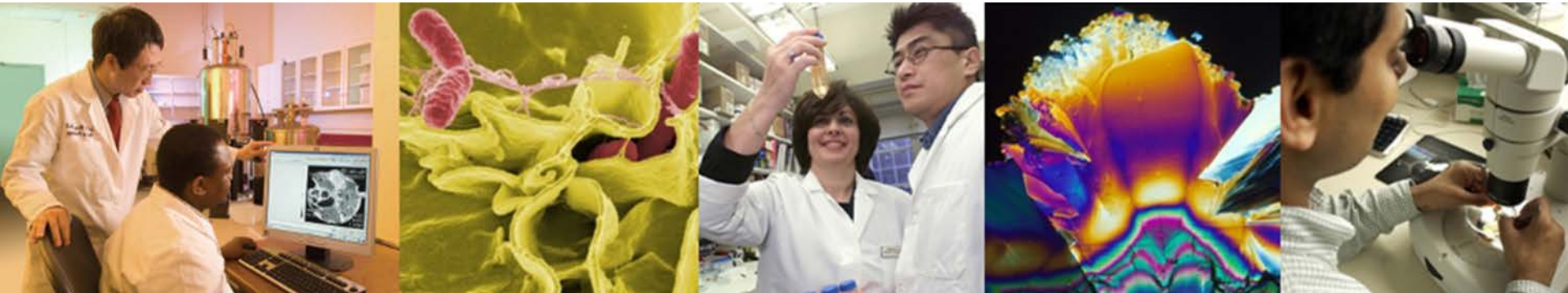


NIH-Wide Strategic Plan

*111th Meeting of the
Advisory Committee to the Director
National Institutes of Health*

December 10, 2015



Lawrence A. Tabak, DDS, PhD
Principal Deputy Director, NIH
Department of Health and Human Services



Review: Goals of the NIH-Wide Strategic Plan

- The strategic plan **should** clearly articulate the highest trans-NIH priorities and how the Agency will achieve them
- The strategic plan **should** be a living document that will require refinement throughout its lifecycle
- The strategic plan **should not** describe all the many important things that NIH does and will do in the future
- The strategic plan **should not** address priorities of the individual Institutes, Centers, and Offices (ICOs) since each ICO has its own strategic plan

Process Used to Date

- Extensive consultation with NIH Leadership (NIH Director and his Deputies; Institute, Center, and Office [ICO] Directors) throughout process
- Formation of NIH working group with representatives of NIH ICOs
- Public presentations to, and feedback from, the Advisory Committee to the Director (ACD):
 - June 11th
 - July 20th (http://acd.od.nih.gov/slides/NIH_Strategic_Plan_ACD.pdf and http://acd.od.nih.gov/07202015_transcript.pdf)
- Solicited feedback through an RFI (closed August 16th)
<https://grants.nih.gov/grants/guide/notice-files/NOT-OD-15-118.html>
 - A summary of the responses may be found in this public report: <http://www.nih.gov/sites/default/files/about-nih/nih-strategic-plan-rfi-comments-suggestions-framework.pdf>

Process Used to Date (cont.)

- Conducted 3 interactive Webinars with external stakeholders; ACD members (Cori Bargmann, Eric Goosby, Helen Hobbs, Cato Laurencin, and Ian Lipkin), served as co-chairs
 - <http://www.nih.gov/sites/default/files/about-nih/nih-strategic-plan-webinar-2015.pdf>
- Presented draft framework to 20 National ICO Advisory Councils and received member, staff, and guest feedback
- Presentations to Department of Health and Human Services
- Received final comments from ACD members
- Final presentation to the ACD – December 10th

NIH-Wide Strategic Plan Framework

Overview

- Mission of NIH
- Unique moment of opportunity in biomedical research
- Current NIH-supported research landscape
- Constraints confronting the community in the face of lost purchasing power

Objective 1: Advance Opportunities in Biomedical Research

Fundamental Science

- Foundation for progress
- Consequences often unpredictable
- Technology leaps catalyze advances
- Data science increases impact/efficiency

Health Promotion/Disease Prevention

- Importance of studying healthy individuals
- Advances in early diagnosis/detection
- Evidence-based reduction of health disparities

Treatments/Cures

- Opportunities based on molecular knowledge
- Breakdown of traditional disease boundaries
- Breakthroughs need partnerships, often come from unexpected directions
- Advances in clinical methods stimulate progress

Objective 2: Set Priorities

- Incorporate disease burden as important, but not sole factor
- Foster scientific opportunity; need for nimbleness
- Advance research opportunities presented by rare diseases
- Consider value of permanently eradicating a pandemic risk

Objective 3: 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

Objective 4: Excel as a Federal Science Agency by Managing for Results

NIH-Wide Strategic Plan: Overview

Overview

- **Mission of NIH**
- Unique moment of opportunity in biomedical research
- Current NIH-supported research landscape
- Constraints confronting the community in the face of lost purchasing power

NIH: Steward of Medical and Behavioral Research for the United States



“Science in pursuit of **fundamental knowledge** about the nature and behavior of living systems and **the application** of that knowledge to extend healthy life and reduce illness and disability.”

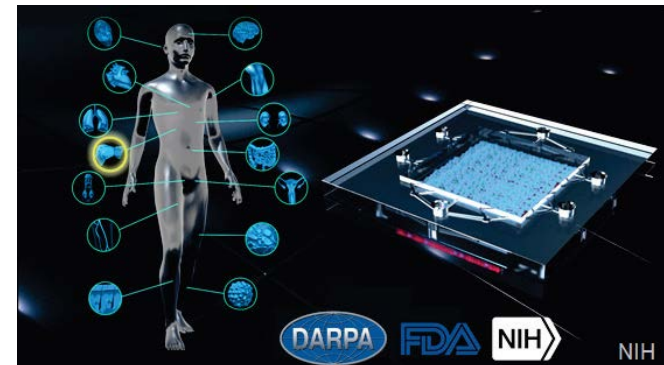
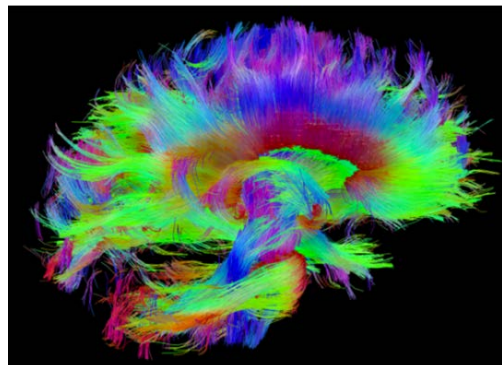
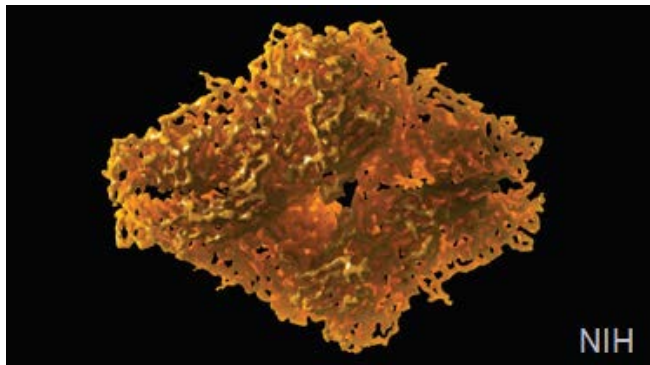
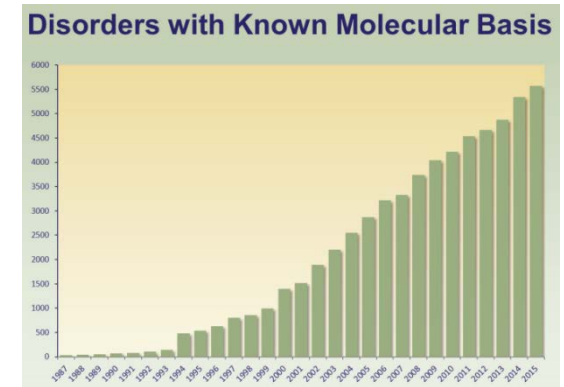
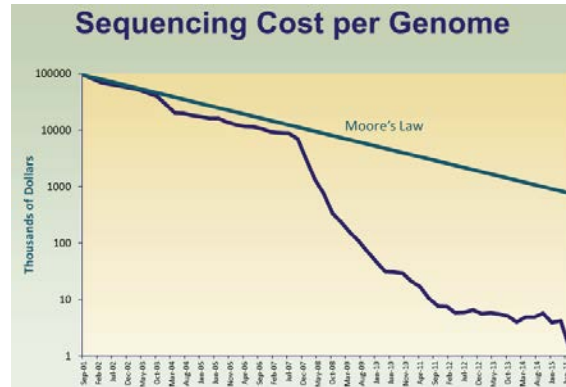


NIH-Wide Strategic Plan: Overview

Overview

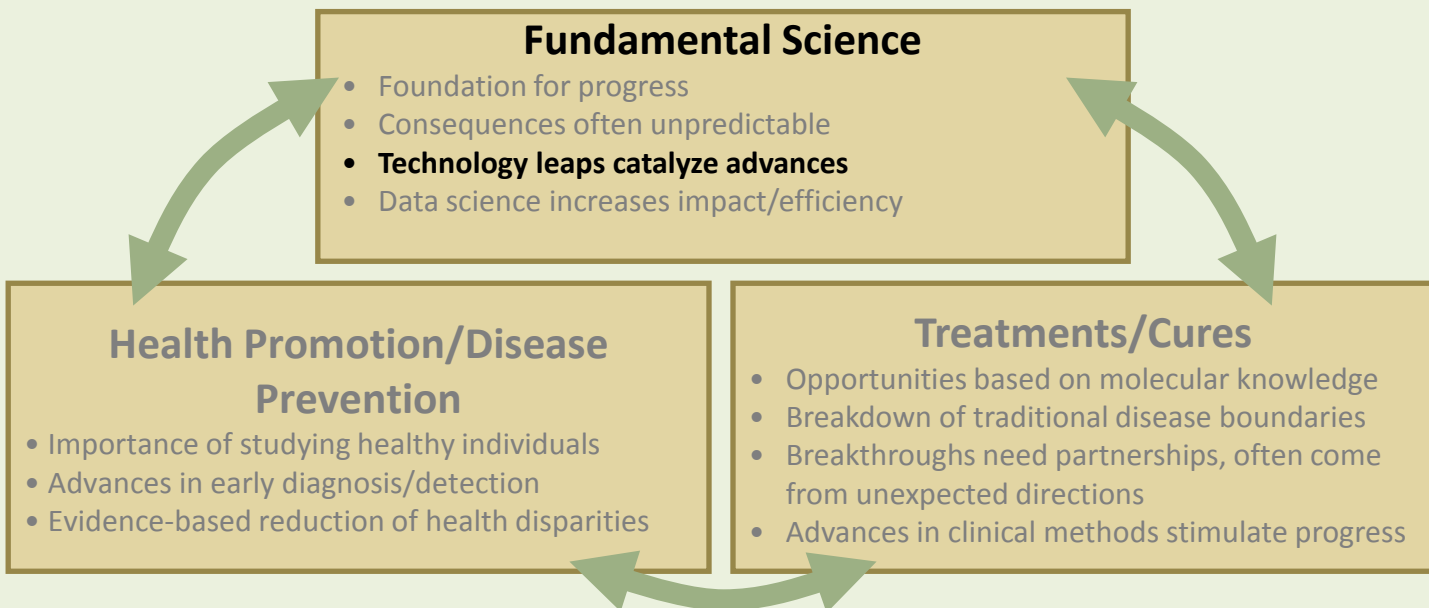
- Mission of NIH
- **Unique moment of opportunity in biomedical research**
- Current NIH-supported research landscape
- Constraints confronting the community in the face of lost purchasing power

A Unique Moment of Opportunity in Biomedical Research is being fueled by advances in Technology, increased Molecular Knowledge, and Interdisciplinary approaches to Problem Solving



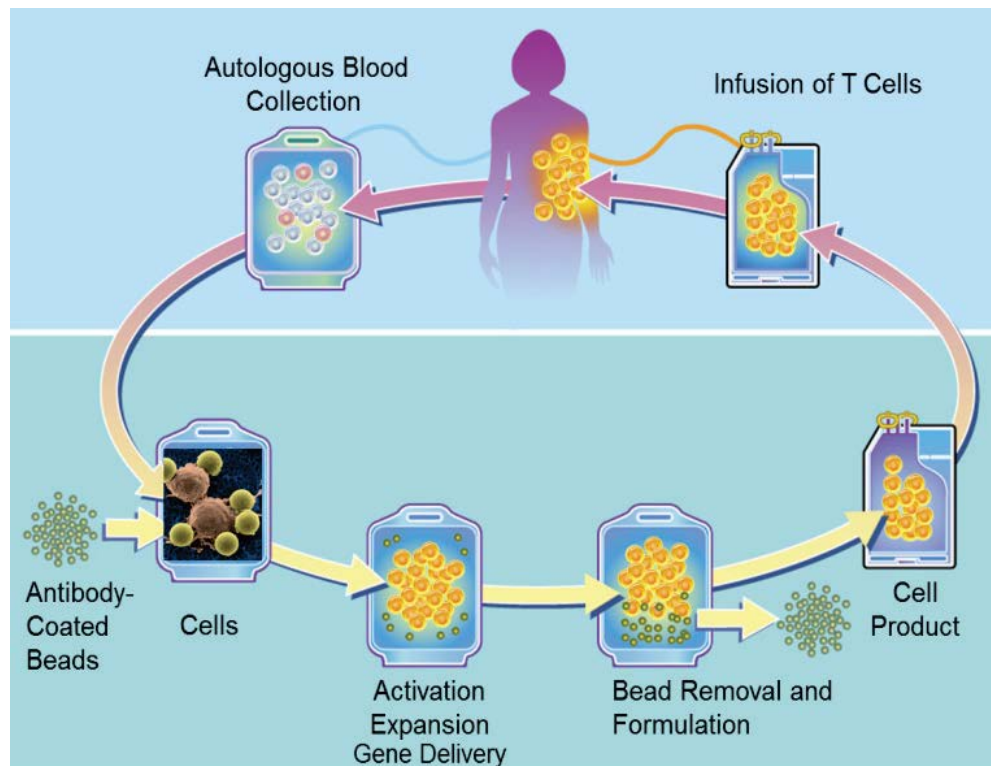
NIH-Wide Strategic Plan: Advance Opportunities in Biomedical Research

Objective 1: Advance Opportunities in Biomedical Research



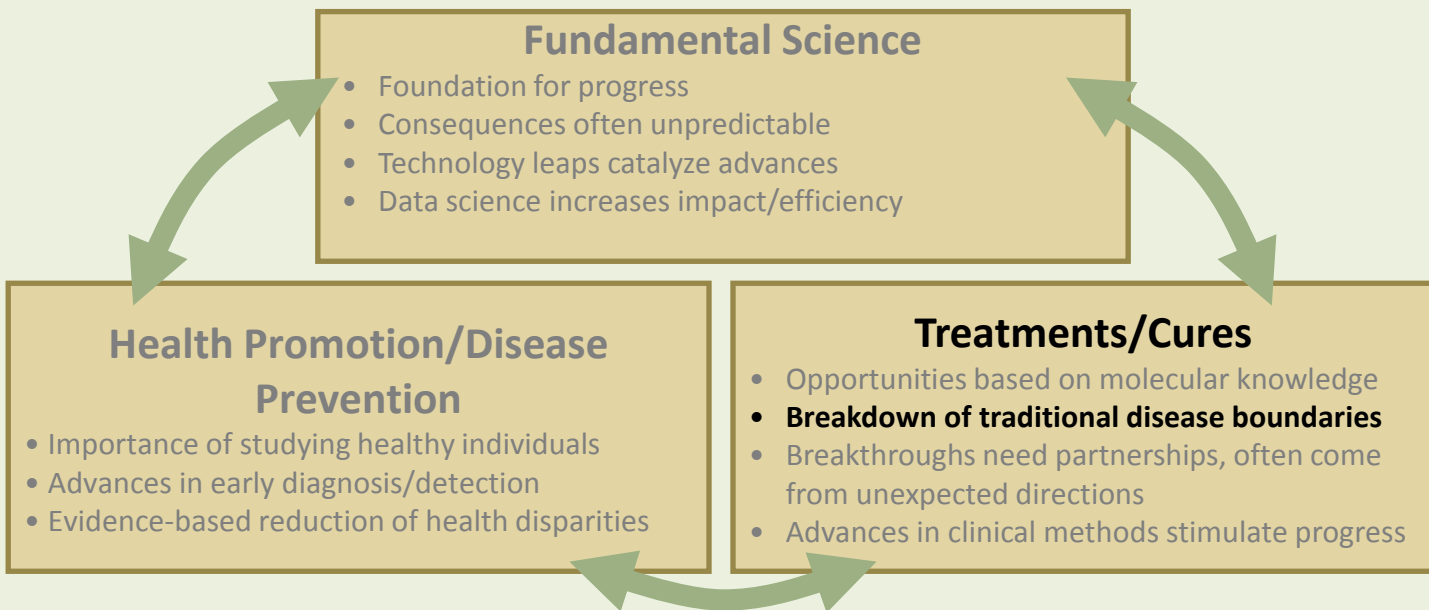
Technology Leaps Catalyze Advances: Cancer Immunotherapy

- Chimeric antigen receptor (CAR) therapy involves genetically engineering a patient's T cells to recognize and attack specific antigens on tumor cells

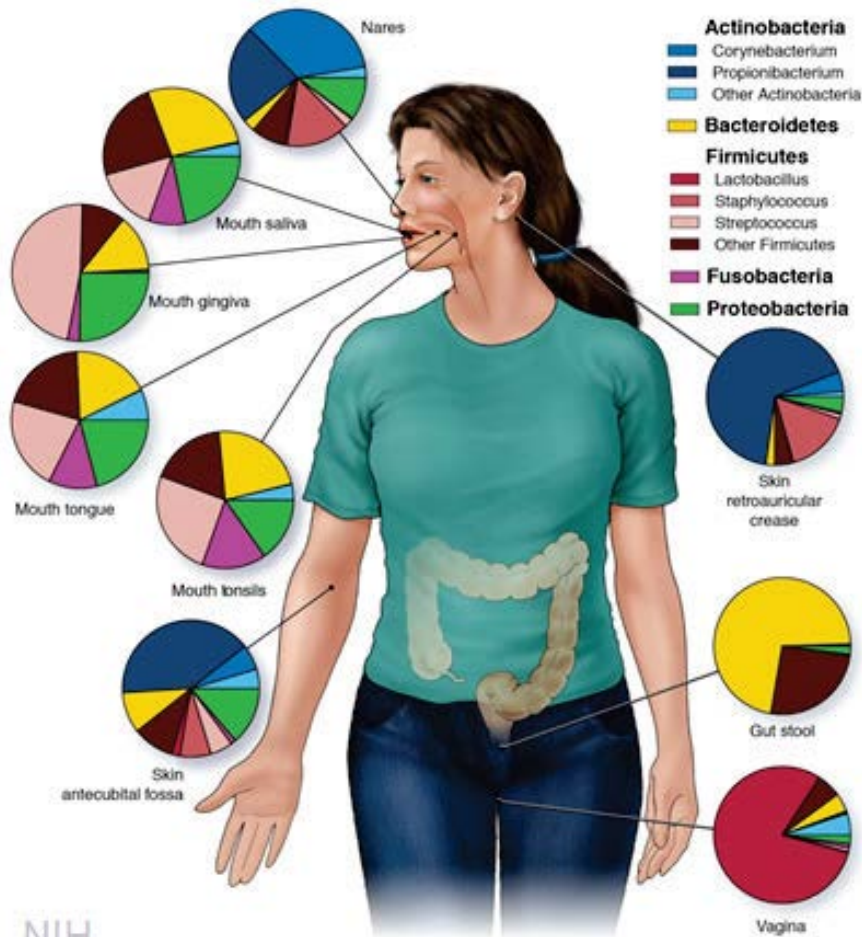


NIH-Wide Strategic Plan: Advance Opportunities in Biomedical Research

Objective 1: Advance Opportunities in Biomedical Research



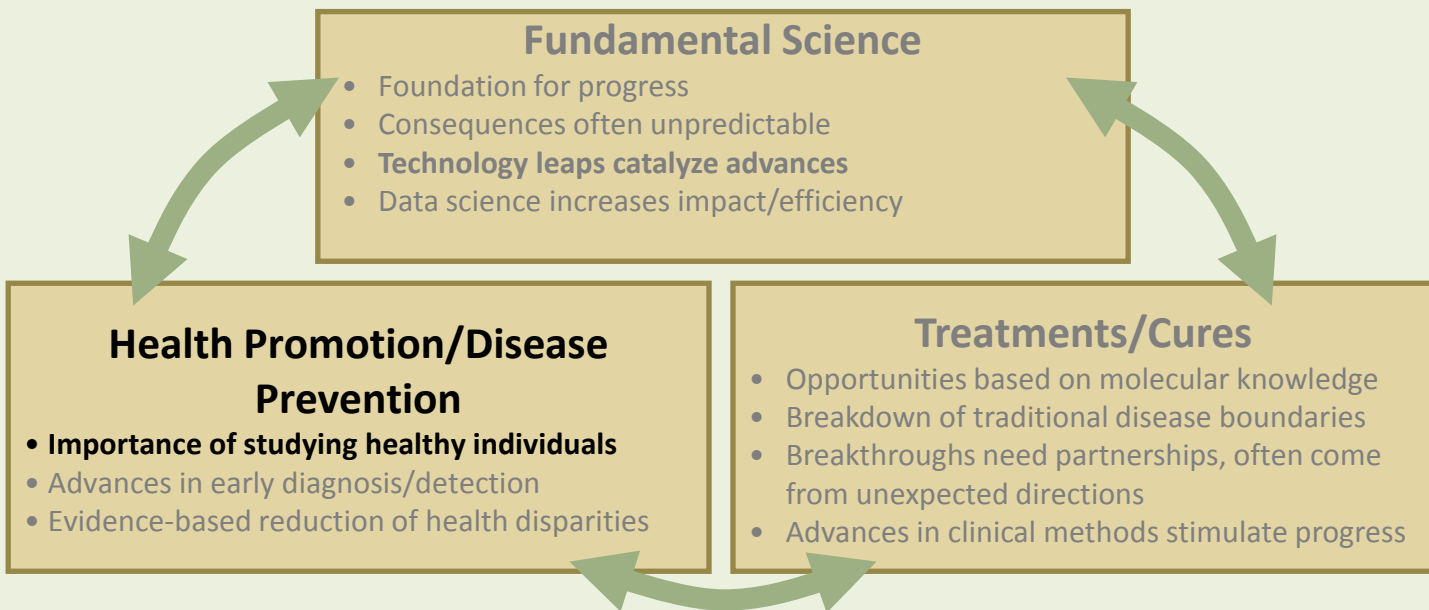
Breakdown of Traditional Disease Boundaries: Microbiomics



- Better understanding of the role played by the microflora in immune system development
- The NIH Human Microbiome Project is analyzing the trillions of bacteria, fungi, viruses, and other microbes that live in and on the human body

NIH-Wide Strategic Plan: Advance Opportunities in Biomedical Research


Objective 1: Advance Opportunities in Biomedical Research



Importance of Studying Healthy Individuals: Precision Medicine Initiative Cohort

- Longitudinal research cohort of 1 million or more U.S. volunteers will establish a base of scientific knowledge to develop prevention and screening strategies tailored to individuals across the lifespan

The Precision Medicine Initiative® Cohort



- Will enroll 1 million or more U.S. volunteers
- Will represent the nation's rich diversity
- Will build the knowledge base needed to advance precision medicine
- Will engage participants and protect privacy at every step

NIH-Wide Strategic Plan:

Objective 2 – Set Priorities

Underlying Principles

Objective 2

Set Priorities

- Incorporate disease burden as important, but not sole factor
- **Foster scientific opportunity; need for nimbleness**
- Advance research opportunities presented by rare diseases
- Consider value of permanently eradicating a pandemic risk

Objective 3

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
- Employ risk management strategies

Objective 4

Excel as a Federal Science Agency by Managing for Results

Set Priorities: Foster scientific opportunity; need for nimbleness

NIH HIV/AIDS Research Priorities and Guidelines for Determining AIDS Funding

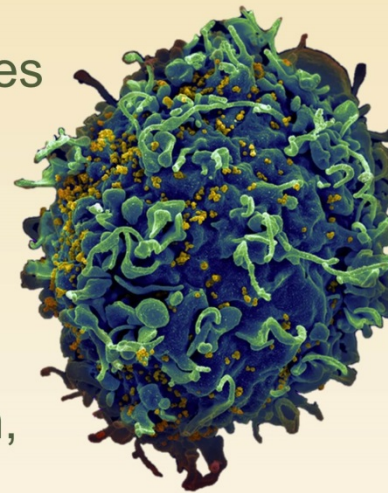
Notice Number: NOT-OD-15-137

Key Dates

Release Date: August 12, 2015

HIV/AIDS Research Priorities

- Reduce incidence, including vaccines
- Safer, easier-to-use therapies
- Work toward a cure
- HIV-associated comorbidities, co-infections
- Cross-cutting areas: Basic research, health disparities, training



NIH-Wide Strategic Plan:

Objective 3 – Enhance Stewardship

Underlying Principles

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Objective 4

Excel as a Federal Science Agency by Managing for Results

Enhance Stewardship: Enhance Workforce Diversity

- **How:** implement recommendations of ACD Working Group on Diversity in the Biomedical Research Workforce (<http://acd.od.nih.gov/dbr.htm>)
- **Evaluate:** which programs work and then swiftly apply best practices across the Agency



NIH-Wide Strategic Plan:

Objective 3 – Enhance Stewardship

Underlying Principles

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Objective 4

Excel as a Federal Science Agency by Managing for Results

Enhance Stewardship:

Enhance Impact Through Partnerships

NIH's Frequent Federal Partners		
U.S. Department of Health and Human Services	Mission	Select Collaborations with NIH
 Agency for Healthcare Research and Quality	Produces evidence to make health care safer, higher quality, more accessible, equitable, affordable. Partners with others to ensure such evidence is understood and used.	U.S. Preventive Services Task Force (USPSTF)
 Centers for Disease Control and Prevention	Works to protect Americans from health, safety, security threats. Conducts science and provides health information to protect against such threats.	SEARCH for Diabetes in Youth
 Centers for Medicare and Medicaid Services	Administers Medicare, Medicaid, the Children's Health Insurance Program (CHIP), and parts of the Affordable Care Act (ACA).	Data sharing between CMS and NCI's SEER (Surveillance, Epidemiology, and End Results) Program, NIDDK's U.S. Renal Data System, and NHLBI's Research Cohorts
 Food and Drug Administration	Protects public health by ensuring safety, efficacy, security of drugs, biological products, medical devices, food, cosmetics, radiation-emitting products. Helps speed innovations to make medical products safer, more affordable, effective.	Accelerating Medicines Partnership®
 Health Resources and Services Administration	Improves access to healthcare by strengthening healthcare workforce, building healthy communities, achieving health equity. Provides health care to people who are geographically isolated, economically or medically vulnerable.	Maternal and Child Health Research Network Programs
 Indian Health Service	Raise the physical, mental, social, and spiritual health of American Indians and Alaska Natives to the highest level.	Native American Research Center for Health (NARCH) (also with AHRQ, HRSA)
 Substance Abuse and Mental Health Services Administration	Reduce the impact of substance abuse and mental illness on America's communities.	Patient-Reported Outcomes Measurement Information System® (PROMIS®) (also with CDC, CMS, FDA)

Enhance Stewardship: Enhance Impact Through Partnerships Accelerating Medicines Partnership

	 Alzheimer's Disease	 Type 2 Diabetes	 Autoimmune Diseases
Industry members	   	    	     
Government members	 		 
Non-profit members	   	 	      

NIH-Wide Strategic Plan:

Objective 4 – Managing for Results

Underlying Principles

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Objective 4

Excel as a Federal Science Agency by Managing for Results

Objective 4: Managing for Results

- Continue to develop the “Science of Science”
 - **How:** develop and validate new analytical methodologies to characterize and compare ICO portfolios
 - **Measure:** a broad range of scientific outputs as a function of time
 - **Evaluate:** long-term success of grants and assess any correlation between short-term outputs versus long-term outcomes

New Results

Relative Citation Ratio (RCR): A new metric that uses citation rates to measure influence at the article level

Bruce Ian Hutchins, Xin Yuan, James M Anderson, George M Santangelo

doi: <http://dx.doi.org/10.1101/029629>

Abstract

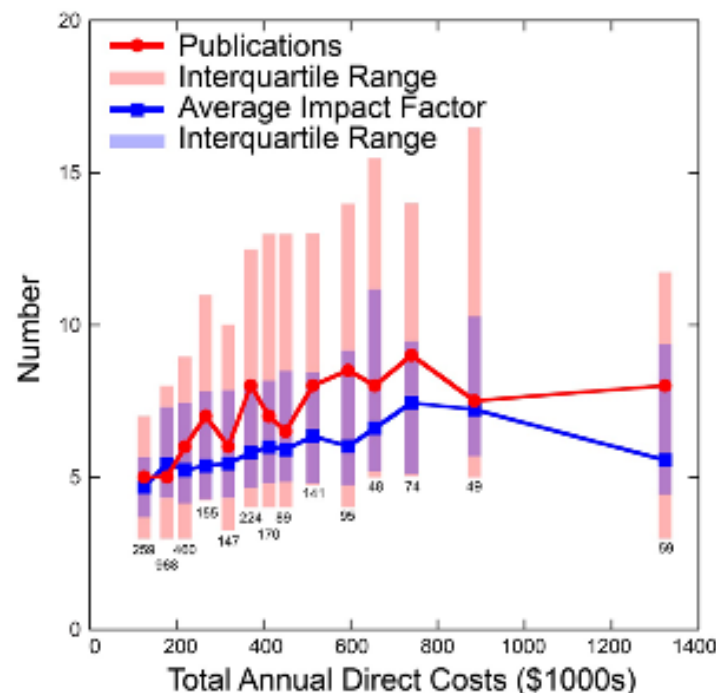
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Abstract

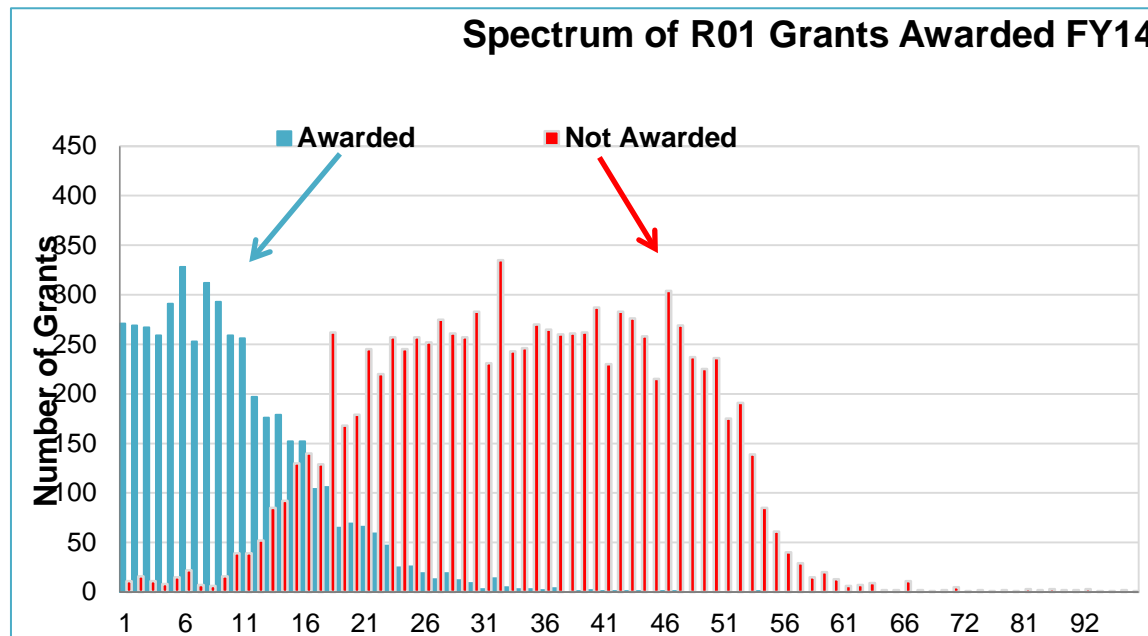
Despite their recognized limitations, bibliometric assessments of scientific productivity have been widely adopted. We describe here an improved method that makes novel use of the co-citation network of each article to field-normalize the number of citations it has received. The resulting Relative Citation Ratio is article-level and field-independent, and provides an alternative to the invalid practice of using Journal Impact Factors to identify influential papers. To illustrate one application of our method, we analyzed 88,835 articles published between 2003 and 2010, and found that the National Institutes of Health awardees who authored those papers occupy relatively stable positions of influence across all disciplines. We demonstrate that the values generated by this method strongly correlate with the opinions of subject matter experts in biomedical research, and suggest that the same approach should be generally applicable to articles published in all areas of science. A beta version of iCite, our web tool for calculating Relative Citation Ratios of articles listed in PubMed, is available at <https://icite.od.nih.gov>.



Lorsch, MBoC 26:1578, 2015
(note - original analysis performed by
Jeremy Berg, Paul Sheehy, and Matt
Eblen [NIGMS]).

Objective 4: Managing for Results

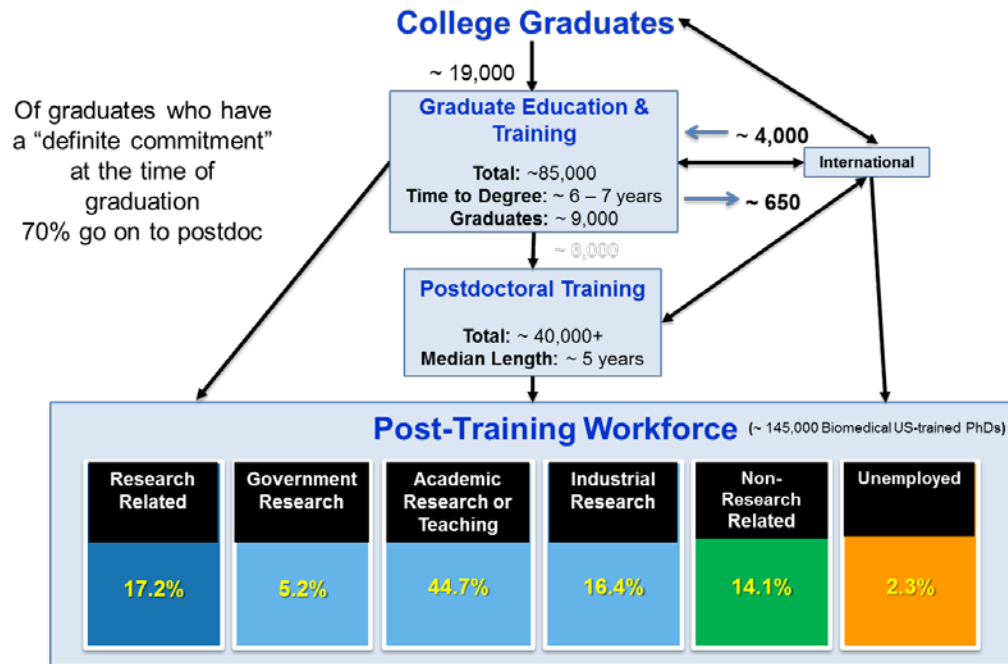
- Continue to enhance the transparency of Agency decision making
 - **How:** develop and validate facile measures of Agency decisions for public display
 - **Measure:** feedback from stakeholder groups; number of ICOs that provide this information
 - **Evaluate:** processes used by ICs over time



Objective 4: Managing for Results

- Continue to enhance the transparency of Agency decision making
 - How:** create a dynamic model of the PhD and MD/PhD workforce
 - Evaluate:** new approaches to engaging MD/PhDs, and the optimal number of PhDs and postdocs for NIH to support

PhD Biomedical Research Workforce



Note: All data estimates come from 2011 NSF data (GSS, SED, etc.), 2011 stay rates data (Mike Finn), and the 2010 SDR. Median length of postdoc cited from Kahn & Ginther (2014). OER/OEP/DBRW

Objective 4: Managing for Results

- Evaluate Steps to Enhance Rigor and Reproducibility
 - **How:** continue supporting a series of initiatives
 - **Evaluate:** existing activities for benefits and unanticipated, negative consequences



The screenshot shows the NIH website's 'Rigor and Reproducibility' page. The header includes the NIH logo and navigation links. The main content area features a sidebar with links to 'Principles and Guidelines', 'Publications', 'Training', 'Meetings and Workshops', 'Expanded Guidelines', and 'Application Instructions'. The main text discusses the importance of rigor and reproducibility in scientific research, mentioning Johns Hopkins University students in a laboratory. A right sidebar contains 'Email Updates' and 'Contact Us' sections.

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RIGOR AND REPRODUCIBILITY

Rigor and Reproducibility

- Principles and Guidelines
- Publications
- Training
- Meetings and Workshops
- Expanded Guidelines
- Application Instructions

Two of the cornerstones of science advancement are rigor in designing and performing scientific research and the ability to reproduce biomedical research findings. The application of rigor ensures robust and unbiased experimental design, methodology, analysis, interpretation, and reporting of results. When a result can be reproduced by multiple scientists, it validates the original results and readiness to progress to the next phase of research. This is especially important for clinical trials in humans, which are built on studies that have demonstrated a particular effect or outcome.



Johns Hopkins University students in a laboratory. Johns Hopkins University

In recent years, however, there has been a growing awareness of the need for rigorously designed published preclinical studies, to ensure that such studies can be reproduced. This webpage provides information about the efforts underway by NIH to enhance rigor and reproducibility in scientific research.

Email Updates

Sign up to receive email updates about rigor and reproducibility.

[Sign up for updates](#)

Related Links

[Letter from Dr. Stephen I. Katz: An Update on the NIH Initiative to Enhance Research Rigor and Reproducibility](#)

Contact Us

Please send email to NIHReprodEfforts@od.nih.gov.

Objective 4: Managing for Results

- Reduce Administrative Burden
 - **How:** reduce or, wherever possible, eliminate burdens
 - **Evaluate:** each burden with regard to origin
- Track Effectiveness of Risk Management in Decision Making
 - **How:** continually adapt the NIH risk management system to include new elements
 - **Evaluate:** unexpected issues and why they occurred

A Few Bold Predictions for 2020

- NIH will be known as the model agency for applying the scientific method to itself—for learning, in a rigorous way, how best to fund biomedical research.
- Hundreds of thousands of cancer patients will experience enhanced survival from application of precision medicine.
- Universal influenza vaccine will demonstrate both safety and effectiveness in a community-based trial.
- NIH-supported research will develop culturally precise behavioral interventions to promote health and prevent illness in populations that experience health disparities.
- Large-scale application of pharmacogenomics in real-world clinical settings will lead to improved outcomes in the use of several drugs.

A Few Bold Predictions for 2020 (cont.)

- Novel HIV/AIDS vaccine will confer better than 50% protection in a trial conducted in a real-world setting.
- NIH-supported clinical trials will show that at least a half-dozen interventions thought to be clinically beneficial actually have no value.
- Radical new methods for structural biology will revolutionize drug screening.
- NIH-supported research will directly contribute to FDA-approved therapies for at least a dozen rare diseases.
- Application of mobile health (mHealth) technologies will provide rigorous evidence for their use in enhancing health promotion and disease prevention.

A Few Bold Predictions for 2020 (cont.)

- Wearable biosensor for monitoring blood-alcohol levels in real time will be developed and show efficacy for preventing and treating alcohol-related injury and disease.
- Technologies to reverse paralysis and restore normal functions will be available to spinal cord injury patients.
- Vaccine against respiratory syncytial virus will be developed, promising dramatic declines in this leading cause of childhood pneumonias.
- Research on the artificial pancreas will lead to advanced trials showing significantly better management of diabetes, without dangers of hypoglycemia.
- More than 10 NIH-supported scientists will win Nobel Prizes.

Next Steps

- **Timeline**

- Transmit to Congress by December 16

- **Communications plan**

- Post plan on the NIH website – homepage and strategic plan page
- Issue news release
- Notify key Congressional staff and stakeholder communities

Many Thanks!

- **The Stakeholder Communities of the NIH**
- **The NIH Advisory Committee to the Director**
- **Institute, Center, and Office Directors**
- **NIH Director's Executive Committee**
- **NIH OD Staff** - Carla Garnett, Jill George, Nirupa Goel, Rebecca Kolberg, and Tara Schwetz
- **NIH Strategic Plan Working Group** - Ronit Abramson, Hugh Auchincloss, Elizabeth Baden, Michelle Bennett, Laura Berkson, Juliana Blome, David Bochner, Maureen Boyle, Rosalina Bray, Penny Burgoon, John Burklow, Andrew Burton, Anna Calcagno, Cindy Caughman, Laura Cole, Christine Cooper, Ned Culhane, Christine Cutillo, Jessica Escobedo, Meredith Fox, Bekah Geiger, Taylor Gilliland, Sarah Glavin, John Grason, Pamela Harris, Rebecca Hawes, Gene Hayunga, Jill Heemskerk, Jennifer Hobin, Jonathan Horsford, Lisa Kaeser, Mary Beth Kester, Wendy Knosp, Ellen Liberman, Jaron Lockett, Jane Lockmuller, Karin Lohman, Dwayne Lunsford, Sheila Newton, Morgan O'Hayre, Marie Parker, Amy Patterson, Wilma Peterman Cross, Stephane Philogene, Patricia Powell, Michele Rankin, Barbara Rapp, Sarah Rhodes, Samir Sauma, Peggy Schnoor, Elka Scordalakes, Paul Scott, Allan Shipp, Keisha Shropshire, Ellen Silva, Megan Singh, Rachel Sturke, Kimberly Thigpen-Tart, Santa Tumminia, Dave Vannier, Susan Vasquez, Samantha White, Betsy Wilder, Bridget Williams-Simmons, Carrie Wolinetz, and Buck Wong