

Lahey Lung Health Program:

Lee Gazourian, MD
November 3rd, 2022

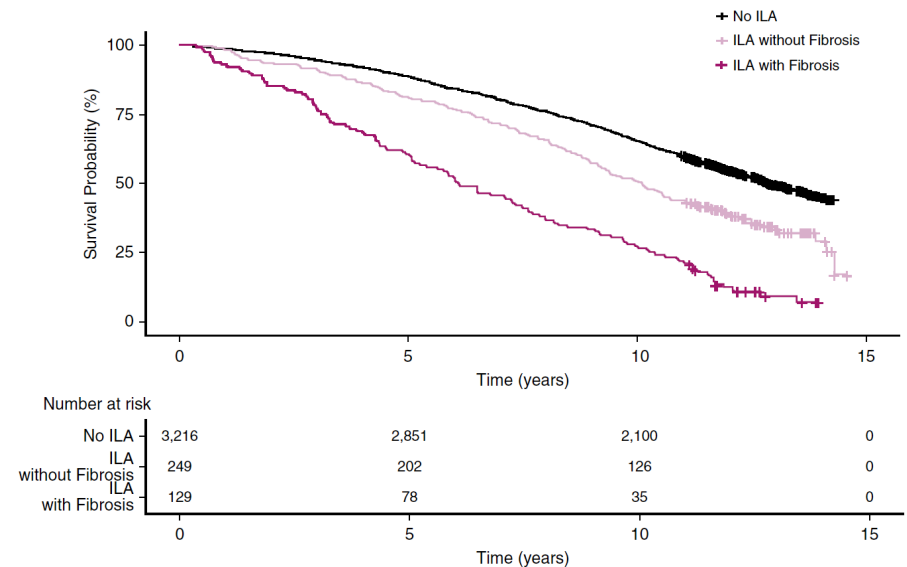
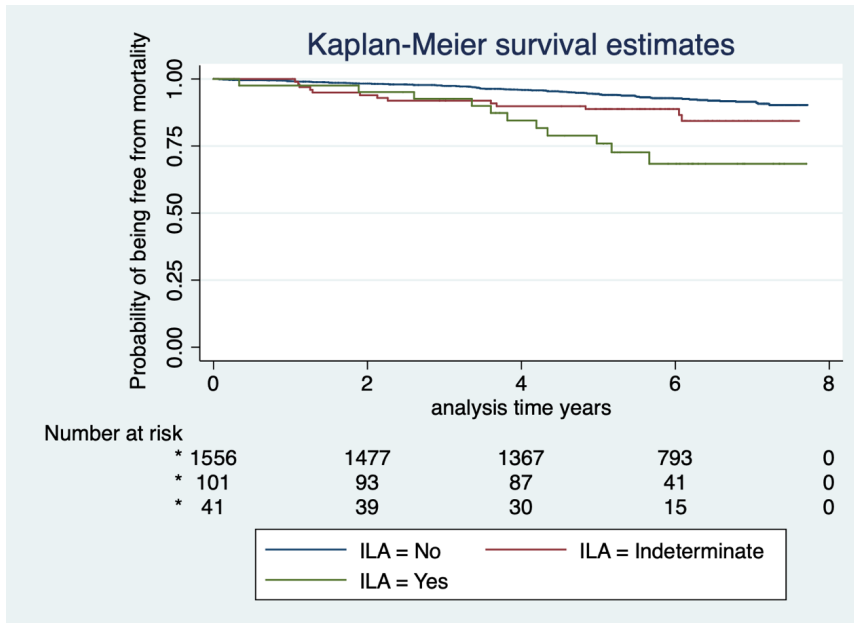
Beth Israel Lahey Health 
Lahey Hospital & Medical Center

ILA DATA CTLS Cohort: Mortality Supported by Genentech

	HR	p-value
No ILA	Reference Group	-
Indeterminate ILA	1.83 (1.03, 3.26)	0.04
ILA	3.71 (1.99, 6.94)	<0.001

Table 4. Association between Imaging Pattern and Features and Mortality*

	Unadjusted Analysis		Adjusted Analysis†	
	HR (95% CI)	P Value	HR (95% CI)	P Value
Reticular markings ¹	2.0 (1.3–3.1)	0.002	1.6 (1.0–2.5)	0.049
Centrilobular nodules	0.7 (0.6–0.9)	0.01	0.9 (0.7–1.1)	0.3
Nonemphysematous cysts	1.7 (1.3–2.2)	<0.0001	1.4 (1.1–1.8)	0.02
Traction bronchiectasis	2.0 (1.6–2.6)	<0.0001	1.6 (1.3–2.1)	0.0001
Lower lobe ² predominance	1.5 (0.95–2.5)	0.08	1.1 (0.6–1.7)	0.8
Subpleural location ³	2.0 (1.3–3.2)	0.003	1.6 (1.0–2.7)	0.050
ILA without fibrosis	1.3 (1.2–1.4)	<0.0001	1.2 (1.1–1.3)	0.0004
Definite fibrosis	1.9 (1.7–2.1)	<0.0001	1.5 (1.3–1.6)	<0.0001
Indeterminate for UIP	1.6 (1.3–2.0)	<0.0001	1.2 (0.98–1.5)	0.07
Probable UIP pattern	3.3 (2.6–4.2)	<0.0001	1.9 (1.5–2.5)	<0.0001
UIP pattern	6.9 (4.2–11)	<0.0001	4.5 (2.8–7.2)	<0.0001



Putman et al. 2019

* Multivariable analysis adjusted for age, sex, BMI, pack years, current smoker

ILA DATA CTLS Cohort: Clinical Opportunity

N=41 (2.6% of CTLS scans)	N (%)	Years to
Followed by Pulmonary Pre	7 (17.1%)	-
Followed by Pulmonary Post N=34	29 (85.3%)	2.37 ± 2.87
ILD diagnosis	10 (24.4%)	4.47 ± 2.72

ILA DATA Non-Screening Cohort: Clinical Opportunity 2/9/2022-5/6/2022

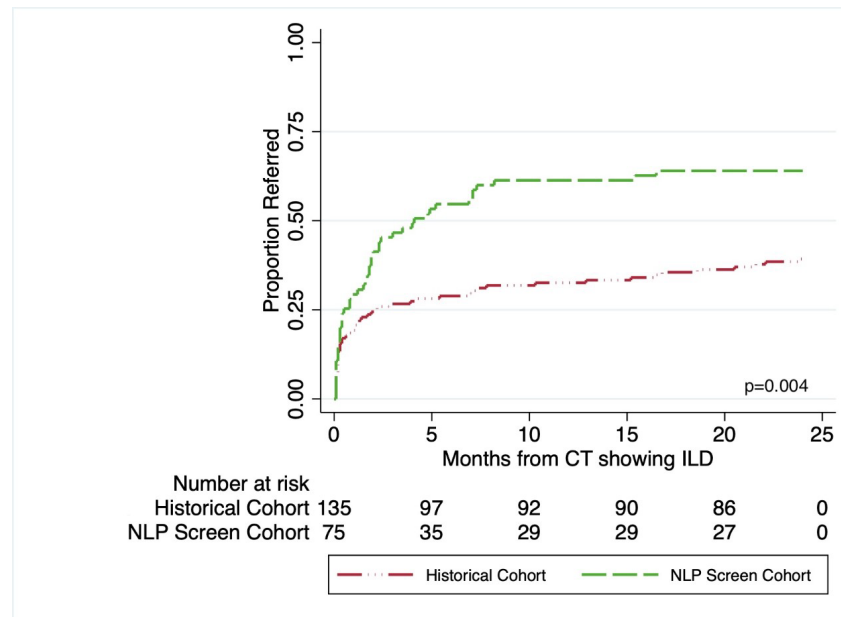
Table 7. CT Chest N 5451	N (%)	Extrapolation to 1 year
Table 7: ILA Criteria		
ILA*	99 (1.82%)	429
New to Pulmonary	46 (0.84%)	199
Carry ILD Diagnosis		
ILD	155 (2.84%)	672
Currently on Antifibrotic treatment	22 (0.40%)	95
Treatment opportunity		
Met antifibrotic Treatment Criteria [#]	17 (0.31%)	74
Potential antifibrotic candidates [#]	68 (1.25%)	295

*Excluded age>85, Active metastatic cancer, dementia or other major comorbidities.

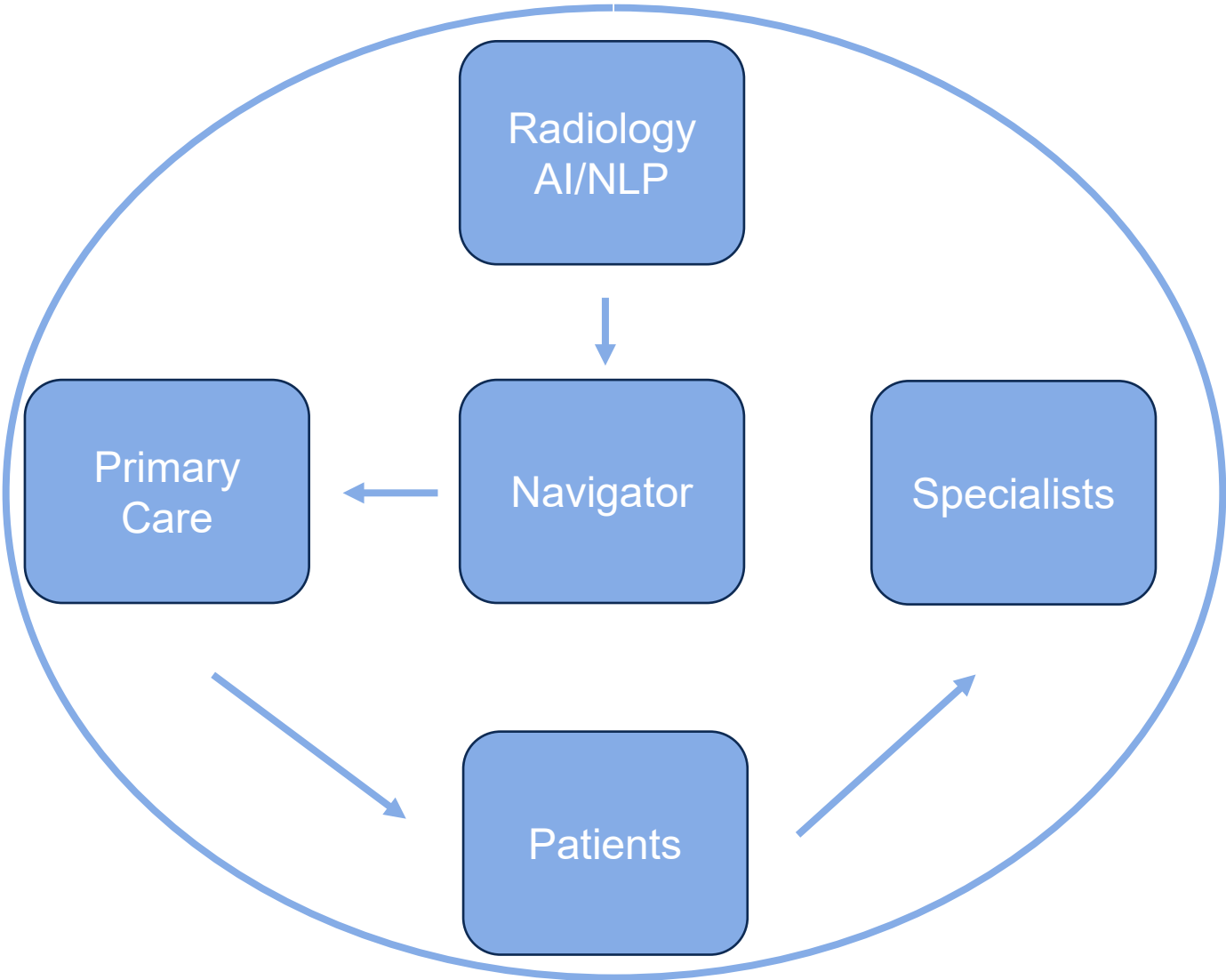
[#]Did not exclude age>85


Screening ILD Increases Referral UC Davis Study

- Outpatient CT reports screened using NLP
- Flagged patients reviewed by ILD specialist
- Patients with incident ILD had pulmonology referral recommended to PCPs



UC Davis Model:



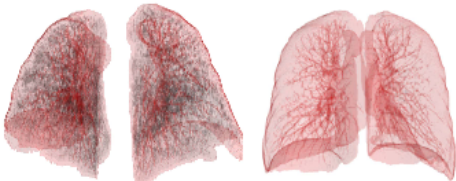
Beth Israel Lahey Health 
Lahey Hospital & Medical Center

AIR™ Lung Report
CT Scan Performed on 10/10/2022

Name: John DOE
Sex: MALE
Patient ID: 11269
Age: 60

Your Recent CT scan of the CHEST demonstrated:
Interstitial Lung Abnormalities (ILA)

ILA can be an early marker of: Early Interstitial lung disease, they may also not have any significance or health impact.



Your Lungs **Unaffected Lungs**

*Abnormal ILA in Black

1. Interstitial lung disease causes include hazardous exposures, auto immune disease and many are unknown.
2. Early in the disease course patient are often without symptoms or have a dry cough. Symptoms such as shortness of breath often do not appear until significant damage has occurred.
3. Early Treatments can slow the progression of these changes and help preserve lung function.

An evaluation by a lung specialist is recommended: Our pulmonary team will perform an evaluation into the potential cause, perform breathing tests, measure oxygen levels with exercise and provide management recommendations as there are treatments that can slow the progression of interstitial lung disease.

Lahey Lung Health Clinic

Your primary care physician Dr.
was notified of these findings and ordered a referral to the
Lahey lung health clinic. Please call **(781) 744-1823**
to schedule your appointment.

Lahey Hospital and Medical Center®
Powered by Imbio, Inc

Respiratory Medicine 176 (2021) 106245



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Respiratory Medicine

journal homepage: <http://www.elsevier.com/locate/rmed>



Qualitative emphysema and risk of COPD hospitalization in a multicenter CT lung cancer screening cohort study



Lee Gazourian^{a,*}, William B. Thedinger^b, Shawn M. Regis^c, Elizabeth J. Pagura^a,
Lori Lyn Price^{d,e}, Melissa Gawlik^f, Cristina F. Stefanescu^g, Carla Lamb^a,
Kimberly M. Rieger-Christ^h, Harpreet Singhⁱ, Marcel Casasolaⁱ, Alexander R. Walkerⁱ,
Arashdeep Rupalⁱ, Avignat S. Patel^a, Carolyn E. Come^a, Ava M. Sanayei^b, William P. Long^b,
Giulia S. Rizzo^j, Andrea B. McKee^c, George R. Washko^{k,l}, Raul San Jose Estepar^{k,m},
Christoph Waldⁿ, Brady J. McKeeⁿ, Carey C. Thomson^{i,o,p,1}, Timothy N. Liesching^{a,1}

Table 5

Rates of active smoking, PFT/COPD screening in the 5 years prior to baseline exam and pneumococcal 23 (PPSV 23) vaccination rates in patients with qualitative emphysema on their baseline CTLS exam in patients with in network primary care physicians.

	<u>LHMC</u>	<u>MAH</u>
	N = 3226	N = 915
Emphysema (Yes)	1839 (57.0%)	475 (51.9%)
Active Smoking	1045 (56.8%)	261 (54.9%)
PFTs (No)	1238 (67.3%)	371 (78.1%)
PPSV 23 (No)	713 (38.8%)	254 (53.5%)

Quantitative CT Assessment in the CT Lung Cancer Screening (CTLS) Population: A potential tool for screening candidates for bronchoscopic lung volume reduction (BLVR)

Approximately 4% of the CT lung screening population may benefit from further evaluation for candidacy for bronchoscopic lung volume reduction with systematic use of quantitative emphysema CT assessment.

Carla Lamb MD, Shawn Regis PhD, William Thedinger BA, Effie Adjei MD, Julia Rabazzi, Susan Jin Kim BS, Elizabeth Pagura BA, Kim Rieger-Christ PhD, Christoph Wald MD PhD, Brady McKee MD, Andrea McKee MD, Tim Liesching MD, Lee Gazourian MD

BACKGROUND:

15 million Americans are estimated to be eligible for CT lung cancer screening (CTLS). CTLS may help identify patients who could clinically benefit from BLVR or lung volume reduction surgery (LVRS).

METHODS

A retrospective, single center study assessed all baseline CTLS exams from January 1, 2012-September 30, 2017. All analysis was performed utilizing a lung analysis software on IntelliSpace Portal 9.0 (CT COPD Philips Healthcare Cleveland OH) Readers blinded to outcomes data performed the analysis and reviewed multiplanar images and corrected any errors in interlobar segmentation. Attenuation of each voxel within segmented lungs was calculated automatically. Emphysema destruction was calculated as the sum of voxels with attenuation below -950 Hounsfield units (HU)

PRESENTED AT

CHEST 2021 
ANNUAL MEETING | OCTOBER 17-20



Results:

A total of 4673 patients were included in the study. Quantitative global and lobar emphysema scores were obtained on 4495 patients (96.2%). A majority of patients 2845 (60.9%) had less than 1% emphysema destruction. 1207 of the patients (25.8%) had between 1-5% emphysema destruction with 235 patients (5%) between 5-10% destruction and 208 patients (4.5%) with greater than 10% emphysema destruction. In our cohort, 124 patients (59.6%) demonstrated a global % LAA of -950 HU > 10% and had heterogeneous disease defined as delta of 15% LAA between ipsilateral lobes. There were 182 patients (3.9%) who had at least one lobe with at least 20% lung destruction (%LAA -950 HU > 20%).

CLINICAL IMPLICATIONS

- Utilizing a systematic quantitative emphysema CT assessment in patients undergoing CT lung screening may identify potential candidates for further evaluation for BLVR or LVRS.

Beth Israel Lahey Health 
Lahey Hospital & Medical Center

Imbio

CASE STUDY

POPULATION HEALTH SCREENING

NOTE: This is a continuation of our 90-day review that yielded 49 AI-detected severe emphysema patients, which led to 27 new BLVR candidates within the pulmonology clinic, and the scheduling of 4 patients that qualified after cross-referencing for BLVR.

SITUATION

Emphysema and COPD are underdiagnosed in up to 50% of patients, and many are not found until later stages of the disease. For those presenting with advanced disease, having the latest options like Bronchoscopic Lung Volume Reduction (BLVR) to help them improve their breathing is extremely important. As a nationally ranked Pulmonology and Lung Surgery center, the Pulmonary clinic at the University of Chicago treats complex, chronic and rare lung diseases, and their clinicians are always looking for innovative approaches to patient care. Dr. D. Kyle Hogarth, Professor of Medicine in the Section of Pulmonary and Critical Care Medicine, saw the potential of Imbio's Population Screening Program as a way to identify patients seen anywhere in the hospital system that should have been referred to Pulmonology based on their imaging. Along with Dr. Ajay Wagh, Interventional Pulmonologist, the clinic is utilizing Imbio's artificial intelligence technology to identify and treat more patients who have COPD, including those with severe emphysema.



D. Kyle Hogarth, MD



Ajay Wagh, MD, MS

IMBIO IMPACT

"Imbio's unique platform helps us identify emphysema patients that could benefit from BLVR. It has been invaluable in helping us to keep our colleagues informed on additional treatment options that can help COPD patients in our community resulting in appropriate referrals and better care."

- Dr. Ajay Wagh

150-Day Review

67 new potential BLVR patients added to the clinic

after cross-referencing pre-existing conditions

8 patients treated or confirmed eligible for treatment

with a remaining qualification funnel of

40 additional patients under further evaluation

**19 patients deemed ineligible due to other clinical factors*

SOLUTION

Imbio helps find the hidden patients in your health system. Imbio's suite of imaging AI algorithms automatically analyze a facility's daily chest CTs and specialists, like Dr. Hogarth and Dr. Wagh, are alerted to high risk patients who were not being routed to their clinic. Imbio AI also provides clinicians with visualization of the patient condition on their CT scan, and quantitative reports that can enhance the way the patient is diagnosed, treated, and managed. By analyzing and identifying patients across the UC institution and alerting the proper specialist, patients who may have been overlooked can receive preventative treatment, or advanced care, such as the BLVR procedure. Imbio provides a way to detect an issue that patients and providers may not have known existed, improving care. It also helps busy clinicians grow their practice and retain patients in their health system without disrupting their daily work.



Helping Patients



Growing Pulmonology Practice

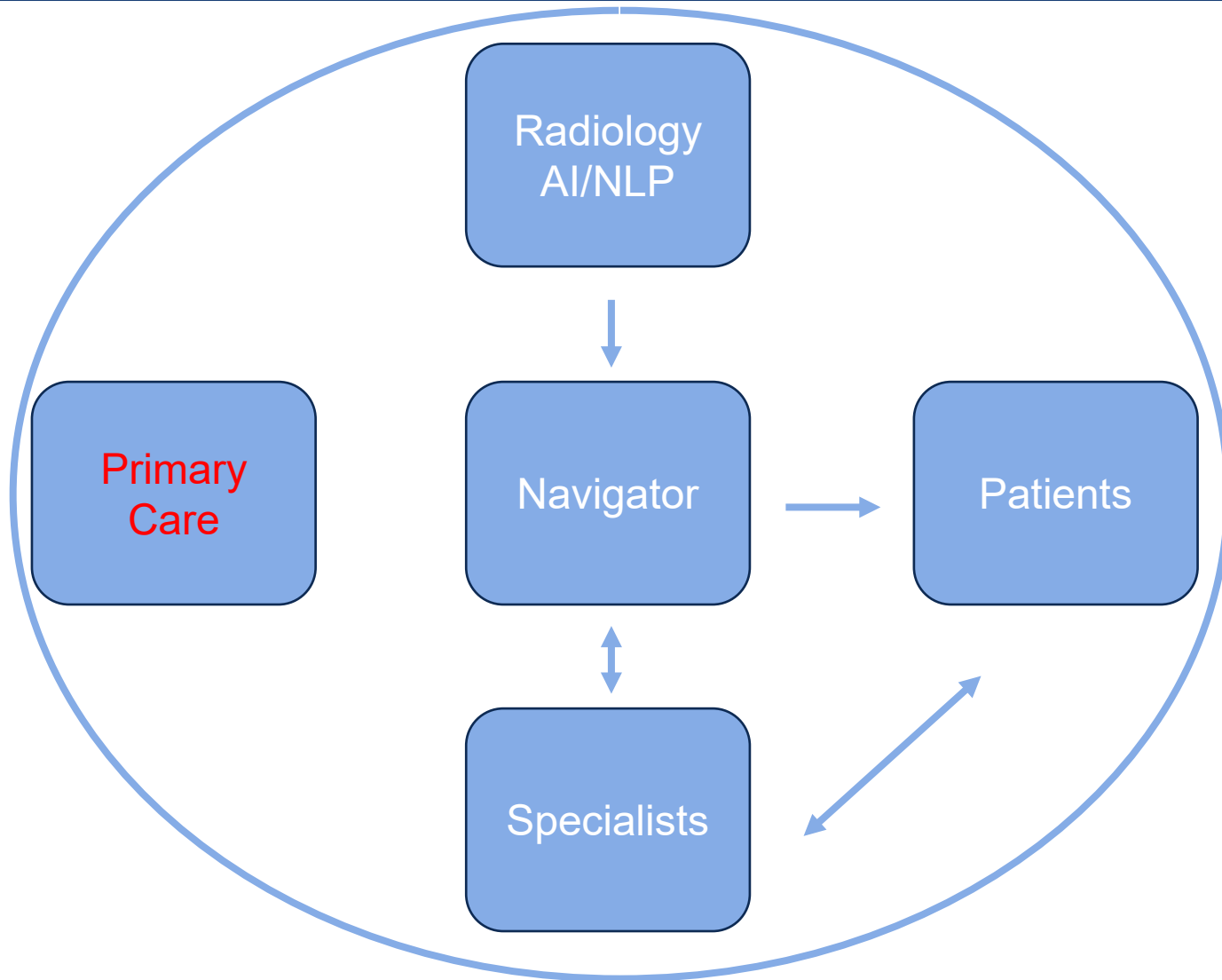


Increasing Revenue

info@imbio.com | +1.612.520.7360 | www.imbio.com

MM-7 v2.3

U Chicago Model:



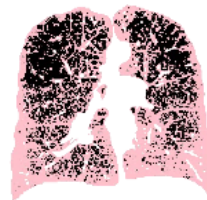
Beth Israel Lahey Health 
Lahey Hospital & Medical Center

AIR™ Lung Report

CT Scan Performed on 10/10/2022

Name: LILLY DOE
Sex: FEMALE
Patient ID: 11269
Age: 60

Your recent CT Exam demonstrated: Marked Emphysema



Your Lungs



Unaffected Lungs

*Abnormal Emphysema in Black

Patients with your degree of Emphysema are at increase risk for:

- Lung Cancer
- Hospitalization
- Mortality

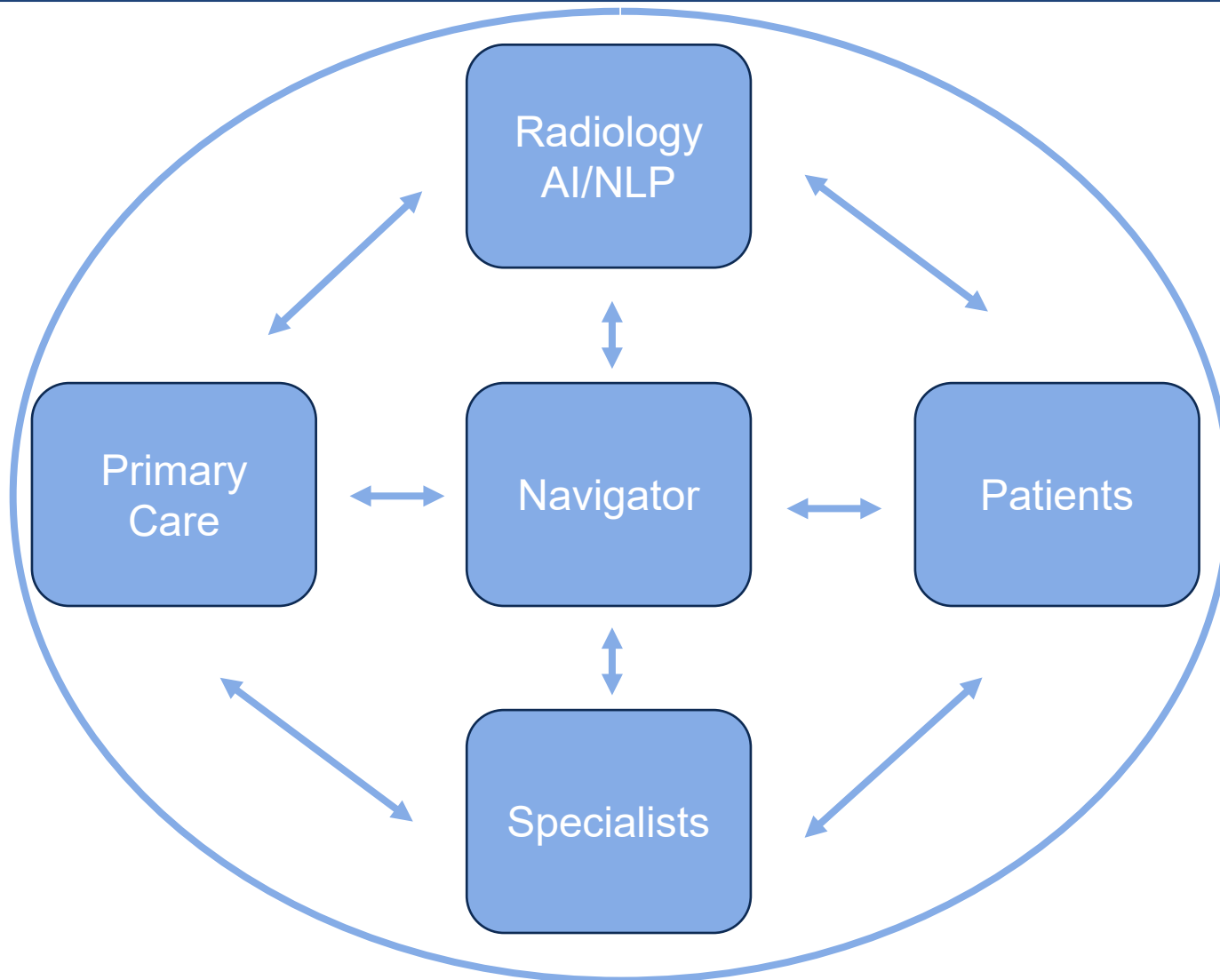
Evaluation by our COPD team is recommended: They will perform an evaluation, review your current COPD treatment regimen. You may qualify for advanced therapies such as bronchoscopic or surgical lung volume reduction, pulmonary rehabilitation and others. Our team can also provide information on clinical trials that you may also qualify for with a goal of improving your quality of life.

Lahey Lung Health Clinic

Your primary care physician Dr. [Name] was notified of these findings and ordered a referral to the Lahey Lung Health clinic. Please call (781) 744-1823 to schedule your appointment.

Lahey Hospital and Medical Center®
Powered by Imbio, Inc

Lahey Lung Health Model: Supported by Three Lakes Foundation



Lung Health Program Mission.

