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# Value Impact of Robotic Minimally Invasive Hysterectomy (MIH) in Gynecological Cancer

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## Context and Problem

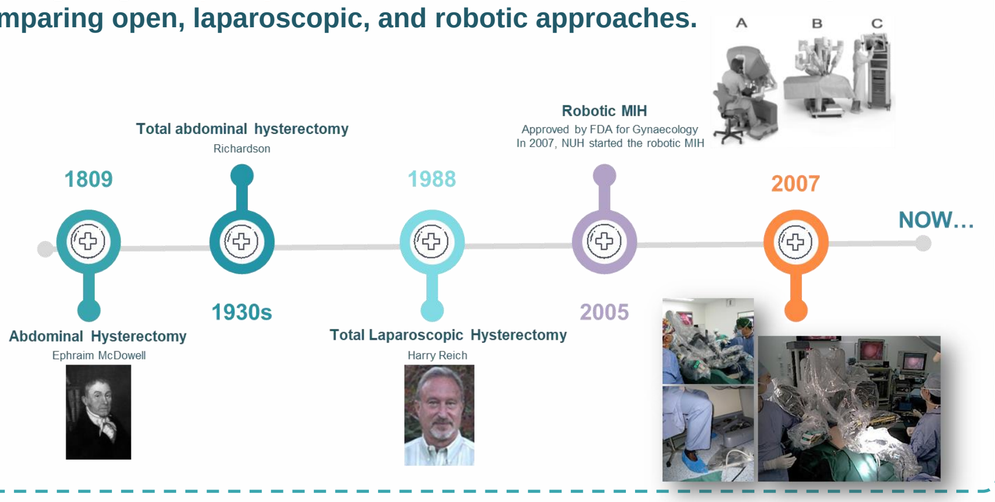
Minimally invasive hysterectomy (MIH) was first described in 1985 by Harry Reich. Since its introduction, the promise of MIH has gone largely unfulfilled with most hysterectomies being open. [1]

The introduction of the daVinci robotic surgical platform has improved the access to MIH as the technology enables more surgeons to offer MIH.

A key consideration has always been whether and how introducing this technology will impact the quality and cost of healthcare.

This study starts to address this question by

- **Investigating the quality and cost of incident care for hysterectomy comparing open, laparoscopic, and robotic approaches.**




## Methodology and Data

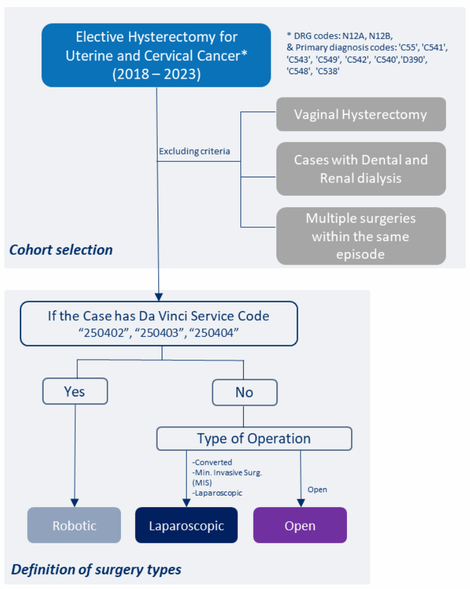
### Value-Driven Outcomes (VDO) Framework

$$Value = \frac{Quality}{Cost}$$

- Clinical quality and safety
- Appropriate care
- Patient reported outcomes
- Patient experience

**NUH VDO Quality Indicators for Hysterectomy**

1. Rate of Post-Op LOS <= 4 Days
2. Rate of Unscheduled Return to OT Within 30 Days
3. Rate of Readmission within 30 Days (Any Cause)
4. Rate of In-Hospital Mortality
5. Rate of Blood Transfusion Within 30 Days
6. Rate of Post Op Complication Within 30 Days
7. Rate of ICU LOS <= 2 Days




### Study design

**Retrospective cohort study was conducted on**

- **421** patients with **Uterine and Cervical Cancer**
- From Jan 2018 to Dec 2023 – **six years**
- Elective **Hysterectomy** in NUH
- **Value Driven Outcomes (VDO) framework** to analyse quality of care and cost

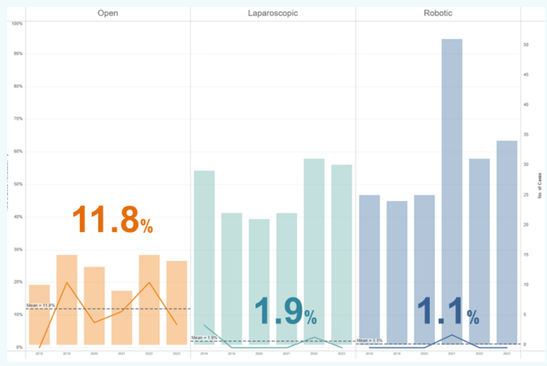
## Discussion and Conclusion

- Robotics just democratizes MIS improving access to MIS for surgeons and therefore, patients.
- Deploy it as a solution to address volume overload.
- We should develop rational policies around making sure that we leverage this natural advantage in this generation of surgeons to efficiently produce value in surgical healthcare.
- It is critical to understand the role of surgical robotics in how we deliver surgical care across the cluster. Technology remains a tool and how we use it says more about us than what the technology is about.
- Understanding leads to planning and rational strategies for growth. We need to stop trying to stop the train. We need to innovate in administration and program management.
- Data should and does drive everything we do in surgical robotics at the NUHS.

## Results

### a. Open vs. MIH

Blood Transfusion Rate

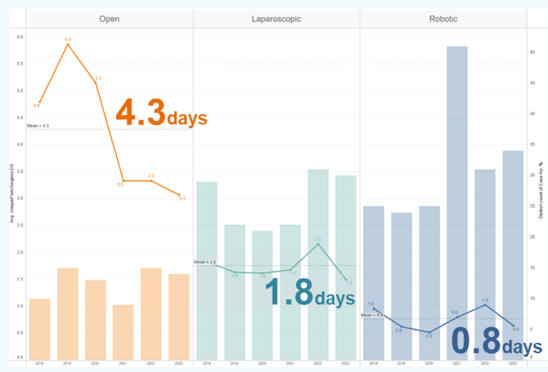



**Blood transfusion rate of MIH is lower than open surgeries**

- Change from Open to MIH
  - L-MIH: **lower** blood transfusion rate **(-9.9%, CI[-15.9%, -3.8%], p=0.001)**
  - R-MIH: **lower** blood transfusion rate **(-10.7%, CI[-16.0%- -5.6%], p<0.001)**
- Change from L-MIH to R-MIH
  - **lower** blood transfusion rate **(-0.8%, CI[-3.4%, 1.7%], p=0.496)**
- **WHY?**

➢ Minimally invasive technique minimizes surgical trauma and therefore intra-operative bleeding compared to open surgery technique

LOS from Surgery




**LOS of MIH is lower than open surgeries**

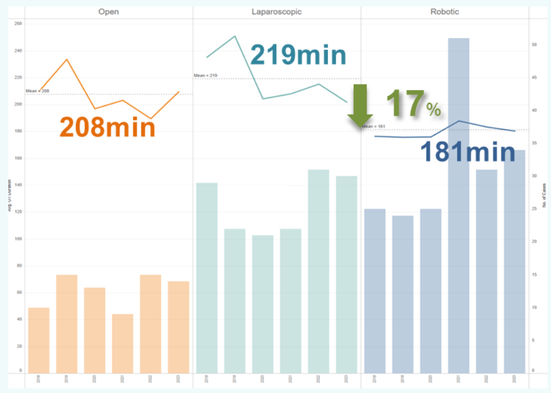
- Change from Open to MIH
  - L-MIH: **shorter** LOS **(-2.5 days, CI[-3.3 - -1.7], p<0.001)**
  - R-MIH: **shorter** LOS **(-3.5 days, CI[-4.2 - -2.9], p<0.001)**
- Change from L-MIH to R-MIH
  - **Shorter** LOS **(-1 day, CI[-1.3 - -0.7], p<0.001)**

**What does it mean?**

➢ Patients with MIH recover faster

### b. MIH: Laparoscopic vs. Robotic

OT Duration




**OT Duration of R-MIH is lower than Open and L-MIH**

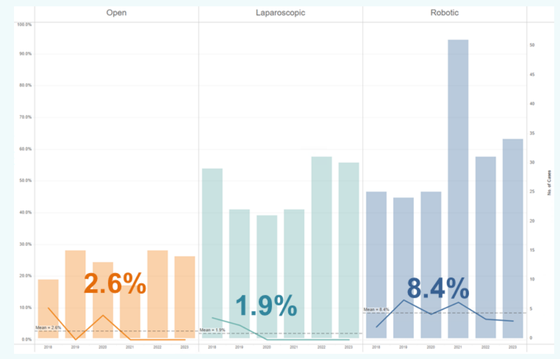
- Change from Open to MIH
  - L-MIH: **longer** OT duration **(+11 mins, CI[-2.4-25.4], p=0.105)**
  - R-MIH: **shorter** OT duration **(-26 mins, CI[13.8-38.8], p<0.001)**
- Change from L-MIH to R-MIH
  - **Shorter** OT duration **(-38 mins, CI[-47.9 - -27.7], p<0.001)**

**What does it mean?**

➢ Shorter OT duration optimizes the utilization of facility and resources

➢ Save the dosage of anaesthesia, potential benefits to patients' mental health [2]

Readmission Rate




**However, readmission rate of R-MIH is higher**

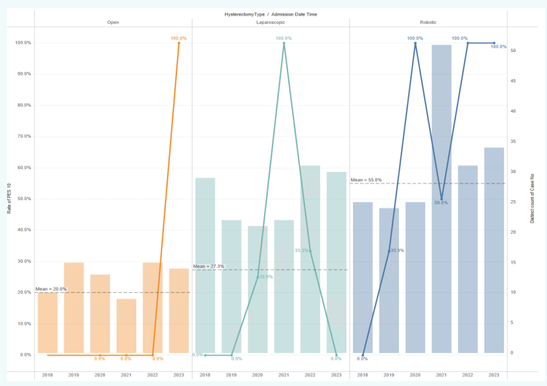
- Change from Open to MIH
  - L-MIH: less readmission **(-0.7%, CI[-0.05-0.03], p=0.734)**
  - R-MIH: more readmission **(+5.8%, CI[-0.01-0.12], p=0.090)**
- Change from L-MIH to R-MIH
  - More readmission **(+6.5%, CI[0.02-0.11], p=0.009)**

**What does it mean?**

➢ Patients may have more challenging pathology which would not have been possible lap and conventionally done open.

➢ Bigger, heavier, more challenging patients that are not candidates for laparoscopy but that would have benefited from MIH nonetheless (e.g., to avoid wound complications or complications of prolonged bedrest/hospitalization)

Patient Satisfaction




**Patient satisfaction of R-MIH is higher**

- **Response rate** of patient satisfaction survey is **low**
- But, according to the responses, patients are **more satisfied with R-MIH** and have a higher ratio of satisfaction score 10/10

**Cost of R-MIH and L-MIH are comparable**

- Cost of L-MIH and R-MIH surgeries are very **comparable** if we exclude robot facility cost
- **R-MIH** is not subsidised; **Bill for R-MIH** is **higher** compared to L-MIH

**References**

[1] Sutton C. 1 Hysterectomy: a historical perspective. Bailliere's clinical obstetrics and gynaecology. 1997 Mar 1;11(1):1-22.

[2] Belrose JC, Noppens RR. Anesthesiology and cognitive impairment: a narrative review of current clinical literature. BMC anesthesiology. 2019 Dec;19:1-2.

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