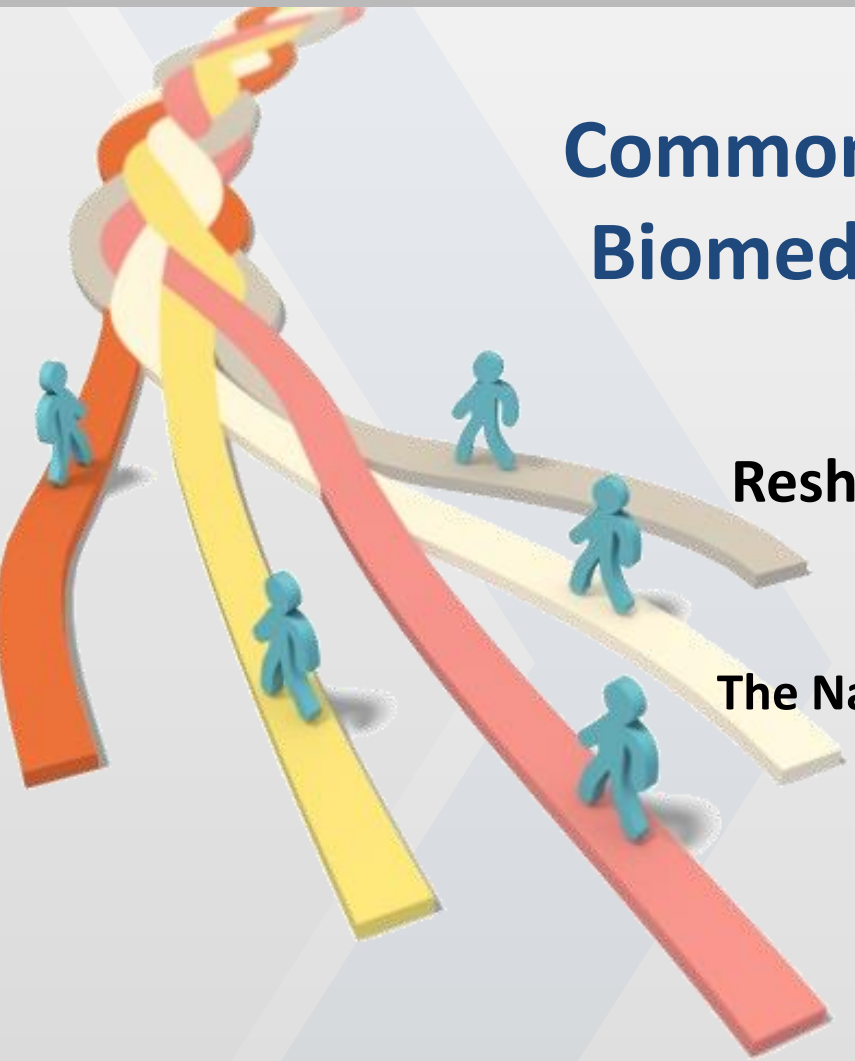


Common Fund "Strengthening the Biomedical Research Workforce" Program

Reshaping Graduate STEM Education for the 21st Century

The National Academies of Sciences, Engineering, and Medicine

January 12, 2017

Patricia Labosky, PhD
Program Leader

NIH National Institutes of Health
Office of Strategic Coordination - The Common Fund

NIH is committed to a robust and sustainable biomedical research workforce

In 2011, the NIH Advisory Committee to the Director (ACD) formed the Biomedical Workforce (BMW) Working Group to examine issues related to the future of the biomedical research workforce.

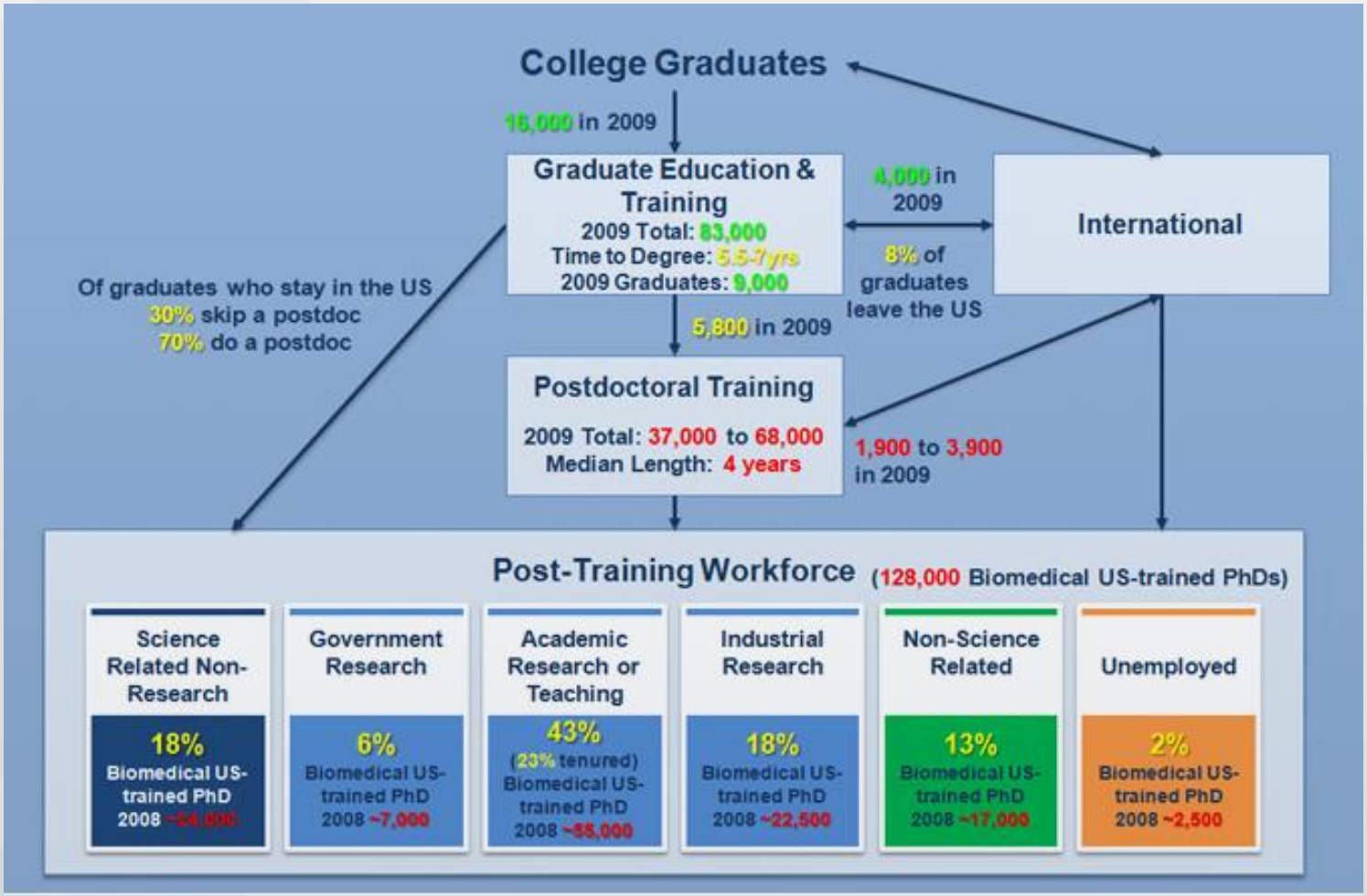
Charge:

Develop a model for a sustainable and diverse U.S. biomedical research workforce that can inform decisions about training of **the optimal number of people for the appropriate types of positions** that will advance science and promote health.

Working Group Chairs:

- Shirley Tilghman, Ph.D., then President, Princeton University, N.J.
- Sally Rockey, Ph.D., then NIH Deputy Director for Extramural Research

Ph.D. Biomedical Research Workforce: Snapshot



http://report.nih.gov/investigators_and_trainees/ACD_BWF/

ACD Report: Findings and Conclusions

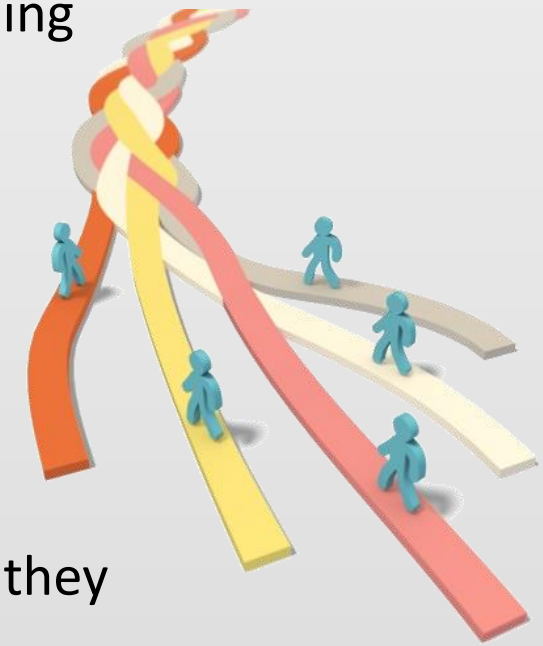
- Combination of the large upsurge in US-trained PhDs, increased influx of foreign-trained PhDs, and aging of the workforce make **launching a traditional, independent, academic research career increasingly difficult**.
- **Long training time and relatively low early-career salaries** may make the **biomedical research career less attractive**.
- The **current training programs do little to prepare people for anything besides an academic research career**.

One result:

- The NIH Common Fund launched the **Strengthening the Biomedical Research Workforce** program to expand the versatility of training opportunities to prepare early career scientists for entry into the dynamic biomedical workforce landscape. This program made the **BEST (Broadening Experiences in Scientific Training)** awards.

Strengthening the Biomedical Research Workforce Program

- Program Launched 2013
- BEST awards (DP7) are **research** awards, not training grants - not to support trainee stipends
    - **5 years, non-renewable**
    - Proposed to establish and **evaluate novel training programs with the potential to transform** their training environment
    - Must work with the NIH on a **cross-site evaluation**
    - Must **disseminate** the program findings as they are developed
    - Awardees **work together** as a consortium



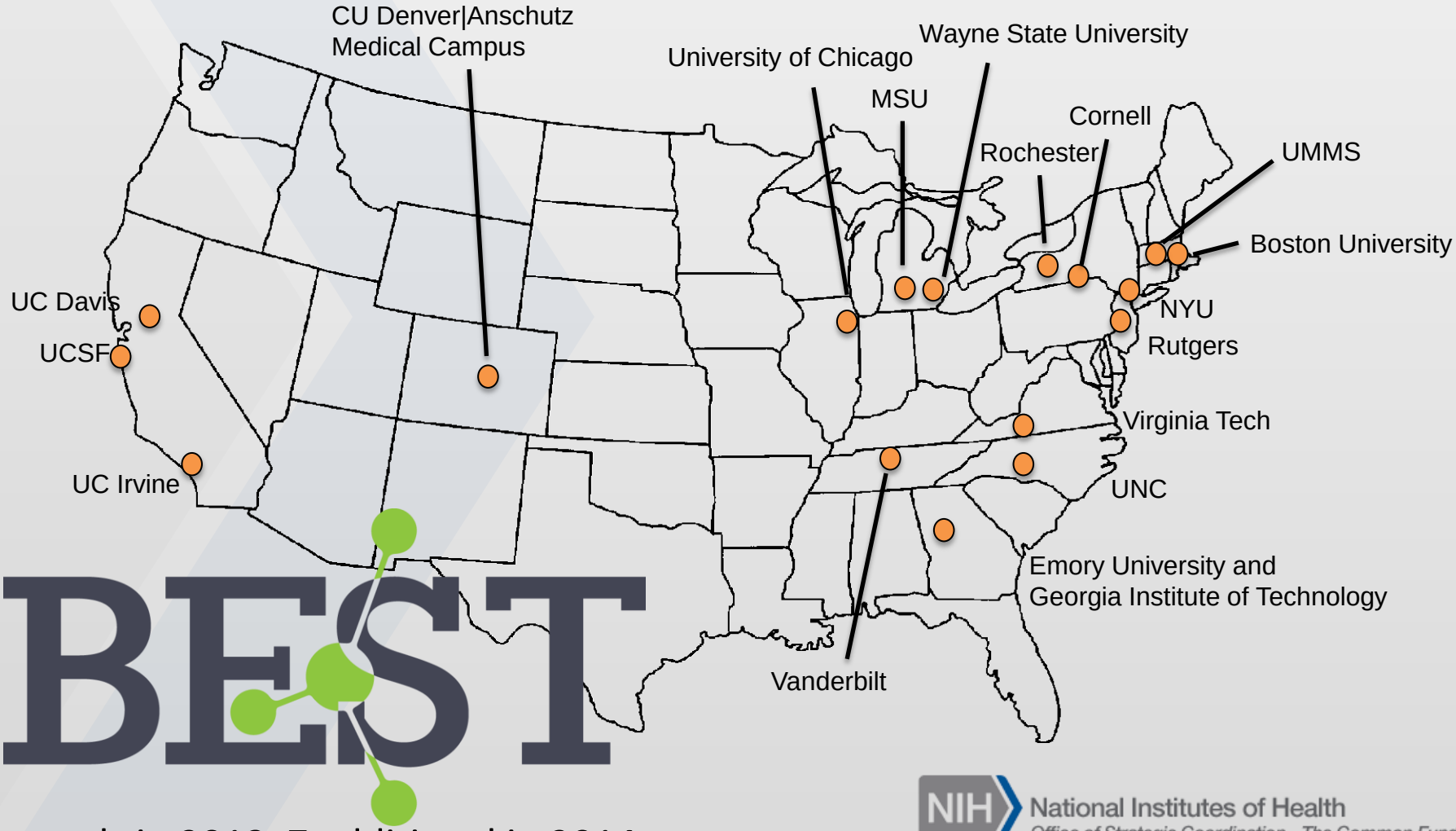
Goals of BEST Awards

- **Transformative Workforce Development**
- **New Tools, Technologies, Data, Approaches**
  - Trying to affect a “sea change” with this program.
  - Alter the training landscape to give pre-doctoral students and postdoctoral fellows direct exposure to a myriad of career options.
  - Provide trainees with a working knowledge of the opportunities available to them AND the information to facilitate their path towards these options.
  - Determine what approaches make a difference and for whom.
  - Make tested approaches widely available.
- **Enabling Infrastructure**

  Building infrastructure, novel courses, internships, training opportunities, workplace exposures, etc.

NIH BEST Grants

BEST: Broadening Experiences in Scientific Training



BEST

10 awards in 2013, 7 additional in 2014

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General Features of BEST Programs

Format
Small Cohort Model
Broad Exposure Model

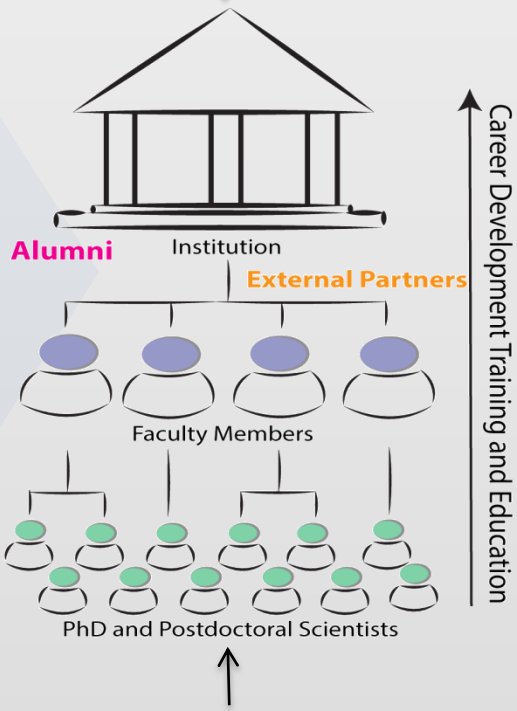
Participation
Selected graduate programs & departments
Diverse levels of exposure (dosage)

Mentoring
Alumni
Professional Coaching
Peers
Program staff & faculty

Content Focus
Academia
Science Communication
Government & Science Policy
Law
Business
Industry/Pharmaceutical Companies

NIH External Panel of Experts

Influence of Job Market



Steering Committees,
Internal & External Advisory Boards

Target Trainee Population
PhD Scientists Only
Both PhD and Postdoctoral Scientists

Institutional Environment
Joint Institution Program
Medical School Program Only
Graduate School Program Only
Medical + Graduate School

Partnerships Outside Academia
Industry/Pharma
Law
Business
Government

National Institutes of Health
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Meyers et al., FASEB 2015

Common BEST Consortium Programmatic Elements

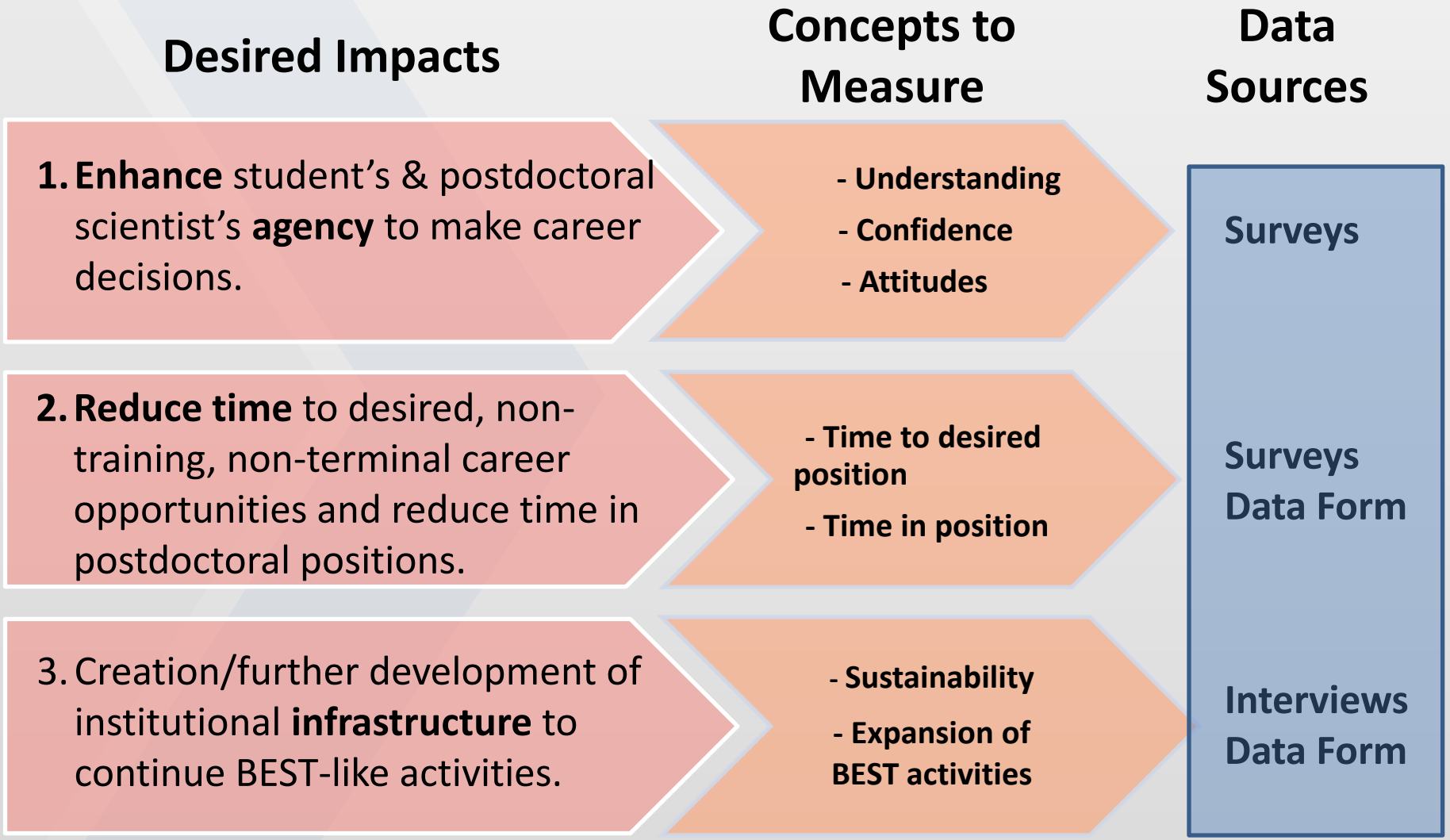
- **Career Development Skills:** Understanding career options, self-reflections, making use of Individual Development Plans (IDP), networking, and job search skills.
- **Professional Development Skills:** Team building, time management, oral and written communication, networking, leadership training, and cognitive assessment of leadership, conflict, and negotiation skills.
- **Experiential Learning:** Brief intensive experiences with partners outside of the University (*e.g.* biotechnology, science writing) or within the University. Seminar series, Entrepreneurial workshops.
- **Mentorship:** Primary research advisor as well as peer mentoring and/or connecting to alumni and professionals in their career(s) of interest.

Meyers, Frederick J., et al. "The origin and implementation of the Broadening Experiences in Scientific Training programs: an NIH common fund initiative." The FASEB Journal 30.2 (2016): 507-514.

Long Term BEST Consortium Goals

- Training at U.S. institutions will value a **commitment** to development of higher levels of research skills as well as exposure to and education in preparing for a broader and diverse range of careers.
- Establish high caliber **Offices of Professional Career Development** at all U.S. research institutions focused on graduate and postdoctoral education.
- Truth in **Recruiting** will become widespread, offering **data** on career outcomes**.**
- Universal recognition and support for philosophy **that choosing a non-academic career is not failure.**
- Evaluated approaches for career advisors and scientists-in training will be available on the **NIH BEST Consortium website** and **disseminated through publications.**
- Trainees will **have increased confidence** to pursue their career goals and will spend shorter times in training – the default into a postdoctoral training period will decrease/disappear.

BEST Program Desired Impacts



Note: These are being evaluated at the INDIVIDUAL level.

Data Collection: Survey

Year	Entrance Survey *2015: All current graduate students 2016-2019: Only new graduate students*	Interim Survey *All graduate students from previous entrance surveys*	Exit Survey *Only students graduating*	Post-exit 2-year	Post-exit 6-Year	Post-exit 10-Year	Post-exit 15-Year
2015	●		●*				
2016	●		●				
2017	●	●	●	●			
2018	●		●	●			
2019		●	●	●			
2020			●	●			
2021			●	●	●		
2022			●	●	●		
2023			●	●	●		
2024				●	●		
2025				●	●		
2026					●		
2027					●		
2028					●	●	
2029					●	●	
2030						●	●
2031						●	●
2032						●	●
2033						●	●

Example of Question:

How confident are you that you can do the following?

a. Assess your abilities to pursue your desired career path(s)
b. Determine the steps to pursue your desired career path(s)
c. Seek advice from professionals in your desired career path(s)
d. Identify potential employers, firms, and institutions relevant to your desired career path(s)
e. Achieve your career goals

Blue: While trainees are at the institutions
Grey: After trainees leave the institution

Black Dot: Cohort 1 and Cohort 2
Red Dot: Cohort 2 Only

*Includes Spring 2015 and Fall 2015 graduates

Data Collection: Institutional Annual Data Form

Captures information on:

- Trainees' Participation in BEST Activities
    - Individual level of participation for each BEST activity
- Other Program and Institutional Information
    - Examples: Criteria for participation, total number of participants, graduate degrees awarded by the institution, placement after graduation, number of trainees who pursue other degree programs, faculty and external partner participation
- Length of time in graduate school, career paths of graduates, length of time in postdoc positions (prior to and during award period)

Data Collection: Institutional Interviews

- Annual one hour phone interviews with key staff from each institution
- To address implementation/further development of institutional infrastructure to continue BEST-like activities
- Provides important context for activities and challenges at different institutions

Preliminary Insights

- BEST is a unique training program at 17 institutions
- Individual and institutional level data are being collected
- Cross-site evaluation includes “treatment” and “comparison” groups
- There are minimal differences in attitudes and levels of confidence in the treatment and comparison groups at baseline (***in progress analysis***).
- Awardees consider the quality of seminars and workshops, as well as recruitment and participation, as some of their greatest successes to date
- Those participants who have had some exposure to BEST rate the program highest on providing information about a broad range of career options

Preliminary Evaluation Findings:

Perceived Program Implementation Challenges and Strategies to Address Them

• Challenges

- Faculty attitudes
- Implementing activities
- Identifying participants
- Participation in activities
- Program resources
- Program sustainability
- Using Advisory Board
- Collecting evaluation information

• Strategies

- Faculty engagement
- Flexibility in activities
- Leverage partnerships
- Outreach to graduate students and postdoctoral scientists
- Increase program staff
- Add fee for activities

Preliminary Example: Lessons Learned

- Challenges to Voluntary versus Required Curriculum for Professional Development

VOLUNTARY CURRICULUM	REQUIRED CURRICULUM
Only those interested attend, creating a positive environment.	Programming reaches all learners so that everyone gains important knowledge, skills and a sense of community.
High-quality pedagogy is critical to attract participation in future events.	High-quality pedagogy is critical to engage all learners – including those who may not have otherwise chosen to attend.
Programming can cater to specific interests, providing in-depth exposure to topics that may be of interest to only a subset of the population.	Broadly-spaced lessons that minimally distract from research can build on one another over semesters or years of training, leading to depth in skill development over time.
Not all programming relies on faculty buy-in.	Faculty must be sold on the importance of this requirement, a challenging but important step to creating culture change and support for career development training.
To maximize attendance and minimize the no-show rate, the university must plan strategically through event timing, incentive structures, publicity, or a selective application process.	The university must develop a clear syllabus to enforce the requirement and be willing to hold students accountable to participating.

Only those interested attend, creating a positive environment.

Programming reaches all learners so that everyone gains important knowledge, skills and a sense of community.

Not all programming relies on faculty buy-in.

Faculty must be sold on the importance of this requirement, a challenging but important step to creating culture change and support for career development training.

- Whether required or voluntary curriculum: need effective pedagogy, thoughtful scheduling, and campus support. Work on these details up front with a structured, required curriculum; or develop them on the fly with a flexible, voluntary set of programs.

http://www.nihbest.org/career-development-guides/build-a-supportive-career-development-organization/voluntary-vs-required-curriculum/

**Important—see NIH BEST website for information like this

Conclusions

- Training for the 21st century biomedical research workforce is changing rapidly and institutions need to adapt to recruit bright and talented trainees.

- NIH has multi-pronged approach to responding to changing landscape, including the Common Fund "Strengthening the Biomedical Research Workforce" Program with its **BEST awards**.

- The BEST program aims to **provide an evidence base** for what does and does not work and for whom.

NIH "Strengthening the Biomedical Research Workforce" Working Group

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Kay Lund, Ph.D. (OD)
(Sally Rockey)

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(Rod Ulane)

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Jonathan Wiest, Ph.D. (NCI)

National Institutes of Health
Office of Strategic Coordination - The Common Fund

Origins of the Common Fund

One Hundred Ninth Congress
of the
United States of America

AT THE SECOND SESSION

Begun and held at the City of Washington on Tuesday, the third day of January, two thousand and six

An Act

To amend title IV of the Public Health Service Act to revise and extend the authorities of the National Institutes of Health, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "National Institutes of Health Reform Act of 2006".

TITLE I—NIH REFORM

2004: NIH Roadmap is launched

December 9, 2006: Congress unanimously passes a reauthorization bill affirming importance of NIH and its vital role in advancing biomedical research to improve the health of the Nation.

Established the **Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI)** within Office of the Director and the **NIH Common Fund** to provide a dedicated source of funding to enable **goal-driven trans-NIH research.**

Common Fund Enables a Different Approach to Science and Science Management

Transformative: expected to have **exceptionally high and broadly applicable impact.** Relevant to many diseases; set new standards for research or clinical practice; entirely new approaches to research or clinical care; establish new biological paradigms.

Catalytic, Short Term and Goal-driven: achieve - not just work toward - a goal. They have deliverables - data sets, tools, technologies, approaches, or fundamental principles of biology, etc. – that can be achieved within 5-10 years.

Synergistic /Enabling: be **valued-added** to the NIH Institutes and Centers, with the output enabling the mission of NIH.

Requires a High Level of Trans-NIH Coordination: address complex issues requiring trans-NIH teams, insights, and perspectives to design and manage. There must be a reason why strategic coordination is required.

Novel: should provide **new solutions** to specific challenges**.**

Designed to accomplish goals and deliverables within 5-10 years
Evaluation of program outputs/outcomes is essential

Current Common Fund Programs (FY17)