Remote Allocation in a Centralized Transfusion Service

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Executive Vice President
Puget Sound Blood Center

HAABB
September 28, 2011
A Centralized Transfusion Service

*How We Got to Where We Are*
October 12, 1944
First collection: King County Hospital

1946, King County Central Blood Bank
The first building in the US constructed expressly for collection, processing and testing of blood.
From Vancouver to Vancouver
- From the Cascades to the Coast
Growth of the Centralized Transfusion Service

• 1946
  – 13,000 units
  – 23,000 cross matches

• 2010
  – 93,000 units in CTS (187,500 total)
  – >167,000 cross matches
  – >8000 antibody panels
  – >24,000 unit phenotypes
First Hill

Pill Hill

Virginia Mason Hospital (400 ft)

Swedish Hospital (1000 ft)

Harborview Hospital (1600 ft)
Our Current Model
Benefits of a Centralized Transfusion Service

- Patient database (antibodies and requirements)
- Component modifications and IRL – available to all
- Efficient use of inventory: Minimize outdated
- Efficient use of staff and their expertise
- Distribution of capital expense
- Wide distribution of physician expertise
- Development of standard practice in a community
- Comparison of practice patterns
Remote Allocation

One aspect of addressing these needs

- Pre-place inventory where the patients are (!)
- Remove “efferent limb” transportation
- Reduce excessive crossmatching
- Reduce extensive “holding”
- Modification: Allow distribution of Thawed Plasma
- Future: Facilitate introduction of bedside identification
Software Supplier Selection

• End-to-End Solution
• Barcode pilot
• Hospital interest in BT TX
Phase 1
Recruiting Pilot Hospitals

• How many?
• Which?
  – Criticality of improving turn around time
  – Resources available and competing projects
  – Willingness to work with physicians to modify ordering practices
  – Space, HVAC, and critical power
Customer Advisory Committee

- Member Selection
- Charter
  - Purpose
    “The Remote Allocation Customer Advisory Committee is being formed to collaboratively and proactively identify, address, and provide input to help resolve issues, questions, and concerns regarding the use of the HemoSafe system for remote allocation of blood products throughout King County.”
  - Scope and Boundaries
    “This committee is expected to provide ideas, suggestions, feedback, and data to the Puget Sound Blood Center for the system-wide implementation of the Remote Allocation system throughout King County.”
Project Initiation

- Change Request Notice
- Steering committee
  - IT Director and IT lead
  - Transfusion Services Director
  - Project Manager
  - Sponsor
- Impact Analysis

Impact Statement

Project: Remote Allocation

<table>
<thead>
<tr>
<th>Area</th>
<th>Potential Impact</th>
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<tbody>
<tr>
<td>IT</td>
<td>• Increased workload due to managing remote devices – telecommunications circuits</td>
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<td>• Critical system – need redundancy to ensure no stoppage</td>
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<td>• Increased servers and computer storage</td>
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<td></td>
<td>• IT - Phase 1 system may not be practical to expand to more than a few hospitals due to BBCC limitations</td>
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<td>• Increased staffing support</td>
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<td>• Additional software, server, and telecommunications support - best estimate ~ $20,000</td>
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<td></td>
<td>• May be additional interface costs dependent on the type of interface connection used</td>
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<tr>
<td>Transportation</td>
<td>• Reduction in transportation</td>
</tr>
<tr>
<td></td>
<td>• Increased role of stocking refrigerator</td>
</tr>
<tr>
<td>Transfusion Services</td>
<td></td>
</tr>
<tr>
<td>Patient</td>
<td>• Phase 1 - Faster delivery for cross-matched patients (90-95%)</td>
</tr>
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<td></td>
<td>• Potential increase in patient safety - ID armband</td>
</tr>
<tr>
<td></td>
<td>• Phase 2 – decrease in order processing time, transportation time</td>
</tr>
<tr>
<td>Operational</td>
<td>• Two processes (remote release and traditional)</td>
</tr>
<tr>
<td></td>
<td>• Maintenance of HemoSafe – monitoring and calibrating</td>
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<tr>
<td></td>
<td>• Monitoring temp controls – has it’s own monitoring controls</td>
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<tr>
<td></td>
<td>• Monitoring of the Blood Track Manager at all times</td>
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<td></td>
<td>• Possible Lean exercise with hospital to review their OP-TS processes</td>
</tr>
<tr>
<td></td>
<td>• How we manage short-dated units</td>
</tr>
<tr>
<td>Financial</td>
<td>• Cost of hardware and software</td>
</tr>
<tr>
<td></td>
<td>• Reduction in transportation costs offset by increase in component cost</td>
</tr>
<tr>
<td></td>
<td>• Maximum utilization of highly-trained technical staff. Phase 2 - computer does the cross-match, OP tech can monitor the orders and stocking level</td>
</tr>
<tr>
<td></td>
<td>• Revenue adjustments required due to decreased CT ratios – offset</td>
</tr>
<tr>
<td></td>
<td>• Ongoing maintenance costs to vendor – software costs</td>
</tr>
<tr>
<td></td>
<td>• Additional software, server, and telecommunications support - best estimate ~ $20,000</td>
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</tbody>
</table>
Decisions

• Transfusion Report / Compatibility Label
Transfusion Report
Remote Allocation

AFFIX TRANSFUSION RECORD HERE

IF NO LABEL IS PRESENT THIS UNIT HAS NOT BEEN CROSSMATCHED

IF ISSUED AS AN EMERGENCY UNIT CONFIRM THAT THE UNIT IS TYPE O POSITIVE OR TYPE O NEGATIVE PRIOR TO TRANSFUSING

For Group O Blood being issued as emergency unmatch, complete the following:
1. Record Patient Name and Patient ID to the left
2. Complete a Stock Unmatched Blood Justification (SUB) Form and forward to the Puget Sound Blood Center

I have verified all of the following:

- The name and hospital number on the patient's identification band is identical to that on this Transfusion Report.
- The unit number, ABO/Rh and expiration date/time on the unit label is identical with that on this Transfusion Report.
- The unit is stored in its original package.

VERIFIED AND STARTED BY: [Date] [Time]
VERIFIED BY: [Date] [Time]

IF A TRANSFUSION REACTION IS SUSPECTED

STOP THE TRANSFUSION IMMEDIATELY! Do not discard the unit of blood or component

- Notify the Medical Staff
- Complete a Blood Center "Report of Susp. Transfusion Reaction" form
- Send the form, specimen(s) and blood bag with attached tubing and fluids to your lab

UNIT RECORD this section is to remain attached to the blood bag

AFFIX COMPATIBILITY LABEL HERE

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- Send the form, specimen(s) and blood bag with attached tubing and fluids to your lab

COMPATIBILITY LABEL

Patient Name if unmatch:

Patient ID Number if unmatch:

Hospital

Unit Number

Expiration Date and Time

Type

Component

Do Not Transfuse After

Compatibility Results

Patient ID Number

Patient Blood Type

Patient Requirements

Processes on Component
Decisions

- Software configuration and security options
- Diversity of inventory to stock
  - Red cells
  - CMV vs Leukoreduced
  - Irradiation
  - Thawed plasma
- Blood Center and Hospital responsibilities
- Custom Software
  - Data partition
  - Transfusion Comments
## Elements of the Project

- Development Studies
- Process Mapping
- FMEA
- Validation
- Standard Operating Procedures
- Training

### FMEA WORKSHEET

<table>
<thead>
<tr>
<th>Number</th>
<th>PROCESS CHANGE</th>
<th>POTENTIAL FAILURE MODE</th>
<th>POTENTIAL EFFECTS</th>
<th>Occurrence</th>
<th>Detection</th>
<th>Severity</th>
<th>RPN</th>
<th>PRECAUTIONS</th>
<th>Change Control #</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>CTL - Evaluate for remote allocation following US.</td>
<td>Decided that patient is eligible and they are not</td>
<td>appropriate inventory not available</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>XW crossmatch required but can’t be done</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decided that patient is not eligible and they are</td>
<td>units processed at TSL - delay in getting unit</td>
<td>2</td>
<td>6</td>
<td>7</td>
<td>84</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Inventory impact at TSL</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Don’t evaluate for Remote Allocation</td>
<td>Processed from TSL</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>14</td>
<td></td>
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</tr>
<tr>
<td>2.</td>
<td>Review Blood Track Inventory (printed inventory) and determine if appropriate units are available in HomoSafe.</td>
<td>Print-out not up to date</td>
<td>Units available that you are not aware of</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Print-out not available</td>
<td>Units unavailable that are listed</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Appropriate units not available</td>
<td>Don’t know inventory</td>
<td></td>
<td>Need Report as up to date as possible</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Review print report as needed</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Decide that appropriate units not available but they are</td>
<td>Can’t process using RA</td>
<td></td>
<td>Work flow evaluation</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Don’t process using RA when you could</td>
<td></td>
<td></td>
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</tbody>
</table>
Needed Culture Shifts

• Type and Screens
  – Increase number
  – Include patient profiles

• Limiting number of units ordered

• Willingness to release units before 3 days
HemoSafe Utilization

Orders filled in 2010

- % Pt Assigned
- % Pt Available
- % Available
- % Other
- % Empty

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Turn Around Time

Overlake Hospital Medical Center
Turnaround Times
Received to Assigned 2010-2011
Swedish Medical Center - Cherry Hill Campus
Turnaround Times
Received to Assigned 2010-2011

<table>
<thead>
<tr>
<th>Time (minutes)</th>
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<tbody>
<tr>
<td>60</td>
</tr>
<tr>
<td>50</td>
</tr>
<tr>
<td>40</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

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Swedish Medical Center - Cherry Hill Campus
Turnaround Times
Initial Call to Available at Hospital 2010-2011

Mean STAT TAT - Plasma
Mean STAT TAT - RBC (Phone/Fax)
Mean STAT TAT - RBC (Sample Required)
Mean Routine TAT - RBC (Routine Phone/Fax)
AB Plasma Use

Overlake Stock of Frozen AB Plasma Usage

- # of AB Plasma units thawed
- # of AB Plasma units transfused

2010
Overall Plasma Use

Overlake FFP & Thawed Plasma Orders

- # of Thawed Plasma Unassigned
- # of Thawed Plasma issued from Hemosafe - i.e. charged
- # of FFP wasted
- # of FFP charged to Overlake
Subsequent Hospitals:

- Swedish First Hill (13 months)
- Swedish Cherry Hill (9 months)
- St. Elizabeth’s (5 months)
- Evergreen (6 months)
- Northwest (6 months)
Challenges:

• Hospital resources
• Two HemoSafes at one location
• VPN vs GCI… and firewalls
• Remodels needed for some
• FDA not familiar with the concept
Physician practice:

- Type and Screen
- CT ratios
- Removing units for transport to OR
Next steps:

• Bi-directional interface
  – Programming and beta testing
  – FDA submission
  – Interface validation in conjunction with overall upgrade for blood center

• Additional hospitals for Phase 1?
Phase 2
Imagine Saving a Life.
Phase 2

- C:T ratios close to 1:1 since only issued when orders to give

- Reduced staff time
  - Cross matching (fully automated)
  - Transport (point of use)
  - 60 second availability
Phase 2 - Considerations

- Inventory is more fragmented
- Not all patients eligible
  - Need to have T/S
  - Cannot have positive antibody history/screen
  - Cannot have special needs such as washed, fresh, etc.
- Patient profile must in the LIS before removing red cells
- Substitution (LR for CMV not automatic)
Future Phases

- Platelets
- Patient ID (vein to vein)
- Perfect Match?
What it doesn’t replace
Questions?

Imagine Saving a Life.

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