Data Science Opportunities for the NCI

Interim Recommendations

National Cancer Advisory Board

Ad hoc Working Group on Data Science

August 14, 2018

Data Science WG Members

Mia Levy
(co-chair)
Vanderbilt

Charles Sawyers
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Regina Barzilay
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Amanda Haddock
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Anne-Marie Meyer
IQVIA

Vince Miller
Foundation Medicine

Sylvia Plevritis
Stanford

Kim Sabelko
Komen

Lincoln Stein
OICR

Nick Wagle
Dana-Farber

Dec-April
Co-Chairs identified
Members finalized/confirmed
Possible priority areas identified

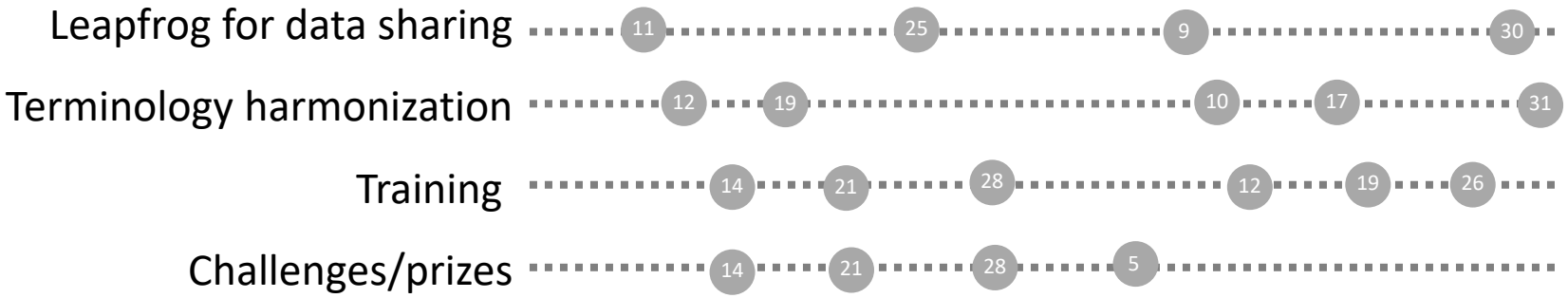
F2F meeting at NCI
Charge to WG
Discussion of priority areas for data science
Brainstorming
Consensus and identification of longer-term priority areas
Prioritization and development of short-term targeted areas

Full WG virtual meeting
Discussion of draft recommendations

Virtual “pre-meeting”
Introductions
Background

June-July
Subgroup meetings to flesh out and develop initial recommendation areas

New WG formed by
Dr. Sharpless/NCAB

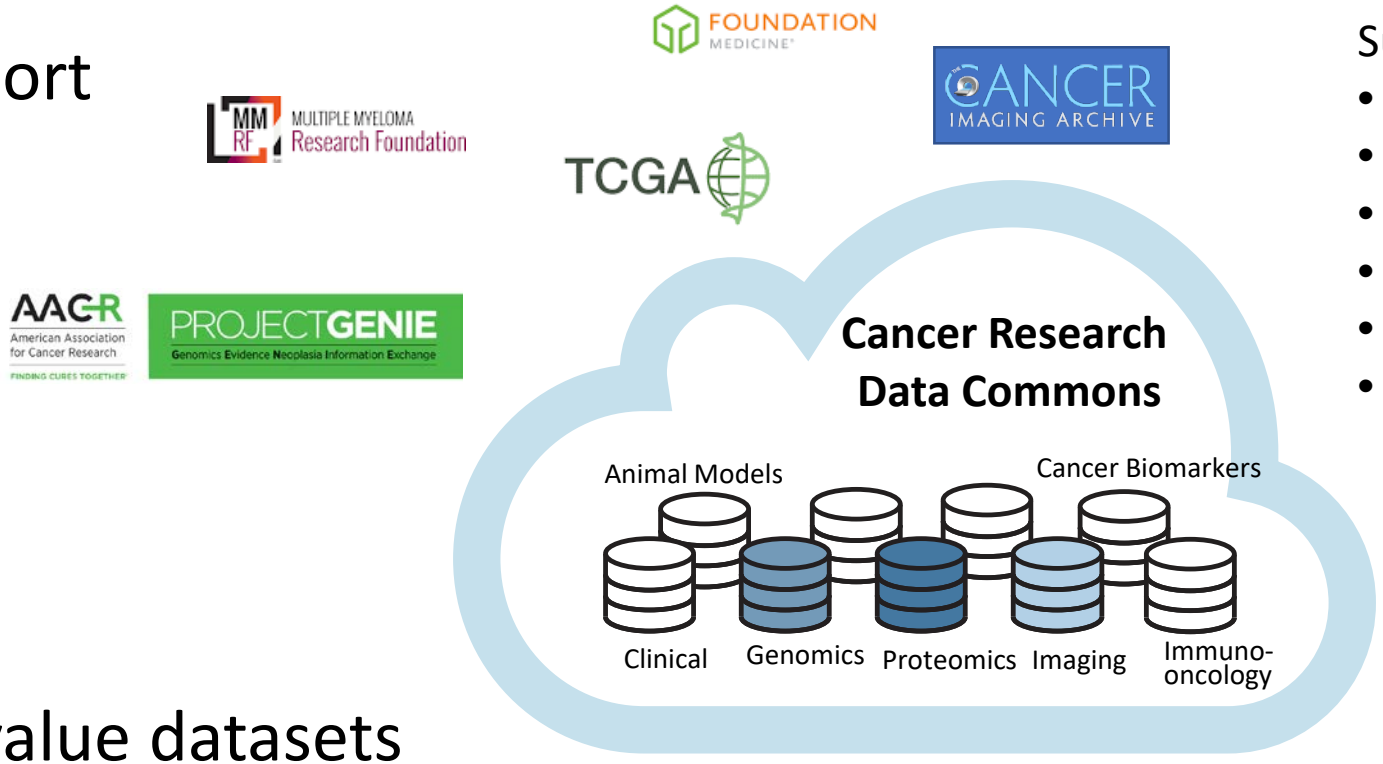


Initial Recommendation Areas

1. Investments to leapfrog data sharing for high-value datasets
2. Harmonization of terminology between cancer research data and clinical care data
3. Support of data science training at the graduate level
4. Opportunities for funding challenges and prizes

Recommendation 1: Investments to leapfrog data sharing for high-value datasets

- Resources to support
  - Identification
  - Enrichment
  - Curation
  - Harmonization
  - Annotation
  - Publishing



Subgroup members:
- John Carpten
- Warren Kibbe
- Mia Levy
- Vince Miller
- Charles Sawyers
- Nick Wagle

- Examples of high-value datasets
  - Those fully collected and annotated but not yet shared in a public repository
  - Datasets that would be enhanced by additional data generation and/or collection (e.g., genomic datasets needing additional clinical annotation)

Recommendation 2: Harmonize terminologies between cancer research and clinical care

- Augment EHR data standards to further bridge clinical care and cancer research
- Fund research related to achieving near clinical trial grade data within traditional clinical care settings
- Identify and prioritize existing standards bodies and activities

RXNORM

SNOMED CT

The global language of healthcare

LOINC®

from Regenstrief

Subgroup members:

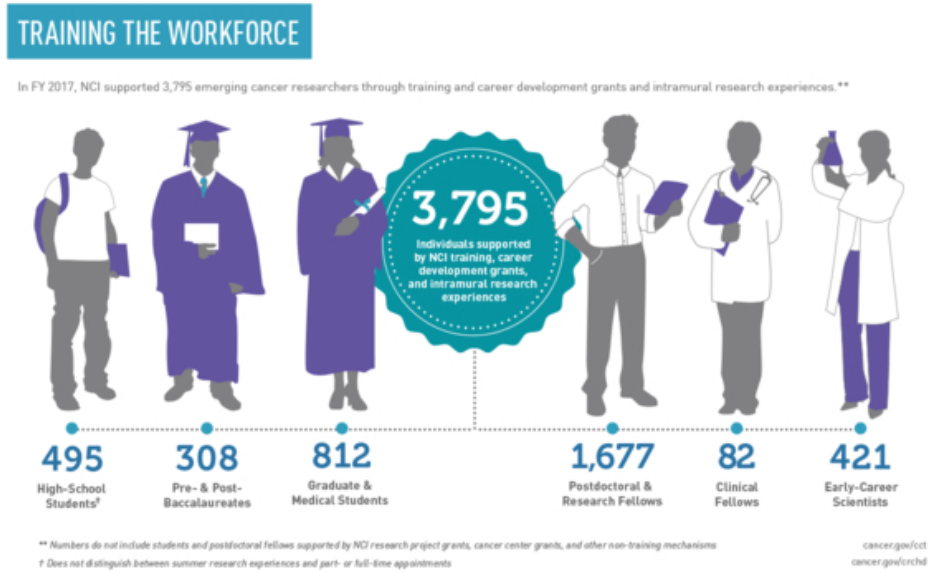
- George Hripcsak
- Mimi Huizinga
- Warren Kibbe
- Michelle Le Beau

Benefits of harmonized terminologies

- Increase the utility and ease of incorporation/integration of clinical care data from EHRs into cancer research
- Enable more efficient research, better patient care, and better real-world evidence generation
- Enhance integration of the cancer and non-cancer research communities

Recommendation 3: Increase the number of training programs and trainees in cancer data science

- Dedicate a specific T32 training program in cancer data science
- Contribute to existing NIH training programs
  - NLM T15 training programs
  - NIGMS Medical Scientist Training program
- Develop a short-term training program for clinicians and biological scientists



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- Sylvia Plevritis
- Kim Sabelko

Recommendation 4: Sponsor a series of data science challenges

Subgroup members:
- Regina Barzilay
- Amanda Haddock
- Michelle Le Beau
- Lincoln Stein

- Potential challenge topics (~4-8 per year)
  - Drug response prediction
  - Discovery of multi-omic prognostic biomarkers
  - De-convolution of heterogenous tumors
  - Cancer diagnosis, grading, and staging
  - Facility of data access and integration from the ethical, legal, and social implications standpoint
- Consider beginning with an “idea challenge” to identify the appropriate challenge topic/task/question

The Open Science Prize

precisionFDA Challenges
Engage and improve NGS software through community challenges

DREAM CHALLENGES
powered by Sage Bionetworks

Benefits of data science challenges

- Spur research in computational cancer biology and increase the availability of advanced analytic software to the broader research community
- Attract new talent to cancer research
- Validation and dissemination of state-of-the-art tools and technologies
- Demonstrates the inter-relationship between all the recommendations. Challenges require:
  - Openly shared datasets
  - Ability to work across harmonized datasets
  - Participants with appropriate skillsets and expertise