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Project design for Surgical Department reorganization at Hospital-University of Parma

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Summary. The article explains the main technical and methodological references of the reorganization of the main surgical activities (for production volumes and case mixes) of the Parma University Hospital. In defining the organizational design we considered the compliance with national laws and regional guidelines, the vision of the Public Enterprise Strategic Management, the attempt to bring the continuity of care through hospital paths, the valorization of the high technical specialty of a hub university center, the recognition of the ability and vocations of Professionals and the search for efficiency of a complex public production system. The project has also responded to the need to pursue greater production efficiency by the entire local health system of Parma, optimizing, at the same time, training courses for Medical Students and Health Professions of the University of Parma transversely with respect to surgical clinical pathways and clinical research. (www.actabiomedica.it)

Key words: project design, healthcare management, clinical pathways, surgical waiting list management, surgical activity management

Introduction

An overall re-evaluation need is emerging on the hospital organization to address two essential challenges facing healthcare: to satisfy healthcare needs from increasingly complex and fragile patients and to increase efficiency in the use of available resources.

Current models have, since their implementation, excellently carried out the function for which they were conceived: to support the specialization processes of the hospital activities (1). However, this approach does not give overall answers to the two major priorities mentioned above.

For this reason, the future of hospitals must be focused on clinical pathways, taking charge and patient-centered vision (2), maintaining, both institutionally and functionally, the current departmental organization but favoring the recomposition of professional families through the creation of multidisciplinary professional groups. Multidisciplinary groups are responsible for the taking charge of the patient while single Professionals are in charge of applying hyperspecialistic knowledge. Organizations are always involved in continuous search for quality, excellence and innovation and, as change is a universally present phenomenon in every time and every type of organization (3), its effectiveness always depends on internal ability to actively support Professionals during the change process (4). The University Hospital of Parma is a highly specialized health facility that integrates university functions in the fields of assistance, research and teaching. It also can be defined as a second level hospital, including a second level Emergency Department (DEA), according to current Italian Ministry of

Health standards (Ministerial Decree 70/2015) (5). Hospital Strategic Administration has set among its objectives the creation of new organizational conditions for General and Specialist Surgical Department to express greater efficiency, productivity and safety of care, adhering to law principles regarding respect and transparency of waiting lists for elective surgery.

The project design was guided by the following drivers: a) compliance with the regulatory guidelines, b) Hospital Strategic Administration vision, c) attempt to achieve continuity of care through surgical pathways, d) enhancement of the high technical specialty of a university hub center, e) recognition of skills and vocations of Professionals and f) the need of efficiency of a complex public services production system. The Hospital, whose function is to provide multi-specialized high or medium level care, is the primary node of a health network (6) of local services for assistance, care and prevention. His filtering and leading role in that network could be carried on only through adequate interactions with other nodes. Thus in a manifold system, in which hospital represents a fundamental element in organizational and technological resource use terms, although it has equal dignity compared with other Structures and the other nodes. The Department's skills must therefore approach the management techniques (7) now consolidated in other fields pursuing the so-called "3E" (efficiency, effectiveness and economy).

Rational

The process of corporatization of healthcare system and the increase of autonomy and economic accountability of hospital enterprises brought to seek a redefinition of the internal organizational structures (8) changing aggregation criteria of the activities and introducing intermediate levels of responsibility.

The purpose of the project is to integrate medical disciplines hyperspecialization in a system aimed at giving health need advanced satisfaction. Organizational redesign followed the model of 3 fundamental assets, as exposed in OASI 2012 statement (9) by F. Lega, considering the current situation of labor law and contractual rules in healthcare in Italy and having

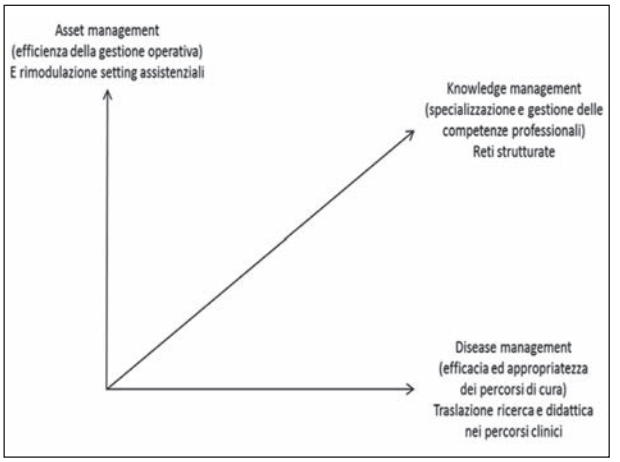

Figure 1. Three fundamental axes of the hospital organization (Lega F.)

regard also for human resource age management principles. Indeed, although human resource turnover has to ensure at first continuity of services in compliance with contractual and regulatory rules, human resource management must be focused on organizational effects trough asset management, knowledge management and disease management.

Project's goals were established, in each stage of implementation, according to appropriateness and efficiency principles:

1. enhancement of interfaces with other facilities (both local public hospitals and accredited private facilities);
2. optimization of a local and regional hospital healthcare services network;
3. improvement of the hub & spoke network interactions for surgery gathering complex cases in the hub hospital [consistently with the Ministerial Decree 70/2015 (5)] and building agreements with other nodes of network for less diseases requiring less complex treatments;
4. ensuring equity of access, homogeneous running of waiting lists and – mostly - patient safety;
5. building hub & spoke paths contemplating moving professional surgical teams among network hospitals toward the patients;
6. experimentation of integrated models between hospitals including "in service" surgical activity;
7. Overcoming of old conception of invariability in allocation of scheduled operating sessions

and operating room to each surgical unit or discipline;

8. ICT development as a support to organizational change from waiting list to operating room management software (10), including the building of a new classification of surgical activities related to their productive factors/variables (timing, consumptions, use of medical devices);

Regarding to transparency and fairness in elective surgery waiting lists management, a recent Resolution of the Council of Emilia-Romagna Region, n. 272/2017) (10) introduced a new management profile involved in monitoring and control of the whole surgical patient path, defined as Elective surgery access manager (RUA) with 6 main goals/areas of intervenction: a) achieving compliance with standard waiting times, b) appropriate information to patients, c) integration of booking procedures with surgical activities scheduling d) surgical scheduling developed based on the consistency / criticality of waiting lists, e) implementation of local network synergies to guarantee waiting times, f) balance between volumes and waiting time for both institutional and private surgical activity.

Data analysis

Analysis were performed, within the Hospital Management Team, in order to asses process and productivity indicators of all Department's surgical units, starting from ad hoc analysis concerning bed occupancy and admission scheduling of surgical wards including those dedicated to short hospitalization (Week Surgery Unit). Other investigated indicators were:

- ✓ waiting times for ordinary intervention;
- ✓ waiting times for ordinary intervention in Day Hospital setting;
- ✓ the most frequent DRGs in ordinary setting;
- ✓ the most frequent DRGs in Day Hospital setting.
- ✓ estimate of the time spent in operating room restoration;

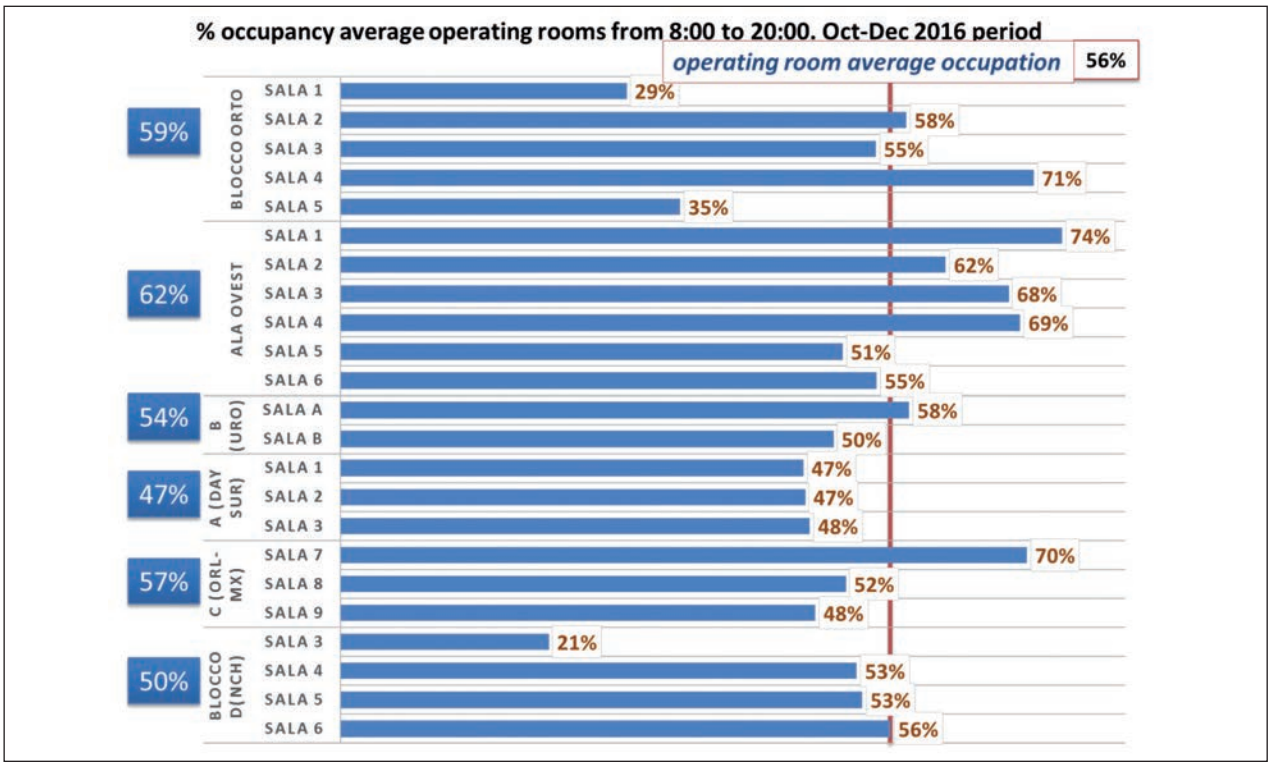

Figure 2. % occupancy average operating rooms from 8:00 to 20:00. Oct-Dec 2016 period

- ✓ number of interventions performed by each Surgical Unit per operating room: (indicator of the o.r. resource allocation);

Also operating room occupancy during the day (from 8:00 a.m to 8:00 p.m.) was assessed in a two month of full activity period, in order to improve surgical activity's efficiency and appropriateness through analysis of operating room management software data.

As far as it concerns operating room indicators, our findings highlighted a lack of homogeneity in o.r. occupancy rate, from minimum of 21% to maximum of 74%. A low overall occupancy rate of 56% was observed, only partially attributable to emergency and transplant dedicated rooms. Those findings were considered critical for the organization and not compatible with the expected performance of a hub hospital and its institutional function to satisfy complex healthcare needs.

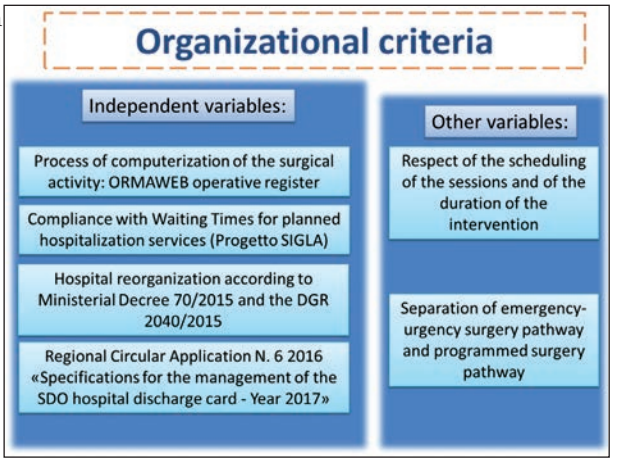

Figure 3. Organizational criteria for the project

Project design

The keystone to understand the entire design was the enhancement of surgical planning, intended as an overall organization act including all processes and healthcare settings related to surgical intervention. Another significant element consists in assigning the production planning to surgical manager profiles. Both the above mentioned aspects contribute to enhance potentialities and participation in surgical planning meetings characterized by bottom-up and shared decision making among Professionals, following some significant criteria (Figure 1).

The whole process of surgical department organization re-design can be explained according to four main areas of intervention:

A) Clinical pathways as organizational node

One of project endpoints is the creation of a local healthcare system surgery network able to bring the operational integration between the "production sectors" of the surgical performances to the highest levels, focusing on relationship with the other public hospitals with accredited private enterprises.

As clinical pathways must lead patient through this context, specific responsibilities were identified within General Surgery Unit to ensure disease management, consistency of clinical competences required for specific paths, homogeneity/appropriateness of treatments and the diagnostic-therapeutic choices and, not least in terms of importance, integration between Professionals contributing, through their personal skills and vocation, to the maintenance of the path itself.

B) Logistical separation between emergency surgery electives surgery settings

Operating room verticalization

Surgical activity organization among hospital logistic platforms was reviewed in order to increase efficiency and occupancy rate of operating rooms. To this purpose the possibility of extending their ordinary use for scheduled surgical interventions in the afternoon hours (up to 20:00 on weekdays, including restoration activities) was considered and preliminary feasibility assessments were carried out with anesthesia services managers and head nurses, paying particular attention to review workforce management in compliance with current regulations for healthcare sector and recently performed workload analysis (11). Implementation of operating room verticalization model, mostly for elective surgery, had also the purpose of gain operating room availability for emergency and organ transplantation surgery dedicated pathways.

Logistical separation

As resulted from the above mentioned resources re-allocation, emergency and urgent surgery of several surgical disciplines was moved to dedicated operating rooms in order to avoid the urgency variable to interpose uncontrollably with elective surgery planning and to prevent elective surgical intervention's delays or cancellations.

C) Teaching and research sponsorship

Promoting and achieving teaching and applied research programs is considered a main institutional mission for Hospital Enterprises integrated with University, according to Legislative Decree n. 571/99 (12) and related acts. Surgery Department must develop these programs within care and diseases pathways also addressing training needs of Students, in training physicians, PhD attendants with innovative modalities of integration and interface with other units and hospitals of the local and regional training network. University-Hospital research and training programs can also ensure significant scientific contribution to clinical pathways planning, development, evaluation and continuous update.

D)Project outline

Project implementation could be described through four phases, in each of which specific elements of innovation have been introduced. The subdivision into phases responds both to a temporal criterion than to a general consecution.

Phase 1: Reorganization of Department planning and implementation of the profile of the Surgical Activity Manager

A new management profile has been defined hierarchically below the Head of Surgical Department, maintaining the departmental institutional set-up with

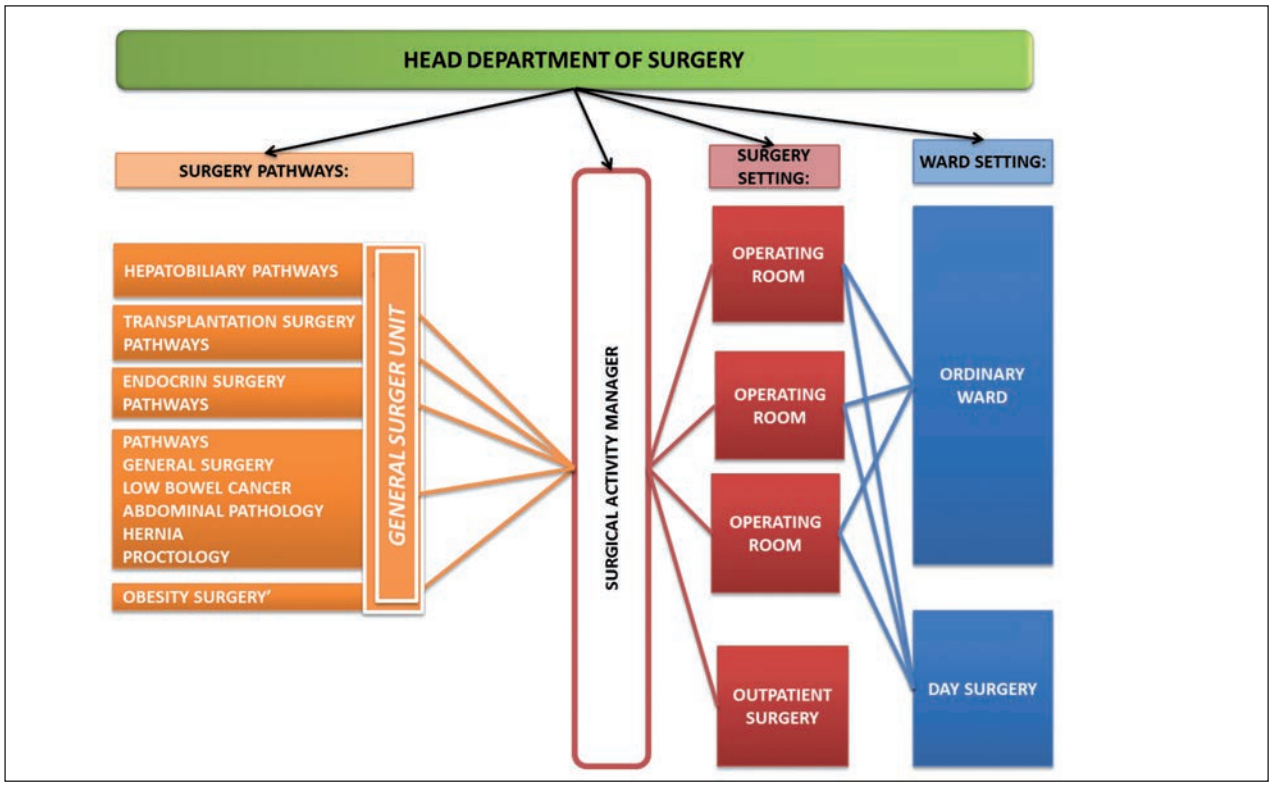

Figure 4. Representation of surgery pathways and asset platforms

limited structural changes to the single surgical units; following three main steps:

- Institution of the profile of **Surgical Activity Manager** ("*Direttore Organizzativo Gestionale delle Attività Chirurgiche*") and recruitment of a surgeon with managerial and mediation skills adequate for this role, mainly involved in *asset management*;
- two general surgery units of the Surgical Department were merged in single unit called "**General Surgery Unit**" in order to enhance surgical pathways recalled in Figure 4 (*disease management axis*).
- Strengthening of **surgery planning board**'s role, coordinated by Surgical Activity Manager in collaboration with other management profiles such as hospital medical manager, operation management nurse, bed management nurse and below the supervision of the Head of the Surgical Department.

The new concept of the surgical activity is summarized in figure 5 representing (letter "C") the function of coordination, management and relationships with wards. Also the role of interface with other local public and accredited private hospitals is shown as essential for contextualizing surgical activity management within the local healthcare network.

Phase 2: Surgical Activity Management Board update in order to improve planning

The Sugical Activity Management Board was updated adding Anesthesiology Physician and a O.R. head nurse profiles. In this phase, Elective surgery access management (the RUA profile according to regional law) responsibility was also formally assigned to Surgical Activity Manager highlighting the close cor-

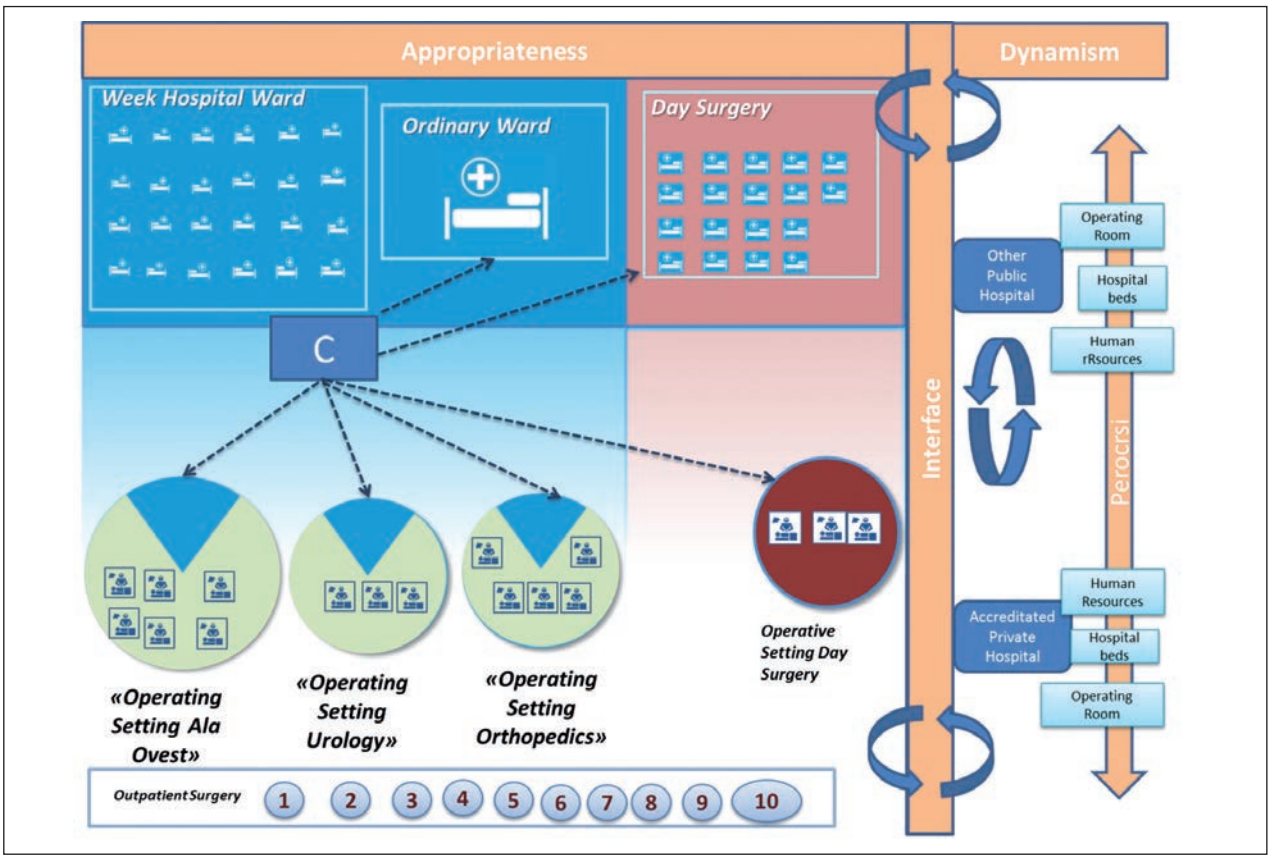

Figure 5. Representation of new local surgical network

relation between waiting lists management and surgical planning. A coordination office between University-Hospital and Local Health Authority enterprises for waiting lists management was instituted in order to share projects, organizational choices and access criteria within local healthcare system.

Phase 3 – Flexibility on operating room resources allocation and enhancement of production efficiency

Utilization rate of single elective operating rooms and resource allocation criteria were reviewed, introducing the concept of dynamic attribution according to waiting list priority and consistency. At this stage "vertical" surgical planning was introduced providing 12 hours sessions.

Phase 4 – Commitment to sharing a project for an integrated provincial General Surgery activity network with the Local Health Authority.

Surgical Activity Manager was asked to develop a project for integrated provincial General Surgery activity network with the Local Health Authority with in order to improve clinical pathways and to optimize overall hospital production platforms utilization according to criteria of urgency level, expected hospitalization, clinical complexity and technological resources needed.

Phase 5 – Organizational and technological renovation perspective

The above mentioned innovative approach concerned some organizational aspects considered critical for the overall Surgical Department performance:

- pre-admission phase and operating scheduling coordination;
- scheduling of the operative block;
- election and urgent patients flows harmonization;
- accurate planning of discharge and post-acute phases management.

The prerequisites for the introduction of new technological solutions in order to make these paths more usable and at the same time reach levels of greater technical progress were laid in this stage:

- ✓ *Polifunctional Surgical Room*: a new operating room hosting the most advanced technologies available for precision surgery: the Mobile Intraoperative CT (already owned by hospital), and the Robotic Assisted Surgery system;
- ✓ *Hybrid Room*
- ✓ *Operating Room Information System* enhancement including informatics support for surgical schedule planning and o.r. resources management.

Results

The creation of Surgical Activity Manager profile and assignment of the role at the same Professional were officially formalized at every institutional level ensuring *best practices* in reducing the productive variability among different units with equal supply capacity. Surgical Activity Manager oversee daily and weekly management of operating room and hospital beds assignment.

In order to increase the production efficiency of the operating sector and, at the same time, ensure appropriate use of available resources, "verticalization" of the surgical activities has already been applied intensively in some areas.

This has had a direct effect increasing the rate of use of operating resources and the number of surgical interventions with the same case mix (+20%). As far as project design for strengthening specialist pathways within surgical units concern, the identification of surgical clinical pathways managing profiles is underway among the Surgical Department.

Long term results of the project design of the Surgical Department consist in:

1. Improved processes of interface between the components of the surgical fields reorganization,
2. qualitative and quantitative improvement of hospital and local healthcare system performances,
3. response to specific health needs with appropriate treatments,
4. volumes of surgical activities redistribution within the local hospital network in a coordinated, concerted and dynamic manner,
5. compliance with national plan healthcare outcomes (PNE) (13) and resolution of the re-

gional council 1030/2016 (14) indicators surgical standards,
6. renovation of the surgical professional environment,
7. increased differentiation of the paths of General Surgery and Emergency Surgery.

Conclusions

Within the overall project we addressed some direction towards which the surgical departments and surgeons' profiles should go. Indeed, organizational design includes two different profiles of surgeons for each discipline. The first of each having greater planning responsibility, becoming the operating room and hospital bed resources manager in collaboration with surgical unit head. Although managerial skills must be proper to each physician, being the first guarantor of the appropriateness of care, some of them should be enhanced in new operation manager profiles, whose need is in continuous increase in complex healthcare organizations such as Hospitals. Alongside this profile, other physicians – with the "**Specialist**" profile - can conversely develop their own technical vocation for highly specialized surgical procedures by among clinical pathways that in a University Hospital must be in continuous scientific and technological progress. Clinical pathways integration will allow these "non-electively organizational" profiles to perform technical-scientific reference roles for the surgical units.

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