# Key Performance Indicators for Thyroid and Parathyroid Surgery: Audit of North Shore Hospital


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Waitematā District Health Board
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## Introduction

- A head and neck database was established at North Shore Hospital in 2017 to monitor performance of thyroid and parathyroid surgery.
- Key performance indicators (KPIs) are rates of recurrent laryngeal nerve (RLN) injury, hypocalcaemia and haematoma requiring surgical evacuation.
- The aim of this study is to audit this database, measure these KPIs for and compare the results to published standards to assess our performance.

## Methods

- Retrospective review of the North Shore Hospital head and neck database from July 1997 to February 2020.
- RLN injury was measured as a percentage of nerves at risk. Total thyroidectomies and bilateral neck exploration were counted as two events
- Hypocalcaemia (<2.15mmol/L) was reported for patients at risk i.e., total or completion thyroidectomy, and parathyroidectomy for primary hyperparathyroidism.
- Temporary RLN injury and hypocalcaemia was defined as <6 months.
- CUSUM analysis is a sequential analysis technique that identifies shifts in performance over time. The plot shifts up with each event and down with each non-event. The horizontal line represents the threshold line, which when crossed, informs us that the complication rate is increasing to beyond benchmark rates.

## Results

- The total number of procedures was 1423.
- There were 1062 thyroid operations, 336 parathyroidectomies and 25 others.
- CUSUM analysis performed for permanent RLN injury, permanent hypocalcaemia and haematoma for thyroid surgery, and permanent hypocalcaemia for parathyroid surgery.
- The rate of RLN and haematoma for parathyroid surgery was too low for CUSUM analysis.

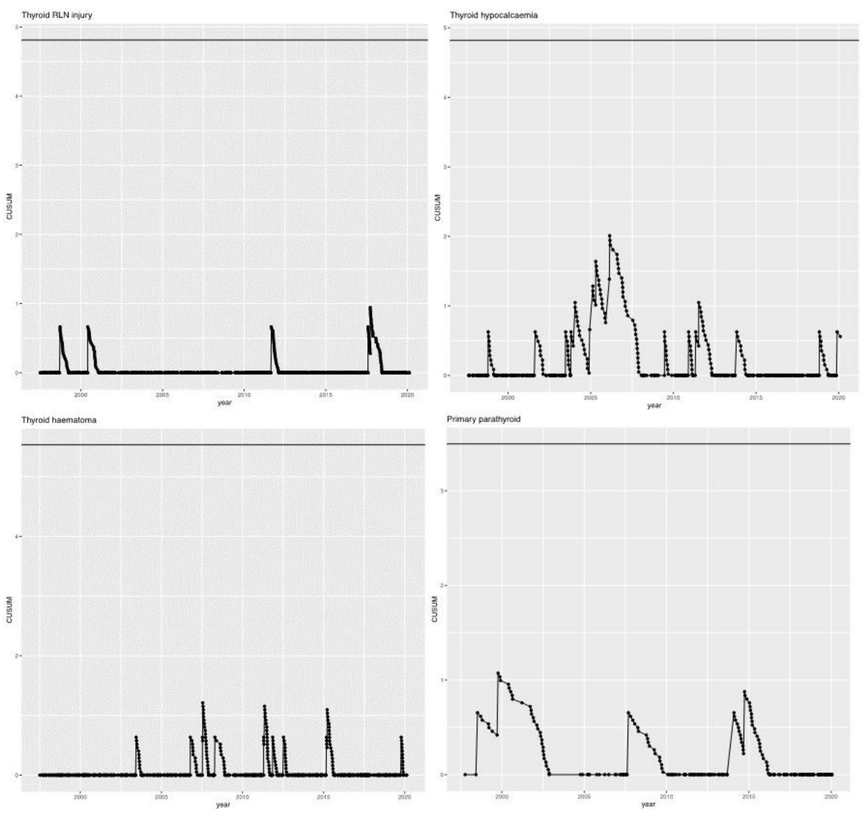
| Complications | Rate | Standard |
|---|---|---|
| **Thyroid surgery** | | |
| • RLN injury | | |
| Temporary | 1.9% | <6% |
| Permanent | 0.3% | <3% |
| • Hypocalcaemia | | |
| Temporary | 29.1% | <30% |
| Permanent | 3.3% | <7% |
| • Haematoma | 1.1% | <6% |
| **Parathyroid surgery** | | |
| • RLN injury | | |
| Temporary | 0.8% | <6 |
| Permanent | 0% | <3 |
| • Hypocalcaemia | | |
| Temporary | 15.7% | <30 |
| Permanent | 2% | <4 |
| • Haematoma | 0.3% | <6 |

| Demographics | |
|---|---|
| Median age (range) | 50 (16-92) |
| Gender | 77% F: 23% M |
| **Ethnicity** | |
| Caucasian | 57% |
| Asian | 14% |
| Maori | 12% |
| Pacific | 11% |
| Other | 6% |

| Operation | |
|---|---|
| Hemithyroidectomy | 38% |
| Total thyroidectomy | 34% |
| Parathyroidectomy | 24% |
| Completion thyroidectomy | 2% |
| Other | 2% |

| Pathology - Benign | |
|---|---|
| Multinodular Goitre | 29% |
| Thyroid adenoma | 19% |
| Hashimoto thyroiditis | 4% |
| Grave's disease | 3% |
| Autoimmune thyroiditis | 0.4% |
| Other | 1% |
| | |
| Parathyroid adenoma | 20% |
| Parathyroid hyperplasia | 1% |

| Pathology - Malignant | |
|---|---|
| Papillary carcinoma | 17% |
| Follicular carcinoma | 3% |
| Hurthle cell carcinoma | 1% |
| Anaplastic carcinoma | 0.4% |
| Medullary carcinoma | 0.2% |
| Lymphoma | 0.2% |




## Conclusion

- Performance of thyroid and parathyroid surgery at North Shore Hospital is operating within acceptable standards.
- Use of this clinical database will help in future monitoring of performance, and help drive improvement in the service.

## Contact

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## References

1. Roman BR, Morris LG, Davies L. The thyroid cancer epidemic, 2017 perspective. Curr Opin Endocrinol Diabetes Obes 2017 Oct;24(5):332-336.
2. National Thyroid Cancer Tumour Standards Working Group. Standards of Service Provision for Thyroid Cancer Patients in New Zealand - Provisional. 2013 December.
3. Connolly TM, Watters DA. Monitoring performance in thyroidectomy: cumulative sum analysis of outcomes. Thyroid 2010 April 01;20(4):407-412.
4. Health Information and Quality Authority, (HIQA). Guidance on developing key performance indicators and minimum data sets to monitor healthcare quality v1.1. 2013 Feb 14,.
5. Steen S, Rabeler B, Fisher T, Arnold D. Predictive Factors for Early Postoperative Hypocalcemia After Surgery for Primary Hyperparathyroidism. Proceedings - Baylor University. Medical Center 2009 Apr 1,;22(2):124-127.
6. Kaya C, Tam AA, Dirikoç A, Kılıçyazgan A, Kılıç M, Türkölmez Ş, et al. Hypocalcemia development in patients operated for primary hyperparathyroidism: Can it be predicted preoperatively? Archives of Endocrinology and Metabolism 2016 10/;60(5):465-471.