Hematology Selection, Implementation, and Performance Tracking;

“Lean Away Waste Using Hematology Automation”

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Objectives

- Recognize recent advances in hematology laboratory automation.
- Discuss how advancements in hematology automation can improve workflow efficiency.
- List the pros and cons of implementing automated hematology instrumentation.
## Operational Challenges

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Details</th>
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<tbody>
<tr>
<td>Decrease in number of accredited schools</td>
<td></td>
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<tr>
<td>Bye Bye Baby Boomers</td>
<td></td>
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<tr>
<td>Decrease in number of students entering field</td>
<td>• Under-recognition of Laboratory Medicine field&lt;br&gt;• Salaries do not correlate with education</td>
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<tr>
<td>Healthcare Changes</td>
<td>• Affordable Care Act&lt;br&gt;• Reimbursement changes – quality vs. quantity</td>
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<td>Laboratory testing volume is on the rise</td>
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Operational Solutions

- Doing more with less…
  - LEAN-LEAN-LEAN
- Lab Automation and Middleware
- LIS Auto-Verification
- Advanced Parameters
  - Thorough information interpretation?
- Cross Training
Memorial Sloan Kettering Department of Laboratory Medicine

**Past**
- Relative recent division consolidation
- Same thing 10 different ways

**Present**
- New Chair and Vice Chair
- New Lab Administration
- New LIS

**Future**
- New Lab Building
- New LIS
- New Sites
### MSK Growth

#### Manhattan
- Current Labs = 6
  - 2 Multi-Disciplinary
  - 4 Heme Only
- Future Labs (2019) = 8
  - 4 Multi-Disciplinary
  - 3 Heme Only
  - 1 POCT Only

#### Regional Network (Long Island, New Jersey, Westchester)
- Current Labs = 5
  - 1 Multi-Disciplinary
  - 4 Heme Only
- Future Labs (2018) = 6
  - 2 Current Closing, 3 New, 2 Expansions
  - 6 Multi-Disciplinary

14 Labs with Hematology
## Hematology Instrumentation
### Manhattan vs Regional Network

**Manhattan Sites**
- Different technology from Regional Sites
- Larger Footprint
- No Automation
- 6 Part Auto Diff
- LIS auto-verification used
- Digital Imaging Used

**Regional Network Sites**
- Different technology from Manhattan sites
- Smaller footprint – Lab space constraints
- No Automation
- 5 Part Auto Diff
- LIS auto-verification used
- No Manual Diffs or Slide Review – All sent to Main Lab
Hematology Workflow

Specimen received in Hematology

Sample placed on instrument

Sample run on instrument

Repeat?

Results available

• Auto-verified Yes → No further action
• Auto-verified No → Additional tasks
• Needs to be repeated?

Prepare Slide

Stain Slide

Perform Slide Review or Manual Diff

Pathologist review needed?

Final Results Review

Results Release

Steps not performed at Regional Sites – All sent to Main Lab

Non-decision

Touch-Point

Automated OR Manual
Need Identified – Integrate and STANDARDIZE Hematology
Goals of RFP

Standardize Equipment
• Small Footprint – Scale to volume
• Same reagents

Automation
• Auto Repeats
• Slide-Maker-Stainer
• Scalable
• What else?

Middleware
• Integrate all instruments
• Integrate Digital Imagers
• Facilitated remote review
• What can it offer??

Decreased TAT’s
New Hematology Automation

Digital Imager (CellaVision)

Analyzer

Analyzer

Slide Maker/Stainer
Other Configurations
Middle-ware

Houses

Rules
- Repeats
- Slide Review
- Manual Diff

SOP’s
- Critical Values
- Bench excerpts

First pass results review

Auto-verify?

Information Pass-thru?

Defines next steps

Integrates

Instrument to instrument information

Instrument information with cell images

Allows for remote review and resulting

Paperless

No instrument printouts

No QC printouts

With automation → Drives workflow process

Repeats

Slide prep

Slide review

Improved TAT

$\$ SAVINGS

Improved TAT

$\$ SAVINGS
Hematology Automation

Automated Slide Maker-Stainers
- Connected to Hematology Instrument
- Not connected to Hematology Instrument

Digital Imager
- Automated Differential or Slide Review
- WBC and RBC Morphology

Automation Connectivity
- Between Hematology instruments
- Attached to larger automated line
MSK Implementation

Validation
- New Instrument to Incumbent
- New Digital Imager to Existing Imager AND new instrument
- Middleware build, testing, interfacing

Staff Training
- New Instrument and technology
- New Workflows
- New Middleware
- Customized

Go Live
- Scheduled for 11/15/15
- Few setbacks
- Phased approach
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Results Release

Non-decision

Touch-Point

Automated OR Manual

Steps not performed at Regional Sites – All sent to Main Lab

All Labs - Before
Hematology Workflow

Specimen received in Hematology

Sample placed on Line

Sample run on instrument

Results available

• Needs to be repeated?

Auto-verified Yes → No further action
Auto-verified No → Additional tasks

Prepare Slide

Stain Slide

Perform Slide Review or Manual Diff

• Pathologist review needed?

Final Results Review

Results Release

REMOTE REVIEW

Main Lab - After
Hematology Workflow

Specimen received in Hematology

Sample placed on instrument

Sample run on instrument

Results available

- Needs to be repeated?

Auto-verified Yes → No further action
Auto-verified No → Additional tasks

Prepare Slide

Stain Slide

Perform Slide Review or Manual Diff

Pathologist review needed?

Final Results Review

Results Release

Non-decision

Touch-Point

Automated OR Manual

Non Main Labs - After
Expected Outcomes

**Quality**
- Eliminate waste
- Reduce touchpoints
- Reduce opportunity for Error
- Improved training and competency assessment

**Efficiency**
- Cross training
  - More Information
  - More SOP’s
  - Multitasking
- Reduced TAT’s
  - Faster clinical decision making
  - Better patient outcomes
- FOCUS SKILLS!!

**Cost Savings**
- Instrument, reagent and service savings
- Paperless
- Increased staff utilization
MSK – Next Steps

- Implement
- Monitor and Assess
- Tweak and Refine
Pros and Cons to Hematology Automation

**Pros**
- Streamlined and efficient workflow
- $$ Savings
- Decreased Turn-Around-Times
- Standardized processes
- Consistency in results
- FOCUS SKILLS!!!

**Cons**
- Space constraints
- Maintenance
- Implementation*
- Cost**
Considerations

- Know objectives and goals
- Plan, plan, plan
- Time, time, time
Advanced Parameters

- Immature Granulocyte Enumeration
- Platelet Count
  - Optical/Fluorescent Platelet Counts
  - Automated CD61
- Nucleated Red Blood Cells
- Immature Platelet Fraction
Advanced Parameters/Methods

- Platelet Count
  - Optical/Fluorescent Platelet Counts
  - Automated CD61
    - Accurate platelet counts with
      - Giant Platelets
      - Microcytic anemia
      - Schistocytes

- Nucleated Red Blood Cells
- Immature Platelet Fraction
Questions??

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