

# QUALITY MANAGEMENT TOOLS AS STRATEGIES FOR REDUCING SURGERY CANCELLATIONS AND DELAYS

*Ferramentas de gestão de qualidade como estratégias para redução do cancelamento e atrasos de cirurgias*

*Herramientas de gestión de calidad como estrategias para reducción de la cancelación y retrasos de cirugía*

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**ABSTRACT: Objective:** Case study on the reduction of surgery cancellations leveraging quality management tools to solve the problem of lack of surgical materials. **Method:** For mapping the problem, the team listed related factors that were categorized and presented using an Ishikawa diagram and, after that, the GUT Prioritization Matrix. **Results:** Through the optimization of the “Surgical Data Map”, the active participation of its members and the adoption of management tools (Ishikawa diagram and GUT), actions were taken and led to the solution of weaknesses related to the surgical dynamics. **Conclusion:** The use of management tools to detail the problem and to make better use of the surgical mapping made it possible to solve several issues related to suspension, delay and transfer of procedures, thus mitigating future problems. **Keywords:** Quality management. Problem solving. Nursing. Sterilization.

**RESUMO: Objetivo:** Relatar a experiência de redução de cancelamentos de cirurgias que utilizou ferramentas da gestão de qualidade para solucionar a problemática de falta de materiais para as cirurgias. **Método:** Para o mapeamento da problemática, a equipe listou uma série de fatores relacionados que foram categorizados e apresentados na forma de diagrama de Ishikawa; posteriormente, utilizou-se a matriz de priorização de gravidade, urgência e tendência (GUT). **Resultados:** Por meio da otimização do “bate-mapa”, da participação ativa dos seus integrantes e da adoção de ferramentas de gestão (diagrama de Ishikawa e matriz GUT), ações foram tomadas, levando à solução de fragilidades relacionadas à dinâmica cirúrgica. **Conclusão:** O uso de ferramentas gerenciais para detalhamento do problema e melhor utilização do “bate-mapa” cirúrgico possibilitou solucionar problemas relacionados à suspensão, ao atraso e/ou à transferência de procedimentos, mitigando problemas futuros. **Palavras-chave:** Gestão da qualidade. Resolução de problemas. Enfermagem. Esterilização.

**RESUMEN: Objetivo:** Informe de caso para la reducción de cancelaciones de cirugías que utilizó herramientas de gestión de calidad para solucionar la problemática de falta de materiales para las cirugías. **Método:** Para el mapeo de la problemática, el equipo enumeró una serie de factores relacionados que fueron categorizados y presentados en la forma de Diagrama de Ishikawa, posteriormente se utilizó la Matriz de Priorización GUT. **Resultados:** Por medio de la optimización del “bate-mapa”, de la participación activa de sus integrantes y de la adopción de herramientas de gestión (Diagrama de Ishikawa y GUT), se tomaron acciones que llevaron a la solución de fragilidades relacionadas con la dinámica quirúrgica. **Conclusión:** El uso de herramientas gerenciales para detallar el problema y la mejor utilización del “bate-mapa” quirúrgico posibilitó solucionar diversos problemas relacionados con la suspensión, el retraso o la transferencia de procedimientos, mitigando los problemas futuros. **Palabras clave:** Gestión de la calidad. Solución de problemas. Enfermería. Esterilización.

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## INTRODUCTION

The Sterile Processing Department (SPD) is a functional unit with the goal of reprocessing reusable medical devices (RRMD) within healthcare services. The SPD units are rated as Class I or II, according to a Resolution by the Collegiate Board of the Brazilian Health Regulatory Agency (ANVISA), Resolution No. 15, from March 15, 2012<sup>1</sup>. Class I SPD is the one that does the reprocessing of non-critical, semi-critical and critical medical devices, with non-complex design, which are subject to processing. Class II SPD does the reprocessing of non-critical, semi-critical and critical medical devices, with complex and non-complex design, which are subject to processing.

The technical manager (TM) is a undergraduate and legally licensed professional who takes technical responsibility for the healthcare service or for the processing company in compliance with the health regulatory agency, as defined by the current legislation. The nurse, who integrates the healthcare team, gathers the indispensable conditions to be responsible for the SPD. The nurse is the professional who, throughout academic education both in undergraduate and graduate degrees, studies specific themes regarding good practices for RRMD processing<sup>2</sup>.

The SPD unit has connections with most sectors in a hospital because it supplies medical devices not only to the Surgery Center (SC), but also to in-patients units, ambulatory, emergency and intensive care units, among others<sup>3</sup>.

SPD focuses on processing the RRMD in order to assure patient safety and avoid the occurrence of adverse events related to the use of these medical devices. RRMD processing includes sequential and unidirectional steps, and any undetected flaw in any of those steps may affect the expected results, meaning that the patients might not receive medical devices that are safe to protect them from healthcare-associated infections (HAI).

The hospital environment is constantly evolving in search of always-improving healthcare safety and excellence. Therefore, new technologies are incorporated into the daily routine of the institution and new goals are set throughout the hospital's strategic planning.

With the technological advances and the development of new surgical techniques and minimally-invasive procedures, the medical devices used in aggressive medical interventions have become more complex, requiring the improvement of cleaning, preparation, sterilizing and storage routines.

The SPD main connection inside the hospital is the SC, which supplies material for the conduction of several anesthetic and

surgical procedures. Therefore, the actions carried out in the SPD have direct repercussion over the SC dynamics, so, if there's a flaw in any of the unit's routines, it might compromise patient safety as well as result in the delay or even cancellation of surgeries.

The cancellation of surgeries occurs, among other reasons, due to lack of planning. Surgery is an important event that requires the attention of the entire team involved in the anesthetic/surgical procedure, especially when the reasons for cancellation are potentially preventable<sup>5</sup>.

Such situations require quality management actions to guarantee the observance and the fulfillment of good practices of healthcare attention, towards the effectiveness and the efficiency of hospital care. The tools used in quality management for event analysis and decision-making processes allow professionals to define, measure, analyze and offer solutions for problems that have direct or indirect interference in patient care.

This report was motivated by a successful experience to deal with the lack of medical supplies in operating rooms (OR), as well as correlated problems, which led to a reduction in the number of surgeries cancelled not due to patient-related reasons, but with close relation to the SPD.

## OBJECTIVE

To report a case that took place at a SPD that used quality management tools to solve the problem of lack of medical supplies for surgeries. The proposed strategy to solve the problem was the reformulation of the department's daily meeting, called "Surgical Data Map".

## METHOD

### Study type

This is a case report that describes the performance of SPD nurses to overcome the challenge of surgery cancellations due to the lack of specific medical supplies for surgical procedures.

### Context of the studied field

The scenario is part of a large, private tertiary care health institution founded in 1906 and located in São Paulo city (Brazil). The work carried out at the hospital is acknowledged by the *Joint Commission International* (JCI) and *QMentum*, organizations that guide and monitor high-performance standards in

quality. The health institution is nationally accredited by the National Accreditation Organization (ONA) with degree of excellence, the highest level of certification granted by this organization. These entities utilize an evaluation system that, after analyzing the work routines, formally acknowledges and certifies the quality of the services provided by the hospital. In order to ensure the quality levels, the evaluations are revalidated every year by a specialized external team.

The hospital in question is a high-complexity facility that currently works with 294 operational beds and 73 intensive care beds. This hospital offers several clinical and surgical services, including: craniomaxillofacial, oral and maxillofacial, cardiology, head and neck, digestive tract, general, pediatrics, plastic, thoracic, vascular, coloproctology, orthopedic, oncology and urology, as well as general and specialized neurosurgeries, among others. The SC is available to outside surgeons, though a previous registration is required.

The SPD is a Class II centralized kind with a physical space of 295 m<sup>2</sup> (3,175 sq. ft.), equipped with modern technology to process the RRMD and to allow the traceability

of cleaning, preparation, disinfection and sterilization routines. This system allows the hospital to perform an average of 1,200 surgeries per month.

### Ishikawa diagram development

In 2014, the SPD was experiencing some difficulties with its daily workflow, and the worst of them was the lack of medical supplies to meet the demands of elective, urgent and emergency surgeries which led to the delay or cancellation of procedures. In order to outline the problem, the team listed a series of related factors that were categorized and presented in the form of an Ishikawa diagram, also known as cause and effect diagram (Figure 1).

The Ishikawa diagram was used to show the existing relationship between the phenomenon, the cause and the effect, elements that, for technical reasons, may affect the result. The process ultimately consisted of a problem to be solved and then used to sum up and define the possible causes, working as a guide to identify and determine the corrective measures to be adopted<sup>6</sup>.

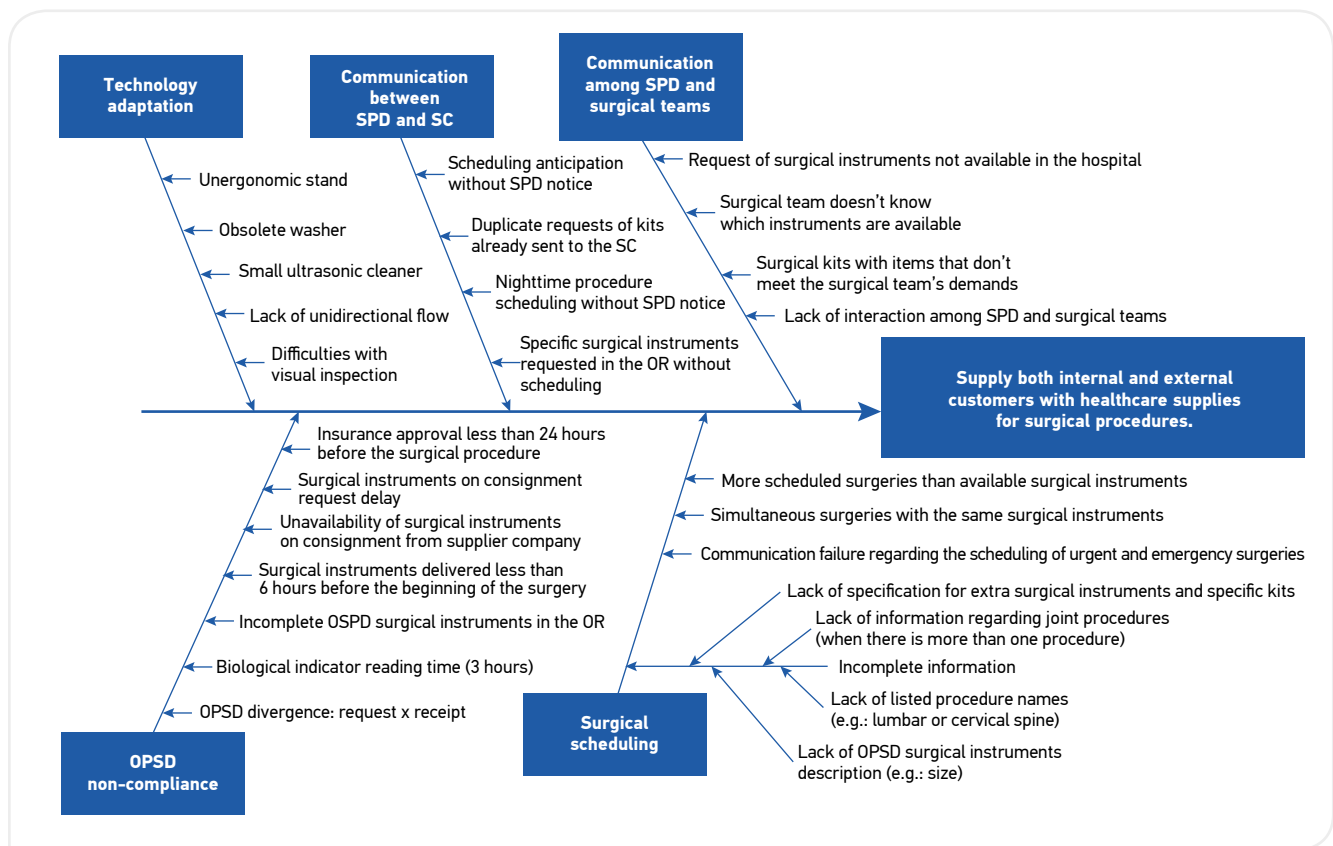


Figure 1. Cause and effect diagram: mapping of weaknesses.

## Defining action priorities

After the problems and their inter-relations got listed with the cause and effect diagram, it was possible to identify improvement opportunities. To solve the problem, the team decided to use a prioritization matrix tool (gravity, urgency and tendencies – GUT) as a way to prioritize the actions that would be taken (Chart 1).

The step-by-step for the construction of the matrix included:

- step 1: formulation of the list of problems;
- step 2: categorization of problems according to each of the three GUT variables. Each problem was analyzed according to a score ranking from 1 to 5, to each one of the variables: 1 for cases with no gravity

or urgency, but with a tendency to get worse, and 5 for extremely severe and urgent cases that will get worse immediately if not dealt with;

- step 3: establishment of a ranking of the main problems (by multiplying the three scores);
- step 4: analysis to define the weak points (ranking of the main problems);
- step 5: elaboration of action plans to solve or reduce the problems<sup>6</sup>.

## Proposed solutions

After the analysis of the problems, other correlated causes that required short and mid-term solutions were detected.

**Chart 1.** Prioritization matrix.

Problem description	G	U	T	SCORE	*
Incomplete OPSD** material in the room	5	5	5	125	1º
Lack of description on OPSD equipment (e.g.: size)	5	5	5	125	2º
Specific surgical instruments requests without scheduling	4	5	5	100	3º
Simultaneous surgeries with the same surgical instruments	5	4	4	80	4º
Obsolete washer	5	4	4	80	5º
OPSD divergences: request x receipt	4	4	4	64	6º
Missing unidirectional flow	4	4	4	64	7º
Scheduled surgeries overcoming available surgical instruments	4	3	3	36	8º
Lack of information regarding joint surgeries	4	3	3	36	9º
Communication failure regarding the scheduling of urgent and emergency surgeries	3	4	3	36	10º
Surgical instruments on consignment unavailable from supplier company	4	3	3	36	11º
Request of surgical instruments unavailable in the hospital	3	4	3	36	12º
Equipment being delivered with less than 6 hours advance regarding the start of the surgery	3	4	3	36	13º
Surgery anticipation without the SPD being informed	3	3	3	27	14º
Nighttime surgery scheduling without notice to the SPD	3	3	3	27	15º
Surgical instruments on consignment request delay	3	3	3	27	16º
Lack of listed surgery procedure names (e.g.: lumbar or cervical spine)	3	3	3	27	17º
Difficulties to carry out visual inspection	4	3	2	24	18º
Surgical kit with items that don't meet the team's demands	3	2	3	18	19º
Lack of specification for extra surgical instruments and specific kits	3	2	3	18	20º
Small ultrasonic cleaner	2	3	3	18	21º
Lack of communication among SPD and medical teams	2	3	2	12	22º
Biological indicator reading time (3 hours)	2	2	2	8	23º
Surgery approved by insurance less than 24 hours before the procedure	2	2	2	8	24º
Surgical team unaware of the available surgical instruments	2	2	2	8	25º
Unergonomic equipment stand	2	2	2	8	26º
Duplicate requests (kits that have been previously sent to the SC)	2	2	2	8	27º

\*Prioritization; OPSD: Orthosis, Prosthesis and Special Devices.

However, those problems involved different sectors of the hospital, other than the SPD, and the interaction between them would allow the solution of most of the listed issues. Three lines of action were identified to solve the problems:

1. “Surgical Data Map”;
2. financial support for the following items: infrastructure adequacy, acquisition of new technologies, surgical instruments and increase of human resources of the hospital.
3. inter-professional communication.

## RESULTS

### “Surgical Data Map”

The nurses of the SPD began to participate, systematically, of a meeting called “Surgical Data Map”, which happened every day in order to verify the authorizations by the private health insurance for surgical procedures. The group of professionals who attended the meeting consisted of SPD, SC and surgical scheduling nurses, as well as the nurse technician who was responsible for ordering the products

on consignment. The daily meetings allowed the identification of other issues and their effective solving solution.

After the reformulation of the “Surgical Data Map” daily meeting, other professionals spontaneously joined the group, such as the SC pharmacists, the Hemodynamics nurses and, in some specific meetings, the leaders of the sector responsible for products on consignment. Currently, the newcomers of the aforementioned sectors, the staff in training and the trainee nurses also take part in the “Surgical Data Map” meeting. With the optimization of the “Surgical Data Map”, the active participation of the group members and the adoption of management tools, several actions were taken and led to the solution of deficiencies, as shown in Chart 2.

The involvement of the hospital’s financial department was necessary for some of the actions, as described in Chart 3.

Important inter-professional communication components were also outlined, as listed in Chart 4.

The implemented actions resulted in solutions that contributed with the improvement of the surgery cancellation indicator. The data were selected according to the SPD criterion of lack of reusable medical devices. When this indicator was analyzed, the team concluded that over the last 5

**Chart 2.** Actions taken after “Surgical Data Map” assessment.

Rescheduling of simultaneous surgeries with the same surgical instruments.
Surgical instruments requests are met according to previous scheduling and availability.
OPSD requests are ordered soon after approval.
During urgent or emergency situations, other supplier companies are contacted when the first-choice company has no availability of the surgical instruments on consignment, according to pre-established criteria.
Surgical instruments on consignment inspection on delivery according to medical request and insurance authorization.
Surgical instruments on consignment orders are made by the respective sector by phone or e-mail to the supplier company. If there’s a delay, the SPD nurse will place a new phone call in order to get a delivery forecast.

OPSD: Orthosis, Prosthesis and Special Devices; SPD: Sterile Processing Department.

**Chart 3.** Financial support to the following items: infrastructure adequacy, acquisition of new technologies, surgical instruments and increase of the human resources of the hospital.

New surgical instruments acquisitions according to the type of scheduled surgery.
Acquisition of a 1-hour biological indicator reader.
Acquisition of six equipment stands and hydraulic chairs according to professional’s height.
Acquisition of three thermodesinfectant equipment.
Acquisition of a higher capacity ultrasonic cleaner.
Physical space rearrangement in order to maintain unidirectional flow.
Acquisition of inspection microscope and light system replacement.
Hiring of a coordinator for the SPD and two night shift exclusive nurses.

SPD: Sterile Processing Department.

**Chart 4.** Interprofessional communication.

The surgery scheduling sector notifies the SPD about urgent and emergency procedures by phone or e-mail.
The nurse in charge of the sector will review the scheduling information whenever necessary.
Surgery scheduling can only be anticipated upon instruments and equipment on consignment availability check by an SPD nurse.
Medical kits sent to the SC are registered under a document called "Surgical Notice" which describes all the supplies and equipment to be utilized during the surgery. This information is also uploaded to a traceable computer system.
Surgical teams are invited to the SPD to see which surgical instruments regarding their specialties are available at the department, thus allowing a better management of said equipment.
Content rearrangement on the existing kits according to suggestions by surgeons and surgical technicians.
Acquisition of new medical kits after SPD nurses and surgical teams conjoint decision.
SPD nurses are present in the OR during perioperative period, when needed, with direct contact with the multidisciplinary team in order to clarify doubts and to give immediate responses to problems regarding instruments.
When there are doubts upon the receipt of surgical instruments on consignment the surgical team is contacted to provide answers.

SPD: Sterile Processing Department. SC: Surgery Center; OR: operating room.

years, the surgery cancellation rate peaked in 2012 (3.8%), which was the worst result motivated by this problem, and kept on decreasing throughout the following years, reaching its best performance in 2016, with under 0.5% cancellations of scheduled anesthetic/surgical procedures.

## DISCUSSION

In order to assess the quality of healthcare services, the selection of a method that will allow guidelines or standards that can help the institution to reach the highest levels of excellence is key. Hospital institutions choose accreditation programs which are voluntary and developed under a periodic basis, according to order No. 538, issued by the Health Ministry (HM) on April 17, 2001. This ministerial order acknowledges ONA as the competent and authorized institution to be responsible for carrying out the development of the Hospital Accreditation Program<sup>7</sup>.

This program allows healthcare services to be managed with quality, according to what is recommended by the Accreditation Guide for Hospitals<sup>7,8</sup>. It is an evaluation program, therefore, the healthcare institutions are expected to adopt the indicators. Those are objective measures that provide, through its results, a clear view of the hospital's real conditions. Therefore, it is also possible to outline new practices. During the evaluation period, the team could verify the importance of not only monitoring the indicator, but also intervening when necessary. For that to happen, the adoption of tools that can help with the decision-making process is essential, such as the ones used in this experience report, including the Ishikawa diagram and the GUT prioritization matrix tool.

The management of the surgery cancellation indicator allowed the SPD and the multidisciplinary teams to find solutions for several issues. A study has demonstrated that the cancellation of surgeries has repercussions on the entire chain of services of the anesthetic/surgical routine. The lack of medical supplies is reported as one of the main causes leading to this scenario<sup>9</sup>.

## CONCLUSION

This report showed that better interaction among the several sectors of a large hospital is possible with the implementation of a daily meeting called "Surgical Data Map". This routine facilitated the solution of problems such as the lack of reprocessing of reusable medical devices for surgeries, thus avoiding the suspension, the delay or the postponement of procedures and the mitigation of several forthcoming problems.

It demonstrated that the adoption of quality management tools helped with decision-making processes, leading to the increase of managerial and care quality and the humanization of the hospital-patient relationship. The study made all the professionals involved, with no exception, aware that they are co-responsible both for the positive results of a successful procedure and for the waste and loss of resources and the work redone. It was also established that the nurse, in the context of the multidisciplinary team, is the most committed and knowledgeable professional to coordinate a work group with the goal of improving patient care and safety.

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