Cancer Imaging Program

Innovate
Quantitate
Translate
Validate

J.F. Eary, M.D.
Associate Director
janet.early@nih.gov
Imaging initiatives:

Cancer Imaging Program
- Molecular Imaging branch
- Imaging Technology development branch
- Imaging guided branch intervention branch
- Clinical trial branch (DCTD)

Cancer Biology (DCB)

Cancer Prevention (DCP)

Cancer Diagnosis (DCTD)

Radiation Therapy (DCTD)

Cancer Informatics (CBIIT)

Cancer Genomics (DCB)

PAR-14-085
PAR-14-086
PAR-14-087
PAR-16-228
PAR-16-229
PAR-15-075
PAR-15-331
PAR-15-332
PAR-15-333
PAR-15-334
PAR-15-289
PAR-16-385*
PAR-16-089
PAR-14-116*
PAR-15-266*

*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
Cancer Imaging Program

Innovate
Quantitate
Translate
Validate

J.F. Eary, M.D.
Associate Director
janet.eary@nih.gov
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
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.
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.

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

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; \( P = 0.02 \)).
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 websites 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)

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)

http://www.cancerimagingarchive.net/

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