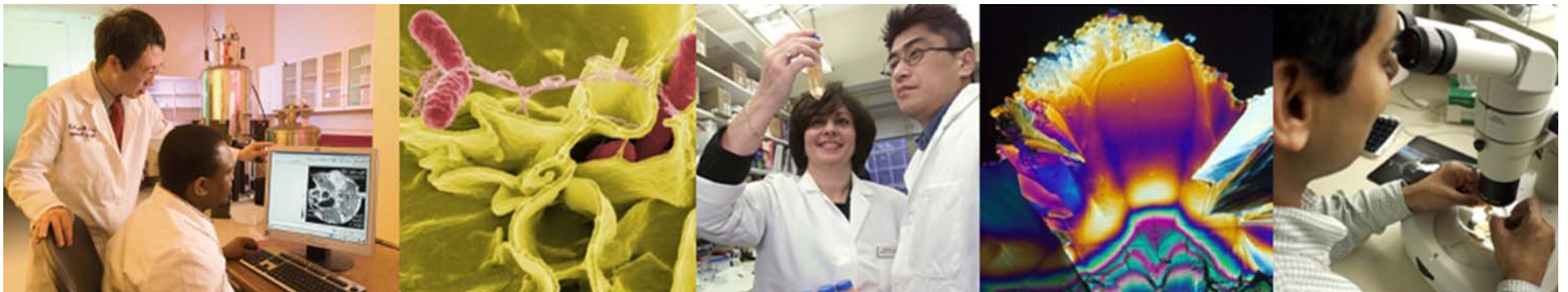


Enhancing Stewardship: *The Next Generation of Researchers Initiative*

9th Joint Meeting of the Board of Scientific Advisors & National Cancer Advisory Board

June 20th, 2017



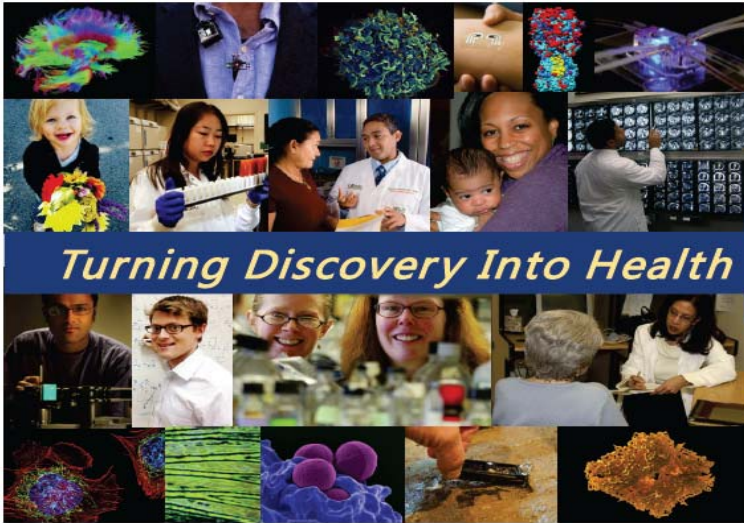
Lawrence A. Tabak, DDS, PhD
Principal Deputy Director, NIH



Good Stewardship is Essential to NIH

NIH-Wide Strategic Plan

Fiscal Years 2016-2020



Enhance Stewardship

- Recruit/retain outstanding research workforce
- Enhance workforce diversity
- Encourage innovation
- Optimize approaches to inform funding decisions
- Enhance impact through partnerships
- Ensure rigor and reproducibility
- Reduce administrative burden

The Observation



PERSPECTIVE



PERSPECTIVE

Rescuing US biomedical research from its systemic flaws

Bruce Alberts^a, Marc W. Kirschner^b, Shirley Tilghman^{c,1}, and Harold Varmus^d

^aDepartment of Biophysics and Biochemistry, University of California, San Francisco, CA 94158; ^bDepartment of Systems Biology, Harvard Medical School, Boston, MA 02115; ^cDepartment of Molecular Biology, Princeton University, Princeton, NJ 08540; and ^dNational Cancer Institute, Bethesda, MD 20892

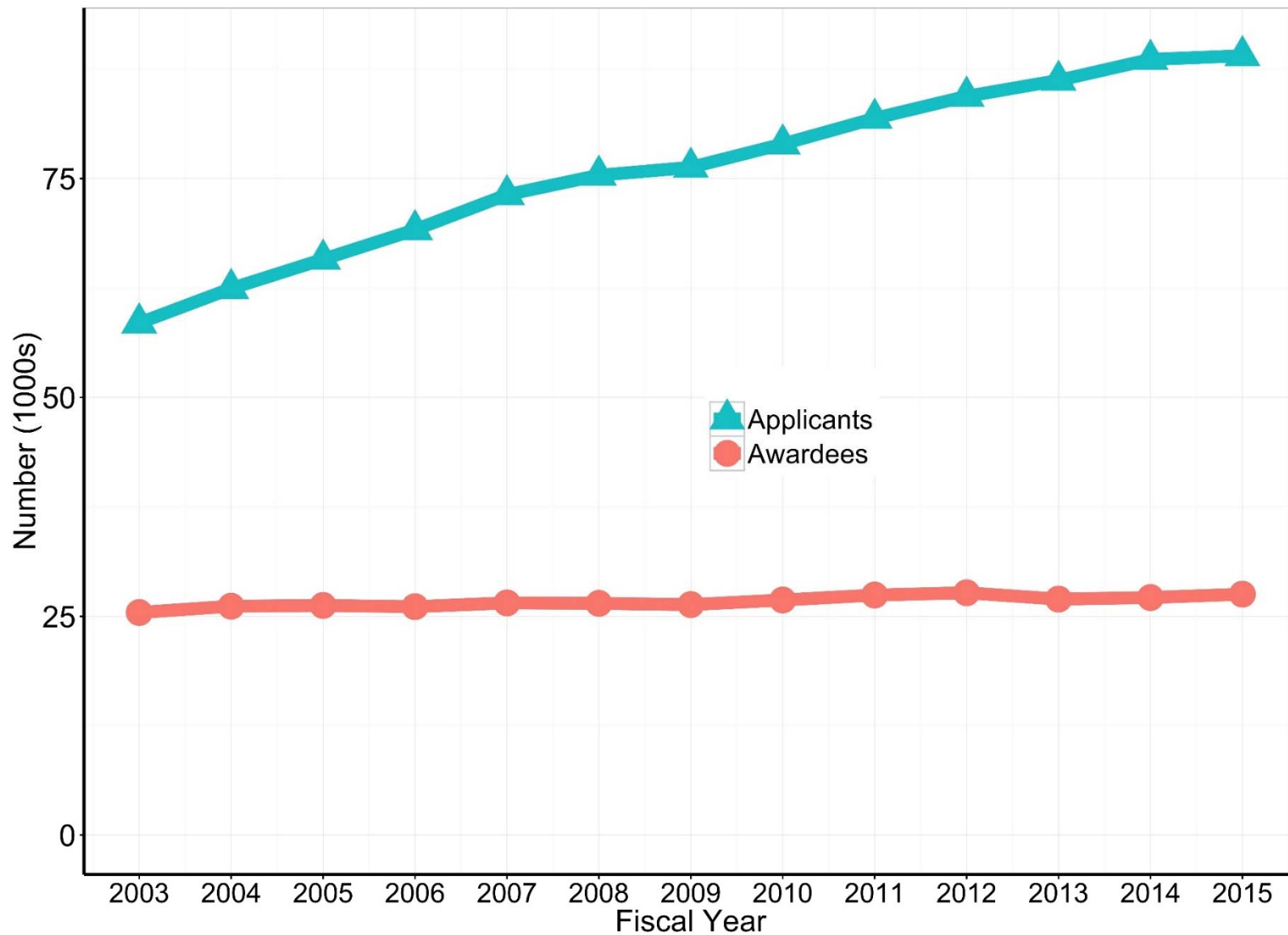
Edited by Inder M. Verma, The Salk Institute for Biological Studies, La Jolla, CA, and approved March 18, 2014 (received for review March 7, 2014)

The long-held but erroneous assumption of never-ending rapid growth in biomedical science has created an unsustainable hypercompetitive system that is discouraging even the most outstanding prospective students from entering our profession—and making it difficult for seasoned investigators to produce their best work. This is a recipe for long-term decline, and the problems cannot be solved with simplistic approaches. Instead, it is time to confront the dangers at hand and rethink some fundamental features of the US biomedical research ecosystem.

The long-held but erroneous assumption of never-ending rapid growth in biomedical science has created an unsustainable hypercompetitive system that is discouraging even the most outstanding students from entering our profession... This is a recipe for long-term decline... It is time to confront the dangers at hand and rethink some fundamental features of the US biomedical research system.

Alberts B et al. PNAS. 2014;111:5773-7

Hypercompetition: Applicants and Awardees for NIH RPGs

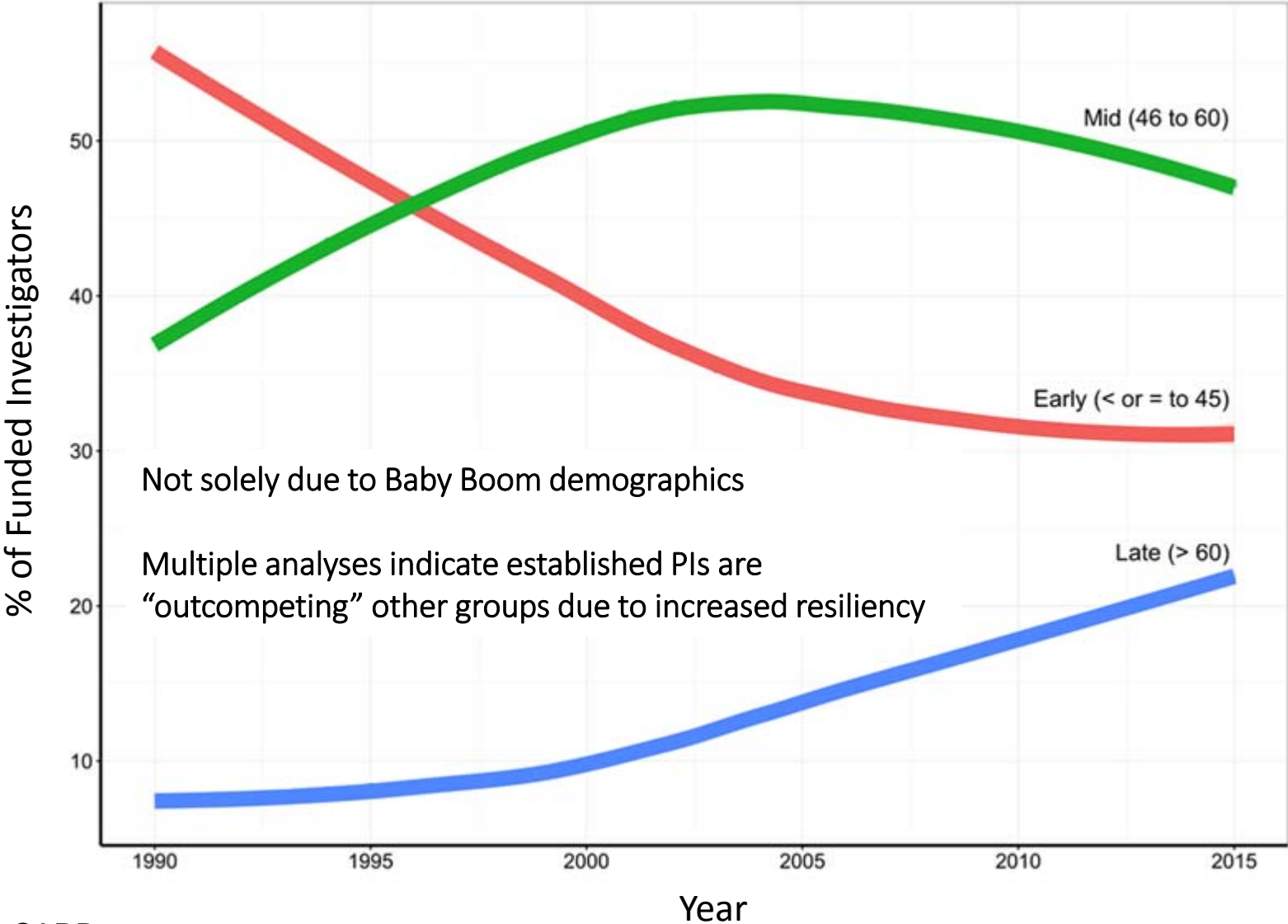


21st Century Cures Act

- Directs NIH Director to promote policies that will promote **earlier independence and increased funding** for new investigators

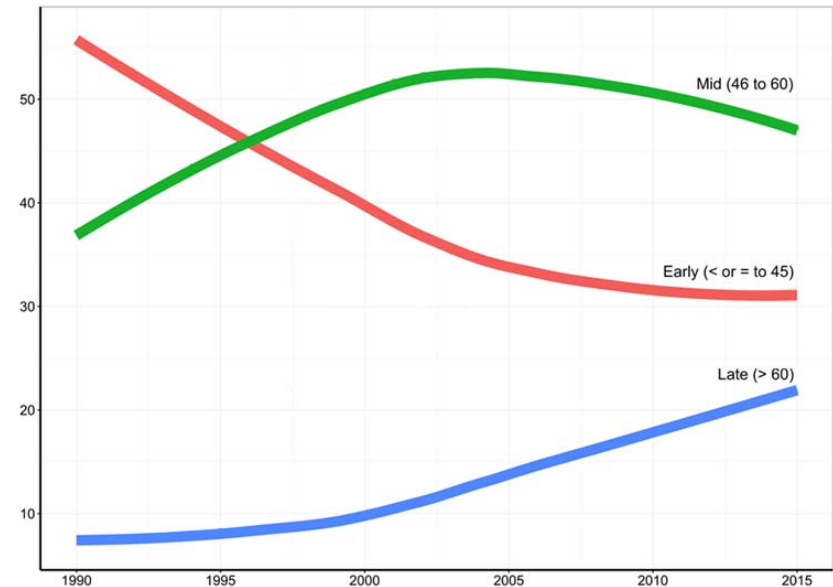
404M. Next generation of researchers (a) Next Generation of Researchers Initiative - *There shall be established within the Office of the Director of the National Institutes of Health, the Next Generation of Researchers Initiative (referred to in this section as the “Initiative”), through which the Director shall coordinate all policies and programs within the National Institutes of Health that are focused on promoting and providing opportunities for new researchers and earlier research independence.*

Age of Investigators Funded by NIH



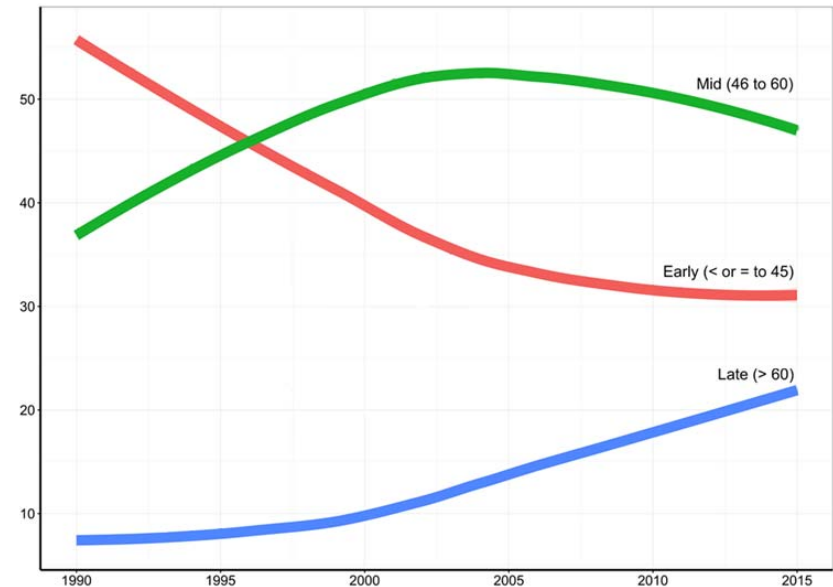
I. How do we Increase the Number of Early-Career Funded Scientists?

- Enhance the prioritization of Early Stage Investigators (ESIs)
 - Current trans-NIH policy provides a boost for first time applicants
 - ESI success rates are similar to that of more experienced investigators
 - Despite that, in FY16, there were 193 R01 applications from ESIs with either percentiles ≤ 25 , or (for RFAs) priority score ≤ 35 that were not funded
 - We therefore need to further extend the payline for ESIs



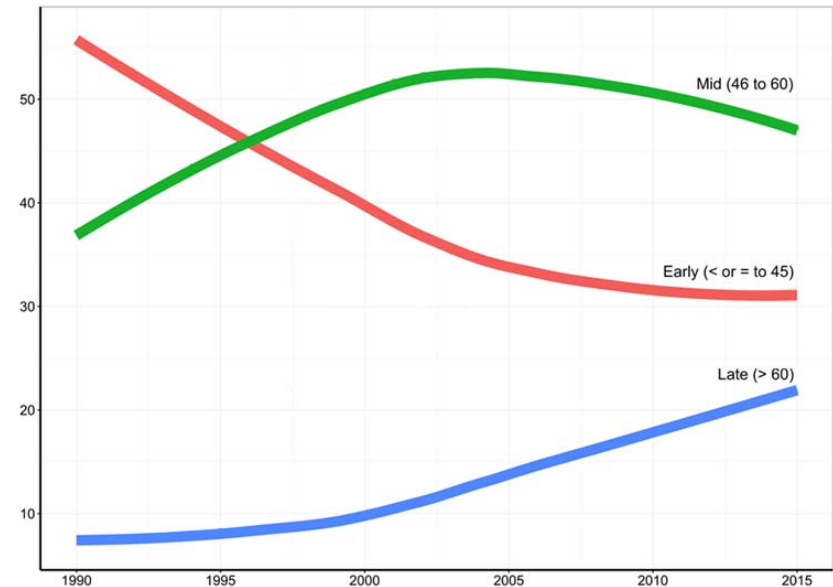
II. How do we Stabilize the Career Trajectories of Scientists?

- Provide new support systems to nurture investigators with ≤ 10 years as an NIH Principal Investigator who just missed funding for their first competitive renewal
- In FY16, there were 263 R01 applications from mid-career investigators in this category with either percentiles ≤ 25 , or (for RFAs) priority scores ≤ 35 that were not funded
- We will need to prioritize support for these investigators who are about to lose all NIH support, and may be likely to leave the workforce



II. How do we Stabilize the Career Trajectories of Scientists? (cont.)

- Provide new support systems to nurture investigators with ≤ 10 years as an NIH Principal Investigator that seek support for their second RPG
- In FY16, there were 75 R01 applications from mid-career investigators in this category with percentiles of ≤ 25 , or (for RFAs) priority scores ≤ 35 that were not funded
- Program staff will identify these “rising stars” and prioritize support for these individuals



Bending the Curve to Ensure Support for PIs at all Career Stages: New Proposed Plan

- All ICs have committed to ensuring support for highly meritorious early stage and mid-career investigators
 - Starting immediately, NIH OD will create an inventory of all ESIs and mid-career investigators within the fundable range
 - NIH OD will track IC funding decisions of ESIs and mid-career investigators with fundable scores
 - Evaluate if uniform decision making is occurring across NIH

Implementation of this New Proposed Plan

For ESIs, those who have been a PI for ≤ 10 years and are about to lose all NIH funding, and PIs who are seeking a second award:

- It would require an estimated \$210M/year to fund these additional investigators* in the first year, and an additional ~\$210M each year for 4 additional years (for a total of 5 years), reaching a steady state cost of ~\$1.1B

Where will the money/support come from?

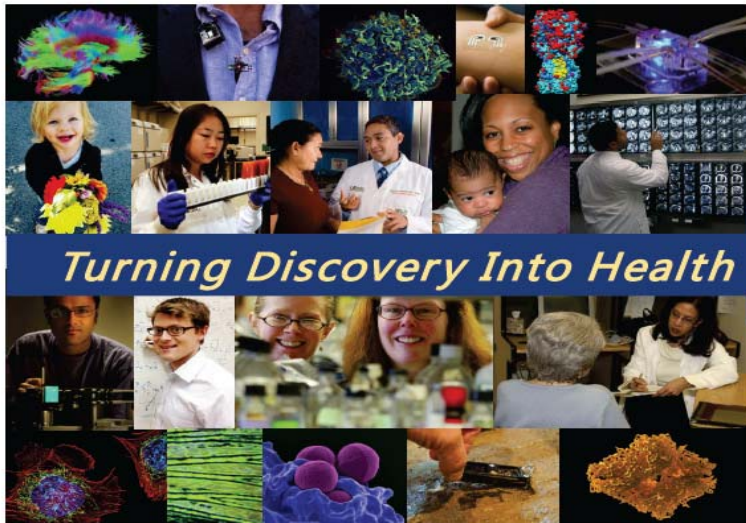
- Reprioritization of funds
- Some ICs use the R56
- Some ICs use the R35; for example:
 - NIGMS: Maximizing Investigators' Research Award (MIRA)
 - NIDCR: Sustaining Outstanding Achievement in Research (SOAR) Award
 - NIAMS: Supplements to Advance Research (STAR) from Projects to Programs

*Funding to the 25th percentile (or to a priority score of ≤ 35 from RFAs) based on FY16 R01s only

NIH Can't Afford to Support Everything: Good Stewardship is Essential

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Enhance Stewardship

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Assessing Impact of NIH Research: Developing Metrics of Productivity

- Long term: Assess the value of our investments by measuring outcomes such as:
 - Disruptions in prevailing paradigms
 - Patents/licenses
 - New technologies
 - New medical interventions
 - Changes to medical practice
 - Improvements in public health

Assessing Impact of NIH Research: Developing Metrics of Productivity

- But good stewardship also requires ways to assess impact in a less extended time frame
 - Need a reliable approach to measure the interim influence of NIH funding
- For a short-term assessment, we would need a:
 - Validated metrics for output (productivity)
 - Metrics for grant support that are not based on dollars, but on commitment
 - e.g., clinical research is more costly than most basic research

NIH Tools to Assess Influence of Publications

- **Relative Citation Ratio (RCR):** time-independent, field-normalized metric that measures the influence of publications in PubMed



META-RESEARCH ARTICLE

Relative Citation Ratio (RCR): A New Metric That Uses Citation Rates to Measure Influence at the Article Level

B. Ian Hutchins¹, Xin Yuan¹, James M. Anderson², George M. Santangelo^{1*}

1 Office of Portfolio Analysis, National Institutes of Health, Bethesda, Maryland, United States of America, 2 Division of Program Coordination, Planning, and Strategic Initiatives, National Institutes of Health, Bethesda, Maryland, United States of America

- Validated by thorough analysis – includes strong correlation with the opinion of experts about the impact of papers in their fields
- **iCite:** publicly available dashboard of bibliometrics for publications selected by the user range of years, article type, etc.
 - Displays articles per year, citations per year, and RCRs
- **Additional approaches must be considered**



Open Mike

Helping connect you with the NIH perspective, and helping connect us with yours

Following Up on Your Feedback on How to Strengthen the Biomedical Research Workforce



Posted on **June 5, 2017** by **Mike Lauer**

We appreciate the many thoughtful comments posted to the blog about working together to improve NIH funding support for early- and mid-career investigators to stabilize the biomedical workforce and research enterprise using a measure called the Grant Support Index (GSI). Some clear themes have emerged, including: [Continue reading](#) →



Posted in [blog](#), [Open Mike](#) | Tagged [Biomedical Workforce](#), [Early Stage Investigators](#), [ESI](#), [funding](#), [mid-career](#) | [Leave a reply](#)



Dr. Michael Lauer is NIH's Deputy Director for Extramural Research, serving as the principal scientific leader and advisor to the NIH Director on the NIH extramural research program.

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NIH has been exploring approaches to creating a modified “grant support index” – much more work needs to be done

Going Forward

- Beginning immediately, NIH is committed to redistributing an estimated \$210M/year, reaching a steady-state of ~\$1.1B, over the next 5 years, to support additional meritorious ESI and Mid-Career Investigators
- NIH will encourage independent analyses of metrics that can be used to assess the impact of the NIH portfolio
 - Analyses will be reviewed by a working group of the Advisory Committee to the NIH Director (ACD), and will be fully discussed at future ACD meetings
- All actions will continue to be informed by stakeholder input

Acknowledgements

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- Ms. Jill George – OCPL
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NIH...

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Turning Discovery Into Health

