Performance Improvement Team
Transfusion Delays

South Texas Veterans Healthcare System
Data Timeframe
January to July 2009
Meet the Team

1. Darla Martinelli, RN Nurse Manager
2. Lisa Browning, RN
3. Bernadette Arredondo, MAS
4. Romeo Mercado, Super Tech
5. Enrique Hernandez, Transport
6. Doug McCoy, PA, Physician Educator
7. Susan Ashley, CAC, IT
8. Shaman Singh, MD, Hospitalist
9. Audrey Tio, MD, Section Chief, Hospitalist
10. David Dooley, MD
**Priority Setting Tool**

<table>
<thead>
<tr>
<th>Performance Indicators &amp; Monitors</th>
<th>Other Accreditations</th>
<th>Joint Commission</th>
<th>Key Drivers</th>
<th>ORYX Core Measure</th>
<th>NPSG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission Critical Measure</td>
<td>OIG</td>
<td>Immediate Threat to Health &amp; Safety Preliminary Denial of Accreditation (PDA)</td>
<td>Assessment &amp; Care Credential Practitioners Communication</td>
<td>Technical Quality</td>
<td>Community Acquired Pneumonia, Pt Identification</td>
</tr>
<tr>
<td>Strategic Business Plan</td>
<td>CARF</td>
<td>Situation Decision Rule Conditional Accreditation (CA) &amp; PDA</td>
<td>Equipment Use, Infection Control, Information Mgmt., Medication Mgmt.</td>
<td>Access To Care, Heart Failure</td>
<td>Improve Communication Among Caregivers</td>
</tr>
<tr>
<td>Key Core Competency</td>
<td>ACOG</td>
<td>Indirect Impact Requirement High Volume</td>
<td>Performance Improvement, Rights &amp; Ethics Staffing</td>
<td>Maximize Resources, SIP</td>
<td>Reduce Risk of Healthcare Associated Infections</td>
</tr>
<tr>
<td>Monitor</td>
<td>Surgery</td>
<td>Low Volume</td>
<td>Healthy Communities</td>
<td>ACS</td>
<td>Reconcile Medications</td>
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<tr>
<td></td>
<td>NCQA</td>
<td></td>
<td>Employer of Choice</td>
<td></td>
<td>Reduce the Risk of Patient Harm Resulting from Falls</td>
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<tr>
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<td>Texas Quality Award</td>
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<td>Reduce the Risk of Flu &amp; Pneumonia</td>
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<td></td>
<td>Carey Award</td>
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<td>Encourage Patient's Involvement in Own Care</td>
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<tr>
<td><strong>High Priority</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Prevent Healthcare Associated Pressure Ulcers</td>
</tr>
<tr>
<td><strong>Moderate Priority</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Identify Safety Risks Inherent in Patient Populations</td>
</tr>
</tbody>
</table>

*Assessment Key (Circle all that apply)*
- High Priority = 7 - 8 Items Circled or 1 Item in the Red Area
- Low Priority = 1 - 3 Items Circled

Recommendation: Patient Care Re-design  
PI Team Refer to ACOS  Other:
Aim Statement

To reduce transfusion time from the "MD order" to the "Start Time" on 4 South from 6 hours to 2 hours or less by August 2009.
# Team Metrics

<table>
<thead>
<tr>
<th>Measures</th>
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<tbody>
<tr>
<td>1</td>
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<table>
<thead>
<tr>
<th>Data Elements</th>
</tr>
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<tr>
<td>1</td>
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<td>2</td>
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<tr>
<td>3</td>
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</table>
Pre-Intervention Transfusion Flow

MD evaluates Transfusion need

Does patient meet criteria?  
Yes  
Informed Consent obtained  
No  
Continue to evaluate

Is there a specimen in the blood bank drawn within the last 72 hours?  
Yes  
MD Orders Transfusion Date/Time  
Blood Bank Processes the Blood/Blood Product

Blood/Blood Product is transfused Start Date/Time

Transfusion Reaction?  
Yes  
Transfusion Reaction Investigation  
No  
Transfusion Follow-up Testing

Is this an urgent order?  
(Yes if surgical & after 10am the day prior to surgery or if to be given within 2 hours of the transfuse order)  
Yes  
Schedule Urgent Ward Collect by RN/Super Tech  
No  
Schedule routine Lab Collect @ 5am or 11am

Definitions:
Routine – Transfusion scheduled at specific date/Time in the future
- Lab Collect @ 5am or 11am
Urgent – After 10am the day prior to surgery or within 2 hours of the Transfuse Order
- Ward Collect by RN/Super Tech
Emergent – Uncross-matched blood to be administered

Indicates data elements to be captured for reporting.
Transfusion Delays

MD Transfuse Order to Transfusion Start Time = <6 Hours

Procedures
- Delay in getting proper MD Order
- Poorly defined Blood Admin. Categories (Routine, Emergent)
- Delays in Drawing Blood

Policies
- Outdated policies that do not reflect actual practice
- Do not meet criteria for blood transfusion
- Poorly defined Blood Admin. Categories

People
- Inconsistent Staffing Patterns
- Poor Communication MD – RN – PSA - Transporter - Lab
- Inconsistent Notification Of MAS to RN
- Excessive hand off times BB to Delivery
- Lack Priority Awareness & Setting

Cause & Effect Diagram
Transfusion Delays
MD Transfuse Order to Transfusion Start Time = <6 Hours
Force Field Analysis Started 04/08/09

**Goal:** To reduce the time of routine blood administration from the "MD to give" order to the "Transfusion Start Time" on 4South from the 6 hours baseline to 2 hours or less.

### Driving Forces

- 4South staff is patient focused & motivated
- 4South staff motivated to produce good patient outcomes
- 4South staff highly skilled, knowledgeable & capable
- 4South has adequate supplies & equipment
- Management supports valued employees

### Restraining Forces

- Poor Communication between MD / Nurse (7)
- Delays in getting blood drawn (6)
- Lack of priority setting (3)
- Delay in getting orders (2)
- Excessive hand off times BB ready to delivery (2)
- Inconsistent MAS notification to RN
- Do not meet criteria for blood administration
- Poorly defined blood administration categories (routine, Emergent)
- Outdated policies that do not reflect actual process
- Inconsistent staffing patterns

These forces produced average Blood administration delays of > 2 hours
Pre-Intervention Data -

The average time from MD order to transfusion start time is 5.86 hours.

Transfusion Order to Start Time in Hours
XmR Average Transfusion Time
Data Time Frame
January – June 7, 2009
ALM - Unit 4 South

<table>
<thead>
<tr>
<th>Case #</th>
<th>Transfusion Order to Start Time in Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

- UCL: 14.86
- CL: 5.86
- LCL: -3.14
Pre-Intervention Data -
The average moving range is 3.38 hours

Transfusion Order to Start Time in Hours
XmR Moving Range
Data Time Frame
January – June 7, 2009
ALM - Unit 4 South

Moving Range

UCL 11.05
CL 3.38

Case #
Pre-Intervention Data –

There is wide variation in the data from MD order to transfusion start time . . .
Interventions

Creating expectations
- Precise physician transfusion order

Setting Priorities
- RN and MAS Alert List - Teaching Tool

- Clarifying provider roles & responsibilities
This menu is loaded with prompts for:

- Consent
- Repeating type and screen if not within 72hrs at the top in bold.

It also gives the option for ordering blood to be administered in 4 distinct ways:

1) Emergent, call blood bank

2) STAT, defined as the need for blood products within 2 hours

3) ROUTINE, defined as the need for blood products within 4 hours

4) FUTURE, defined as the need for administration times in the future
The appearance of the nurse transfusion text order stays the same, but now has defined time expectations.
Here the nursing order has STAT and a description of what that means (within 2 hours).
We also have the ability to order all relevant labs at different criteria (STAT or routine).

Each pathway for blood transfusion has an automated order set where you will be taken through all the possible orders.

The physician has the opportunity to avoid the order set and just order what they specifically need.

And at the bottom is a link to another menu which demonstrates current blood bank criteria.
These are current blood bank guidelines to be used as recommendations. Note the stipulation in bold at the top for decisions to be made based upon clinical assessment and not on lab values alone.
Implementation of the **NEW** transfusion order occurred June 10, 2009.

Education on the **NEW** transfusion order occurred through:
- MD’s/Surgical Service - Doug McCoy
- Medicine Service – Drs. Tio & Singh
- Residents – David Dooley, MD
- QEB – Jay Brooks, MD
- CEB – Shaman Singh, MD
- RN’s – 4South Darla Martinelli
- MAS – 4South Bernadette Arredondo & Michael Weiner
  Chief MAS
Post-Intervention Data -

The average time from MD order to transfusion start time decreased from 5.86 hours to 3.68 hours.
Post-Intervention Data-

The average moving range decreased from 3.38 hours to 1.80 hours.

Transfusion Order to Start Time in Hours
Data Time Frame
Jan - Jul 2009
Audie L. Murphy Memorial Veterans Hospital - 4 South

New MD Transfusion Order Set Implemented
June 10, 2009

Moving Range

Case #

UCL 11.05
CL 3.38
1.80

11.05
5.87
3.38
1.80
Post-Intervention Data –

Data skews to the right due to an outlier at the 17 hour range.

Histogram - Transfusion Order to Start Time

- LSL: -4.10
- USL: 14.50
- Mean: 5.18
- Median: 3.99
- Mode: 5.18

Number of values distribution from -5.21 to 18.99.
Post – Intervention Data

The diagram suggests a direct relationship between transfusion time and LOS.

Scatter Diagram - Transfusion Time vs LOS

- Transfusion Time in Hours
- LOS
- $y=mx+b$
- Linear (Transfusion Time in Hours)
- Linear (Transfusion Time in Hours)

$R^2 = 0.8557$
Building the Business Case

- There is statistically significant change (P-value = 0.41) in LOS between the before and after intervention groups.
- Too few post intervention data were collected to date. There were 14 post intervention compared to 33 pre intervention data points.
- Continued data collection is expected to change this observation.
- There are many variables that impact LOS on 4 South Nursing Unit.
- We will continue to monitor LOS metrics throughout ALM VA Hospital.

### Anova: Single Factor

<table>
<thead>
<tr>
<th>Groups</th>
<th>Count</th>
<th>Sum</th>
<th>Average</th>
<th>Variance</th>
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</thead>
<tbody>
<tr>
<td>Before LOS</td>
<td>33</td>
<td>585</td>
<td>17.73</td>
<td>656.58</td>
</tr>
<tr>
<td>After LOS</td>
<td>14</td>
<td>164</td>
<td>11.71</td>
<td>155.14</td>
</tr>
</tbody>
</table>

### ANOVA

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>355.41</td>
<td>1</td>
<td>355.41</td>
<td>0.69</td>
<td>0.41</td>
<td>4.06</td>
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<tr>
<td>Within Groups</td>
<td>23027.40</td>
<td>45</td>
<td>511.72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23382.80851</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Building the Business Case

- Differences in cost per case cannot be directly attributable to new transfusion physician order set.
- Too few post intervention values were collected to date. There were 14 post intervention compared to 33 pre intervention data points. Continued data collection may change this observation.
- There are many variables that impact LOS on 4 South Nursing Unit.
- We will continue to measure cost per case metrics for impact.

<table>
<thead>
<tr>
<th>Patient Population</th>
<th>AVLOS</th>
<th>Cost / Day</th>
<th>Cost / Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Intervention</td>
<td>17.7</td>
<td>$1,706</td>
<td>$30,196</td>
</tr>
<tr>
<td>After Intervention</td>
<td>11.7</td>
<td>$1,706</td>
<td>$19,960</td>
</tr>
<tr>
<td><strong>Cost Difference</strong></td>
<td></td>
<td></td>
<td><strong>$10,236</strong></td>
</tr>
</tbody>
</table>
Lessons Learned

- A “good” physician order is key to creating nursing expectations and follow through.

- We eliminated arbitrary verbal turnaround times and instead based transfusion on physician clinical assessment coupled with blood bank guidelines.

- We focused on our desire to improve and put aside prior performance & prejudice.

- We created a safe environment of trust in which to make mistakes and to learn how to make improvements.

- We broke down barriers between departments and created the expectation of multi-disciplinary team effort.

- The new clearly defined process will be reflected in the revised Blood Administration Policy.
Sustain Best Practice

- 4 South data will be reported to the Blood Use Committee on a routine basis.

- The data will also be placed on the 4 South PI Dashboard to provide feedback to staff on their performance.

- We are beginning to spread this best practice to 6B and will eventually cover all nursing units with reporting to Blood Use Committee and Nursing PI Dashboards.
Sustain Best Practice

☐ This team submitted an abstract to the VHA Improvement Forum in July 2009.

☐ This team submitted an abstract for presentation in October, 2009 to the Center for Safety Effectiveness.

☐ An abstract will be submitted to the IHI poster presentation for December 2009.

☐ We expect to publish and are looking for the proper opportunity to make this happen.
Point of Contact

- Amir Ehsan, MD - Champion
- Jay Brooks, MD – Team Leader
  Director, Blood Bank Services
- Yolanda Garza & Michael Noriega - Co-Team Leaders
  Blood Bank Supervisors

- Edna Cruz, RN, MS, CPHQ - Facilitator
  QM Clinician – Performance Improvement Clinician
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- Diane Woomer, RN, MSN, - Co-Facilitator
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  1-210-364-8154