

# **TOWARDS IMPROVED THEATRE EFFICIENCY.**

Stellenbosch

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# A study of procedural times for common elective surgical procedures at Tygerberg Hospital.

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#### Introduction

The operating theatres are vital parts of many hospitals. They should provide a safe space and suitable equipment for patients to undergo a multitude of different surgical procedures. To provide this service, there are multiple components that are required to work together smoothly and efficiently. If theatre efficiency is compromised, it may have significant negative implications for the hospital, the staff and the patients.

At our facility, theatre slates are booked according to estimates of procedural

Procedure	Count	Duration (minutes)
Total abdominal hysterectomy	256	Mean = 184.2 Median = 175.0 IQR = 140.0 – 215.0
Total hip replacement	227	Mean = 166.1 Median = 155.0 IQR = 135.0 – 181.0
Transurethral prostatectomy	154	Mean = 143.1 Median = 101.5 IQR =75.0 – 172.5
Amputation above knee	152	Mean = 122.1 Median = 100.0 IQR =80.0 – 130.0
Transurethral excision or destruction of bladder tissue	148	Mean = 88.8 Median = 80.0 IQR = 60.0 – 101.3
Excision or destruction of breast tissue	126	Mean = 78.3 Median = 63.0 IQR = 46.3 - 83.0
Unilateral simple mastectomy	114	Mean = 98.4 Median = 90.0 IQR = 68.0 – 120.0
Total knee replacement	84	Mean = 182.4 Median = 177.5 IQR = 160.0 – 200.0
Peripheral vascular shunt or bypass	80	Mean = 247.1 Median = 230.0 IQR =174.8 – 282.8
Unilateral radical mastectomy	80	Mean = 110.3 Median = 104.0 IQR = 85.0 – 126.8
Amputation below knee	72	Mean = 123.5 Median = 115.0 IQR = 90.0 – 145.0
Unilateral repair of inguinal hernia	66	Mean = 158.6 Median = 135.0 IQR = 120.0 – 177.5
Гуmpanoplasty	56	Mean = 154.3 Median = 143.0 IQR = 120.0 – 180.8
Complete nephrectomy	55	Mean = 237.1 Median = 220.0 IQR = 167.5 – 302.5
Arthroscopy, knee	54	Mean = 91.7 Median = 87.5 IQR = 65.0 – 110.0
Arthroscopy, shoulder	42	Mean = 166.2 Median = 152.5 IQR = 122.75 – 180.0
Extracranial ventricular shunt	39	Mean = 164.2 Median = 130.0 IQR =105.0 – 177.5
Partial thyroidectomy	37	Mean = 202.6 Median = 185.0 IQR =151.0 – 235.0
Mastoidectomy	28	Mean = 253.7 Median = 237.5 IQR = 215.0 – 291.3
Cholecystectomy	27	Mean = 169.0 Median = 155.0 IQR = 37.5 – 212.5
Radical neck dissection, bilateral	24	Mean = 402.9 Median = 360.0 IQR =230.0 - 615.0
Total reconstruction of breast	21	Mean = $258.1$ Median = $262.0$



times by the surgeons. These estimations have been proven to be inaccurate in other institutions and to results in sub-optimal utilisation of the available theatre time. If the surgical times are over-estimated, then an early finish may result in wasted available theatre time which could have been utilized for another procedure. If the surgical times are under-estimated, then the list may either run late, or it may result in patients being cancelled as there is not sufficient time available for all the booked procedures (1). Lack of theatre time is the most common cause for cancellations at various institutions (2,3). An audit done previously at Tygerberg Hospital (TBH) demonstrated that over 50% of day-of-surgery cancellations caused overbooking due to inaccurate predictions of elective surgical procedural times (4).

#### Aims & Objectives

- **Primary Objective:** To determine the average duration of common elective surgical procedures in TBH.
- Secondary Objective: To determine if there are discrepancies between the estimates of procedural times made by surgeons and the actual procedural times for common surgical procedures.

### Methodology

A single-centre retrospective observational study was conducted. Data from January till December 2019 was captured from the hospital's electronic theatre records. Thirty-two elective procedures were selected and data, including total procedural, surgical and non-surgical time, was recorded and analysed. Durations of the five most frequently occurring procedures from this retrospective data were compared prospectively, over a five-month period, with the estimated procedural times and analysed to determine level of agreement.







Category

Category

Estimated

Actual

Actual Estimated

250

200

# Ethical Considerations

- Ethical approval was obtained from HREC Stellenbosch University (N20/11/120) and hospital permission granted by Tygerberg Hospital.
- This study posed no risk of adverse effects to patients as data extraction was done retrospectively from hospital electronic records and did not influence patient care in any way.
- Patient confidentiality was maintained by de-identifying all data at the time of data collection.

#### Results

The time parameters of thirty-two common elective surgical procedures performed in this institution were recorded and tabulated. The cohort was further divided into minor and major surgery groups. Average mean non-surgical time for minor and major surgery was 36 and 44 minutes,



# **Discussion & Conclusion**

- The average duration of 32 common elective surgical procedures in this institution has been documented through this research. These times can now be used by surgeons to structure their future slates and potentially help them with planning of waiting lists. • For example, if the data shows that average time it takes to complete a certain procedure
- respectively.
- Prospective data analysis showed statistically significant underestimation of procedural time when compared to actual duration of total abdominal hysterectomy (p=0.011), total hip replacement (p<0.001), transurethral resection of the prostate (p < 0.001) and above knee amputation (p=0.013). Average procedural time underestimation for the five procedures ranged between 33% to 61%
- is 180 minutes, then it would likely be unwise to attempt that procedure when there is less than 120 minutes available time, as it is likely that the list will run over time.
- This research also shows that surgeons at our institution frequently underestimate the total procedure times of selected common procedures.
- We anticipate that this data will assist with the accuracy of future procedural time estimates and ultimately have a beneficial effect on theatre efficiency at Tygerberg Hospital.

#### References

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- 4. Wenhold T.E (faculty of health science university of S. AN AUDIT OF PREDICTED AND ACTUAL DURATION OF ELECTIVE SURGICAL CASES AT TYGERBERG ACADEMIC HOSPITAL. Stellenbosch University; 2012.