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Project #11: Clinical Evaluation and Cost Impact of Sugammadex Utilization at Henry Ford Health Hospitals

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Introduction

- Sugammadex is a widely adopted neuromuscular reversal agent (NMBA) for rocuronium and vecuronium-induced paralysis.
- There is mixed evidence regarding the impact of sugammadex on PACU length of stay and time from NMBA reversal to operating room exit.¹
- Concerns excess usage could lead to higher overall costs with negligible benefits led to an exploration of use at Henry Ford Health (HFH).
- HFH policy indicates neostigmine/glycopyrrolate is the cost-effective standard of care for NMB reversal which is preferred over sugammadex, except in defined situations.
- This medication use evaluation conducted within HFH hospitals aims to:
 - Assess the use of sugammadex in accordance with published policy.
 - Evaluate the cost implications of sugammadex utilization.

Methods

Study Design and Objectives

This was a six-month, retrospective, cohort study conducted at HFH, a system comprised of five hospitals spanning across Southeastern Michigan.

The study objectives were to:

1. Compare and contrast proportions of neuromuscular reversal agent use across the various HFH sites.
2. Determine differences in time between last NMBA dose and first reversal administration.
3. Assess drug costs between use of sugammadex versus neostigmine with glycopyrrolate.

Inclusion Criteria:

- Adult patients ≥ 18 YO who underwent surgical procedures
- Received at least one dose of sugammadex or the combination of neostigmine with glycopyrrolate at HFH from January 2023 - June 2023



Exclusion Criteria:

- Incomplete documentation of preoperative or intraoperative data
- Neuromuscular reversal agent ordered but not administered



Study Design and Objectives

Data was collected from electronic medical records using a standardized case report form. Data collected included patient demographics, HFH hospital location, neuromuscular blocker used, reversal agent used, number of doses, and time to reversal.

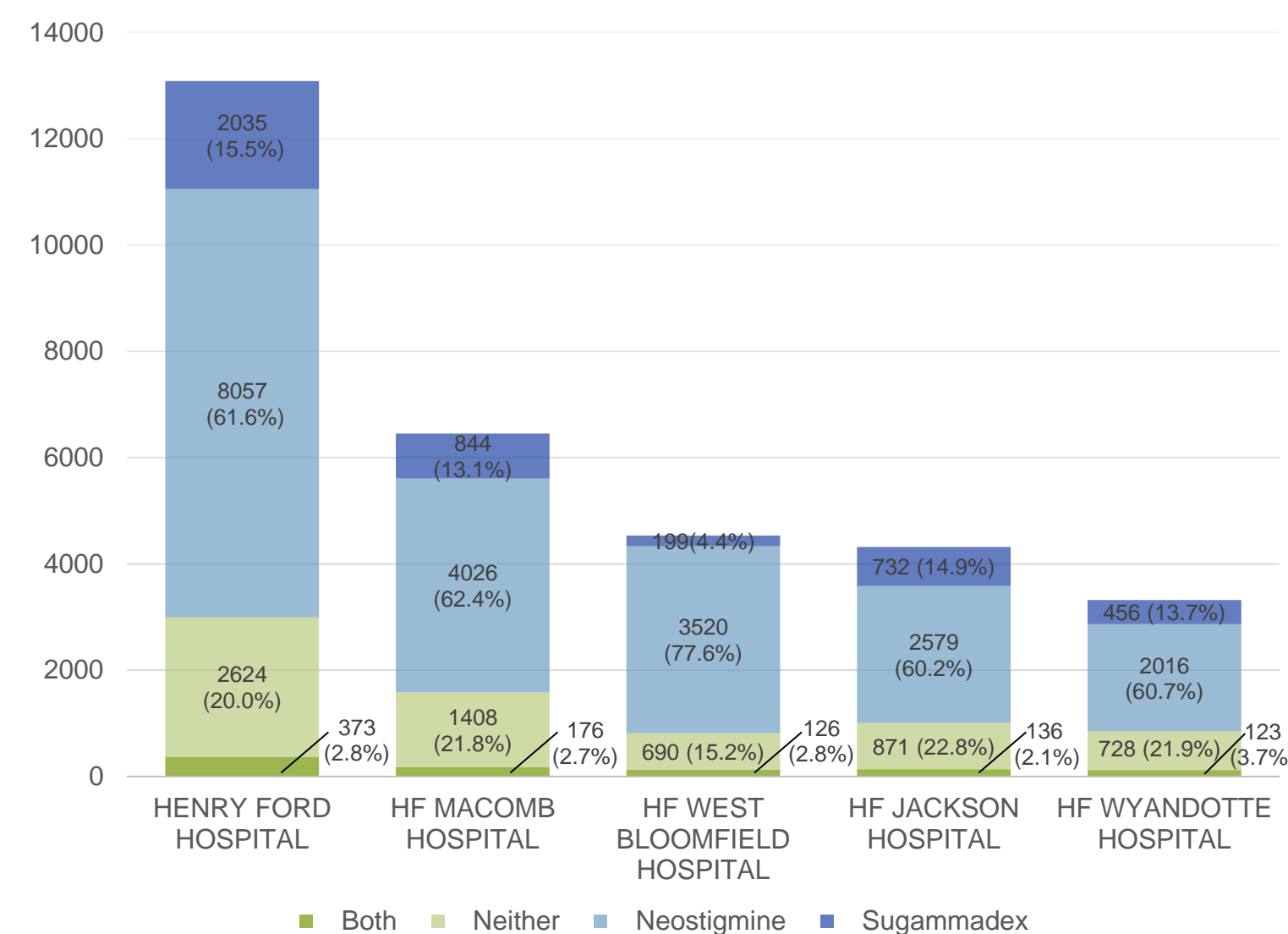
Analysis

A standardized case report form was used to collect data during chart reviews. Descriptive measures were used to describe the total doses of reversal agents at each site as well as proportion of doses used. Time between last paralytic dose and first reversal admin as well as total drug cost was compared using violin plots and box plots, respectively.

Results

Total Use Across Hospitals

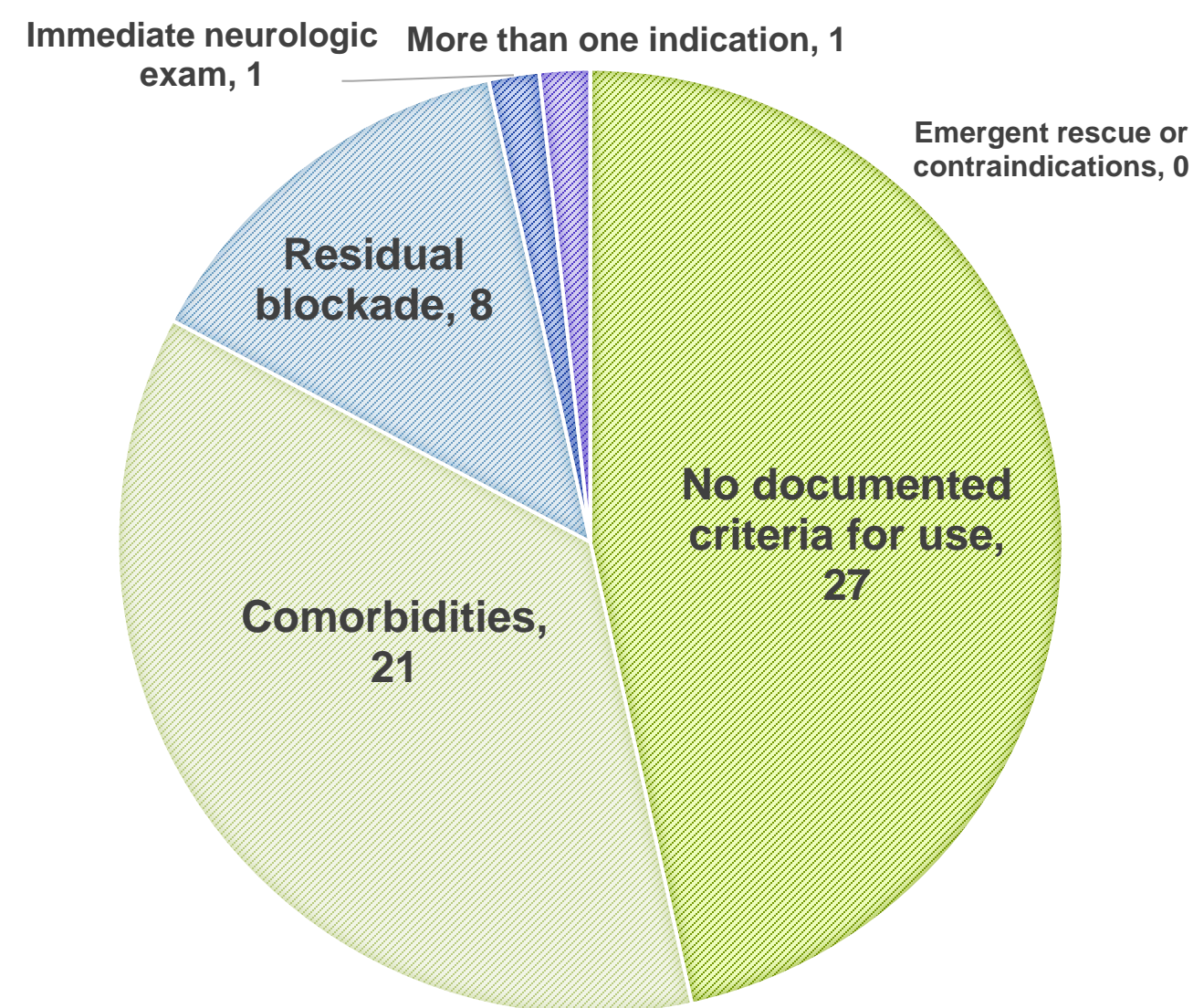
TOTAL DOSES AT HFH HOSPITALS



- 39.0% of total NMBA doses administered were at HF Detroit, 19.5% at Macomb, 13.5% at West Bloomfield (WB), 12.9% at Jackson and 9.9% at Wyandotte (WYN).
- 46.2% of sugammadex administered were at Detroit, 19.2% at Macomb, 4.5% at WB, 16.6% at Jackson, and 10.4% at WYN.
- Highest use of sugammadex: Detroit at 15.5%.
- Lowest use of sugammadex: WB at 4.4%. Other sites ranged from 13.1-14.9%.

Documentation of Criteria for Sugammadex Use

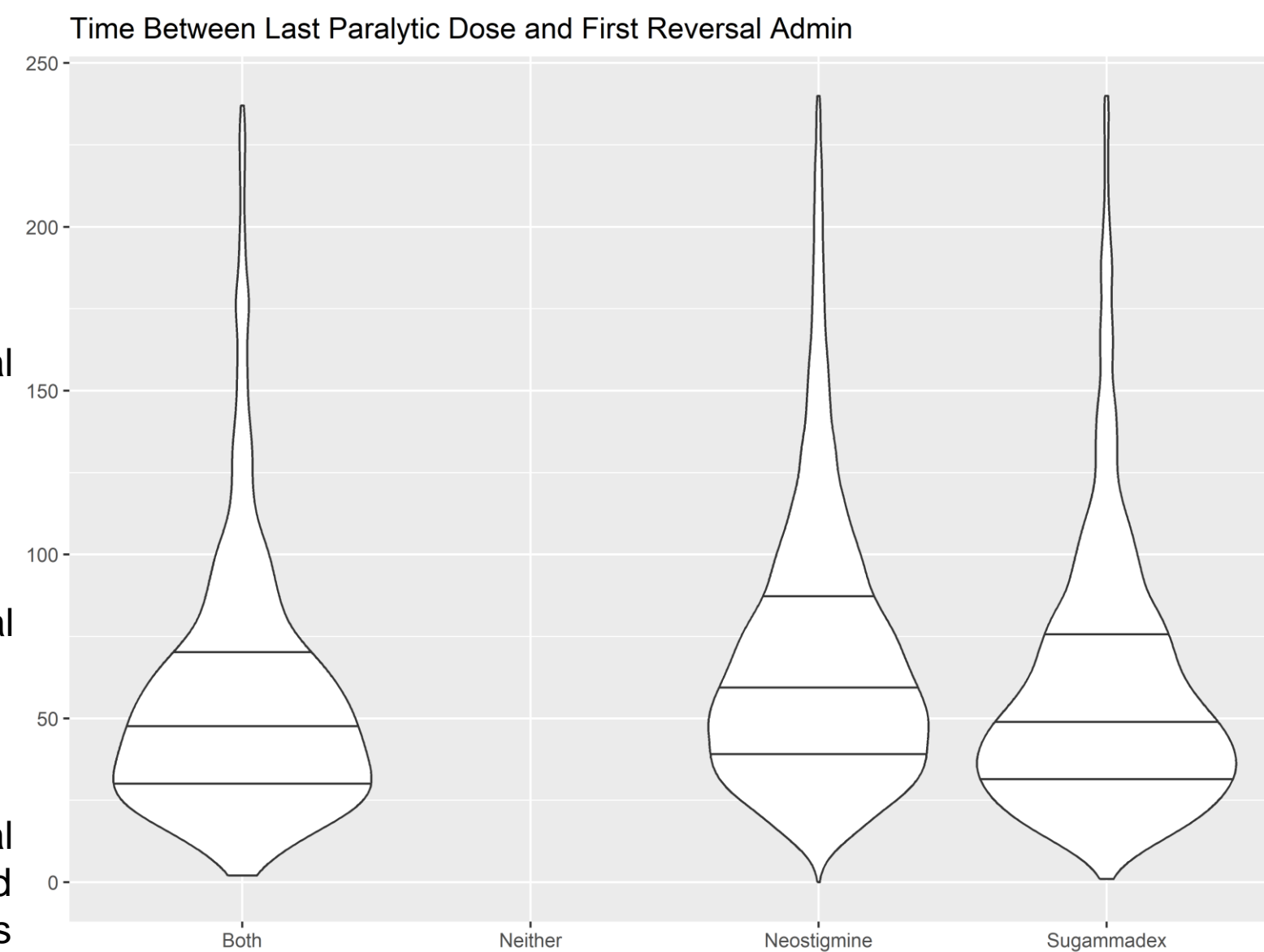
CRITERIA FOR SUGAMMADEX USE



- Sugammadex was used without documented criteria for use in 46.6% (n=27) of cases in the subgroup analysis.
- When sugammadex use was documented, significant co-morbidities including pulmonary disease, neuromuscular disorders, and risk of arrhythmias were found in 67.7% (n=21) of patients
- Other reasons for sugammdex use included incomplete reversal with neostigmine (25.8%, n=8) and need for immediate neurologic exam (3.2%, n=1).

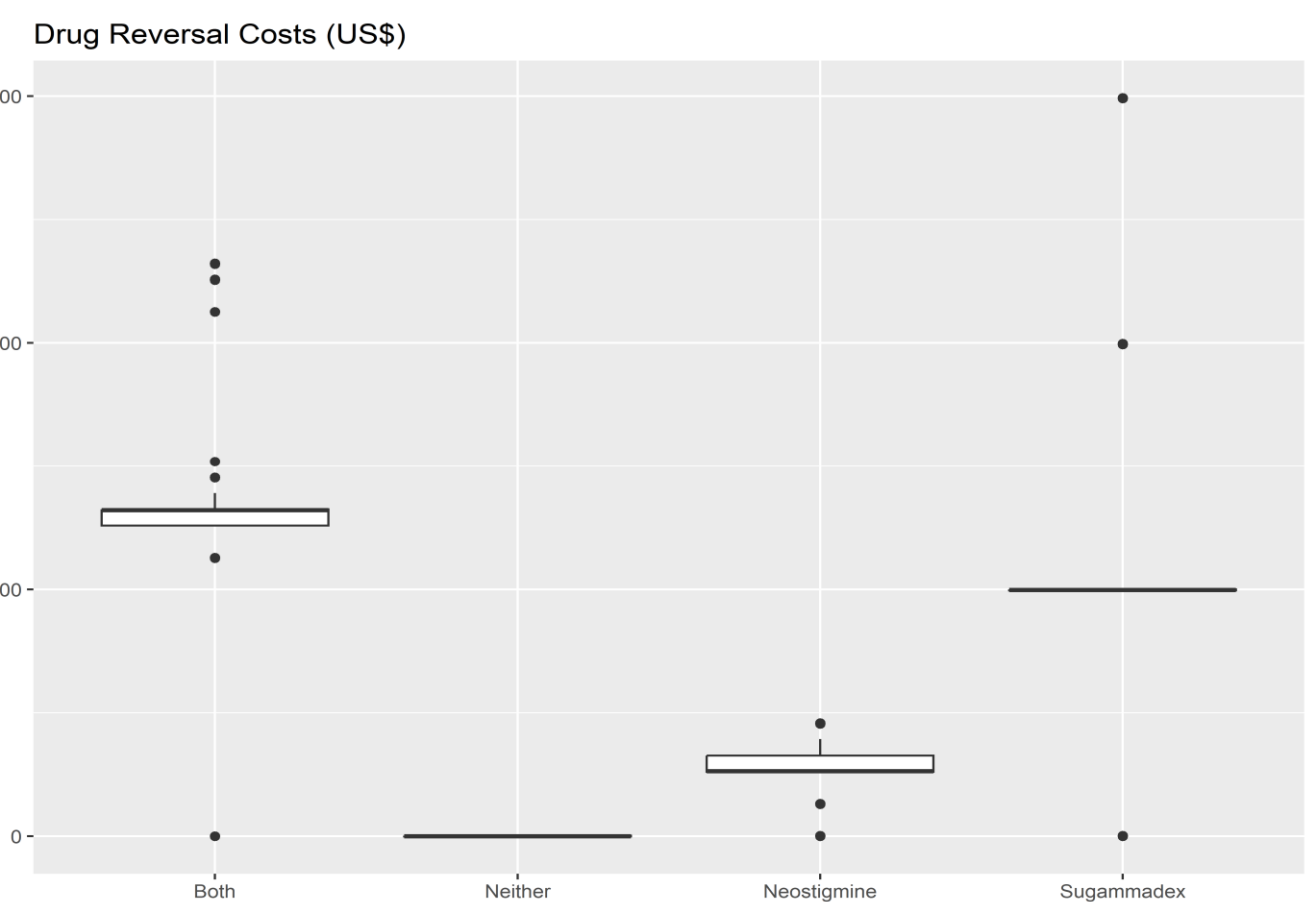
Time Between Last Paralytic Dose and First Reversal Admin

- Average time to last paralytic dose: longest in neostigmine patients, shortest in patients treated with both.
- Average time to reversal was longest at Detroit with 81.24 mins \pm (69.52).
- Shortest time to reversal was at Jackson with 57.07 mins \pm (46.41).
- Average time to reversal at the other sites ranged from 63.43 – 68.09 mins \pm (43.29 - 55.97).



Reversal Drug Cost Comparison

- Highest average cost: patients treated with both (~\$130), lowest in those treated with neostigmine (~\$35).
- Average reversal drug cost was highest at HFMC \$42.36 \pm (49.43), lowest at WB \$30.62 \pm (29.02).
- Average reversal drug cost at other sites ranged from \$34.45 - 39.79 \pm (37.32- 41.98).
- Average difference in cost between sugammadex and neostigmine was ~\$70 per patient.



Summary

- Henry Ford Health Policy indicates neostigmine/glycopyrrolate is the cost-effective standard of care for NMB reversal, unless certain criteria are met for the use of sugammadex.
- Documentation of criteria for use of sugammadex continues to present a challenge.
- Neostigmine presents a real cost savings difference of \$70 per patient over sugammadex.
- Costs increased significantly in cases where both agents were used.