

ELECTROMAGNETIC NAVIGATION BRONCHOSCOPY VERSUS SHAPE-SENSING ROBOTIC-ASSISTED BRONCHOSCOPY LUNG NAVIGATION PLATFORMS – A COST-MINIMIZATION ANALYSIS

T. Münch,¹ R. Saunders,¹ E. Villas,² D. Harrel,³ D. Chamber,³ R. Holladay³

(1) Coreva Scientific GmbH & Co KG, Koenigswinter, NRW, Germany (2) Medtronic, Minneapolis, MN, USA, (3) Louisiana State University Health Sciences Center, Shreveport, LA, USA

OBJECTIVE

- Lung navigation platforms offer advanced approaches to improve the diagnostic yield of biopsy of peripheral lung lesions.
- Two such approaches are digital tomosynthesis-corrected electromagnetic navigation bronchoscopy (DT-ENB) and shape-sensing robotic-assisted bronchoscopy (ssRAB).
- A recent publication found the clinical and safety outcomes of DT-ENB and ssRAB to not be statistically different.¹
- A cost-minimization analysis may help to inform the decision making of hospitals regarding the ownership of DT-ENB and ssRAB platforms.

METHODS

- The costs of ownership were compared between one DT-ENB (ILLUMISITE™ fluoroscopic navigation platform, Medtronic Inc) and one ssRAB (Ion™ endoluminal system, Intuitive Inc).
- Resource requirements and usage were based on clinical practice at Louisiana State University Health Sciences Center, Shreveport, which has both DT-ENB and ssRAB systems in use.

Tab. 1 Key cost data

	DT-ENB	ssRAB
Procedure kit/catheter	\$1,498 ^a	\$1,000 ^{b,c}
Catheter guide sheath	n/a	\$40 ^{b,c}
Needle	\$220 ^a	\$250 ^{b,c}
Forceps	\$111 ^a	\$26 ^b
Brush	\$35 ^a	\$16 ^b
Bronchoscope adapter	\$86 ^a	n/a
Swivel connector	n/a	\$130 ^{b,c}
Vision probe	n/a	\$427 ^{b,c}
Vision probe adapter + bag	n/a	\$50 ^{b,c}
Reprocessing kit accessories	n/a	\$225 ^b
Reprocessing kit consumables	n/a	\$21 ^b
Reprocessing costs	\$63 ²	\$125 ²
Radial EBUS probe + driver	\$50 ^a	\$50 ^b
Patient sensor patches	\$14 ^a	n/a
Total direct cost per procedure	\$2,077	\$2,360

DT-ENB: Digital tomosynthesis-corrected electromagnetic navigation bronchoscopy; ssRAB: shape-sensing robotic-assisted bronchoscopy, a) list prices on file with Medtronic; b) Louisiana State University Health Sciences Center, Shreveport, LA, USA provided by authors RH, DH, & DC; c) IQVIA costing report, Medtronic data on file

- Costs for capital purchase, per procedure, and resource reprocessing were obtained from: Louisiana State University Health Sciences Center, the product manufacturer, and industry reports.
- If multiple sources for costs were identified, the average cost was taken as the input.
- Costs per procedure were obtained from a teaching hospital in Louisiana and from list pricing. (**Tab. 1**)

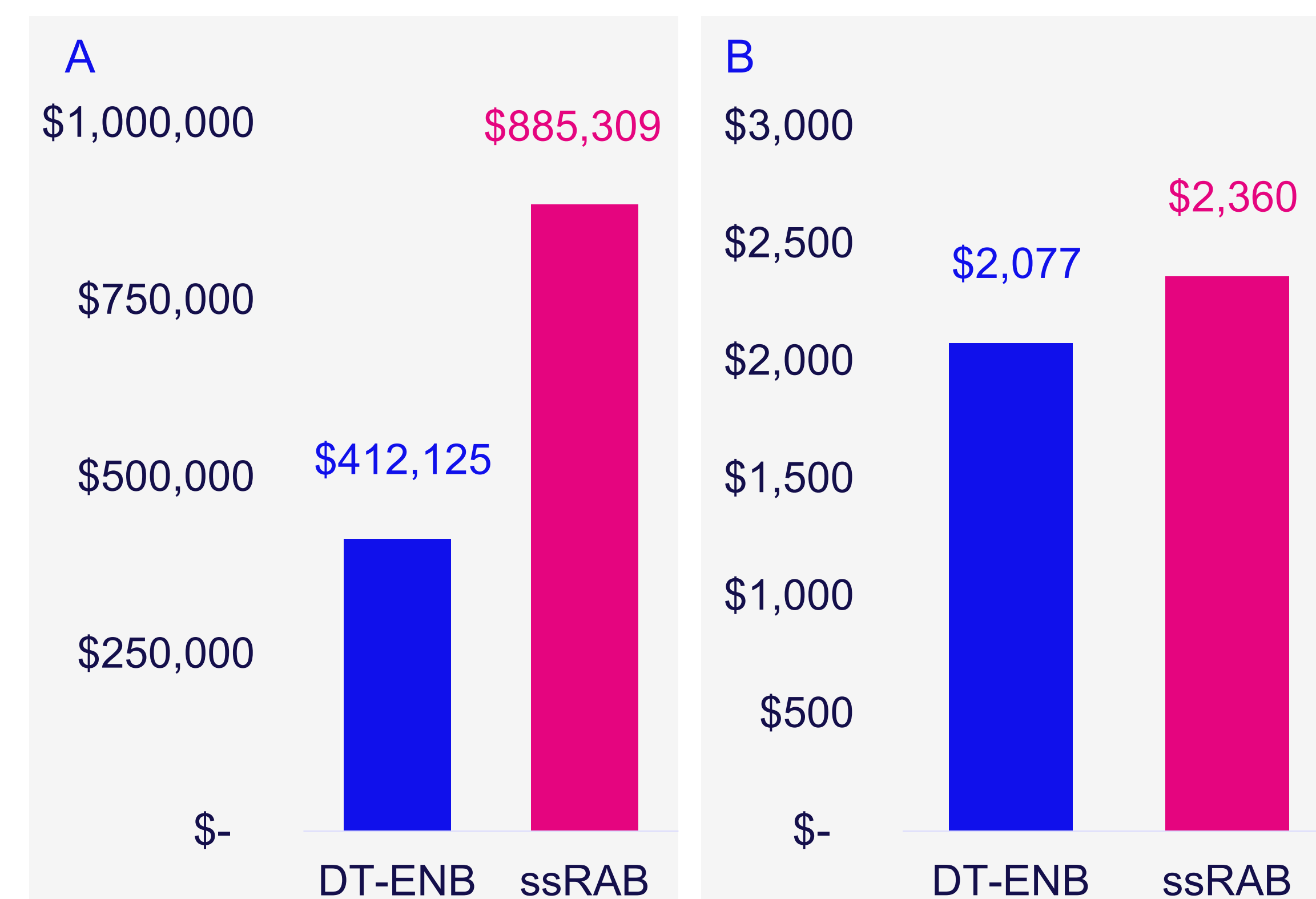


Fig. 1 A) Fixed costs B) Variable costs per procedure

DT-ENB: Digital tomosynthesis-corrected electromagnetic navigation bronchoscopy; ssRAB: shape-sensing robotic-assisted bronchoscopy

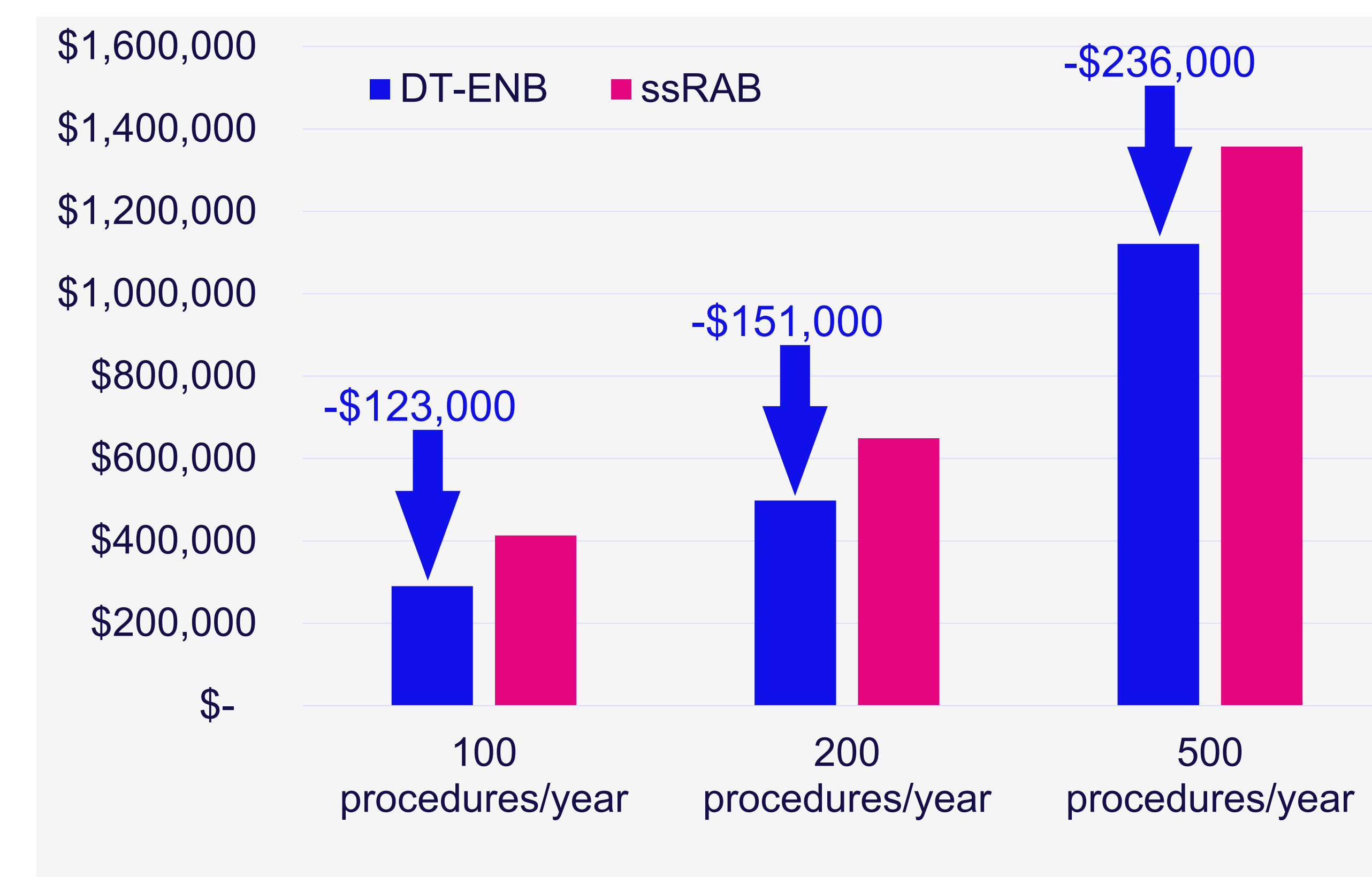


Fig. 2 Yearly cost for different levels of procedures per year

DT-ENB: Digital tomosynthesis-corrected electromagnetic navigation bronchoscopy; ssRAB: shape-sensing robotic-assisted bronchoscopy

CONCLUSION

- Lower capital and operating costs make DT-ENB technology a lower cost option compared to ssRAB.
- As list pricing is rarely the final price paid by the hospital for capital purchases, price offering options should be considered when making an ownership decision for a lung navigation platform.
- Since reimbursement is the same for DT-ENB and ssRAB aided biopsy, the difference in acquisition, utilization and reprocessing costs is likely an important factor for the ownership decision.

- The total capital cost for both platforms were \$281,625 (DT-ENB) and \$632,749 (ssRAB) respectively.

- Costs are presented in 2023 USD and considered over a 5-year time horizon.

RESULTS

- Fixed costs including the capital system and the annual service plan differed among the platforms from \$281,625 for DT-ENB to \$632,749 for ssRAB. (**Fig. 1A**)

- Variable costs consisting of procedural, consumable, and reprocessing costs were comparable between the platforms, resulting in \$2,077 (DT-ENB) and \$2,360 (ssRAB) per procedure. (**Fig. 1B**)

- Considering a 5-year time horizon and 100 procedures per year, DT-ENB was found to have lower costs of ownership, saving \$614,761 (\$436,956-\$757,118) compared to the ssRAB lung navigation platform.

- Savings vary depending on the volume of procedures, an increase of procedures per year results may increase the benefits of DT-ENB. (**Fig. 2**)

References

1. Low et al. Shape-Sensing Robotic-Assisted Bronchoscopy vs Digital Tomosynthesis-Corrected Electromagnetic Navigation Bronchoscopy: A Comparative Cohort Study of Diagnostic Performance. *Chest*. 2023 Apr;163(4):977-984.
2. Andersen et al. The Cost of Flexible Bronchoscopes: A Systematic Review and Meta-analysis. *Pharmacoecoen Open*. 2022 Nov;6(6):787-797.

Disclosure

TM is an employee and RS is the owner of Coreva Scientific GmbH & Co KG, all of whom received consultancy fees for this research. EV is an employee of Medtronic. DH, DC, and RH declare no conflict of interest. The research was funded by Medtronic