Implementation of Lean and Six Sigma in Magnetic Resonance Imaging:
Optimizing the "End-To-End" Process to Improve the Customer Experience and Operational Efficiency in a Patient Service Center Mode

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Background

Competency Map
- Customer service excellence
- Presence in major economic centers
- Extensive performance in the healthcare value chain
- Medicine and Health expertise
- Innovation, research and development

Competitive Position
- Best solution to customers and physicians.
- Intensification and deepening of the relationship with customers and physicians.
- Focus on the needs and resolution of customer and physicians’ problems.
- Unquestionable quality and offering of innovative products and services.

Operational Excellence Drivers
- Continuous improvement of all our operations and administrative activities
- Simplification of all key processes.
- Focused in increasing the customer satisfaction.
- Based on the integrated management.
- Essential for the maintenance of competitive advantage.
Objectives

"As-is":
(At four large Patient Service Centers - PSCs)

- Service productivity with opportunities to be better.
- High lead times of execution in imaging exams.
- Exam schedules of patients not met
- Complaints related to waiting time for MRI.
- Customer Satisfaction below the goals in all the MRI services.

The implementation of Lean & Six Sigma in Magnetic Resonance Imaging (MRI) service:
Key Performance Indicators

- Service productivity
- Complaints
- Net promoter score (NPS)

Methods: DMAIC

- Value Streaming Mapping
  a. "As-is" Map
  b. drawing of the future = "to-be" Map

- Analytics phase and prioritization
  a. Stratification of data collect results
  b. Identification of potential problems versus impacts
  c. Prioritization of the most important issues

- Points of failure reduction
  a. Treatment of the problems prioritizationed
  b. Improvements implementation by using Lean Tools

- Standardization of processes
  a. Definition and a standardization of new flows and activities
  b. Work Team train
  c. Implementation of Management frameworks

- Routine Management
  a. Development of daily reports
  b. Start new format of meetings with team
  c. Assessment

Figure 1: OPTIMA GE MRI

Figure 2: Example from Brigadeiro PSC VSM
Improvements

They triggered immediate actions in different phases of the service delivery process, from the customer’s arrival, registration, exam processing and finalization of the test, when the client went away from the PSC.

Figure 4: Board to estimate "Quick & Easy kaizen"

Figure 5: Point-of-Use Storage Kanban

Figure 6: Services route

Figure 7: Process Map Optimized

Figure 8: Pull & Synchronous Scheduling

Losses X Improvements examples
Standardization of processes & Routine Management

Figure 9 - In-Station Quality Control: Prevents defects from passing to downstream processes and ensures immediate feedback for correction of quality problems.

Figure 10 - Self Directed Work Teams (SDWT): SDWTs are the ultimate form teams for managing daily work.

Figure 11 - Statistical Process Control (SPC): Improve quality and process capability using statistical methods.

Figure 12 - Jidoka ("LogBook"): Prevents problems on one station of a production line from building inventory and also creates urgency to find permanent solutions.

Figure 13 – Assessments: sustain the new processes and improvements implemented

Kaizen Blitz: Improve localized production areas quickly and dramatically and overcome inertia common to many organizations.

Figure 14 - Team Development: To provide motivation, improved coordination, reduce management requirements and exploit the knowledge of employees.

Results

Service productivity

Complaints

Net promoter score (NPS)

Lower values indicate that service is being faster and better.

Higher values indicate a positive service is being delivered

<table>
<thead>
<tr>
<th>KPI</th>
<th>After (Feb16) X Before Results (Oct16)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit A</td>
</tr>
<tr>
<td>Service productivity</td>
<td>+56 pp</td>
</tr>
<tr>
<td>MRI complaints</td>
<td>-47 pp</td>
</tr>
<tr>
<td>Net promoter score</td>
<td>+4.1 pp</td>
</tr>
</tbody>
</table>
More results

Extra Revenue 🍀 Adherence to Scheduled Time

How much bigger is the Equipment Productivity, it open new exam scheduling opportunities and more Revenue (if there are over demand).
Higher values indicate positive adhesion between the patient scheduling time and the time of the exam realization.

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</thead>
<tbody>
<tr>
<td></td>
<td>Unit A</td>
</tr>
<tr>
<td>Revenue (from more Productivity of MRI Equipments)</td>
<td>R$ 57,9 K</td>
</tr>
<tr>
<td>Sheduling Adherence</td>
<td>+ 16 pp</td>
</tr>
</tbody>
</table>

R$ - Brazilian Money

* No new more scheduling opportunities

Conclusion

- Lean & Six Sigma tools were very important to identify and promote continuous improvement in many “end-to-end” processes.

- In this process, all the requirements and standards of quality were met, ensuring the differentials established at our organization.

- Moreover, with more controlled and effective non-technical processes, it was possible to find other opportunities for improvement in MRI: review of technician’s schedule and time duration of exams, resulting in increased revenue from MRI service.

- Improved overall efficiency
- Helped to promote more competitive advantage
- Improved customer’s satisfaction