Impact of a lean approach on the organization of a chemotherapy production unit.

L. Carrez³, M. Jermini¹,², V. Martin¹, V. Malet³, L. Falaschi¹, L. Bouchoud¹, P. Bonnabry ¹,²
¹Pharmacy, Geneva University Hospitals, Geneva, Switzerland
²School of Pharmaceutical Sciences, University of Geneva, University of Lausanne, Geneva, Switzerland
³Direction of finances, Geneva University Hospitals, Geneva, Switzerland

Aims
- Increase the efficiency
- Improve the quality of life at work
- Reduce time and production costs
- Evaluate if Lean methodology is a relevant tool in hospital pharmacy

Context
- Increase in chemotherapy demands : + 27% since 2006
- Work-overload for production operators
- Increase of risk errors
- Rethink the organizational strategy toward a more efficient workflow by Lean methodology

Results

Before the change: (Define, Measure, Analyse)

1. Team feeling
Production staff complaints of stress and overload particularly on the early morning shift (7 am–10 am).

2. Workflow
Average daily chemotherapy production rate proportions

<table>
<thead>
<tr>
<th>Daily service</th>
<th>Overload in the 7 am –10 am slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>13-16h</td>
<td>0.0%</td>
</tr>
<tr>
<td>10-12h</td>
<td>10.0%</td>
</tr>
<tr>
<td>7h-12h</td>
<td>20.0%</td>
</tr>
<tr>
<td>5/6h</td>
<td>30.0%</td>
</tr>
<tr>
<td>7h-12h</td>
<td>40.0%</td>
</tr>
<tr>
<td>7h-16h</td>
<td>50.0%</td>
</tr>
<tr>
<td>8h</td>
<td>60.0%</td>
</tr>
<tr>
<td>9h</td>
<td>70.0%</td>
</tr>
</tbody>
</table>

Occupancy rate of the equipments

<table>
<thead>
<tr>
<th>Time (7h)</th>
<th>7-10h</th>
<th>10-12h</th>
<th>11-13h</th>
<th>13-15h</th>
<th>15-16h</th>
<th>Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>29.4%</td>
<td>41.8%</td>
<td>50.4%</td>
<td>16.2%</td>
<td>54.4%</td>
<td>60.6%</td>
</tr>
</tbody>
</table>

2. Process
Process cycle-time : 585min (9h45)

3. Space
Unnecessary movements

Main changes

New work organisation
- Daily Production Coordinator to make decisions and prioritise actions
- Production overview with computer-aided production-management software
- Daily meetings (Obeya) to reassign tasks

New production workflow
- Preparation for same-day or next-day use
- Management of each chemotherapy without interruption of the flow
- Simplified checks (e-signature, self-check)
- Definition of a production rate : max. 4 preparations per safety cabinet

New area logistic organisation
- Design of a U shape picking pathway
- Elimination of waiting station (trolley)
- Visual management
- SS process (sort; straighten, simplify; sweep, shine, scrub; standardise, stabilise; sustain, self-discipline)

Inventory:
- Rationalisation of inventory
- Establishment of a standard, sequenced materials collection procedure
- Creation of a fail-safe (joka-yoke) collection container
- Order management

Conclusion
- Smoothing the activity
- Optimise the stock and the space
- Decrease in needed human ressource
- Strengthening team spirit
- Positive staff feeling about the project and its execution

Method

Who ? The production team, a pharmacist, a Lean expert
When ? From January 2015 to July 2016
How ? Application of a Lean-6 Sigma methodology : DMAIC
- Define
- Measure
- Analyse
- Improve
- Control

4. Space
Reduction of unnecessary movements

Authors
1.0%
57.0%
30.0%
20.0%
10.0%
0.0%