

Costs of the Diagnostic Workup for Lung Cancer: A Medicare Claims Analysis

Lokhandwala T¹, Dann R², Johnson M², D'Souza AO¹

¹Xcenda LLC, Palm Harbor, FL; ²GE HealthCare, Chalfont St Giles,
United Kingdom

Objective	<ul style="list-style-type: none"> ▪ Obtain utilization rates and estimate costs of diagnostic tests of patients with and without a lung cancer diagnosis who had an abnormal chest CT scan.
Data Source (Study Period)	<ul style="list-style-type: none"> ▪ 5% Medicare Claims Database (January 1, 2009 through December 31, 2011)
Study Population	<ul style="list-style-type: none"> ▪ Patients aged 65-74 years with an abnormal chest CT scan[‡] between July 1, 2009 through December 31, 2010 ▪ Excluded: <ul style="list-style-type: none"> ▪ Patients diagnosed with cancer, pneumonia, atelectasis, or tuberculosis in the 6 months prior to the abnormal chest CT scan ▪ No continuous enrollment in Medicare parts A and B through study period
Analytical Approach	<ul style="list-style-type: none"> ▪ Index date: date of first abnormal chest CT scan ▪ Outcomes (computed in 12-month post-index) <ul style="list-style-type: none"> ▪ Lung cancer incidence – reported as n (%) ▪ Utilization of diagnostic tests (Chest CT, PET, X-rays, Biopsy) – reported as n (%) of patients ▪ Costs of diagnostic tests (Chest CT, PET, X-rays, Biopsy) – reported in USD 2013 and includes total payments by Medicare, the beneficiary, and other third-party payers

[‡]An abnormal finding that occurred within 7 days of the CT scan identified using the following ICD-9 CM codes -793.1 (nonspecific (abnormal) findings on radiological and other examination of lung field) ; 786.6 (swelling, mass or lump in chest); 518.89 (other diseases of lung not elsewhere classified); 519.8 (other diseases of respiratory system, not elsewhere classified); 519.9 (unspecified disease of the respiratory system)

Results

- Total sample = 8,979
- Demographics: Mean (SD) age in years = 69.3 (2.9), 43.6% males, and 86.5% Caucasian.
- Lung cancer diagnosis rate over 12 months = 13.9%
- Median time to lung cancer diagnosis = 11 days

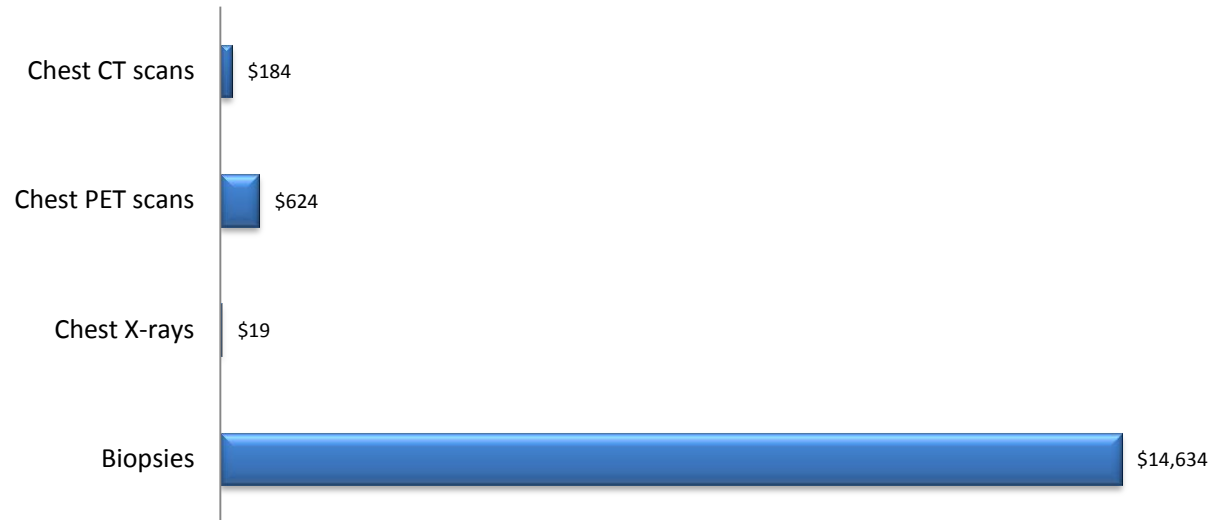
Use of Diagnostic Tests

Type of test	All	With Lung Cancer Dx		No Lung Cancer Dx	
	N= 8,979	N= 1,249		N= 7,730	
Chest CT scans	32.9%	251	20.1%	2,707	35.0%
Chest PET scans	0.5%	10	0.8%	37	0.5%
Chest X-rays	54.4%	829	66.4%	4,057	52.5%
Biopsy overall	19.4%	983	78.7%	761	9.8%

Diagnostic Costs per Patient

	Average cost per patient (USD 2013)		
	Mean	(SD)	Median
All Patients	\$4,267	(21,513)	\$324
Patients with Lung Cancer diagnosis ^a	\$7,567	(11,062)	\$2,354
Patients with biopsy	\$8,341	(11,360)	\$2,852
Patients without biopsy	\$244	(339)	\$102
Patients without Lung Cancer diagnosis ^a	\$3,558	(23,089)	\$260
Patients with biopsy	\$22,127	(56,070)	\$4,732
Patients without biopsy	\$274	(333)	\$169

Average Cost Per Diagnostic Test



- Biopsy costs include all costs incurred during the visit for the biopsy and not just the cost on the claim with a CPT code for biopsy. This approach enabled the capture of other services and adverse events that are associated with a biopsy.
- The costs for X-Ray/PET/CT scan included costs on claims with a CPT code for the specific service under consideration.

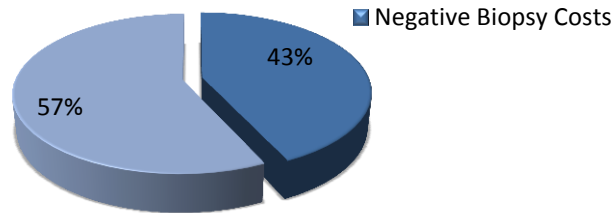
Biopsy Adverse Events and Negative Biopsies

- Patients with biopsy = 1,744
- Patients with biopsy-related adverse events[‡] = 336 (19.3%)
- An adverse event increased the cost of a biopsy ~ 4 fold.

Average cost per biopsy (USD 2013)

With Adverse Event			Without adverse event		
<i>Mean</i>	<i>SD</i>	<i>Median</i>	<i>Mean</i>	<i>SD</i>	<i>Median</i>
\$37,745	(60,129)	\$14,824	\$8,869	(15,312)	\$2,235

- The total lung cancer diagnostic cost was \$38.3M in the defined patient population, of which 43.1% was accounted for by negative biopsies.



Total Lung Cancer Diagnostic Costs = \$38.3M

[‡] Biopsy-related adverse events included were hemorrhage, pneumothorax, and respiratory failure requiring mechanical ventilation

Key Messages

- Biopsy costs are a significant proportion of overall cost of diagnosing lung cancer today.
- We need to develop more precise risk stratification tools to better identify patients who require referrals for lung biopsy.
- This has the potential to reduce costs and improve patient outcomes.