Fitting Automation into a Small Transfusion Service

Jo Bruner, MLS (ASCP)CM
Blood Bank, Hematology & Coagulation
Section Head
Fulton County Health Center Laboratory

Objectives
- List the advantages and disadvantages of automated testing within a small transfusion service.
- Describe a process by which solid phase automation can be integrated into a small transfusion service.
Timeline

- **Test tube**
  .....*forever & a day*
**Pros & Cons**

- Standardize testing
- Increased sensitivity & reliability
- Improve efficiency
- Walk away testing
- Decrease referrals to reference lab
- Reagent price protection

- New & different
- Nontraditional reaction interpretation
- Cost
- Reagent waste

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**Staff Shortages in Labs May Put Patients at Risk**

By LAURA LANDRO

THE INFORMED PATIENT  MAY 13, 2009

The swine-flu outbreak has focused a spotlight on a looming risk for hospitals and their patients: a shortage of technicians to run critical lab tests.

Vanderbilt University Hospital’s lab had to pull staffers from other parts of the hospital and ask technicians to work double shifts to test incoming patients for swine flu earlier this month. “It was all hands on deck for a week,” says Michael Laposata, chief pathologist at the large medical center in Nashville, Tenn.

Swine flu has had minimal impact in the U.S. so far. But in the event of a major infectious disease outbreak, labs at smaller hospitals around the country “would never have enough expertise or resources to mount a response,” Dr. Laposata says. “This is a major patient-safety issue, right behind taking out the wrong kidney or giving 10 times the dose of a drug.”

Like the growing shortages of primary-care doctors and nurses, the shrinking ranks of skilled lab workers pose a potential threat to the safety and quality of health care, medical experts warn.

Hospitals say it currently can take as much as a year to fill some job openings. And the American Society for Clinical Pathology, which certifies lab professionals, says average job-vacancy rates currently top 50% in some states. The group is lobbying for federal and state funds to keep some academic training programs alive and raise awareness of the problem.

Besides testing for deadly viruses and infections, lab technicians, who currently number about 300,000 nationwide, perform such vital tests as diagnosing heart attacks and identifying cancerous tumors. There is no firm evidence to link the growing shortage of lab professionals to an increase in errors or a national slowdown in getting results to patients. But to head off that eventuality, hospitals and professional groups are taking new steps to increase funding for training and to lure new recruits.

“We’re holding everything together with Band-Aids and glue today, but five years from now it’s going to be another story,” says Susan Cease, lab director for Three Rivers Community Hospital in Grants Pass, Ore., which is owned by Asante Health Systems. She says the hospital has been working with a local community college to provide the hands-on lab training for graduates of a two-year medical lab technician program. The hospital also lets its lab technicians with two-year degrees take online courses toward a bachelor’s degree…

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**Timeline**

- **Test tube**
  ..... forever & a day

- **Manual Capture**

CASE 1

PT, an 81 y/o male with chronic anemia, was admitted from ER on night shift.

- 2 units of LRPC ordered
- no history of antibodies
  (prewarmed technique had been utilized for probable cold agglutinin, solid phase testing was not in place at time)

Current Results

Type: O positive
Antibody screen:
  POSITIVE – SCI 4+ SCII 4+ (Capture methodology)

  NEGATIVE – (test tube methodology)
  prewarmed technique
Compatible units found and one given.

**Anti-Jk^a identified**

DAT positive
Serological evidence of hemolytic transfusion reaction confirmed by reference lab.
Unit typed Jk^a positive.

2^nd unit given Jk^a negative.

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**Timeline**

- Test tube
  .....forever & a day

- Manual Capture

- **ECHO**
  6/2008 – **went live in November**.

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**Blood Bank Automation Guidelines**

- ABO test – run on ECHO
- Antibody Screen – Routines - batch (minimum of 2), run on ECHO.
  Stat or urgent need, run singly on ECHO
- Crossmatch – Immediate Spin (negative antibody history)
  AHG – run on ECHO (positive antibody history or positive IS)
- Antibody ID – run on ECHO
- Antigen type – manual tube test
- Cord Blood – manual tube test
# ECHO Troubleshooting

<table>
<thead>
<tr>
<th>ABO TYPING</th>
<th>ACTION</th>
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| No Interpretation        | 1. If reactions present, interpret, document on printout and report if applicable.  
                          |   2. If reactions absent, repeat by tube or ECHO. Document on printout, interpret and report. |
| No Interpretation...     | Repeat testing by tube or ECHO. Document on printout, interpret and report. |
| No Interpretation...?    | 1. Visually look at test well. Discern if valid result; document on printout, interpret and report.  
                          |   2. If invalid, repeat testing by tube or ECHO. Document on printout, interpret and report.|

<table>
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<tr>
<th>Antibody Screen</th>
<th>ACTION</th>
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| No Interpretation        | 1. If reactions present, look at camera snapshot. Document on printout, interpret, and report.  
                          |   2. If reactions present and unable to interpret, repeat testing by ECHO or tube. Document on printout, interpret, and report.  
                          |   3. If reactions absent, repeat by ECHO or tube. Document on printout, interpret and report. |
| No Interpretation...?    | 1. View result file (highlight file, right click, and toggle to well and number). Determine where it falls in assay cut-off range and if significant. Document on printout, interpret, and report.  
                          |   3. If questionable, remove strip from ECHO and put on manual light viewbox. Interpret. If negative, document on printout and report.  

| Positive Results         | Run Ready-ID.                                                            |

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5/1/2015
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<th>ANTIBODY ID</th>
<th>ACTION</th>
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| Positive Results | 1. Interpret and report.  
2. If unable to interpret, Repeat Antibody Screen testing using tube methodology. Document results, interpret and report.  
3. If positive tube, perform Extend I and/or Extend II panel (depending on initial results).  
4. If unable to interpret, send to ARC Reference Lab. |

**CASE 2**

RM, a 60 y/o female with MDS, was dependent on regular blood transfusions.

History of Anti-K.

**Current results**

**Type:** O positive  
**Antibody Screen:** RS3 – all cells positive 4+  
**Ready-ID** – all cells reacting 4+

Following ECHO guidelines, DAT done.

**DAT Positive**

Specimen sent to Reference Lab for work up.  
Anit-Cw  
Anti-f  
Probable HLA Antibodies
Froze multiple aliquots of current specimen.

Used to screen K negative and C negative units for transfusion.

Transfused 180 units to this patient at FCHC over 3 years.

Summary:

1. A small transfusion service can benefit from automation and can optimize services.
2. Transitioning from tube testing to solid phase automated testing is a process.
3. Flowcharts are helpful tools for staff.
4. Patient care can be enhanced with the use of automation in the blood bank.