The purpose of this project was to evaluate the SVP process and identify opportunities for improvement. CLINICAL IMPORTANCE

- Small volume parenteral (SVP) medications are batch-processed once daily at a 90+ bed academic medical center.
- Labels are printed 36 hours before medications are compounded and delivered for a 24-hour period.
- Therapy changes, discontinuations or patient transfers lead to increased rework, missing doses, and ultimately waste.
- Lean methodology was originally developed as a production philosophy and quality assurance tool.

Other benefits of Lean philosophy include:
- The continual identification and elimination of waste in order to maximize value.
- Lean has been used in healthcare with great success.

PURPOSE

The purpose of this project was to evaluate the SVP process and identify opportunities for improvement.

- Current process was redesigned using Lean Thinking and associated tools.
- SVP processing was increased to three times daily to minimize waste, improve workflow, and decrease overall drug expenditure.

METHODS

- Develop project charter to establish the scope and goals by 4 institutional Lean Leaders and 1 Lean Master.
- Form SVP improvement team consisting of pharmacy administrators, pharmacists, and technicians.
- Engage stakeholders and frontline staff to identify potential issues and barriers to project implementation through Voice of Customer (VOC) interviews (Table 1).
- Map current and future state SVP processes using value stream mapping and defining metrics
- Reorganize SVP work and storage areas using the Lean 5-S methodology (Sort, Store, Shine, Standardize, and Sustain).
- Create documentation tools and standard operating procedures to address staff concerns.
- Utilize Lean Thinking and associated tools, the once daily SVP process was transformed.
- Analyze hospital-wide purchasing and billing data for targeted high-cost medications.

RESULTS

- The concept of flow stipulates that processes should move smoothly from process to process with zero waste. Flow may be a physical matter such as re-aligning machinery in a factory or through using a 5S methodology (Sort, Store, Shine, Standardize, and Sustain).
- An annual cost-saving of $140,952 was observed with 4 out of 5 high-cost drugs that were monitored. This amount may be higher if other high-volume SVP products (i.e., vancomycin, piperacillin/tazobactam, cefazolin, etc.) were taken into consideration.
- Anecdotally, however, pharmacy staff reported that there were fewer missing medication calls from nurses with the three times daily SVP processing.

REFERENCES


DISCLOSURES

Phuoc Lynsey Le, Dominick Bulone, PharmD; Akta Patel, PharmD, BCPP; Glenn Oettinger, PharmD; Dennis Delisle, MHPA, PMP

Department of Pharmacy, Thomas Jefferson University Hospital, Philadelphia, PA

Table 1. VOC Questionnaire

| 1. Why are we doing this project? |
| 2. What is the ultimate goal? |
| 3. What is your role in achieving that goal? |
| 4. What will success look like? |
| 5. What are the barriers you foresee? |
| 6. How can we overcome those barriers? |

Table 2. The VOC indicated the following opportunities for improvement:

- Establish consistent staff coverage in the SVP area for all shifts
- Create a checklist of responsibilities per shift
- Develop optimal pair levels for each medication
- Create a call-out plan
- Reorganize the physical space
- For nurses, the primary objective was to receive medications from the pharmacy on time to avoid delays in administration

Table 3. Average Monthly Purchasing and Billing Data Pre- and Post-Implementation

<table>
<thead>
<tr>
<th>Drug</th>
<th>Monthly Purchased (BU)</th>
<th>Price per BU</th>
<th>Total Purchased (dollars)</th>
<th>Monthly Billing (dollars)</th>
<th>Difference (dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphotericin B</td>
<td>30mg</td>
<td>1mg</td>
<td>$15,000</td>
<td>$18,000</td>
<td>$3,000</td>
</tr>
<tr>
<td>Daptomycin</td>
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<td>$3,000</td>
</tr>
<tr>
<td>Micafungin</td>
<td>1mg</td>
<td>1mg</td>
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<tr>
<td>Tigecycline</td>
<td>50mg</td>
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Flow

The concept of flow stipulates that products should move smoothly from process to process with zero waste. Flow may be a physical matter such as re-aligning machinery in a factory or through using a 5S methodology (Sort, Store, Shine, Standardize, and Sustain).

Institutional SS experts were brought in to assess how we could reorganize the SVP workspace to optimize flow. Figure 5 illustrates the SVP area pre- and post-SS. Lastly, par levels were established to implement a pull system whereby products are batched only when needed.

Figure 5. SVP Area: Pre- (left) and Post-5S (right)

DISCUSSION

- Billing ratio for amphotericin B is greater than 1 post-implementation because stock purchased prior to go-live was used and billed for the period following the change in SVP production.
- Daptomycin showed a monthly net difference of $3,908 because the cost of drug increased from $0.55 to $0.60/BU post-implementation. Additionally, since the drug is supplied as daptomycin 500 mg single-use vials and is dosed by weight, odd doses would result in wasting the remainder of a vial.

CONCLUSION

Utilizing Lean Thinking and associated tools, the once daily SVP process was successfully redesigned to three times daily production. Although banking was not completely eliminated, we were able to break down the process into smaller batches to reduce waste.

An annual cost-saving of $140,952 was observed with 4 out of 5 high-cost drugs that were monitored. This amount may be higher if other high-volume SVP products (i.e., vancomycin, piperacillin/tazobactam, cefazolin, etc.) were taken into consideration. Due to logistical challenges, we were not able to measure the number of missing doses pre- and post-implementation. Anecdotally, however, pharmacy staff reported that there were fewer missing medication calls from nurses with the three times daily SVP production.

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