Lahey Hospital & Medical Center

CT Lung Screening Implementation Challenges: ALA/ATS Implementation Microsite

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November 2018

Business

America's Heaviest Smokers Don't Want to Know if They Have Cancer

Screening could save 12,000 lives annually, but fewer than 2 percent of those eligible take advantage of it.

2016 data, 3 years after ACS recommendation and one year after CMS coverage

Mammography -28% in 1987, 11 years after ACS recommendation

Colonoscopy -32% in 1980, 20 years after ACS recommendation

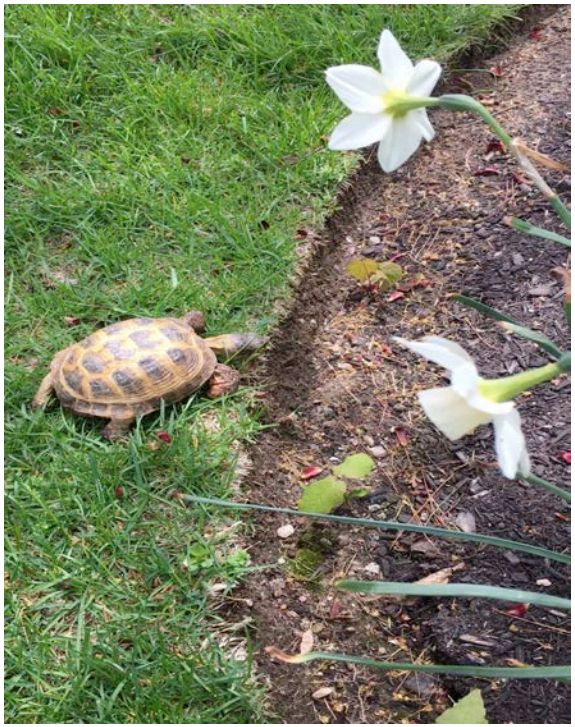
Lung cancer screening Lahey– 65% in 2018, 6 years after NCCN recommendation
65% of eligible population screened – Changed the conversation

HEALTH NEWS ✓ Fact Checked

Why Only 2 Percent of Heavy Smokers Get Lung Cancer Screenings

Why so slow?

Reimbursement
Stigma
Infrastructure
Who does what
Misinformation
Terminology
Resources
Quality
Training
Silos



Reimbursement and Messaging

70498	Ct Angio, Neck Combo, Incl Image Process	$2,586.00	$300.14	$160.27	$1,163.70	$345.16
71010	Chest X-Ray 1 Vw	$150.00	$58.96	$31.48	$67.50	$67.80
71020	Chest X-Ray 2 Vw	$150.00	$58.96	$31.48	$67.50	$67.80
71035	Chest X-Ray Spec Views	$298.00	$58.96	$31.48	$134.10	$67.80
71110	X-Ray Ribs 3 Vw Bilat	$448.00	$93.44	$49.90	$201.60	$107.46
71111	X-Ray Ribs, Chest 4+ Vw	$448.00	$93.44	$49.90	$201.60	$107.46
71250	Ct Scan, Thorax, w/o Contrast	$1,671.00	$130.01	$69.43	$751.95	$149.51
71260	Ct Chest Contrast	$2,586.00	$255.98	$136.69	$1,163.70	$294.38
71275	Ct Angio, Chest, Combo, Incl Image Proc	$2586.00	$300.14	$160.27	$1,163.70	$345.16
72040	X-Ray Exam Neck Spine 3/Or Less	$298.00	$58.96	$31.48	$134.10	$67.80

CTLS Medicare Payment
2016 -$112.49
2017 – $59.84
2018 –$52.56

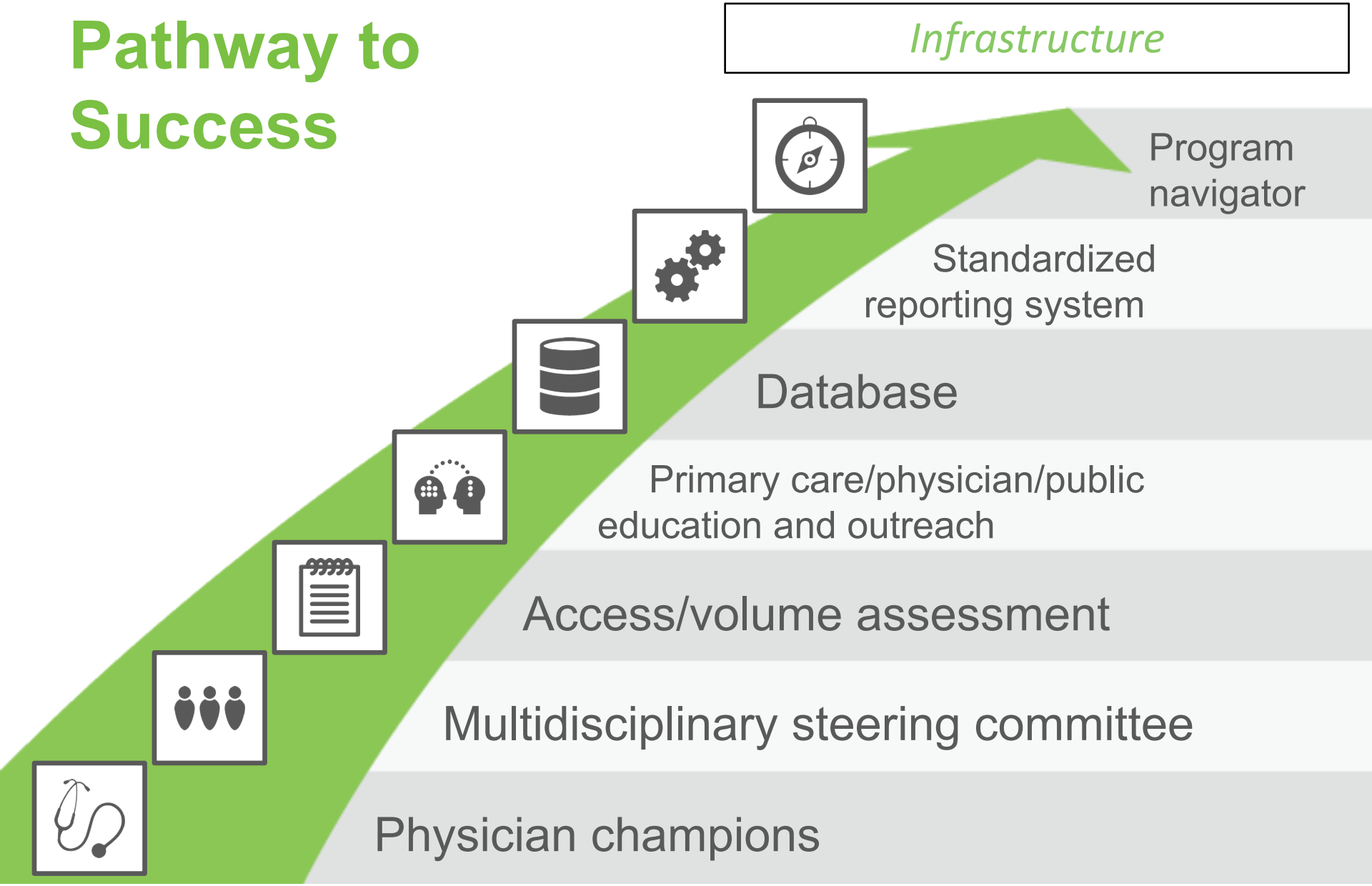
2018 TC - $189.71
2018 Global - $242.28

Stigma and Big Tobacco

Competition has been tough - tobacco industry, Hollywood, press

Guard against withholding of health care services or advocacy based on social history – slippery slope

Pathway to Success



Revenues and Expenses
Different Silos

Training

Radiology- Make the radiologist comfortable

- Mevis Lung Academy
- IELCAP VA PALS
- European 18 month implementation plan

Primary Care – Make primary care comfortable

- SDM Massachusetts Medical Society
- SDM tools Grannis

Specialist

Navigator

- State Quality Collaborative

Technologist

Smoking Cessation

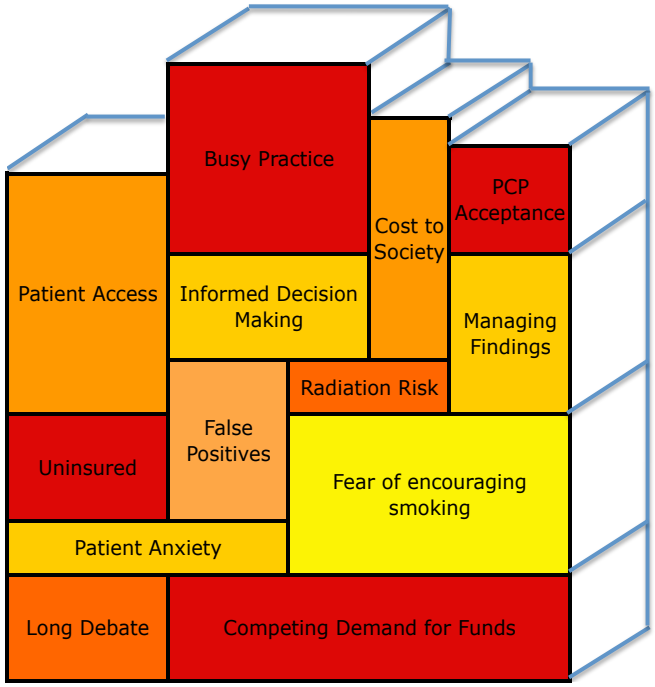
Program Access and Structure

Centralized vs Decentralized

Program Volume

- # referred
- # qualified
- ***# screened***

Is your program accessible?



McKee, B et al. Low-dose Computed Tomography Screening for Lung Cancer in a Clinical Setting: Essential Elements of a Screening Program. J Thorac Imaging. 2015 Mar;30(2):115-29.

ACR Registry Requirements

Required Elements

Exam details:
Facility ID number, patient name, exam date

General:
Smoking status in pack years
Smoking cessation counseling
Documentation of shared decision making
Height, weight, comorbidities, cancer history
Radiologist name, ordering provider and NPI
Indication for the exam
Exam modality, manufacturer, radiation exposure
CT exam results by Lung-RADS™ category
Other abnormalities- CT exam result S modifier
Prior history of lung cancer and years since diagnosis

Follow-up within 1 year
Documentation of an exam anytime within prior 12 months and date
Follow-up diagnostic for tissue:

- Tissue Diagnosis
- Tissue diagnosis method
- Location from which sample was obtained
- Histology
- Stage- Clinical or pathologic
- Overall stage
- T, N, M status
- Period of follow-up for incidence (in months)

Additional Risk Factors:
Education level, radiation exposure, occupational exposures, history of cancers associated with a higher risk of lung cancer, lung cancer in first-degree relative, other family history of lung cancer, COPD, pulmonary fibrosis, secondhand smoke exposure.
Name of person performing data collection for the exam, submission date.

Systems Approach

Division of labor

- cost efficient/effective
- volume for PCP, specialist, radiology
- Triage to manage specialty volume

Additional Challenges

Who to screen

Identifying the high risk population

Scheduling

Quality metrics and benchmarking

Tracking

Compliance

Workflow and division of labor

Smoking cessation

Community outreach

- Radiology
- Care escalation
- Smoking cessation
- Access
- Primary Care engagement
- Identification of the high risk population
- Who to compare to?
- Who tracks and reviews metrics
- Metric feedback
- Workflow and division of labor
- Community outreach

Shared Decision Making

Editorials Exaggerating Radiation Harm and FPR

What is the false positive rate in modern clinical practice CTLS?

98%, 60%, 50%, 23%, 12%, 7%, 2%

Patient Anxiety – Little/No Evidence

"Permission to Smoke" – Little/No Evidence

Overdiagnosis

What is the rate of overdiagnosis in the NLST when using modern reporting and work up algorithms?

70%, 50%, 18%, 3%

Significant Incidental Findings

What is the rate of significant incidental findings in clinical CTLS practice?

70%, 40%, 10%, 6%, 4%,2%

”False” False Positive Rates

What is the False Positive Rate?

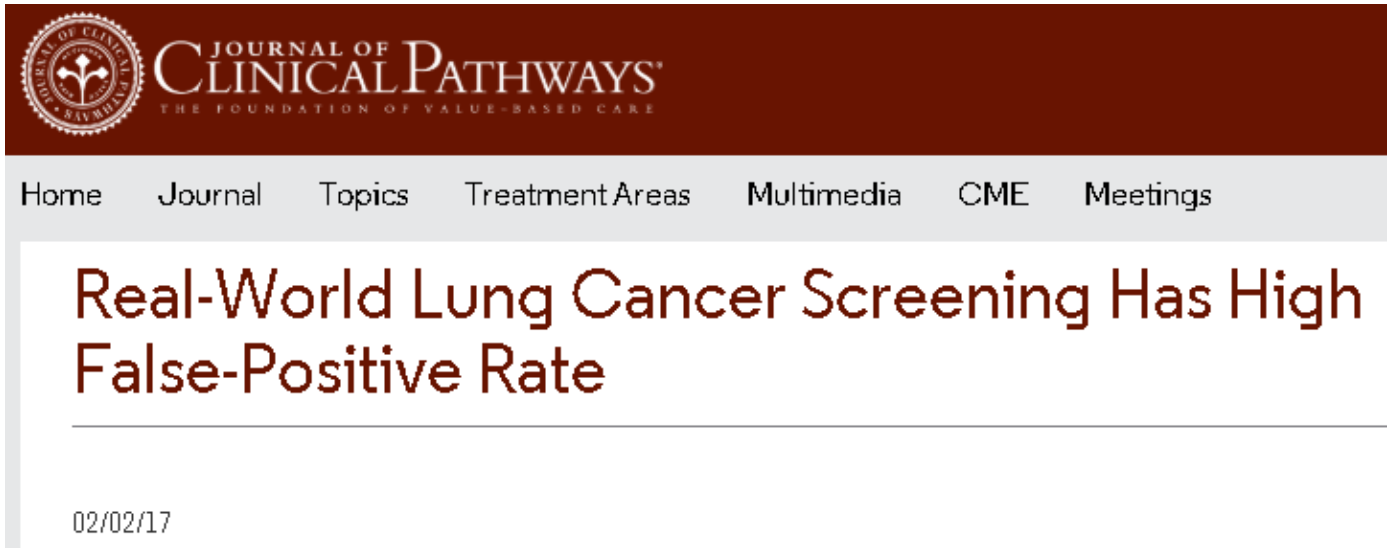
"On a population-based level, the FP rate is traditionally defined as the probability of receiving a positive result, given an absence of the disease. In this review, the FP rate will be defined as the number of FPs as a proportion of the total number of screening examinations conducted (i.e. accounting for cases of both the presence and absence of malignant disease). The definition has been modified from the true technical definition as a result of an observed trend, whereby the FP rate is reported in the latter manner by most of the publications concerning mammographic screening." -British Journal of Radiology

What is NOT the False Positive Rate?

"In 1995, Benjamini and Hochberg introduced the concept of the False Discovery Rate (FDR) as a way to allow inference when many tests are being conducted. The FDR is the ratio of the number of false positive results to the number of total positive test results." -Partnership for Assessment and Accreditation of Scientific Practice

	Disease or Condition	No Disease or Condition
Test Positive	A True Positive	B False Positive
Test Negative	C False Negative	D True Negative

- **False positive rate = B / (A + B + C + D)**
- **False discovery rate = B / (A + B)**



"Of the 2106 screened patients, 1257 (59.7%) had nodules, and 1184 (56.2%) required tracking. Only 42 (2.0%) patients required further evaluations that did not result in a lung cancer diagnosis, and only 31 (1.5%) were diagnosed with lung cancer within 330 days. Overall, researchers calculated a false-positive rate of 97.5%. Incidental findings such as emphysema, other pulmonary abnormalities, and coronary artery calcification were observed on the scans of 857 patients (40.7%). Wide variation in processes and patient experiences among the 8 sites was also noted."

This is the false discovery rate

JAMA Internal Medicine | Original Investigation

Implementation of Lung Cancer Screening in the Veterans Health Administration

Linda S. Kinsinger, MD, MPH; Charles Anderson, MD, PhD; Jane Kim, MD, MPH; Martha Larson, BSN, MS; Stephanie H. Chan, MPH; Heather A. King, PhD; Kathryn L. Rice, MD; Christopher G. Slatore, MD, MS; Nichole T. Tanner, MD, MSCR; Kathleen Pittman, BSN, MPH; Robert J. Monte, MBA; Rebecca B. McNeil, PhD; Janet M. Grubber, MSPH; Michael J. Kelley, MD; Dawn Provenzale, MD, MSc; Santanu K. Datta, PhD; Nina S. Sperber, PhD; Lottie K. Barnes, MPH; David H. Abbott, MS; Kellie J. Sims, PhD, MS; Richard L. Whitley, BS; R. Ryanne Wu, MD, MHS; George L. Jackson, PhD, MHA

Patients screened	2106 (85.9)	442 (81.0)	228 (92.3)	213 (82.9)	444 (90.8)	247 (96.9)	135 (76.3)	258 (89.0)	139 (72.8)
Patients with nodular findings on scans[c]	1257 (59.7)	340 (76.9)	70 (30.7)	181 (85.0)	248 (55.9)	153 (61.9)	63 (46.7)	112 (43.4)	90 (64.7)
Patients with nodules to be tracked[d]	1184 (56.2)	323 (73.1)	64 (28.1)	176 (82.6)	225 (50.7)	143 (57.9)	61 (45.2)	108 (41.9)	84 (60.4)
Patients with suspicious findings not confirmed to be lung cancer[e]	42 (2.0)	10 (2.3)	2 (0.9)	2 (0.9)	13 (2.9)	10 (4.0)	0	1 (0.4)	4 (2.9)
Patients with confirmed lung cancer	31 (1.5)	7 (1.6)	4 (1.8)	3 (1.4)	10 (2.3)	0	2 (1.5)	3 (1.2)	2 (1.4)

- 2106 patients screened; 1257 positive* exams; 31 confirmed lung cancers
- False positive* rate = (1257 – 31) / 2106 = **58.2%**
- False suspicious rate = (73 – 31) / 2106 = **2%**

"There was wide variation among sites in the percentage of screening test results that were positive for nodules or possible lung cancer. Overall, 1257 of the 2106 patients (59.7%) screened had a positive test result (site range, 70 of 228 [30.7%] to 181 of 213 [85.0%]) (Table 1), including 1184 patients (56.2%) who had 1 or more nodules needing to be tracked (site range, 64 of 228 [28.1%] to 176 of 213 [82.6%]). Most nodules were small (<5 cm; 710 of 1293 [54.9%]) and solid (1079 of 1293 [83.4%]) (Table 3). A total of 73 patients (3.5% of all patients screened) had findings suspicious for possible lung cancer and underwent further diagnostic evaluation. Lung cancer was confirmed for 31 of those patients (1.5%; site range, 0 of 247 to 10 of 444 [2.3%]) within the 330-day follow-up period; 20 (64.5%) of the cancers were stage I (Table 4). The mean number of days from initial LDCT scan to cancer diagnosis was 137 (range, 5-330 days). The remaining 42 patients (2.0%; site range, 0 of 135 to 10 of 247 [4.0%]) who underwent evaluation were not confirmed to have lung cancer during that time frame. The rate of false-positive test results for lung cancer was 97.5% (1226 of 1257) during the 330-day follow-up period (Table 1)."

false discovery rate

* "Since only about one-third of nodules identified as needing to be tracked in the LCSDP were 6 mm or greater, the positive rate might decline from nearly 60% to about 20%."

- Jan 2017 JAMA Internal Medicine article:
  - "The rate of false-positive test results for lung cancer was 97.5% (1226 of 1257) during the 330-day follow-up period"
  - "The reason for the overall high rate of initially positive examination results in the VHA sites is not certain but may be owing, in part, to the older age and heavier smoking history of veterans screened."
  - **"Since only about one-third of nodules identified as needing to be tracked in the LCSDP were 6 mm or greater, the positive rate might decline from nearly 60% to about 20%"**

http://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2599437

Editorial

October 2018

Failing Grade for Shared Decision Making for Lung Cancer Screening

Rita F. Redberg, MD, MSc[1,2]

» Author Affiliations | Article Information

JAMA Intern Med. 2018;178(10):1295-1296. doi:10.1001/jamainternmed.2018.3527

"Even in the highest-rated discussions, there was no mention of possible harms from the screening by the physicians, even though these harms include a 98% false-positive rate, which may lead to anxiety; additional testing including imaging or procedures, such as biopsy or lobectomy; and radiation from the LDCT with the small increased risk of cancer. Some evidence suggests that a more-rigorous and -informative SDM discussion about lung cancer screening is occurring in the Veterans Administration system."

This is the false discovery rate

NEJM Journal Watch

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MEDICAL NEWS | PHYSICIAN'S FIRST WATCH

January 31, 2017

Lung Cancer Screening in Real World Has High False-Positive Rate

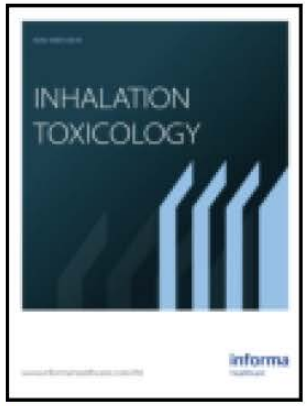
By Kelly Young

Edited by David G. Fairchild, MD, MPH, and Jaye Elizabeth Hefner, MD

"A pair of studies in JAMA Internal Medicine illustrate the difficulties of implementing lung cancer screening.

In the first, eight Veterans Health Administration medical centers identified and screened patients using low-dose computed tomography (LDCT). Over 2100 patients who were eligible for screening based on smoking history and other factors completed LDCT. Overall, 60% had nodules, but just 1.5% had lung cancer diagnosed within 330 days. The researchers calculate a false-positive rate of 97.5%."

This is the false discovery rate



Taylor & Francis
Taylor & Francis Group

Inhalation Toxicology

International Forum for Respiratory Research

ISSN: 0895-8378 (Print) 1091-7691 (Online) Journal homepage: http://www.tandfonline.com/loi/iiht20

Screening tests: a review with examples

L. Daniel Maxim, Ron Niebo & Mark J. Utell

Table 5. Reported false positive rates for CT scans for lung cancer.

Reported false positives as %		Remarks	Source
96.4		National Lung Screening Trial Research Team, p. 399 **(Exhibit A again)**	National Lung Screening Trial Research Team (2011)
96.1		Study also reports 90% sensitivity	Swensen et al. (2003)
95.5	D	106 false positives among 111 with nodules >0.5 cm	Tiitola et al. (2002)
92.9–96.0		Rates depended on nodule size, p. 260.	Swensen et al. (2005)
86.6–96.4		Rates depend upon assumed nodule size from 5.0 to 9.0 mm	Henschke et al. (2013)
94.6	E	Based on 14 detected cancers among 259 patients with abnormal CT scans	McWilliams et al. (2003)
94.1	F	From Table 2, 1773 false positives among 1883 nodules detected	Mahadevia et al. (2003)
93	G	Based on 8 lung cancers among 114 subjects with nodules >5 mm	Novello et al. (2005)
92.6	H	Based on 22 lung cancers among 298 patients with nodules	Pastorino et al. (2003)
92.1	I	Based on 22 cancers in 279 with suspicious nodules	Sone et al. (2001)
88.5–97		From Table 3, rate dependent upon risk	Kovalchik et al. (2013)
87.6		Based on 29 malignancies among 233 positive results	Henschke et al. (2002)
75		Percent of patients with non-calcified nodules on CT	Manos (2013)
73.4		Based on 163 benign nodules among 222 evaluated by thin section CT	Li et al. (2004)
>70		Reported value derived from Mayo clinic and ELCAP trials	Patz et al. (2004)
62.1		Based on 18 false positives among 29 subjects; for nodules >10 mm	Diedrerich et al. (2002)
43.75		Based on 36 confirmed lung cancer cases among 64 patients	Nawa et al. (2002)
21–33		Rates depend upon number of tests, p. 509. Of participants with a false-positive CT scan, 7% had an unnecessary invasive procedure and 2% had major surgery for benign disease.	Croswell et al. (2010)
19		p. 119	Gohagan et al. (2004)
7.9		p. 612. Includes multi-stage process with classification of nodules by size and calcification with follow-up.	Pedersen et al. (2009), Saghir et al. (2012)
7.9 M/5.6 F		Sensitivity reported to range between 84.6% W to 90.6% M	Toyoda et al. (2008)
1.7		Sensitivity reported at 94.6%, based on Volume CT scanning	van Klaveren et al. (2009)

D: 95.5% = 106 / 111 ≠ false positive rate

E: 94.6% = (259 – 14) / 259 ≠ false positive rate

F: 94.1% = 1773 / 1883 ≠ false positive rate

G: 93% = (114 – 8) / 114 ≠ false positive rate

H: 92.6% = (298 – 22) / 298 ≠ false positive rate

I: 92.1% = (279 – 22) / 279 ≠ false positive rate

THESE ARE ALL FALSE DISCOVERY RATES

NIH NATIONAL CANCER INSTITUTE https://www.cancer.gov/types/breast/hp/breast-screening-pdq

- **False Positives with Additional Testing and Anxiety.**

Magnitude of Effect: In the United States, approximately 10% of women are recalled for further testing after a screening examination, however, only 0.5% of tested women have cancer; thus, approximately 9.5% of tested women will have a false-positive exam.[8,9] Approximately 50% of women screened annually for 10 years in the United States will experience a false positive; of these, 7% to 17% will undergo biopsies.[10,11] Additional testing is less likely when prior mammograms are available for comparison.

- False discovery rate = (10 – 0.5) / 10 = **95%**
- False positive rate = **50%**

Editorial

June 2017

Physician Adherence to Breast Cancer Screening Recommendations

Deborah Grady, MD, MPH[1,2]; Rita F. Redberg, MD, MSc[1,3]

» Author Affiliations | Article Information

JAMA Intern Med. 2017;177(6):763-764. doi:10.1001/jamainternmed.2017.0458

"It is estimated that 50% of women who undergo 10 mammography screens will have a false-positive finding."

Not using false discovery rate when discussing breast cancer screening

Is This Misrepresentation Happening for All Cancer Screening?

JAMA | US Preventive Services Task Force | EVIDENCE REPORT

Screening for Ovarian Cancer
Updated Evidence Report and Systematic Review for the US Preventive Services Task Force

Jillian T. Henderson, PhD; Elizabeth M. Webber, MS; George F. Sawaya, MD

Table 4. False-Positive and Surgical Harms Reported in Ovarian Cancer Screening Tria

Source	Quality[b]	False-Positive Screening Rate Across Entire Program, No. With False-Positive Screen/ No. Without Cancer (%)[c]
UKCTOCS, 2016[22,31,34] (CA-125 ROCA)	Good	20 340/46 067 (44.2) across 2-11 rounds of screening[e]
UKCTOCS, 2016[22,31] (TVU)	Good	NR[h]
PLCO, 2011[20,21,27]	Good	3285/34 041 (9.6) across 1-6 rounds of screening
UK Pilot, 1999[33]	Good	462/10 942 (4.2) across 1-3 rounds of screening[m]
QUEST, 2007[29]	Fair	NA

Not using false discovery rate when discussing ovarian cancer screening

JAMA | US Preventive Services Task Force | EVIDENCE REPORT

Screening for Cervical Cancer With High-Risk Human Papillomavirus Testing

Updated Evidence Report and Systematic Review for the US Preventive Services Task Force

Joy Melnikow, MD, MPH; Jillian T. Henderson, PhD; Brittany U. Burda, DHSc, MPH; Caitlyn A. Senger, MPH; Shauna Durbin, MPH; Meghan S. Weyrich, MPH

Not using false discovery rate when discussing cervical cancer screening

Table 3. Colposcopy Referrals and False-Positive Rates as Harms of hrHPV Screening, Based on Randomized Clinical Trials (Key Question 2)

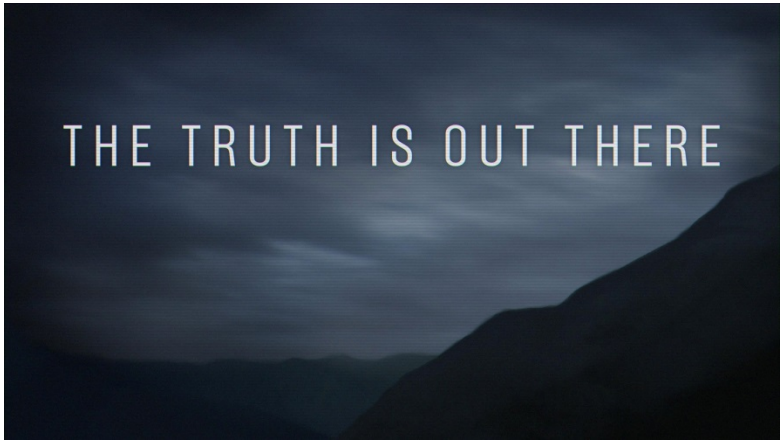
Source	Quality[a]	Screening Round (Planned Follow-up Period, y)[b]	Screening Approach	No./Total (%) Test Positivity[c] Intervention	Test Positivity[c] Control	Colposcopy Referrals[d] Intervention	Colposcopy Referrals[d] Control	False-Positive Rate, No. Screened Positive Without CIN 2+/Total No. Screened Without CIN 2+ (%)[d] Intervention	False-Positive Rate, No. Screened Positive Without CIN 2+/Total No. Screened Without CIN 2+ (%)[d] Control
hrHPV Primary Screening									
NTCC Phase II Ronco et al,[20] 2008 Ronco et al,[14] 2010	Good	1 (3.5)	hrHPV vs conventional cytology	hrHPV+: 1936/24 661 (7.9)	ASCUS+: 825/24 353 (3.4)	1936/24 661 (7.9)	679/25 435 (2.8)	1799/24 428 (7.4)	770/24 038 (3.2)
HPV FOCAL Ogilvie et al,[22] 2010 Cook et al,[19] 2015 Ogilvie et al,[21] 2017 Ogilvie et al,[13]	Fair	1 (1)[c]	hrHPV with LBC triage vs LBC	hrHPV+: 771/9540 (8.1)[d,e]	ASCUS+: 334/9408 (3.5)[d,e]	544/9540 (5.7)[e,g]	290/9408 (3.1)[e,g]	624/9393 (6.6)	244/9318 (2.6)
		2 (4)[c]	Cotesting vs cotesting[f]	hrHPV+: 469/8296 (5.7)	ASCUS+: 513/8078 (6.4)[d,e]	469/9540 (4.9)[e,g]	660/9408 (7.0)[e,g]	421/8248 (5.1)	413/7978 (5.2)
FINNISH Leinonen et al,[23] 2012	Fair	1 (5)	hrHPV with conventional cytology triage vs conventional cytology	hrHPV+: 4971/62 106 (8.0)[h]	ASCUS+: 4506/65 747 (6.9)[h]	796/66 410 (1.2)	755/65 784 (1.1)	4462/61 597 (7.2)	4239/65 480 (6.5)
Compass Canfell et al,[12] 2017	Fair	1 (5)	hrHPV with LBC triage vs LBC[i]	hrHPV+: 277/4000 (6.9)	ASCUS+: 67/995 (6.7)	154/4000 (3.8)	27/995 (2.7)	NR	NR
hrHPV Cotesting With Cytology									
NTCC Phase I Ronco et al,[25] 2006 Ronco et al,[26] 2006 Ronco et al,[14] 2010	Good	1 (3.5)	Cotesting vs conventional cytology	hrHPV+ or ASCUS+: 2830/22 708 (12.5)	ASCUS+: 855/22 466 (3.8)	2470/22 708 (10.9)[j]	738/22 466 (3.3)	2702/22 042 (12.3)	771/21 972 (3.5)
POBASCAM Bulkmans et al,[27] 2004 Rijkaart et al,[28] 2012 Dijkstra et al,[29] 2016	Good	1 (4)	Cotesting vs conventional cytology	hrHPV+ or ASCUS+: 1406/19 999 (7.0)	ASCUS+: 706/20 106 (3.5)	NR	NR	1149/19 742 (5.8)	513/19 913 (2.6)
		2 (5)	Cotesting vs cotesting	hrHPV+ or ASCUS+: 742/19 579 (3.8)	hrHPV+ or ASCUS+: 774/19 731 (3.9)	NR	NR	610/9572 (6.4)	612/9450 (6.5)
Swedescreen Naucler et al,[30] 2008 Elfström et al,[31] 2014	Fair	1 (3)	Cotesting vs conventional cytology	hrHPV+: 433/6257 (6.9) ASCUS+: 146/6257 (6.9)	ASCUS+: 150/6270 (2.4)	NR	NR	NR	72/6192 (1.2)
ARTISTIC Kitchener et al,[32] 2008 Kitchener et al,[33] 2009 Kitchener et al,[34] 2009 Kitchener et al,[35] 2014	Fair	1 (2)	Cotesting vs LBC	hrHPV+ or ASCUS+: 4019/18 386 (21.9)	ASCUS+: 786/6124 (12.8)	1247/18 386 (6.8)	320/6124 (5.2)	3566/17 933 (19.9)	653/5991 (10.9)
		2 (2)	Cotesting vs LBC	hrHPV+ or ASCUS+: 1258/11 862 (10.6)[k]	ASCUS+: 210/3928 (5.3)[k]	284/10 716 (2.7)[k]	74/3514 (2.1)[k]	1178/10 512 (11.2)[k]	176/3832 (4.6)[k]

	False Positive Rate				False Discovery Rate			
Screening Round	NLST	NLST LR	LHMC	MG	NLST	NLST LR	LHMC	MG
T0	26.3%	12.6%	10.6%	7-12%	96.2%	92.8%	83.1%	95%
T1	27.2%	5.3%	5.2%	?	97.6%	90.3%	78.2%	?
T2	15.9%	5.1%	5.0%	?	94.8%	87.2%	84.6%	?
Overall	23.3%	7.8%	7.6%	50%	96.4%	91.0%	82.1%	?

NLST: National Lung Screening Trial; NLST LR: Pinsky et al NLST conversion;

LHMC: Lahey CTLS program; MG: Mammography (nationwide)

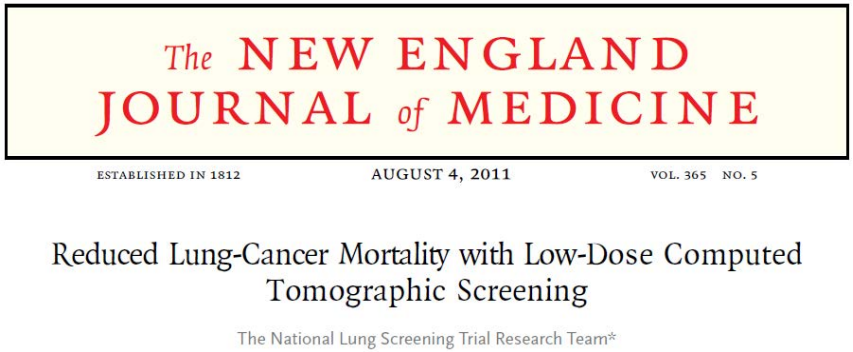
Do you ever hear the false positive rate for mammography quoted as 95%??



"Based on solid evidence, approximately 96% of all positive, low-dose helical computed tomography screening exams do not result in a lung cancer diagnosis. False-positive exams may result in unnecessary invasive diagnostic procedures. Magnitude of Effect: Based on the findings from a large randomized trial, the average false-positive rate per screening round was 23.3%. A total of 0.06% of all false-positive screening results led to a major complication after an invasive procedure performed as diagnostic follow-up to the positive screening result. Over three screening rounds, 1.8% of participants who did not have lung cancer had an invasive procedure following a positive screening result."

- NIH
2 Feb 2018

So What **ARE** the False Positive Rates for CT Lung Screening?



T0: 26.3%
T1: 27.2%
T2: 15.9%
Overall: 23.3%

T0: 12.6%
T1: 5.3%
T2: 5.1%
Overall: 7.8%

T0: 10.6%
T1: 5.2%
T2: 5.0%
Overall: 7.6%

Quality Metrics - Agreement on Terminology

Major discrepancies in the reporting of significant incidental findings in CT lung screening due to lack of both general and specific standard definitions

Table 2. Results of Three Rounds of Screening.*

Screening Round	Low-Dose CT			
	Total No. Screened	Positive Result	Clinically Significant Abnormality Not Suspicious for Lung Cancer	No or Minor Abnormality
			no. (% of screened)	
T0	26,309	7191 (27.3)	269 (10.2)	16,423 (62.4)
T1	24,715	6901 (27.9)	151 (6.1)	16,295 (65.9)
T2	24,102	4054 (16.8)	140 (5.8)	18,640 (77.3)

N Engl J Med 2011; 365:395-409

"The review of the scan reveals that an abnormality is present and requires further evaluation, but is not suggestive of lung malignancy. It is up to the radiologist to determine whether an abnormality is clinically significant."

Table 1. Summary Results for the Initial Ro

Characteristic	No. (%) All Sites
Patients who met all screening criteria	4246
Patients who agreed to be screened[b]	2452 (57.7)
Patients screened	2106 (85.9)
Patients with nodular findings on scans[c]	1257 (59.7)
Patients with nodules to be tracked[d]	1184 (56.2)
Patients with suspicious findings not confirmed to be lung cancer[e]	42 (2.0)
Patients with confirmed lung cancer	31 (1.5)
Patients with incidental, non-nodule findings on scans	857 (40.7)
Total LDCT scans completed[f]	2694

JAMA Intern Med. 2017;177(3):399-406

"Radiologists and coordinators were asked to record only incidental findings that would likely require follow-up or further evaluation. Overall, 857 patients (40.7%) had 1 or more incidental findings reported (site range, 89 of 444 [20.0%] to 135 of 213 [63.4%])"

Table 5

Screening Round	Significant Incidental Findings						
	Overall		Group 1		Group 2		*P* Value
T0	188	6.4%	150	6.7%	38	5.4%	.23
T1	45	2.5%	40	3.0%	5	1.2%	.03
T2	23	2.1%	20	2.4%	3	1.1%	.32
≥T3	13	1.9%	10	1.9%	3	1.9%	1
Total	269	4.1%	220	4.5%	49	3.2%	.02

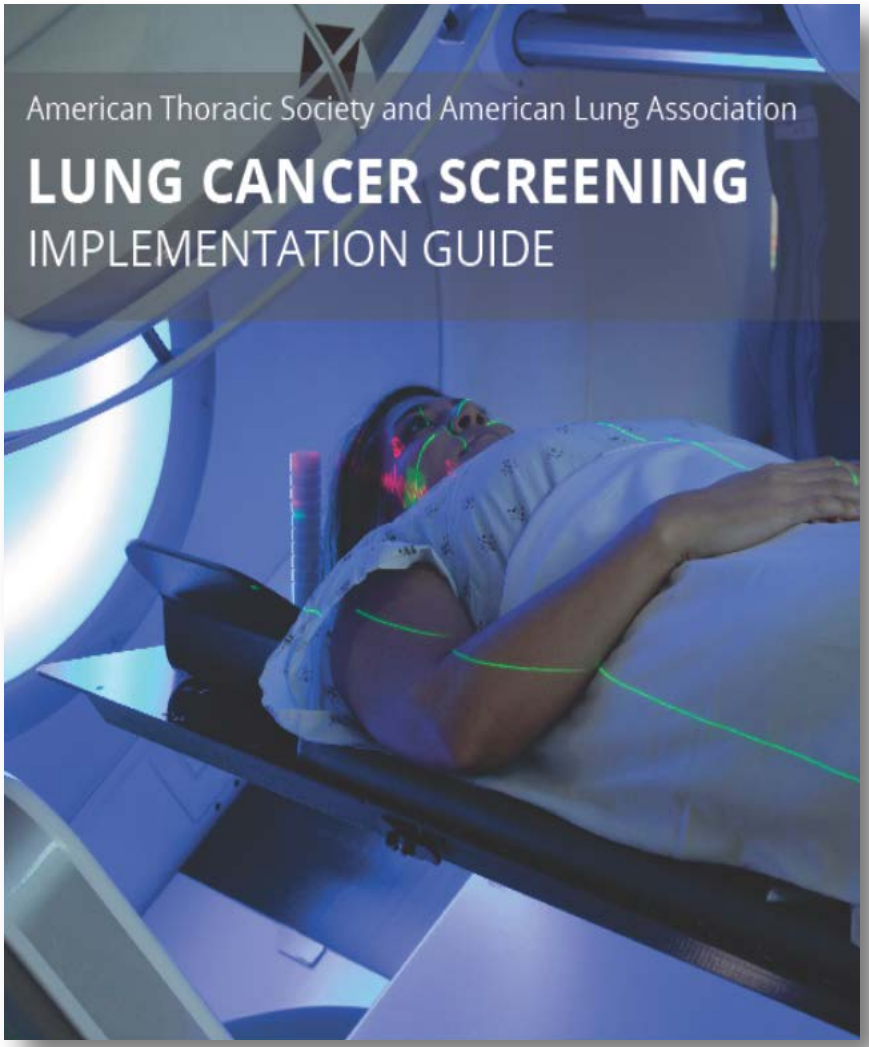
J Natl Compr Canc Netw 2018;16(4):444–449

*"**Unexpected** findings which are either **new** or **unknown** and require some form of clinical or imaging investigation before the next recommended CTLS exam"*

WCLC 2018

Systems Approach

LUNG CANCER SCREENING IMPLEMENTATION GUIDE



- Intended for community hospitals and healthcare systems
- Highlights potential hurdles along with resources that will aid healthcare systems in establishing their own lung cancer screening program
- Twenty-five experts from 16 institutions representing all geographic regions of the country volunteered for the panel to develop the guide and website
- Available in the Fall of 2018, the website will allow users to interact with the guide in easy to navigate sections
- For more information visit Lung.org/screening-guide-news

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LUNG FORCE

Survey Q and A Format

- Questions submitted by participants from 16 sites
- Variety of screening settings
- Massachusetts state DPH survey
- http://www.lungcancerscreeningguide.org/