

Uptake of Minimally Invasive Surgery and Stereotactic Body Radiation Therapy for Early-Stage Non-Small Cell Lung Cancer in the United States: an Ecological Study of Secular Trends Using the National Cancer Database

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Online Supplement

Supplementary Methods

Deriving surgical extent variable.

Original code RX_SUMM_ SURG_PRIM_SITE	Meaning	Recode
0	None; no surgery of primary site; autopsy ONLY	No surgery
20	Excision or resection of less than one lobe, NOS	Sublobar resection
21	Wedge resection	Sublobar resection
22	Segmental resection, including lingulectomy	Sublobar resection
23	Excision, NOS	Sublobar resection
24	Laser excision	Sublobar resection
25	Bronchial sleeve resection ONLY	Sublobar resection
30	Resection of lobe or bilobectomy, but less than the whole lung (partial pneumonectomy, NOS)	Lobectomy or bilobectomy
33	Lobectomy WITH mediastinal lymph node dissection	Lobectomy or bilobectomy
45	Lobe or bilobectomy extended, NOS	Lobectomy or bilobectomy
46	WITH chest wall	Lobectomy or bilobectomy
47	WITH pericardium	Lobectomy or bilobectomy
48	WITH diaphragm	Lobectomy or bilobectomy
55	Pneumonectomy, NOS	Pneumonectomy
56	WITH mediastinal lymph node dissection (radical pneumonectomy)	Pneumonectomy

65	Extended pneumonectomy	Pneumonectomy
66	Extended pneumonectomy plus pleura or diaphragm	Pneumonectomy
70	Extended radical pneumonectomy	Pneumonectomy
12	Laser ablation or cryosurgery	Other
13	Electrocautery; fulguration (includes use of hot forceps for tumor destruction)	Other
15	Local tumor destruction, NOS	Other
19	Local tumor destruction or excision, NOS	Other
80	Resection of lung, NOS	Other
90	Surgery, NOS	Other

Supplementary Tables and Figures

Supporting Table 1: Extent of resection among early-stage non-small cell lung cancer cases by clinical stage at diagnosis and by year of diagnosis.

	Sublobar n (% [95% CI])	Lobectomy or bilobectomy n (% [95% CI])	Pneumonectomy n (% [95% CI])	Other n (% [95% CI]) ^a
Stage				
IA	10727 (24.3 [23.9-24.7]) ^b	32569 (73.8 [73.3-74.2]) ^b	367 (0.8 [0.7-0.9]) ^b	497 (1.1 [1-1.2]) ^b
IB	1903 (11.3 [10.8-11.7])	14110 (83.5 [82.9-84])	683 (4 [3.7-4.3])	206 (1.2 [1.1-1.4])
IIA	714 (7.6 [7.1-8.2])	7679 (81.8 [81-82.6])	894 (9.5 [8.9-10.1])	101 (1.1 [0.9-1.3])
IIB	652 (9.4 [8.8-10.2])	5180 (75 [74-76])	910 (13.2 [12.4-14])	165 (2.4 [2-2.8])
Year				
2010	2624 (17.5 [16.9-18.1]) ^c	11550 (76.9 [76.2-77.6]) ^e	605 (4 [3.7-4.4]) ^d	237 (1.6 [1.4-1.8]) ^b
2011	2776 (18.3 [17.7-18.9])	11611 (76.4 [75.7-77.1])	579 (3.8 [3.5-4.1])	228 (1.5 [1.3-1.7])
2012	2765 (18 [17.4-18.6])	11851 (77 [76.4-77.7])	595 (3.9 [3.6-4.2])	174 (1.1 [1-1.3])
2013	2875 (18.2 [17.6-18.8])	12219 (77.2 [76.5-77.9])	562 (3.6 [3.3-3.9])	171 (1.1 [0.9-1.3])
2014	2956 (18.6 [17.9-19.2])	12307 (77.2 [76.6-77.9])	513 (3.2 [3-3.5])	159 (1 [0.8-1.2])
Overall	13996 (18.1 [17.8-18.4])	59538 (77 [76.7-77.3])	2854 (3.7 [3.6-3.8])	969 (1.3 [1.2-1.3])

Table legend:

a As the percentage of surgically treated cases that received an “other” type of resection was low, time trends in the uptake of MIS and the rate of conversions were not further analyzed for this subgroup.

b Statistically significant trend (p<0.0001).

c Statistically significant trend (p=0.0370).

d Statistically significant trend (p=0.0001).

e Statistically non-significant trend (p=0.1837).

Supporting Figure 1: Uptake of minimally invasive surgery among early-stage non-small cell lung cancer cases treated surgically between 2010-2014 by clinical stage at diagnosis.

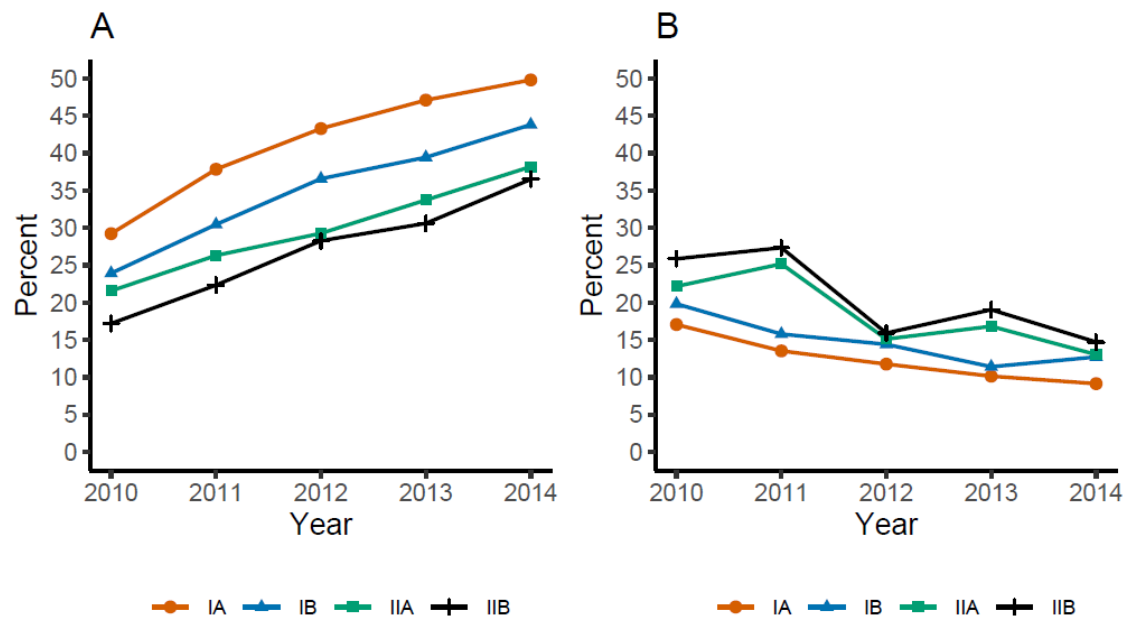


Table legend:

In this sensitivity analysis, cases with missing data on surgical approach or missing data on radiation modality were excluded. Panel A shows the percentage of lung cancer surgeries which started as minimally invasive surgery between 2010-2014 by clinical stage at diagnosis. Panel B shows the percentage of lung cancer surgeries which started as minimally invasive surgery that were converted to open surgery between 2010-2014, by clinical stage at diagnosis.

Supporting Figure 2: Uptake of stereotactic body radiation therapy among early-stage non-small cell lung cancer cases treated with thoracic radiotherapy between 2010-2014 by clinical stage at diagnosis.

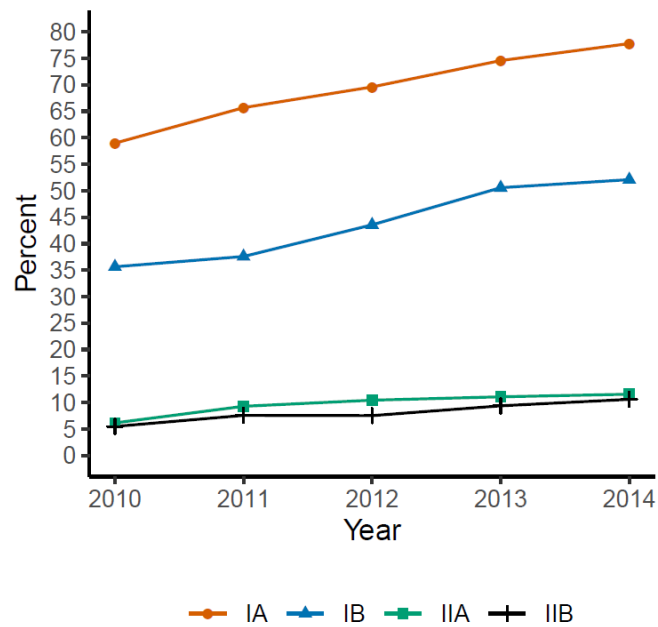


Table legend:

Sensitivity analysis where cases with missing data on surgical approach or missing data on radiation modality were excluded.

Supporting Figure 3: Uptake of minimally invasive surgery among early-stage non-small cell lung cancer cases treated surgically between 2010-2014 by sex.

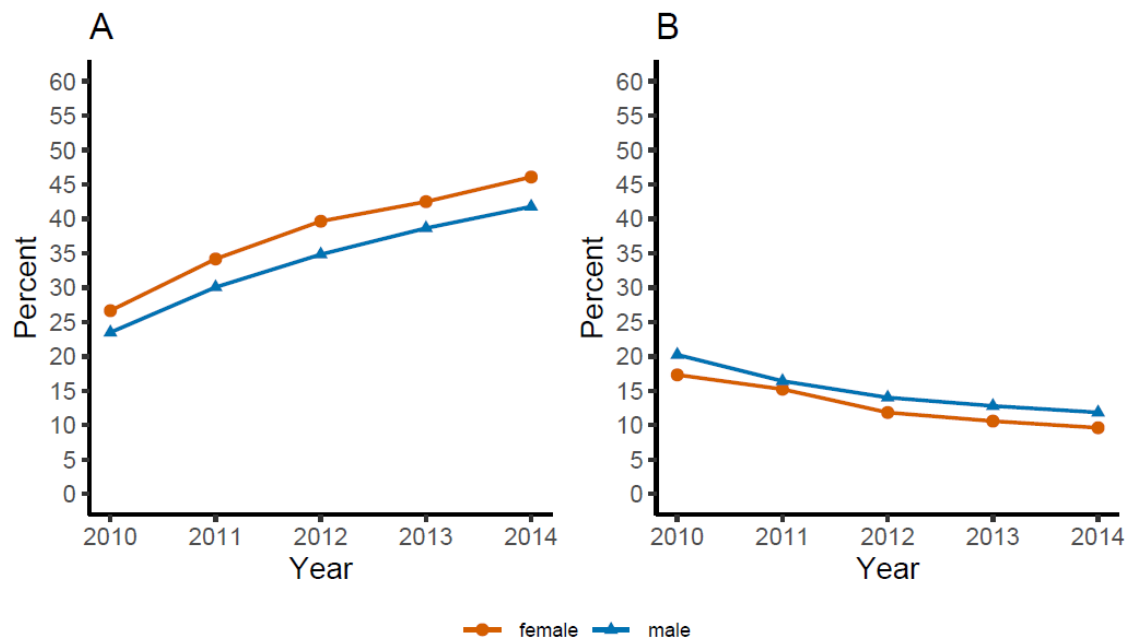
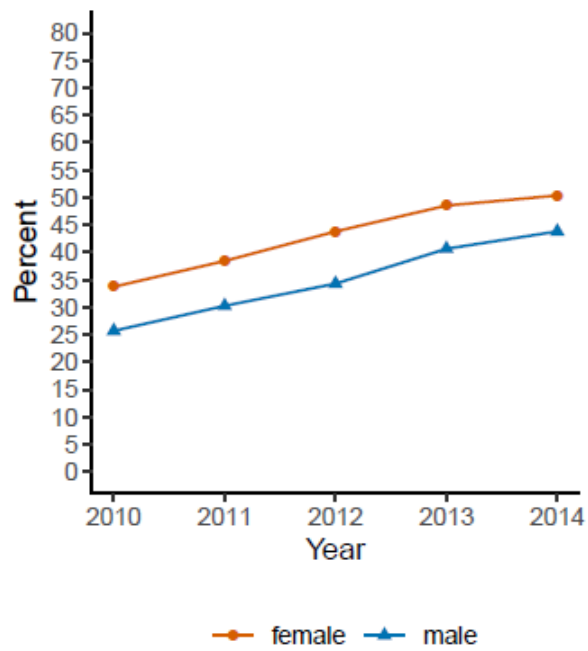


Figure Legend:

Panel A shows the percentage of lung cancer surgeries that were started as minimally invasive surgery between 2010-2014 by sex. Panel B shows the percentage of lung cancer surgeries which started as minimally invasive surgery that were converted to open surgery between 2010-2014, by sex.

Supporting Figure 4: Uptake of stereotactic body radiation therapy among early-stage non-small cell lung cancer cases treated with thoracic radiotherapy between 2010-2014 by sex.



Supporting Figure 5: Uptake of minimally invasive surgery among early-stage non-small cell lung cancer cases treated surgically between 2010-2014 by age.

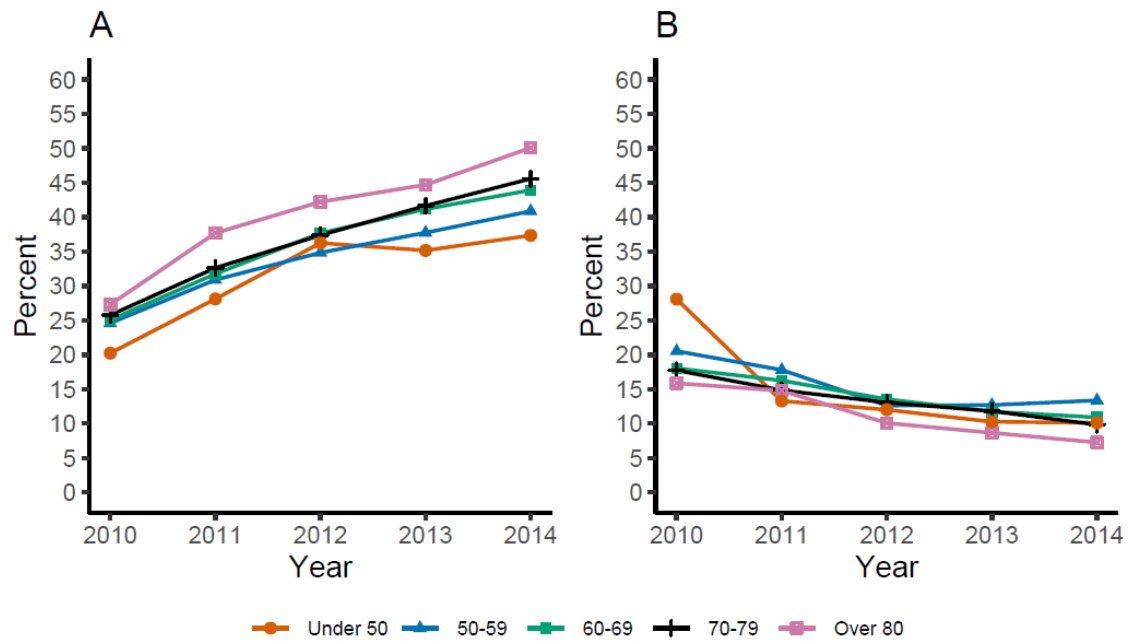


Figure Legend:

Panel A shows the percentage of lung cancer surgeries that were started as minimally invasive surgery between 2010-2014 by age. Panel B shows the percentage of lung cancer surgeries which started as minimally invasive surgery that were converted to open surgery between 2010-2014, by age.

Supporting Figure 6: Uptake of stereotactic body radiation therapy among early-stage non-small cell lung cancer cases treated with thoracic radiotherapy between 2010-2014 by age.

