Leveraging Technology to Effect Patient Outcomes and Enhance Quality

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Port Jefferson, NY
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

J.T. Mather Memorial Hospital. Our Mission to be the best community hospital in New York State.
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
Labs are only 3% of

2012 AACC Lab Automation
Changing Role of the Clinical Laboratory

Old Paradigm
LAB → Diagnose Disease

New Paradigm
- Start/Adjust/Stop an Intervention
- Screen for Disease/Screen to Determine Risk of developing Disease
- "Rule in" Diagnosis
- Assess Prognosis
- ‘Rule out” Diagnosis
- Assess efficacy of an intervention/Compliance with an Intervention
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

2011 Outpatient Test Volume

19.4% Increase

2012 Outpatient Test Volume

2011 Outpatient Test Volume
Total Volume for ED

2011
E.D. Test Volume

2012
E.D. Test Volume

8.7%
Increase
2012 AACC Lab Automation
Cardiac Troponin I and Basic Metabolic Panel (BMP) turnaround time decreased by 30 minutes, representing a 33% decrease in turnaround time to the Emergency Room. Turnaround time at John T. Mather Hospital for blood specimens is defined as the time of order entry from a Hospital location to the time of results release.
ED STAT BMP Total Turn Around Time (TAT)

ED STAT BMP Total Turn Around Time
N= 22,729

- November
- September
- July
- May
- March
- January

Order to Collection
Collection to Receipt
Receipt to Release

Minutes
ED STAT Basic Metabolic Panel
Total Turn Around Time

ED STAT BMP
Pre-Analytical & Analytical TAT

Order to Receipt
Receipt to Release

Minutes

January
February
March
April
May
June
July
August
September
October
November
December

2011

25
27
29
31
33
35
37
39
41
43
## Basic Metabolic Panel (BMP)

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<th>4p-12a</th>
<th>12a-8a</th>
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<td>2637</td>
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ED STAT Basic Metabolic Panel
Total Turn Around Time

ED STAT BMP Turn Around Time 2012

- Order to Receipt
- Receipt to Release
- Total TAT
Laboratory Performance Improvement
Code Orange Turn Around Time in the Emergency Department
Average Receipt To Result Time by Department

<table>
<thead>
<tr>
<th>Department</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
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Laboratory Performance
Bottom Line Results Since 2002

- 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: +62%
Cost / Req: -28%
Productivity: +73%
Operational Costs for a Typical Laboratory

- Labor: 60%
- Reagents & Supplies: 10%
- Capital: 10%
- Overhead: 7%
- Other: 13%
Laboratory Annual Expense Breakdown 2011

- AP and Mirco Services: 13%
- Other: 1%
- Labor: 35%
- Lab Supplies: 6%
- MD Salaries: 2%
- Send Out: 7%
- Blood: 19%
- Reagents: 17%
Creating Value

“The laboratory’s turnaround time is excellent.”

“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. Joan Faro
John T. Mather Memorial Hospital
John T. Mather Memorial Hospital

Patient Admissions

Number of Patient Care Days

<table>
<thead>
<tr>
<th>Year</th>
<th>Admissions</th>
<th>Patient Care Days</th>
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<tbody>
<tr>
<td>2001</td>
<td>71456</td>
<td>10382</td>
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<tr>
<td>2002</td>
<td>70938</td>
<td>10771</td>
</tr>
<tr>
<td>2004</td>
<td>10648</td>
<td>68530</td>
</tr>
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<td>2007</td>
<td>11099</td>
<td>66955</td>
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<td>2009</td>
<td>11184</td>
<td>65307</td>
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<tr>
<td>2011</td>
<td>11316</td>
<td>61757</td>
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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)
Workflow: Self contained cartridge – just add sample

1. Insert swab into elution reagent vial and break at score

2. Vortex and dispense sample into Port 5

3. Insert cartridge and start assay.
Active Surveillance For MRSA
Cost-Benefit Molecular Testing (PCR)

Costs

- Screened high risk patients
  2008: 88/mo = 1,050/yr
  2009: 139/mo = 1,663/yr
  2010: 176/mo = 2,107/yr
  2011: 182/mo = 2,181/yr

- PCR Assay ~ $40-63 per test

- Total Screening Cost
  $352,763

- NO ADDITIONAL FTE’S

- MRSA testing performed 24/7

Savings

248 bed hospital
82,373 patient days/91% occupancy

- 0.90/1,000 = 74.3 infections (2007)
- 0.59/1,000 = 48.0 infections (2008)
- 0.29/1,000 = 23.8 infections (2009)
- 0.25/1,000 = 19.0 infections (2010)
- 0.17/1,000 = 13.0 infections (2011)

(2007 vs 2011)

Difference = 61.5 fewer infections @ $35,000

Decrease in 2008 hospital costs = $920,500
Decrease in 2009 hospital costs = $847,000
Decrease in 2010 hospital costs = $175,000
Decrease in 2011 hospital costs = $210,000

Total cost avoidance/reduction= $2,152,500

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

- 82%
- 85%
Implementation of an Active MRSA Screening Program

Improved services by bringing Molecular testing in-house

Increased Awareness of HAI’s

**Achieved Best Practices in:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Length of Stay in ICU and CCU</th>
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<tbody>
<tr>
<td>2007</td>
<td>4.3</td>
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<td>2011</td>
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Reflects an annual cost savings of $491,000
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
Improved process = High Performance
Metrics = Better Patient Care

Together Laboratorians and Executives Can Leverage Tomorrow’s Technology Today!
Thank You
Wrap up

Questions??????
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