Supporting Cancer Research Through Planning and Analysis

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Acting Director
Center for Research Strategy (CRS)

NIH NATIONAL CANCER INSTITUTE

March 23, 2022

From Bench to Standing Desk

- 2005-2012: Staff Scientist, CCR, NCI

- 2012-2015: Scientific Program Analyst,
  Division of Intramural Research, NHLBI
- 2015-2018: Health Science Administrator,
  Center for Research Strategy, NCI
- 2018-2021: Deputy Director, CRS
- Present - Acting Director, CRS

NCI Organizational Overview

- Extramural Divisions
  - Division of Cancer Biology
  - Division of Cancer Control and Population Sciences
  - Division of Cancer Diagnosis and Treatment
  - Division of Cancer Prevention
  - Division of Extramural Activities

- Offices and Centers

- Intramural Research Program
  - Center for Cancer Research
  - Division of Cancer Epidemiology and Genetics

NCI Organizational Overview – Centers and Offices

- Center for Biomedical Information and Informational Technology
- Center for Cancer Genomics
- Center for Cancer Training
- Center for Global Health
- Center for Research Strategy
- Center for Strategic Scientific Initiatives
- Center to Reduce Cancer Health Disparities
- Coordinating Center for Cancer Clinical Trials
- Office of AIDS & HIV Malignancy
- Office of Cancer Centers
- SBIR Development Center
- Technology Transfer Center

CRS Overview

CRS Mission

To apply scientific, strategic, and analytic expertise to inform decision making, identify cross-cutting opportunities, and collaborate on initiatives that advance the missions of NCI and NIH

How CRS Supports the NCI and NIH Missions

Why are these activities needed at the NCI?

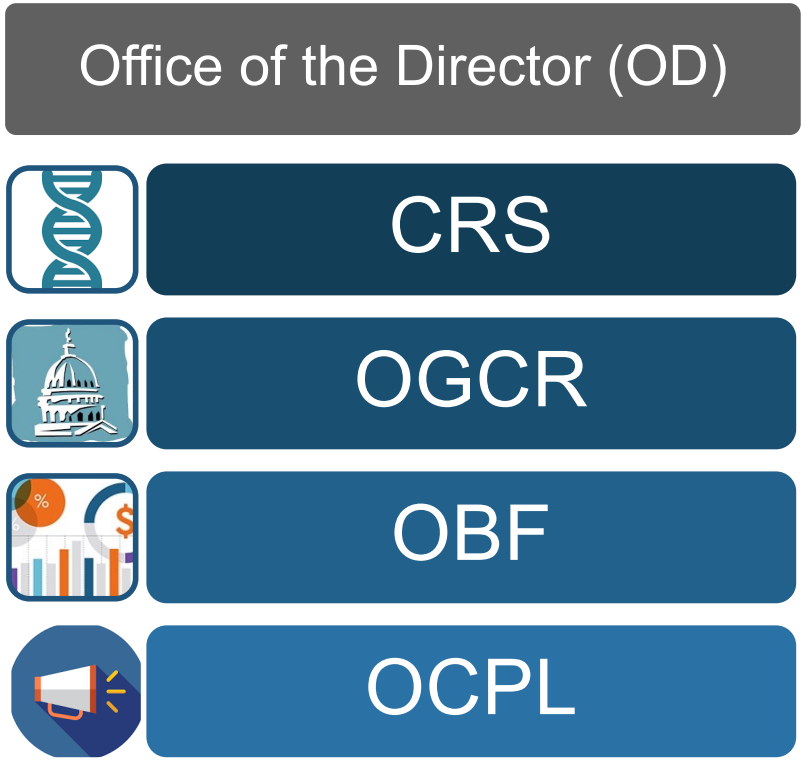
Analysis & Evaluation	Portfolio analysis and evaluation provide information on NCI's workforce, funded portfolio, and programs to enable data-driven decision making for portfolio management, policy development, and strategic planning.	Integration Across NCI and NIH
Planning & Reporting	Activities that aid in policy development and adherence, portfolio analysis, program evaluation, and monitoring the research progress of NCI and NIH. Includes synthesizing information for legislatively mandated reports that demonstrate the progress of NCI research.	
Advancing Method Development	Develop methodologies and leveraging technologies to better understand and communicate the impact of the NCI enterprise. Critical component of analysis, evaluation, planning, and reporting efforts in CRS.	

CRS Collaborates at Multiple Levels Across NCI

- ✓ Catalyze – Ideas and opportunities for the Annual Plan (AP)
- ✓ Convene – AP Topic Experts, Research Funding Systems, Firewood Sessions, Facile Funding Group
- ✓ Coordinate – Planning, evaluation, and reporting activities
  - Collecting and reporting NCI's accomplishments
  - Working with OGCR to answer congressional inquires
  - Knowledge management across the OD offices to share information more broadly, reduce duplication, and streamline efforts

NCI OD Collaborates On Various Projects/Requests

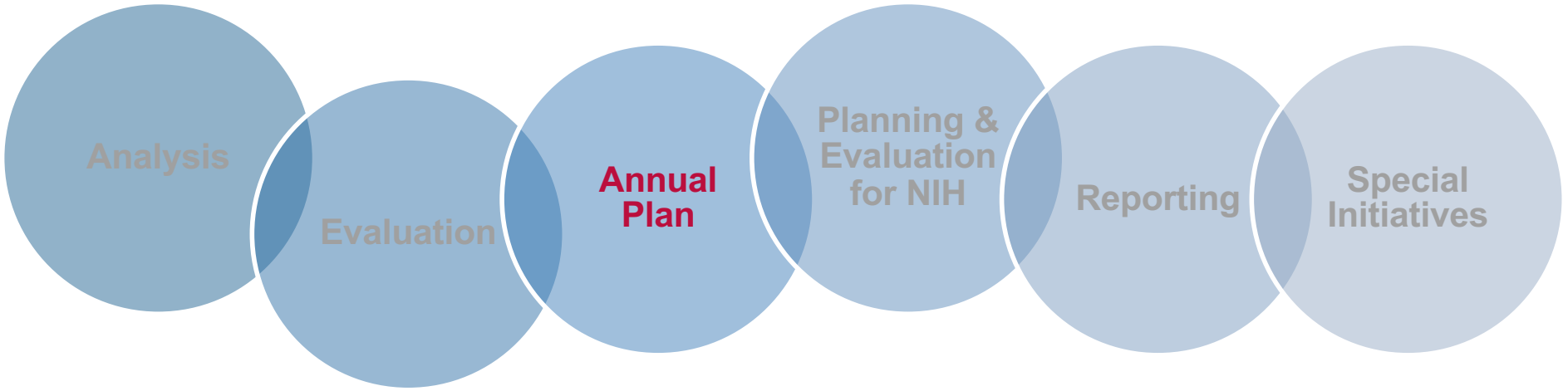
- NCI Annual Plan
- Innovation Report (Moonshot)
- COVID Activities



- Significant Items
- Reports to Congress

- Appropriations Hearing Preparation

OGCR – Office of Government and Congressional Relations
OBF – Office of Budget and Finance
OCPL – Office of Communications and Public Liaison


Analysis
Evaluation
Annual Plan
Planning & Evaluation for NIH
Reporting
Special Initiatives

The National Cancer Act of 1971

- Established the procedure for submitting NCI's annual budget, deemed the "bypass budget"

President Nixon signing the National Cancer Act of 1971

Section 407 (9) (A) – Prepare and submit, directly to the President for review and transmittal to Congress, an annual budget estimate for the National Cancer Program, after reasonable opportunity for comment (but without change) by the Secretary, the Director of the National Institutes of Health, and the National Cancer Advisory Board; and (B) receive from the President and the Office of Management and Budget directly all funds appropriated by Congress for obligation and expenditure by the National Cancer Institute.

Annual Plan & Budget Proposal

- Professional Judgement Budget (PJB)
  - Communicates NCI's best professional judgment on the optimum funding needed to make the most rapid progress against cancer
- Annual Plan (AP)
  - Opportunity to present areas of scientific opportunity
  - Yearly dynamic strategic plan
    - 21st Century Cures Act calls for NIH institutes to prepare strategic plans regularly

At-a-Glance

Professional Judgement Budget Proposal for FY 2023

(DOLLARS IN MILLIONS)

FISCAL YEAR 2021 NCI BASE APPROPRIATION	$6,365*	
TOTAL BUDGET INCREASE (Proposed Allocation)	$1,185†	$277 Inflation Adjustment†† $165 Cancer Biology Research $185 Cancer Prevention Research $150 Cancer Detection & Diagnosis Research $205 Cancer Treatment Research $125 Public Health & Cancer Control Research $78 Training & Infrastructure
FY 2023 BUDGET RECOMMENDATION	$7,550	
FY 2023 CANCER MOONSHOT℠ FUNDING	$216	
FY 2023 TOTAL	$7,766	

* The base appropriation includes $50 million for the 4th year of the Childhood Cancer Data Initiative, a 10-year initiative that began in FY 2020.

† The increase of $1,185 million includes an inflation adjustment and $908 million for additional infrastructure and cancer research in six major focus areas.

†† This adjustment includes inflation for the 2 years between FY 2021 and FY 2023.

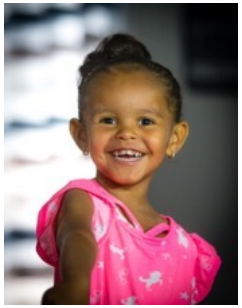
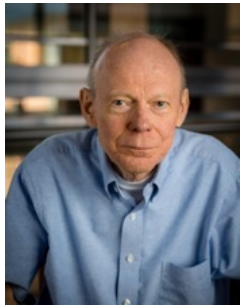
Scientific Priorities

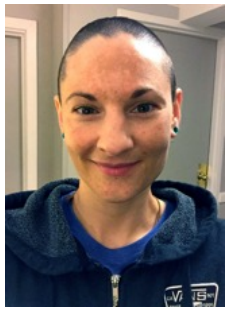
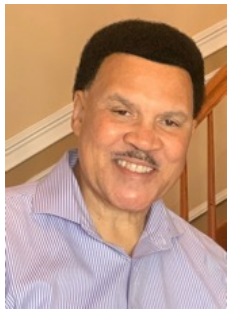
- Understanding the Mechanisms of Cancer
- Preventing Cancer
- Detecting & Diagnosing Cancer
- Treating Cancer
- Advancing Public Health in Cancer
- Strengthening the Cancer Research Enterprise
  - Workforce and Infrastructure
- Understanding, Preventing, and Mitigating Cancer Disparities

Highlight Scientific Opportunities

- FY 2023
  - Tumor Dynamics: Predicting Cancer's Trajectory Using Tumor Atlases
  - Computer-Based Drug Design: Advancing the Discovery of New Cancer Medicines
  - Precision Prevention: Predicting and Intercepting Your Cancer
  - Clinical Trials: Bringing Cancer Research to All Possible Participants
- FY 2022
  - Cancer Drug Resistance
  - Molecular Diagnostics for Cancer Treatment
  - Obesity & Cancer
  - Survivorship
- FY 2021
  - The Immune System and Microbiome
  - Artificial Intelligence
  - Implementation Science

Telling NCI's Story Through the Patient and Researcher Experience













Analysis
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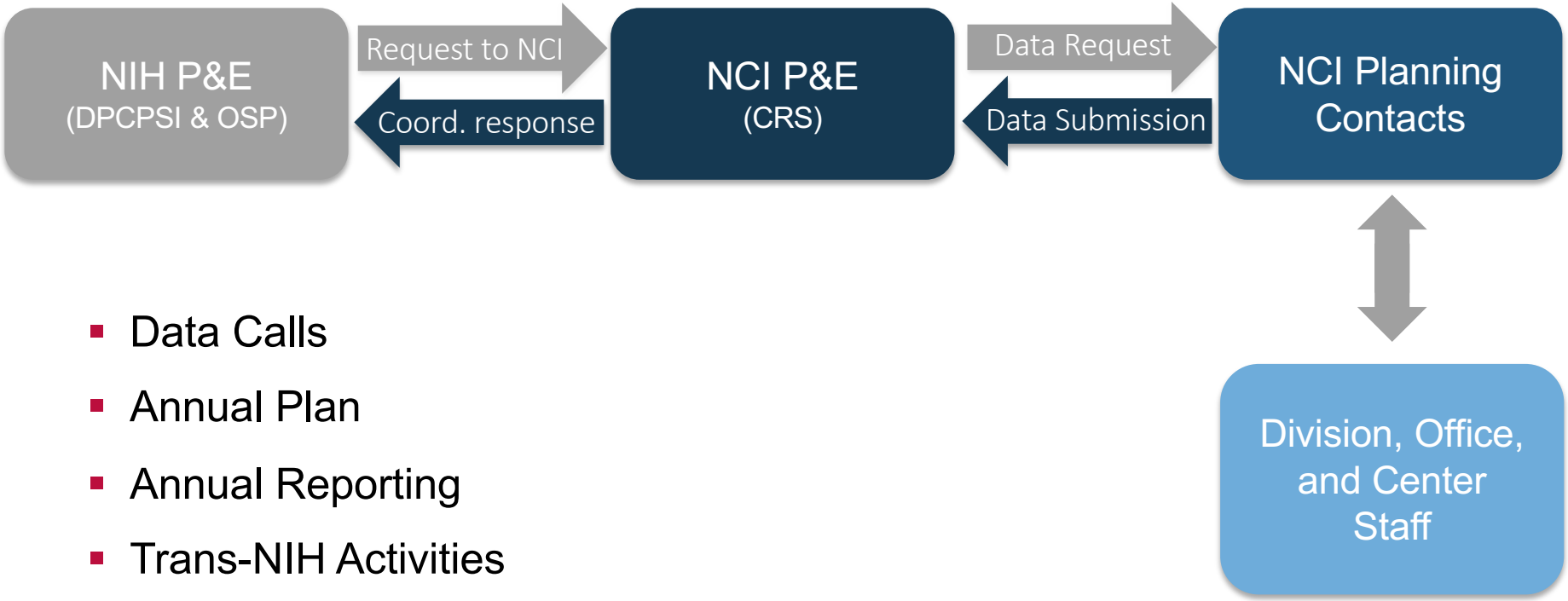
CRS: NCI's Planning and Evaluation (P&E) Office

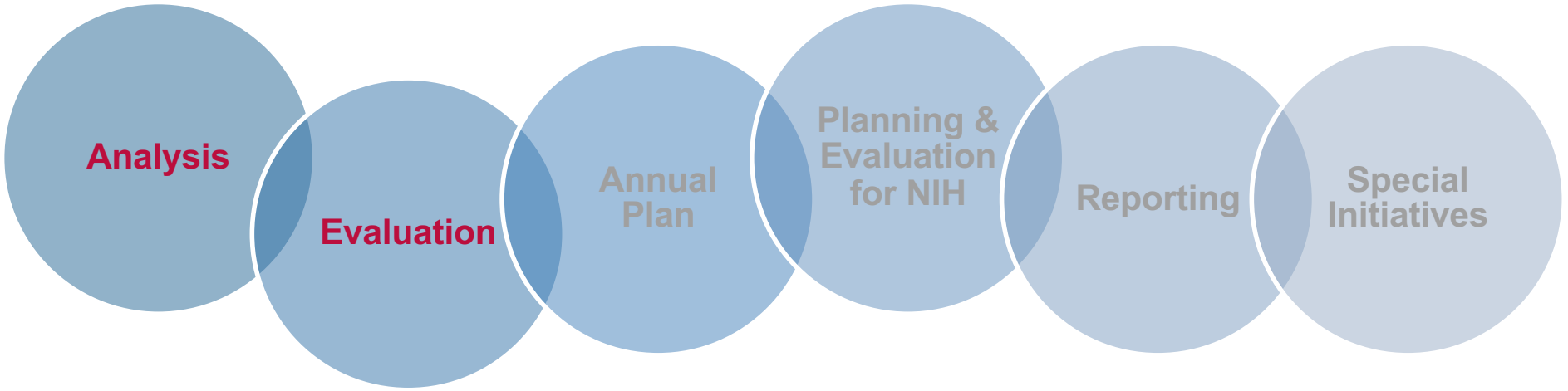
- NIH P&E Community
  - Led by DPCPSI/NIH
  - NIH Institute, Center, & Office P&E Officers
    - coordinate NIH planning, evaluation, and reporting processes
    - advise on science policy issues affecting biomedical and behavioral research
    - share information on relevant policies, procedures, and strategic objectives

CRS Coordinates Across NCI

- NIH Planning & Evaluation (P&E) Activities



  - Data Calls
  - Annual Plan
  - Annual Reporting
  - Trans-NIH Activities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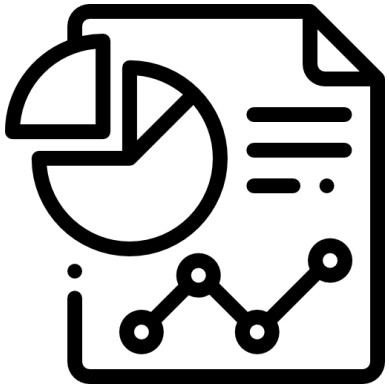
Analysis and Evaluation

- Support data-informed decision making
- Answer NCI questions using a diversity of analytical approaches
  - Understand how the NCI supports and impacts the cancer research landscape
- Collaborate with the OD, the DOCs, other ICs and NIH OD



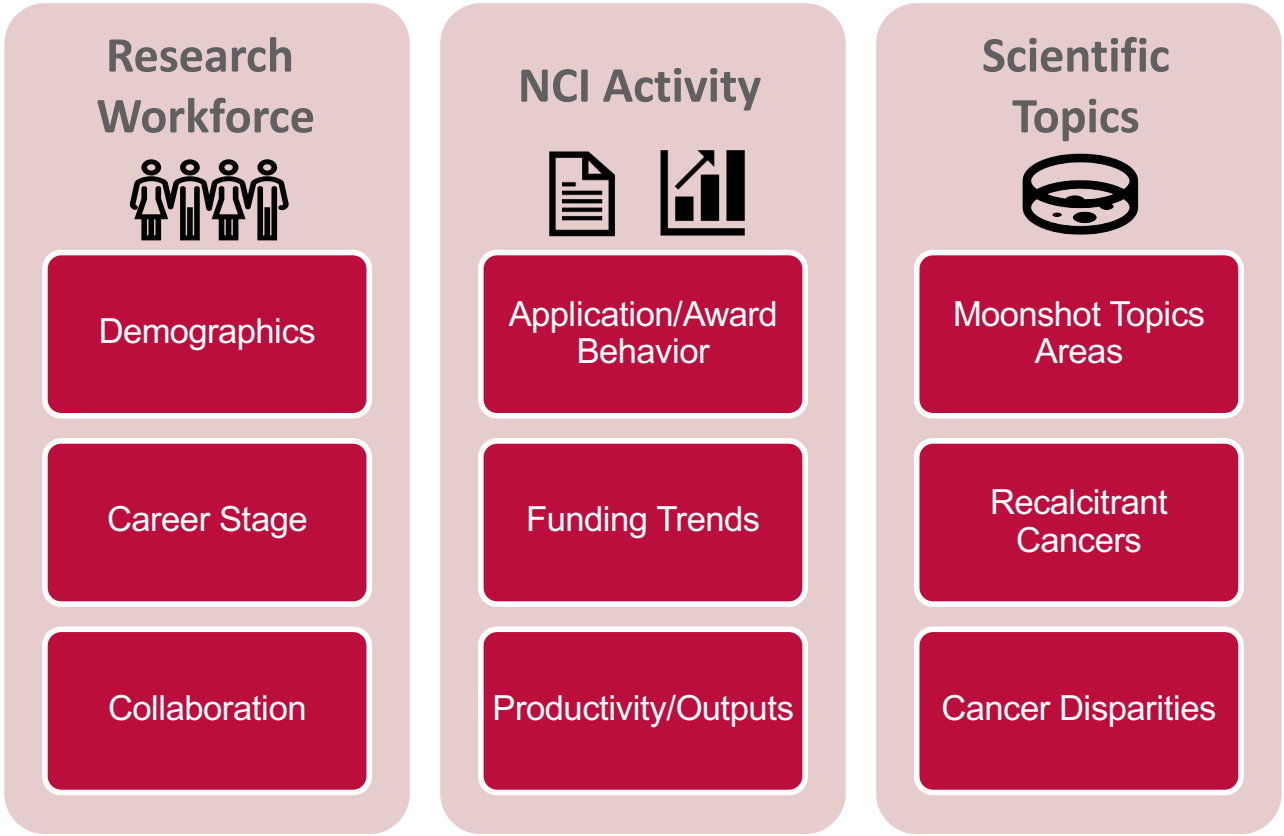
What is our approach to analysis?

- Define the question
  - Who applies for funding?
  - Whom do we fund?
  - What do we fund?
  - What is the impact of our funding?
- Gather the data and conduct analysis
- Communicate results

Why?

- To aid in decision making
  - Program management, policy development
- To track and understand trends over time
- To support various NCI committees and working groups
- To respond to public and government inquires

Examples of Types of Analysis



Scope of NCI Data

Number of Competing (New) Applications

- Approximately 13,000/year

Number of Awards (competing and non-competing)

- Approximately 7,000/year

Numbers of NCI PIs

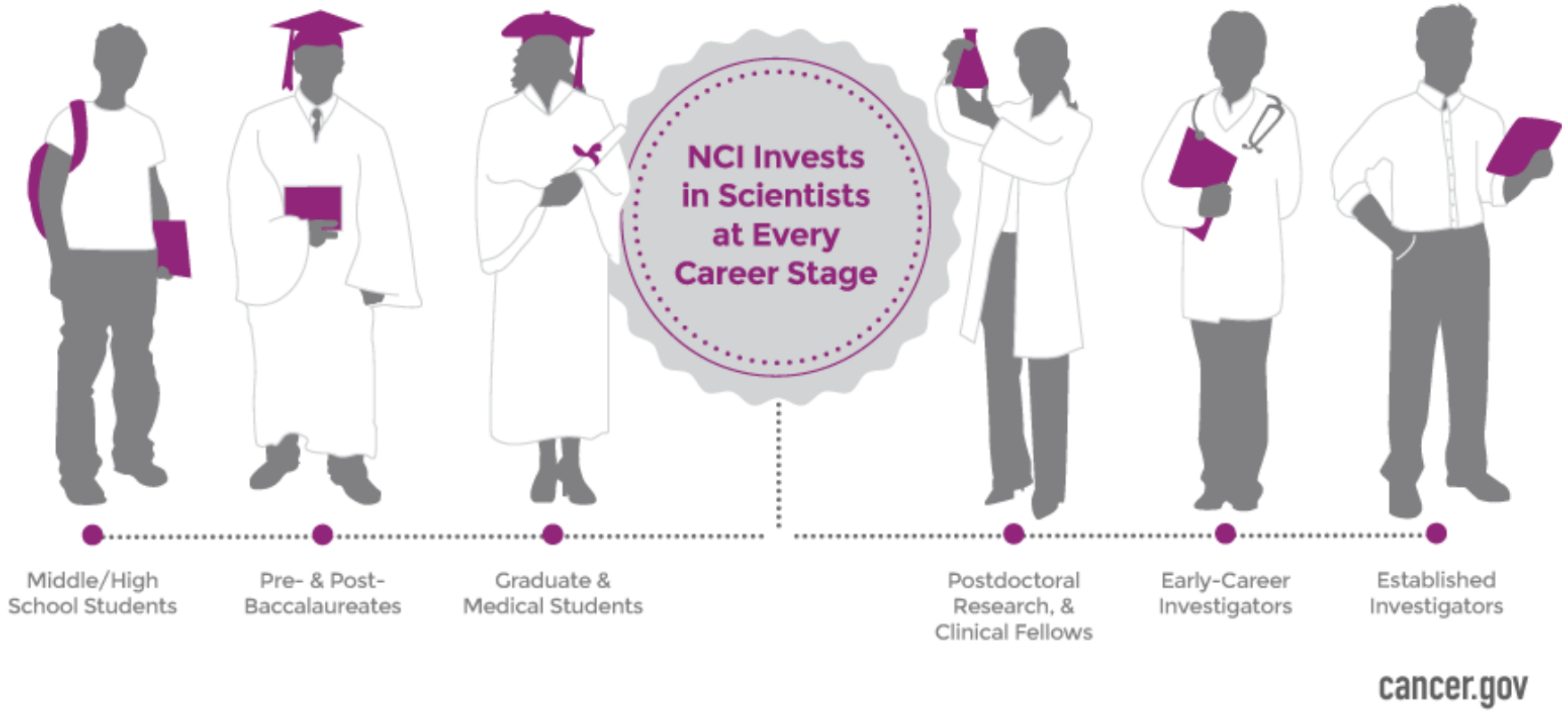
Approximately

- 7000 PIs on all awards
- 4000 PIs on R01 equivalents

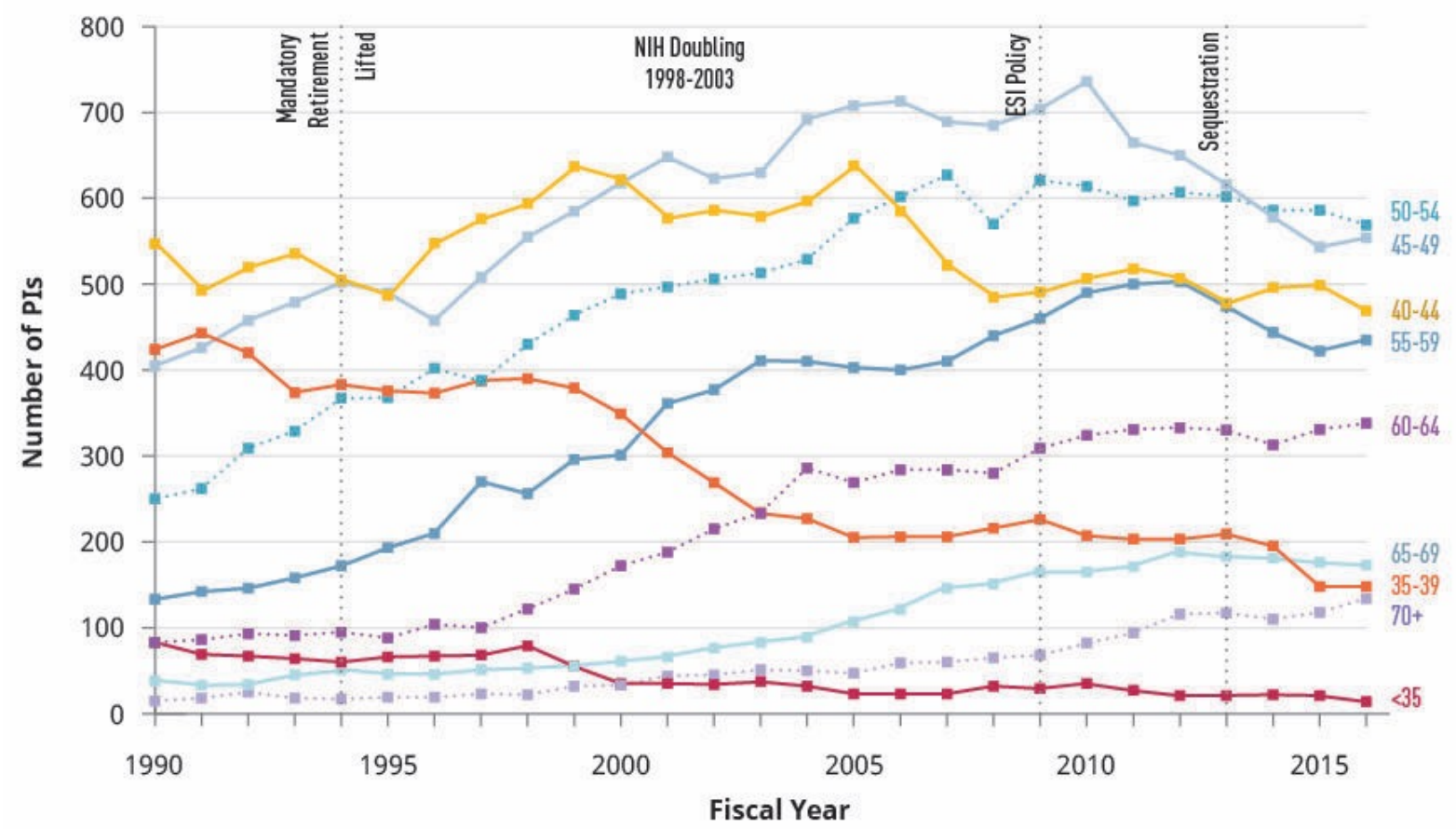
- 300 New Investigators (NIs)
- 150 Early Stage Investigators (ESIs)

Example 1: Extramural Workforce Analyses

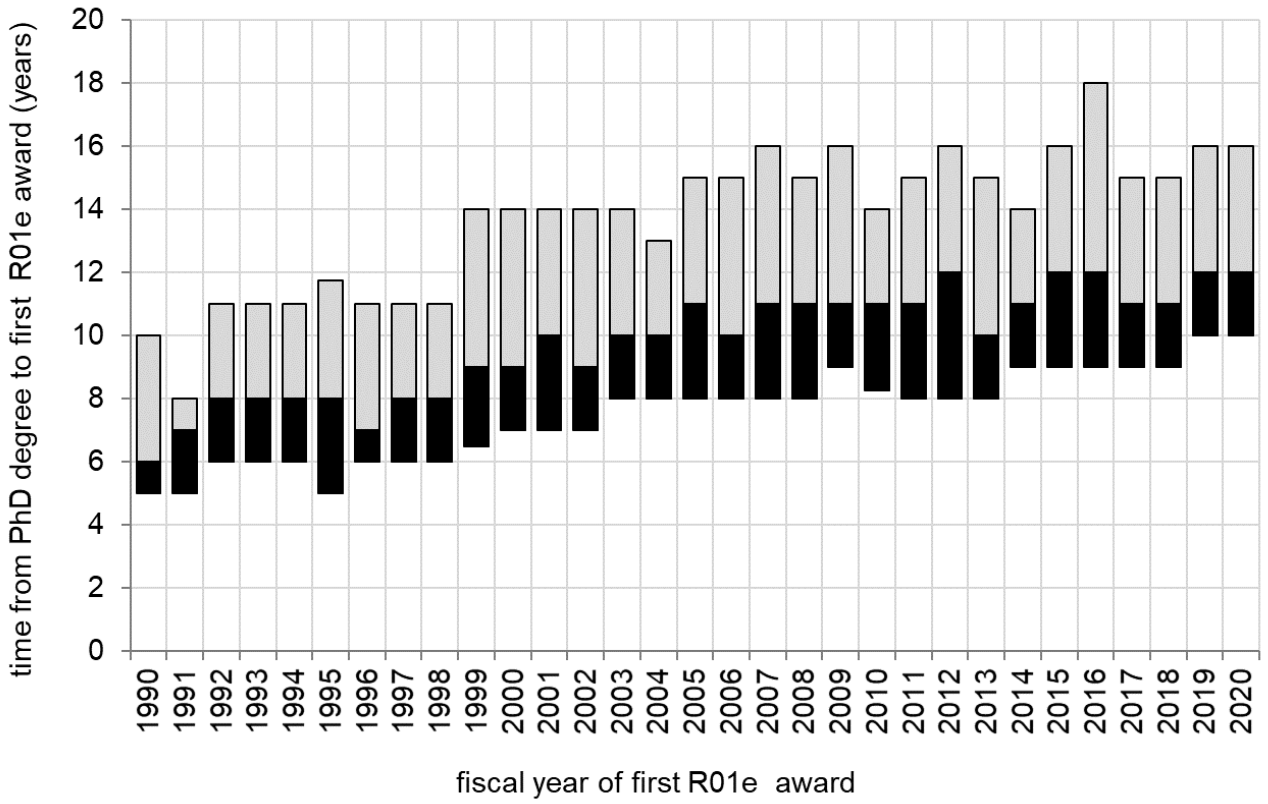
NCI Trains People To Do Cancer Research

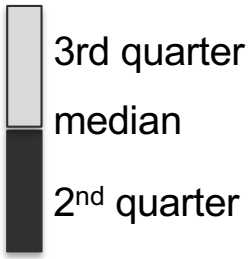


Aging of NCI R01-equivalent workforce



Time from degree to first R01-equivalent award doubled





- 1990 - 2020
- NIs with a PhD degree
- PIs getting first award at an older age - Median age at first award increased
  - from 36yo in FY 1990
  - to 42yo in FY 2020

NCI MERIT Award (R37): additional 2 years

- CRS provided analyses and worked closely with the ESI working group, which made this recommendation
- More stability, reduced stress (e.g., for PIs with young families)
- More time for innovation, publications, starting a second project
- More progress by the time of competing for a renewal

- First awards issued in FY 2018

- CRS is going to evaluate this program

Guide Notice: NOT-CA-18-037, January 2018

The Journal of Clinical Investigation

REVIEW

Changes in the National Cancer Institute's R01 workforce: growth, aging, retention, and policy implications

Melissa D. Antman, Roman Gorelik, Amy Kennedy, Grace F. Liou, Eddie N. Billingslea, James G. Corrigan, and L. Michelle Bennett

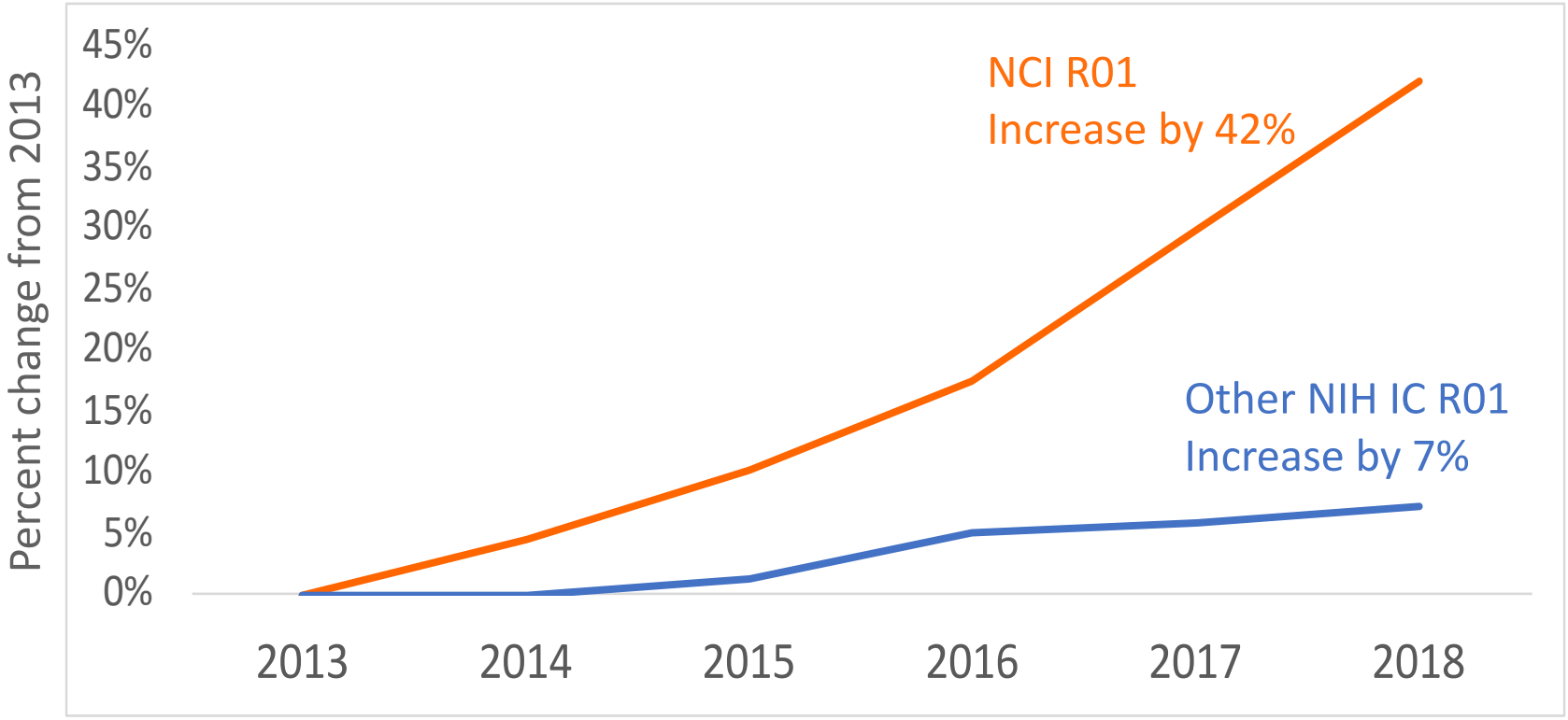
Center for Research Strategy, National Cancer Institute, NIH, Bethesda, Maryland, USA.

Scientific progress and discovery of preventions and cures for life-threatening diseases depend on the vitality of the biomedical research workforce. We analyzed the workforce of cancer researchers applying for and receiving R01 awards from the National Cancer Institute (NCI) from fiscal years 1990 to 2016, the last year prior to implementation of the Next Generation Researchers Initiative. Here we report that the NCI R01 Principal Investigator (PI) workforce expanded 1.4-fold and aged over this time frame. We tracked 9 age groups and found that the number of PIs in the 3 oldest groups increased dramatically, in contrast with the younger groups. Sustained increases in the number of funded older PIs stemmed from increases in the number of older PIs submitting applications, rather than higher funding rates for older PIs. The decline in the number of funded younger PIs was driven in part by (a) a marked increase in time from PhD degree to first R01 application and award, as well as (b) a decrease in retention of PIs in the funded R01 workforce beyond their first R01 award. The NCI is using these and other analyses to inform strategies and policies for attracting, supporting, and retaining meritorious early-career researchers.

J Clin Invest. 2021; vol.131; issue 7 (April 1, 2021)

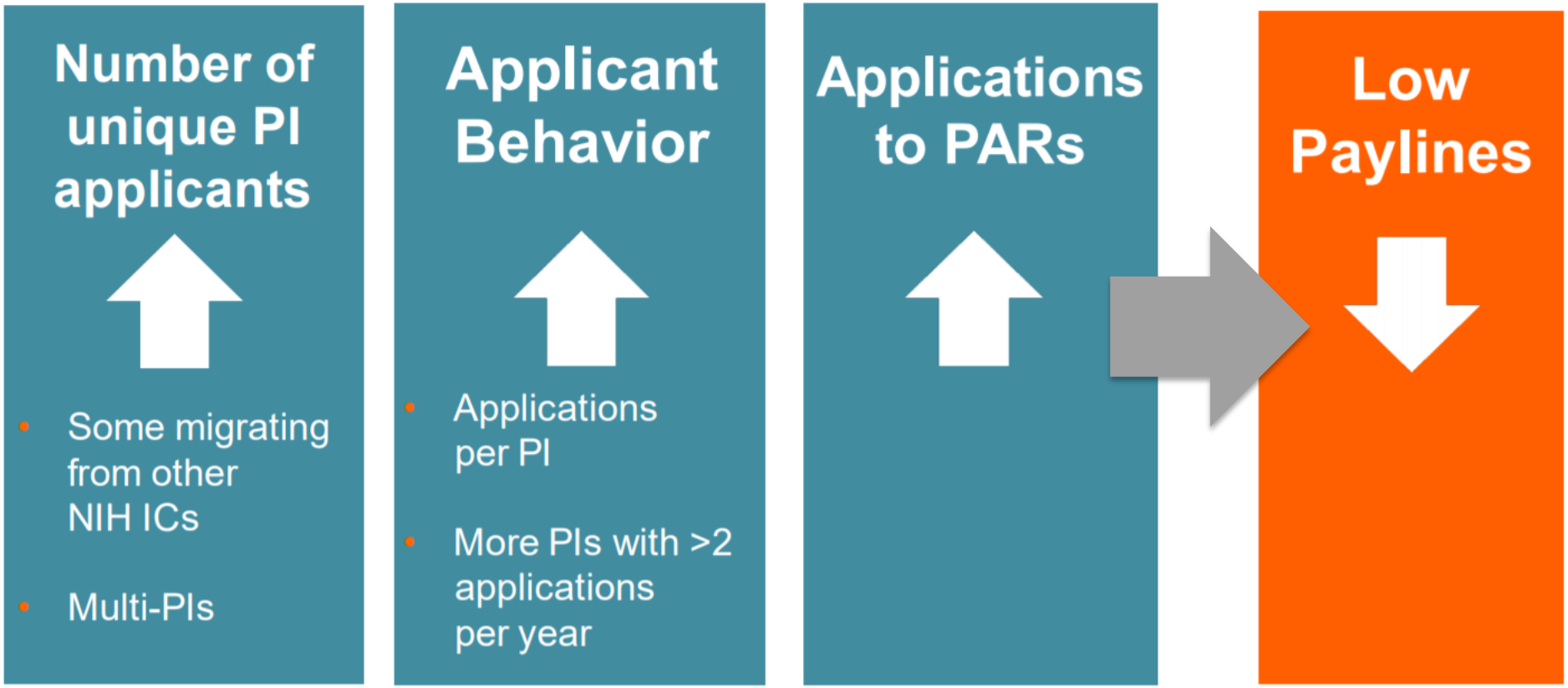
Example 2: Understanding NCI Application and Award Trends

Dramatic increase in R01 Applications FY 2013-2018



Data from RePORT

Multiple factors contributed to increased applications



Two Years of Budget Increases to Raise the Payline

- FY 2020 budget increase allowed NCI to raise the R01 payline to the 10th percentile
- FY 2021 budget increase allowed NCI to raise the R01 payline to the 11th percentile

CRS Staff

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Health Science Policy Analyst

Grace Liou, PhD
Scientific Program Analyst

Christophe Marchand, PhD
Health Scientist Administrator

Darlene Summers, MA
Technical Writer

Data Scientist

Evaluation Officer

Some Closing Thoughts

- What opportunities exist?
  - Program Directors and Scientific Review Officers
  - Analysts
  - Data Scientists
  - Planning and Policy
- How close to the science do you want to be?
- Does the type of science matter to you?

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