Maximizing Quality & Safety Performance with Visual Analytics at Massachusetts General Hospital

Andrea Tull, PhD, Director of Reporting & Analytics, Mass General Hospital
Dan Beneventо, Principal, HealthDataViz

Today's Speakers

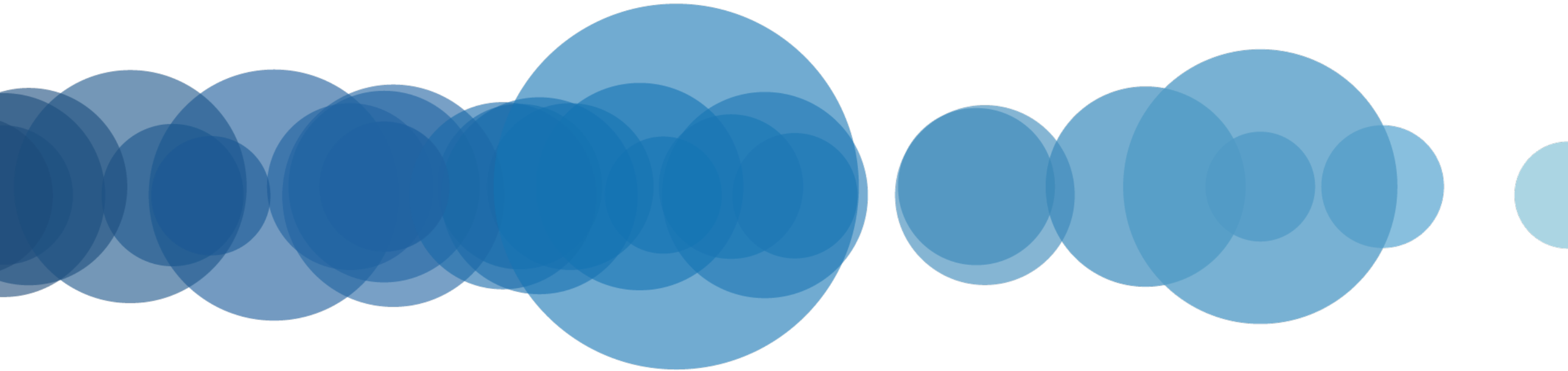
Andrea Tull, PhD, MGH Lawrence Center for Quality & Safety, Mass General Hospital

Dan Benevento, Principal, HealthDataViz

Agenda

- Background, Business Challenges & Implications
- Analytics Strategy & Objectives
- Implementing Self-Service Visual Analytics: Readmission, Core Measures & Infections
- Impact: Improving Outcomes for Patients & How We Do Our Work
- Future Directions with Self-Service Visual Analytics

Background & Context



Massachusetts General Hospital

MASSACHUSETTS GENERAL HOSPITAL
MASSACHUSETTS GENERAL PHYSICIANS ORGANIZATION
EDWARD P. LAWRENCE CENTER FOR QUALITY & SAFETY

- Founded in 1811
- Large, complex academic medical center
  - 48,000 inpatient admissions
  - 1.5M outpatient visits
  - 100,000 emergency room visits
- 1,046 licensed beds
- 25 satellite locations in metro-Boston
- 30,000 employees - *largest private employer in Boston*
- $ 800 MM in research funding

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Center for Quality & Safety Structure

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Areas of Expertise

- Clinical Compliance
- Patient Safety
- Research & Education
- Quality Management, Analytics & Reporting
- Patient Experience
- Process Improvement
- Informatics

- Established in 2007
- Employs a multidisciplinary team of physicians, nurses, analysts, researchers, consultants and informatics professionals
- Serves as an institution-wide resource

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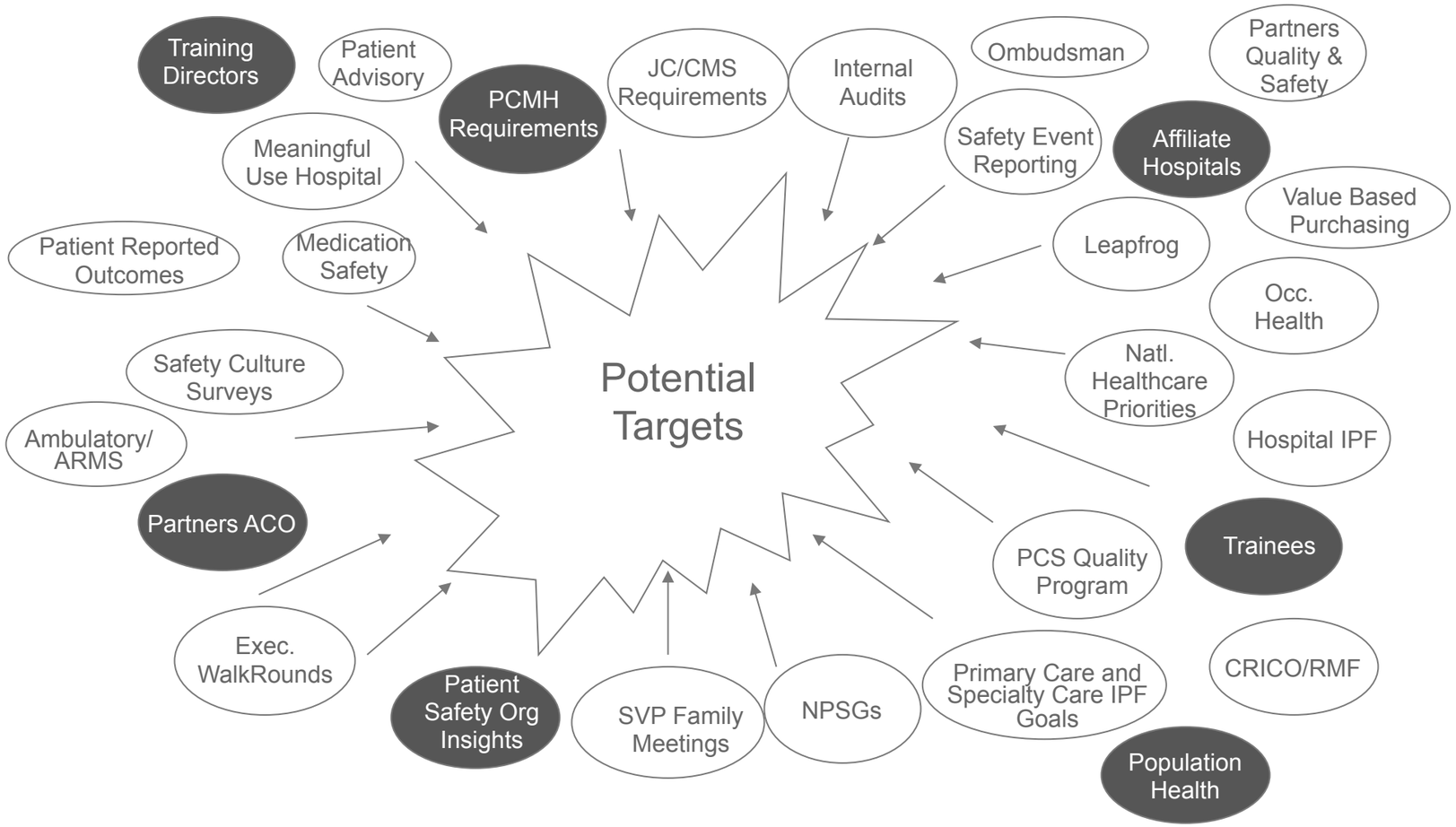
Analytics Challenge: Enabling Focus



- Hundreds of measures tracking to dozens of improvement programs
- Enormous appetite for data and reporting

Implications:

- Impossible to address all measures/inputs: need to create **focus**

2014: The Business Case for Change

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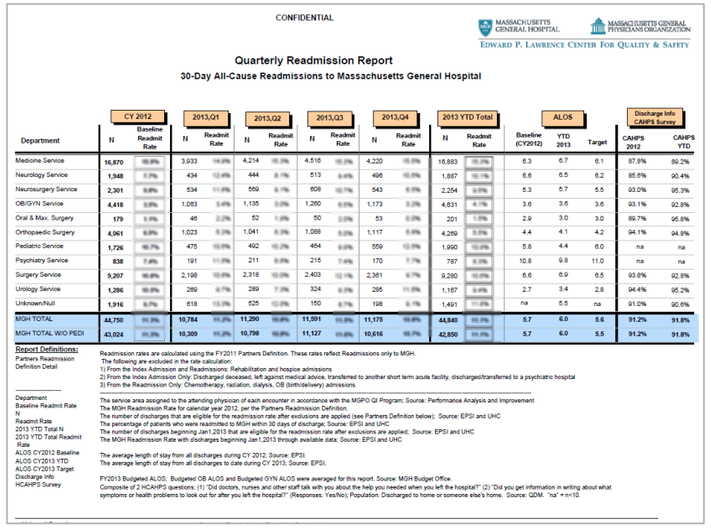

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Quarterly Readmission Report
30-Day All-Cause Readmissions to Massachusetts General Hospital

Department	CY 2012 N	CY 2012 Baseline Readmit Rate	2013,Q1 N	2013,Q1 Readmit Rate	2013,Q2 N	2013,Q2 Readmit Rate	2013,Q3 N	2013,Q3 Readmit Rate	2013,Q4 N	2013,Q4 Readmit Rate	2013 YTD Total N	2013 YTD Total Readmit Rate	ALOS Baseline (CY2012)	ALOS YTD 2013	ALOS Target	Discharge Info CAHPS Survey CAHPS 2012	Discharge Info CAHPS Survey CAHPS YTD
Medicine Service	16,870	10.9%	3,933	14.0%	4,214	15.3%	4,516	15.3%	4,220	15.5%	16,883	15.3%	6.3	6.7	6.1	87.8%	89.2%
Neurology Service	1,948	7.7%	434	12.4%	444	8.1%	513	9.4%	496	10.5%	1,887	10.1%	6.6	6.5	6.2	85.6%	90.4%
Neurosurgery Service	2,301	5.8%	534	11.5%	569	9.1%	608	10.7%	543	8.5%	2,254	9.5%	5.3	5.7	5.5	93.0%	95.3%
OB/GYN Service	4,418	3.5%	1,063	3.4%	1,135	3.0%	1,260	4.0%	1,173	3.3%	4,631	3.4%	3.6	3.6	3.6	93.1%	92.8%
Oral & Max. Surgery	179	1.1%	46	2.2%	52	1.9%	50	2.0%	53	0.0%	201	1.0%	2.9	3.0	3.0	89.7%	95.8%
Orthopaedic Surgery	4,061	6.9%	1,023	5.1%	1,041	6.3%	1,088	6.0%	1,117	6.5%	4,269	5.9%	4.4	4.1	4.2	94.1%	94.8%
Pediatric Service	1,726	10.7%	475	10.5%	492	10.2%	464	8.0%	559	12.5%	1,990	10.6%	5.8	4.4	6.0	na	na
Psychiatry Service	838	7.4%	191	11.5%	211	8.5%	215	7.4%	170	7.7%	787	8.3%	10.8	9.8	11.0	na	na
Surgery Service	9,207	10.8%	2,198	10.0%	2,318	10.0%	2,403	12.1%	2,361	9.7%	9,280	10.5%	6.6	6.9	6.5	93.8%	92.8%
Urology Service	1,286	10.3%	269	9.7%	289	7.3%	324	8.3%	285	11.9%	1,167	9.4%	2.7	3.4	2.8	94.4%	95.2%
Unknown/Null	1,916	9.7%	618	13.3%	525	12.0%	150	8.7%	198	9.1%	1,491	11.8%	na	5.5	na	91.0%	90.6%
MGH TOTAL	44,750	10.3%	10,784	11.2%	11,290	10.8%	11,591	11.3%	11,175	10.8%	44,840	11.1%	5.7	6.0	5.6	91.2%	91.8%
MGH TOTAL W/O PEDI	43,024	10.3%	10,309	11.2%	10,798	10.8%	11,127	11.3%	10,616	10.7%	42,850	11.1%	5.7	6.0	5.5	91.2%	91.8%

Report Definitions:

Partners Readmission Definition Detail

Readmission rates are calculated using the FY2011 Partners Definition. These rates reflect Readmissions only to MGH.
The following are excluded in the rate calculation:
1) From the Index Admission and Readmissions: Rehabilitation and hospice admissions
2) From the Index Admission Only: Discharged deceased, left against medical advice, transferred to another short term acute facility, discharged/transferred to a psychiatric hospital
3) From the Readmission Only: Chemotherapy, radiation, dialysis, OB (birth/delivery) admissions

Department
The service area assigned to the attending physician of each encounter in accordance with the MGPO QI Program; Source: Performance Analysis and Improvement

Baseline Readmit Rate
The MGH Readmission Rate for calendar year 2012, per the Partners Readmission Definition.

N
The number of discharges that are eligible for the readmission rate after exclusions are applied (see Partners Definition below); Source: EPSI and UHC

Readmit Rate
The percentage of patients who were readmitted to MGH within 30 days of discharge; Source: EPSI and UHC

2013 YTD Total N
The number of discharges beginning Jan1,2013 that are eligible for the readmission rate after exclusions are applied; Source: EPSI and UHC

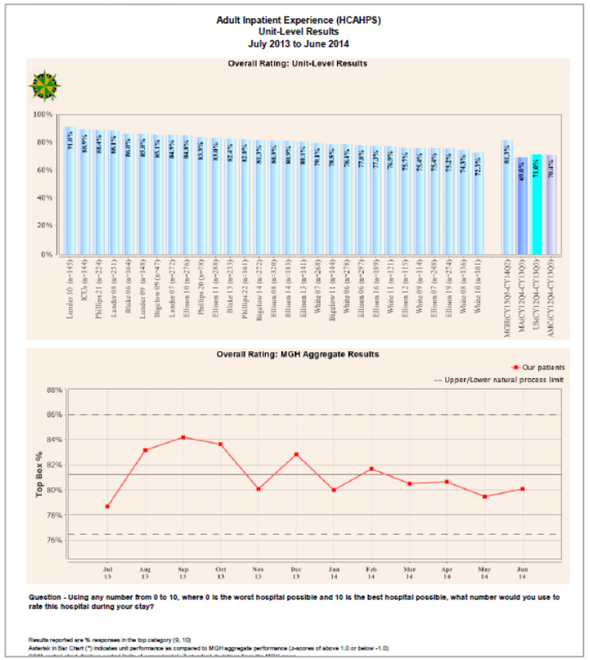
2013 YTD Total Readmit Rate
The MGH Readmission Rate with discharges beginning Jan1,2013 through available data; Source: EPSI and UHC

ALOS CY2012 Baseline
The average length of stay from all discharges during CY 2012; Source: EPSI.

ALOS CY2013 YTD
The average length of stay from all discharges to date during CY 2013; Source: EPSI.

ALOS CY2013 Target
FY2013 Budgeted ALOS; Budgeted OB ALOS and Budgeted GYN ALOS were averaged for this report. Source: MGH Budget Office.

Discharge Info HCAHPS Survey
Composite of 2 HCAHPS questions: (1) "Did doctors, nurses and other staff talk with you about the help you needed when you left the hospital?" (2) "Did you get information in writing about what symptoms or health problems to look out for after you left the hospital?" (Responses: Yes/No); Population: Discharged to home or someone else's home. Source: QDM. "na" = n<10.



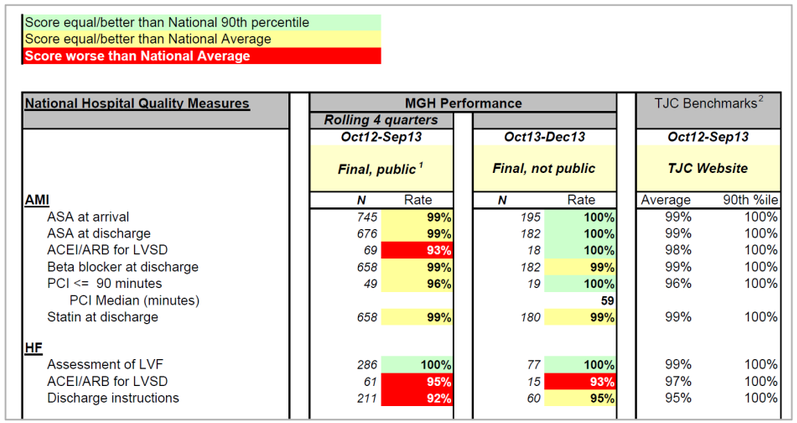
Adult Inpatient Experience (HCAHPS)
Unit-Level Results
July 2013 to June 2014

Overall Rating: Unit-Level Results

Overall Rating: MGH Aggregate Results

Question - Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?

Results reported are % responses in the top category (9, 10)



Score equal/better than National 90th percentile
Score equal/better than National Average
Score worse than National Average

National Hospital Quality Measures	MGH Performance Rolling 4 quarters Oct12-Sep13 Final, public[1] N	Rate	Oct13-Dec13 Final, not public N	Rate	TJC Benchmarks[2] Oct12-Sep13 TJC Website Average	90th %ile
AMI						
ASA at arrival	745	99%	195	100%	99%	100%
ASA at discharge	676	99%	182	100%	99%	100%
ACEI/ARB for LVSD	69	93%	18	100%	98%	100%
Beta blocker at discharge	658	99%	182	99%	99%	100%
PCI <= 90 minutes	49	96%	19	100%	96%	100%
PCI Median (minutes)				59		
Statin at discharge	658	99%	180	99%	99%	100%
HF						
Assessment of LVF	286	100%	77	100%	99%	100%
ACEI/ARB for LVSD	61	95%	15	93%	97%	100%
Discharge instructions	211	92%	60	95%	95%	100%

- Summary, static, PDF reporting
- Different designs
- Multiple tools & technologies
- Hard-coded and labor intensive
- Long queue of data requests from curious audience
- Transition to Epic…

Implications:

- Human Data Integrators not sustainable!

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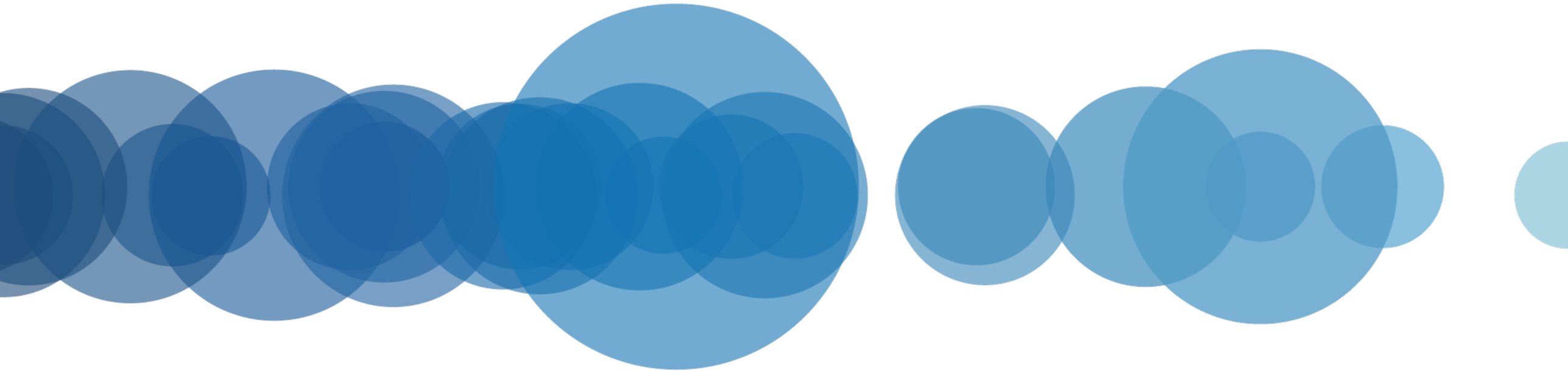
Healthcare Analytics Strategy & Objectives



Healthcare Analytics Strategy & Goals

Create focus on most important measures

- Provide context to measures
- Promote understanding of complex quality measures across wide audience
- Promote transparency

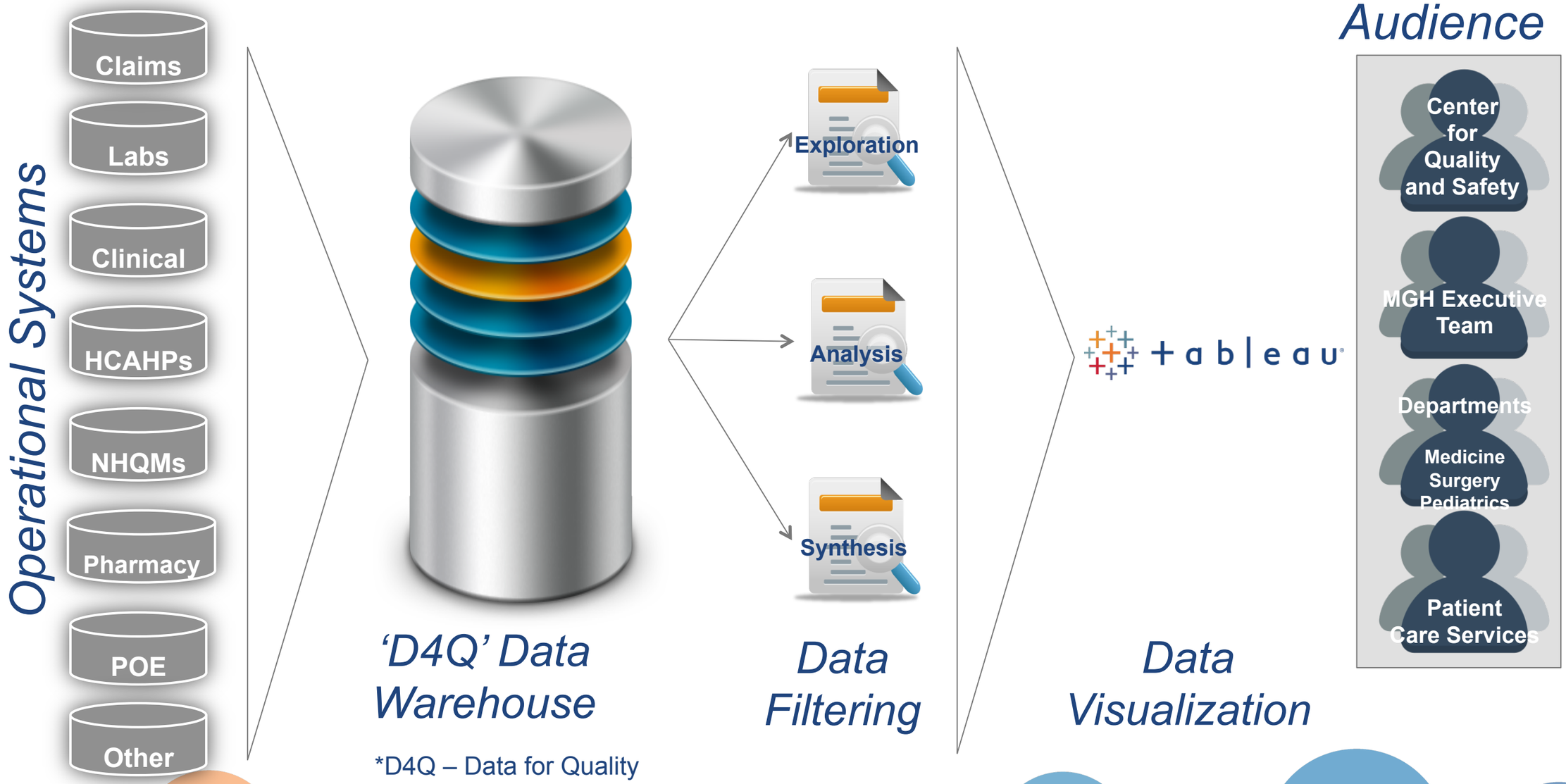
Deliver actionable reporting tools that support improvement

- Trended data with multiple drill-down (service, unit, provider, patient)
- Identify opportunities for standardization, cost savings, improvement
- Provide a measurement platform to support process improvement efforts

Build a culture of self-service to reduce analyst burden

- Understand audience needs and build tools to meet those needs
- Branding of reports with similar look and feel to enhance user experience
- Free up analysts from ad-hoc queries to do more complex analytic work

Data Analytics Structure: 'Data for Quality'



*D4Q – Data for Quality

Why Self-Service Visual Analytics?

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Visualization + Interactivity + Self-Service = Lower Analyst Overhead

- Intuitive display works for busy clinicians and executives
- Minimal user training
- Moving from "dashboards" to "tools" allows users to self-serve

Drive Transparency and Culture Change

- Promotes friendly competition
- Drives identification & sharing of best practices
- Present quality measures in context

Measurable Return on Investment

- Easily integrated with existing databases & BI platform
- Durable and flexible
- Promotes collaboration & data sharing across departments, silos

Goals & Desired Impact:

- Reduce ad-hoc reporting queue by 75%
- Provide more proximal data (3 months faster)
- Reduce report refresh times by 50%
- Staff working at "top of their license"

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Key Business Objectives with Visual Analytics

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Lead in Quality of Care: Hospital Acquired Infections & Clinical Process of Care

- Create awareness and focus on key safety indicators such as Hospital Acquired Infections
- Monitor, measure, analyze and reduce variation in care delivery
- Enable conversations with providers about variation and pathways to improvement
- Achieve "best decile" performance

Maximize Efficiency: Readmission Reduction

- Monitor, measure, analyze trends in readmission rates
- Engage clinicians in finding opportunities for improvement and build QI programs
- Reduce ad-hoc reporting requests by **50%**

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Partnership with HealthDataViz

See how you're doing

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HEALTHDATAVIZ — UNIQUE EXPERIENCE AND EXPERTISE

HEALTHCARE | DATA VIZ + DESIGN | TECHNOLOGY

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A few best practices for Mass General Hospital

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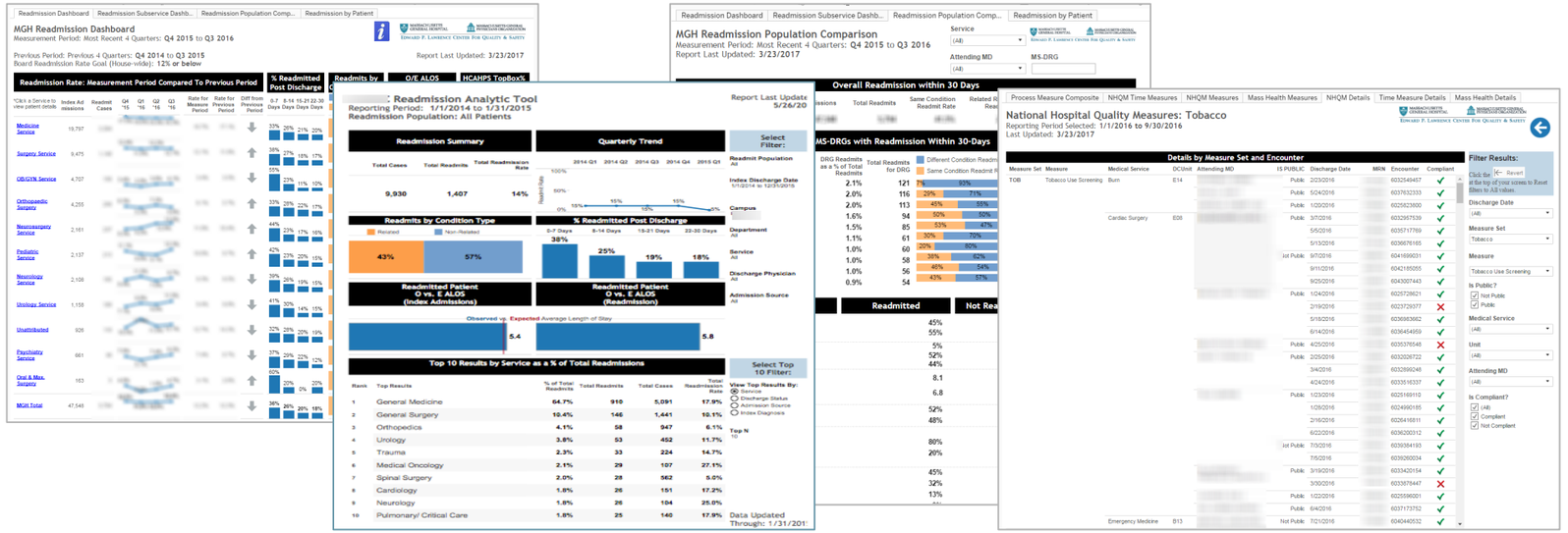
1. Building a culture of data: Education & Training
2. Building a culture of data: Empowering MGH Analysts to be Doctors, not Order Takers
3. Considering Audience: Readmission Summary and Swiss Army Knife
4. Drill Downs and Interactivity: Overview > Zoom > Detail



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See how you're doing

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How did we build a culture of data driven decision making at MGH?
Step 1: Education & Training

We educated members from disparate teams with varied roles:

Who did we teach:

- IT Programmers and Database Architects
- Quality and Safety Analysts
- Managers and Decision Makers

What did we teach:

- Healthcare Data Visualization Best Practices
- Tableau for Healthcare Beginner to Advanced
- Fundamentals of Data Analysis and Statistics

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How did we build a culture of data driven decision making at MGH?
Step 2: Empowering Analysts to be Doctors, not Order Takers

Analytics from an Order Taker:

- Stakeholder places an exact order for reports
- Analyst delivers what was requested
- Realize the solution does not solve the business need and start over!

Analytics at the Doctor's:

- Stakeholder presents the business problem
- Analyst collaborates to determine the right data and view, developing and incorporating subject matter expertise
- Iterative feedback leads to data driven decision making!

Order Takers provide what was asked for…
Doctors provide what is needed.

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Know your Audience

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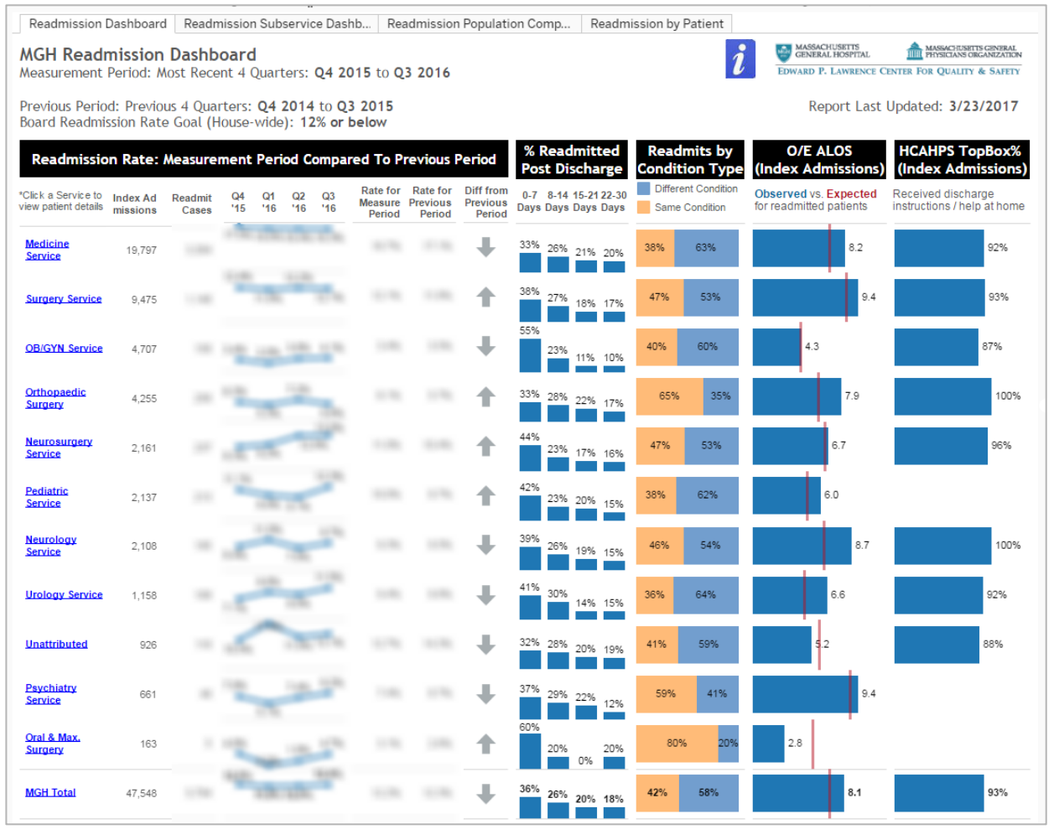
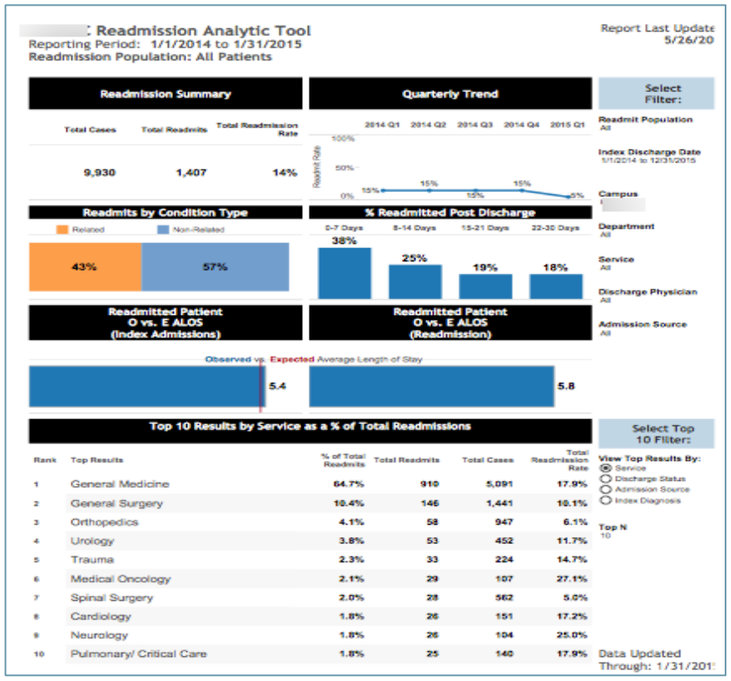
What does a CMO need to know about readmissions?



What does a Business Analyst need to know about readmissions?



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Anticipate Drill-Down Questions:

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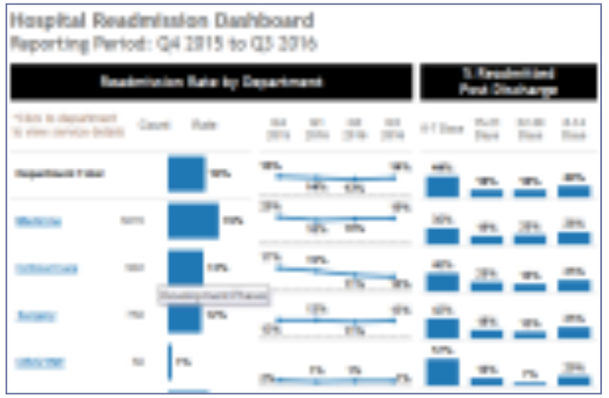
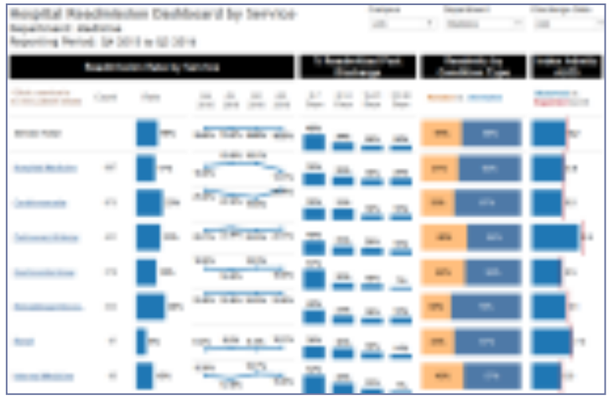
Intuitive Report Navigation

Overview



Zoom



Detail

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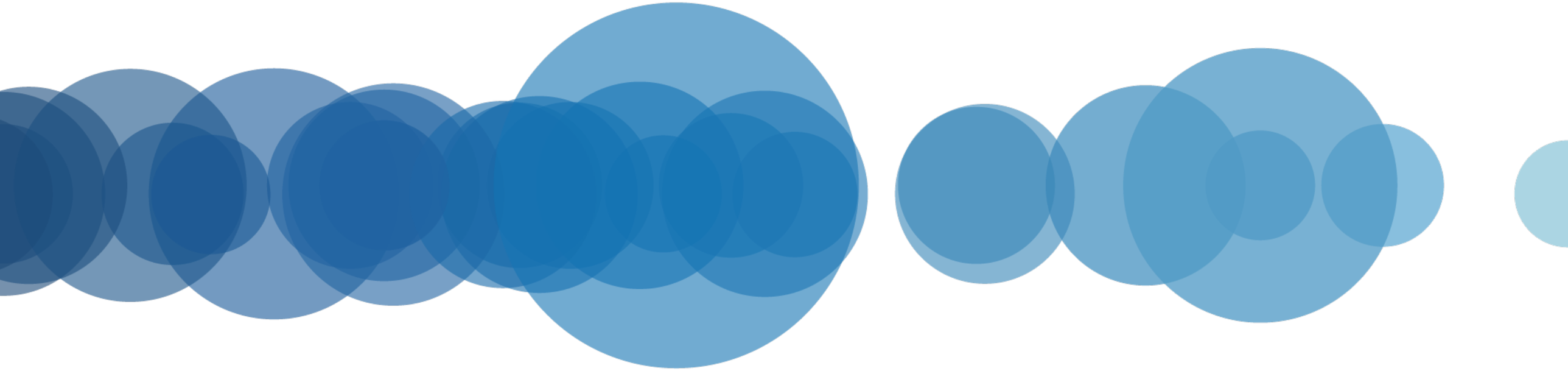
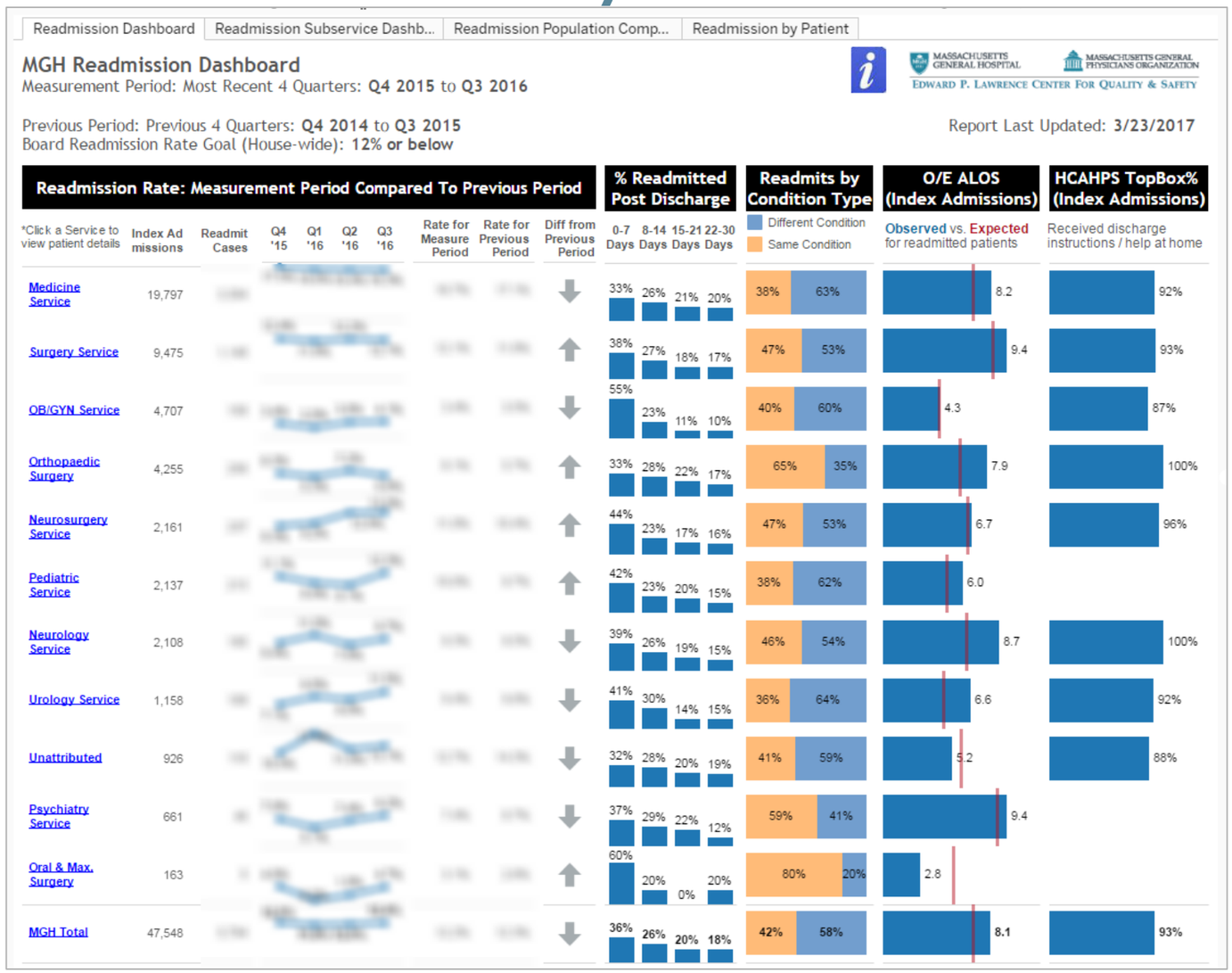
Implementing Self-Service Visual Analytics: Use Cases and Value



Use Case: 30-Day Readmissions



MGH Readmission Tool

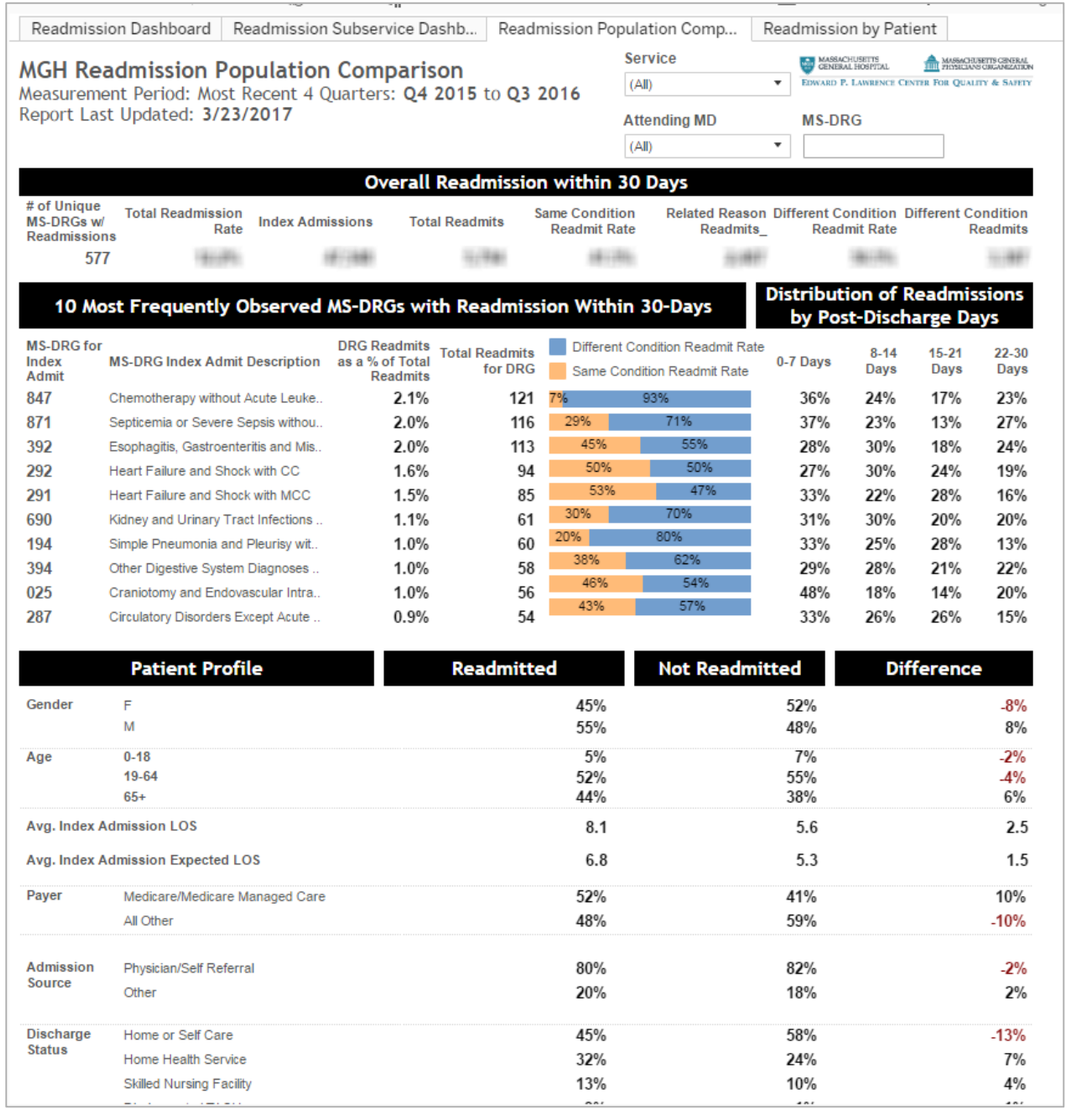
Use Case

- Executive view by service
- Trend and progress toward goal
- Contextual information
  - When are patients readmitted?
  - Where are patients readmitted?
  - Is there a tradeoff between length of stay and readmissions?
  - What do readmitted patients have to say about discharge instructions and whether they have help at home?

Measurable Impact

- Readmission performance in context

Use Case: 30-Day Readmissions: Population Comparison



Readmission Dashboard | Readmission Subservice Dashb... | Readmission Population Comp... | Readmission by Patient

MGH Readmission Population Comparison
Measurement Period: Most Recent 4 Quarters: Q4 2015 to Q3 2016
Report Last Updated: 3/23/2017

Service: (All) | Attending MD: (All) | MS-DRG:

Massachusetts General Hospital | Massachusetts General Physicians Organization
Edward P. Lawrence Center For Quality & Safety

Overall Readmission within 30 Days

# of Unique MS-DRGs w/ Readmissions	Total Readmission Rate	Index Admissions	Total Readmits	Same Condition Readmit Rate	Related Reason Readmits_	Different Condition Readmit Rate	Different Condition Readmits
577	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

10 Most Frequently Observed MS-DRGs with Readmission Within 30-Days

Distribution of Readmissions by Post-Discharge Days

MS-DRG for Index Admit	MS-DRG Index Admit Description	DRG Readmits as a % of Total Readmits	Total Readmits for DRG	Different Condition Readmit Rate / Same Condition Readmit Rate	0-7 Days	8-14 Days	15-21 Days	22-30 Days
847	Chemotherapy without Acute Leuke..	2.1%	121	7% / 93%	36%	24%	17%	23%
871	Septicemia or Severe Sepsis withou..	2.0%	116	29% / 71%	37%	23%	13%	27%
392	Esophagitis, Gastroenteritis and Mis..	2.0%	113	45% / 55%	28%	30%	18%	24%
292	Heart Failure and Shock with CC	1.6%	94	50% / 50%	27%	30%	24%	19%
291	Heart Failure and Shock with MCC	1.5%	85	53% / 47%	33%	22%	28%	16%
690	Kidney and Urinary Tract Infections ..	1.1%	61	30% / 70%	31%	30%	20%	20%
194	Simple Pneumonia and Pleurisy wit..	1.0%	60	20% / 80%	33%	25%	28%	13%
394	Other Digestive System Diagnoses ..	1.0%	58	38% / 62%	29%	28%	21%	22%
025	Craniotomy and Endovascular Intra..	1.0%	56	46% / 54%	48%	18%	14%	20%
287	Circulatory Disorders Except Acute ..	0.9%	54	43% / 57%	33%	26%	26%	15%

Patient Profile		Readmitted	Not Readmitted	Difference
Gender	F	45%	52%	-8%
	M	55%	48%	8%
Age	0-18	5%	7%	-2%
	19-64	52%	55%	-4%
	65+	44%	38%	6%
Avg. Index Admission LOS		8.1	5.6	2.5
Avg. Index Admission Expected LOS		6.8	5.3	1.5
Payer	Medicare/Medicare Managed Care	52%	41%	10%
	All Other	48%	59%	-10%
Admission Source	Physician/Self Referral	80%	82%	-2%
	Other	20%	18%	2%
Discharge Status	Home or Self Care	45%	58%	-13%
	Home Health Service	32%	24%	7%
	Skilled Nursing Facility	13%	10%	4%

MGH Readmission Tool

Use Case

- Filters by service, MD and MS-DRG
- How do readmitted patients differ from those who are not readmitted?

Measurable Impact

- Helped MGH identify patterns of high risk patients by disease group & acuity
  - Implemented improvement programs aimed at high risk patients
- Uncovered best practices by Service/MD

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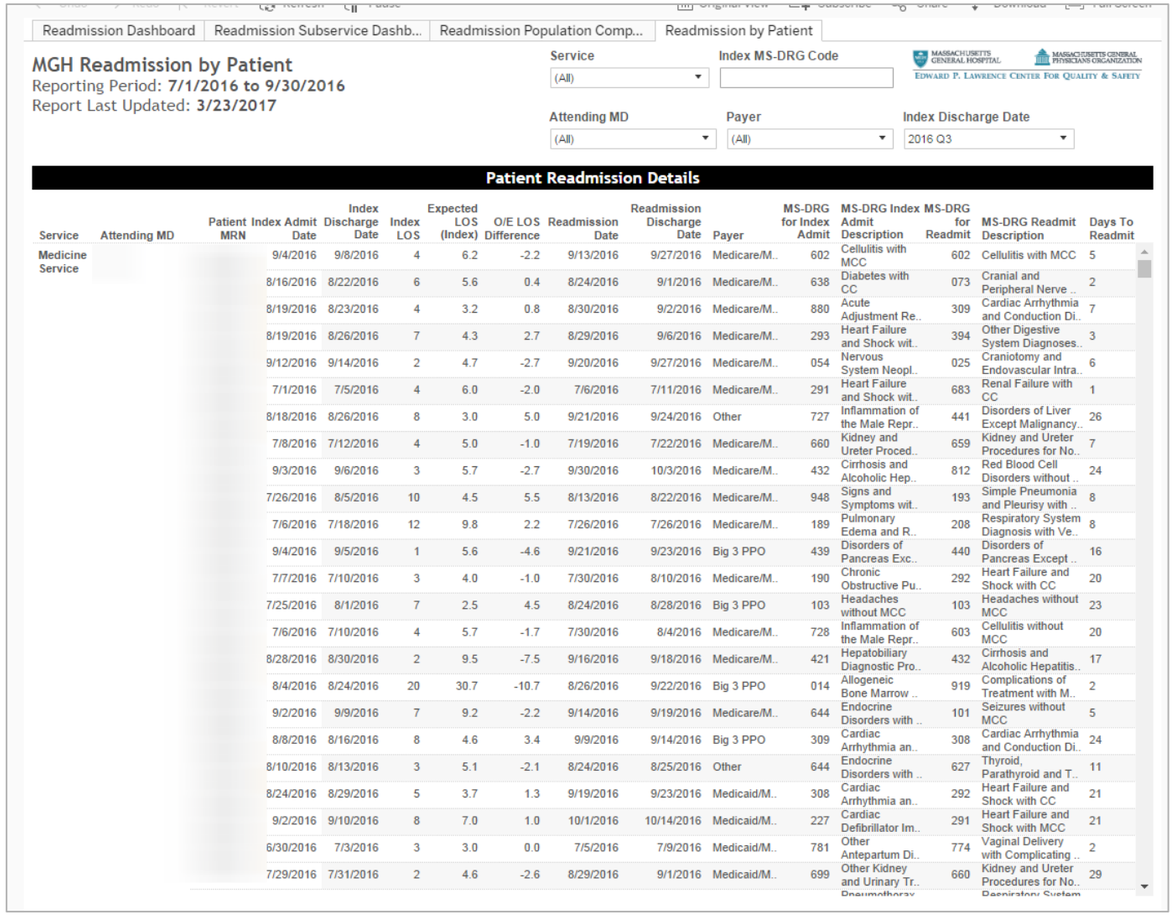
Use Case: 30-Day Readmissions - Patient Level



Readmission Dashboard | Readmission Subservice Dashb... | Readmission Population Comp... | Readmission by Patient

MGH Readmission by Patient
Reporting Period: **7/1/2016 to 9/30/2016**
Report Last Updated: **3/23/2017**

Service: (All) | Index MS-DRG Code | Attending MD: (All) | Payer: (All) | Index Discharge Date: 2016 Q3

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Patient Readmission Details

Service	Attending MD	Patient MRN	Index Admit Date	Index Discharge Date	Index LOS	Expected LOS (Index)	O/E LOS Difference	Readmission Date	Readmission Discharge Date	Payer	MS-DRG for Index Admit	MS-DRG Index Admit Description	MS-DRG for Readmit	MS-DRG Readmit Description	Days To Readmit
Medicine Service			9/4/2016	9/8/2016	4	6.2	-2.2	9/13/2016	9/27/2016	Medicare/M..	602	Cellulitis with MCC	602	Cellulitis with MCC	5
			8/16/2016	8/22/2016	6	5.6	0.4	8/24/2016	9/1/2016	Medicare/M..	638	Diabetes with CC	073	Cranial and Peripheral Nerve ..	2
			8/19/2016	8/23/2016	4	3.2	0.8	8/30/2016	9/2/2016	Medicare/M..	880	Acute Adjustment Re..	309	Cardiac Arrhythmia and Conduction Di..	7
			8/19/2016	8/26/2016	7	4.3	2.7	8/29/2016	9/6/2016	Medicare/M..	293	Heart Failure and Shock wit..	394	Other Digestive System Diagnoses..	3
			9/12/2016	9/14/2016	2	4.7	-2.7	9/20/2016	9/27/2016	Medicare/M..	054	Nervous System Neopl..	025	Craniotomy and Endovascular Intra..	6
			7/1/2016	7/5/2016	4	6.0	-2.0	7/6/2016	7/11/2016	Medicare/M..	291	Heart Failure and Shock wit..	683	Renal Failure with CC	1
			8/18/2016	8/26/2016	8	3.0	5.0	9/21/2016	9/24/2016	Other	727	Inflammation of the Male Repr..	441	Disorders of Liver Except Malignancy..	26
			7/8/2016	7/12/2016	4	5.0	-1.0	7/19/2016	7/22/2016	Medicare/M..	660	Kidney and Ureter Proced..	659	Kidney and Ureter Procedures for No..	7
			9/3/2016	9/6/2016	3	5.7	-2.7	9/30/2016	10/3/2016	Medicare/M..	432	Cirrhosis and Alcoholic Hep..	812	Red Blood Cell Disorders without ..	24
			7/26/2016	8/5/2016	10	4.5	5.5	8/13/2016	8/22/2016	Medicare/M..	948	Signs and Symptoms wit..	193	Simple Pneumonia and Pleurisy with ..	8
			7/6/2016	7/18/2016	12	9.8	2.2	7/26/2016	7/26/2016	Medicare/M..	189	Pulmonary Edema and R..	208	Respiratory System Diagnosis with Ve..	8
			9/4/2016	9/5/2016	1	5.6	-4.6	9/21/2016	9/23/2016	Big 3 PPO	439	Disorders of Pancreas Exc..	440	Disorders of Pancreas Except ..	16
			7/7/2016	7/10/2016	3	4.0	-1.0	7/30/2016	8/10/2016	Medicare/M..	190	Chronic Obstructive Pu..	292	Heart Failure and Shock with CC	20
			7/25/2016	8/1/2016	7	2.5	4.5	8/24/2016	8/28/2016	Big 3 PPO	103	Headaches without MCC	103	Headaches without MCC	23
			7/6/2016	7/10/2016	4	5.7	-1.7	7/30/2016	8/4/2016	Medicare/M..	728	Inflammation of the Male Repr..	603	Cellulitis without MCC	20
			8/28/2016	8/30/2016	2	9.5	-7.5	9/16/2016	9/18/2016	Medicare/M..	421	Hepatobiliary Diagnostic Pro..	432	Cirrhosis and Alcoholic Hepatitis..	17
			8/4/2016	8/24/2016	20	30.7	-10.7	8/26/2016	9/22/2016	Big 3 PPO	014	Allogeneic Bone Marrow ..	919	Complications of Treatment with M..	2
			9/2/2016	9/9/2016	7	9.2	-2.2	9/14/2016	9/19/2016	Medicare/M..	644	Endocrine Disorders with ..	101	Seizures without MCC	5
			8/8/2016	8/16/2016	8	4.6	3.4	9/9/2016	9/14/2016	Big 3 PPO	309	Cardiac Arrhythmia an..	308	Cardiac Arrhythmia and Conduction Di..	24
			8/10/2016	8/13/2016	3	5.1	-2.1	8/24/2016	8/25/2016	Other	644	Endocrine Disorders with ..	627	Thyroid, Parathyroid and T..	11
			8/24/2016	8/29/2016	5	3.7	1.3	9/19/2016	9/23/2016	Medicaid/M..	308	Cardiac Arrhythmia an..	292	Heart Failure and Shock with CC	21
			9/2/2016	9/10/2016	8	7.0	1.0	10/1/2016	10/14/2016	Medicaid/M..	227	Cardiac Defibrillator Im..	291	Heart Failure and Shock with MCC	21
			6/30/2016	7/3/2016	3	3.0	0.0	7/5/2016	7/9/2016	Medicaid/M..	781	Other Antepartum Di..	774	Vaginal Delivery with Complicating ..	2
			7/29/2016	7/31/2016	2	4.6	-2.6	8/29/2016	9/1/2016	Medicaid/M..	699	Other Kidney and Urinary Tr..	660	Kidney and Ureter Procedures for No..	29

MGH Readmission Tool

Use Case

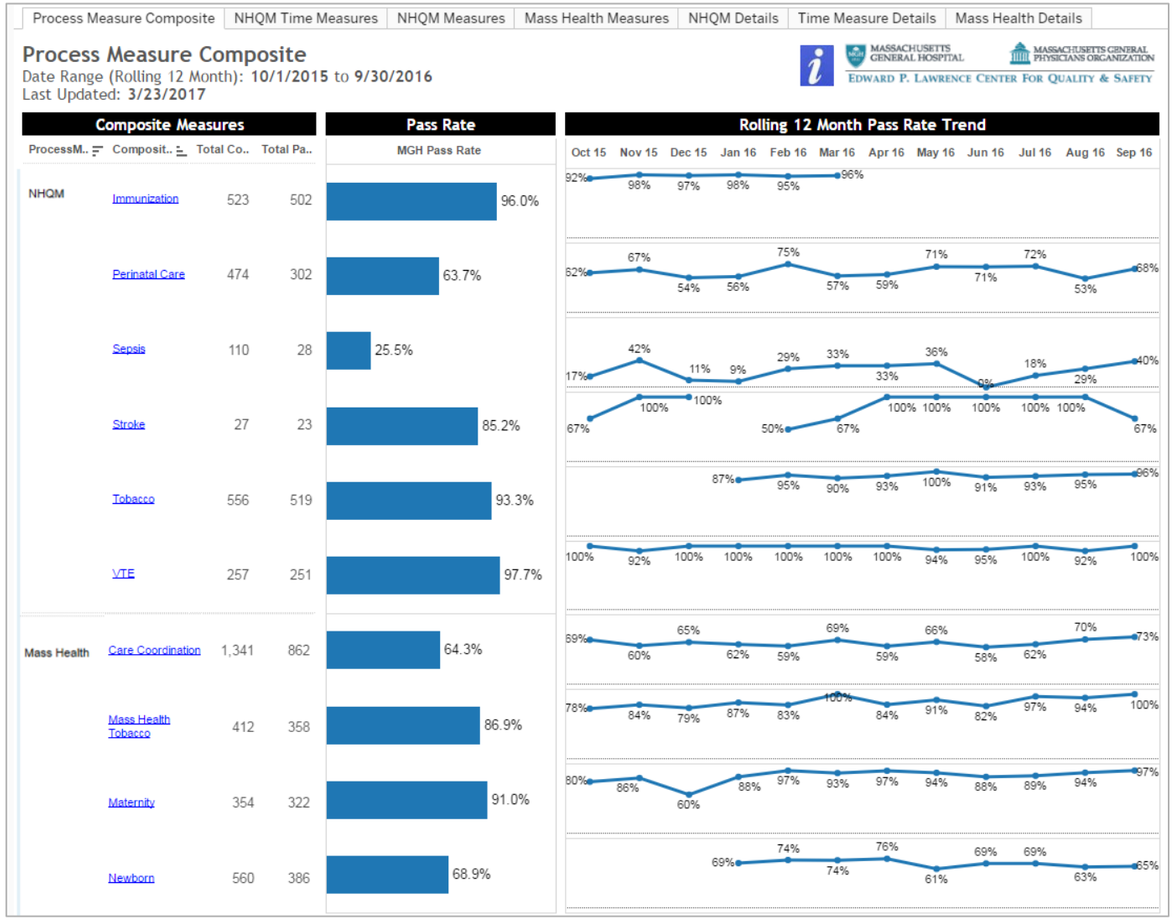
- Filter by Service, MS-DRG, MD, Payer, Index Discharge Date
- I want to do a chart review of the readmitted patients. May I have a patient list?

Measurable Impact

- Clinician engagement in understanding who is readmitted and why
- Supports departmental M&M process
- Reduced ad-hoc reporting by 100%

+ableau

Use Case: Clinical Process of Care - Composite View



MGH Clinical Process of Care Tool

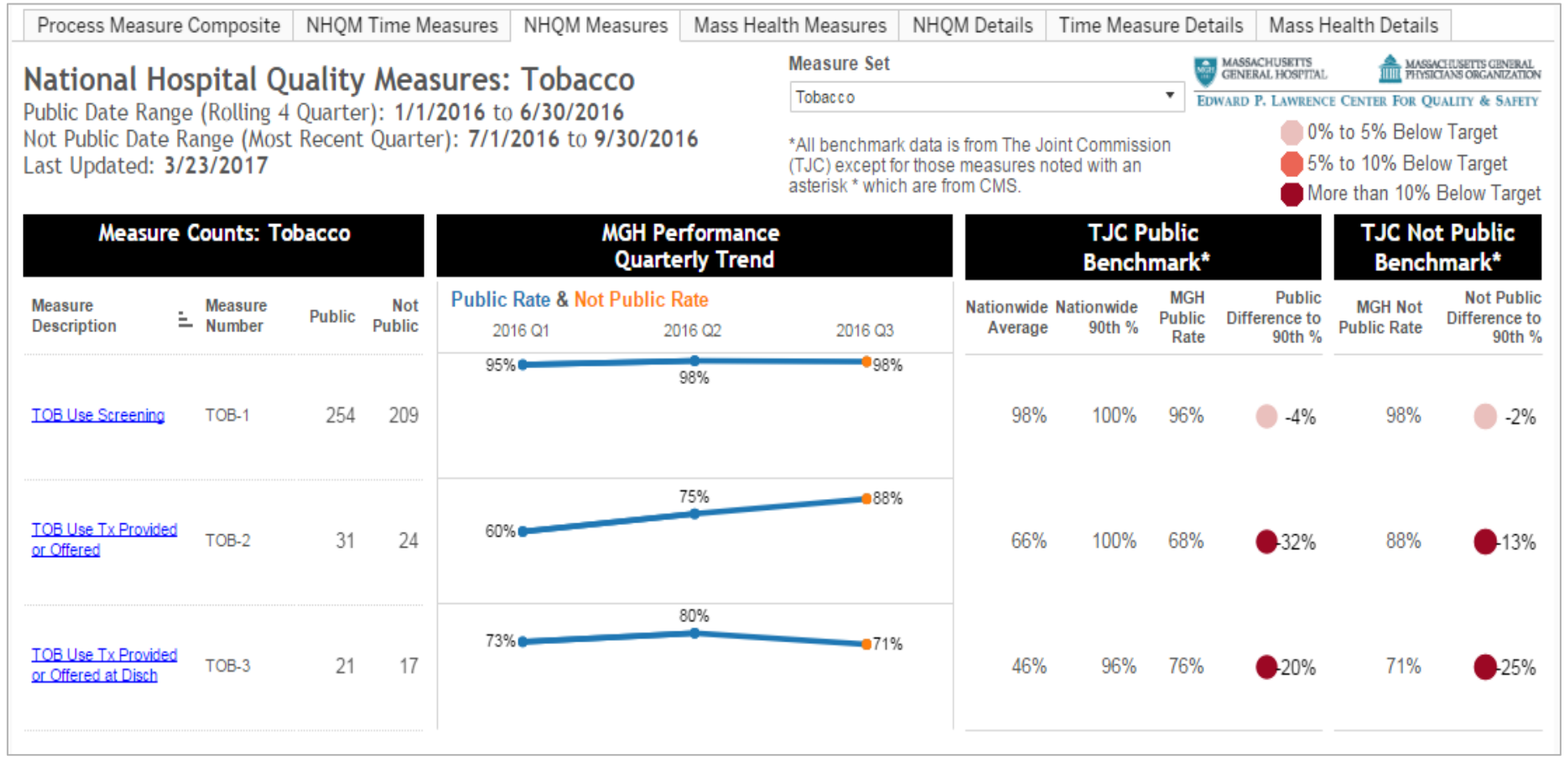
Use Case

- Publicly reported clinical process measures
- Executive view of performance at composite level
- National (CMS &TJC) as well as Medicaid
- How are we doing on composite measures over time?

Measurable Impact

- Identification and improvement on metrics without waiting for public reporting

Use Case: Clinical Process of Care - Individual Measures



MGH Clinical Process of Care Tool

Use Case

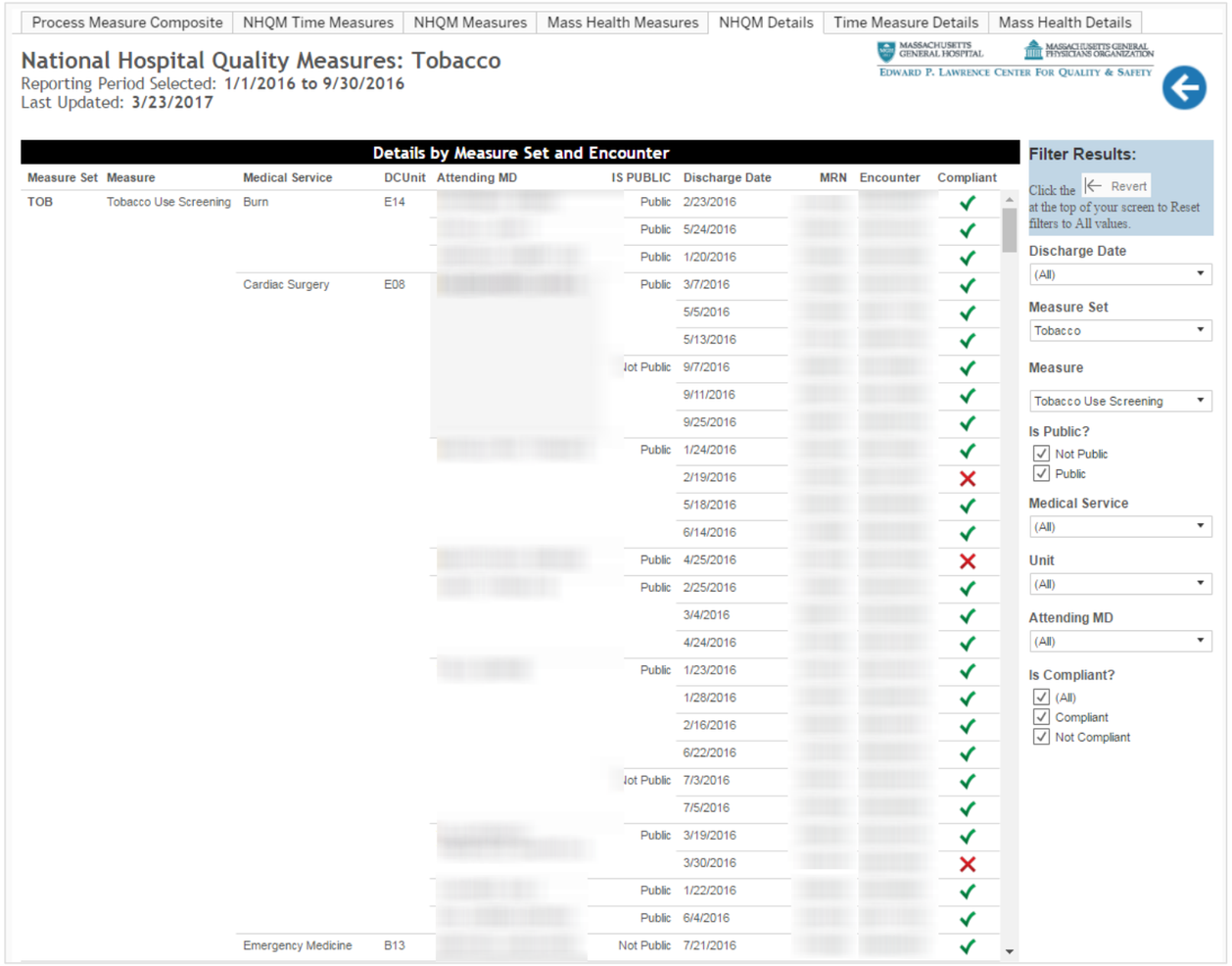
- Drill-down to individual measures
- How far are we from our targets?
- Where do we need to improve?

Measurable Impact

- Creates focus and energy on improving "red" metrics
- Steady improvement on new measures, sustainability on mature measures

tableau

Use Case: Clinical Process of Care - Patient level view



MGH Clinical Process of Care Tool

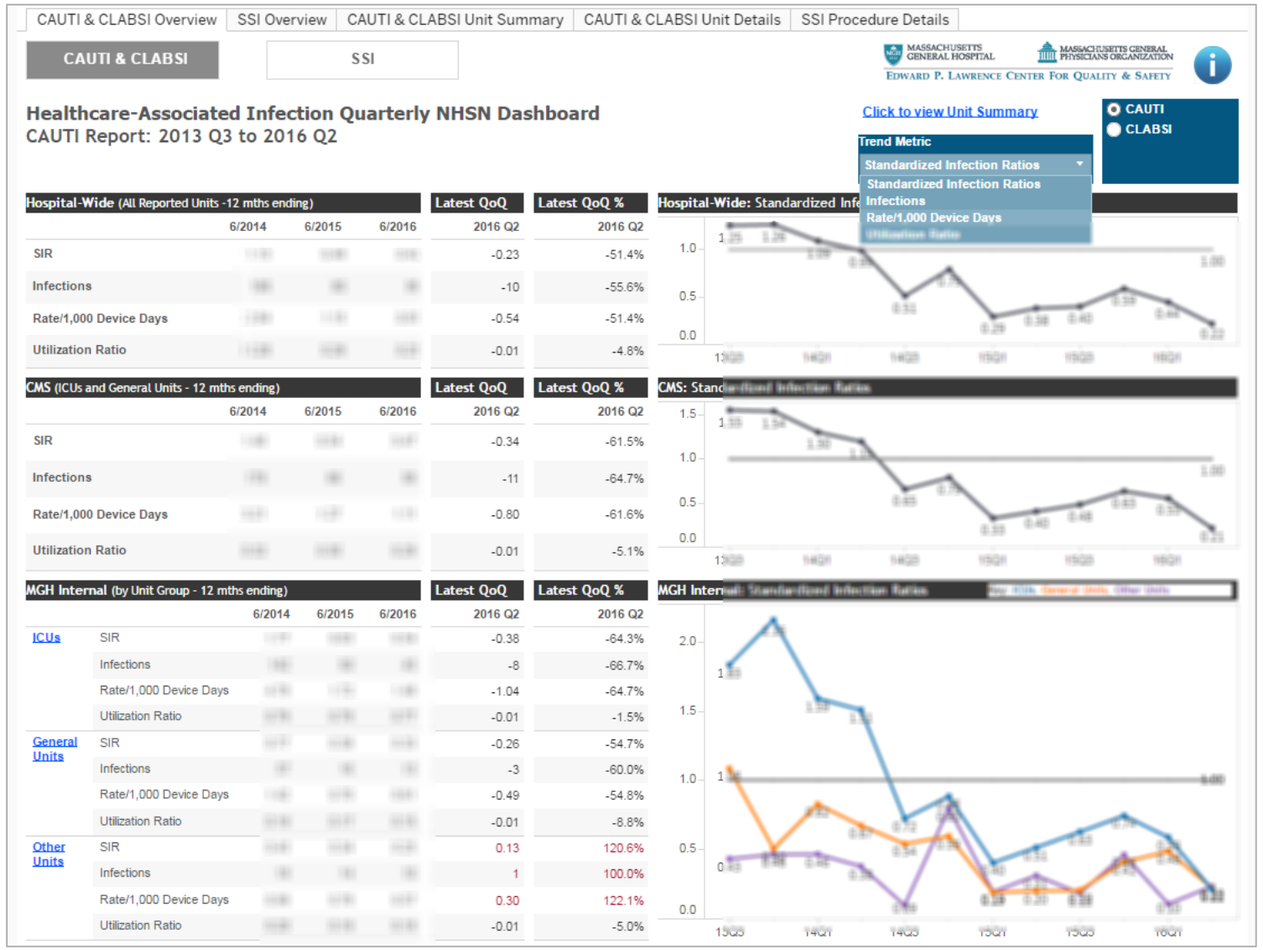
Use Case

- Filters by Discharge Date, Measure, Service, Unit, MD, Compliant/Not Compliant
- Which cases did not pass the measure? May I have a list?
- Used by QA Nurses to educate clinicians on documentation & practice

Measurable Impact

- Easy identification and RCA for any missed case
- Reduced ad-hoc data requests by 100%

Use Case: Healthcare Associated Infections



MGH Healthcare Associated Infections Tool

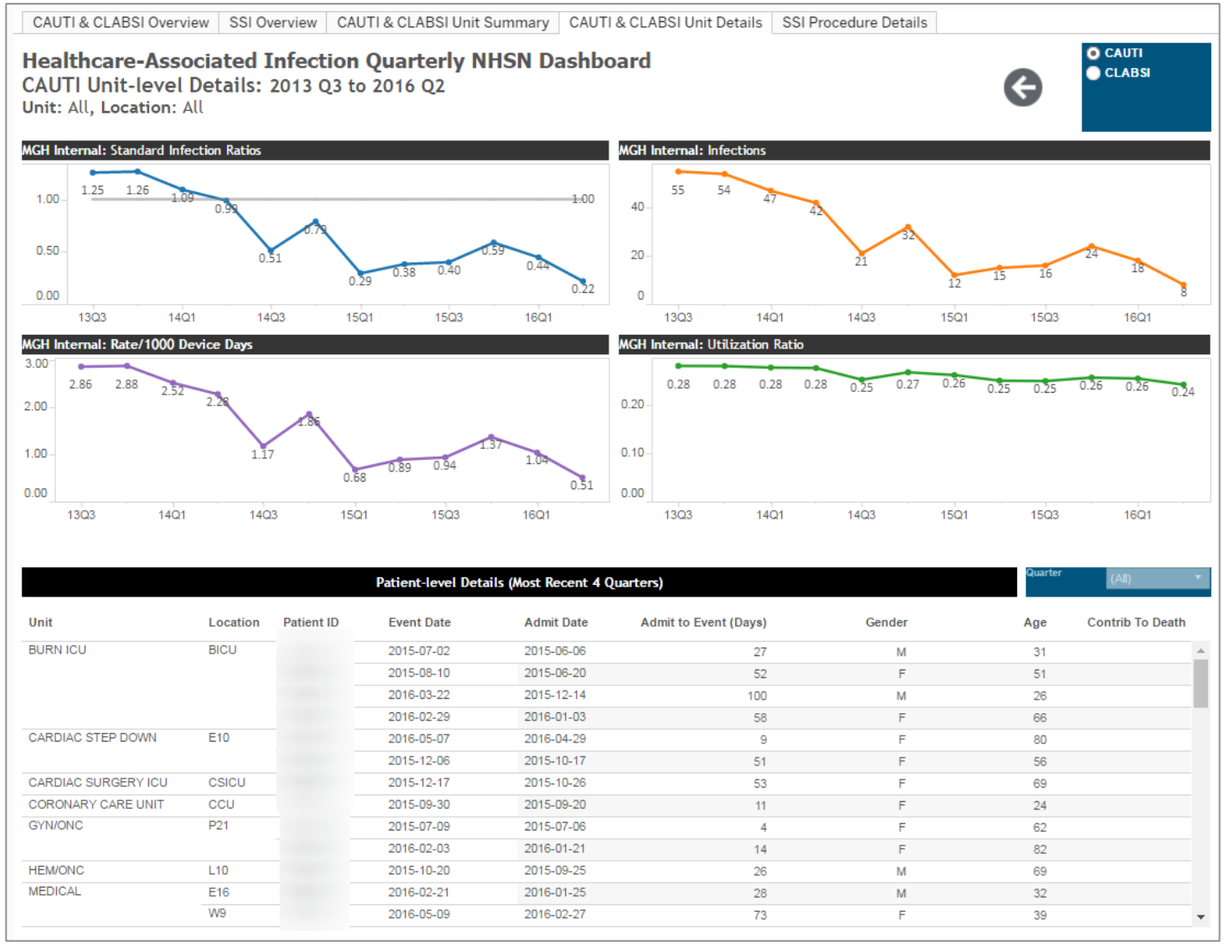
Use Case

- Designed to be 'source of truth' of infection performance measurement
  - Device Associated Infections (CAUTI/CLABSI) and Surgical Site Infections
  - Multiple stakeholders with multiple ways of measuring infections (SIR, rates per device day, N of infections, utilization ratio)
  - Displays trends for different groupings of units
  - How are we doing over time?
  - Where are infections occurring?

Measurable Impact

- Saved dozens of hours a quarter in infection control RN and analyst time
- Created focus on CAUTI

Use Case: Healthcare Associated Infections-Unit Level Details



MGH Healthcare Associated Infections Tool

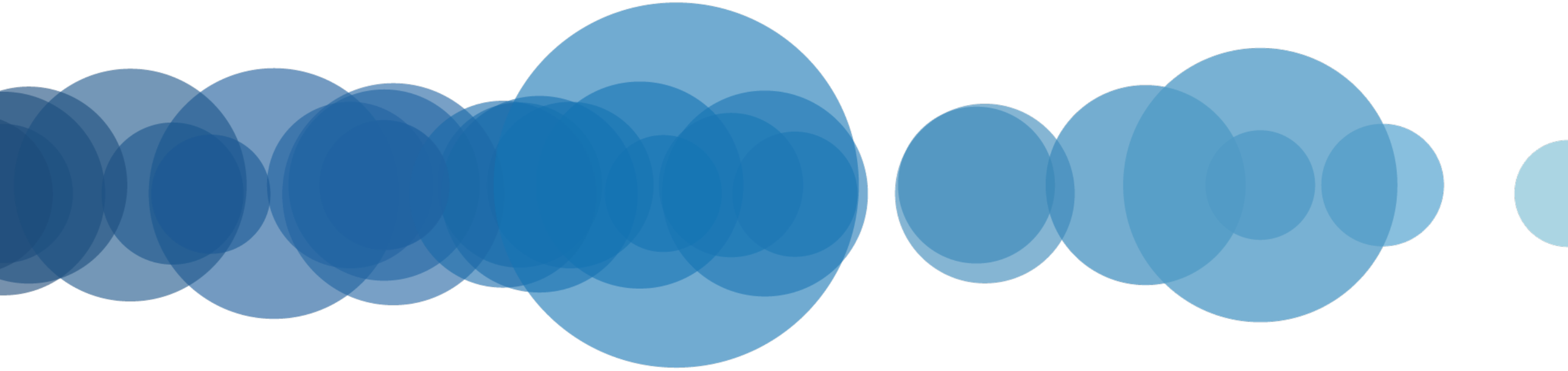
Use Case

- Displays trend for individual units on all measures
- Select single or multiple units
- Provides patient-level details
- How is my unit performing?
- May I have a list of patients with an infection?

Measurable Impact

- Tool helped create focus on CAUTI: big opportunity for MGH to improve
  - CAUTI standardized infection ratios: from 2.11 (statistically worse) to 0.56 (statistically better)

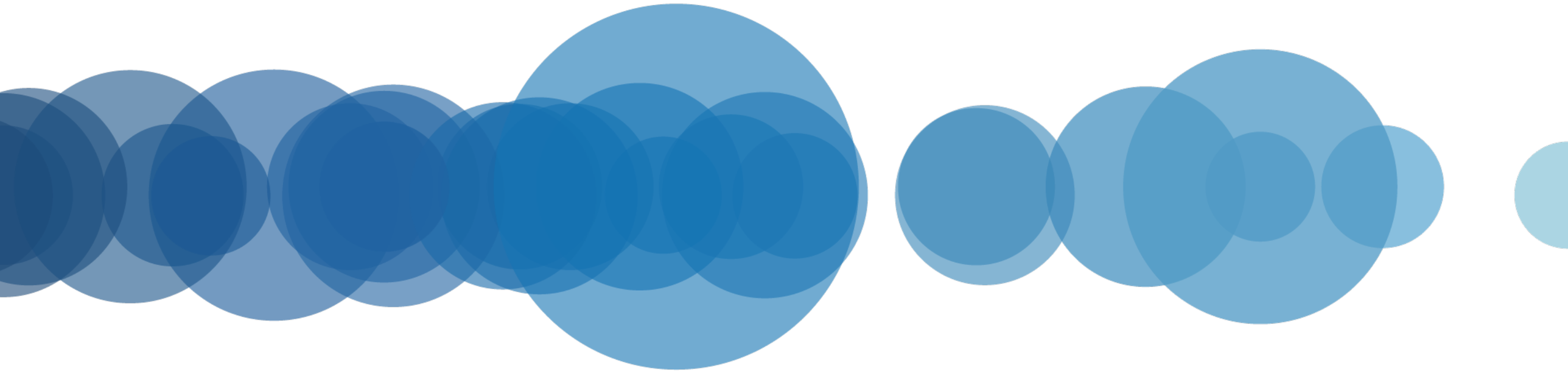
Measurable Impact: Improving Outcomes for Patients and How We Do Our Work



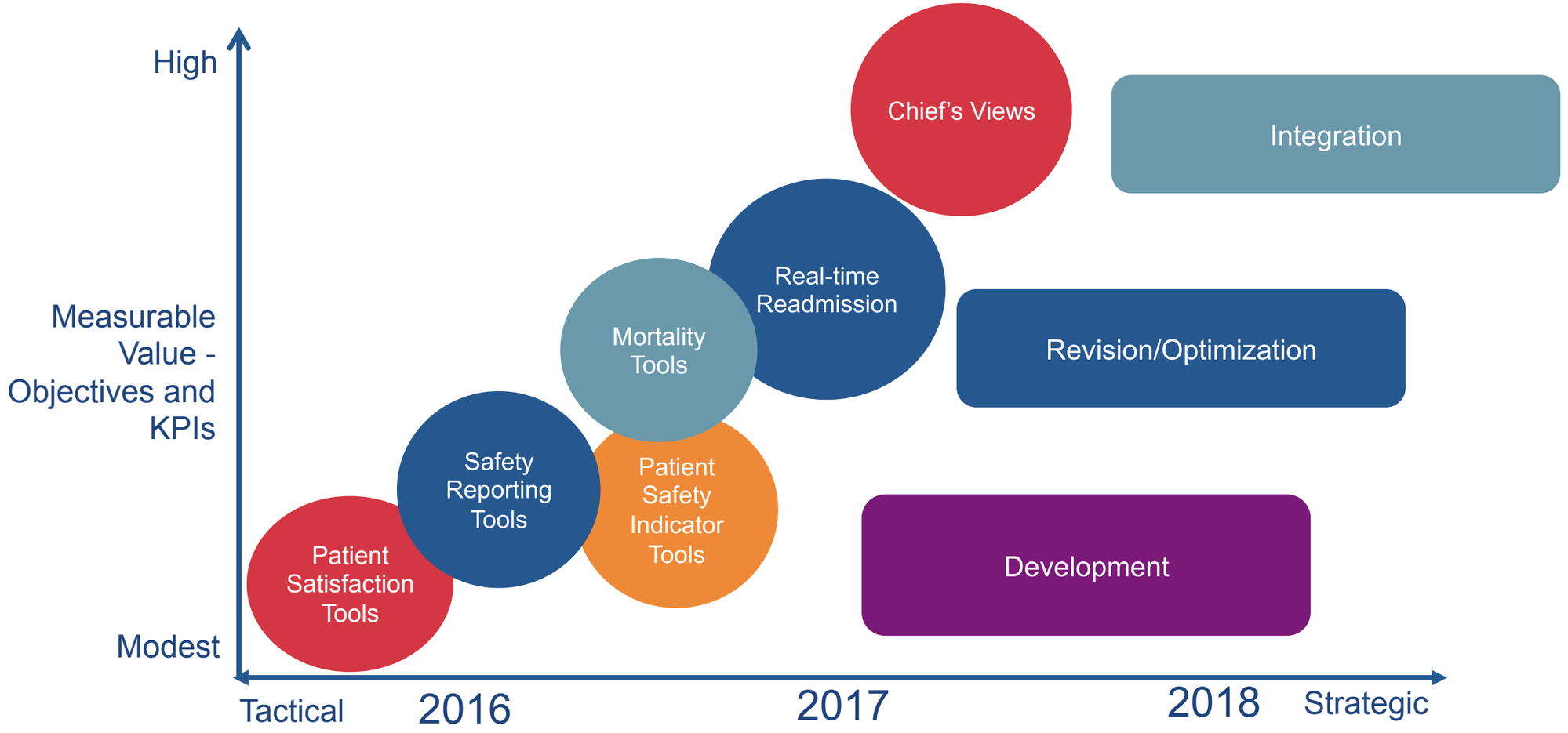
Impact of Self-Service Visual Analytics

1. Created focus on Key Quality Indicators (KQIs) to drive improvement
   - 85% reduction in CAUTI
   - No Hospital Acquired Condition Penalty 3 years in a row (~$10m)
   - High reliability on national/state clinical process of care measures: at 90th percentile for most
2. Enriched engagement with clinicians around quality measurement and improvement
   - Readmissions tools support new intervention bundle for high risk patients
   - Clinical process of care tool supports QI process for national/state quality measures
3. Maximized analyst skills and diverted to higher priority, more complex work
   - Ad-hoc reporting queue virtually eliminated: from ~100 requests a quarter to <5!
   - Analysts working on higher level projects; clinical staff focusing on clinical work, not reporting
4. Established a culture of transparency

Future Direction with Self Service Visual Analytics



Future Direction with Visual Analytics



Questions?

Maximizing Quality & Safety Performance with Visual Analytics at Massachusetts General Hospital

Andrea Tull, PhD, Director of Reporting & Analytics, Mass General Hospital
Dan Beneventо, Principal, HealthDataViz