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## INTRODUCTION

In Italy, the percentage of surgical procedures performed using the open technique remains high (46%)<sup>1</sup>. In recent years, the volume of procedures carried out using minimally invasive techniques has been increasing even if the robotic surgery accounts for less than 10% of all procedures<sup>1</sup>. Given the limited resources of the National Healthcare System and the high costs of robotic surgery, it is crucial to optimize their use to ensure efficient resource allocation, maximize clinical and economic benefits, and promote equitable access to advanced technologies nationwide.

## OBJECTIVE

The objective of this study is to conduct a budget impact analysis to evaluate the cost implications of a steady increase in the use of robotic surgery for major procedures in the specialties of urology, gynecology, and general surgery over a five-year time horizon.

## METHOD

A budget impact model was developed to analyze hospital costs for different surgical approaches across urological, gynecological, and general surgeries, with a population of 500 patients per procedure type (prostatectomy, nephrectomy, hysterectomy, cystectomy, myomectomy, gastrectomy, colectomy, splenectomy, and ureteral reimplantation) for a total of 5,500 procedures each year.

The costs of medical devices, operating room, hospital stay, personnel, and complications were considered<sup>2-3</sup>. Complications were considered both during the first hospitalization and follow-up. Costs related to the HUGO™ robotic platform were used<sup>2</sup>. The maximum utilization for each robotic platform was set at 500 procedures, with a total of 4 platforms considered over a five-year period.

For procedure duration, length of stay, and complication rates, as well as the increase/decrease of percentages of surgical techniques, data from the Agenas HTA report and literature included were utilized<sup>1</sup>.

## RESULTS

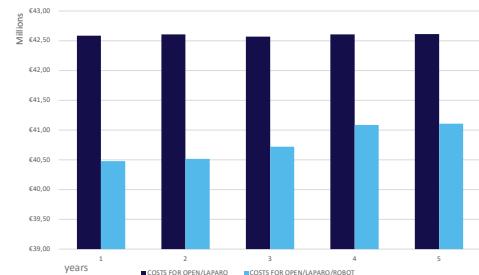
Out of a total of 5,500 procedures, the percentage of robotic procedures is supposed to increase from an average of 11% in the first year to 36% in the fifth year. The percentage of open procedures decreased from 53% to 40%, while laparoscopic procedures dropped from 36% to 24% (Fig. 1)

In the first year, the costs for open and laparoscopic surgery alone vs costs including the three surgical approaches (open, laparoscopic, and robotic) amounted to €42.6 million vs €40.5 million. The robotic surgery was considered for a total of 623 procedures. After five years, the costs for open and laparoscopic surgery alone vs costs including the three surgical approaches were €42.6 million vs €41.1 million. The robotic surgery was considered for a total of 1,987 procedures (Fig. 2).

Fig. 1 DISTRIBUTION OF PROCEDURES (OPEN, LAPAROSCOPIC, ROBOTIC) OVER 5 YEARS



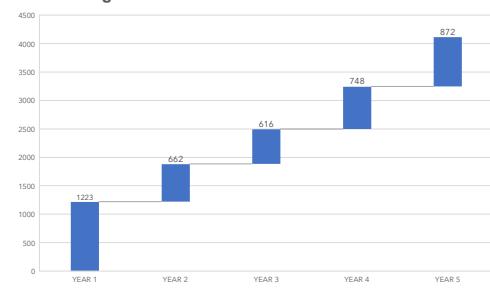
Fig. 2 COST COMPARISON  
SoC vs INTRODUCTION of ROBOTIC SURGERY



Mainly thanks to the decrease in the percentage of open surgery, a considerable reduction in the length of stay was observed, for a total of 4,121 saved hospital-days over five years (fig.3).

According to our assumptions and consequent results, the introduction of robotic surgery did not increase overall costs over time; on the contrary, it resulted in a cost reduction of approximately €1 million per year, mainly due to shorter hospital stays, a lower conversion rate to open surgery, and an optimization of the patient pathway.

Fig. 3 DAYS OF HOSPITALIZATION SAVED



## CONCLUSIONS

Despite the high initial investment typically associated with robotic surgery, the analysis shows that in the medium term (five years), this approach may lead to a reduction in overall hospital costs.

Key contributing factors include a lower postoperative complication rate compared to open surgery, shorter hospital stays, and greater surgical efficiency. Moreover, the huge volumes of robotic procedures are crucial to optimizing the investment done.

The introduction of robotic surgery in settings already performing open and laparoscopic procedures appears to be a sustainable choice, capable of optimizing the care pathway and rationalizing healthcare spending over time.

## REFERENCES

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