The Biomedical Research Workforce Working Group

- A working group of the Advisory Committee to the NIH Director

- 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.

- Based on this analysis and input from the extramural community, make recommendations for actions that NIH should take to support a future sustainable biomedical infrastructure.

- Reported to the ACD in June 2012.
  http://acd.od.nih.gov/Biomedical_research_wgreport.pdf

- Supplementary Web Site
  http://report.nih.gov/investigators_and_trainees/ACD_BWF
Age at First PhD, First Non Postdoctoral Job, First Tenure Track Job, for US trained Doctorates

Source: Survey of Earned Doctorates
PhD Biomedical Research Workforce

College Graduates

~ 19,000

Graduate Education & Training

Total: ~85,000
Time to Degree: ~ 6 – 7 years
Graduates: ~ 9,000

International

~ 4,000

~ 650

Postdoctoral Training

Total: ~ 40,000+
Median Length: ~ 5 years

Post-Training Workforce ~ 145,000 Biomedical US-trained PhDs

Research Related 17.2%
Government Research 5.2%
Academic Research or Teaching 44.7%
Industrial Research 16.4%
Non-Research Related 14.1%
Unemployed 2.3%

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
Workgroup Conclusions

Weighing all the data analyzed, the working group concluded that:

- The large upsurge in US-trained PhDs, increased influx of foreign-trained PhDs, and aging of the academic biomedical research workforce make launching a traditional, independent, academic research career increasingly difficult.

- The long training time and relatively low early-career salaries when compared to other scientific disciplines and professional careers may make the biomedical research career less attractive to the best and brightest of our young people.

- The current training programs do little to prepare people for anything besides an academic research career, despite clear evidence that a declining percentage of graduates find such positions in the future.
Initiatives

- Improving graduate student and postdoctoral training by:
  - Putting individual development plans in place for all trainees
  - Reducing the length of graduate training
- Reducing the length of graduate training
- Offering F30s and F31s from all ICs – fully implemented for applications received after April 2014
- Increasing postdoctoral stipends – implemented in FY2014
- Considering policies on benefits
- Shortening the eligibility period and increasing support for K99/R00 – implemented for applications received after February 2014
Initiatives

BEST
Broadening Experiences in Scientific Research
2013
2014

Innovative ways to prepare trainees for a variety of career options in the biomedical research workforce.
“YES to Cures Act of 2014” would:

- Require the reservation of funds in the Common Fund for research carried out by one or more emerging scientists.
- Prohibit funds appropriated to the NIH to be subject to a tap for evaluation activities and require the NIH to reserve those funds in the Common Fund for awards to emerging scientists.
- Require the NIH Director to submit a report to Congress on the trends in age of recipients of NIH funded major research grants.

“Funding Scientists at the Peak Age of Discovery Act” would:

- Require the NIH Director to ensure that the median age of first time researchers receiving grants in the R series is under 40 by 2019, under 39 by 2022, and under 38 by 2025.
Average Age and Degree Type of First-Time Investigators on R01-Equivalent Grants

- Average Age (Years)
- MD-PhD
- MD Only
- PhD Only

Data from 1980 to 2013, showing an increase in average age for all degree types over time.
NIH Policies to Shorten Time to Research Independence

- New investigator policy, 2007: ICs will establish comparable success rates for new investigators and experienced investigators on competing, type 1 R01 equivalent awards.

- Early stage investigator (ESI) policy, 2009: ICs will monitor their new investigator pool to ensure that ~ half have ESI status. Applications from ESI, like those from all new investigators, are given special consideration during peer review and at the time of funding.
Awards to Promote the Transition to Independence

- **Pathway to Independence Award (K99/R00; 2006):** to help outstanding postdoctoral researchers complete mentored training and transition in a timely manner to independent, tenure-track or equivalent faculty positions.

- **NIH Directors New Innovator Award (DP2; 2007):** to support exceptionally creative new investigators who propose highly innovative projects that have the potential for unusually high impact.

- **Early Independence Award (DP5; 2011):** to help early career scientists move rapidly into independent research positions by essentially omitting the traditional post-doctoral training period.

- **Institute-specific Awards:** e.g., NIEHS Outstanding New Environmental Scientist (ONES) Award (R01); NIMH Biobehavioral Research Awards for Innovative New Scientists (BRAINS) (R01)
R01-Equivalent Investigators: Number of Competing Awardees, by Career Stage of Investigator, and Percent New
Retention Rates for First-Time R01 Awardees

We have seen increased interest in the biomedical workforce by Congress and especially by our community. From our end we’ve in particular observed heightened attention to how the dynamics of the workforce impact researchers in the early stages of their careers. So the topic definitely deserves our continued attention and I thought in light of this it’d be a good time to share some of NIH’s analyses on one specific aspect of this that my office has been closely examining.

We know that over time investigators are, on average, 42 years old when receiving their first R01, which is older than it was than before the doubling of the NIH began. And, we know that funding rates for both first-time NIH investigators and experienced NIH investigators alike have declined. So we wondered, of those first-time recipients of NIH R01-equivalent funding, how many years after their first year of R01 funding do they receive additional research grant funding? And furthermore, given the changes in NIH’s budget over the years, does the year they received their first R01 – and the rise of fall of NIH funding – correlate with whether or not they
# Three Cohorts of First-time R01-equivalent Awardees

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<thead>
<tr>
<th></th>
<th>1989</th>
<th>1997</th>
<th>2003</th>
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<tbody>
<tr>
<td>Overall R01-equivalent success rate that year</td>
<td>27.90%</td>
<td>30.10%</td>
<td>30.20%</td>
</tr>
<tr>
<td>Number of first-time NIH R01-equivalent awardees</td>
<td>1,693</td>
<td>1,597</td>
<td>1,778</td>
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<tr>
<td>Average age of awardees</td>
<td>39.2</td>
<td>40.4</td>
<td>42.6</td>
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<tr>
<td>Average length of award</td>
<td>3.9</td>
<td>4.1</td>
<td>4.1</td>
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<tr>
<td>Average amount of first year award</td>
<td>$137,670</td>
<td>$179,880</td>
<td>$318,285</td>
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<tr>
<td>Average amount of 1st year award in 1986 constant dollars</td>
<td>$118,317</td>
<td>$114,354</td>
<td>$165,507</td>
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RetentionPolicy First-time NIH R01-equivalent Recipients in the NIH Funding Pool

Survival Curves for R01-Equivalent Awardees (Kaplan-Meier)

Select Cohorts

1989 cohort
1997 cohort
2003 cohort

% of Awardees Continuing to Receive R0PG Funding

Years Since First R01 Award

Cohorts
- 1989
- 1997
- 2003
Retention of First-time NIH R01-equivalent Recipients in the NIH Applicant Pool

Survival Curves for R01-Equivalent Awardees (Kaplan-Meier)

Select Cohorts

- 1989 cohort
- 1997 cohort
- 2003 cohort
Factors Contributing to Increased Age at First Award

- Aging workforce overall
- Protracted training periods: average age of first non-postdoctoral job is ~ 37
- Risk-averse institutions: Age at first application (and hence award) is entirely controlled by institutions; most institutions restrict applications to those who have obtained a faculty appointment.
Request for Information: A Potential Emeritus Award for Senior Researchers

- NOT-OD-15-064
  Release Date: February 3, 2015
  Response Date: March 6, 2015

- Could allow a senior investigator to transition to a new role, such as full time teaching

- Could permit a senior investigator to form a partnership with a junior faculty member in order to hand off his or her line of research inquiry
Trans-NIH Working Groups

- How to decrease the age at which early stage investigators reach research independence (Chair: Sally Rockey, OER)

- Identifying ways to develop more efficient and sustainable funding mechanisms and policies (Chair: Jon Lorsch, NIGMS)
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Blog

I’m Tweeting!!
@RockTalking

http://nexus.od.nih.gov/all/rock-talk

Two years of blogging the NIH

Sally Rockey, deputy director for extramural research at the US National Institutes of Health, reflects on the second anniversary of her precedent-setting blog.