**BLOOD BANK AUTOMATION - GALILEO™**

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**Agenda**

- Overview of Northwestern Memorial Hospital  
- Why we decided to automate  
- Understand the role of automation in the blood bank  
- Familiarize the Galileo™ Blood Bank Automated Machine  
- Describe the NMH workflow process of integrating the Galileo™ Automation

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**Northwestern Memorial Hospital**

**Who We Are**

- Second Oldest Hospital in Chicago (1865)  
- Primary Teaching Affiliate of Feinberg School of Medicine of Northwestern University  
- One of 125 Academic Medical Center Hospitals  
- Community Hospital Serving Near North Side  
  - Great Urban Neighborhood - Michigan Avenue  
  - Economically and Ethnically Diverse  
- "Most Preferred" Hospital in Chicago  
- Nationally recognized for Quality/Financial Strength  
  - "Most Wired"  
- AA+ Bond rating
Why did we automate?

- Manage volume growth of over 20% from 1999 to 2004
- Handle additional duties
  - Organ banking & ABO compatibility confirmation
  - Blood vessels storage, ABO compatibility & tracking
  - Tissue Services Implementation
- Standardize testing techniques
- Achieve consistent TATs of less than one hour for STAT Type and Crossmatch
- Struggle to recruit Med Techs
- Increase efficiency and productivity
- Improve employee satisfaction
- Lower operating costs
- Remove repetitive, routine manual tasks from staff... allowing complex & intensive work in the lab to be handled in a more timely and efficient manner
- We have an excellent model in our Core Lab

Admissions and Overnight OP
What Blood Bankers want?

- Full Automation (robotics and true walk-away capability)
- Broad Menu
- Ease of Use
- True Continuous Access
- High Throughput
- Process Controls

Why Galileo™

- Process Benefits of Automated System
  - Allows testing to occur as it comes into the lab
  - Can accommodate 90%+ of testing
  - Reduces hands-on tech time in routine testing
- Instrumentation preferred by pathologists and techs
- Good Partner
  - As close to a “turn-key” implementation as possible
  - One vendor
Galileo™ - Full Automation

- Pipetting
- Incubation
- Washing
- Centrifugation
- Shaking
- Reading of Reactions
- Interpretation of results

Galileo™ - Broad Menu

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<thead>
<tr>
<th>ASSAYS</th>
<th>TECHNOLOGIES</th>
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<tbody>
<tr>
<td>ABO/D Grouping</td>
<td>Hemagglutination</td>
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<td>Donor Confirmation</td>
<td>Hemagglutination</td>
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<td>Antibody Screen</td>
<td>Capture-R Ready Screen</td>
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<td>Antibody Identification</td>
<td>Capture-R Ready-ID, Extend I &amp; II</td>
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<td>Crossmatch</td>
<td>Capture-R Select</td>
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<td>Weak D Testing</td>
<td>Capture-R Select</td>
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<tr>
<td>DAT</td>
<td>Capture-R Select</td>
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Future Assays......

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<tr>
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<tr>
<td>CMV</td>
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<td>Syphilis</td>
<td>Treponemal Based Assay</td>
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<td>RBC Phenotyping</td>
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<td>Platelet Antibody Screen</td>
<td>Capture-P Ready Screen</td>
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<tr>
<td>Platelet Crossmatch</td>
<td>Capture-P</td>
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Galileo™ - Characteristics

• Truly hands-off walk away capability
• Computer controlled & totally robotic
• Complete bar-coding system
• Linear rack system
• PCAnywhere
• Dynamic Scheduler
• Bi-directional LIS interface
• Independent & simultaneous modules
• Touch screen monitor & user friendly
• Large capacity for samples, reagents & microplates
• Capable of assay recovery from mechanical failures by troubleshooting

Galileo™ - Characteristics

• Password protected with different level of accessibility
• Consistent color coding system for consumables and resources
• Concise and comprehensive preventative maintenance schedules
• Multiple documented QC steps for each assay
• Generates actual instrument readings plus images and single result interpretation
• Extensive data availability, easy and quick retrieval

NMH Galileo™ work flow

process integration

• EDTA samples received with barcodes - Floor Order Entry
• Samples received in LIS
• 3 min spin time at 5600 rpm
• Samples loaded onto the Galileo™ using the linear rack
• Tests are selected via the touch screen monitor
• Load resources (If necessary)
• Testing process started
NMH Galileo™ workflow
process integration

- Continue sample loading as samples arrive will batch all routines and/or run STAT samples together with the routines to maximize effective resources usage
- Once testing is in progress, staff is available for various tasks within the lab
- Results are entered into LIS manually currently, interface not available with Misys LIS

Galileo™ general observation

- ABO and D Typing - Nothing Magical
- The D Dilemma
  - Two monoclonal anti-D’s (D4 and D5) are run on each patient sample
  - Same IgG clones but different IgM clones in blends

Galileo™ general observation

- Antibody Screen...increased sensitivity will pick up weak reacting clinically significant antibodies but yet...some clinically insignificant antibodies will also show up
- Same issues as with any serologic testing
- Antibodies do not read textbooks
- Use the same rules for ruling out and confirming antibodies
**Galileo™ General Observation**

- Sample with previously known + antibody screen
- Can simultaneously run the panel with the initial antibody screen
- More sensitive DAT compared to the standard tube technique for ABO incompatibilities
- Sample Failures
  - QNS - 250 uL packed RBCs/ 500 uL Plasma
  - Excessive hemolysis (5+), lipemia and icterus
  - Clots
  - Mechanical failures

**Automation in Blood Banking**

- Benefits of Automation
  - Increased productivity
  - Enhanced QA…more controlled SOP and standardized process
  - LIS interface reduces potential for transcription errors
  - Reduces workload stress
  - Fewer errors
  - More satisfied staff
  - Lower overtime expenses
  - More flexibility with staff scheduling

**What We’ve Learned from Automation**

- Automation highlights process inconsistencies
- It is a key to staffing efficiency
- It caused us to redesign our workflow and our physical space to maximize our through-put
- Creates positive culture accepting of more change because workflow is so dramatically improved.
Galileo™ in Operation at
Northwestern Memorial Hospital since Oct. 4, 2004

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