Understanding and Managing Cost of Quality in the Laboratory

Mohammed Mustapha
Senior Principal Systems Engineer
Mayo Clinic
Rochester, Minnesota

Disclosures

Relevant Financial Relationship(s):
Nothing to Disclose

Off Label Usage:
Nothing to Disclose
Learning Objectives

• Explain the concept of Cost of Quality
• Components of Cost of Quality
• Calculate Cost of Poor Quality

Cost of Quality

• Why it matters?
Because …it impacts
  • Patient care
  • Bottom line (finances)
  • Employee burnout/morale
  • Delivery of services
What is Quality

• The degree to which something meets or exceeds the expectations of its consumers.
  • Quality may be subjective
    • How good something is
    • Measured against a standard
    • As defined by the customer
  
  • Quality is also objective
    • In the laboratory, quality is defined as a process that ensures customers receive products free from defects and meet their needs

What is Cost of Quality

\[
\text{Cost of Quality} = \text{Cost of Good Quality} + \text{Cost of Poor Quality}
\]

Cost of Good Quality: money spent to achieve quality service

Cost of Poor Quality: money spent to fix poor quality
Components of Cost of Quality

Cost of Quality

Cost of Good Quality
- Prevention Cost
- Appraisal Cost

Cost of Poor Quality
- Internal Failure Cost
- External Failure Cost

Cost of Good Quality

Prevention Cost
- Money spent proactively on preventing quality problems and maintaining high quality levels
  - Quality program
  - Quality management systems
  - Continuous improvement activities
  - Quality education and training programs
  - Engineering-Design of error proof processes
  - Preventative maintenance
Cost of Good Quality

Appraisal Cost

- Money spent in assessing the quality of products or services
  - Inspections
  - Audits
  - Peer reviews
  - Competency assessment
  - Quality controls

Cost of Poor Quality

Internal Failure Cost

- Money spent to fix errors inside the lab
  - Ordering errors
    - Wrong test
  - Collection errors
    - Mis IDs, Redraws
  - Processing errors
    - Aliquot errors
  - Testing errors
    - Failed QC
Cost of Poor Quality

External Failure Cost

• Money spent to fix errors that reach external customers
  • Complaints
  • Incorrect billing
  • Revised reports
  • Lost or erroneous results

Calculating Cost of Poor Quality (COPQ)

• Understand path of workflow
  • Process map
  • Value stream map
  • Process times
  • Quality metrics (data collection and trending)

• Know your production cost
  • Labor
  • Materials and supplies
  • Equipment
  • Overhead
Typical laboratory workflow

Collection Reasons
- Clotted
- Collection Instruction Label Not Followed
- Damaged/Leaking Container from Collection
- Delay in Receipt of Specimen
- Hemolyzed
- Improper Collection
- Labeling Error
- QNS Collection
- Suspected Contamination

Processing Reasons
- Centrifugation Error
- Damaged/Leaking Container from Processing
- Processing Instruction Label Not Followed
- Processing Lab Accident

Testing Reasons
- Adjusted Anticoagulation Tube
- Erratic Results
- QNS to Complete Testing (in Lab)
- Sample Not Received
- Testing Lab Accident

Example of COPQ for recollected blood specimen

<table>
<thead>
<tr>
<th>Process step</th>
<th>Job title</th>
<th>Labor ($/hr)</th>
<th>Time (hr)</th>
<th>Total</th>
<th>Supply List</th>
<th>Cost</th>
<th>Qty used</th>
<th>Total</th>
<th>COPQ per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Analytic</td>
<td>Phlebotomist</td>
<td>17</td>
<td>0.25</td>
<td>4.25</td>
<td>Materials and supplies</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>6.25</td>
</tr>
<tr>
<td>Analytic</td>
<td>Lab. Assistant</td>
<td>14</td>
<td>0.1</td>
<td>1.4</td>
<td>Materials and supplies</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>4.4</td>
</tr>
<tr>
<td>Post-Analytic</td>
<td>Technologist</td>
<td>20</td>
<td>0.2</td>
<td>4</td>
<td>Materials and supplies</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

Assuming 100 redraws per month
COPQ/month $1,865.00
QUESTIONS & DISCUSSION

Save the Date - Registration Now Open!
Phlebotomy 2019: People + Performance = Patient Care
May 2-3, 2019
Rochester, Minnesota
mayocliniclabs.com/2019phlebotomy