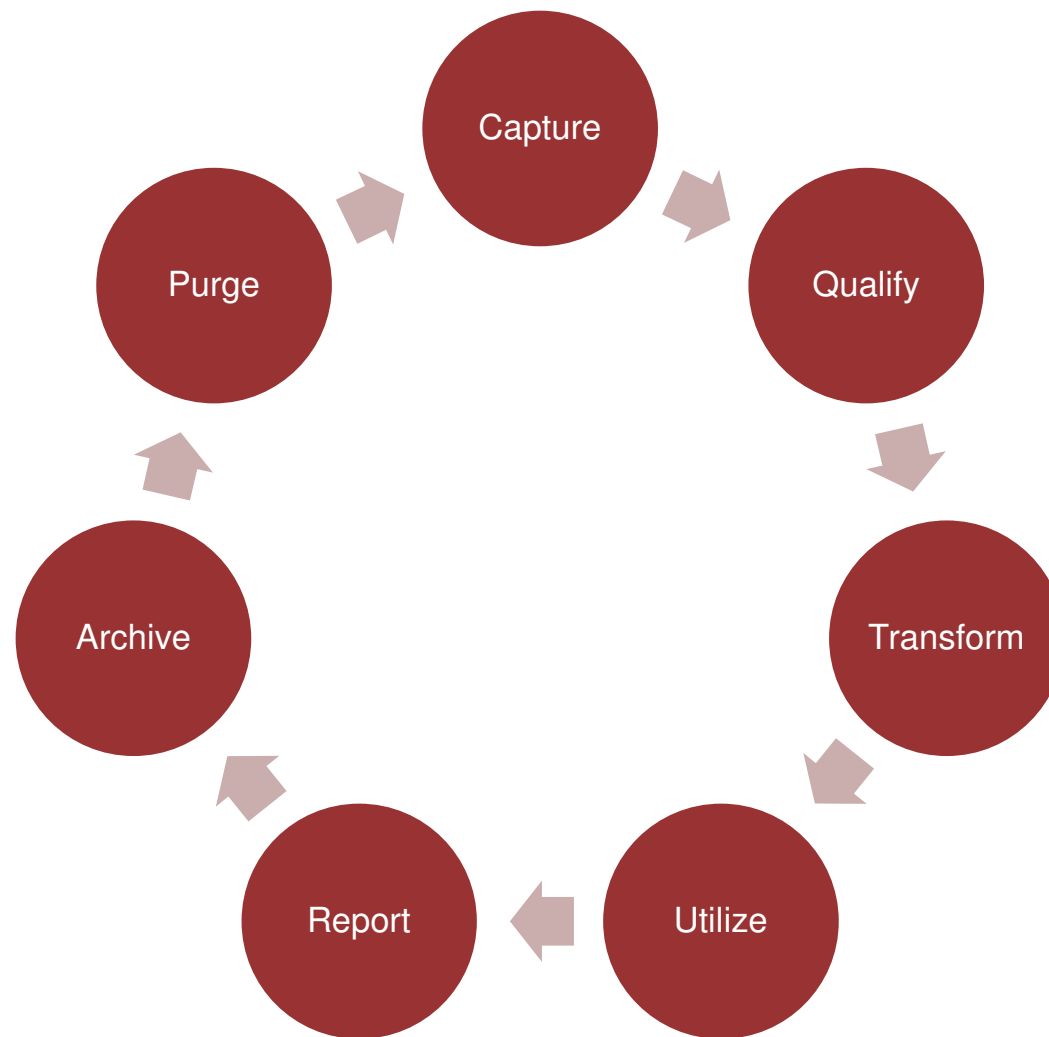
# The Role of Data Analytics in Quality and Performance Efforts

# Big Picture of Data

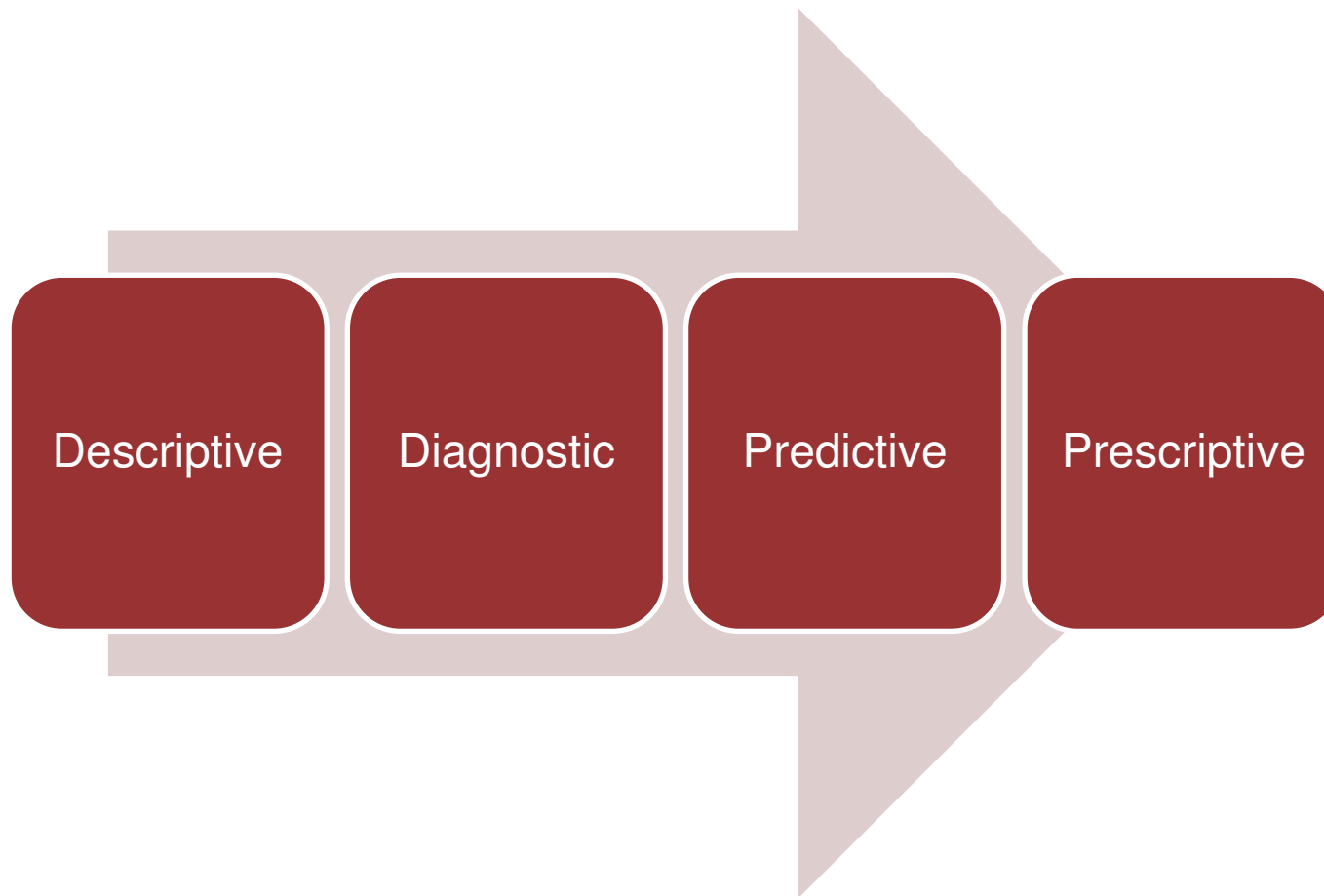
Architecture – Solutions - Patterns



# Phases of Data Life Cycle



# Analytic Data Types

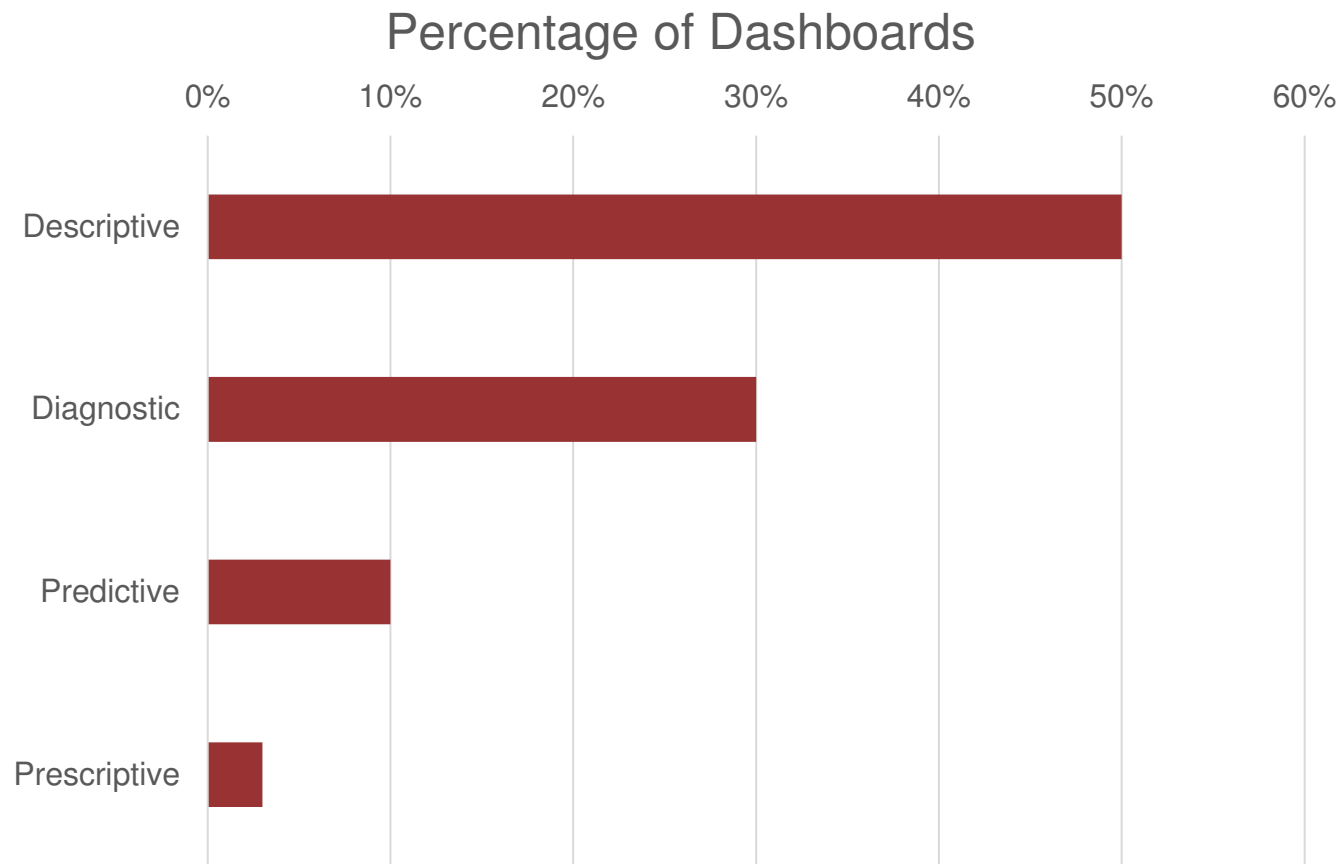


# Polling Question 3

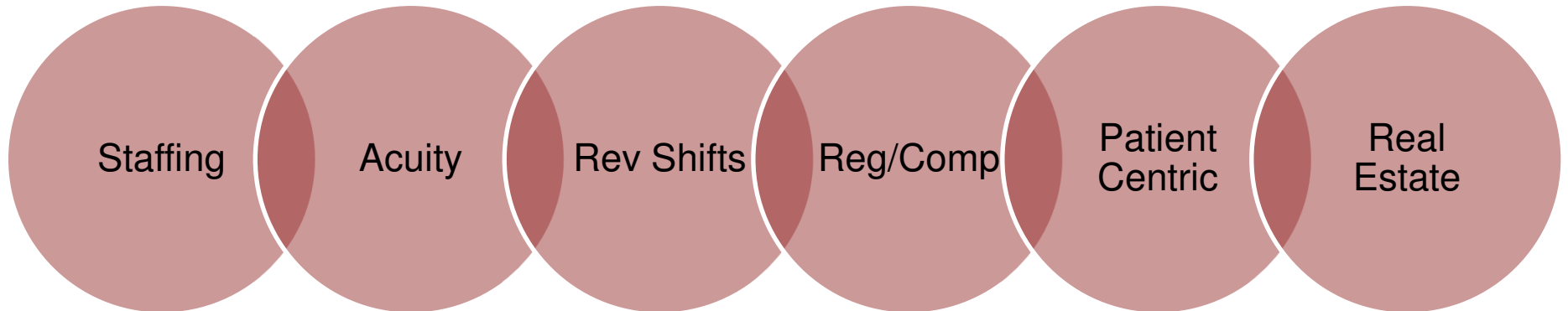
Considering the analytics currently being distributed to management in your organization – which data type is most prominent?

- A) Descriptive
- B) Diagnostic
- C) Predictive
- D) Prescriptive

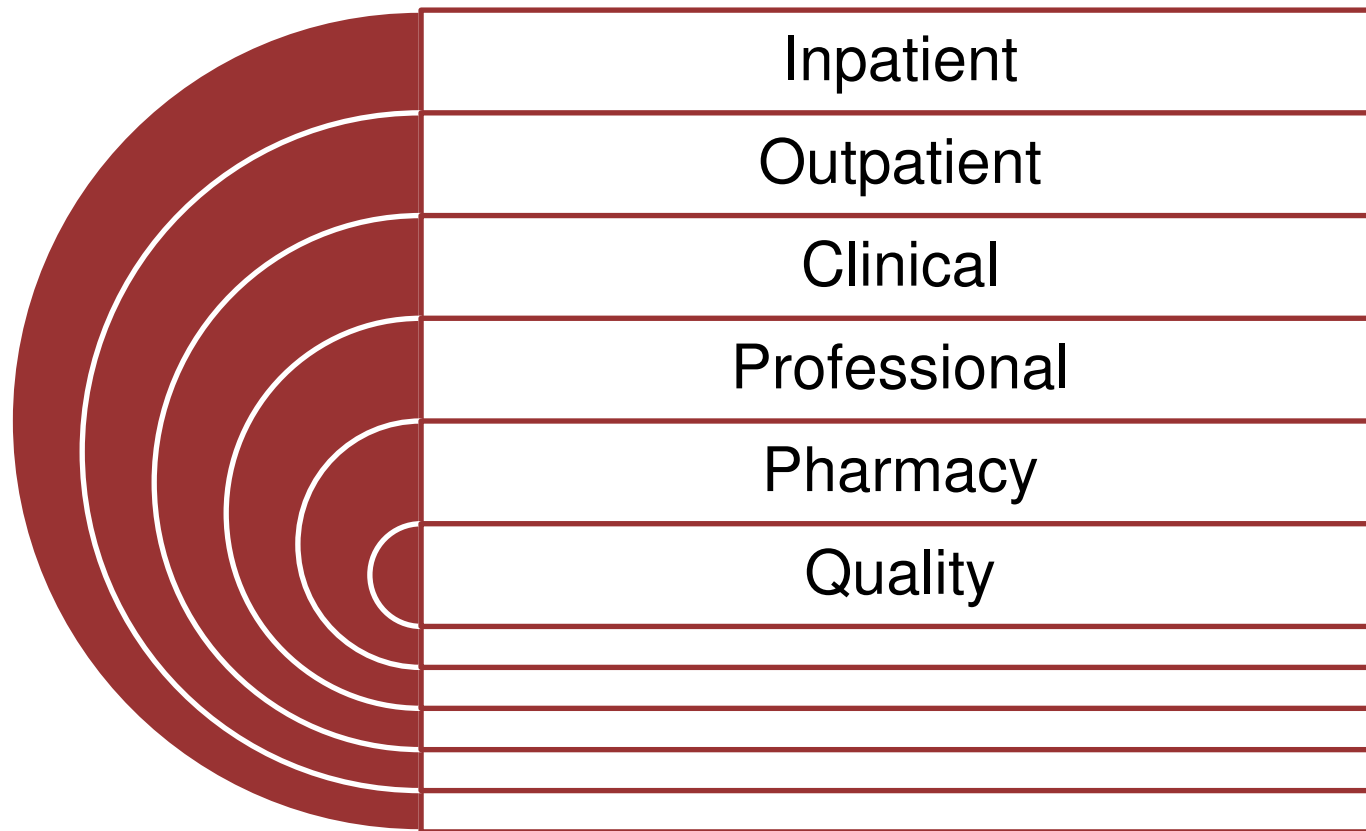
# Analytical Data Uses



# Key Drivers of Healthcare Reporting

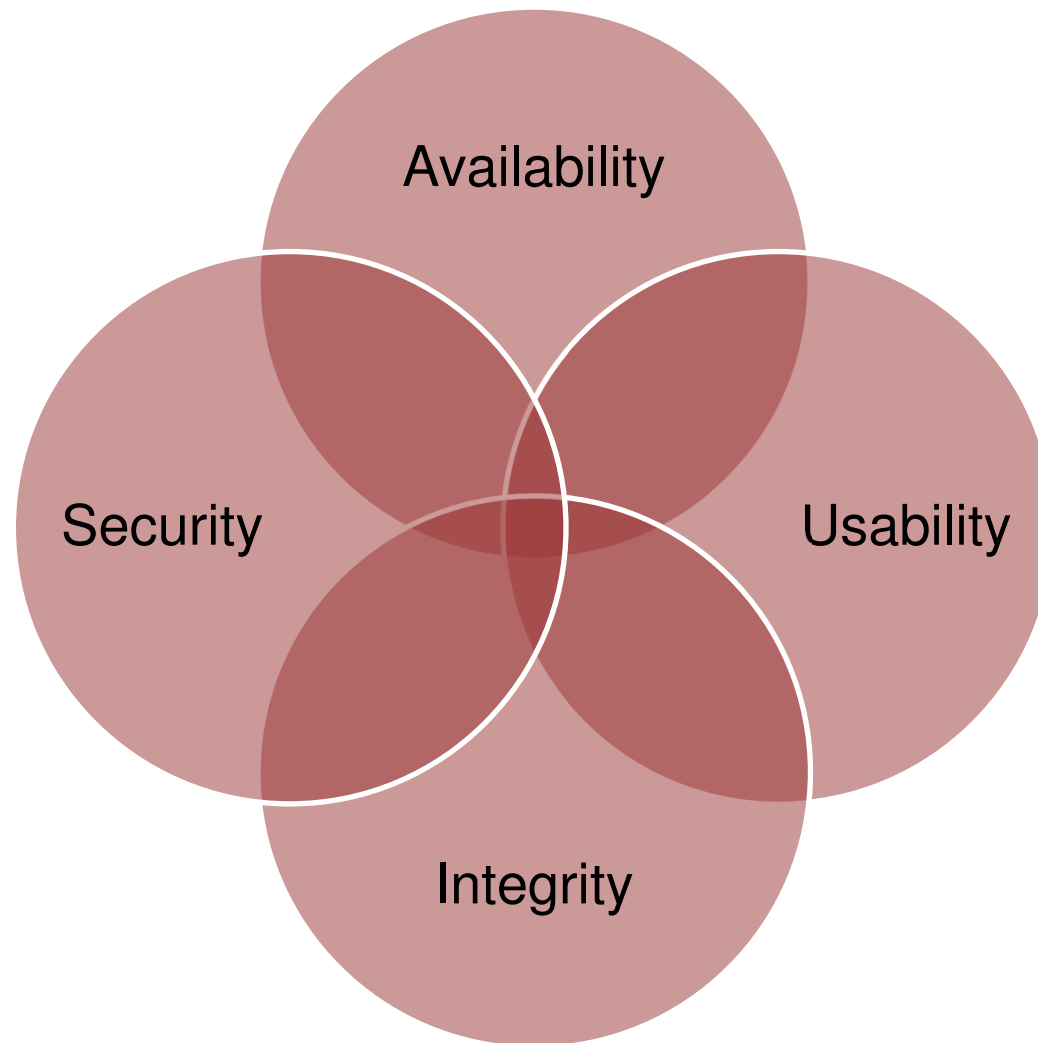


# Major Categories of Healthcare Data





# Data Governance



# Tools and Techniques used for Data Analytics in Healthcare Organizations

# How many 8's?

8	20	15	2	19	15	8	8
9	9	5	4	5	12	8	13
14	20	13	9	15	14	5	4
8	8	6	5	1	2	13	8
10	15	20	20	9	14	8	1
9	8	2	6	8	8	8	8

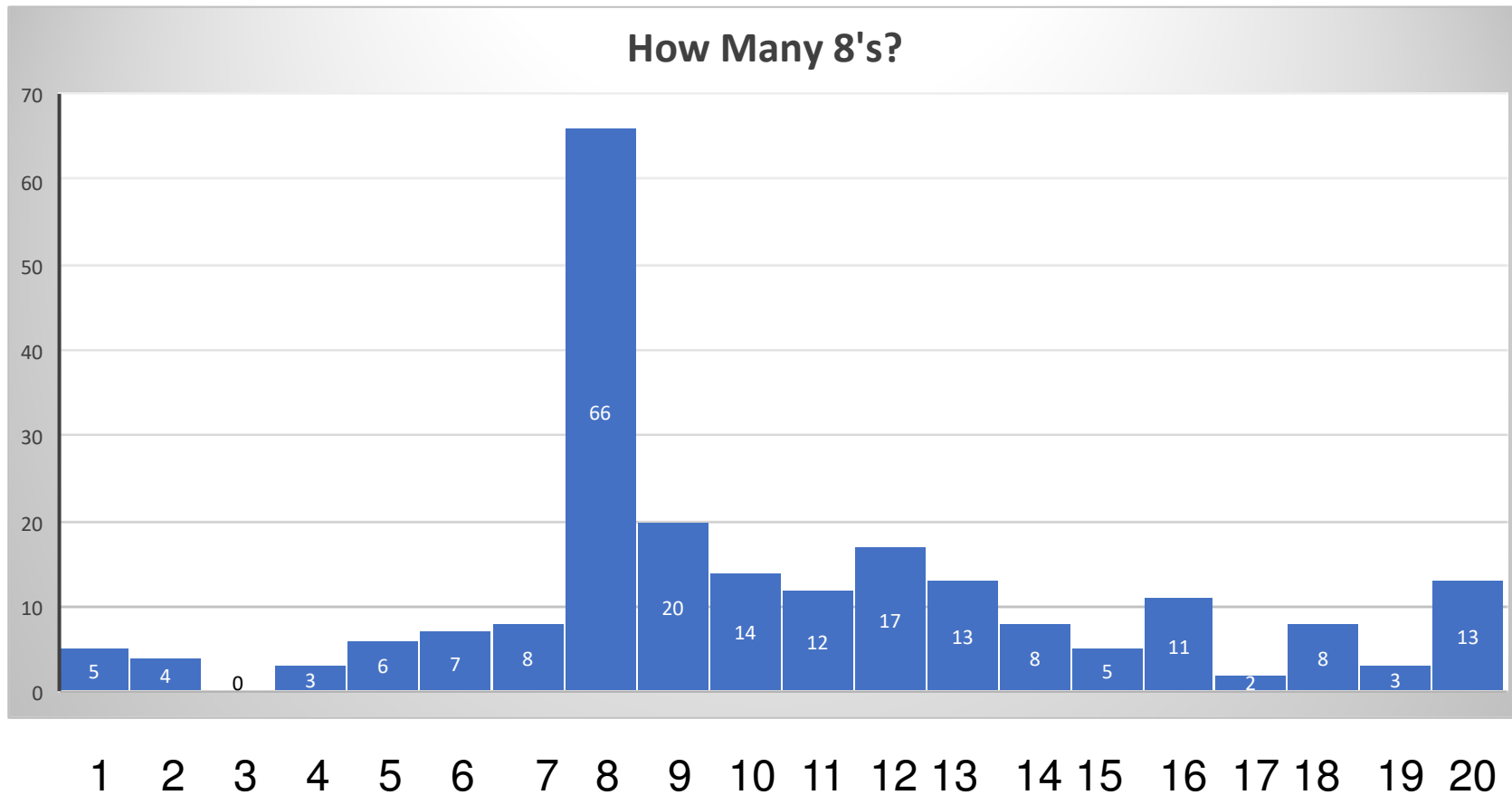
# How many 8's? Now?

15	13	9	5	9	11	7	7	1	9	10	13	8	18	5
6	8	8	9	11	13	14	8	16	8	20	10	8	10	8
8	9	9	9	8	12	8	16	8	8	12	12	8	5	7
14	8	19	8	7	4	8	7	12	16	20	8	18	18	12
13	6	8	8	11	19	8	11	9	8	11	2	1	1	10
16	8	11	8	6	8	10	8	12	12	8	11	19	2	8
20	8	9	14	8	10	2	7	8	10	8	13	16	16	20
16	13	8	9	1	20	20	12	11	9	13	9	8	6	16
11	9	8	8	14	14	15	4	14	12	13	12	12	8	10
4	9	8	1	6	15	10	6	8	8	9	8	14	9	8
8	17	10	18	2	8	8	5	10	18	5	8	20	8	8
13	8	11	8	11	8	10	8	10	8	9	8	12	13	8
10	20	8	14	18	5	16	13	18	9	8	12	20	8	16
12	20	20	8	12	8	7	11	15	20	8	9	15	8	6
13	8	12	8	8	7	16	12	9	18	17	8	20	13	8

# How many 8's? Easier?

15	13	9	5	9	11	7	7	1	9	10	13	8	18	5
6	8	8	9	11	13	14	8	16	8	20	10	8	10	8
8	9	9	9	8	12	8	16	8	8	12	12	8	5	7
14	8	19	8	7	4	8	7	12	16	20	8	18	18	12
13	6	8	8	11	19	8	11	9	8	11	2	1	1	10
16	8	11	8	6	8	10	8	12	12	8	11	19	2	8
20	8	9	14	8	10	2	7	8	10	8	13	16	16	20
16	13	8	9	1	20	20	12	11	9	13	9	8	6	16
11	9	8	8	14	14	15	4	14	12	13	12	12	8	10
4	9	8	1	6	15	10	6	8	8	9	8	14	9	8
8	17	10	18	2	8	8	5	10	18	5	8	20	8	8
13	8	11	8	11	8	10	8	10	8	9	8	12	13	8
10	20	8	14	18	5	16	13	18	9	8	12	20	8	16
12	20	20	8	12	8	7	11	15	20	8	9	15	8	6
13	8	12	8	8	7	16	12	9	18	17	8	20	13	8

# How many 8's? Better?

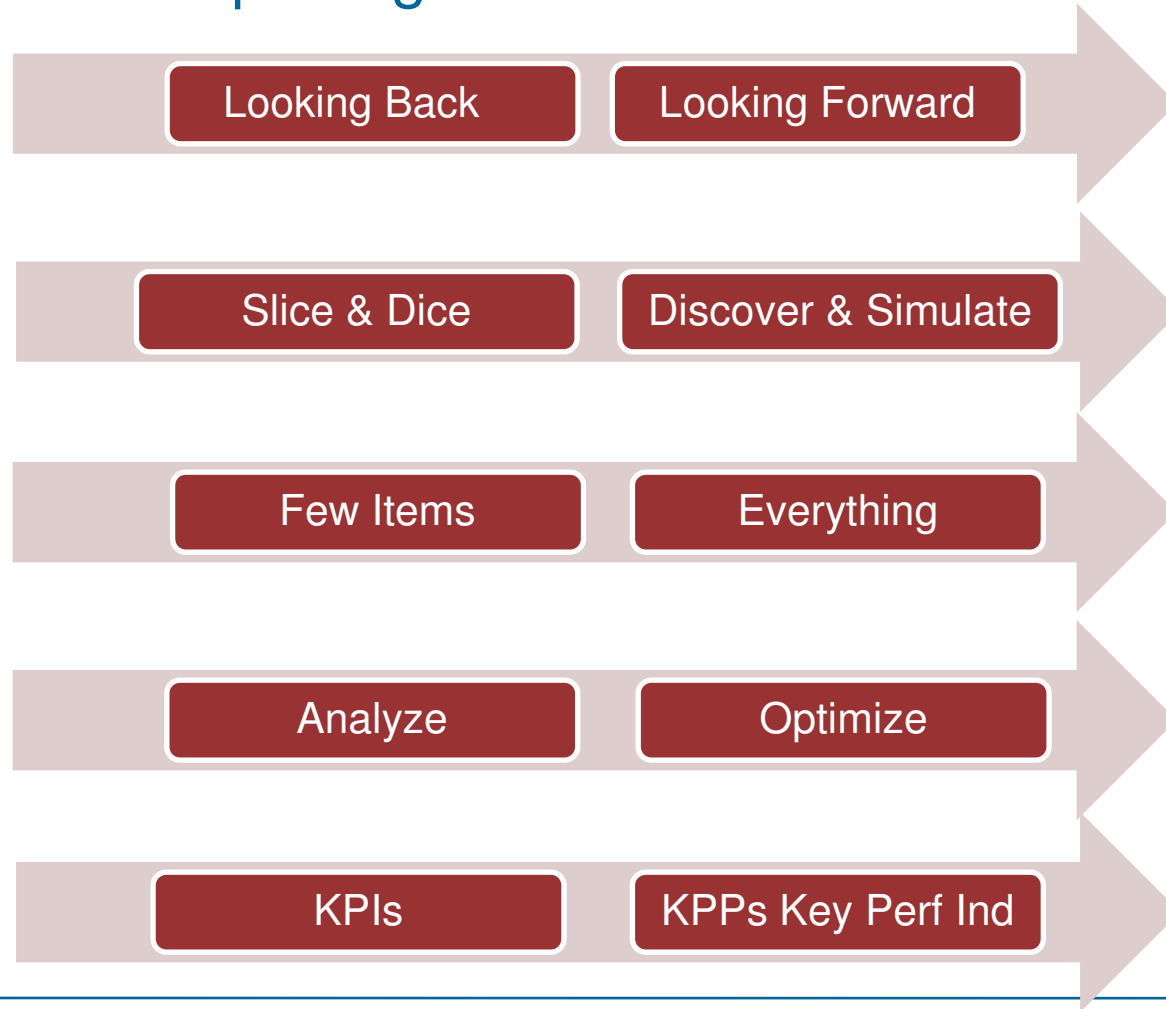


# Tools



# From “How did we” to “What should we”

- Operational Reporting -- Shift to:





# Client Relationship evolution

Trust – Gain or lose share with every transaction

## ANALYST

What  
analysis  
do you  
need?

## EXPERT

What  
does your  
analysis  
show?

## ADVISOR

What do  
you think  
of the  
analysis?

## PARTNER

What do  
you think  
we should  
do?



# World's Most Valuable Resource

- “Computing hardware used to be a capital asset, while data wasn’t thought of as an asset in the same way. Now, hardware is becoming a service people buy in real time and the lasting asset is the DATA.”
  - Erik Brynjolfsson - MIT



**Recognize how Real Time Data Analysis  
can be Used to Answer Data-Driven  
Questions and Reduce the Number of  
Subsequent Meetings**

# HUD

## Financial Performance - Monthly HUD

13th day of month 17 days remaining 43% complete

### Financial Ratios - Capital Structure

	Last Month	Target	% Target	Last 12 Months
Long Term Debt to Capitalization	0.3535	0.3548	✓ 100%	
Debt Service Coverage	0.9585	1.3096	✓ 73%	
Equity Financing	0.5321	0.5300	✓ 100%	
Total Debt to Total Assets	0.4679	0.4700	✓ 100%	

### Financial Ratios - Cost

	Last Month	Target	% Target	Last 12 Months
Salaries to Total Expense	0.3761	0.3753	✓ 100%	
Average Age of Plant	11.46	11.60	✓ 101%	
FTEs/AOB	8.2502	6.1505	⚠ 75%	

### Financial Ratios - Liquidity

	Last Month	Target	% Target	Last 12 Months
Days Cash on Hand	67.21	67.72	✓ 99%	
Days Revenue in Net AR	171.63	162.96	✗ 95%	
Current Ratio	1.72	1.50	✓ 115%	

### Financial Ratios - Profitability

	Last Month	Target	% Target	Last 12 Months
Operating Margin	34.49%	36.71%	✓ 94%	

### Financial Ratios - Profitability continued...

	Last Month	Target	% Target	Last 12 Months
Total Margin	4.89%	3.64%	✓ 135%	
Cash Flow Margin	19.33%	11.17%	✓ 173%	
Return on Equity	0.0049	0.0020	✓ 246%	

### Financial Ratios - Revenue

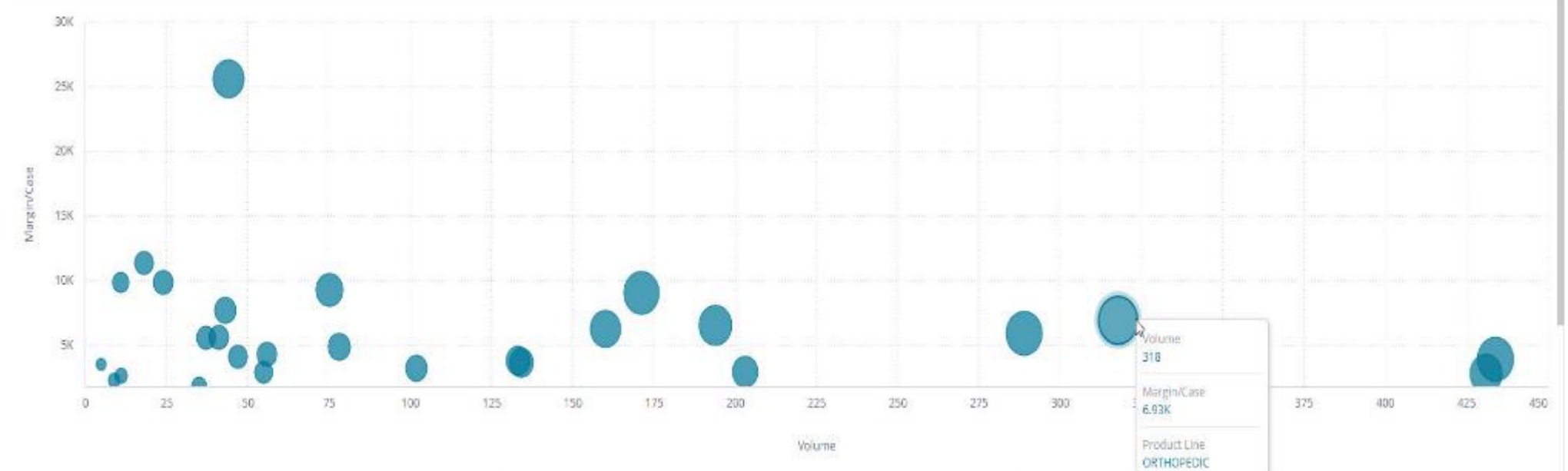
	Last Month	Target	% Target	Last 12 Months
OP Revenue to Total Revenue	0.6625	0.7241	✓ 109%	
Patient Deductions	0.6469	0.6475	✓ 100%	
Medicare IP Payor Mix	0.3867	0.3800	✓ 98%	
Medicare OP Payor Mix	0.4290	0.4200	✓ 98%	
Medicare OP Cost to Charge	0.5482	0.5666	✓ 103%	
Medicare Revenue per Day	\$7,238	\$6,835	✓ 106%	

### Financial Ratios - Utilization

	Last Month	Target	% Target	Last 12 Months
ADC Swing SNF Beds	40	37	⚠ 91%	
ADC Acute Beds	390	390	✓ 100%	



Product Line Distribution (excl. transplant, lab, ER, radiology)



# Service Line Case Study

# Organization Demographics

- Southeastern United States
- 320-bed acute care hospital
- Major referral hospital
- Net revenue - ~\$325M
- Employee >200 physicians

# Background

- Focus on cost accounting
- +5 years since last update to cost accounting system
- Complete review and update of cost accounting for hospital
- Developed cost accounting for physician groups
- Get physicians onboard with cost accounting and data analytics



# Polling Question 4

Which statement best describes your current cost accounting capabilities?

- A) Have a cost accounting system, but it's not reliable.
- B) Have a reliable cost accounting system/process for hospital side only
- C) Have a reliable cost accounting system/process for both hospital and physicians
- D) Don't have a cost accounting system

# Cost Accounting

- Focus on Orthopedics - Joint Procedures
- Goals
  - Reduce variability
    - Length of stay
    - Implant cost
    - Rehab
  - Minimize outliers
  - Involve physicians and clinicians

# Orthopedic Inpatient Surgery

- Most recent completed fiscal year
- Remove cases if reimbursement was not final
- Major Hip and Knee Joint Replacement or Reattachment of Lower Extremity
  - MS-DRG 469 – With Major Complicating or Comorbid Condition (MCC)
  - MS-DRG 470 – Without Major Complicating or Comorbid Condition (MCC)

## Focus on MS-DRG 470

- 0SRD0J9 Replace of Left Knee Joint with Synth Sub, Cement, Open Approach
-

# Orthopedic Inpatient Surgery

MS-DRG	Cases	ALOS	Charges	Reimb	Variable Cost	Cont. Margin	Fixed Cost	Profit/ (Loss)	Implant Cost
469 Major Hip and Knee Joint Replacement or Reattachment of Lower Extremity w MCC or Total Ankle Replacement	14	9.9	1,470,134	396,944	210,275	186,669	179,270	7,399	49,067
470 Major Hip and Knee Joint Replacement or Reattachment of Lower Extremity w/o MCC	340	3.0	22,725,966	8,426,656	4,039,924	4,386,732	2,681,367	1,705,366	1,969,358
Total	354	3.2	24,196,100	8,823,600	4,250,198	4,573,402	2,860,637	1,712,765	2,018,424

- Initial focus on hip and knee replacement
- Identified two MS-DRGs to focus on
- Selected MS-DRG 470 based on volume

# Orthopedic Inpatient Surgery MS-DRG 470 – By Payor

Payor	Cases	ALOS	Charges	Reimb	Variable Cost	Cont. Margin	Fixed Cost	Profit/ (Loss)	Implant Cost
Medicare	23	2.7	1,632,010	410,055	304,629	105,425	188,905	(83,480)	158,336
Medicare Advantage	18	3.5	1,282,415	305,442	231,654	73,788	150,049	(76,261)	112,200
Medicaid MCO	3	3.7	286,616	55,591	57,451	(1,860)	35,278	(37,138)	30,809
Blue Cross	20	2.1	1,283,917	951,315	235,600	715,715	147,357	568,358	122,471
Managed Care	2	2.0	139,368	119,414	23,772	95,642	16,118	79,524	11,630
Self Pay	1	6.0	93,638	0	15,741	(15,741)	11,810	(27,551)	6,210
Total	67	2.8	4,717,965	1,841,816	868,848	972,968	549,517	423,452	441,656

- Medicare – highest volume, least profitable (as measured by total \$)
- Majority of contracts pay fixed rates for inpatient stays
- Lowered variable cost equals higher profit margin

# Orthopedic Inpatient Surgery MS-DRG 470 – Per Case by Payor

Payor	Cases	ALOS	Charges	Reimb	Variable Cost	Cont. Margin	Fixed Cost	Profit/ (Loss)	Implant Cost
Medicare	23	2.7	70,957	17,828	13,245	4,584	8,213	(3,630)	6,884
Medicare Advantage	18	3.5	71,245	16,969	12,870	4,099	8,336	(4,327)	6,233
Medicaid MCO	3	3.7	95,539	18,530	19,150	(620)	11,759	(12,379)	10,270
Blue Cross	20	2.1	64,196	47,566	11,780	35,786	7,368	28,418	6,124
Managed Care	2	2.0	69,684	59,707	11,886	47,821	8,059	39,762	5,815
Self Pay	1	6.0	93,638	0	15,741	(15,741)	11,810	(27,551)	6,210
Total	67	2.8	70,417	27,490	12,968	14,522	8,202	6,320	6,592

- Implant cost variance was not significant, but opportunity with traditional Medicare and Medicaid
- Focus on traditional Medicare due to volume and variable and implant cost
- Review primary diagnosis for further drill down

# Orthopedic Inpatient Surgery

## MS-DRG 470 – Medicare by Prim DX

Primary Diagnosis	Cases	ALOS	Charges	Reimb	Variable Cost	Cont. Margin	Fixed Cost	Profit/ (Loss)	Implant Cost
Bilateral primary osteoarthritis of knee	2	3.0	86,302	22,303	16,290	6,013	9,960	(3,946)	8,851
Mech loosening of internal left knee prosthetic join, init	1	4.0	168,684	30,341	37,619	(7,278)	19,308	(26,586)	24,162
Unilateral primary osteoarthritis, left knee	20	2.6	64,536	16,755	11,722	5,034	7,484	(2,450)	5,824
Total	23	2.7	70,957	17,828	13,245	4,584	8,213	(3,630)	6,884

- Primary diagnosis did impact length of stay and variable and implant cost
- Did not exclude any cases based on primary diagnosis

# Orthopedic Inpatient Surgery

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# Orthopedic Inpatient Surgery





- Focused reviews
  - Length of stay
    - Impact on variable cost
    - Variance by surgeon
  - OR Time
    - Impact on length of stay or variable cost
    - Variance by surgeon
  - Implant Cost
    - Variance by surgeon and vendors

# Orthopedic Inpatient Surgery MS-DRG 470 – Medicare by LOS

Length of Stay	Cases	ALOS	Charges	Reimb	Variable Cost	Cont. Margin	Fixed Cost	Profit/ (Loss)	Implant Cost
1 day	1	1.0	61,551	10,523	10,657	(134)	6,663	(6,797)	5,729
2 days	12	2.0	65,604	17,984	12,182	5,802	7,478	(1,675)	6,439
3 days	5	3.0	64,745	17,069	11,924	5,145	7,637	(2,493)	5,871
4 days	4	4.0	96,533	20,342	18,728	1,614	11,246	(9,632)	10,109
6 days	1	6.0	73,353	17,009	13,257	3,751	9,340	(5,589)	5,549
Total	23	2.7	70,957	17,828	13,245	4,584	8,213	(3,630)	6,884

- No direct correlation between length of stay and implant cost
- 4-day lengths of stay had higher implant cost and identified
  - Drill down to patient level data identified two outliers
- Half of 3- and 4-day lengths of stay were attributed to one surgeon
- 6-day length of stay - admitted through emergency department and delayed surgery

# Orthopedic Inpatient Surgery MS-DRG 470 – Medicare OR Time

Operating Room Time	Stay	# of Units	Total Time
 3600000052 HC OR TIME INT 30 MIN LEV V	2	1	30
3600000057 HC OR TIME EA ADD'L 15 MIN LEV V	2	8	120
 3600000052 HC OR TIME INT 30 MIN LEV V	2	1	30
3600000057 HC OR TIME EA ADD'L 15 MIN LEV V	2	7	105
 3600000052 HC OR TIME INT 30 MIN LEV V	2	1	30
3600000057 HC OR TIME EA ADD'L 15 MIN LEV V	2	9	105
 3600000052 HC OR TIME INT 30 MIN LEV V	2	1	30
3600000057 HC OR TIME EA ADD'L 15 MIN LEV V	2	6	90
 3600000052 HC OR TIME INT 30 MIN LEV V	2	1	30
3600000057 HC OR TIME EA ADD'L 15 MIN LEV V	2	6	105

- Reviewed OR time to determine if there was a significant variance in OR time driving variability in length of stay or cost
  - No measurable variance due to OR time
- Reviewed average OR time by surgeon

# Orthopedic Inpatient Surgery

## MS-DRG 470 – Medicare Implant Cost

Implant Description	Length of Stay	# of Units	Total Implant Cost	Implant Unit Cost
<b>IMP5510-F-301265144 COMPONENT FEMORAL 3 KNEE LEFT CRUCIATE RETAINING CEMENTED TRIATHLON</b>	2	1	2,124.72	2,124.72
<b>IMP5521-B-400265145 BASEPLATE TIBIAL TRIATHLON 4 UNIVERSAL KNEE CEMENTED TOTAL STABILIZE COCR</b>	2	1	1,168.60	1,168.60
<b>IMP5531-G-409265146 INSERT TIBIAL 4 9MM KNEE X3 CRUCIATE SUBSTITUTE TRIATHLON</b>	2	1	1,381.07	1,381.07
<b>IMP5550-G-339265149 COMPONENT PATELLAR 9MM 33MM SYMMETRIC TRIATHLON X3 KNEE</b>	2	1	584.30	584.30
<b>IMP6188-1-001265150 CEMENT BONE SIMPLEX P RADIOPAQUE HALF DOSE PACK OF 1</b>	2	1	31.87	31.87
<b>IMP6188-1-001265151 CEMENT BONE SIMPLEX P RADIOPAQUE HALF DOSE PACK OF 1</b>	2	1	31.87	31.87
<b>IMP110035368265403 CEMENT BONE R1X40US</b>	2	2	159.35	79.68
<b>IMP141234265407 TRAY TIBIA CRUCIATE 75MM</b>	2	1	1,221.72	1,221.72
<b>IMP183030265405 COMPONENT FEMORAL 67.5MM KNEE LEFT CRUCIATE RETAINING CEMENTED PRIMARY VANGUARD</b>	2	1	1,912.25	1,912.25
<b>IMP184788265401 COMPONENT PATELLAR THIN 8.6MM 37MM 3 PEG KNEE SERIES A</b>	2	1	212.47	212.47
<b>IMPEP-189084265422 BEARING 75MMX14MM VANGUARD E1 KNEE ANTERIOR STABILIZE TIBIAL</b>	2	1	2,512.48	2,512.48
<b>IMP110035368267812 CEMENT BONE R1X40US</b>	2	2	125.36	62.68
<b>IMP42-5026-064-01267838 COMPONENT FEMORAL PERSONA COCR 8 STANDARD KNEE LEFT CRUCIATE RETAIN CEMENTED</b>	2	1	2,124.72	2,124.72
<b>IMP42-5099-025-25267815 SCREW GUIDE PERSONA L25 MM OD2.5 MM KNEE FEMALE HEX HEAD STERILE DISPOSABLE</b>	2	1	123.23	123.23
<b>IMP42-5121-008-12267854 INSERT ARTICULAR PERSONA VIVACIT-E 8-11 EF H12 MM KNEE LEFT STERILE</b>	2	1	1,062.36	1,062.36
<b>IMP42-5320-075-01267840 BASEPLATE TIBIAL PERSONA TIVANIUM 5 D F KNEE LEFT CEMENTED STEM</b>	2	1	1,221.72	1,221.72
<b>IMP42-5402-000-35267839 COMPONENT PATELLAR VIVACIT-E ALL POLY OD35 MM KNEE LATEX FREE</b>	2	1	584.30	584.30

- Initial drill down at surgeon level
- Secondary drill down at patient level by surgeon
- System allowed actual cost of implants

# Orthopedic Inpatient Surgery

- Other views
  - Day of procedure – admit date, day of week
  - Emergency Room admits
  - Routine versus ICU/Step-down days, including location
  - Rehab
    - Number of days
    - Start of rehab

# Other Organization Focus

- Outpatient Orthopedic procedures
- General Surgery – Inpatient and Outpatient
- General Medicine
- Cardiac Services – Medical and Surgical

# Polling Question 5

What groups would find value in the use of cost accounting data?

- A) Finance
- B) Clinicians
- C) Physicians
- D) All of the above

# For Additional information

Please contact:

Jeff Lambert - Oi

*jlambert@oihealth.com*

Blaise Ruffing – DHG

*blaise.ruffing@dhg.com*

Kent Thompson -- DHG

*kent.thompson@dhg.com*

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