

	Model 1	Model 2	Model 3
Observations	4,341	4,341	4,164
Age ≥70	0.91 (0.097)	0.91 (0.087)	0.87 (0.096)
Female gender	0.90 (0.11)	0.90 (0.14)	0.91 (0.12)
Preoperative neoadjuvant	1.32 (0.31)	1.32 (0.28)	1.68** (0.43)
FEV1 %	0.99*** (0.003)	0.99** (0.003)	0.99* (0.003)
DLCO %	1.00 (0.003)	1.00 (0.004)	1.00 (0.003)
Clinical nodal involvement	1.42** (0.21)	1.42** (0.24)	1.71*** (0.27)
Clinical Stage I	0.62*** (0.066)	0.62*** (0.066)	0.57*** (0.065)
Packages per year	1.00** (0.001)	1.00** (0.001)	1.00** (0.001)
Right lung	0.93 (0.097)	0.93 (0.12)	0.91 (0.099)
Previous cancer-related surgery	0.94 (0.11)	0.94 (0.11)	0.93 (0.12)
COPD	1.18 (0.14)	1.12 (0.17)	1.19 (0.16)
Healthcare centre dummy	NO	NO	YES
Pseudo R2	0.023	0.023	0.098

*** p<0.01, ** p<0.05, * p<0.1

Supplemental Table S1. Analysis of the impact of cluster correlation at the healthcare centre level. Multivariable logistic regression estimates are expressed in odds ratios. Dependent variable: 1 = conversion to open surgery, 0 = otherwise. Model 1 does not account for cluster correlation at the

healthcare centre level (i.e., standard errors were computed), model 2 computes standard errors corrected for cluster correlation at the healthcare centre level, and model 3 features standard errors and healthcare centre dummy variables.

Variable	VATS No. = 10,698 (90.9%)	Converted No. = 1,074 (9.1%)	<i>p-value</i>
Major			
• Prolonged mechanical ventilation	48 (0.5%)	13 (1.2%)	0.001
• Postoperative ICU	417 (4.0%)	70 (6.5%)	<0.001
Cardiovascular			
• Atrial fibrillation	668 (6.2%)	118 (11.0%)	<0.001
• Myocardial ischemia and infarction	21 (0.2%)	6 (0.6%)	0.018
• Stroke	25 (0.2%)	4 (0.4%)	0.382
Acute cardiovascular			
• Acute peripheral arterial thromboembolism	10 (0.1%)	2 (0.2%)	0.364
• Cardiac arrest	9 (0.1%)	5 (0.5%)	0.001
Pulmonary			
• Prolonged air leak	858 (8.0%)	116 (10.8%)	0.002
• Pulmonary embolism	14 (0.1%)	4 (0.4%)	0.053
• ARDS	36 (0.3%)	12 (1.1%)	<0.001
• Persistent pleural space	301 (2.8%)	32 (3.0%)	0.755
• Pneumonia	317 (3.0%)	63 (6.0%)	<0.001
• Mechanical ventilation	36 (0.3%)	18 (1.7%)	<0.001
• Middle lobe torsion	9 (0.1%)	1 (0.1%)	0.923
• Atelectasis	186 (1.7%)	40 (3.7%)	<0.001
• Sputum retention	241 (2.3%)	45 (4.2%)	<0.001
Surgical			
• Haemothorax	127 (1.2%)	19 (1.8%)	0.100
• Bronchopleural fistula	19 (0.2%)	6 (0.6%)	0.010
• Chylothorax	37 (0.4%)	2 (0.2%)	0.385
• Phrenic nerve injury/palsy	15 (0.1%)	2 (0.2%)	0.705
• Recurrent laryngeal nerve palsy/dysphonia	62 (0.6%)	13 (1.2%)	0.013
• Blood transfusion	175 (0.7%)	70 (6.5%)	<0.001
Renal			

• Acute renal failure	50 (0.5%)	16 (1.5%)	<0.001
• Urinary tract infection	62 (0.6%)	4 (0.4%)	0.386
• Dialysis	8 (0.1%)	1 (0.1%)	0.836
Gastrointestinal			
• Diarrhoea	24 (0.2%)	7 (0.7%)	0.009
• Pancreatitis	5 (0.0%)	1 (0.1%)	0.521
• Intestinal infarction	4 (0.0%)	0 (0.0%)	0.526
• Acute abdomen bowel obstruction	21 (0.2%)	5 (0.5%)	0.073

Supplemental Table S2. Complications in detail between non-converted and converted cases. P-value from χ^2 test reported. ARDS = adult respiratory distress syndrome; ICU = intensive care unit.

Variable	ρ	p -value
Atrial fibrillation	0.055	<0.001
Myocardial ischemia and infarction	0.022	0.018
Stroke, ictus	0.008	0.38
Acute peripheral arterial thromboembolism	0.008	0.36
Cardiac arrest	0.032	0.001
Prolonged air leak	0.029	0.002
Pulmonary embolism	0.018	0.053
ARDS	0.035	<0.001
Persistent pleural space	0.003	0.76
Pneumonia	0.047	<0.001
Mechanical ventilation	0.057	<0.001
Middle lobe torsion	0.001	0.92
Atelectasis	0.042	<0.001
Sputum retention	0.036	<0.001
Haemothorax	0.015	0.10
Bronchopleural fistula	0.024	0.01
Chylothorax	-0.008	0.39
Phrenic nerve injury/palsy	0.004	0.71
Recurrent laryngeal nerve palsy/dysphonia	0.023	0.013
Blood transfusion	0.099	<0.001
Acute renal failure	0.039	<0.001
Urinary tract infection	-0.008	0.39
Dialysis	0.002	0.84
Diarrhoea	0.024	0.009
Pancreatitis	0.006	0.52
Intestinal infarction	-0.006	0.53
Acute abdomen bowel obstruction	0.017	0.073
Prolonged mechanical ventilation	0.031	0.001
Postoperative ICU	0.038	<0.001

Supplemental Table S3. Spearman correlation test between conversion and complications in detail.

ARDS = adult respiratory distress syndrome; ICU = intensive care unit.

Logistic regression									Tobit regression			
Models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Conversion to thoracotomy				≥1 postoperative complication				EuroQoL-5D score at discharge			
Observations	6,363	4,341	4,341	4,164	6,363	4,341	4,341	4,340	6,348	4,330	4,330	4,330
>50 VATS lobectomies	0.78***	0.84*	0.84	0.92	0.89*	0.94	0.94	1.12	0.048***	0.057***	0.057*	0.031**
	(0.07)	(0.088)	(0.17)	(0.13)	(0.053)	(0.066)	(0.11)	(0.10)	(0.009)	(0.011)	(0.034)	(0.012)
Age		1.00	1.00	0.99		1.02***	1.02***	1.02***		-0.002***	-0.002**	-0.002***
		(0.006)	(0.006)	(0.006)		(0.004)	(0.005)	(0.005)		(0.001)	(0.001)	(0.001)
Female gender		0.90	0.90	0.90		0.80***	0.80**	0.77***		-0.044***	-0.044***	-0.048***
		(0.11)	(0.13)	(0.12)		(0.066)	(0.07)	(0.067)		(0.013)	(0.015)	(0.011)
BMI		1.00	1.00	1.00		1.00	1.00	1.000		0.001***	0.001***	0.000***
		(0.001)	(0.002)	(0.001)		(0.001)	(0.002)	(0.001)		(0.000)	(0.000)	(0.000)
Packages per year		1.00**	1.00**	1.00**		1.00	1.00	1.000		-0.000**	-0.000***	-0.000**
		(0.001)	(0.001)	(0.001)		(0.000)	(0.000)	(0.001)		(0.000)	(0.000)	(0.000)
Preoperative neoadjuvant		1.38	1.38	1.76**		1.01	1.01	0.94		0.006	0.006	-0.008
		(0.33)	(0.30)	(0.45)		(0.19)	(0.21)	(0.18)		(0.03)	(0.026)	(0.027)
FEV1 %		0.99***	0.99**	0.99**		0.99***	0.99***	0.99***		0.000	0.000	0.001***
		(0.003)	(0.003)	(0.003)		(0.002)	(0.002)	(0.002)		(0.000)	(0.000)	(0.000)
DLCO %		1.00	1.00	1.00		0.99***	0.99**	0.99***		0.001***	0.001**	0.002***

		(0.003)	(0.004)	(0.003)		(0.002)	(0.003)	(0.002)		(0.000)	(0.001)	(0.000)
Right lung		0.93	0.93	0.91		1.04	1.04	1.04		-0.006	-0.006	-0.008
		(0.097)	(0.12)	(0.099)		(0.073)	(0.062)	(0.076)		(0.011)	(0.009)	(0.010)
Metastasis		0.64	0.64	0.54		0.61	0.61	0.49*		-0.071	-0.071	-0.061
		(0.34)	(0.34)	(0.30)		(0.21)	(0.21)	(0.18)		(0.049)	(0.073)	(0.045)
Previous cancer-related surgery		0.93	0.93	0.93		1.07	1.07	1.02		0.000	0.000	0.000
		(0.11)	(0.11)	(0.12)		(0.082)	(0.086)	(0.083)		(0.012)	(0.019)	(0.011)
Cardiac disease		0.93	0.93	0.95		1.32***	1.32**	1.42***		-0.017	-0.017	-0.047***
		(0.14)	(0.15)	(0.15)		(0.12)	(0.19)	(0.14)		(0.016)	(0.021)	(0.014)
COPD		1.18	1.18	1.20		1.50***	1.50***	1.47***		-0.050***	-0.050	-0.013
		(0.14)	(0.17)	(0.16)		(0.11)	(0.20)	(0.13)		(0.012)	(0.031)	(0.012)
Diabetes		0.87	0.87	0.90		1.05	1.05	1.04		-0.022	-0.022*	-0.026*
		(0.13)	(0.13)	(0.14)		(0.099)	(0.11)	(0.10)		(0.015)	(0.013)	(0.014)
Connective tissue disease		0.88	0.88	0.99		1.11	1.11	0.93		-0.004	-0.004	0.020
		(0.32)	(0.30)	(0.37)		(0.25)	(0.23)	(0.22)		(0.035)	(0.047)	(0.032)
Chronic kidney disease		1.21	1.21	1.10		2.40***	2.40***	2.17***		-0.12***	-0.12***	-0.053**
		(0.32)	(0.32)	(0.31)		(0.41)	(0.41)	(0.40)		(0.028)	(0.038)	(0.025)
Upper lobe		0.95	0.95	0.98		1.20***	1.20***	1.25***		-0.033***	-0.033***	-0.023**
		(0.099)	(0.11)	(0.11)		(0.084)	(0.078)	(0.092)		(0.011)	(0.012)	(0.010)

Clinical nodal involvement		1.42**	1.42**	1.71***		1.28**	1.28**	1.22*		-0.026	-0.026	-0.014
		(0.21)	(0.24)	(0.27)		(0.14)	(0.16)	(0.14)		(0.017)	(0.021)	(0.016)
Clinical stage I		0.62***	0.624***	0.57***		0.82***	0.82***	0.85**		0.022*	0.022	0.022**
		(0.067)	(0.067)	(0.065)		(0.060)	(0.053)	(0.066)		(0.012)	(0.018)	(0.011)
Healthcare centre dummy	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES
Pseudo R2	0.002	0.025	0.025	0.099	0.001	0.042	0.042	0.11	0.004	0.035	0.035	0.308

*** p<0.01, ** p<0.05, * p<0.1

Supplemental Table S4. Logistic (1-8) and Tobit (9-12) regressions. All models feature standard errors except for models 3, 7, and 11, where standard errors are corrected for cluster correlation at the healthcare centre level.