

Lung Cancer Screening: Manage Your Metrics

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Learning Objectives

After completing this activity, the participant should be better able to:

1. Review Lung Cancer Screening (LCS) metrics captured by the ACR registry and additional suggested LCS metrics.
2. Discuss management strategies for collected LCS metrics.
3. Recognize challenges related to LCS metrics.

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Contact Information

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Tiffany Gowen, MHA – Planner/Manager

Carlye Armstrong – Planner/ Reviewer

Allison Ferreira, DO- Faculty

Lung Cancer Screening

- “Lung cancer screening is not solely an imaging test; it is a process that should take place within an organized program.” Mazzone. (2015) *147(2)*, 295–303.
- Multi-disciplinary team
- Lung Cancer Screening Coordinator/Navigator



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LUNG CANCER SCREENING IMPLEMENTATION GUIDE

Search



DOWNLOAD GUIDE

INITIATING A LUNG CANCER
SCREENING PROGRAM

RADIOLOGY
REQUIREMENTS

SHARED DECISION
MAKING

FOR REFERRING
PHYSICIANS

PROGRAM NAVIGATION AND
DATA TRACKING

RESOURCES

ASK A
QUESTION

ABOUT
THIS GUIDE

American Thoracic Society and American Lung Association Implementation Guide for Lung Cancer Screening

<https://www.lungcancerscreeningguide.org/>

American College of Radiology



Initiating a Lung Cancer
Screening Program



Radiology Requirements



Shared Decision-Making



For Referring Physicians



Program Navigation and
Data Tracking



Resources



About This Guide

NLST results to be used in Shared Decision-Making

Review the evidence from the NLST

- 20% reduction in lung cancer mortality LDCT screening (3 rounds – prevalence 2 annual incidence, 6.5 year follow-up)
- 6.7% reduction all-cause mortality LDCT screening
- Stage shift – 70% of lung cancers detected Stage 1 and 2 with LDCT; reverted to 37% during follow-up after screening rounds completed
- 26.6% false positive rate baseline scan – reduced to 12.8% in a retrospective analysis with ACR LungRADS
- Less than 0.5% intervention for benign disease
- Less than 1.5 mSv radiation exposure
- Estimated 18% overdiagnosis; majority (15%) of overdiagnosis for what is now known as carcinoma in situ (bronchoalveolar cell carcinoma)

Comparison to other screening modalities

Number needed to screen LDCT less than mammography and colonoscopy

- Screening LDCT (NLST) NNS = 320 (The National Lung Screening Trial Research Team. N Engl J Med 2011;365:395-409)
- Screening Mammography NNS = 780-2000 (Getzsche PC, Nielson M. Screening for breast cancer with mammography. Cochrane Database Syst Rev. 2011;(1):cd001877 and J Med Screen 2001;8:125-127)
- Screening Colonoscopy NNS = 1250 (J Med Screen 2001;8:125-127)
- Screening LDCT 3 highest risk quintiles (NLST) NNS = 208 (Kovalchik SA et al. N Engl J Med 2013;369:245-254)

Screening LDCT more deaths prevented as compared to mammography and PSA testing

- LDCT – 3 deaths averted
- Mammography – 0.1-1.6 deaths averted
- PSA – 0-1 death averted

LCS is the only cancer screening test to reduce overall mortality.

CMS LCS Metrics Requirement

- Collect and submit data to a CMS-approved registry for each LDCT lung cancer screening performed
- Primary purpose: document compliance with coverage criteria
- Secondary purpose: aid in studying the clinical benefits of screening

CMS LCS Metrics Requirement

- The data collected and submitted to a CMS-approved registry must include, at minimum, all of the following elements:

Data Type	CMS Minimum Data Elements
Facility	Identifier
Radiologist (reading)	National Provider Identifier (NPI)
Patient	Identifier
Ordering Practitioner	NPI
CT scanner	Manufacturer, Model
Indication	Lung cancer LDCT screening, absence signs or symptoms of lung cancer
System	Lung nodule identification, classification and reporting system
Smoking history	Current status (current, former, never) Years since quitting Pack-years Smoking cessation interventions available
Effective radiation dose	CT Dose Index (CTDIvol)
Screening	Screen date, initial or subsequent screen

Additional CMS registry requirements:

- Steering committee and governance board
- Quality assurance plan

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ACR Registry

ACR Registry **Required** Elements

- Refused to answer SSN
- Refused Medicare ID
- Date of birth
- Patient sex
- Patient height
- Patient weight
- Smoking status
- Pack years
- Number of years since quit

ACR Registry **Required** Elements

- Did physician provide guidance
- Documentation of shared decision making
- Ordering practitioner NPI
- Reading radiologist NPI
- Exam date
- Signs or symptoms of lung cancer
- Indication of exam

ACR Registry **Required** Elements

- Modality
- CT scanner manufacturer
- CT scanner model
- Reconstructed image width
- CTDIvol
- DLP
- CT exam result Lung RADS
- CT exam result modifier S
- CT exam result modifier C

ACR Registry **Optional** Elements

- Exam unique ID
- **Patient name**
- **Other ID (MRN)**
- Patient SSN
- Medicare Beneficiary ID
- **Ordering practitioner name**

ACR Registry **Optional** Elements

- Date of death
- Cause of death
- How cause was determined
- Other method of determining
- Non-lung cancer cause
- Death within 30 days

ACR Registry **Optional** Elements

- Other comorbidities
- COPD
- Interstitial lung disease
- Pulmonary fibrosis
- Cancer related history
- Years since prior diagnosis
- Radon exposure
- Occupational exposures
- Second hand smoke exposure
- History of cancers
- Lung cancer in first degree relative

ACR Registry **Optional** Elements

- Tube current time
- Tube voltage
- Scanning time
- Scanning volume
- Pitch
- Reason for recall
- Mass specifics
- **Patient race**
- **Patient ethnicity**
- **Health insurance**
- Education level

ACR Registry **Optional** Elements

- Date of follow-up
- Follow-up diagnostic
- **Tissue diagnosis**
- Tissue diagnosis method
- Location from sample obtained
- **Histology**
- Stage, clinical or pathologic
- Overall stage
- T status
- N status
- M status

Shared Decision Making Requirements

- Determination of eligibility
- Use of one or more decision aids
- Benefits and harms of screening
- Follow up diagnostic testing
- Overdiagnosis

Shared Decision Making Requirements

- False positive rate
- Total radiation exposure
- Counseling on importance of adherence to annual LDCT LCS
- Impact of comorbidities and ability or willingness to undergo diagnosis and treatment

Shared Decision Making Requirements

- Counseling on importance of maintaining cigarette smoking abstinence or beginning/continuing tobacco use cessation
- Providing information about tobacco cessation interventions
- If appropriate, provide written order for LCS with LDCT including DOB, current smoking status, pack-year history, # years since quitting, asymptomatic, NPI ordering provider

Additional Data Elements/Future Work

- Institutional positivity rate (provided by ACR)
- Number of cancers (true positives)
- False positive rate
- Treatment, Survival outcomes
- Complications

Additional Data Elements/Future Work

- Impact of screening participation, smoking cessation rates
- Predictor model use
- Biomarker status
- Institutional adherence rates for annual exams
 - Uncover unknown barriers, redirect outreach efforts
- Identification of unscreened groups of patients
- Rate of incidental findings

Metrics Management Strategies

- LCS Coordinator
- Integration with EMR and reporting system
- ACR Registry reports
- Institutional databases

CT Chest Screening Lung Cancer

✓ Accept ✗ Cancel

Process Inst:

Eligibility criteria:

1. Willing and able to undergo lung cancer treatment
2. No signs/symptoms of lung cancer or respiratory infection in past 12 weeks
3. Minimum of 30 pack-years of smoking
4. If former smoker, quit within 15 years
5. Age 55-77 years
6. No history of lung cancer ever or other comorbidities that limit life expectancy to less than 5 years.

Status:

Expected Date:

 Approx.

Expires:

Last Resulted:

Lab Test Results

Component	Time Elapsed	Value	Range	Status
BUN	212 days (09/02/18 0355)	16	10 - 20 mg/dL	Final result
Creatinine	212 days (09/02/18 0355)	0.75 (L)	0.80 - 1.50 mg/dL	Final result
eGFR	212 days (09/02/18 0355)	91	>=60 mL/min/1.73 m ²	Final result

Comments: The eGFR was calculated using the CKD-EPI equation. As with all creatinine based estimates of kidney function, eGFR values calculated with the CKD-EPI equation are not accurate in patients with acute kidney failure, extremes of body mass or the acutely ill. <http://tinyurl.com/DHMCnkf>

Reference Links:

1. Lung Ca CT Screening Decision Aid

Priority:

Routine Routine STAT

Class:

Ancillary Performed Ancillary Performed External

Where will study be performed?

Lebanon Radiology Lebanon Radiology Manchester Radiology External

Reason for exam and clinical history:

Lung Cancer Screening

Other pertinent information:

Asymptomatic but at high risk for lung cancer

Smoking status:

Current Former

How many years ago did patient quit?

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 or greater

Pack Years:

30

Shared decision required for first billed scan - see link above for decision aid. Use the smartphrase ".CTLUNGANCER" for documentation.

Shared Decision Making Documented. This is not the first screen.

Does the patient show any signs or symptoms of lung cancer?

Yes No

Is this the first (baseline) CT or an

Annual

Does the patient show any signs or symptoms of lung cancer?

Is this the first (baseline) CT or an annual exam?

Annual

Is this a low dose CT or a routine CT?

Low Dose CT

Does patient require sedation?

GA rationale:

Airway Concerns Anxiety/Claustrophobia Obesity Pediatric patient

Date of injury if applicable:

Requested Date

Requested Time

CC Results:

Recipient	Modifier	Add PCP
		<input type="button" value="v"/>
		<input type="button" value="Add My List"/> <input type="button" value="v"/>
		<input type="button" value="Build My Lists"/>
		<input type="button" value="Clear All"/>

Comments:

Show Additional Order Details

PATIENT INFORMATION					
NAME			DOB		MRN
<input type="checkbox"/> ON PRECAUTION	<input type="checkbox"/> IS OR MAY BE PREGNANT		<input type="checkbox"/> IV	<input type="checkbox"/> O ₂	<input type="checkbox"/> DEAF <input type="checkbox"/> BLIND
<input type="checkbox"/> DIABETIC	<input type="checkbox"/> WHEELCHAIR		<input type="checkbox"/> STRETCHER		<input type="checkbox"/> DISORIENTED

INDICATION / REQUEST DETAILS	
<input type="checkbox"/> CT	PART TO BE EXAMINED: <i>CT CHEST LUNG CANCER SCREENING(IMG4556)</i> <input type="checkbox"/> BASELINE SCREEN <input type="checkbox"/> ANNUAL
SIGNS / SYMPTOMS: <i>Asymptomatic but at high risk for lung cancer</i>	
QUESTION TO BE ANSWERED: <i>Screening for signs of lung cancer</i>	
ICD-10 CODE <input type="checkbox"/> Former smokers Z87.891 "History of Tobacco Use" <input type="checkbox"/> Current smokers F17.200 "Nicotine Dependence"	COMMENTS:

REFERRING PROVIDER INFORMATION			
NAME		NPI (National Provider Number - REQUIRED):	
<input type="checkbox"/> STAFF PHYSICIAN	<input type="checkbox"/> RESIDENT / INTERN	<input type="checkbox"/> NP / APRN / PA	<input type="checkbox"/> OTHER (OUTSIDE DH)
SIGNATURE		DATE	

BY SIGNING THIS ORDER YOU CERTIFY AND THE MEDICAL RECORD REFLECTS THAT THE PATIENT:	
<input type="checkbox"/> IS 55 – 77 YEARS OF AGE	
<input type="checkbox"/> IS ASYMPTOMATIC FOR LUNG CANCER (no fever, chest pain, new shortness of breath, new or changing cough, coughing up blood, or unexplained significant weight loss)	
<input type="checkbox"/> HAS NO HISTORY OF LUNG CANCER EVER OR OTHER COMORBIDITIES THAT LIMIT LIFE EXPECTANCY TO LESS THAN 5 YEARS	
<input type="checkbox"/> HAS AT LEAST A 30 PACK YEAR HISTORY OF SMOKING - DOCUMENT SMOKING HISTORY BELOW (HELPFUL WEBSITE FOR MULTIPLE STARTING/QUITTING DATES) http://smokingpackyears.com/	
<input type="checkbox"/> CURRENT SMOKER	<input type="checkbox"/> FORMER SMOKER QUIT LESS THAN 15 YEARS AGO: YEAR QUIT _____
<input type="checkbox"/> PACK YEARS MUST BE DOCUMENTED: Packs/day [20 cigarettes/pack] ___ X Years smoked ___ = _____	
<input type="checkbox"/> IF THIS IS THE FIRST SCREENING CT TO BE BILLED TO INSURANCE: HAS PARTICIPATED IN A SHARED DECISION MAKING SESSION DURING WHICH POTENTIAL RISKS AND BENEFITS OF CT LUNG SCREENING WERE DISCUSSED USING A DECISION AID: http://cancer.dartmouth.edu/lung_thoracic/documents/NCCC_Decision_Lung_Cancer_Screening.pdf	
<input type="checkbox"/> WAS INFORMED OF THE IMPORTANCE OF ADHERENCE TO ANNUAL SCREENING, IMPACT OF COMORBIDITIES, ABILITY/WILLINGNESS TO UNDERGO POSSIBLE TREATMENT FOR LUNG CANCER	
<input type="checkbox"/> WAS INFORMED OF THE IMPORTANCE OF SMOKING CESSATION AND/OR MAINTAINING SMOKING ABSTINENCE,	

Data for submission pulls from:

- Order question entries
- Patient's EMR
- CT technologist 'End Exam Navigator'
- Exam report data fields

Registries Console



NRDR LCSR - v1.0

DH MMH LUNG SCREENING SUBMISSION

12/01/18 - 12/31/18

Not ready to submit: 21

Ready to submit: 1

Submitted: 0

Mark Complete

DH MAN LUNG SCREENING SUBMISSION

12/01/18 - 12/31/18

Not ready to submit: 16

Submitted: 0

Patient record for submission has been created by the system

Patient record for submission has been successfully submitted

Patient record for submission is missing no required data elements

Do this when all records for the date range are shown as submitted.

Patient	MRN	Date	Status	Invalid Values?	Missing Required?	Unusual Values?	Missing Recommended?	P
[REDACTED]	[REDACTED]	12/06/2018	New	Y	Y	N	N	

← 🔍 📄 Validation Report

🚨 Important (4)

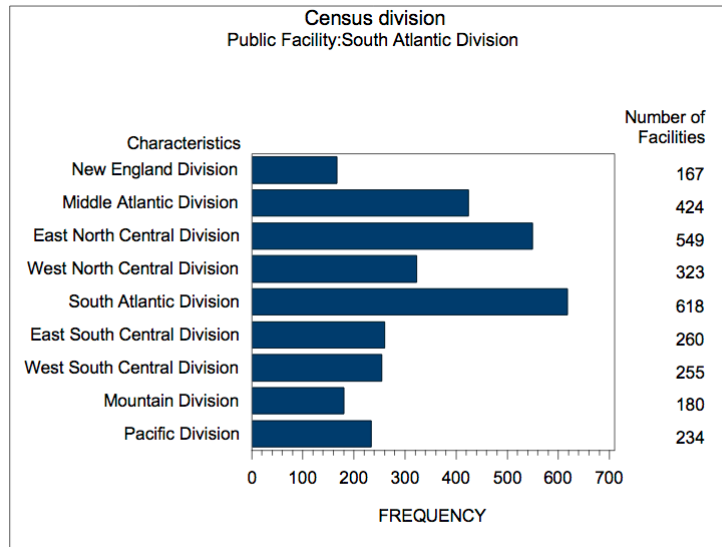
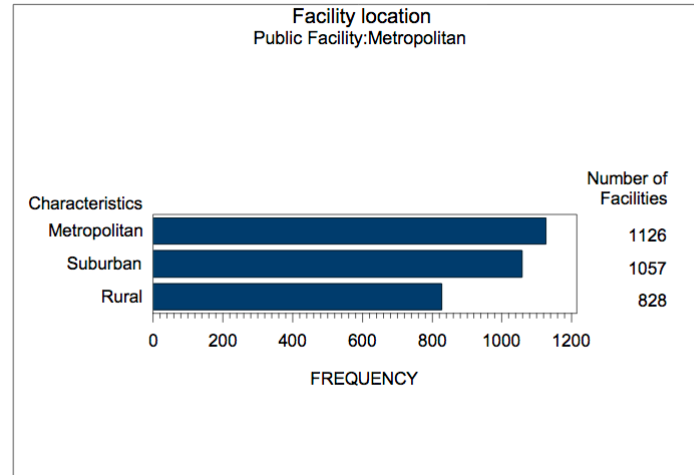
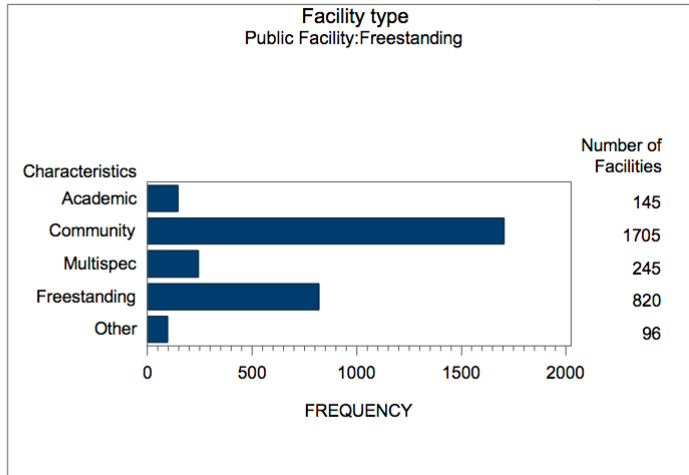
Pack-years: 0	The value 0 is outside the valid range (1 - 999).
CTDIvol: No value	Item missing: CTDIvol
DLP: No value	Item missing: DLP
Reconstructed Image Width: No value	Item missing: Reconstructed Image Width

Essentials

- Proper notification of results
 - Lung-RADS 'positive' versus 'negative' exam
 - EMR/report
 - Telephone
 - Mailing
- Proper follow up of results
- Reminder of annual exam
 - Improving ease of adherence
- Confirming continued eligibility
- Ensuring access to smoking cessation assistance

Report	What Does the Report Show?	Freq.	Users
Accrual	Summary data including number of exams registered, cancelled, in progress and completed for the user's facility	Ad hoc	All
Exam Status	Patient ID, Physician, exam status, and form submission dates		
Exam Detail	Exam and follow-up data, by exam		
LCSR Data Export	All data from Lung Exam and Lung Follow-Up forms submitted to registry for user's facility		
LCSR Quarterly Aggregate Report	<p>Aggregated measures for facility compared to other sites by type, location, and geographical region, and to entire registry</p> <p>Measures for each physician compared to entire registry</p> <p>List of physicians participating in ABR PQI</p> <p>Sample LCSR Quarterly Aggregate Report</p>	Quarterly	All
LCSR Corporate Account Reports	Excel spreadsheet with same data as <i>National Comparison</i> table in <i>Quarterly Aggregate Report</i> , but with data for each facility shown side-by-side compared to entire corporate account (i.e. all facilities combined), and the LCSR.		

LCSR Facility Characteristics : 2017-2018



**Facility 100853 National Comparison
Jan-Dec 2018**

Measure		2018			
		Your Facility (100853)		All LCSR	
		Rate	Num-Den	Rate	Num-Den
All Exams		132379	132379	412546	412546
Appropriateness of screening by USPSTF criteria (%)		90.35	119609 / 132379	90.32	372592 / 412546
Smoking cessation counselling offered (%)		76.35	101070 / 132379	76.94	317420 / 412546
	Smoking cessation counselling offered among current smokers (%)	83.86	64559 / 76980	84.35	203377 / 241105
Radiation exposure 1	Mean CTDIvol - Overall (mGy)	3.23	NA / 132379	3.23	NA / 412546
	Mean CTDIvol - underweight (BMI <18.5)(mGy)	2.61	NA / 5140	2.67	NA / 16838
	Mean CTDIvol - normal (BMI of 18.5 -24.9)(mGy)	2.75	NA / 32174	2.68	NA / 100078
	Mean CTDIvol - overweight (BMI of 25 -29.9)(mGy)	3.06	NA / 42347	3.04	NA / 131690
	Mean CTDIvol - obese (BMI of 30 or greater)(mGy)	3.81	NA / 46635	3.88	NA / 144919
Radiation exposure 2	Mean DLP - Overall	95.99	NA / 132379	95.68	NA / 412546
	Mean DLP - underweight (BMI <18.5)(mGy-cm)	79.97	NA / 5140	78.64	NA / 16838
	Mean DLP - normal (BMI of 18.5-24.9)(mGy-cm)	79.24	NA / 32174	79.28	NA / 100078
	Mean DLP - overweight (BMI of 25-29.9)(mGy-cm)	91.30	NA / 42347	90.89	NA / 131690
	Mean DLP - obese (BMI of 30 or greater)(mGy-cm)	114.50	NA / 46635	113.89	NA / 144919
Abnormal Interpretation Rate (%)	(Lung-RADS 3, 4a, 4b, 4x)	15.30	20256 / 132379	15.35	63307 / 412546
	Abnormal Interpretation Rate, at baseline exam (%)	17.26	15041 / 87142	17.38	47275 / 272081
	Abnormal Interpretation Rate, at annual exam (%)	10.81	4702 / 43484	10.66	14400 / 135087
Cancer Detection Rate (CDR) per 1000		2.68	355 / 132379	2.60	1074 / 412546
	CDR per 1000 for prevalent cancers, detected at baseline exam	3.12	272 / 87142	3.01	819 / 272081
	CDR per 1000 for incident cancers, detected at annual exam	1.79	78 / 43484	1.69	228 / 135087
Positive Predictive Value 1 (PPV1)(%)		1.75	355 / 20256	1.70	1074 / 63307
	PPV1 for lung cancers detected on percutaneous biopsies (%)	49.46	182 / 368	51.24	537 / 1048
	PPV1 for lung cancers detected on bronchoscopies (%)	40.72	90 / 221	39.22	273 / 696
	PPV1 for surgically detected lung cancers (%)	66.06	109 / 165	65.53	365 / 557
Positive Predictive Value 2a (PPV2a) (%)		0.43	73 / 16834	0.44	233 / 52668

Challenges/ Ongoing work

- Quality of data input (e.g. smoking history, comorbidities, pathology correlation)
- Shared decision making verification
- Adherence to registry submission
- Sensitivity
 - ?False negatives
- Overdiagnosis
- Lung-RADS updates

Recap

- Effective LCS requires a multidisciplinary program
- ATS/ALA Lung Cancer Screening Implementation Guide
- Integration with EMR, reporting system
- Importance of LCS Coordinator
- Accurate and complete LCS metrics
 - Institutional and national LCS analysis
 - Future research efforts
- ACR Lung Cancer Screening Registry

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