Robot-Assisted Surgeries: Developing a Database for Future Research on Better Practice

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### Introduction

Currently, LVHN has 3 da Vinci® Si HD Surgical Systems, including 2 located at the Cedar Crest campus and 1 located at the Muhlenberg campus. Since the inception of the Robotic Surgery Department roughly 8 years ago, LVHN has performed over 4,000 robotic cases—a number seemingly large enough to derive valuable insight into the clinical and economic effectiveness of robotic surgeries from retrospective analysis. LVHN has a large repository of electronically stored patient records for each robotic case that can be transformed into an IRB-approved database, which can be designed with a simple interface that allows future data input and interpretation. This project’s goal is to create an intelligently compiled, approved database, so that patient info is protected along with being accurate and accessible data for future research.

### Methodology

Patient data was extracted from electronic medical records, including procedural transcriptions, discharge summaries, pathological reports, and photocopied historical and physical records. The information was entered into the MS Access forms either as a textual description (i.e. Procedure), continuous data (i.e. Weight), a discrete number (i.e. # of Lymph Node), a true or false statement (i.e. Comorbidities). The forms were divided into five subsets, which reflect the type of surgery each case falls under—general (~150 cases), colorectal (~50 cases), gynecological (~775 cases), cardiothoracic (~200 cases), and urological (~12 cases). The number of cases for each subset is not exact because novel cases are being and will continue to be added to the database, seeing as this project is only at its initial stage.

### Results

The result of this project is the newly formatted IRB-approved robot surgery database in MS Access saved on the LVHN X-drive, which is WISAR protected. The database is still being populated, but the hope is that it will be the precursor to meaningful research in the field of robotic surgery at LVHN.

### Discussion and Conclusions

Since numerical results are beyond the scope of this project, it seems appropriate to conclude by speculating about the future of this robotic surgery database and its use in research and quality improvement projects. Currently, this growing database is being used for quality insurance within the Department of Robotic Surgery, but more can still be done.

**Future Improvements:**
- Developing macro to automate the transformation of text-based data into specifically coded numerical variables for easier statistical analysis
- Retrofitting database to include more oncological data, such as positive margin rates, to better evaluate the success of surgical oncology cases

**Future Research Projects:**
- Three-way comparison of robotic assisted, laparoscopic, and open procedures by using post-operative complication and readmission rates, length of stay and surgery duration data expressed as weighted mean differences, and EBL or blood transfusion figures
- Determining the economic effectiveness of robotic surgery from a societal and institutional (LVHN) perspective using cost-effectiveness analysis, cost-utility analysis, cost-minimization analysis, cost-benefit analysis, and cost-consequences analysis

Assuming that robotic caseloads increase due to retrospective analysis of the previous robotic surgery cases, physicians will gain experience and will become more adept at performing a large array of minimally invasive robotic assisted surgeries, thus patients will ultimately receive better health care.

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**REFERENCES**


