

The effect of intraoperative ephedrine use on postoperative recovery in patients undergoing ambulatory surgery

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INTRODUCTION

BACKGROUND

- Previous studies reported **lower risks of postoperative delirium and nausea and vomiting (PONV)** when **ephedrine** was used intraoperatively for hemodynamic management (1,2)
- In primates, the use of **ephedrine** has been shown to **accelerate psychomotor response and recovery** time following anesthesia (3)

HYPOTHESIS

- We hypothesized that the **administration of ephedrine** during anesthesia for ambulatory surgery was **associated with a shorter time to discharge home**

METHODS

SETTING AND STUDY POPULATION

- 163,000** adult patients who underwent **ambulatory surgery** between 2008 and 2024 at Beth Israel Deaconess Medical Center (*Figure 1*)

EXPOSURE

- Use of ephedrine**, compared to no ephedrine use

OUTCOMES

- Time to discharge home** → Length of stay in post-anesthesia care unit (PACU)
- Risks of hemodynamic instability** → PACU discharge delays due to hemodynamic instability

STATISTICAL ANALYSIS

- Multivariable **negative binomial and logistic regression** analysis **adjusted** for patient and procedural factors, including **type and dose of non-ephedrine vasopressors** and **duration of intraoperative hypotension**

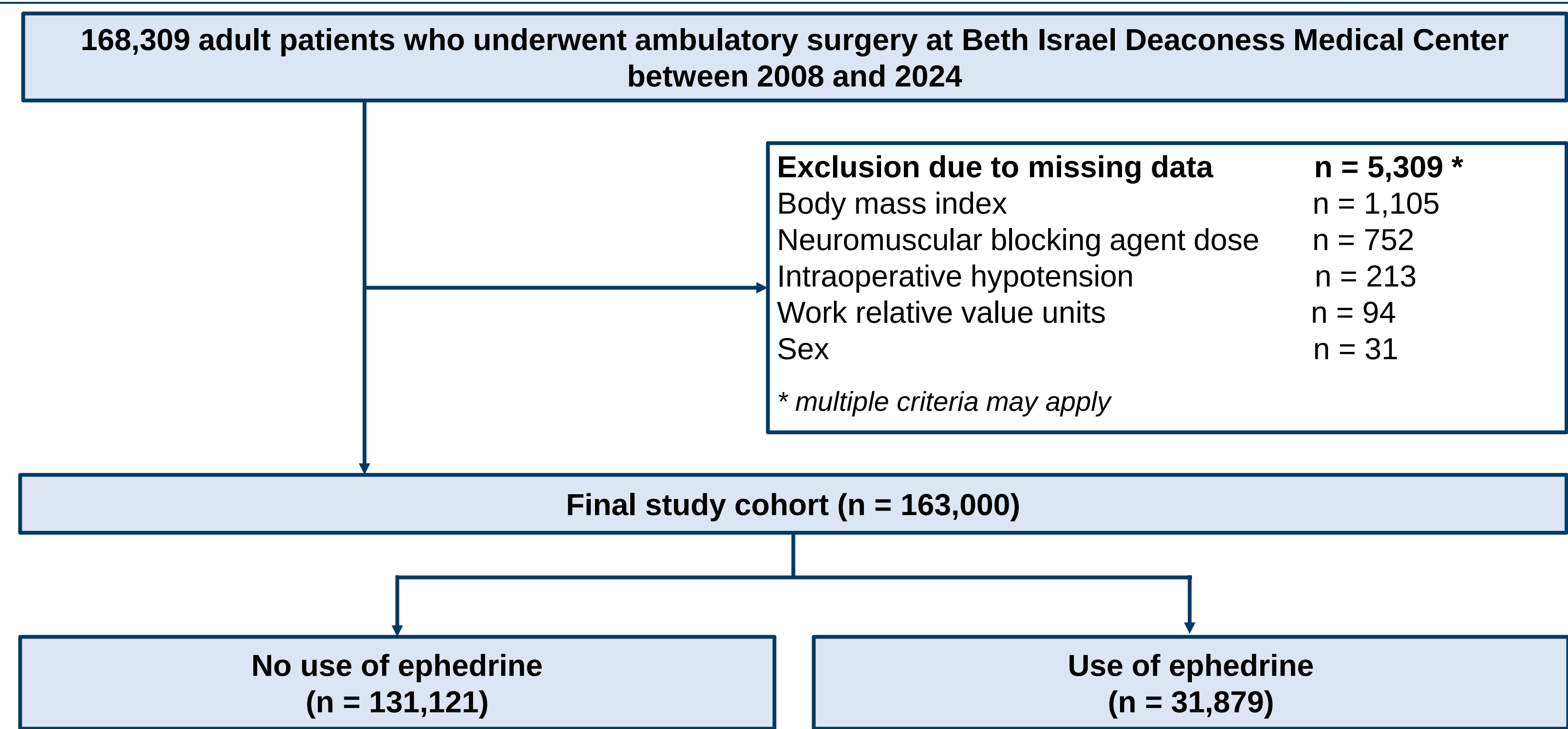


Figure 1. Study flow diagram

RESULTS

- The median postoperative **time to discharge home** was **122 min** (IQR 84 to 170 min)
- Patients who received **ephedrine** had a **5.4 min shorter time to discharge home** (95%CI -6.2 to -4.6 min; p<0.001; *Figure 2A*)
- This association was **magnified**:
 - if ephedrine was **administered within 15 minutes before the end** of the case (-7.3 min; 95%CI -10.0 to -4.6; p<0.001; *Figure 2B*)
 - if **patients required any vasopressor** during surgery (-7.8 min; 95%CI -9.2 to -6.3; p<0.001; *Figure 2C*)
 - if **patients underwent general anesthesia** (-7.8 min; 95%CI -8.8 to -6.8; p<0.001; *Figure 2D*)
- Ephedrine** was associated with a **lower risk of discharge delays due to hemodynamic instability** (adjusted risk difference -1.1%; 95%CI -1.9 to -0.3%; p=0.005)

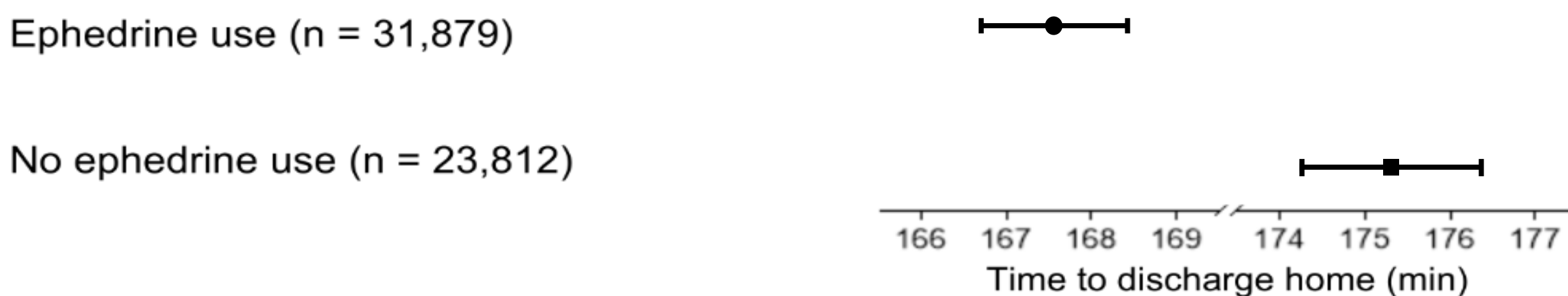
A) Ephedrine and postoperative recovery



B) Late ephedrine administration



C) Patients receiving vasopressors



D) Patients undergoing general anesthesia

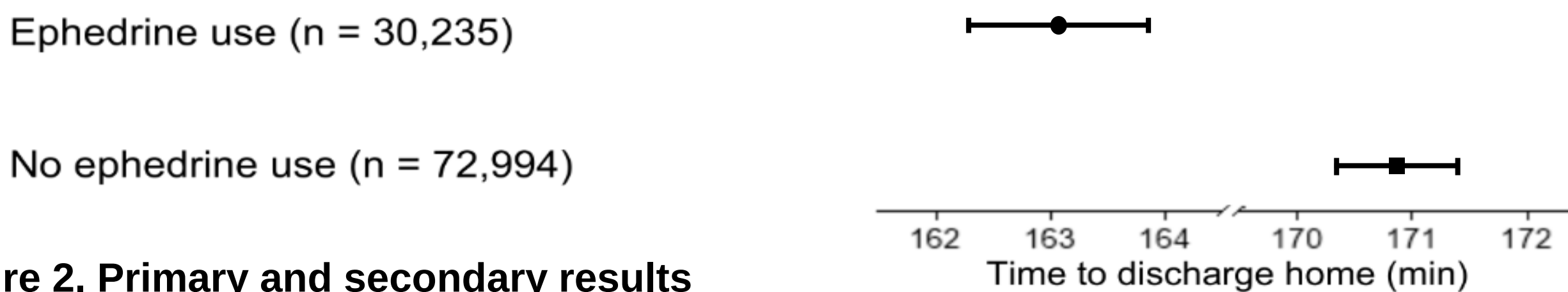


Figure 2. Primary and secondary results

CONCLUSION

- Shorter time to discharge home** in patients receiving ephedrine
- Magnified improvement in recovery profile** with late administration and if patients **require any vasopressor** or undergo **general anesthesia** for ambulatory surgery

	No ephedrine use (n = 131,121)	Ephedrine use (n = 31,879)	Max. absolute standardized difference
Patient demographics and comorbidities			
Age, years	53 (39–65)	59 (48–68)	0.336
Sex, female	79,997 (61.0%)	18,961 (59.5%)	0.031
Body mass index, kg/m ²	26.9 (23.6–31.2)	26.5 (23.4–30.6)	0.076
Elixhauser comorbidity score	0 (0–7)	3 (0–10)	0.112
ASA physical status	2 (2–3)	2 (2–3)	0.095
Apfel score	2 (1–3)	2 (1–3)	0.045
Procedural characteristics			
Surgical service			0.649
Ear, nose, and throat	6,696 (5.1%)	2,310 (7.2%)	
General surgery	18,159 (13.8%)	5,415 (17.0%)	
Gynecology	18,321 (14.0%)	3,556 (11.2%)	
Neurosurgery	1,504 (1.1%)	660 (2.1%)	
Orthopedics	28,980 (22.1%)	6,105 (19.2%)	
Plastic surgery	8,066 (6.2%)	4,029 (12.6%)	
Surgical Oncology	6,953 (5.3%)	2,589 (8.1%)	
Urology	9,979 (7.6%)	3,485 (10.9%)	
Vascular	2,478 (1.9%)	555 (1.7%)	
Other	29,985 (22.9%)	3,175 (10.0%)	
Duration of surgery, minutes	69 (46–104)	106 (77–145)	0.832
Work relative units	7.0 (4.6–10.2)	8.2 (5.8–12.4)	0.381
NMBA dose, ED ₉₅	0.0 (0.0–0.6)	0.0 (0.0–2.2)	0.394
Minutes with MAP below 55 mmHg	0 (0–0)	1 (0–4)	0.829
Use of non-ephedrine vasopressors	23,812 (18.2%)	16,805 (52.7%)	0.783
Phenylephrine dose, mcg	0 (0–0)	0 (100–400)	0.351
Age-adjusted mean alveolar concentration	0.6 (0.0–1.0)	0.9 (0.8–1.1)	0.835
Opioid dose, mg oral morphine equivalents	17.0 (6.2–31.2)	25.0 (17.0–43.8)	0.327

Data are presented as frequency (prevalence in percent) or median (interquartile range). *Abbreviations:* ASA, American Society of Anesthesiologists; NMBA, Neuromuscular blocking agent; ED₉₅, effective dose required to achieve a 95% twitch reduction; MAP, Mean arterial pressure.

Table 1. Patient characteristics and distribution of variables

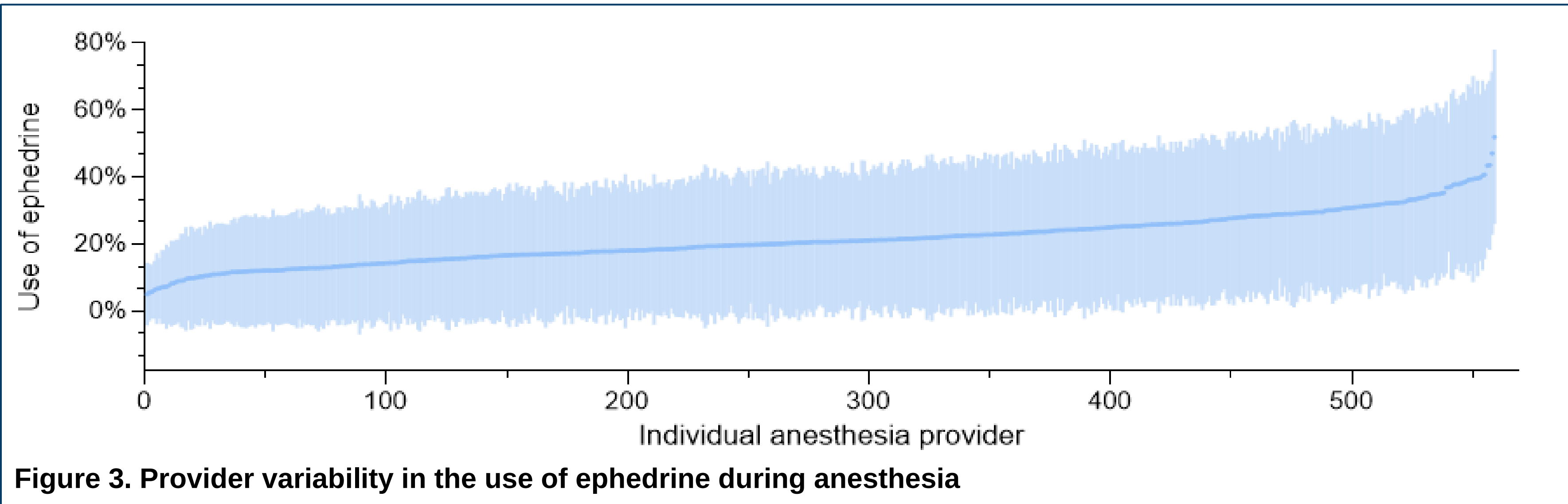


Figure 3. Provider variability in the use of ephedrine during anesthesia

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