

Cancer Imaging Program

Innovate

Quantitate

Translate

Validate

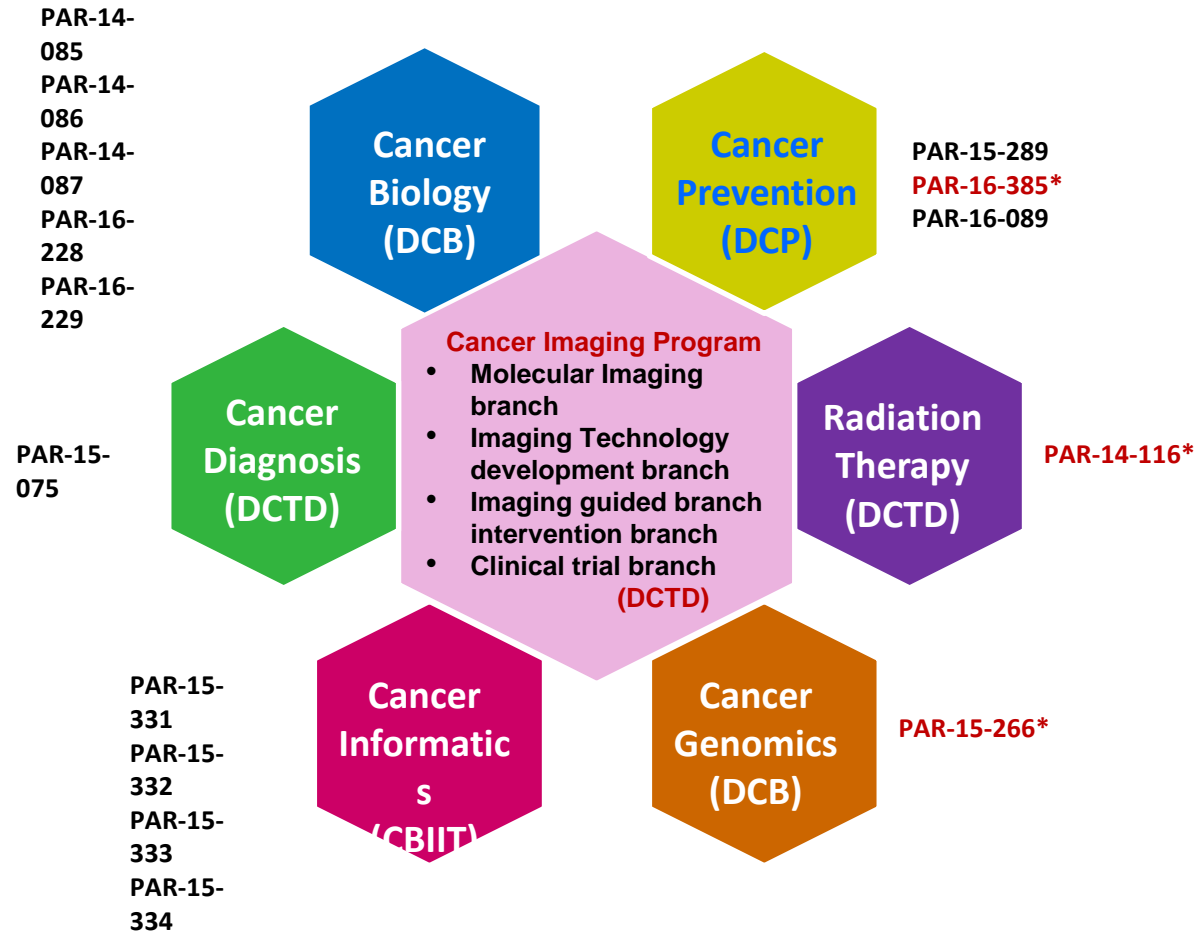


NATIONAL CANCER INSTITUTE

J.F. Eary, M.D.
Associate Director

janet.eary@nih.gov

Imaging initiatives:



*CIP initiatives

NCI/CIP Building Collaboration

- NCI Cancer Imaging: The BIG picture
 - Identify needs/opportunities
 - Convene conversations
 - facilitate articulate goals and focus
 - Identify collaborators
 - Identify resources
 - Participate
 - Communicate

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Evolution of QI in the Thorax

- Define goals
 - Specifics for sensitivity/specificity/accuracy in specific populations (study design)
- Evaluate/harmonize/validate new technology
- Informatics collaboration: set goals

Data vs Information vs Knowledge


INFORMATICS IS EVERYWHERE



NCI Cancer Imaging Program

- **Infrastructure and programs** to support the discovery and development of molecular imaging for cancer care and understanding of cancer biology.
- A set of **imaging methods validated as cancer biomarkers**, some of which are surrogate endpoints.
- Infrastructure and programs to support the **discovery, development and delivery** of image-dependent interventions for cancer and pre-cancer.
- An implemented infrastructure based **on standardized models for the design and conduct of clinical trials** of, or using, imaging and image-guided interventions.
- Accelerated **development and delivery of integrated imaging systems and methods** for cancer care and research.
- Critical role in NIH and NCI activities in emerging technologies, such as nanotechnology, proteomics, and high-throughput screening technologies.
- An implemented **informatics infrastructure** to optimize the value of cancer imaging data.
- A strategy of imaging science and **methods to detect, treat and monitor response** to therapy

Example of risk assessment and screening: Low dose CT lung cancer screening

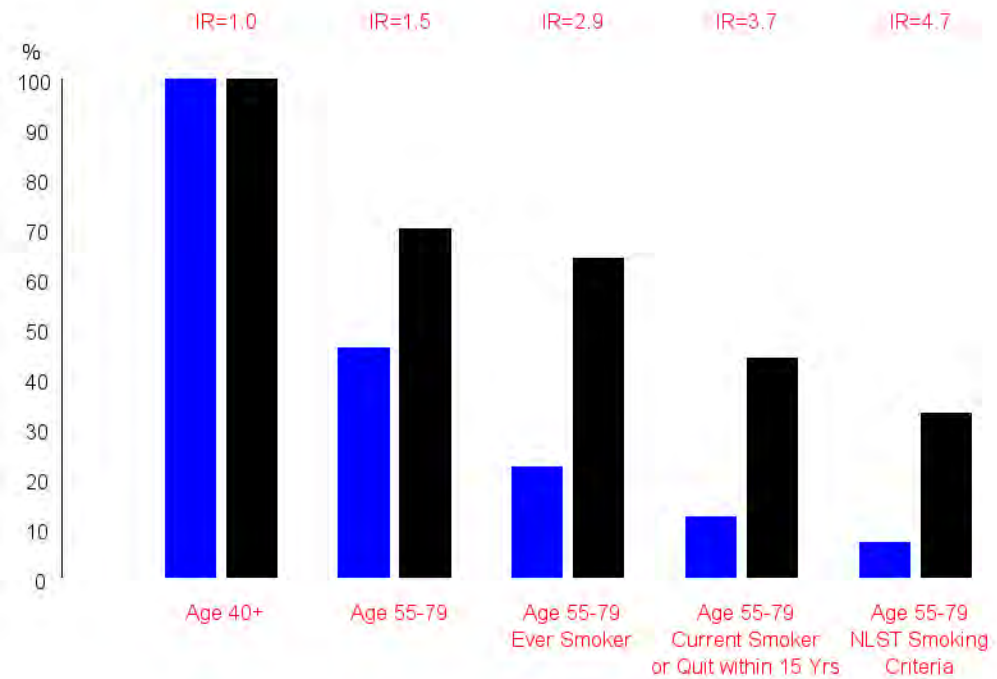
Recommendation Summary		
Summary of Recommendation and Evidence		
Population	Recommendation	Grade (What's This?)
Adults Aged 55-80, with a History of Smoking	The USPSTF recommends annual screening for lung cancer with low-dose computed tomography (LDCT) in adults aged 55 to 80 years who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years. Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery.	B 

The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.

Final Update Summary: Lung Cancer: Screening. U.S. Preventive Services Task Force. July 2015.

Targeted screening through risk stratification for low-dose CT lung cancer screening

Blue bar:
% of
population
Black bar:
% of lung
cancers in the
population



Pinsky PF. Principles of Cancer Screening. Surg Clin North Am. 2015 Oct;95(5):953-66.

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 AUGUST 4, 2011 VOL. 365 NO. 5

Reduced Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening

The National Lung Screening Trial Research Team*

ABSTRACT

BACKGROUND

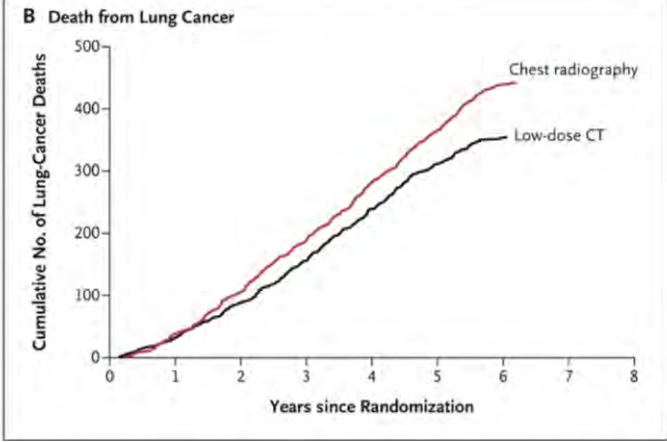
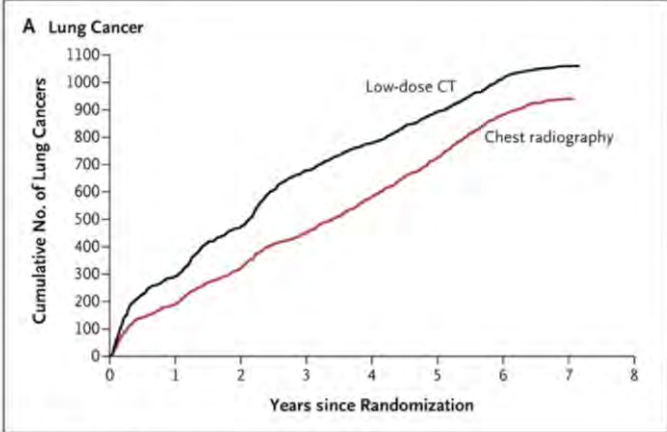
The aggressive and heterogeneous nature of lung cancer has thwarted efforts to reduce mortality from this cancer through the use of screening. The advent of low-dose helical computed tomography (CT) altered the landscape of lung-cancer screening, with studies indicating that low-dose CT detects many tumors at early stages. The National Lung Screening Trial (NLST) was conducted to determine whether screening with low-dose CT could reduce mortality from lung cancer.

The members of the writing team (who are listed in the Appendix) assume responsibility for the integrity of the article. Address reprint requests to Dr. Christine D. Berg at the Early Detection Research Group, Division of Cancer Prevention, National Cancer Institute, 6130 Executive Blvd., Suite 3112, Bethesda, MD 20892-7346, or at berg@mail.nih.gov.

METHODS

There were 247 deaths from lung cancer per 100,000 person-years in the low-dose CT group and 309 deaths per 100,000 person-years in the radiography group, representing a relative reduction in mortality from lung cancer with low-dose CT screening of 20.0% (95% CI, 6.8 to 26.7; P=0.004). The rate of death from any cause was reduced in the low-dose CT group, as compared with the radiography group, by 6.7% (95% CI, 1.2 to 13.6; P=0.02).

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Data Collection Center

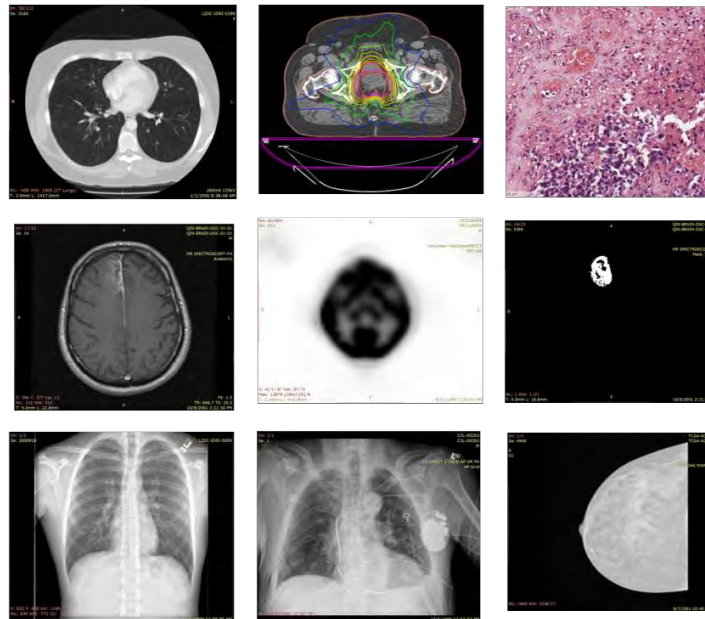
- Tools and staffing to support data collection, curation, and de-identification

Data Access Portal

- Browse (home page)
- Filter/Search (Data Portal)
- REST API
- Analysis Data

Data Analysis Centers

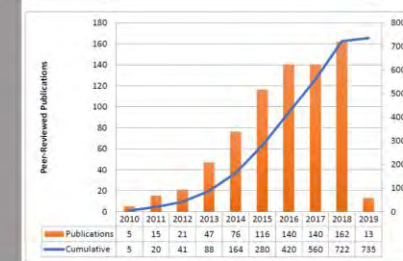
- 3rd party web sites or tools which connect to TCIA's API or mirror its data



TCIA typically supports 15,000 active users from more than 125 countries that download ~ 75 TB of data per month. Countries March 2019 (right)

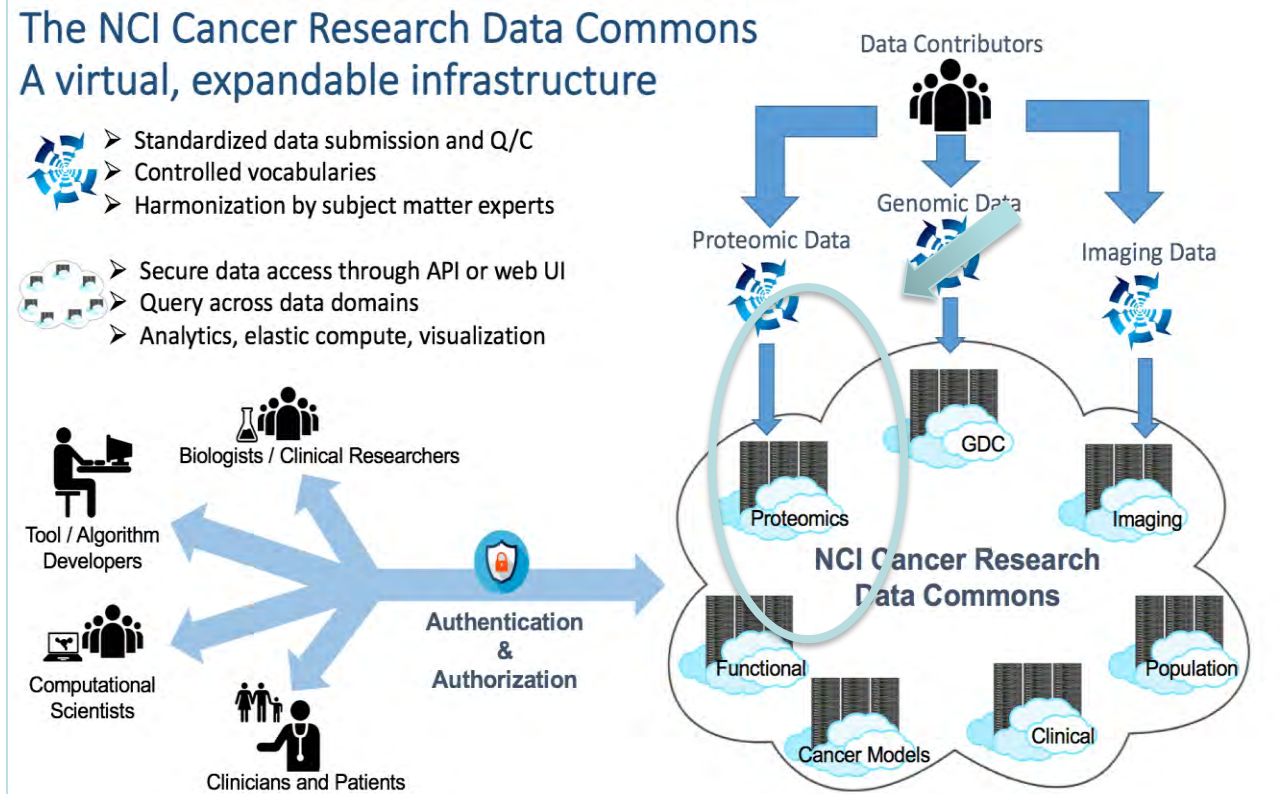


Current Listing of Peer-Reviewed Publications Based on TCIA:



Over 700 publications have referenced TCIA and used its data. A help desk provides email and phone support for both data submitters and researchers who download and use TCIA data. As of March 31, 2019 (above right)

TCIA in the NCI Cancer Research Data Ecosystem



- TCIA will serve as a “data collection center” which feeds into the Imaging Data Commons (IDC)
- IDC will utilize a Data Commons Framework to provide cloud-based analysis