Leveraging Technology to Effect Patient Outcomes and Enhance Quality

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Presentation Objectives

• Describe Healthcare Trends
• Examine the Value of Laboratory Information and Automation
• Outline Laboratory Challenges
• Review Metrics
• JT Mather Experience

John T. Mather Memorial Hospital

• 248 Bed Community Hospital established in 1929
• Located North Shore on Long Island in Suffolk County
• Continually changing to meet the needs of the community
How Health Care is Transforming

- Personalized medicine
- More accurate disease diagnosis
- Health care providers more efficient
- Response, dosing, adverse events
- New, better, safer medicines
- Diagnostic, prognostic process
- When, whether, how to treat

REDUCING THE BURDEN OF DISEASE
BROAD IMPLICATIONS FOR HEALTH POLICY

“One year of increase life expectancy translates to 4% improvement in economic growth (GDP)”


The Case for Investment
Laboratory Diagnostics Information...

- Medical risk and quality management
- Improves medical decision-making
- Changes the course of disease
- Reduces the burden of disease

Total healthcare spending:
$2.60 trillion in 2010 or $8,686 per person
$2.00 trillion in 2005 or $6,697 per person

Source: CMS.gov

30%
Labs are only 3% of

Changing Role of the Clinical Laboratory

Old Paradigm

LAB → Diagnose Disease

New Paradigm

LAB → Assess Prognosis

Start/Adjust/Stop an Intervention

Screen for Disease/Screen to determine Risk of developing Disease

“Rule in” Diagnosis

“Rule out” Diagnosis

The Value is Unquestionable...
Clinical Diagnostic information and services and the people who provide them

SAVES LIVES ..... SAVES DOLLARS

• Chlamydia/GC...molecular test
  * Cost $50
  * Can prevent pelvic inflammatory disease
  * Hospitalization ... surgery ... infertility

• MRSA...molecular test
  * Cost $63
  * Can prevent transmission of MRSA
  * Reduce infection... improve patient flow... enhance patient safety
The Challenges...

Top Challenges for Today’s Clinical Laboratories

1. Manage high labor costs as supply diminishes
2. Reduce reagent/supply costs
3. Cope with demand intensity
4. Deal with low productivity
5. High utilization
6. Upgrade Inappropriate/insufficient technologies

Strategic Plan for Laboratory

• Maintain or improve quality levels
• Fulfill all requirements for regulatory agencies
• Enhance turnaround time of information in the hospital
• Expand test menu and services
• Assure patient safety with patient centric approaches
Metrics

Annual Test Volume

Total Volume for Inpatients

2011
Inpatient Test Volume
9.1% Decrease

2012
Inpatient Test Volume
Total Volume for Outpatients

2012 Outpatient Test Volume
19.4 % Increase
2011 Outpatient Test Volume

Total Volume for ED

2012 E.D. Test Volume
8.7 % Increase
2011 E.D. Test Volume

2012 AACC Lab Automation

Lab Automation
ED STAT Basic Metabolic Panel
Total Turn Around Time

Emergency Department TAT
Shift Comparison

Basic Metabolic Panel (BMP)

<table>
<thead>
<tr>
<th>Shift</th>
<th>8a-4p</th>
<th>4p-12a</th>
<th>12a-8a</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Shift</td>
<td>Mean 36.2</td>
<td>Mean 32.4</td>
<td>34.4</td>
</tr>
<tr>
<td>Median</td>
<td>34</td>
<td>31</td>
<td>33</td>
</tr>
<tr>
<td>Mode</td>
<td>33</td>
<td>31</td>
<td>30</td>
</tr>
<tr>
<td>SD</td>
<td>11.2</td>
<td>7.5</td>
<td>9.5</td>
</tr>
<tr>
<td>ER BMP</td>
<td>750</td>
<td>823</td>
<td>323</td>
</tr>
<tr>
<td>Tot BMP</td>
<td>2637</td>
<td>1155</td>
<td>1968</td>
</tr>
</tbody>
</table>

ED STAT Basic Metabolic Panel
Total Turn Around Time

ED STAT BMP Turn Around Time 2012
JOHN T. MATHER MEMORIAL HOSPITAL LABORATORY

Lab Performance Improvement
Code Orange Turn Around Time in the Emergency Department
Average Report Times by Department

• Consolidated testing by replacing individual instrumentation
• Implementation of Laboratory Automation, Middleware and LIS
• Improved services by bringing several tests in-house

Achieved Best Practices in:
- Test Volume
- Cost / Req
- Productivity

Operational Costs for a Typical Laboratory
Laboratory Annual Expense Breakdown 2011

Creating Value

"One of the hospital's top priorities is to reduce patients' length of stay. By delivering critical information quickly, the laboratory can help us achieve this goal."

Dr. John Fan
John T. Mather Memorial Hospital

John T. Mather Memorial Hospital

Patient Admissions

Number of Patient Care Days

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions</td>
<td>7,456</td>
<td>6,873</td>
<td>18,000</td>
<td>18,160</td>
<td>6,380</td>
<td>6,387</td>
</tr>
<tr>
<td>Patient Care Days</td>
<td>5,150</td>
<td>4,980</td>
<td>14,900</td>
<td>15,010</td>
<td>5,159</td>
<td>5,156</td>
</tr>
</tbody>
</table>
Improving Patient Management

Appropriate utilization of resources improves patient flow

2001-2002: 854 saved patient care days
254 more patient admissions
Generating additional revenue of $1,270,000

2004-2007: 1575 saved patient care days
451 more patient admissions
Generating additional revenue of $2,255,000

2009-2011: 1648 saved patient care days
85 more admissions
Generating additional revenue of $425,000
Total Revenue generated: $3,950,000

Improves Organizational and Laboratory Quality Performance

• Decreases turnaround time (TAT)
• Achieves superior turnaround time leading to high medical staff and patient satisfaction
• Creates best practices - first in/first out
• Enhances patient safety - mapping/tracking
• Maximizes productivity
• Contains labor costs

Rapid MRSA Screening

Molecular Diagnostics Detection and Screening Technology
**Culture – The Gold Standard**

- Traditional microbiology 48 hr broth enrichment
- Sensitive
- Low cost
- Report final results in 96 hours (4 days)
- After many patients are discharged but not before they have had an opportunity to transmit their MRSA to others

**Molecular Diagnostics**

- Direct method of infectious agent detection
- Identification of infectious organisms through the detection of DNA/RNA sequences
- Dramatically reduce (TAT)

**Cepheid's GeneXpert®**

Workflow: Self-contained cartridge – just add sample
Active Surveillance For MRSA
Cost-Benefit Molecular Testing (PCR)

<table>
<thead>
<tr>
<th>Costs</th>
<th>Savings</th>
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<tbody>
<tr>
<td>• Screened high risk patients</td>
<td>248 bed hospital 82,373 patient days/91% occupancy</td>
</tr>
<tr>
<td>2008: 88/mo = 1,050/yr</td>
<td>• 0.901,000 = 74.3 infections (2007)</td>
</tr>
<tr>
<td>2009: 139/mo = 1,663/yr</td>
<td>• 0.681,000 = 48.0 infections (2009)</td>
</tr>
<tr>
<td>2010: 176/mo = 2,107/yr</td>
<td>• 0.291,000 = 23.5 infections (2008)</td>
</tr>
<tr>
<td>2011: 182/mo = 2,181/yr</td>
<td>• 0.251,000 = 19.0 infections (2010)</td>
</tr>
<tr>
<td></td>
<td>• 0.171,000 = 13.0 infections (2011)</td>
</tr>
<tr>
<td>• PCR Assay ~ $40-63 per test</td>
<td>(2007 vs 2011)</td>
</tr>
<tr>
<td>• Total Screening Cost $352,763</td>
<td>Difference = 61.5 fewer infections @ $35,000</td>
</tr>
<tr>
<td>• NO ADDITIONAL FTE'S</td>
<td>Decrease in 2008 hospital costs = $920,500</td>
</tr>
<tr>
<td>• MRSA testing performed 24/7</td>
<td>Decrease in 2009 hospital costs = $847,000</td>
</tr>
<tr>
<td></td>
<td>Decrease in 2010 hospital costs = $175,000</td>
</tr>
<tr>
<td></td>
<td>Decrease in 2011 hospital costs = $210,000</td>
</tr>
<tr>
<td></td>
<td>Total cost avoidance/reduction= $2,152,500</td>
</tr>
</tbody>
</table>

Net Savings due to Prevention $1,799,737

Clinical Impact and Financial Metrics

• Implementation of an Active MRSA High Risk Screening Program
• Improved services by bringing Molecular testing in-house
• Increased Awareness of HAI’s

Achieved Best Practices in:

- Decreased Infection Rate
- Cost Reduction

Length of Stay

• Implementation of an Active MRSA Screening Program
• Improved services by bringing Molecular testing in-house
• Increased Awareness of HAI’s

Achieved Best Practices in:

- Decreased Length of Stay

(reflects an annual cost savings of $481,000)
MRSA Conclusions
The laboratory’s critical role of implementing rapid molecular PCR detection technology provides:
• Powerful actionable medical information for accurate and fast identification of MRSA
• Dramatically reduces turn-around time (TAT)
• Supports prevention strategies that permit rapid identification and interventions that assure patient safety
• Leads to enhanced clinical outcomes, reduced costs and significantly decreased HAIs

Achieved Outcomes from Leveraging Technology
• Improved efficiency
• Increased productivity
• Decreased TAT
• Reduced costs
• Enhanced service levels
• Improved patient safety
• Reduced errors
• Enhanced quality

2012 AACC Lab Automation
Improved process = High Performance Metrics = Better Patient Care
Together Laboratorians and Executives Can Leverage Tomorrow’s Technology Today!
Measurable Outcomes of Rapid Screening Programs

- Rapid Screening for effective management and reduction of Hospital Acquired Infections (HAI)
- Making evidence-based, data driven decisions
- Defining comprehensive outcome measures
- The impact of value added measures on patient outcomes, including population selection, cost, cost effectiveness, rapid turnaround time, technology selection, reduced infection rates and enhanced patient safety and satisfaction