

QUANTITATIVE IMAGING WORKSHOP XIX:

*Utilizing Quantitative Thoracic Imaging
to Optimize Population Health*

November 3-4, 2022 | Virtual

QUANTITATIVE
IMAGING
WORKSHOP



prevent
cancer®
FOUNDATION

kV 120
mA 250
Medium Body
5.000ms/55.00 1.375
Tilt: 0.0
0.65 /HE 11:28:38/03.21
V:350 L:40

LightSpeed VCT SYSVCT

kV 120
mA 250
Medium Body
5.000ms/55.00 1.375
Tilt: 0.0
0.65 /HE 11:28:38/03.21
V:350 L:40
P 143
LightSpeed VCT SYSVCT
A 144
Ex: 15216
Sp: 4
SN 12.75
In: 5+C
DFOV 33.6cm

Medium Body
5.000ms/55.00
Tilt: 0.0
0.65 /HE 11:28:38/03.21
V:350 L:40
LightSpeed VCT SYSVCT
Ex: 15216
Sp: 4
SN 12.75
In: 5+C

IN PARTNERSHIP WITH
 American Lung Association.

QUANTITATIVE IMAGING WORKSHOP 

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QUANTITATIVE IMAGING WORKSHOP 

Goals of Workshop XIX

- Define ways to leverage existing payer infrastructure to speed implementation.
 - + Consider models to sustain innovation with computational tools such as AI for workflow or radiomic analyses so all communities benefit
- Explore issues with moving additional extracted screening image data into clinical application:
 - + Use-cases-emphysema data and annual longitudinal analyses
- Explore issues with the value-proposition with lung screening
 - + Imaging health or disease, perhaps both in moving to true preventive health management
- Update on imaging innovations
 - + Moving from wow to clinical implementation

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Breakouts Conversations

Two simultaneous working breakouts to develop action plans, identify obstacles as well as strategic deliverables

Clinical Session – Getting Serious About the Public Health Impact of Thoracic CT Imaging in a High-risk Cohort

Technical Session – Harnessing Photon Counting CT and AI - in a Precompetitive Quantitative Consortium for Sustained Public Health Application

QUANTITATIVE IMAGING WORKSHOP XVII:

Leveraging CT to Accelerate Detection of Lung Cancer, COPD and Cardiovascular Disease

Why do we keep talking about the transition to population health

- Understanding where the puck is going
- Transition in funding process
- Implications with evolution to Population Health

How do we know we are winning?

- How do you decide what to score?
- Can we be strategic in measuring outcomes?

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Initial Evidence of Screening Stage-shift

Flores R et al. Association of Stage Shift and Population Mortality among Patients With Non–Small Cell Lung Cancer.

open access JAMA Netw Open. 2021; 4(12):e2137508.

doi: 10.1001/jamanetworkopen.2021.37508

Vachani A, et al. Stage Migration and Lung Cancer Incidence After Initiation of Low-Dose CT Screening, Journal of Thoracic Oncology (2022), doi: <https://doi.org/10.1016/j.jtho.2022.08.011>.

Extract Additional Medical Information from Thoracic CT

- *Reanalysis of 52,726 baseline screening CT scans revealed a 23.8% occurrence of COPD emphysema which was usually (75%) without clinical prior symptoms
- COPD is the fourth leading cause of premature death in the US
- Robust efforts to develop targeted therapy to intercept progression of lung diseases especially including COPD are ongoing
- **Lung cancer & COPD are co-morbid diseases routinely occurring in tobacco-exposed individuals, so additional information enhances screening yield

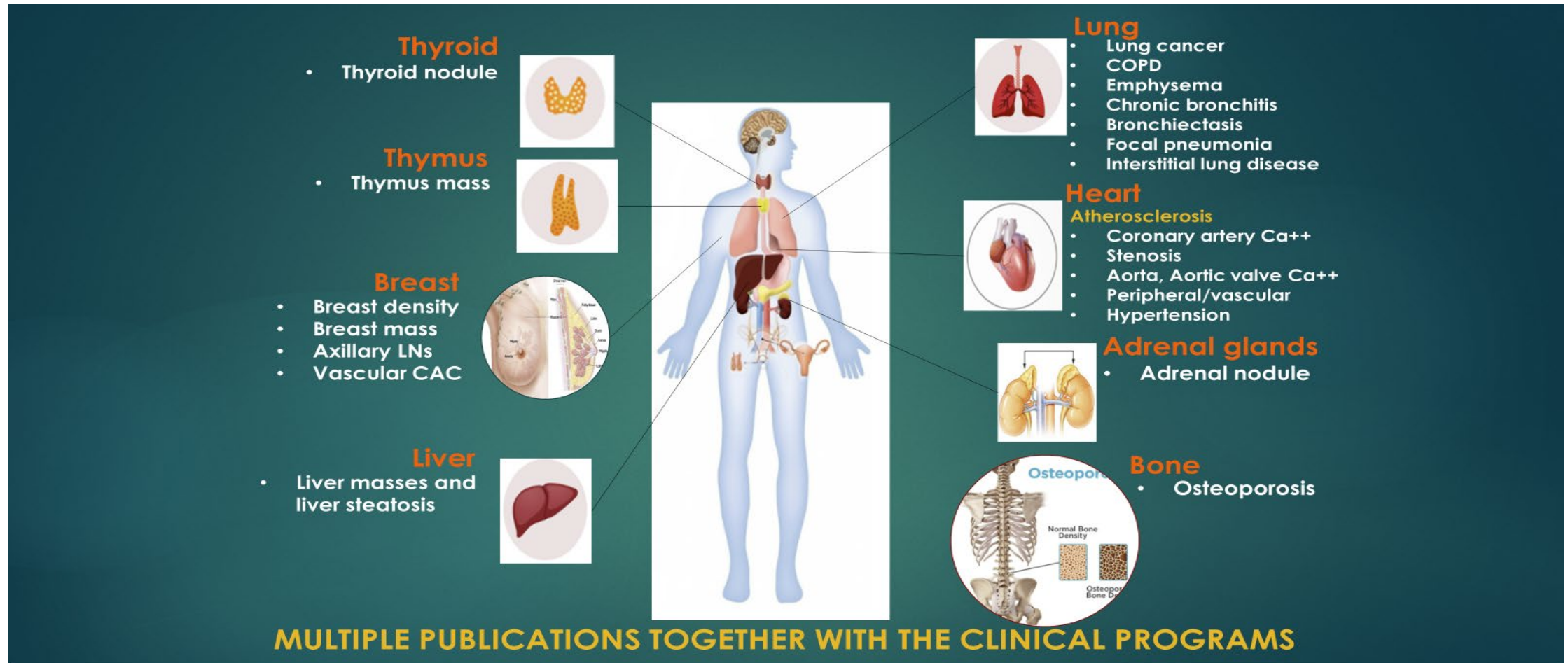
*Steiger D, Siddiqi MF, Yip R et al. The importance of low-dose CT screening to identify emphysema in asymptomatic participants with and without a prior diagnosis of COPD. *Clinical Imaging*. 2021 .78:136-141.

**Rizzo A, Mulshine JL. Thoracic CT screening: using routinely detectable COPD information. *Clinical Imaging*. 2021. 78: 310-12

Getting traction with extracting more imaging information from a screening CT

- Deciding if the additional information can be reliably extracted?
- Implications of information relative to screening participant?
- What is the harms / benefit ration and is that for all participants?
- Is there an efficient road map for validation?
- How do we support innovation with continued radiomics?

Leveraging Radiomics for Personal Health



Relevance of Yin-Yang Concept to Prevention Health and Disease

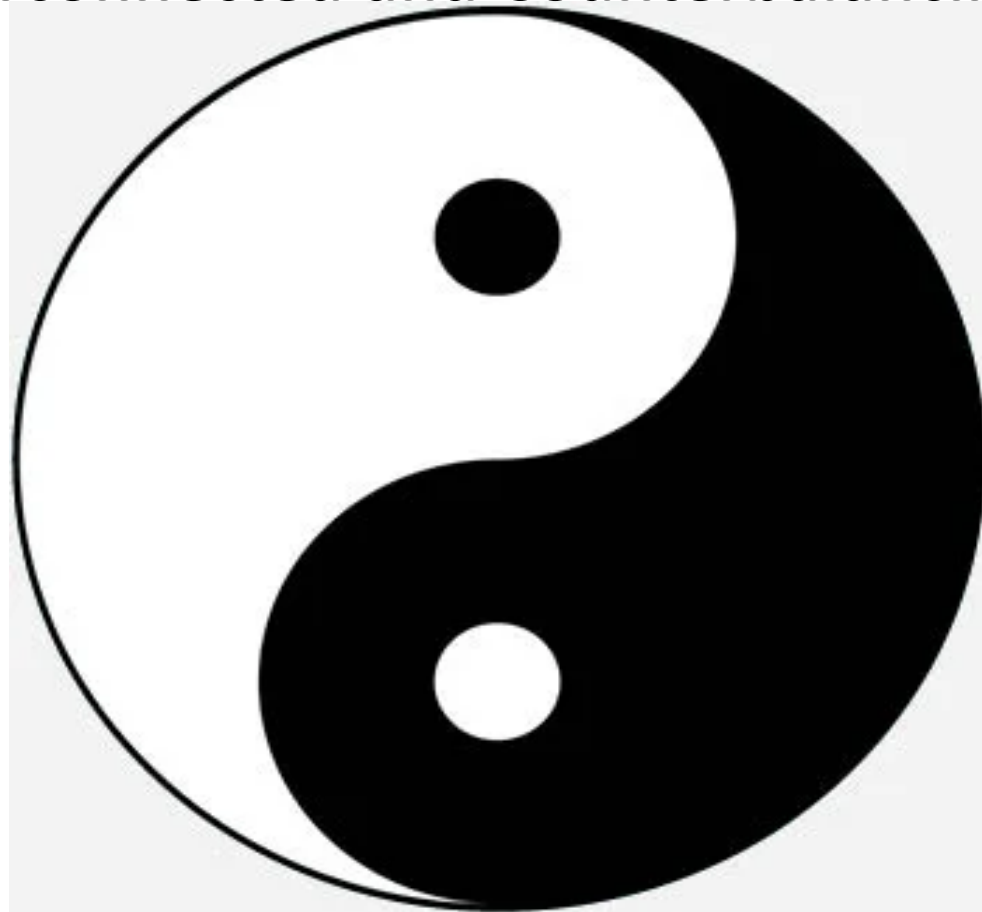
As

Interconnected and Counterbalancing

Heavens

Health

Normal
Tissue



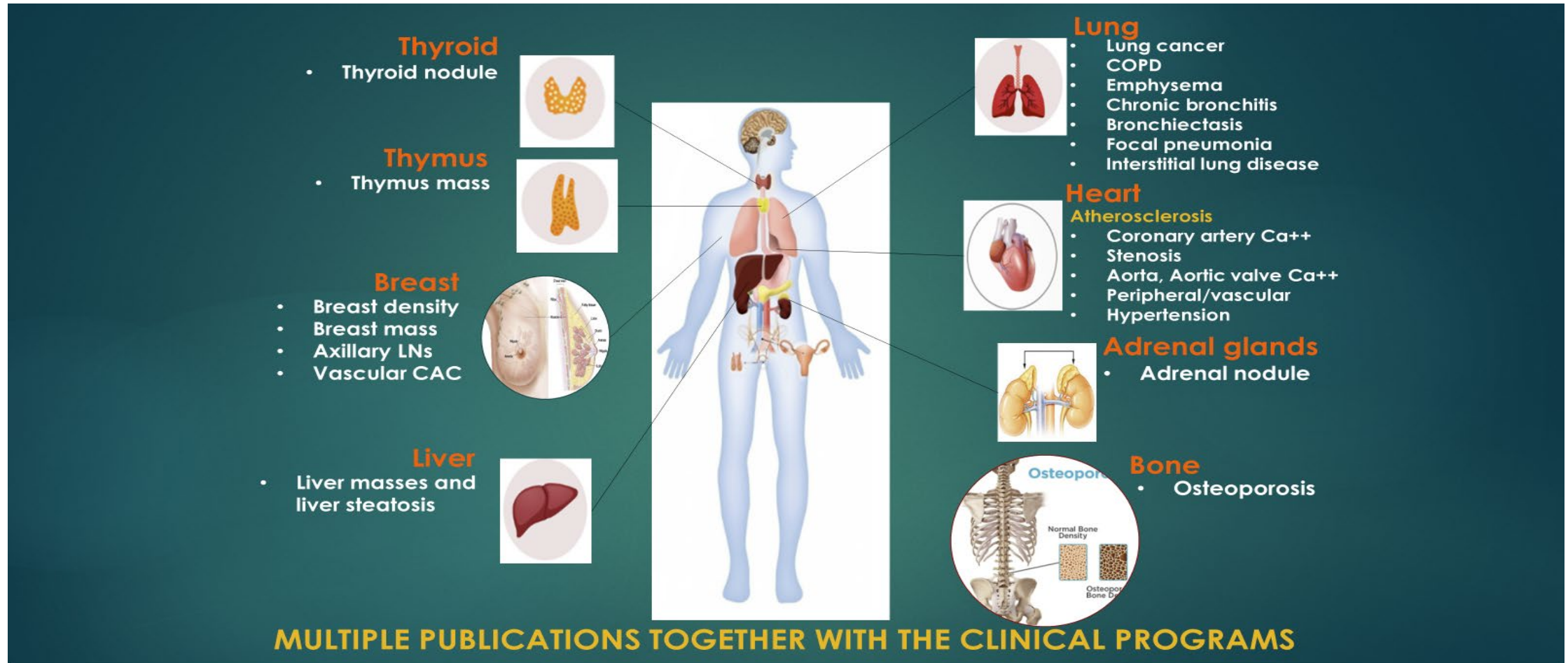
Moon

Disease

Pathological
Tissue

Confucius: Shih Ching , 6th-century BCE

Leveraging Radiomics for Personal Health



Evolution of QIBA Thoracic Profiles for LCS/COPD from COVID Collaboration

- This effort laid the foundation for harmonizing imaging acquisition and quality control to enable optimal quantitative assessment of COPD from images acquired for lung cancer screening
- With new USPSTF guidelines, an additional 50% more individuals with tobacco-exposure will be eligible for annual screening (eligibility from 9-14M)
- Efficient yet rigorous, standardized approach to image processing is key to scalable early disease management which will be used for preventive as well as clinical management support

**Avila RS et al. QIBA guidance: CT imaging for COVID-19 quantitative imaging applications. Clinical Imaging. 2021 Sep;77:151-157. doi: 10.1016/j.clinimag.2021.02.017. PMID: 33684789. **

Clinical Breakout Session Questions

Getting Serious About the Public Health Impact of Thoracic CT Imaging

1. How do we advance the message that lung cancer screening is an internationally validated life-saving service that should be urgently embraced by the public and medical community?
2. How do we communicate the importance of AI and related tools and that imaging data donation is essential to speeding innovations that can address major chronic diseases and ensure that the tool function equally well for all the diverse individuals who could benefit from screening?

Clinical Breakout Session Questions

3. Is it time to think about lung cancer screening in a broader public health context starting with impact on other major tobacco-related diseases?
4. If thoracic CT in a population of tobacco-exposed individuals is such a multi-detection imaging tool, what is the strategy to ensure economic incentives are in place to advance this important public health tools to emerge as rapidly as possible?

Technical Breakout Session Questions

Harnessing Photon Counting CT and AI

1. What are the most promising applications of photon-counting to CT lung cancer screening?
2. How successful has AI been in improving detection of early lung cancer in the community hospital setting? What barriers remain in adoption and is anything needed to achieve wider success?
3. How do we best ensure that AI methods are developed with diverse population databases?

Technical Breakout Session Questions

4. What are the best opportunities to add AI into the CT lung screening clinical workflow?
5. Do we need any changes to the DICOM specification to enable better AI integration?
6. How do we link radiology workflow solutions to ambulatory sites especially in low resource areas that may not use an EHR?
7. Can cloud-based resources be available to work with non EHR-based systems?

Potential Action Items From this Workshop

- Define the value proposition with LDCT screening detection of asymptomatic COPD and complete white paper on pulmonary management options arising from extent of emphysema
- Report on technical CT requirements including image quality processes and standardized report structure for the intersection of lung CA and COPD and engage cardiology to consider similar opportunities to optimize cardiac QI
- Build a precompetitive community to evaluate advanced computational tools, such as with artificial intelligence that could improve the workflow and performance of thoracic-imaging based pre-emptive care
- Validate new metrics for population health activities with thoracic CT imaging