TABLEAU CONFERENCE
Welcome
Driving Efficiency and Improving Bottom Line using Compelling Visual Analytics at Stamford Health

Divya Malhotra, MD, MHA, MBA  
Executive Director, Analytics and Innovation

Luis C. Rodríguez, CFA, CAIA, FRM, MBA  
Sr. Project Manager, Analytics and Innovation
Agenda

• Introduction

• Our Analytics Journey

• Deploying Analytics at Stamford Health

• Measurable Value delivered with Visual Analytics
  • Finance and Revenue Cycle Management
  • Operational Excellence
  • Clinical Quality and Population Health Management (PHM)

• Next Steps and Future Direction
Stamford Health - Introduction

• Not-for-profit, Founded 1896 – Urban and suburban setting
• Major teaching affiliate of the Columbia University College of Physicians & Surgeons

Single Hospital
• 305 beds
• 700+ physicians Medical Staff

Medical Group
• 100+ primary and specialty care physicians
• 10+ Satellite multi-specialty locations

Statistics for FY 2017
• Inpatient discharges – 15,000+
• Emergent /Urgent visits – 68,000+
• Total Surgeries – 18000+
• Outpatient visits – 400,000+
Our Analytics Journey
Reporting at Stamford Health Medical Group

- Application based reporting
- Multiple databases
- No ability to drill down (static reporting)
- Time consuming
- Staff frustration
Impact of Fragmented Analytics

- Wasted and Duplicative effort; increased cost
- “Answer shopping”
- Inconsistencies in information
- Lack of timely decision making
- Employee morale and turnover
Deploying Analytics – Transition from source system reporting
Centralizing Analytics

- Operational issues
- Fin/Ops

- New Business opportunity
- Market positioning

- Process Redesign
- Project Management

Operations

Business Planning

Improvement & Innovation
The ‘3Ts of Analytics deployment’

- Talent
- Tools
- Tenacity
Change Management

Effectiveness

Acceptance

Technical Quality

Engagement

Insights

Data Infrastructure

Analytics

*GE Change Acceleration Process
The IT Landscape and Architecture

Visualization

Reporting

Data Warehouse

Apps

MS SQL Server

Reporting Service

MS SQL Server

Excel Web Forms

Other Databases

Meditech

ECW

ADP

Press Ganey

CT Hospital Association
Measurable Value delivered with Visual Analytics
Financial and Revenue Cycle Management
Use Cases
## Use Case

- Delays and long lag times to create reports
- MD dissatisfaction

## Measurable Impact

- Real-time productivity reporting
- Significant lag time reduction leading to better financial reporting and operational control
## E&M Coding & Demographics

### Evaluation and Management (E&M) Coding & Demographics

**Cost Center(s):**
- SHMG

**Appointment Provider(s):**
- All

<table>
<thead>
<tr>
<th>SHMG Flag</th>
<th>Hospital-Based Practices</th>
<th>Cost Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appointment Provider</th>
<th>Fiscal Year</th>
<th>Month</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

### Use Case

- Delays and long lag times to create reports
- MD dissatisfaction

### Measurable Impact

- Real-time reporting
- Significant lag time reduction leading to better financial reporting and operational control

---

### E&M Coding (by CPT Volume)

#### Office Visit - New Patient (99201-99205)

<table>
<thead>
<tr>
<th>CPT Volume</th>
<th>Average E/M Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>99202</td>
<td>2.61</td>
</tr>
<tr>
<td>99203</td>
<td>2.78</td>
</tr>
<tr>
<td>99204</td>
<td>2.78</td>
</tr>
</tbody>
</table>

#### Initial Hospital Visit (99221-99223)

<table>
<thead>
<tr>
<th>CPT Volume</th>
<th>Average E/M Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>99221</td>
<td>1.64</td>
</tr>
<tr>
<td>99222</td>
<td>2.53</td>
</tr>
</tbody>
</table>

#### Office Visit - Established Patient (99211-99215)

<table>
<thead>
<tr>
<th>CPT Volume</th>
<th>Average E/M Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>99211</td>
<td>3.31</td>
</tr>
<tr>
<td>99212</td>
<td>3.34</td>
</tr>
</tbody>
</table>

#### Subsequent Hospital Visit (99231-99233)

<table>
<thead>
<tr>
<th>CPT Volume</th>
<th>Average E/M Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>99231</td>
<td>1.36</td>
</tr>
<tr>
<td>99232</td>
<td>1.67</td>
</tr>
<tr>
<td>99233</td>
<td>1.67</td>
</tr>
</tbody>
</table>
**Demographic Insights**

**Use Case**
- Need to assess patient demographics
- Need to monitor trends across patient population

**Measurable Impact**
- Real-time reporting
- Medical practices are able to monitor monthly and yearly trends

---

*Unique Patients = Distinct count of Patient IDs.

**Report runs by 'Claim Date'.

**Patient's Age as of 'Service Date'.

**** Data source: eCW (report does not include Meditech-based reads).
Revenue Cycle – Accounts Receivable (A/R) Balances

Use Case
- Multiple data sources prohibited accurate and timely reporting of A/R metrics

Measurable Impact
- Reduced manual work from multiple departments to monitor A/R
- Helps monitor effectiveness of efforts/strategies to improve collection rates
Revenue Cycle – Collections

Stamford Health Medical Group
Collections Report by Payment Date

- Use Case
  - Need to monitor collections on a daily basis at different levels of detail
  - Ability to monitor variances (actuals to budget)

- Measurable Impact
  - Reduced manual work from multiple departments
  - Management can quickly identify trends and monitor unexpected changes in collection rates
Revenue Cycle - Denials

**Use Case**
- Increase in payment denials and inability to track real time

**Measurable Impact**
- Drill down capability “unleashed” operational efficiency
Revenue Cycle – Claim Status

Use Case
- Large amount of claims were left unattended when hospital decided to sunset relationship with former billing services vendor

Measurable Impact
- Ability to identify bottlenecks in the revenue cycle process
Use Case
• Looking for efficient way to monitor variances (actuals to budget) in major General Ledger (G/L) expense categories

Measurable Impact
• Variance tracked by department
• Drill down capability at “Expense category” level to monitor and control expenses
# Tracking Ambulatory Volumes and Profits

## Use Case
- Leadership required better tracking of volumes and financial performance by rehab location

## Measurable Impact
- Service line growth to multiple locations
- Increased revenue and improved cost control management

### Gross Charges and Net Contribution to Overhead by Location

<table>
<thead>
<tr>
<th>GL Class</th>
<th>Location 1</th>
<th>Location 2</th>
<th>Location 3</th>
<th>Location 4</th>
<th>Location 5</th>
<th>Location 6</th>
<th>Location 7</th>
<th>Location 8</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROSS REVENUE</td>
<td>$14,685,579</td>
<td>$8,027,616</td>
<td>$101,122</td>
<td>$4,052,127</td>
<td>$896,462</td>
<td>$781,209</td>
<td>$2,014,159</td>
<td>$0</td>
<td>$31,458,274</td>
</tr>
</tbody>
</table>

### Estimated Net Contribution to Overhead by Location

<table>
<thead>
<tr>
<th>Location</th>
<th>Estimated Collection Rates by Location (adjust as needed)</th>
<th>Net Contribution to Overhead by Location (Summary)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location 1</td>
<td>16.00%</td>
<td></td>
</tr>
<tr>
<td>Location 2</td>
<td>16.00%</td>
<td></td>
</tr>
<tr>
<td>Location 3</td>
<td>16.00%</td>
<td></td>
</tr>
<tr>
<td>Location 4</td>
<td>16.00%</td>
<td></td>
</tr>
<tr>
<td>Location 5</td>
<td>16.00%</td>
<td></td>
</tr>
<tr>
<td>Location 6</td>
<td>16.00%</td>
<td></td>
</tr>
<tr>
<td>Location 7</td>
<td>16.00%</td>
<td></td>
</tr>
<tr>
<td>Location 8</td>
<td>16.00%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EOC group</th>
<th>Location 1</th>
<th>Location 2</th>
<th>Location 3</th>
<th>Location 4</th>
<th>Location 5</th>
<th>Location 6</th>
<th>Location 7</th>
<th>Location 8</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue (Collections)</td>
<td>$2,349,453</td>
<td>$1,204,419</td>
<td>$16,100</td>
<td>$792,340</td>
<td>$143,434</td>
<td>$124,393</td>
<td>$322,265</td>
<td>$0</td>
<td>$5,033,324</td>
</tr>
<tr>
<td>Other Revenue</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Salaries</td>
<td>($1,674,237)</td>
<td>($809,180)</td>
<td>($3,122)</td>
<td>($698,184)</td>
<td>($1,144)</td>
<td>($187,153)</td>
<td>($317,629)</td>
<td>$786</td>
<td>($3,893,064)</td>
</tr>
<tr>
<td>Non-Salary Operating Expenses</td>
<td>($38,195)</td>
<td>($466,226)</td>
<td>($3,831)</td>
<td>($221,662)</td>
<td>($44,571)</td>
<td>($98,896)</td>
<td>($144,420)</td>
<td>($58,532)</td>
<td>($1,026,334)</td>
</tr>
<tr>
<td>Net Contribution to Overhead</td>
<td>$437,260</td>
<td>$9,013</td>
<td>($774)</td>
<td>($120,408)</td>
<td>$17,419</td>
<td>($81,066)</td>
<td>($139,784)</td>
<td>($7,746)</td>
<td>$113,926</td>
</tr>
</tbody>
</table>
Tracking Ambulatory Volumes and Profits

Use Case
- Leadership required better tracking of volumes and financial performance by rehab location

Measurable Impact
- Service line growth to multiple locations
- Increased revenue and improved cost control management
Operational Excellence
Use Cases
Physician Office Wait Times

**Use Case**
- Med Group Executives are evaluating issues with capacity at practices
- Lack of data to understand delays in booking appointments

**Measurable Impact**
- Implementation of a centralized “contact center” to improve scheduling
- Efforts underway to improve scheduling
Patient Panel

Use Case

- Clinical resources are in high demand across healthcare organizations
- Management requires to identify the scope of every practice/specialty to perform an appropriate allocation of financial resources

Measurable Impact

- Ensures physicians are able to offer good care in a timely way to a reasonable number of patients
Use Case

- Practice Managers and Service Line Administrators need a 360 degree view of their practices
- Cancellations and no-shows are costly to the organization

Measurable Impact

- Facilitates staff scheduling
- An associated report helped identify patients who need to reschedule due to cancellations and no-shows
Imaging Service Capacity Tracking

Use Case

- Lack of Transparency around Imaging volume by day and time

Measurable Impact

- Created ability to view busiest times of the day and avoid bottlenecks
- Actionable insights drove staffing scheduling improvements
Potential Electrophysiology (EP) Patients

Use Case

• Identify patients with CPT code 92960 (Cardioversion Electric, Ext) and who have not visited the EP practice in a year

Measurable Impact

• Actionable report; output included provider name, patient account #, patient name, and service date
Responsibilities, Indicators and Objectives (RIOs)

Problem
Find a way to consolidate data points spread across multiple project folders required for quarterly RIO meetings with each medical group practice director and the CMO.

Solution
- **Tag** each workbook with a “RIO” identifier to allow it to stay in its original location without duplication.
- Additionally, use the **Original View** and **Subscribe** features to send custom-filtered reports to each user on a regular basis.
Surgical Services
Use Cases
Use Case

- OR Block management is an on-going struggle for many organizations.
- Accurate data and management of block updates is a challenge.

Measurable Impact

- Manage block utilization better to avoid “wasted” OR time.
- Improve Physician satisfaction.
Use Case

- OR Scheduled cases are always being moved to different rooms due to overflow
- Busier portions of the day create bottlenecks

Measurable Impact

- Allowed OR team to track busiest rooms/times of day and schedule appropriately
Op Group Contribution Margin

Use Case
- Lack of understanding of true profitability when looking at individual surgical departments

Measurable Impact
- Helps track the net profitability of operation groups/departments over time
- Visualizes the severity of the monetary impact associated with specific op groups
Infection Prevention List

Process:
Filter Surgeries by Month > Select Surgeon Name > Sheets below update automatically

MONTHLY LIST OF PATIENTS SEEN

Dear Surgeon B6,

The Stamford Hospital Surgical Staff was pleased to have been able to accommodate your surgical needs. As a part of our routine standard of care, we monitor and review the following events after discharge from the Hospital:

1. Infection within 30 days of discharge from Stamford Hospital.
2. Hospital admission within 14 days of discharge from Stamford Hospital.
3. Emergency room visit within 14 days of discharge from Stamford Hospital.
4. No untoward events following discharge from Stamford Hospital.

Please complete and sign the attached form indicating any of the above mentioned events regarding the listed patients.

Your office may return the completed form to the Hospital by fax, email, or hand delivery. The form should be retained and signed regardless of whether an accident was cited.

Stamford Hospital strives to provide quality care to each and every patient. Outcome measurement allows us the ability to determine corrective actions that may minimize these variations.

Sincerely,

Infection Preventionist
Stamford Hospital

Enclosures

Use Case

• Downloading patient lists from EMR and sending them to the correct party took a tremendous amount of time

Measurable Impact

• Individual report creation time cut down significantly
• Easier to use and quicker to send out as a PDF
# OBGYN MD Scorecards

## Use Case
- Tracking MD performance over time is important for departmental growth

## Measurable Impact
- Shows productivity trends YOY and on a monthly basis
- Created transparency that shows how MD’s stack up against the department average
Clinical Quality and Population Health Management Use Cases
### Quality Reporting

**Use Case**
- MIPS is part of CMS' Quality Payment Program which rewards value and outcomes; several metrics had to be reported to CMS under this program.

**Measurable Impact**
- Several pertinent metrics were developed in Visual Analytics using raw data from different applications.

---

#### CMS MIPS Quality Measure Dashboard

**Measurement Period: January 1, 2017 - December 31, 2017**

<table>
<thead>
<tr>
<th></th>
<th>Total Patients</th>
<th>HbA1c Poor Control</th>
<th>Medical Attention for Nephropathy</th>
<th>Breast Cancer Screening</th>
<th>BMI Screening and Follow Up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shared Patients</strong></td>
<td>46,474</td>
<td>3,155</td>
<td>3,100</td>
<td>29,611</td>
<td>46,080</td>
</tr>
<tr>
<td><strong>Meditech Unique Patients</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>eCW Unique Patients</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Overlap Percentage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Use Case

- Existing data extracts do not include certain quality metrics required to measure physician performance

### Measurable Impact

- Ability to measurably track physician quality performance and benchmark against peers
PCP Wellness Visit

Use Case

- Identify patients who have not had a wellness visit in more than a year.

Measurable Impact

- Helped maximize patient retention and satisfaction
Length of Stay (LOS) – Discharge Times

Use Case

- Patients are discharged too late which leads to increasing costs and capacity issues

Measurable Impact

- Helped management to identify root causes contributing to late discharges for remediation
- LOS decreased by 0.2 days
Patient Demographic Analysis

Use Case

• Understanding patient distribution to our sites to plan new sites

Measurable Impact

• Leadership could immediately understand where patients for a particular practice are coming from and can do site planning
Measurable Value from Visual Analytics

- Actionable data insights has helped us identify opportunities for savings up to $7 MM
- Eliminated approximately $250,000 in third party software/analytics consulting
- Improvement in collection rate by 7%
- LOS reduced by 0.2 days
Next Steps and Future Direction
Next Steps and Future Direction with Visual Analytics

• Develop **consumer analytics function** to assist our Marketing and Planning department.

• Enhance **predictive analytics** for improving patient care.

• Expand analytics to support **supply chain savings**.
Please complete the session survey from the Session Details screen in your TC18 app.
Thank you!

Divya Malhotra, MD, MHA, MBA
Executive Director, Analytics and Innovation

Luis C. Rodríguez, CFA, CAIA, FRM, MBA
Sr. Project Manager, Analytics and Innovation