Enterprise Analytics: Improving Healthcare Organizations

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HCD HEALTH CARE DATAWORKS

HIMSS CENTRAL & SOUTHERN OHIO Chapter

GAIN KNOWLEDGE
LEAD WITH
INSIGHT

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HEALTH CARE DATAWORKS

Overview

- Gartner predictions for business intelligence (BI) and analytics
- Big data paralysis
- Current analytics state at many organizations
- Envisioned future state for analytics
- Governance Structure
- Achieving the vision
- Example Use Cases

Gartner predictions for BI and analytics

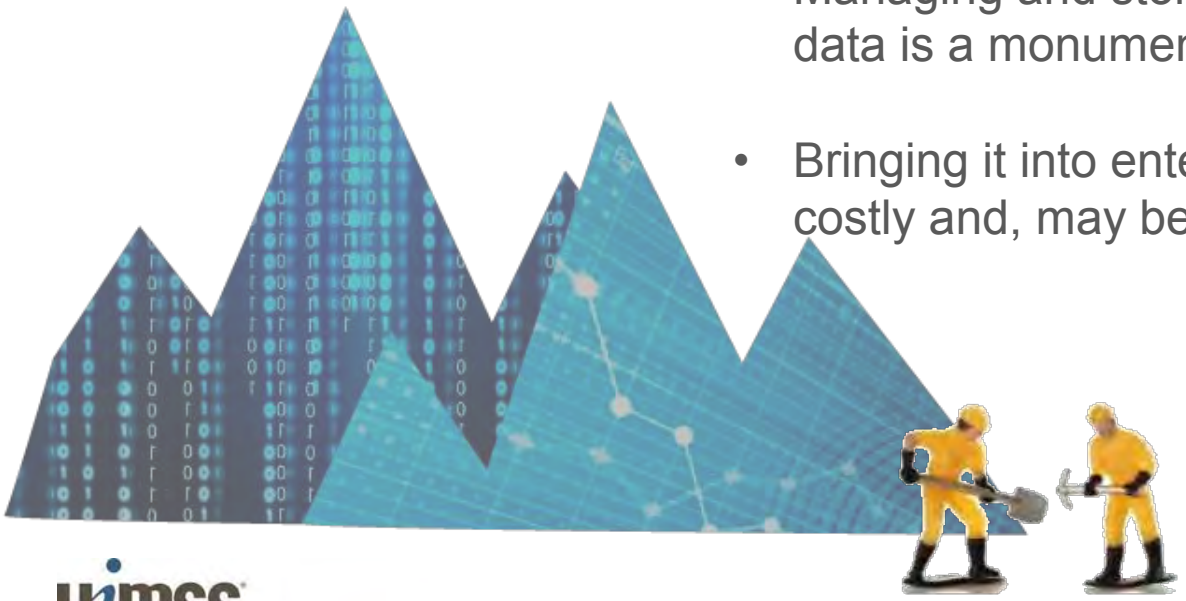
- CIO focus on business intelligence (BI) will continue through 2017
- By 2015, BI emphasis will shift from reporting-centric to analysis-centric
- Until 2016, big data confusion will constrain spending on BI and analytics software to single-digit growth

Recent Gartner survey shows 30 percent of organizations across all industries have made some investment in big data of which only a fraction have made it to production!

Are we falling into the Midas trap?

Is big data becoming our new ‘gold’ to be created upon touch?

More data is collected in one day now than existed in the world just a few years ago!

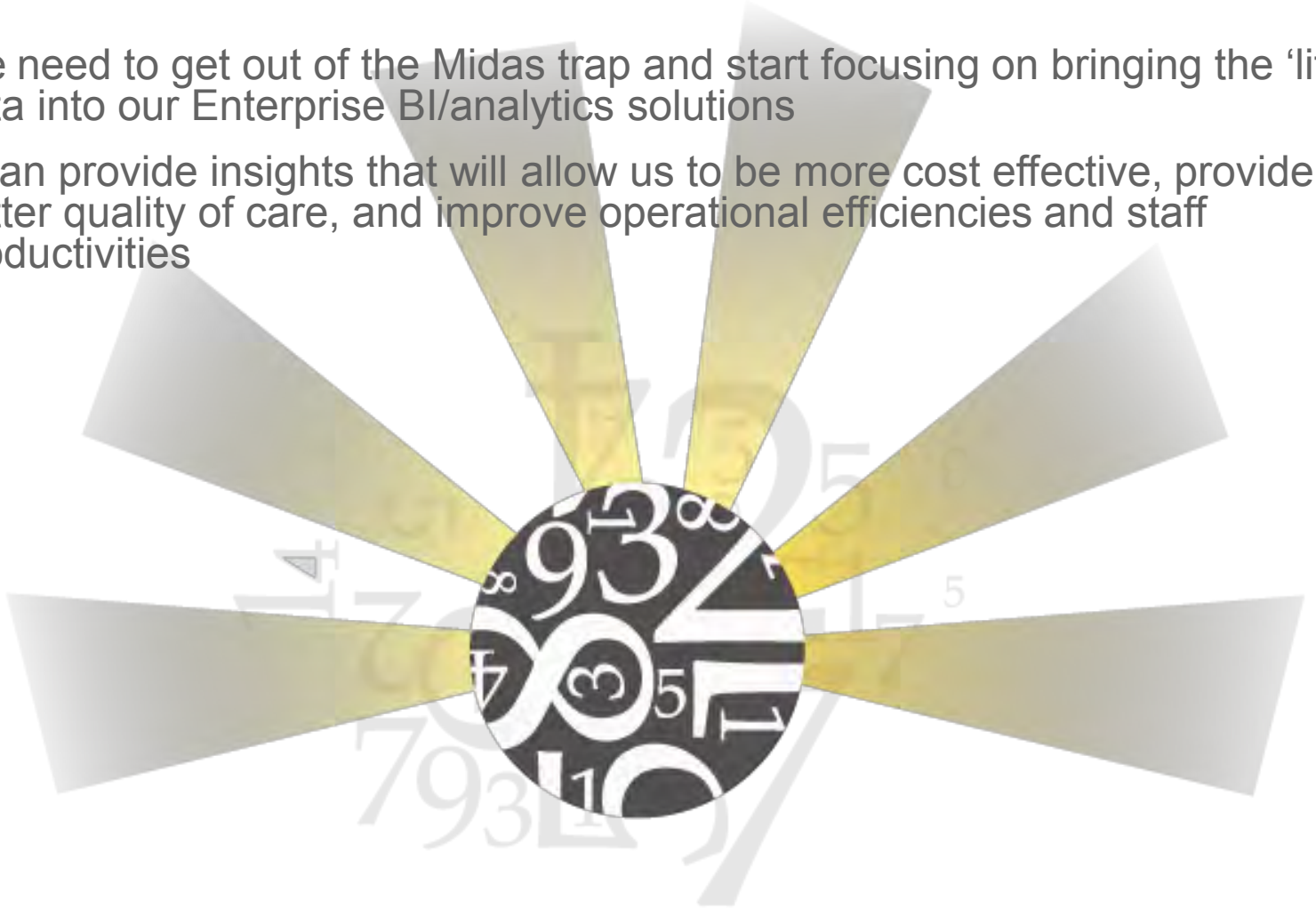


- Managing and storing this vast amount of data is a monumental challenge in itself!
- Bringing it into enterprise analytics is costly and, may be, not always useful!

“There is gold in the mountain of data!” is the big cry

Let your 'little' data shine!

- We need to get out of the Midas trap and start focusing on bringing the 'little' data into our Enterprise BI/analytics solutions
- It can provide insights that will allow us to be more cost effective, provide better quality of care, and improve operational efficiencies and staff productivities



Question foremost in people's minds:

Where is the business critical information?

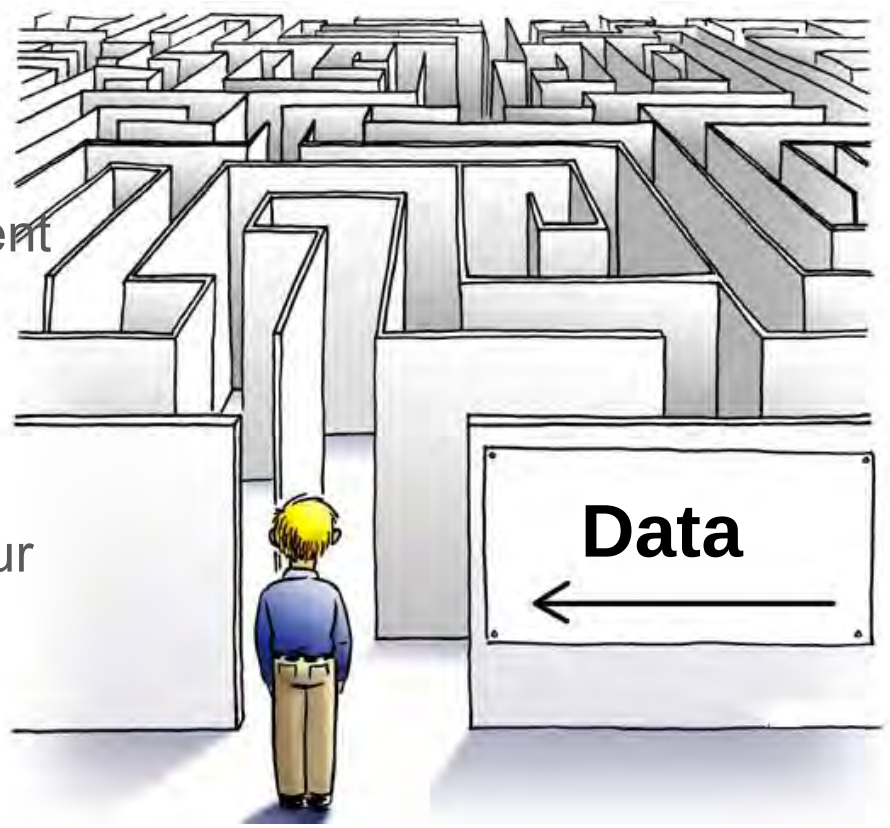
Where are the inefficiencies?

Where are the opportunities?

- Quality improvement
- Chronic disease management
- Bundled payments
- Outreach
- Referrals

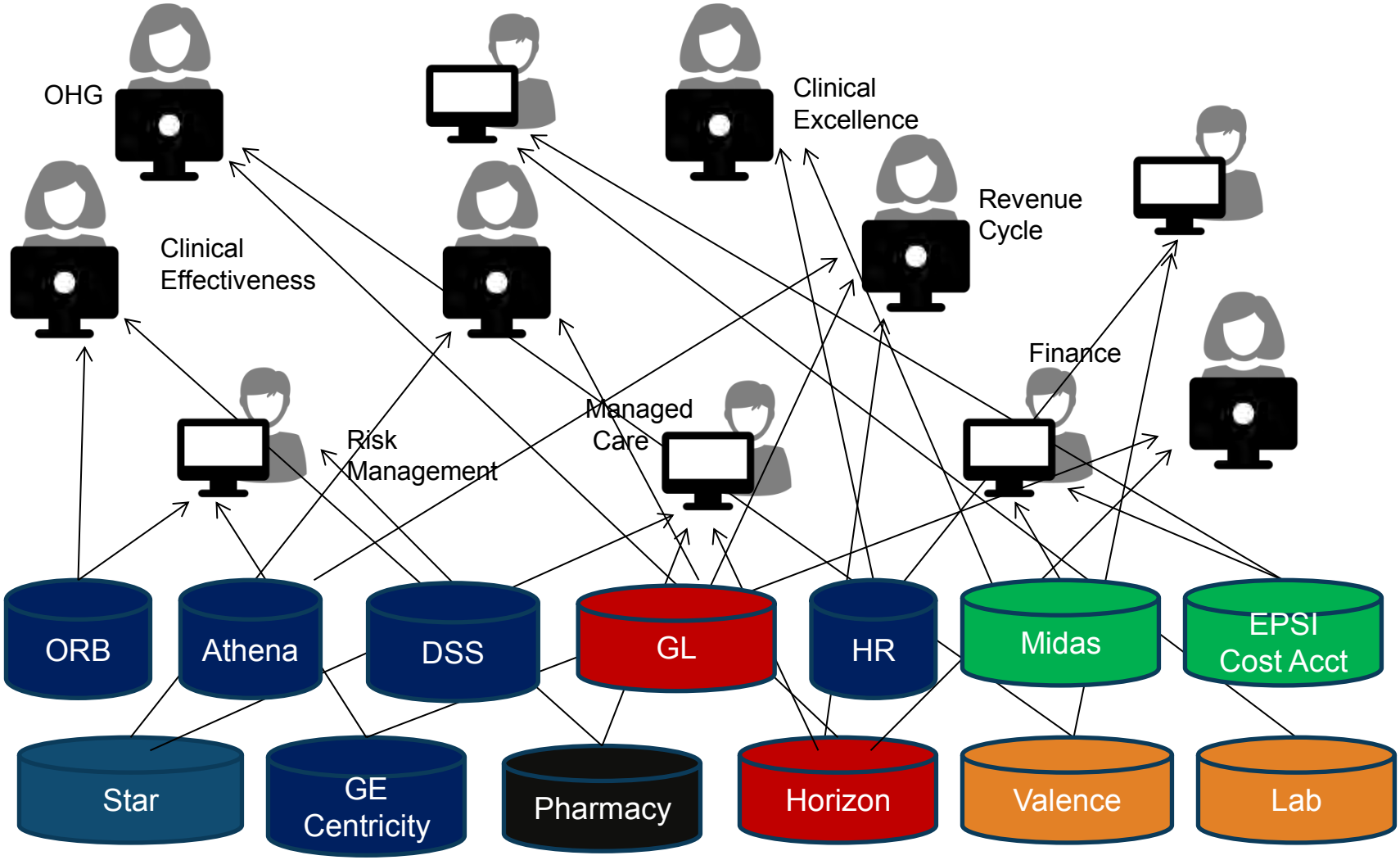
What services/product-lines do our patients want?

What is not working?

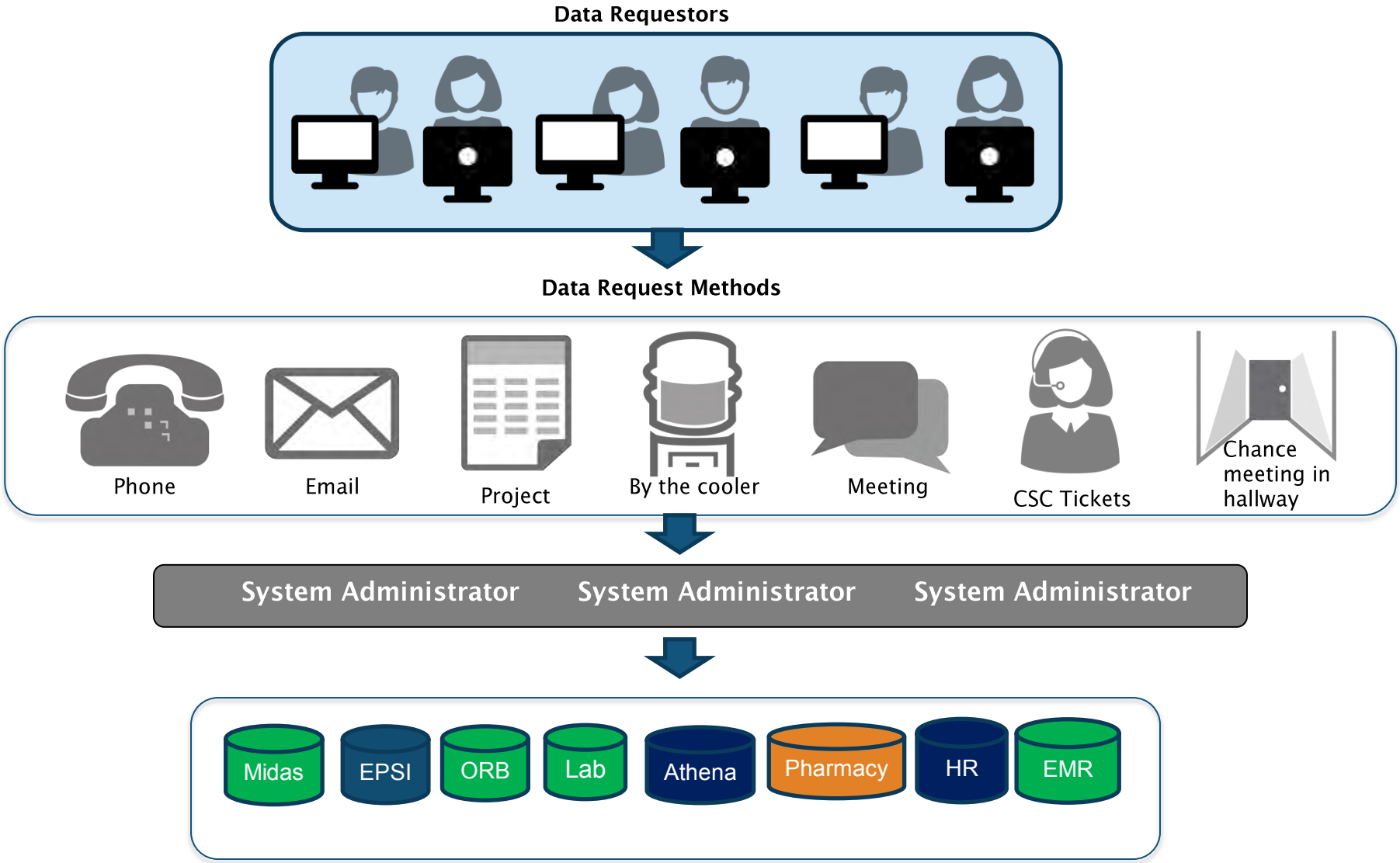


And how are they getting this information?

Many independent initiatives to integrate data!

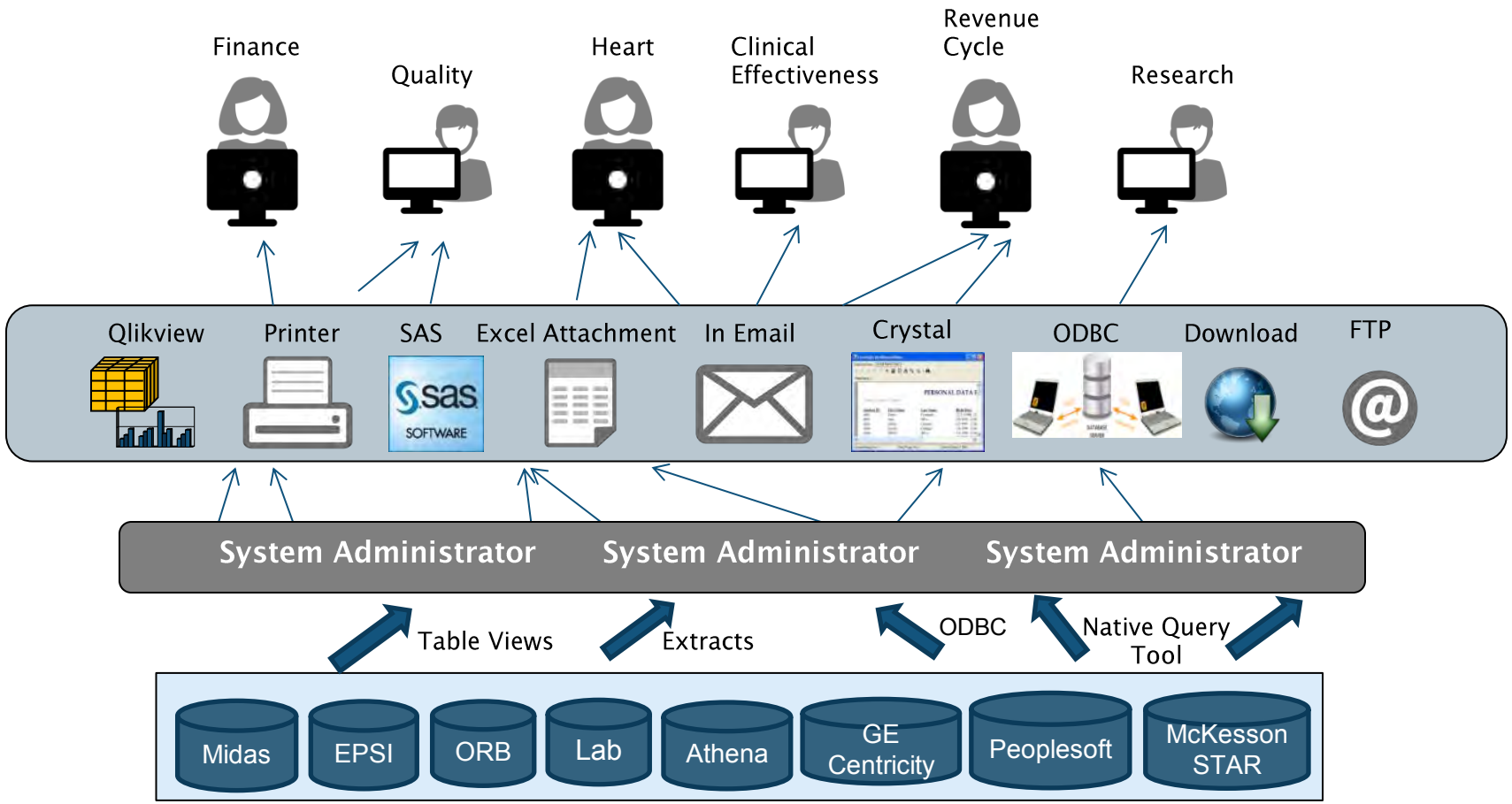


What is the data request process?



Data Dissemination Process

- Little or no security
- No standard tools for accessing data
- No standard tools for extracting data



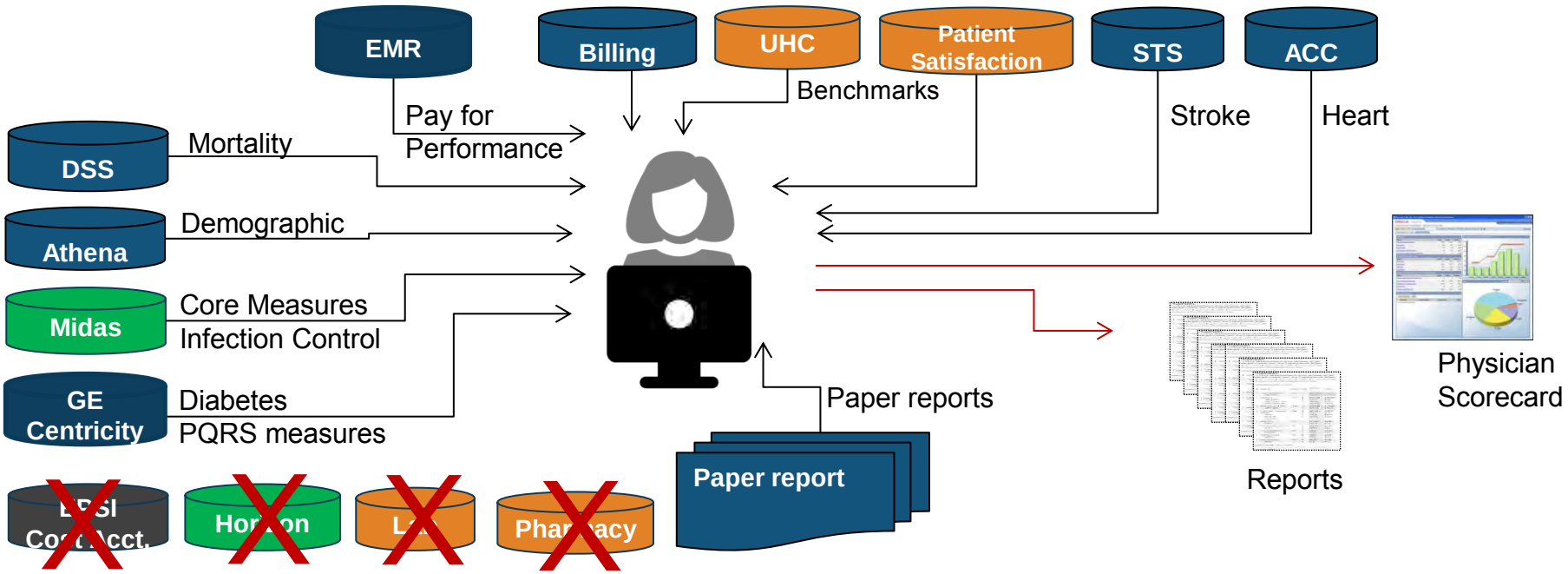
Niche/Point Solutions

- Without a thought out plan for enterprise analytics we fill the gap with niche/silo solutions

Niche Solutions

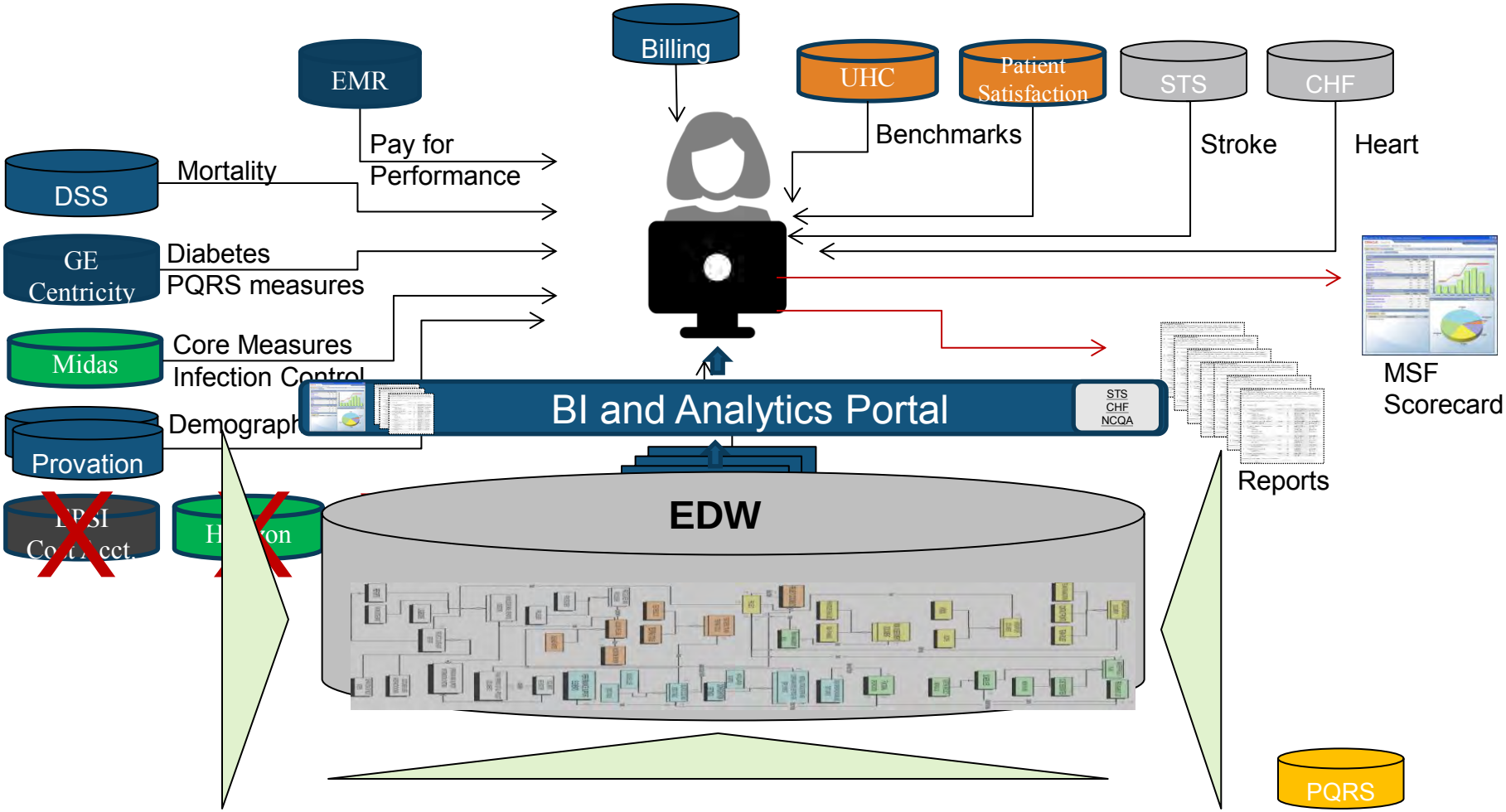
Inconsistent Reporting

Current BI & Analytics: A Real Story!

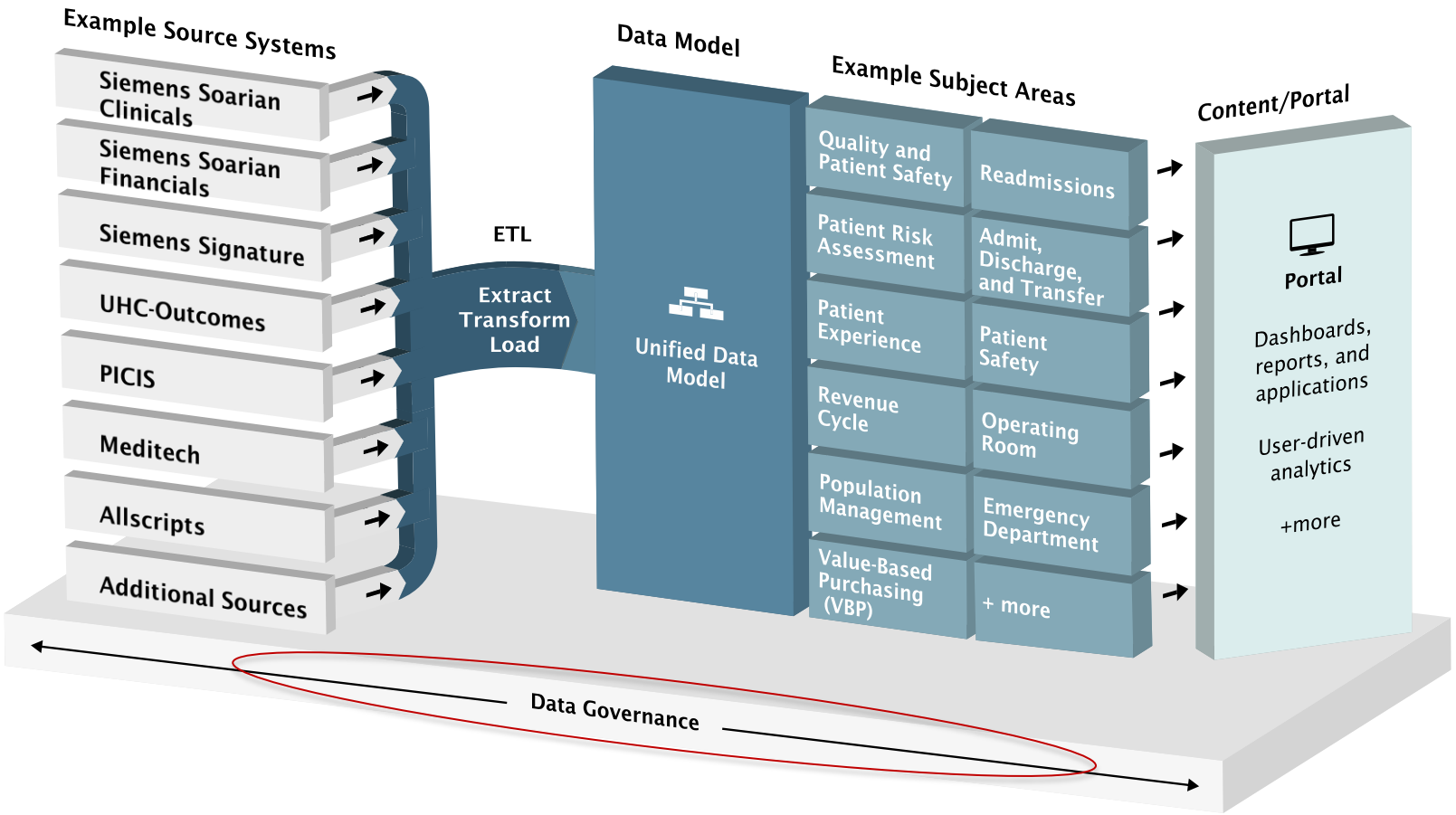


Jane is responsible for creating the Physician Scorecard as well as providing numerous reports for Physicians and Management

What Jane and other people want?
A one stop shop for their data needs!

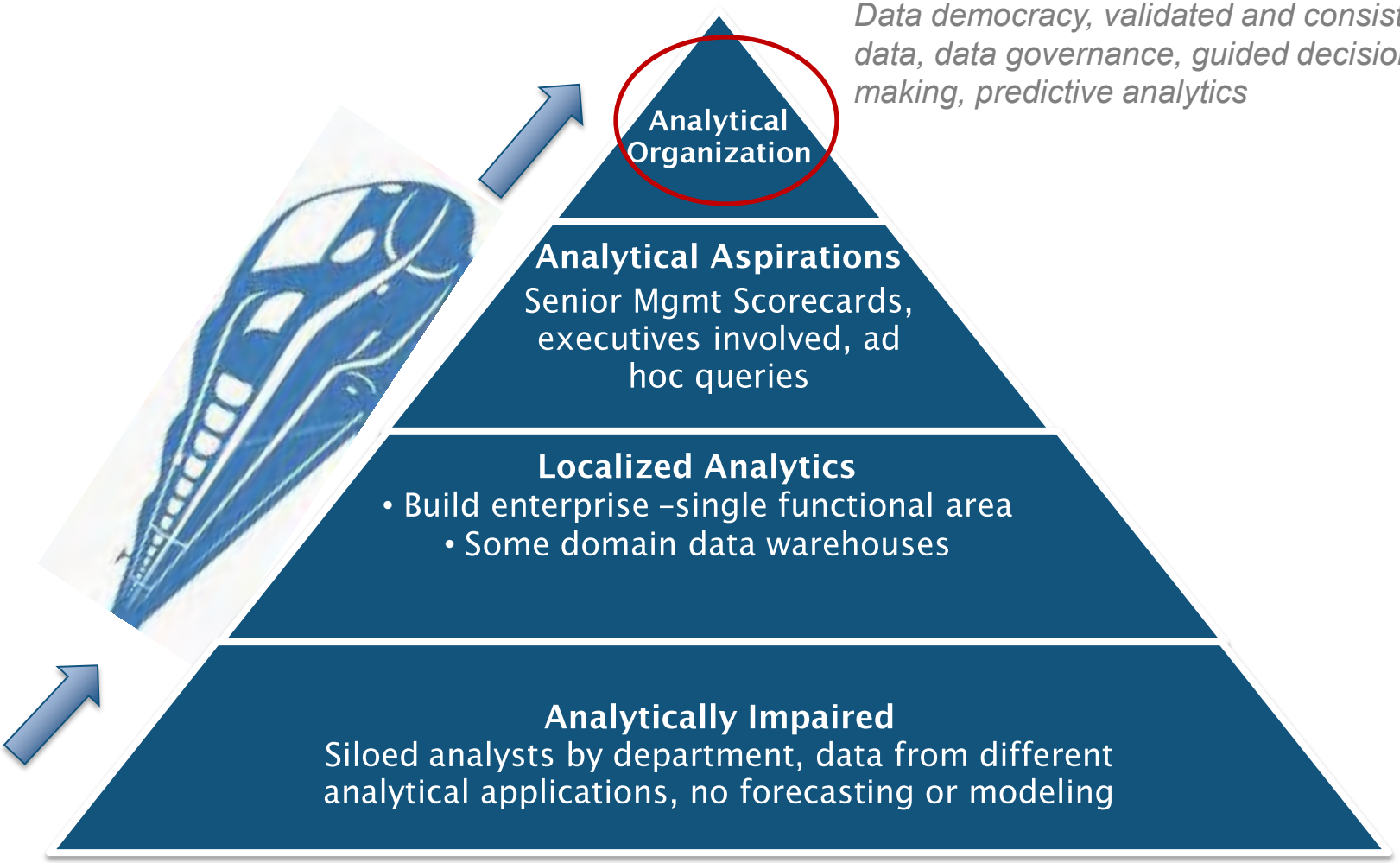


EDW Architecture:



Begin With The End In Mind

Data democracy, validated and consistent data, data governance, guided decision making, predictive analytics



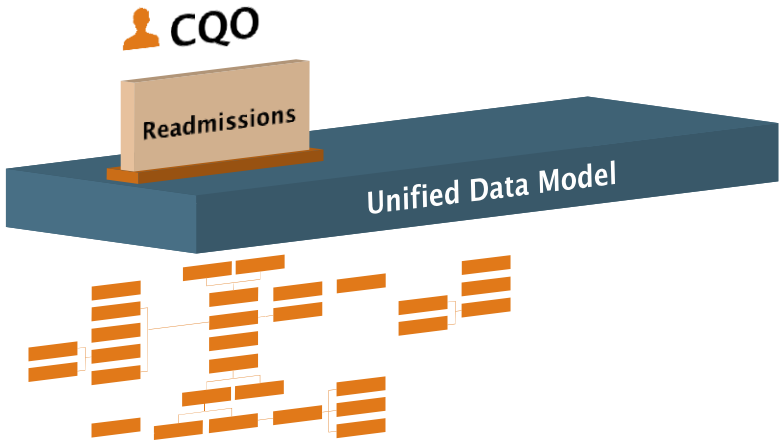
Source: Analytics at Work: Davenport, Harvard Business Press, 2010

Achieving the Vision: Think Big, Start Small!

- Build consensus on buy vs build for the EDW
- Prioritize focus areas and issues
- Take a phased approach to implement and demonstrate value & find a vendor partner
  - Pick the first question you want answered (prioritize)
  - Think of the next up use case and leverage the little data that answered the first use case
  - Before you know, you have an enterprise view of the data

Strategic Approach: Phased implementation

- Align and prioritize your requirements
- Focus initially on areas of high return value
- This approach populates an initial set of data within the unified data model

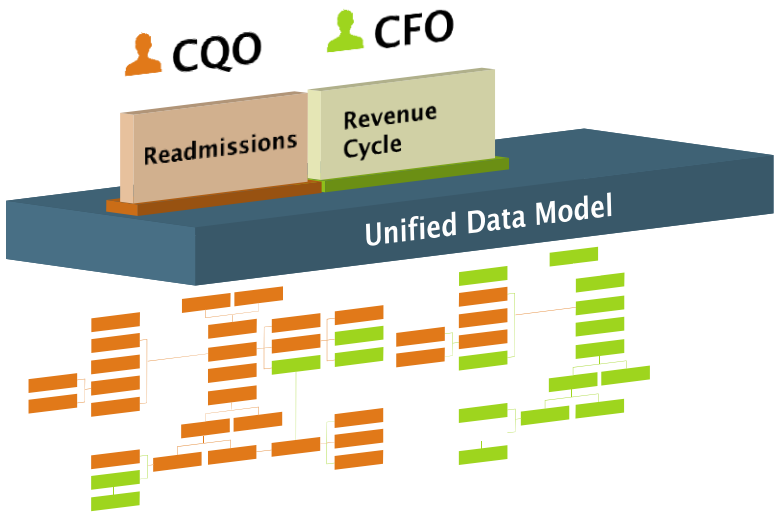


Business Questions You Can Answer:

- *What diagnoses or combination of diagnoses are contributing most to our readmission rates?*
- *Why is oncology showing 20% higher readmissions than the prior year/quarter/month?*

Strategic Approach: Build on the foundation

- As additional areas are populated, the new data augments what already exists
- This saves time and effort as the underlying data model continues to grow

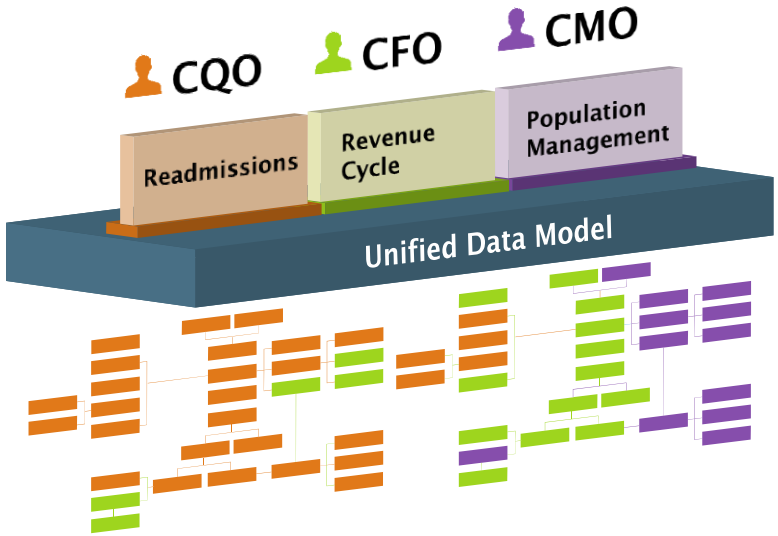


Business Questions You Can Answer:

- *What are my total days in AR, copay's by hospital?*
- *What are the trends over last month for adjustments, denials and payments?*
- *Are payments coming on time?*
- *How many days in coding?*

Strategic Approach: Add as requirements evolve

Consistent data and a unified data model make the move from the first use case to the “Next Up” use case simpler and faster to implement

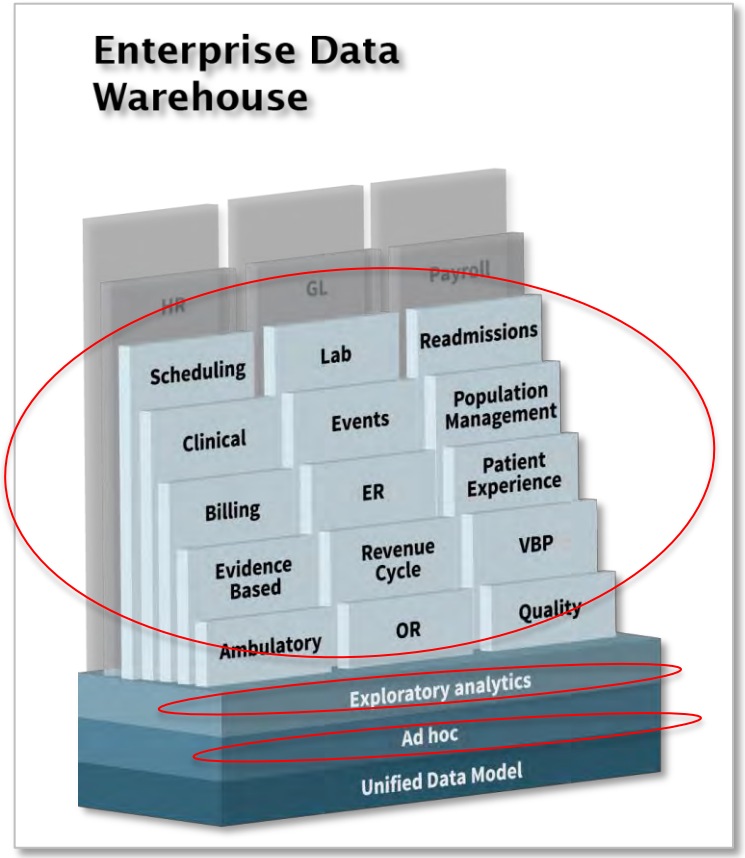


Business Questions You Can Answer:

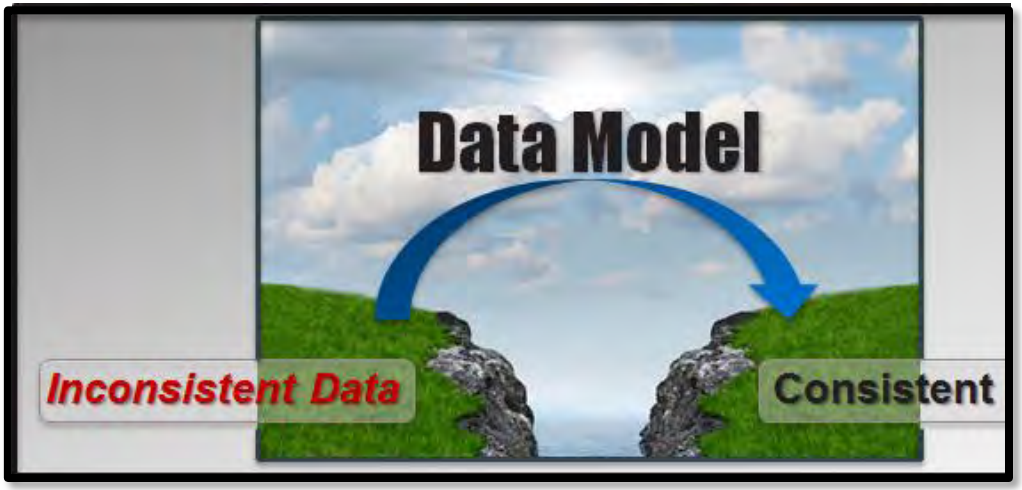
- *Who are our chronic disease patients?*
- *Who are our high risk patients?*
- *Which condition shows a higher risk among our population: diabetes or heart failure?*

Before you know it, you have crossed the chasm!

Ultimately you need enterprise view of data for consistent reporting



Consistent Reporting



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Little Data, Big Impact: Use Cases!

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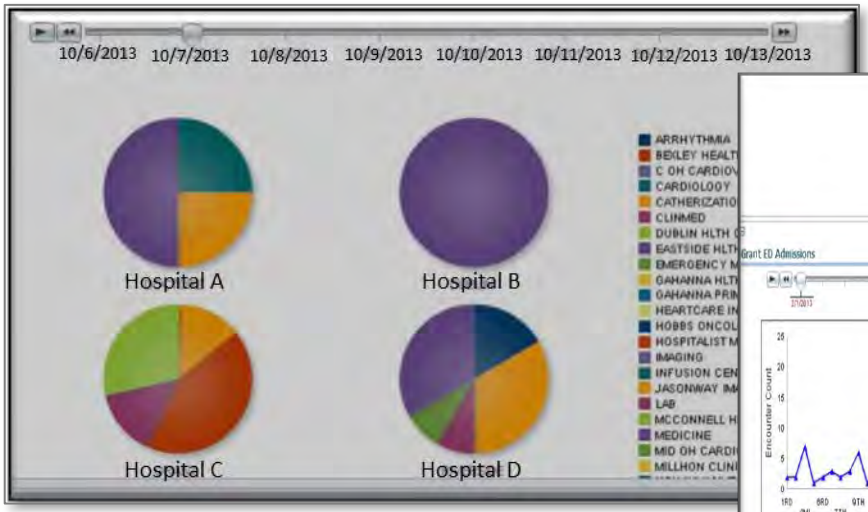
Use Case: Reducing Redundancies

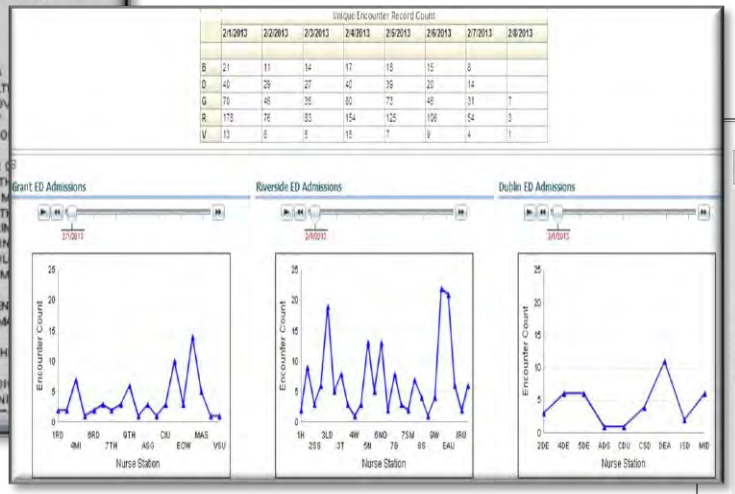
Hundreds of redundant reports consolidated into dashboards with drill down leading to

- Time savings
- Consistent data and reporting
- Better staff satisfaction
- Improved productivity and efficiency
- Insights into problems areas

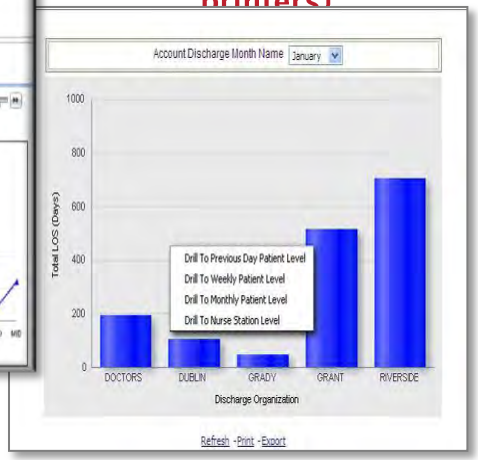
Medicare outpatients admitted from clinics (38 reports)



Admissions through ED (19 reports)



LOS Dashboard (34 reports were going to printers)



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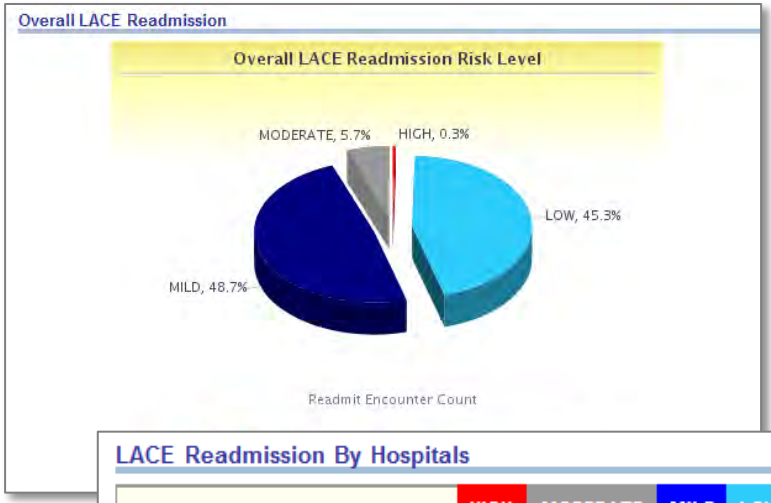
Use Case: Readmission Reduction (Predictive Analytics)

Need: To be more proactive and cost effective in mitigating the impact of reimbursement changes for readmissions

Solution: Daily reporting with the individual risk scores for each of the LACE attributes, along with the composite LACE index displayed in descending order



LACE Readmission By Hospitals

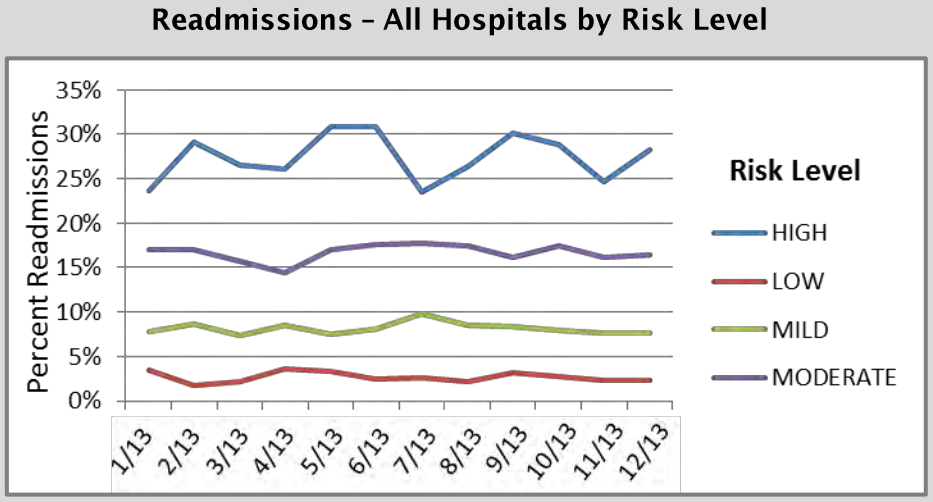
	HIGH	MODERATE	MILD	LOW	Total By Hospital
NORTH HOSPITAL	0	9	43	31	83
SOUTH HOSPITAL	0	1	7	25	33
WEST HOSPITAL	0	0	14	13	27
EAST HOSPITAL	1	19	111	85	216
CENTRAL HOSPITAL	2	20	244	236	502
Total By Risk	3	49	419	390	861

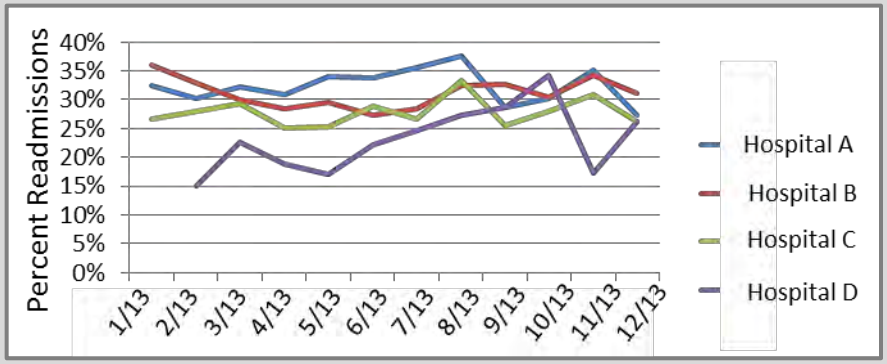
Next Up Use Case: Readmission Trends

Combine LACE risk scores with readmissions subject area to enable deeper analysis:

- Trending of readmissions by risk level
- Trending of high risk patients by hospitals

  Are some hospitals doing better than others?
- Drill down to diagnoses to identify focus areas
- Drill down to clinical service to identify problem areas
- Are remediation measures for readmissions reduction being effective





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Days in Coding Dashboard

Discharge to Bill Summary 0-10
Charges and Patient Count Trend

Please select a view: Data Table

Account Discharge Month Name	Patient Count	Total Charges
January	1,885	$168,036,520.93
February	1,090	$100,140,581.54
March	1,716	$152,484,430.12
April	2,298	$188,516,118.84
May	1,973	$156,760,002.17
June	1,693	$144,753,008.51
July	1,784	$156,360,422.51
August	2,197	$171,944,718.43
September	2,091	$163,653,703.35
October	2,231	$197,839,278.78
November	1,449	$139,778,457.95
December	417	$94,835,785.19

Discharge to Bill Summary 11-29
Charges and Patient Count Trend

Please select a view: Graph

Discharge to Bill Summary 31-60
Charges and Patient Count Trend

Please select a view: Graph

Discharge to Bill (60+ Days)
Charges and Patient Count Trend

Please select a view: Graph

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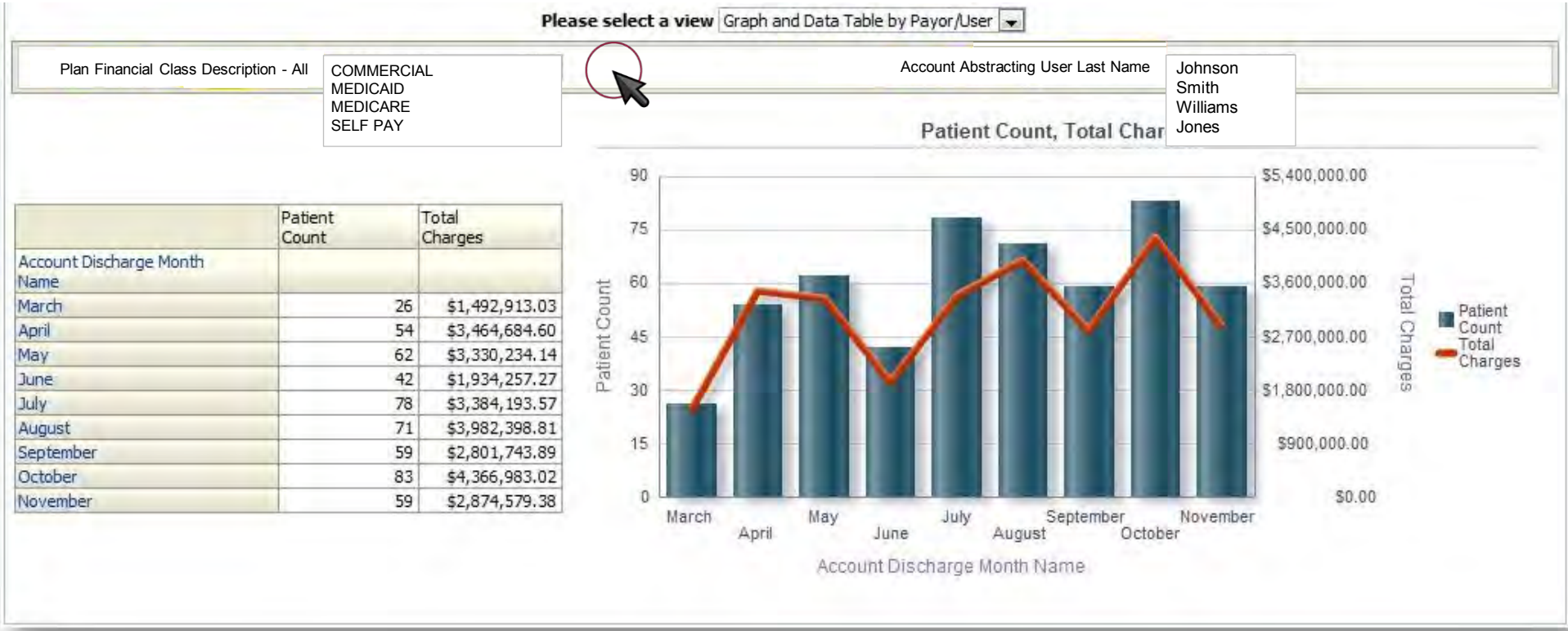
Graph and Data Table by Payer/User View



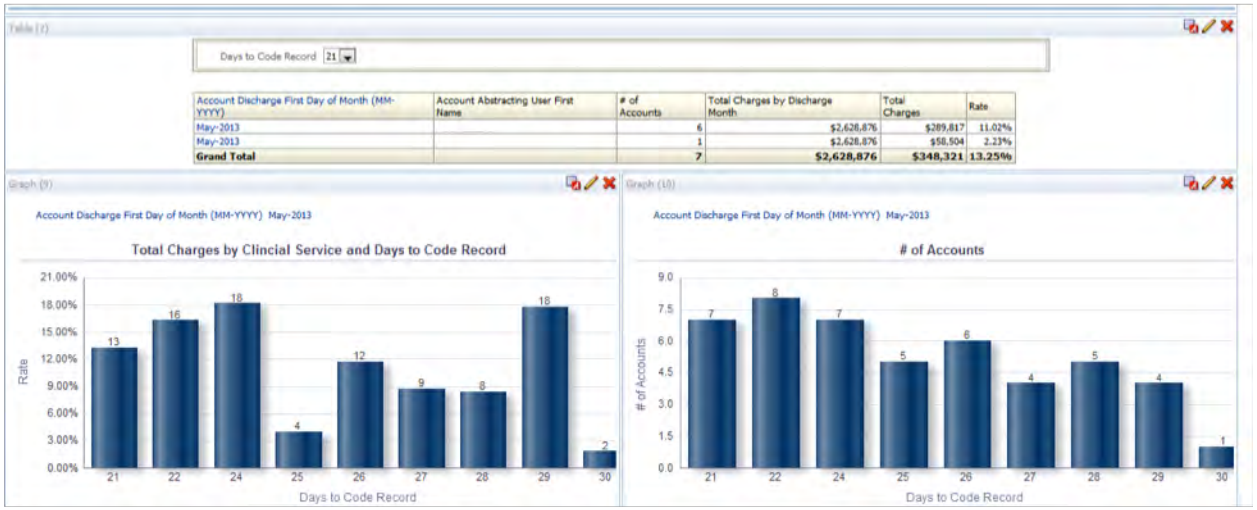
Account Discharge Month Name	Patient Count	Total Charges
March	26	$1,492,913.03
April	54	$3,464,684.60
May	62	$3,330,234.14
June	42	$1,934,257.27
July	78	$3,384,193.57
August	71	$3,982,398.81
September	59	$2,801,743.89
October	83	$4,366,983.02
November	59	$2,874,579.38

Days from Discharge to Final Coding

Overview | By Service Line | By Abstractor

Days to Code by Abstractor

Further breakdown by a specific abstractor



Days to Code by Abstractor 0-10

Account Discha
January

PALMER	1	$23,594	$69,841,607	0.03%
RICHELLE	1	$43,221	$69,841,607	0.06%

Rows 1 - 25

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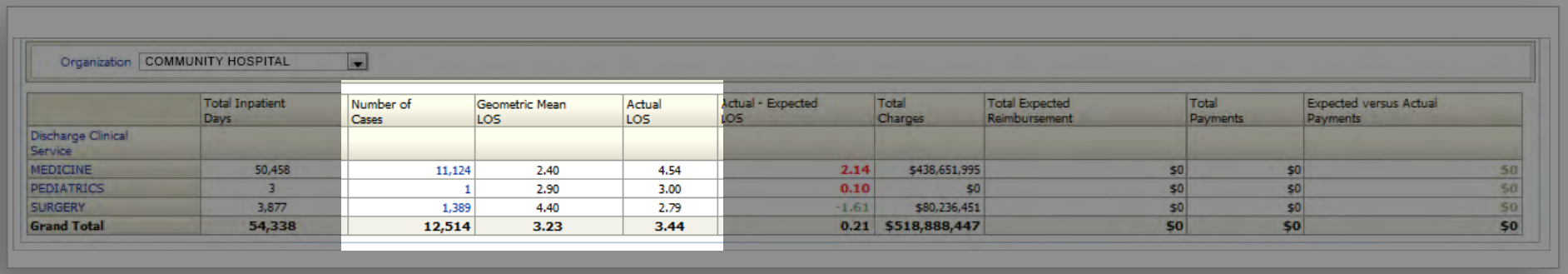
Actual vs. Expected LOS



Organization: COMMUNITY HOSPITAL

Discharge Clinical Service	Total Inpatient Days	Number of Cases	Geometric Mean LOS	Actual LOS	Actual - Expected LOS	Total Charges	Total Expected Reimbursement	Total Payments	Expected versus Actual Payments
MEDICINE	50,458	11,124	2.40	4.54	2.14	$438,651,995	$0	$0	$0
PEDIATRICS	3	1	2.90	3.00	0.10	$0	$0	$0	$0
SURGERY	3,877	1,389	4.40	2.79	-1.61	$80,236,451	$0	$0	$0
Grand Total	**54,338**	**12,514**	**3.23**	**3.44**	**0.21**	**$518,888,447**	**$0**	**$0**	**$0**

- Allows users to track
- Drillable to patient a
- Can group the report by a specific DRG, clinical service or diagnosis/procedure code to look at trends.

Aggregates the number of total cases by service line and compares the GMLOS with the ALOS accordingly over a set time period.

Proactive Monitoring of Charge Capture

Problem: *Loss of revenue because of missed charge capture*

Approach: *Daily audit report combines orders and charges to identify missed charges*

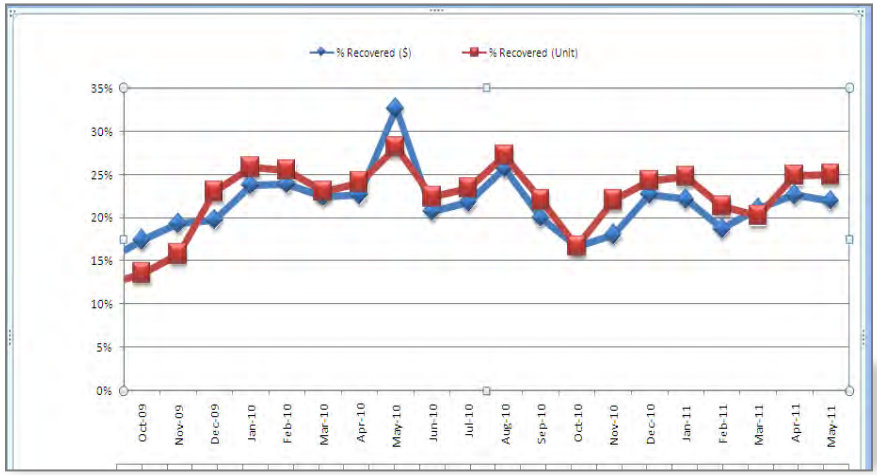
- Analysis of report identifies 20 to 25 % missed charges on a routine basis

Result:

- Recovery of revenue – **$500K to $700K/month**
- Insights into broken operations:
  - Nurses entering charges
    - Do not have time
    - Get interrupted/forget
    - Charges missed during shift changes

Process Improvement: *Full time dedicated person to enter charges on Units*

- Training/reminders on capturing charges
- New audit report with data from EDW
  - Missing documentation restricting charge entry
  - Better documentation training
- 100% charge capture expected



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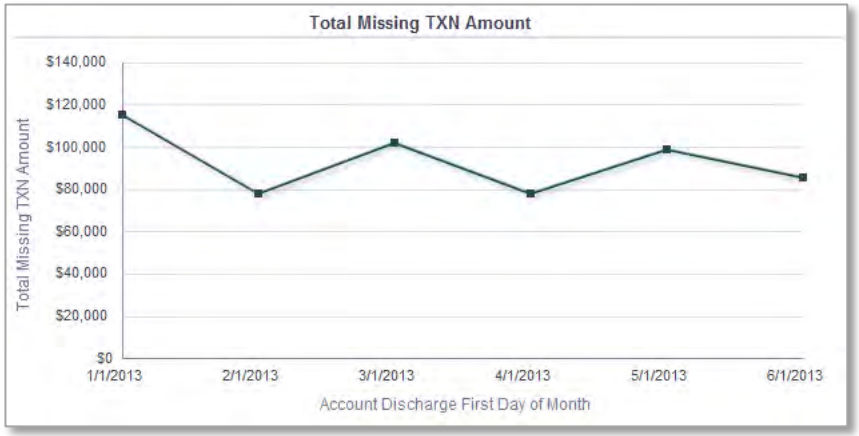
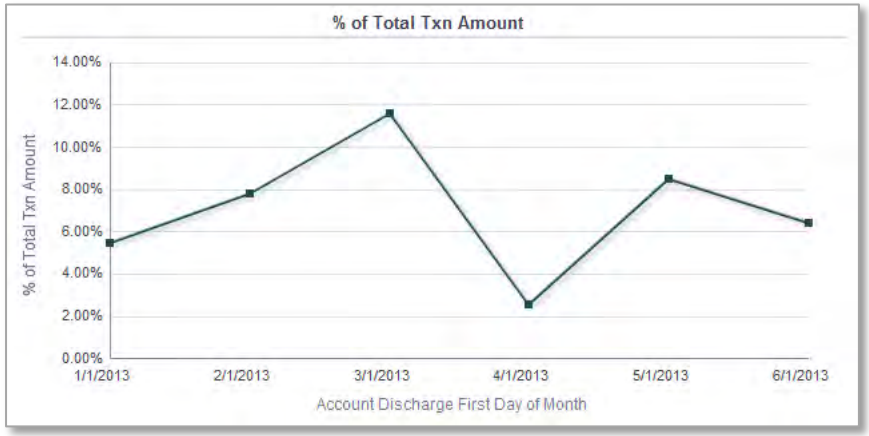
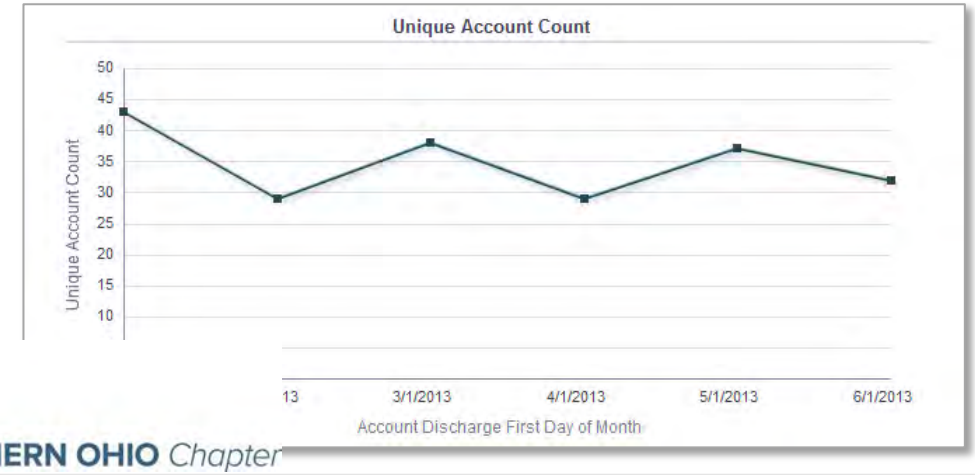
Recovery Room Charges without Anesthesia

Account Discharge First Day of Month	Unique Account Count	Avg TXN amount	Total Missing TXN Amount	Total Transaction Amount	% of Total Txn Amount
1/1/2013	43	$2,678	$115,154	$2,119,736	5.43%
2/1/2013	29	$2,678	$77,662	$1,000,419	7.76%
3/1/2013	38	$2,678	$101,764	$879,738	11.57%
4/1/2013	29	$2,678	$77,662	$3,051,681	2.54%
5/1/2013	37	$2,678	$99,086	$1,165,648	8.50%
6/1/2013	32	$2,678	$85,696	$1,336,130	6.41%
Grand Total	**208**		**$557,024**	**$9,553,350**	**5.83%**







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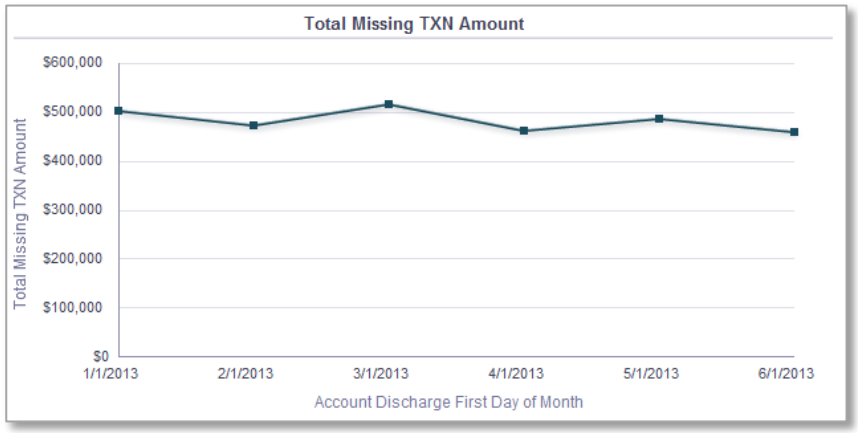
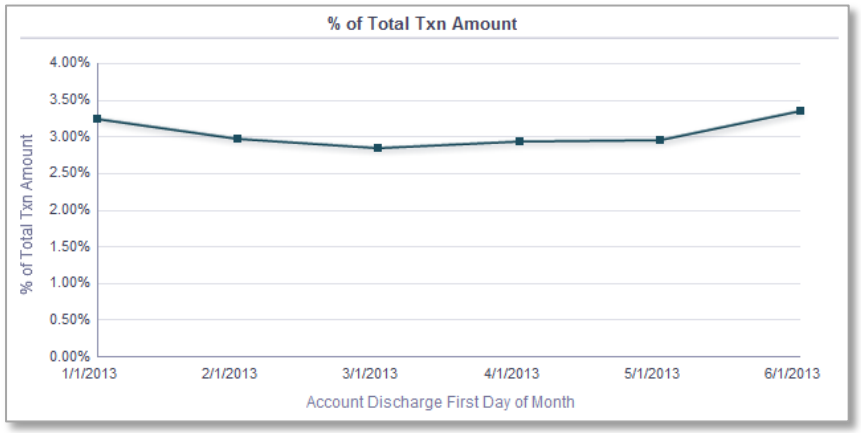
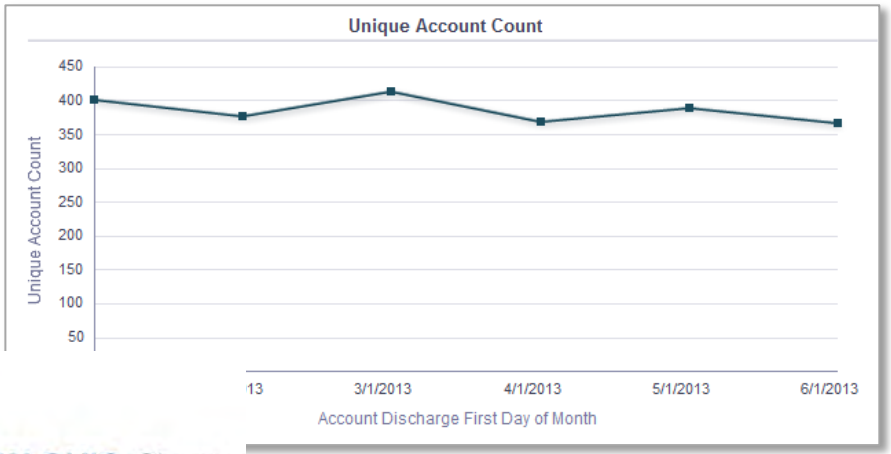
Anesthesia Charges without Recovery Room

Account Discharge First Day of Month	Unique Account Count	Avg TXN amount	Total Missing TXN Amount	Total Transaction Amount	% of Total Txn Amount
1/1/2013	401	$1,250	$501,250	$15,469,873	3.24%
2/1/2013	377	$1,250	$471,250	$15,849,944	2.97%
3/1/2013	413	$1,250	$516,250	$18,128,186	2.85%
4/1/2013	368	$1,250	$460,000	$15,699,227	2.93%
5/1/2013	388	$1,250	$485,000	$16,472,485	2.94%
6/1/2013	367	$1,250	$458,750	$13,705,991	3.35%
Grand Total	**2314**		**$2,892,500**	**$95,325,706**	**3.03%**







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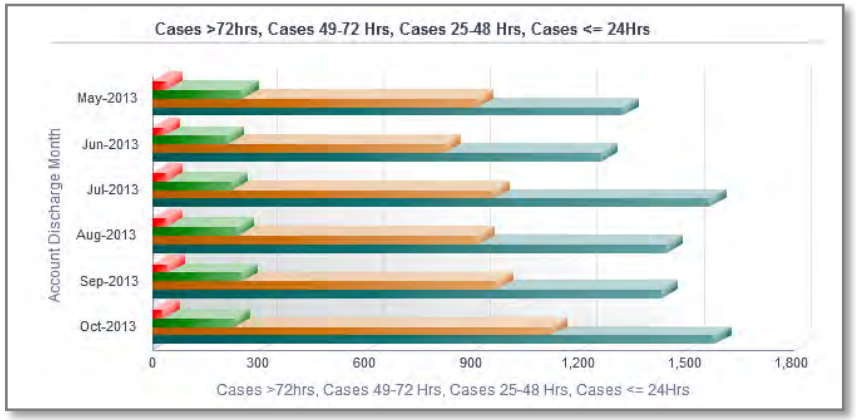
Use Case: Observation Patients Dashboard

Need: *to be more proactive on managing Observation patients*

Solution: *Monthly/Daily Dashboard view with drill down to monitor Observation patients*

- How long are the patients staying as Observation patients
- How many above 72 hours?
- Should they have been admitted?
- How does it affect the new 2 midnight stay ruling?



Account Discharge Month: May-2013

Hospital	Cases <= 24Hrs	Cases 25-48 Hrs	Cases 49-72 Hrs	Cases >72hrs	Total
Hospital A	2	2	0	0	4
Hospital B	204	130	42	1	378
Hospital C	80	52	12	2	146
Hospital D	38	34	6	0	78
Hospital E	412	257	83	17	768
Hospital F	581	434	108	19	1142
Health System	**1317**	**909**	**251**	**39**	**2516**

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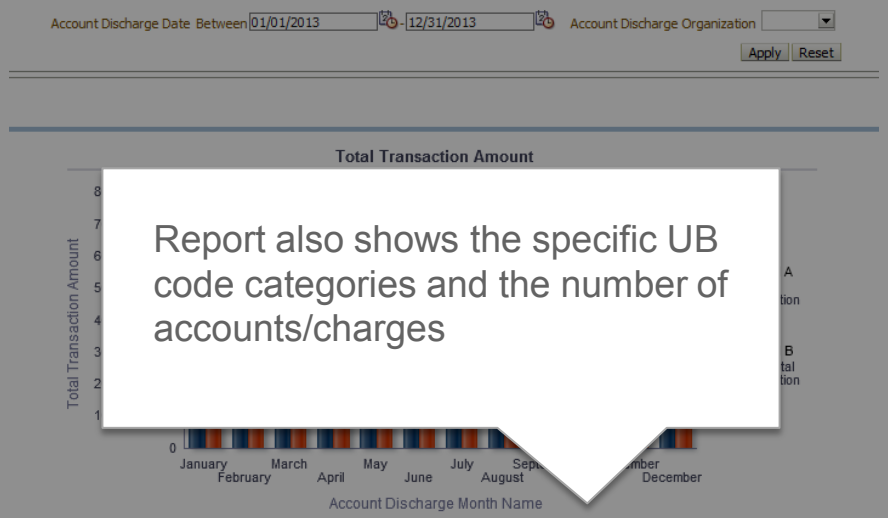
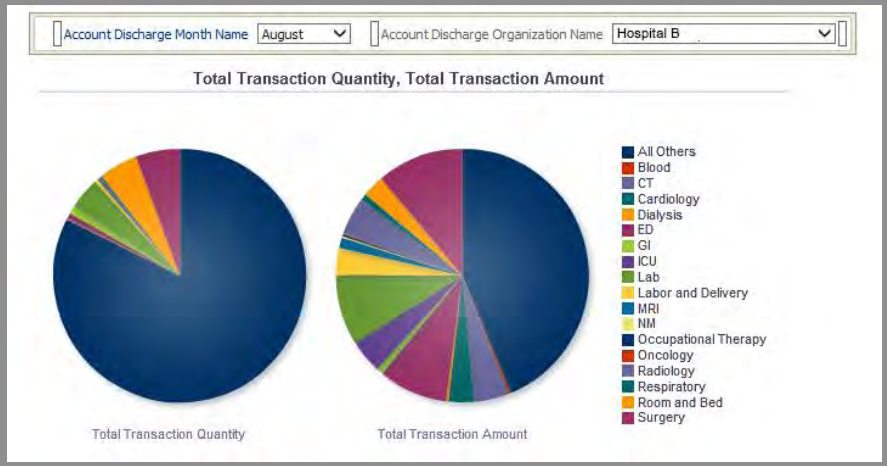
Resource Utilization

Summary | Blood | + more

Summary UB Code



Report also shows the specific UB code categories and the number of accounts/charges



Account Discharge Month Name: August

	Total Transaction Amount			
	Hospital A	Hospital B		
Resource Utilization Category				
All Others	74,006,335	254,		
Blood	210,546	1,		
CT	4,933,843	25,		
Cardiology	351,454	18,		
Dialysis	125,620	2,		
ED	11,756,167	51,		
GI	542,174	4,		
ICU	2,820,127	25,		
Lab	8,478,114	52,		
Labor and Delivery	2,726,743	19,		
MRI	840,673	7,		
NM	165,762	1,153,674	12.0%	88.0%
Occupational Therapy	1,692,568	1,382,263	47.9%	52.1%
Oncology		987,933		100.0%
Radiology	3,847,291	28,006,744	16.1%	83.9%
Respiratory	786,841	4,741,087	13.5%	86.5%
Room and Bed	6,779,578	16,367,967	30.7%	69.3%
Surgery	34,577,525	64,411,838	32.7%	67.3%
Total	**154,641,360**	**580,849,772**	**17.9%**	**82.1%**

Allows for high level comparison of the total number of transactions for specific UB Revenue Codes and the total associated transaction amount

Resource Utilization

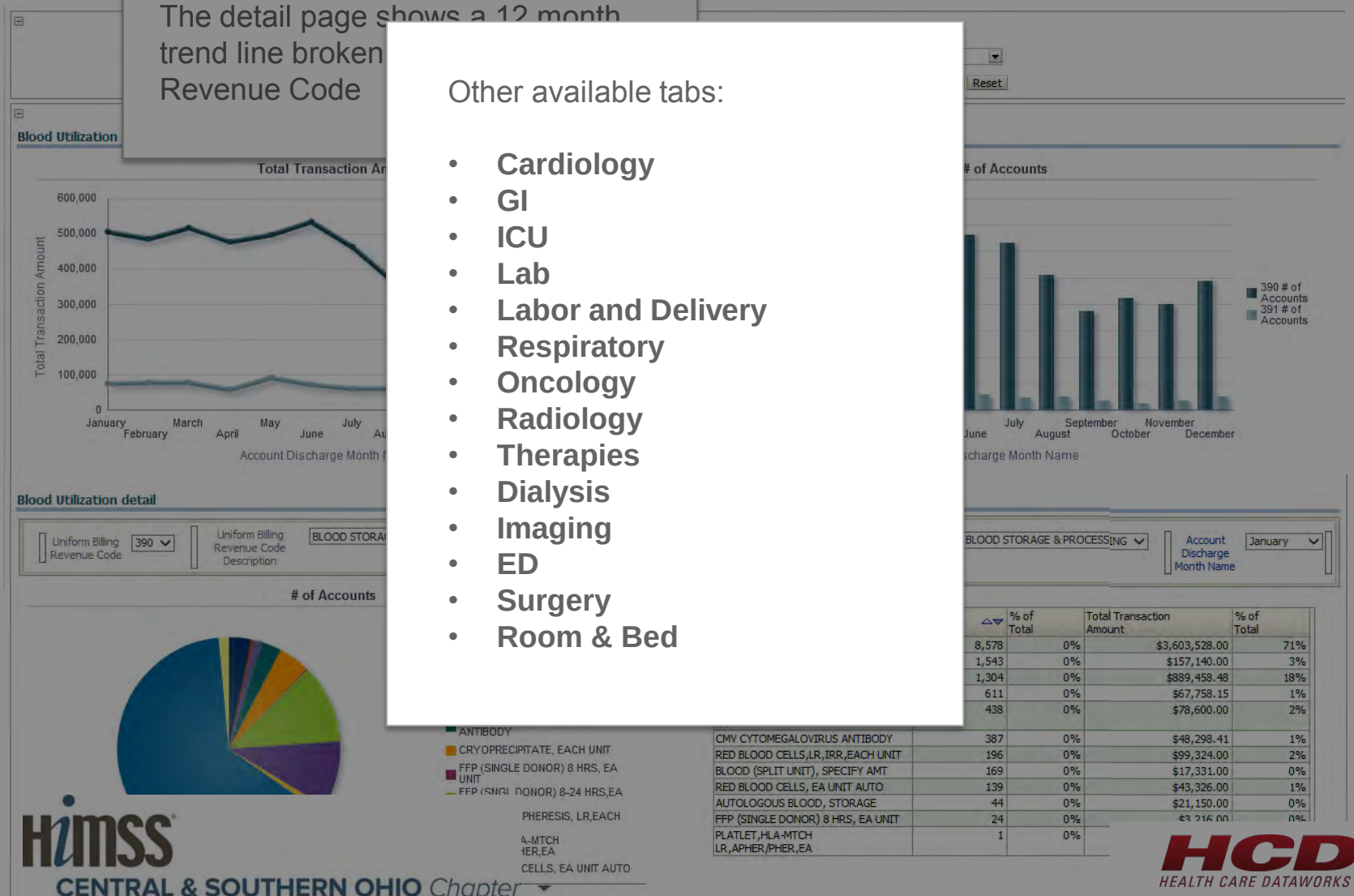
Summary | Blood | + more

Blood Utiliza

The detail page shows a 12 month trend line broken Revenue Code

Other available tabs:

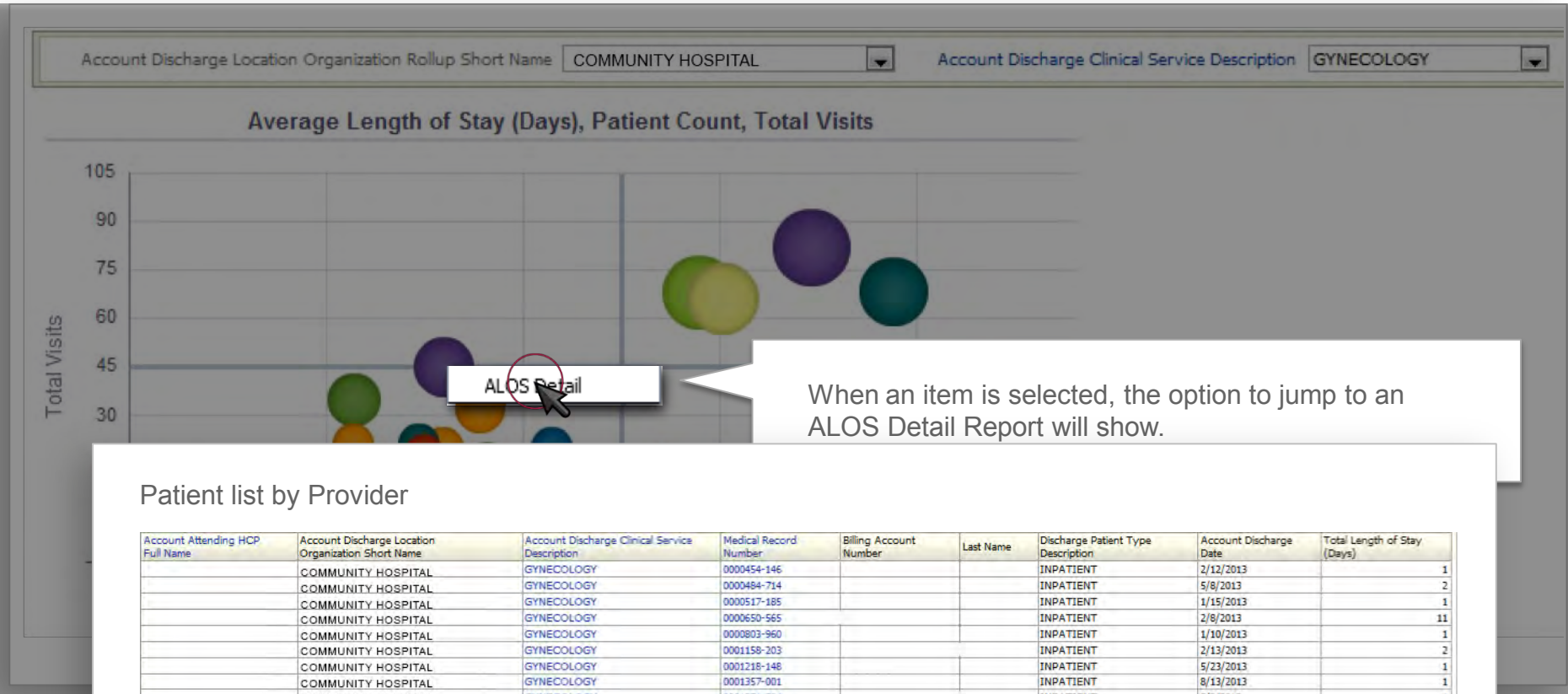
- Cardiology
- GI
- ICU
- Lab
- Labor and Delivery
- Respiratory
- Oncology
- Radiology
- Therapies
- Dialysis
- Imaging
- ED
- Surgery
- Room & Bed



HIMSS CENTRAL & SOUTHERN OHIO Chapter

HCD HEALTH CARE DATAWORKS

ALOS by Attending Provider



Patient list by Provider

Account Attending HCP Full Name	Account Discharge Location Organization Short Name	Account Discharge Clinical Service Description	Medical Record Number	Billing Account Number	Last Name	Discharge Patient Type Description	Account Discharge Date	Total Length of Stay (Days)
	COMMUNITY HOSPITAL	GYNECOLOGY	0000454-146			INPATIENT	2/12/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0000484-714			INPATIENT	5/8/2013	2
	COMMUNITY HOSPITAL	GYNECOLOGY	0000517-185			INPATIENT	1/15/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0000650-565			INPATIENT	2/8/2013	11
	COMMUNITY HOSPITAL	GYNECOLOGY	0000803-960			INPATIENT	1/10/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0001158-203			INPATIENT	2/13/2013	2
	COMMUNITY HOSPITAL	GYNECOLOGY	0001218-148			INPATIENT	5/23/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0001357-001			INPATIENT	8/13/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0001371-704			INPATIENT	5/3/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0001457-196			INPATIENT	3/29/2013	4
	COMMUNITY HOSPITAL	GYNECOLOGY	0001553-496			INPATIENT	5/21/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0001754-961			INPATIENT	3/12/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0001806-696			INPATIENT	2/21/2013	3
	COMMUNITY HOSPITAL	GYNECOLOGY	0001835-950			INPATIENT	4/30/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0001850-522			SHORT STAY	6/27/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0001863-794			INPATIENT	5/14/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0001903-211			INPATIENT	3/19/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0001963-531			INPATIENT	6/28/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0002671-933			INPATIENT	7/16/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0002748-339			INPATIENT	3/5/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0002837-930			INPATIENT	3/26/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0003131-847			INPATIENT	5/2/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0003200-665			INPATIENT	7/4/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0003273-754			INPATIENT	1/4/2013	1
	COMMUNITY HOSPITAL	GYNECOLOGY	0003299-577			INPATIENT	1/8/2013	1

Antimicrobial Usage Reduction

Purpose: *To monitor antimicrobial drug usage*

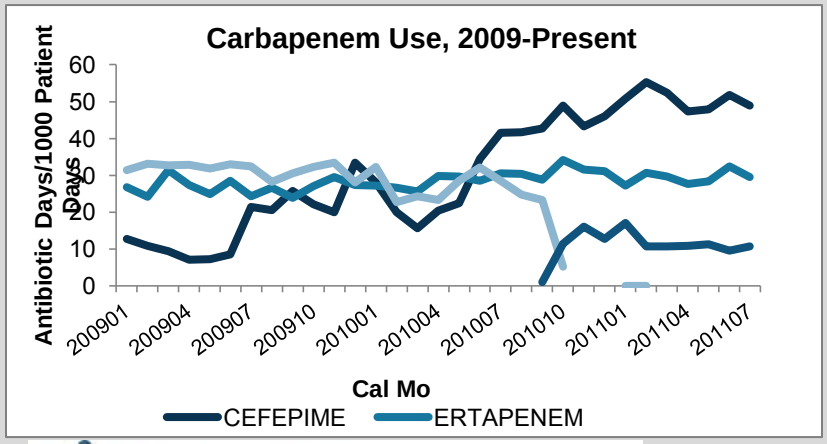
- Monitor the impact of intervention on utilization of antimicrobial drugs
- Monitor the trend to see the effectiveness of the intervention

Approach: *Leveraging the EDW to help monitor Antimicrobial usage*:

Results: *Targeted Drug utilization dropped off by 50% with significant cost savings*

- The savings were able to justify the intervention program cost
- IV form of one drug replaced with more cost effective oral form
- Analysis provides a good measurement tool for future studies

Net savings: $1,101,727/year



Actual Drug Cost Savings	
Drug	Net Savings/Year
Linezolid Restriction	$517,645
Caspofungin Batching	$65,100
Imepenem	$124,540
Pipracillin/Tazobactam	$288,814
Replace Vancomycin capsules with Oral Syringe	$105,628

Use Case: Population Health Management

Identify your chronic disease patients

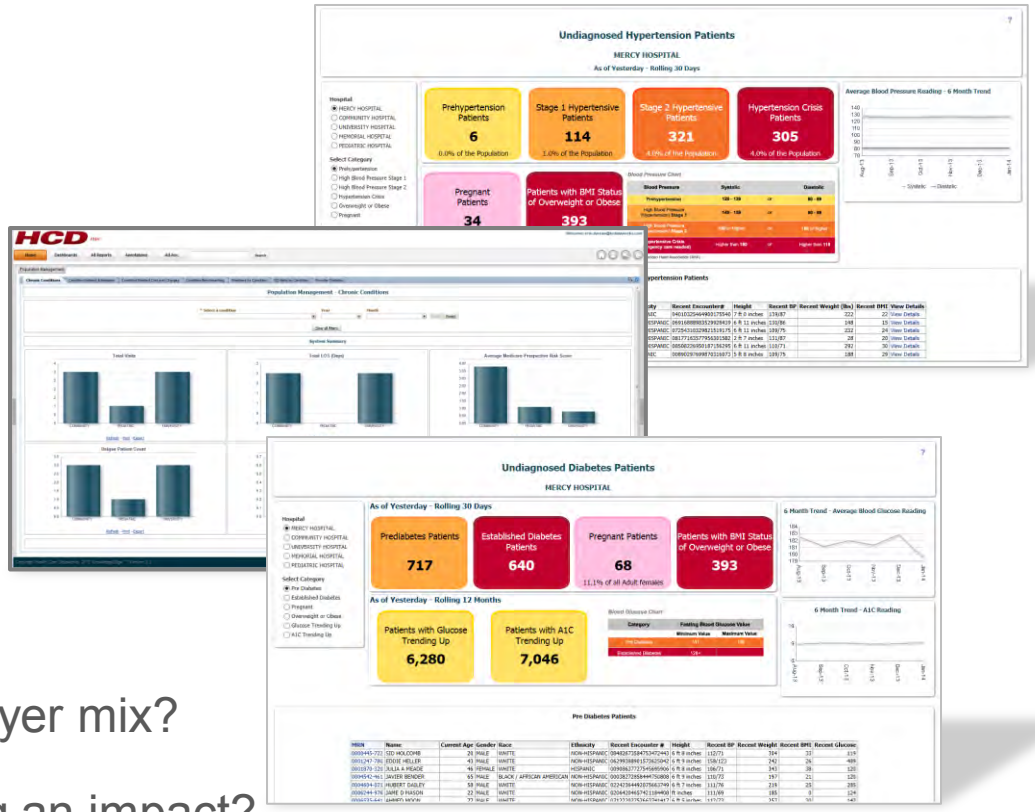
By disease group, such as, diabetes, COPD, CHF, AMI, monitor trends for

- LOS
- Mortality
- Readmissions
- Case Mix Index
- Risk scores

Drill to patient level detail

Are there variations by age, payer mix?

Are remedial measures making an impact?



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HCD HEALTH CARE DATAWORKS

EDW: A Contract Negotiating Tool

Problem: *Uncoordinated purchases of products driving cost*

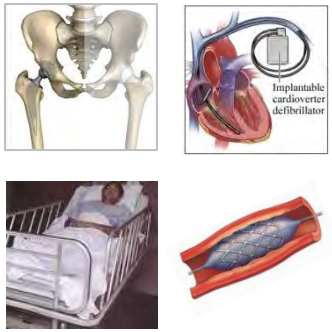
- Missed opportunities for contract negotiations
- Same product spread across multiple vendors
  - Cannot use volume purchasing as a bargaining tool with any one vendor
  - Variations in cost across vendors

Approach: Analyze data from the EDW to show physicians clinical and financial outcomes

- Show examples: Five different types of hip replacements – can we do with 2 and increase our volume order with one vendor to negotiate a lower price

Results: *Savings realized through contract negotiations:*

- **$2.1 M/year** in Cardiac Rhythm management (pacemaker, defibrillator and Leads)
- **$1.2M/year** cost avoidance by keeping cost the same through negotiations
- **$300K/year** savings in Orthopedics by changing products
- **$750K/year** savings in Drug eluting stents
- **$175K/year** in Bare metal stents
- **$225K** savings in consolidating contract negotiations for specialty beds?

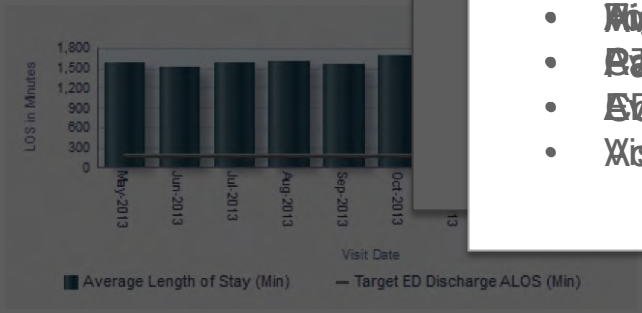


ED Dashboard

Summary | Volume | Turn Around Time | Revenue and Reimbursement | Patient Acuity | High Cost Services

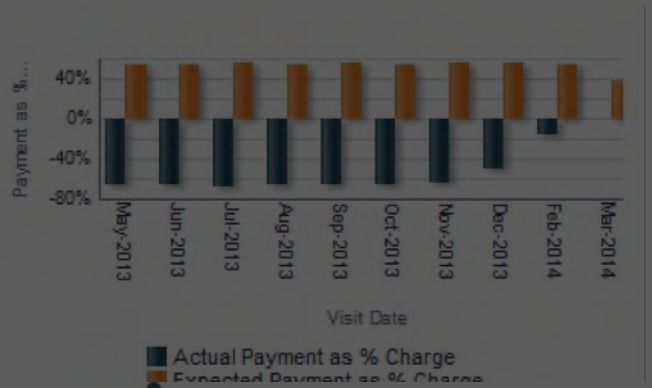
Summary

Overall ED LOS – Discharge

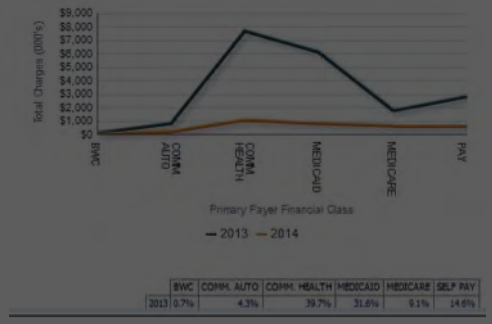


Seen Rate

Actual vs. Expected Reimbursement



Emergency Department Payer Mix



	BWC	COMM. AUTO	COMM. HEALTH	MEDICAID	MEDICARE	SELF PAY
2013	0.7%	4.3%	39.7%	31.6%	9.1%	14.6%

- Age Group at Discharge
- Week
- E/M
- Reimbursement

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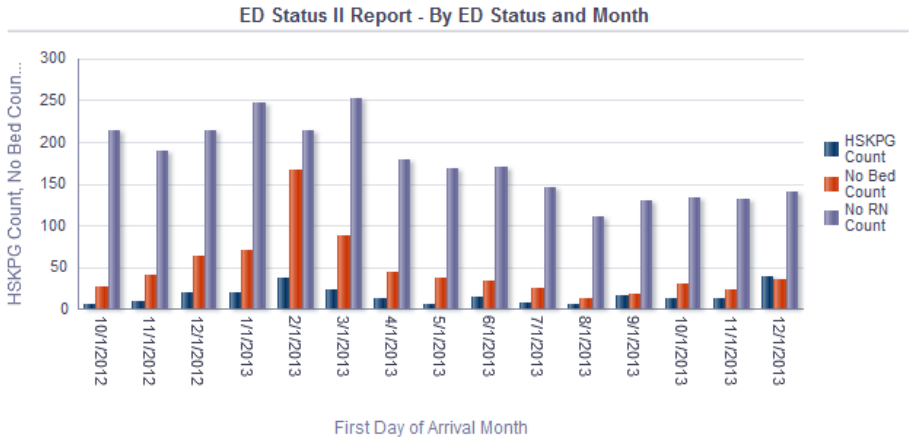
HCD HEALTH CARE DATAWORKS

ED Throughput

ED Status II | Monthly Median | Median Echo

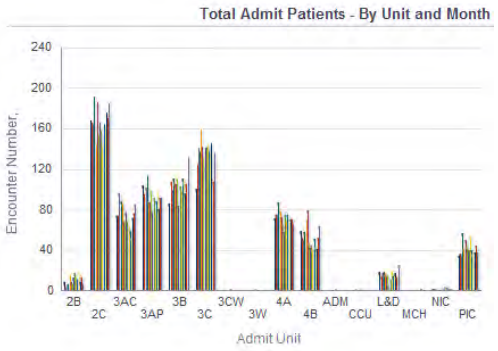
ED Status II Report – By ED Status and Month

First Day of Arrival Month	HSKPG Count	No Bed Count	No RN Count	Status II Event Count
10/1/2012	6	26	214	246
11/1/2012	9	40	189	238
12/1/2012	20	63	214	297
1/1/2013	20	70	247	337
2/1/2013	38	166	213	417
3/1/2013	24	88	251	363
4/1/2013	13	44	178	235
5/1/2013	6	37	168	211
6/1/2013	14	33	170	217
7/1/2013	8	25	146	179
8/1/2013	6	12	110	128
9/1/2013	16	18	129	163
10/1/2013	12	31	133	176
11/1/2013	12	24	132	168
12/1/2013	39	36	140	215
Grand Total	**243**	**713**	**2634**	**3590**



Total Admitted Patients – By Unit and Month

Admit Unit	Encounter Number 10/1/2012	11/1/2012	12/1/2012	1/1/2013	2/1/2013	3/1/2013	4/1/2013	5/1/2013	6/1/2013	7/1/2013	8/1/2013	9/1/2013	10/1/2013	11/1/2013	12/1/2013	Encounter Number Total
2B	8	4	3	6	14	8	6	12	17	13	10	17	8	12	6	**144**
2C	167	165	164	191	144	185	153	165	157	141	164	160	175	170	184	**2485**
3AC	73	73	95	88	85	67	67	76	67	62	59	51	71	75	84	**1093**
3AP	103	94	101	112	87	86	98	76	91	74	88	97	80	91	91	**1369**
3B	85	107	99	110	106	105	110	83	102	98	110	107	95	104	130	**1551**
3C	100	124	140	136	158	142	129	140	141	143	137	129	145	107	135	**2006**
3CW							1	1								**2**
3W						1										**1**
4A	71	74	74	87	78	72	64	57	74	68	74	66	70	70	65	**1064**
4B	58	52	50	57	70	79	46	42	44	39	51	43	41	52	63	**787**
ADM								1								**1**
CCU			1				1			1						**3**
L&D	18	14	17	18	16	14	15	4	10	18	14	17	17	12	25	**229**
MCH										1			1			**2**
NIC	1	1	1		1				2		4	2	3	1	1	**17**
PIC	34									53	40	35	37	44	37	**618**
Grand Total	**718**									**711**	**751**	**724**	**743**	**738**	**821**	**11372**



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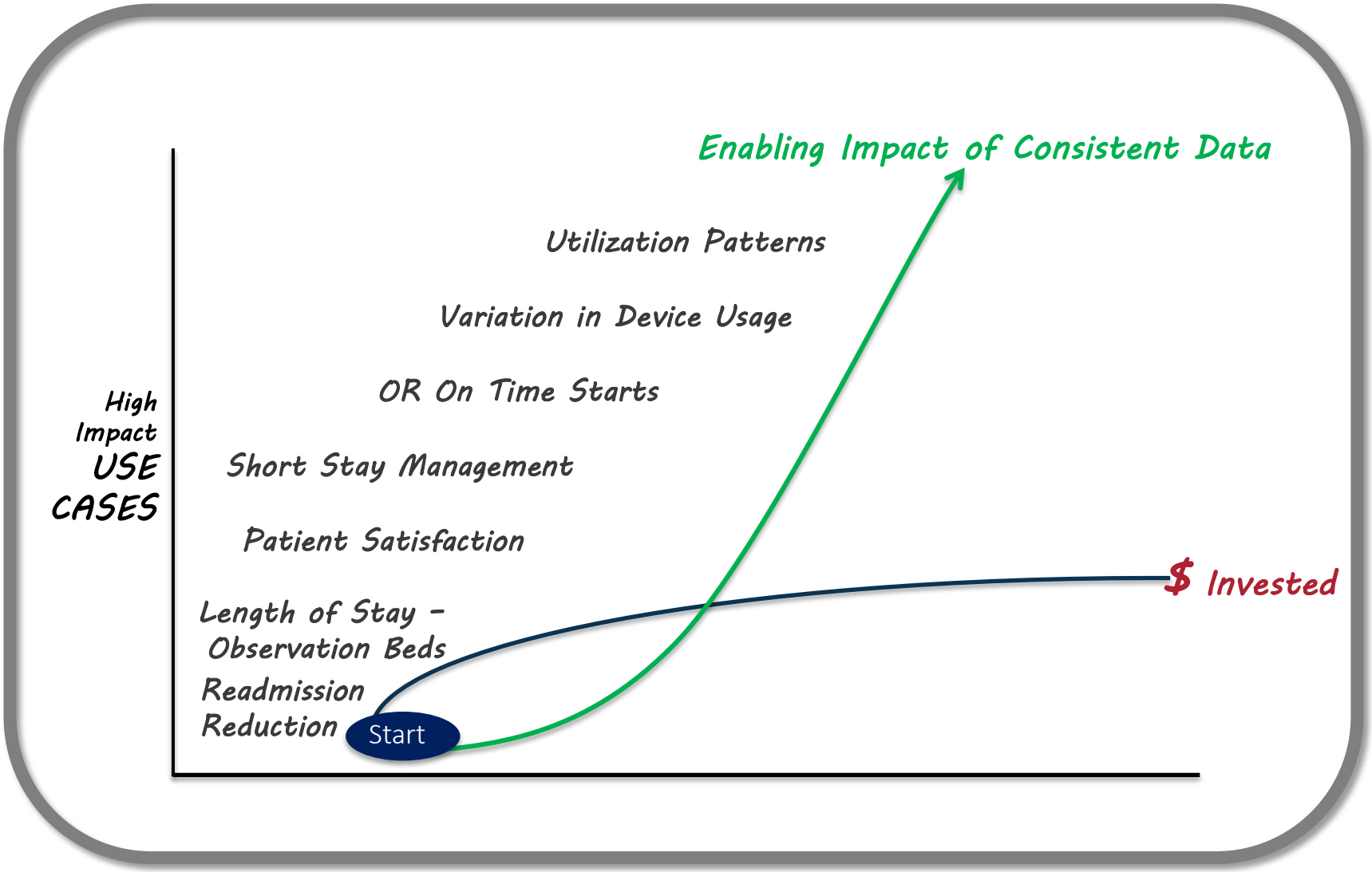
'Next Up' Use Cases: Driving Value & Performance



Questions?

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