New Finding on the Cost-Effectiveness of Robotic-Assisted Lobectomy for Non-Small Cell Lung Cancer

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OBJECTIVE

We aim to evaluate the long-term cost-effectiveness of robotic-

METHOD

- UK NHS perspective with 5- and 10-year time horizons 0
- Partition survival model developed in TreeAge, with survival 0





assisted lobectomy (RAL) vs videoassisted thoracoscopy (VATS) among patients with non-smallcell lung cancer (NSCLC)

data extracted and extrapolated from curves reported by Kneuertz et al, 2020

- Cost data leveraged from Wales HTA report and included perioperative, long-term health states and capital costs; all inflated to 2024 currency
- First-year health utility data from RAVAL trial by Patel et al 0

KEY MODEL INPUTS

Best fit parametric curves of reported survival data from Kneuertz 2020

			<u>*</u>	Log Normal	2 - 5	Rest Fitting Die	strubition	
	RAL	VATS		- Open	α α	— Op	en	
Capital cost	£536	£20		Robotic	9.	VA 	botic	
Consumable cost	£2,879	£2,091	0.4 D	irall Su	4			
Staff cost	£1,649	£1,543	o.2	O V	2			
Postoperative cost	£6,349				0.0			
Annual cost – Disease-free	£4,320 £6,821 0.794		0 12 24 36 48 60 72 8 Time (Months)	34 96 120	0 12 24 36 48 60 72 84 96		120	
Annual cost - Progressed			0.9 0.88			Time (Months)		
Health utility – Disease-free			1st-year health0.860.840.840.82	0.84 0.84	0.85 0.85 0.84			
Health utility – Progressed	0	.678	0.8 0.8 RAVAL trial 0.78 0.76 0.76	0.82 0.78 0.78	0.78 - RAS 0.79 - VATS 0.78			
RESULTS			0.74 0.72 0.7	0.74 Baseline 3 weeks 7 weeks	0.71 12 weeks 6 mon	ths 12 months	ICER	
in all scenarios,			Senario	Intervention	QALY	COST	(R vs V)	
 RAL had higher (i.e., 11% to 26%) QALY than VATS 		Base case (5-year time horizon with survival data from Kneuertz 2020)		ta RAL	3.46	£30,687	£5,586	
				VATS	2.96	£27,894		
 RAL had higher (i.e., 6% to 14%) total cost than VATS 		5-year time horizon with year 1 survival from Kneuertz 2020 and fixed HRs reported from RECOURSE meta-analysis for year 2-5		RAL	3.18	£28,930	£4,902	
				VATS	2.86	£27,362		
 ICERs are around £5K per 10-year time hor 			rizon with extrapolated surviva	I RAL	4.37	£38,036		





QALY and below
conventional thresholds of
£20-30K/QALY

data from Kneuertz 2020

Note: RECOURSE found favorable hazard ratio (HR) of robotic over thoracoscopic surgery; HR = 0.74 (0.59, 0.93) for disease-free survival, and HR = 0.86 (0.73, 1.02) for overall survival.

VATS

CONCLUSIONS

 Robotic-assisted lobectomy is cost-effective when compared to VATS, with ICERs well below conventional willingness-to-pay threshold in various scenarios

 Favorable oncological outcomes and quality-of-life are the key drivers of the finding

REFERENCES

3.75

Kneuertz, Peter J et al. "Long-Term Oncologic Outcomes After Robotic Lobectomy for Early-stage Non-Small-cell Lung Cancer Versus Video-assisted Thoracoscopic and Open Thoracotomy Approach." Clinical lung cancer vol. 21,3 (2020): 214-224.e2.

£33,221

£4,913

Leitao, Mario M Jr et al. "The RECOURSE Study: Long-term Oncologic Outcomes Associated With Robotically Assisted Minimally Invasive Procedures for Endometrial, Cervical, Colorectal, Lung, or Prostate Cancer: A Systematic Review and Meta-analysis." Annals of surgery vol. 277,3 (2023): 387-396

Patel, Yogita S et al. "Robotic Lobectomy Is Cost-effective and Provides Comparable Health Utility Scores to Video-assisted Lobectomy: Early Results of the RAVAL Trial." Annals of surgery vol. 278,6 (2023): 841-849.