Laboratory Stewardship - The Power of Appropriate Test Utilization

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Learning objectives

Describe the difference between utilization management and laboratory stewardship

Identify critical factors for success in implementing laboratory stewardship interventions

Differentiate low impact versus high impact interventions

Cite ways in which laboratory stewardship moves the dial on patient care and outcomes
Laboratory Stewardship is recognized as one of the most impactful strategies used by hospitals and health systems to improve the quality of patient care, optimize resources and reduce waste.
Laboratory Stewardship

Simply stated, laboratory stewardship programs help clinicians improve the quality of patient care while reducing costs to patients, hospitals, and health systems.
Laboratory Stewardship

What you need to succeed
Intervention

The art of creating change

Is physician education alone enough?

What works best: soft or hard stops?

Is it better to ask permission or forgiveness?
Intervention

Removing an obsolete test

Don’t test for myoglobin or CK-MB in the diagnosis of acute myocardial infarction. Instead, use troponin I or T.
Intervention

Removing an obsolete test
Intervention

Removing an obsolete test

**CKMB HARD SAVINGS**

- **2014 Annual Variable Cost** - $42,156.80
  (Annual 2014 Volume 7528 x Variable Cost per test $5.60)

- **2015 Annual Variable Cost** - $13,766.80
  (Annualized 2015 Volume 2460 x Variable Cost per Test $5.60)

**Annual Potential Cost Savings** - $42,156.80-$13,766.80 = $28,380.80
Intervention

Removing an obsolete test

SOFT SAVINGS/GAINS

- Decreased Turnaround Time
- Increased Physician Satisfaction
- Re-Deploying staff to other laboratory testing duties/ increased productivity
- Increased Efficiency
- Cost Avoidance of Inappropriate Ordering and Patient Results
- Avoiding duplicate orders on same patient
## Intervention: Tests Resulted Post-discharge

<table>
<thead>
<tr>
<th>Process</th>
<th>Utilization Analysis</th>
<th>Intervent</th>
<th>% Reduction of events</th>
<th>Charge Reduction</th>
<th>Cost Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tests</td>
<td>Charges</td>
<td>Avg. time†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture Tests</td>
<td>8,933 (45% of total volume)</td>
<td>$4,491,939</td>
<td>7.94 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Tests</td>
<td>8,913 (45% of total volume)</td>
<td>$21,830,237</td>
<td>3.86 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sendout Tests</td>
<td>1,933</td>
<td>$326,028</td>
<td>3.63 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Utilization</strong></td>
<td><strong>10%</strong></td>
<td></td>
<td><strong>$$</strong></td>
<td><strong>$$</strong></td>
</tr>
</tbody>
</table>

*10% of reference tests are resulted post discharge

† Average days of results reported after discharge

*Cost reduction includes cost of phlebotomy
## Intervention: Daily Order Testing

<table>
<thead>
<tr>
<th>Process</th>
<th>Sets</th>
<th>Charges</th>
<th>Cost</th>
<th>Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilization Analysis</td>
<td>CBC with Diff</td>
<td>13,253</td>
<td>$1,341,204</td>
<td>$5.59</td>
</tr>
<tr>
<td></td>
<td>CBC</td>
<td>35,272</td>
<td>$3,181,534</td>
<td>$5.16</td>
</tr>
<tr>
<td></td>
<td>Basic MP</td>
<td>48,156</td>
<td>$6,727,393</td>
<td>$7.73</td>
</tr>
<tr>
<td></td>
<td>Comp MP</td>
<td>369</td>
<td>$83,615</td>
<td>$11.92</td>
</tr>
<tr>
<td>Intervention</td>
<td>% Reduction of events</td>
<td>10-50%</td>
<td>BC + MP Charge Reduction</td>
<td>$1,133,375 - $5,666,876</td>
</tr>
<tr>
<td></td>
<td>BC + MP Cost Reduction</td>
<td>$135,381 - $676,907</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*cost reduction includes cost of phlebotomy*
# Intervention

Reduce the number of daily blood collections

<table>
<thead>
<tr>
<th></th>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phlebotomies per Day</td>
<td>4.50</td>
<td>3.00</td>
</tr>
<tr>
<td>Total Patient Days</td>
<td>83,785</td>
<td>83,785</td>
</tr>
<tr>
<td>Total Phlebotomies</td>
<td>377,033</td>
<td>251,355</td>
</tr>
<tr>
<td>mL blood (assume 5 cc's per draw)</td>
<td>1,885,163</td>
<td>1,256,775</td>
</tr>
<tr>
<td>$ per Phlebotomies</td>
<td>$7.50</td>
<td>$7.50</td>
</tr>
<tr>
<td>Total $'s</td>
<td>$2,827,744</td>
<td>$1,885,163</td>
</tr>
</tbody>
</table>

Savings from Phlebotomy Reduction $942,581
Less Phlebotomies 125,678
Less Units of blood drawn (assume 300 cc's per unit) 2,094.63
“Increasingly healthcare professionals, with the use of laboratory tests, are able to identify and monitor precisely targeted, individualized therapeutic interventions that may result in the best patient outcome – helping to ensure the right therapy for the patient.”
Case Study

Infliximab activity and neutralizing antibody

A significant percentage of patients receiving Infliximab therapy develop neutralizing antibodies to the drug, leading to treatment failure.

Increased testing for Infliximab activity and antibody formation can lead to better patient care and decrease pharmacy expenses.
Of patients suffering from autoimmune and chronic inflammatory disorders experience treatment failure.
If Infliximab Activity is... AND infliximab Neutralizing Ab. Titer is... THEN...

<table>
<thead>
<tr>
<th>Not Detected</th>
<th>Not Detected</th>
<th>A higher dosage of infliximab or shortening the dosing interval may be appropriate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Detected</td>
<td>1:20 or greater</td>
<td>A change to another anti-TNF-α drug may be appropriate.</td>
</tr>
<tr>
<td>0.65 ug/mL or greater</td>
<td>Not Detected</td>
<td>A change to another type of therapy (not targeting TNF-α) may be appropriate.</td>
</tr>
<tr>
<td>0.65 ug/mL or greater</td>
<td>1:20 or greater</td>
<td>Repeat testing is suggested to rule out decreasing infliximab activity and/or increasing neutralizing antibodies.</td>
</tr>
</tbody>
</table>

It’s important not only to know if patients have developed neutralizing antibodies, but also **to understand the different implications with therapy** as a result.
Financial Impact

The average cost of administering one dose of infliximab to a commercial insurer is approximately $2,800.
Blood Stewardship
Case Study

Intervention with blood products

“Why give 2 when 1 will do?”
Single Unit RBC Transfusion

Single unit red cell transfusions should be the standard for non-bleeding, hospitalized patients.
- 7 g/dL threshold for stable patients
- 8 g/dL threshold for stable patients with cardiovascular disease

Don’t transfuse more units of blood than absolutely necessary.
Daily Report

All RBC transfusions from previous 24 hours pulled into database with relevant pre- and post-transfusion lab values and patient locations.

Automated and manual audits performed on all RBC transfusions.

Data analyzed, reports released to clinical medical directors. Targeted education efforts based on results.

Denominator database used for rate calculations, and to credit good transfusion practice.

Discharge Database

Monthly data collection from all newly discharged patients. Patients automatically divided into normal and greater oxygen demand based on ICD-9 codes and audited based on immediate pre-transfusion hemoglobin value.

Transfusions marked for review are compared with audits made in Daily Report. Corrections made.

Corrected data released to accounting department. Data used to assess transfusion practice by procedures.
Intervention

Utilization of packed RBCs

Monthly trend data sent to medical directors or services lines as part of hospital-wide patient blood management program.
Intervention

Utilization of packed RBCs
Intervention

Utilization of packed RBCs

% Appropriate RBC Transfusions

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>97%</td>
<td>97%</td>
<td>96%</td>
<td>97%</td>
<td>97%</td>
<td>98%</td>
<td>96%</td>
<td>96%</td>
<td>97%</td>
<td>98%</td>
<td>97%</td>
<td>98%</td>
</tr>
</tbody>
</table>

Grand Total: 97% 97% 96% 97% 97% 98% 96% 96% 97% 98% 97% 98%
Intervention

Utilization of packed RBCs

2017 % Appropriate RBC Transfusions

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Apr</th>
<th>July</th>
<th>Oct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grand Total</td>
<td>99%</td>
<td>97%</td>
<td>98%</td>
<td>98%</td>
</tr>
</tbody>
</table>
Intervention

Utilization of packed RBCs

2017 Monthly RBC Transfusions per 1000 Patient Days

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>74.19</td>
<td>75.62</td>
<td>72.77</td>
<td>69.57</td>
<td>74.30</td>
<td>71.06</td>
<td>77.24</td>
<td>70.13</td>
<td>73.65</td>
<td>60.67</td>
<td>68.62</td>
<td>62.40</td>
</tr>
</tbody>
</table>
## Intervention

**Utilization of packed RBCs**

### Previous Years Median Rate:

<table>
<thead>
<tr>
<th>Year</th>
<th>Median Rate</th>
<th>% Yearly Change</th>
<th>% Change from Baseline (2012)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>78.09</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>2013</td>
<td>74.82</td>
<td>4.2% decrease</td>
<td>NA</td>
</tr>
<tr>
<td>2014</td>
<td>71.26</td>
<td>4.8% decrease</td>
<td>8.7% decrease</td>
</tr>
<tr>
<td>2015</td>
<td>72.24</td>
<td>1.4% increase</td>
<td>7.5% decrease</td>
</tr>
<tr>
<td>2016</td>
<td>79.05</td>
<td>9.4% increase</td>
<td>1.4% increase</td>
</tr>
<tr>
<td>2017</td>
<td>71.92</td>
<td>9.0% decrease</td>
<td>7.9% decrease</td>
</tr>
</tbody>
</table>
Intervention

Platelet utilization

![Platelet IV bag](image)

**2017 Monthly Platelet Transfusions per 1000 Patient Days**

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>58.17</td>
<td>49.70</td>
<td>46.42</td>
<td>50.77</td>
<td>56.17</td>
<td>53.67</td>
<td>54.56</td>
<td>54.40</td>
<td>49.10</td>
<td>39.71</td>
<td>46.39</td>
<td>38.07</td>
</tr>
</tbody>
</table>
# Intervention

## Platelet utilization

<table>
<thead>
<tr>
<th>Year</th>
<th>Median Rate</th>
<th>% Yearly Change</th>
<th>% Change from Baseline (2012)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>70.34</td>
<td>baseline</td>
<td>NA</td>
</tr>
<tr>
<td>2013</td>
<td>63.96</td>
<td>9.1% decrease</td>
<td>NA</td>
</tr>
<tr>
<td>2014</td>
<td>55.50</td>
<td>13.2% decrease</td>
<td>21.1% decrease</td>
</tr>
<tr>
<td>2015</td>
<td>51.21</td>
<td>7.7% decrease</td>
<td>27.2% decrease</td>
</tr>
<tr>
<td>2016</td>
<td>57.29</td>
<td>11.9% increase</td>
<td>18.6% decrease</td>
</tr>
<tr>
<td>2017</td>
<td>50.23</td>
<td>12.3% decrease</td>
<td>28.6% decrease</td>
</tr>
</tbody>
</table>

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Blood Stewardship

Summary

“There are some patients who will die without transfusions and there are some that will die because of transfusion.”

-Ian Roberts, Director of Clinical Trials Unit, London
Blood Stewardship

Summary

Approximate Savings: $5,000,000
Diagnostic Stewardship
Case Study

Prevention before intervention

Objective:

Implement a screening program to reduce the number of potentially life threatening infections in hospital patients.

Methicillin-resistant Staphylococcus aureus (MRSA)
Screening Program Results

Results:

Number of high-risk patients screened: 8,968

Reduction in MRSA infections from 2007 – 2012: 56
Savings Through Prevention

MRSA costs about $10 billion a year to treat in the U.S., averaging about $60,000 per patient.

Savings → $2.9 million
Closing Thoughts

Stewardship:  
*As defined by Merriam-Webster*

The conducting, supervising, or managing of something; especially the careful and responsible management of something entrusted to one’s care.
Questions?

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