




1:00pm – 4:30pm

# Policy and funding models for graduate students and postdoctoral fellows

*Symposium Organizer: University of Toronto*

# POLICY AND FUNDING MODELS FOR GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

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- This presentation will include a few interactive survey questions using Poll Everywhere. Instructions will appear on the survey slide.
- To participate, you will need **internet access**.
- You can respond to the questions by:
  - Mobile phone via text: Text to **37607**, Message: **cspcuoft** OR
  - Website  Respond at **PollEv.com/cspcuoft**

# POLICY AND FUNDING MODELS FOR GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

NOVEMBER 9, 2019  
CANADIAN SCIENCE POLICY CONFERENCE

Vivek Goel  
Vice-President, Research & Innovation



BOUNDLESS

*Warm up question for Poll Everywhere*

## How old are you?

Under 30

30-49

50-70

Over 70



## Are you a...

Graduate student

Policy-maker /  
Administrator

Post-doctoral fellow

Researcher

Other

## Do you work in ...

Community  
organization

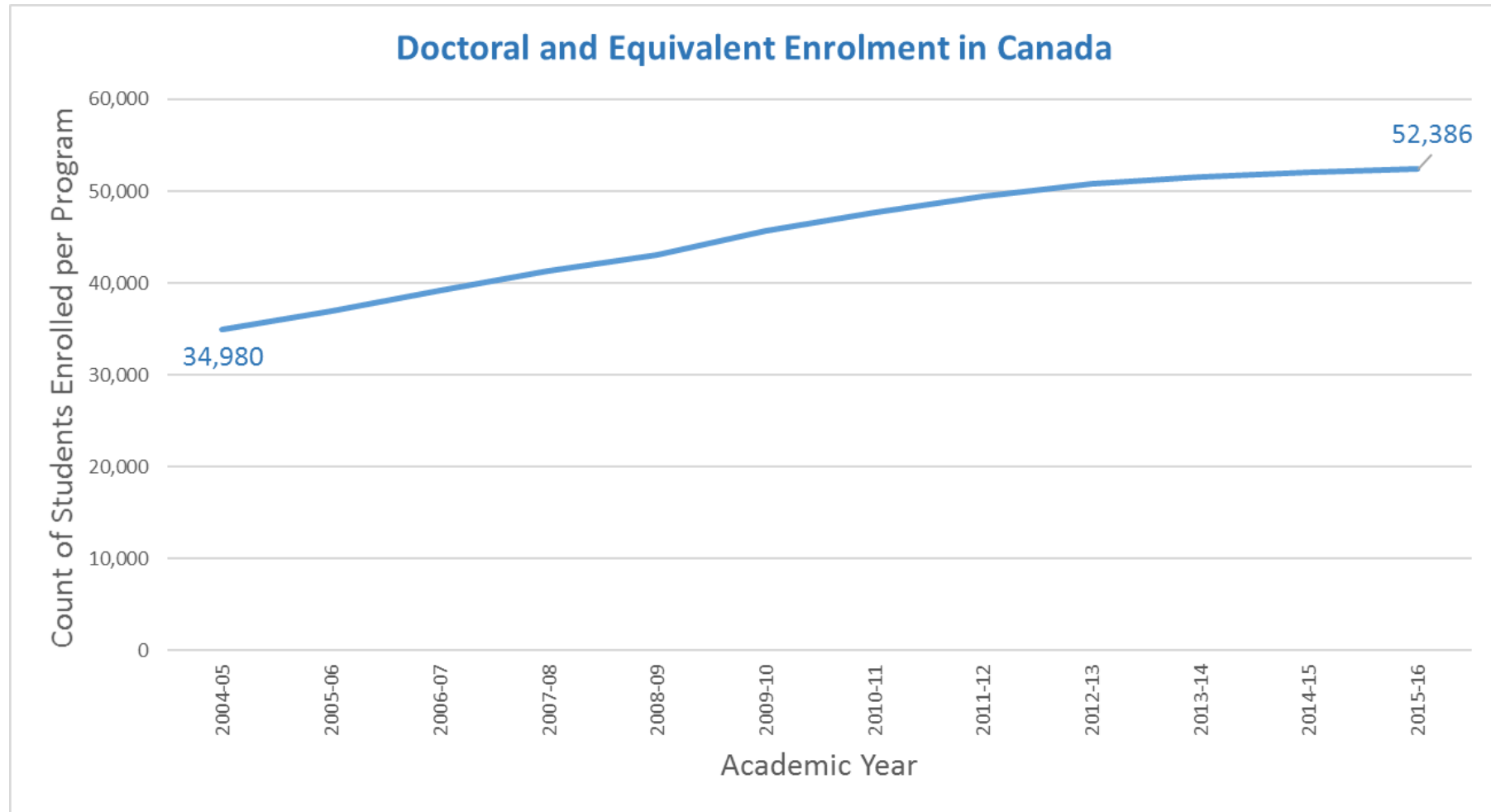
Government

Post-secondary  
institution

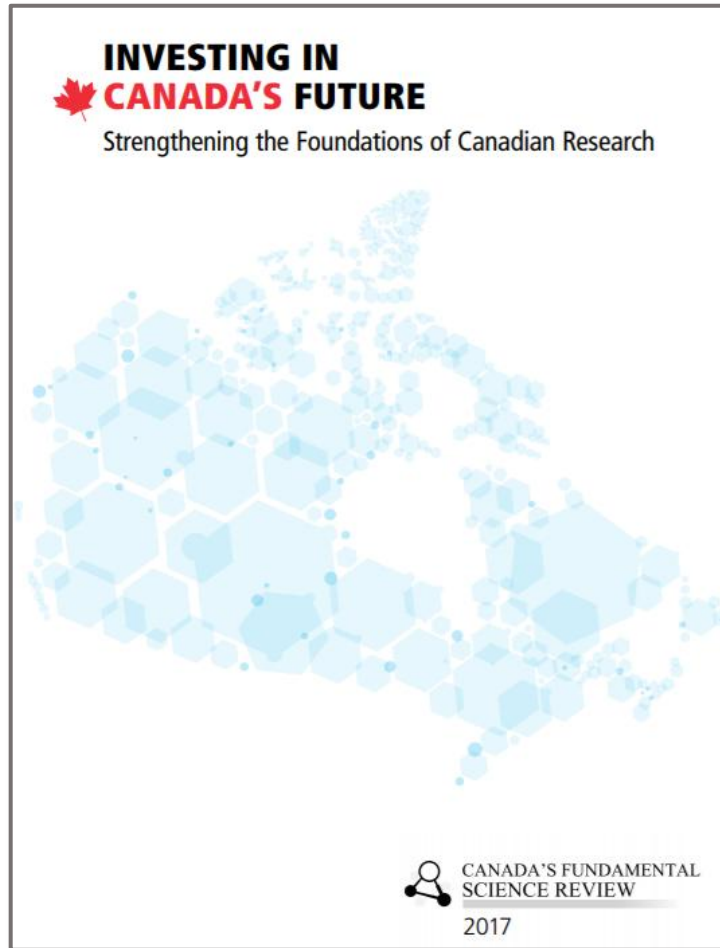
Research institute

Other

# Landscape in Canada



# Fundamental Science Review - Recommendations



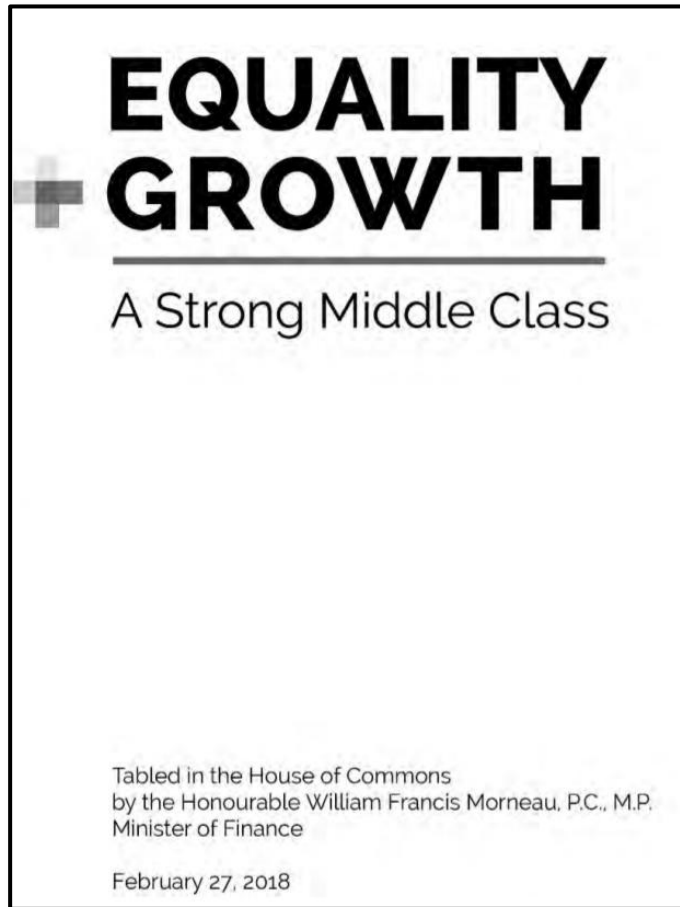
A tri-council process to reinvigorate and harmonize scholarship and fellowship programs, and rationalize and optimize the use of current awards to attract international talent:

- **Harmonized tri-council programs** to award and administer all doctoral and postdoctoral fellow (PDF) awards;
- **More harmonized levels of support (in both value and duration)** for all doctoral and PDF awards;
- **Elimination of restrictions on international portability** of doctoral and PDF awards to Canadians, with monitoring of the results; and
- Refocusing of the Vanier and Banting programs as tools for **international recruitment.**



# Budget 2018

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**EQUALITY  
GROWTH**

A Strong Middle Class

Tabled in the House of Commons  
by the Honourable William Francis Morneau, P.C., M.P.  
Minister of Finance

February 27, 2018

*“Over the next year, the Government will be doing further work to determine how to better support students, the next generation of researchers, through scholarships and fellowships.”*

# Agency Consultations



The screenshot shows the Government of Canada website header with the Canadian flag, the text 'Government of Canada' and 'Gouvernement du Canada', and a search bar. Below the header is a navigation menu with categories: Jobs, Immigration, Travel, Business, Benefits, Health, and Taxes. The breadcrumb trail reads: Home → Consulting Canadians → Canada Research Coordinating Committee Consultation. The main heading is 'Canada Research Coordinating Committee Consultation'. Below this, a list of topics is displayed: Equity, Diversity & Inclusion; Indigenous Engagement; Early Career Researchers; +; Research Data Management; Digital & Data Transformation; Tri-Council Fund; NSERC Research Partnership programs, CFI.

*Canada Research Coordinating Committee has committed to 'establishing Canada as a world leader in supporting the development of talent throughout the research career life cycle'.*

# Reports and submissions

## 2019 Pre-Budget Brief: Investing in Canada's Postdoctoral Trainees

Written Submission for the  
Consultations in Advance  
By:



Canadian Association of  
Association Canadienne de

U<sup>15</sup>

## 2019 PRE-BUDGET SUBMISSION

to the House of Commons  
Standing Committee on Finance



U<sup>15</sup> Group of Canadian Research Universities



## CAGS ACES

Canadian Association  
for Graduate Studies

Association canadienne  
pour les études supérieures

### INVESTING IN THE NEXT GENERATION OF CANADIAN RESEARCHERS

AUGUST 2018

CAGS/ACES 301-260 St. Patrick Street, Ottawa, ON

*All are supportive  
of the  
recommendations  
of the  
Fundamental  
Science Review  
recommendations.*



UNIVERSITY OF  
TORONTO

**BOUNDLESS**

# Models for Funding

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- 1) *Scholarships and fellowships awarded to trainees*
  - Portable for student to any institution
- 2) *Scholarships and fellowship to institutions to award to trainees*
  - Pairing with supervisors and integration into program
- 3) *Support for trainees included through supervisor research operating grants*

# Which model would you prefer to have in place for distribution of funding? (Pre-discussion question)

Scholarships and fellowships to trainees

Scholarships and fellowships to institutions to award to trainees

Support to trainees through supervisor research operating grants

# Should additional funding for scholarships and fellowships be used to:

Increase the  
VALUE of  
awards?

Increase the  
NUMBER of  
awards?

# NIH Pre- and Postdoctoral Programs and Early Investigator Career Development Programs

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**P. Kay Lund, PhD** [kay.lund@nih.gov](mailto:kay.lund@nih.gov)

Director, Division of Biomedical Research Workforce

Office of Extramural Research

Office of the Director

National Institutes of Health



National Institutes of Health  
Office of Extramural Research

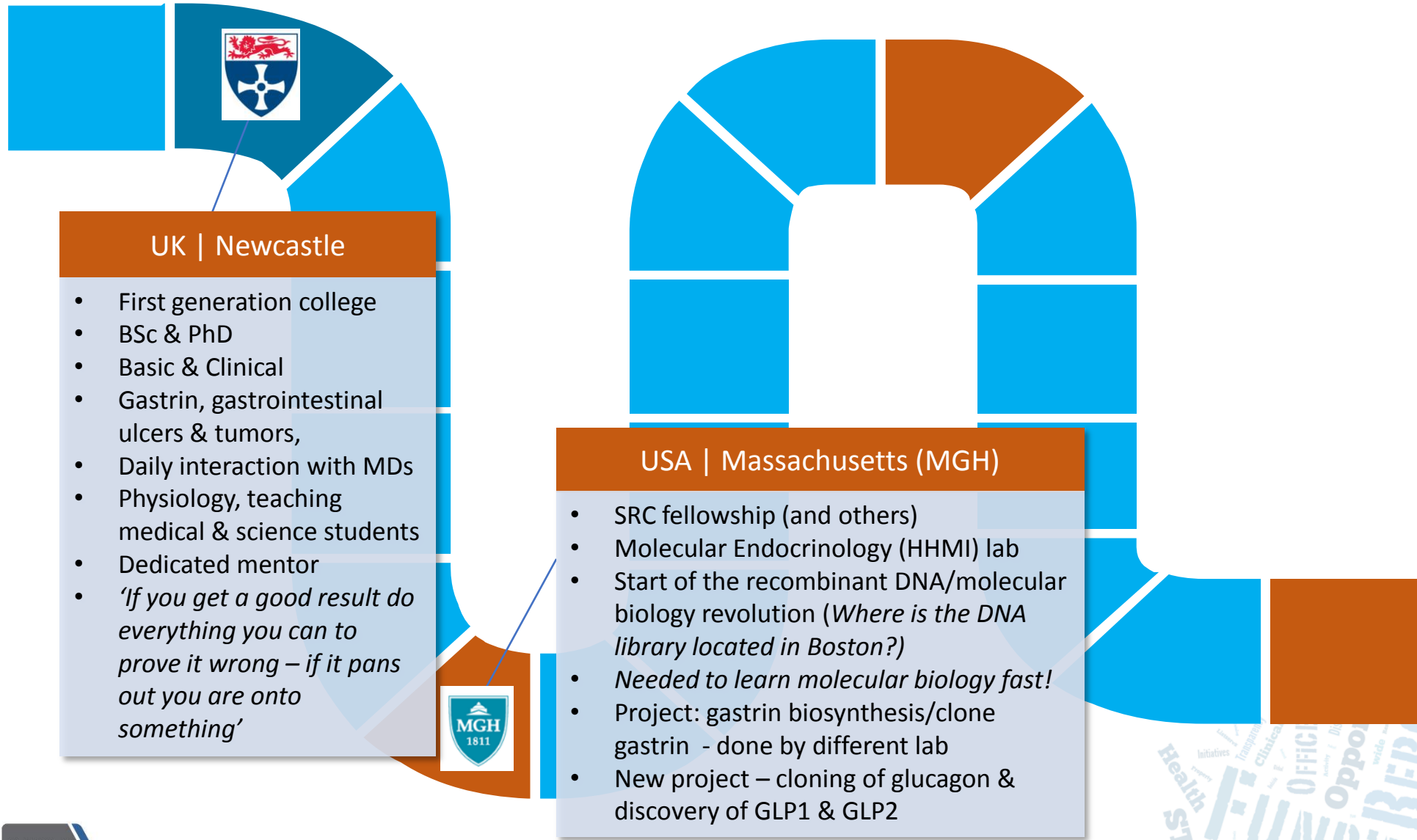
# Topics

- My career path, challenges, rewards & relevant lessons learned
- The NIH Division of Biomedical Research Workforce (DBRW)
- NIH programs and mechanisms to support effective research training, career development and transition to research independence
- How to evaluate impact of specific programs and data on impact of some key programs
- Q and A re how NIH programs might assist in future planning for development and enhancement of Canadian programs

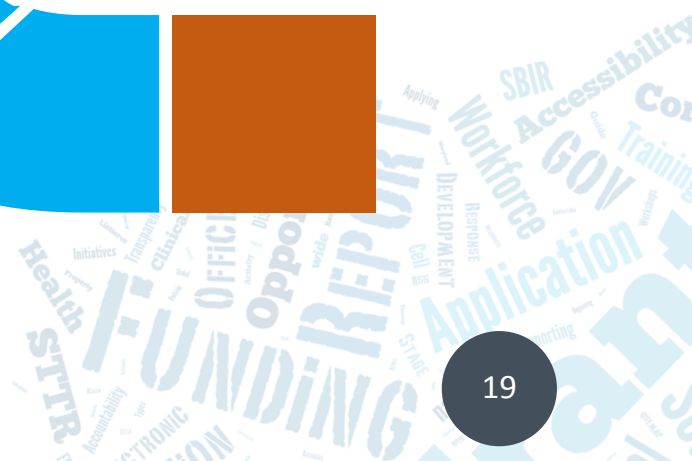
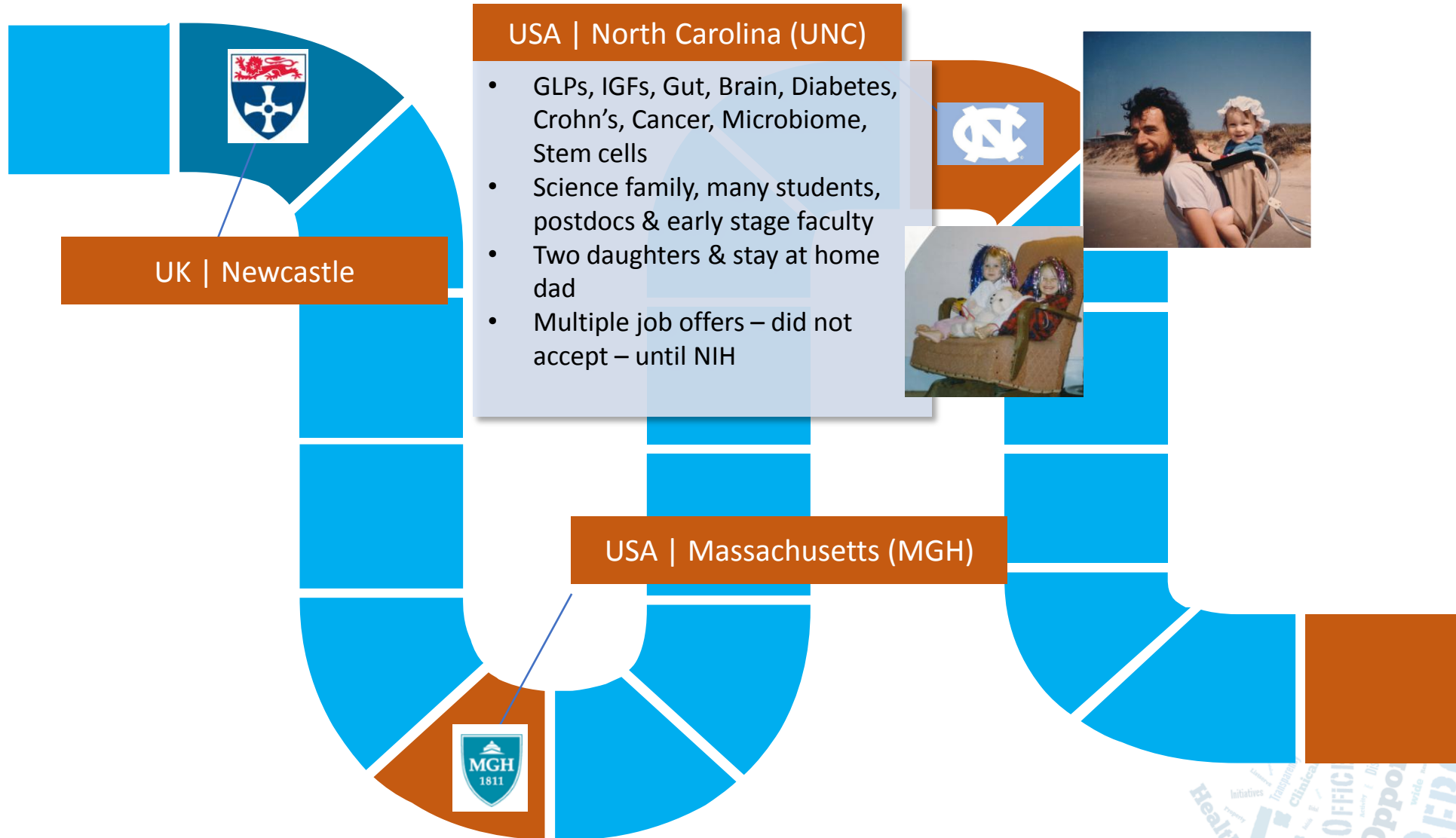




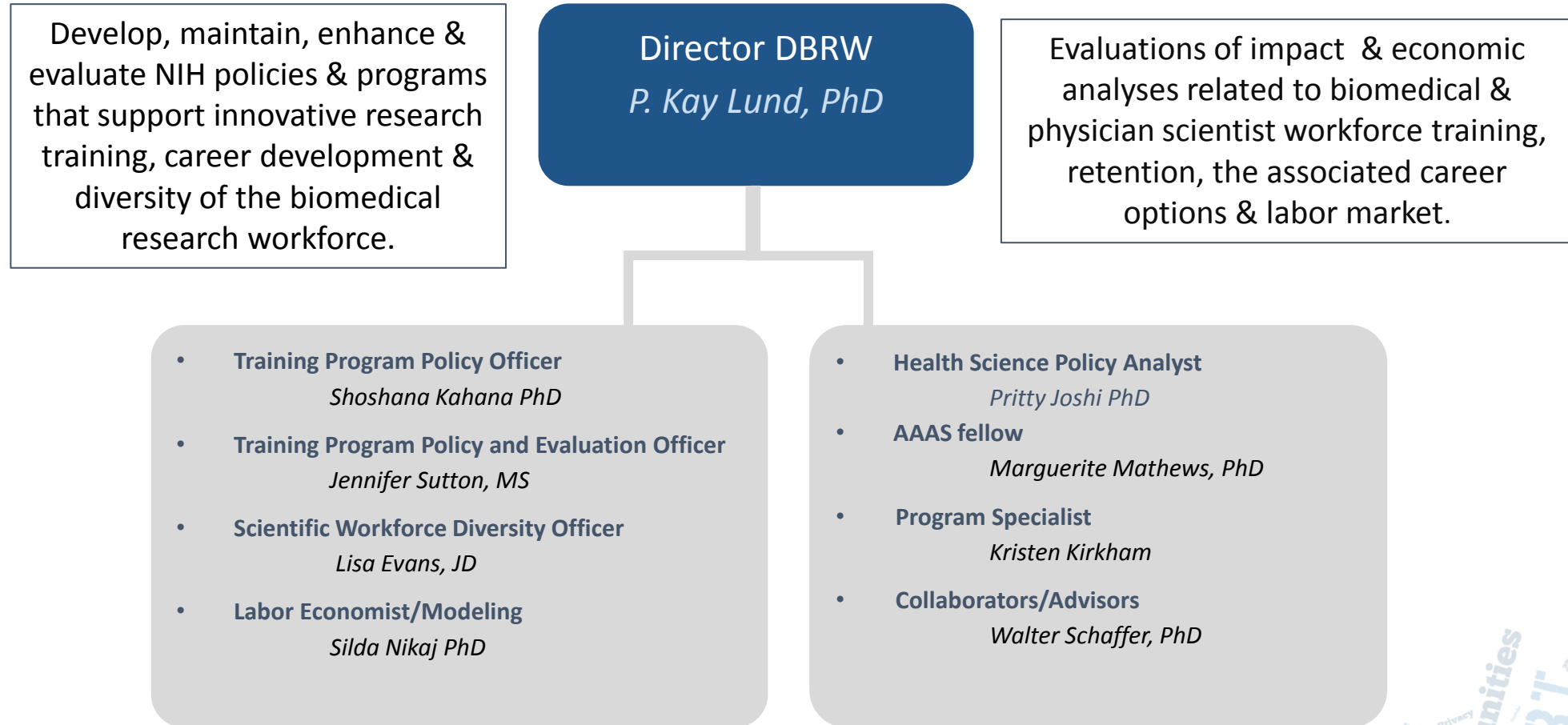
# Research Career Path



# Research Career Path



# Division of Biomedical Research Workforce (DBRW)



[http://acd.od.nih.gov/Biomedical\\_research\\_wgreport.pdf](http://acd.od.nih.gov/Biomedical_research_wgreport.pdf). 'NIH should create a permanent unit in the Office of the Director that works with the extramural research community, the NSF and the NIH ICs to coordinate data collection activities and provide ongoing analysis of the workforce and evaluation of NIH policies so that they better align with the workforce needs'.

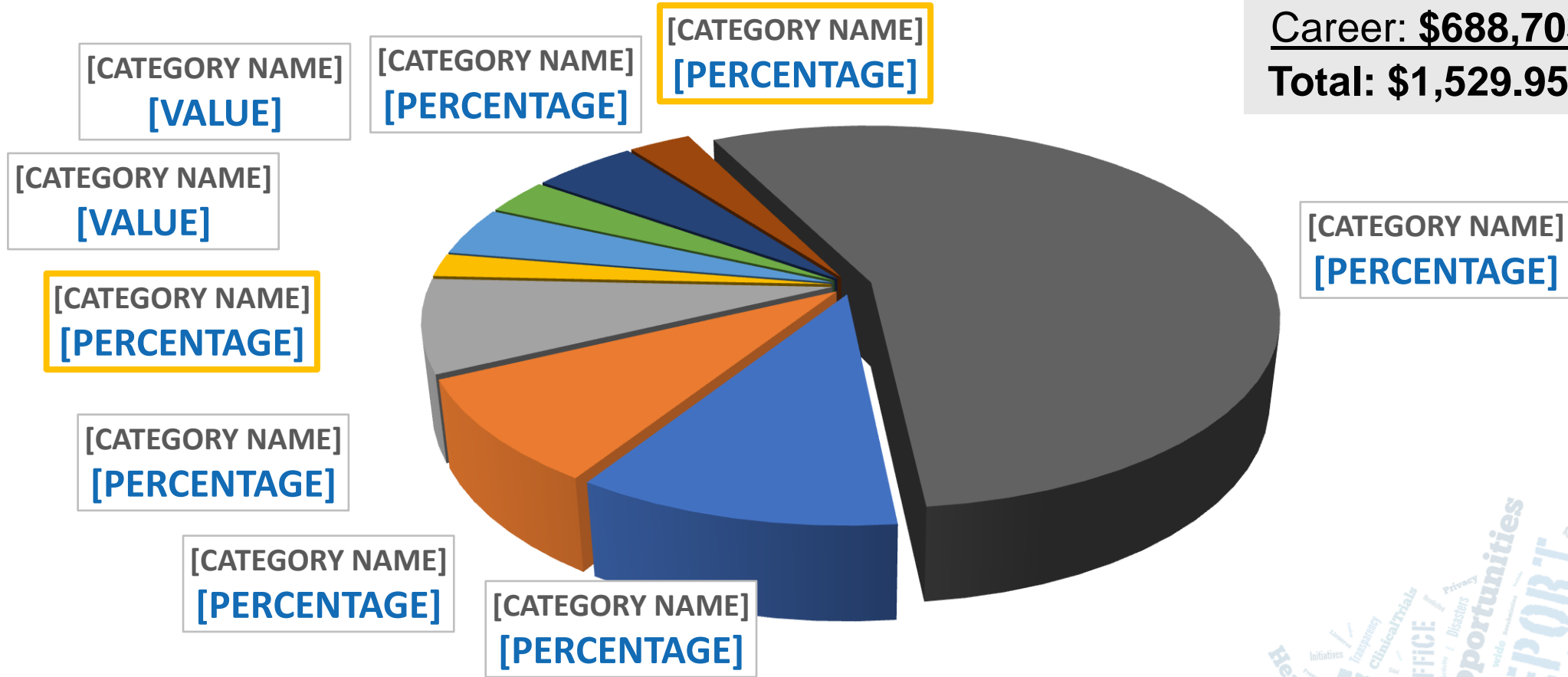


# NIH Research Training Website



# FY 2017 Operating Budget: \$34,229,139M

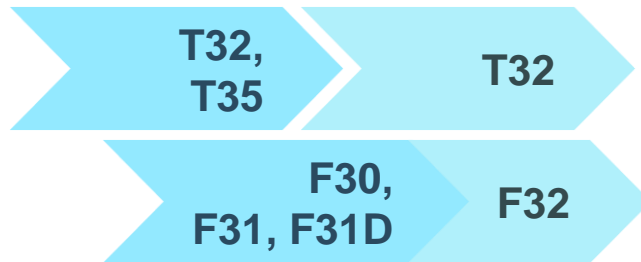
Training: \$841,247M  
Career: \$688,703M  
Total: \$1,529.950M



# NIH Training, Career Development & Independent Research Programs



# Predoc and Early Postdoc Training



## National Research Service Awards (NRSA)

**FY 2019**

**Approved Graduate student stipend: \$24,816**

**Approved postdoc stipend: \$50,004 - 61,308**

**Approved increases in funds for postdoc benefits**

**Kirschstein-NRSA fellows and trainees may spend on average, an additional 25% of their time (e.g., 10 hours per week) in part time research, teaching, or clinical employment. (paid from different source than NRSA)**



# Ruth L. Kirschstein NRSA



**Goal:** to ensure that a diverse pool of highly trained scientists is available, in appropriate scientific disciplines, to address the Nation's biomedical, behavioral, and clinical research needs;

## Institutional Training Programs (T-Series):

- Awards to an institution to support research training for graduate students and/or postdocs (including clinicians) selected by the institution
- Requires a program director and experienced faculty to serve as mentors

## Individual Fellowships (F-Series):

- Awards for combined clinical and research doctoral degree training (MD/PhD) (**F30**)
- Awards for graduate students working towards research doctoral degree (**F31 & F31D**)
- Awards for postdoctoral fellows working towards research independence (**F32**)

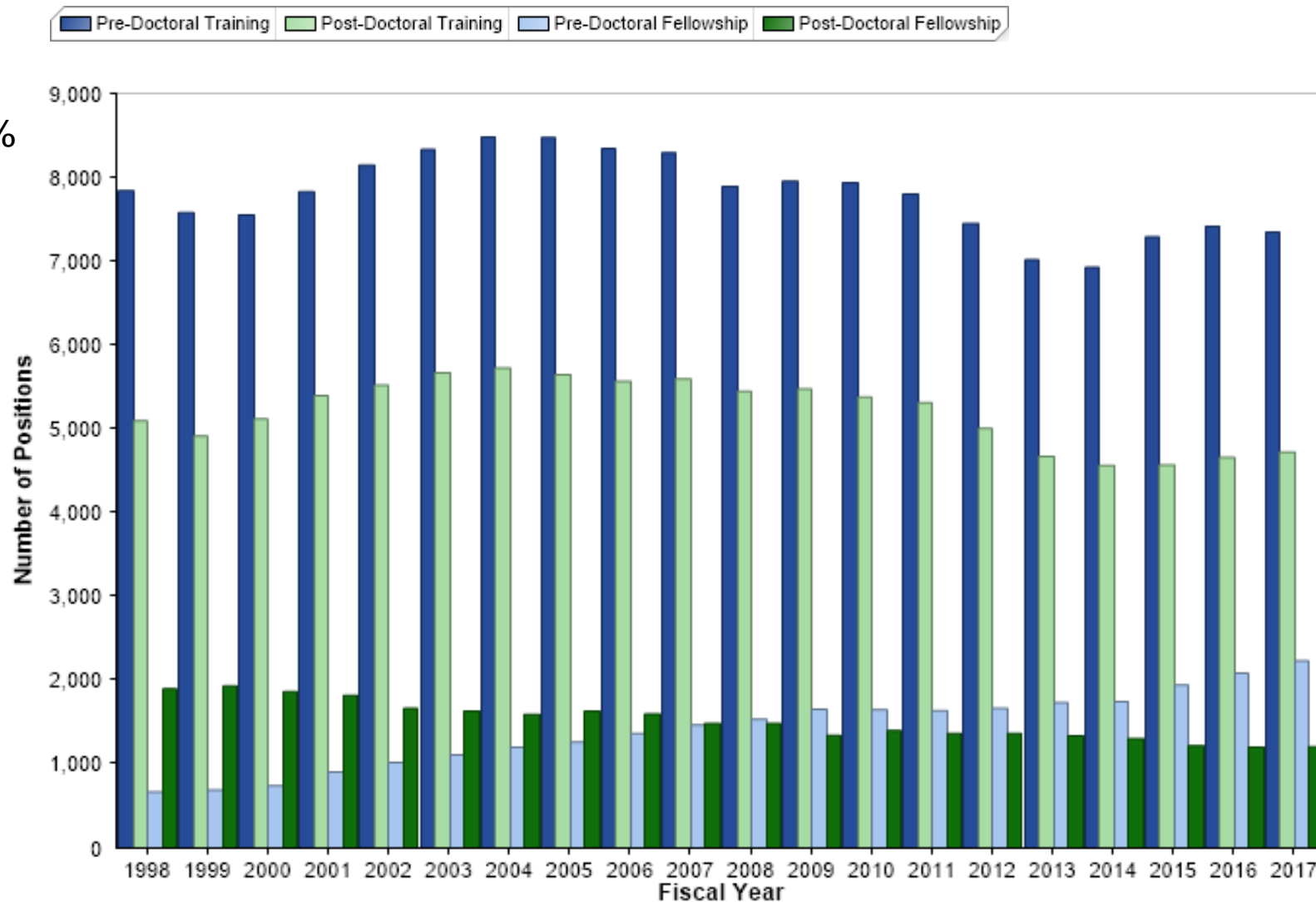
**NRSA awards currently available only to US citizens or permanent residents**





# Kirschstein-NRSA training grants and fellowships Pre- and Post-Doctoral full-time training positions awarded

- Pre-doc training slots decreased 6.3%
- Post-doc training slots decreased 7.3%
- Pre-doc fellowship **increased 332%**
- Postdoc fellowship **decreased 36.4%**
- Postdoc fellowships have significant positive impact on subsequent independent NIH support:  
<https://www.nber.org/papers/w24508>
- **Post-doc to faculty transition** is a major ‘**exit**’ point from the biomedical research workforce, especially for women & under-represented groups



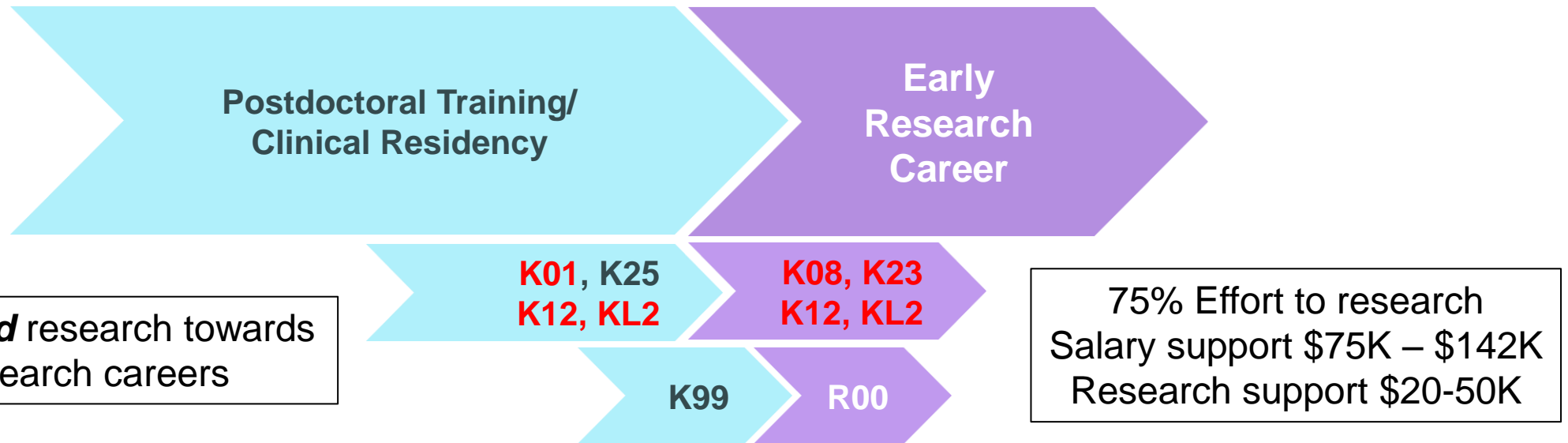
# NRSA: current and ongoing recommendations for enhancements



- Stipend increases & increased funds for benefits 2016 – 2019 ✓
- Consider increased numbers & enhancements to postdoctoral fellowships
  - *Continued stipend and benefit increases*
  - *Improve opportunities to transition to independence*
  - *Extend current 3 year postdoctoral limit to 4 years for clinicians*
- Promote, enhance internships/externships to facilitate career development
  - *Other laboratories, institutions or agencies, policy, communication, industry*
  - *Current NSTC - Lab2 Market committee assessing current federal programs for entrepreneurial training*
- Strategic Plan for Data Science (ongoing)
  - *Data science, computational science, rigor & reproducibility to be incorporated into all NIH training and fellowship programs*



# Postdoctoral Mentored Career Development: K Awards



Support *mentored* research towards *independent* research careers

75% Effort to research  
Salary support \$75K – \$142K  
Research support \$20-50K

- K01:** Support postdoctoral or early career scientists in mentored basic or behavioral research
- K08:** Support clinician scientists in mentored basic or translational research
- K23:** Support clinicians in mentored patient oriented research
- K12/KL2:** Institutional awards appoint PhD or clinician scientists to pursue mentored research



# Pathway to Independence Award



**K99/R00:** Facilitates a *transition* from a mentored postdoctoral research position to a stable independent research position with *independent NIH research support* at an earlier stage than is currently the norm

## Supports protected time (75%) in 2 distinct phases:

### K99 – Phase 1- 2 years

- Mentored: must be affiliated with an institution
- Within 4 years of attaining PhD or completing clinical training
- 2007 awardees: 94.7% transition to R00; 2014 awardees 87.6% transition to R00.

### R00 – Phase 2 (3 years)

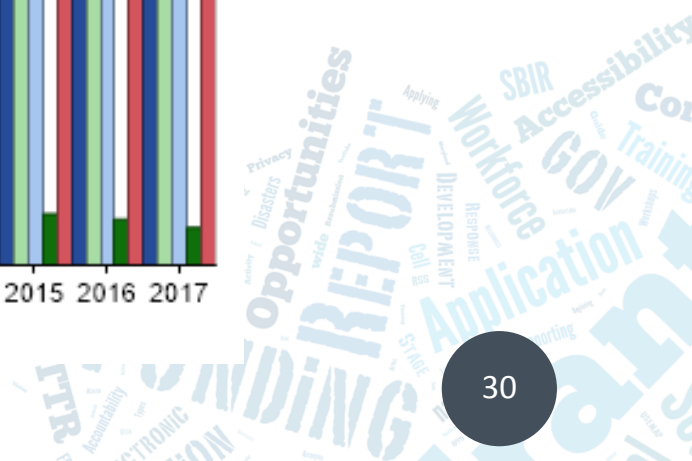
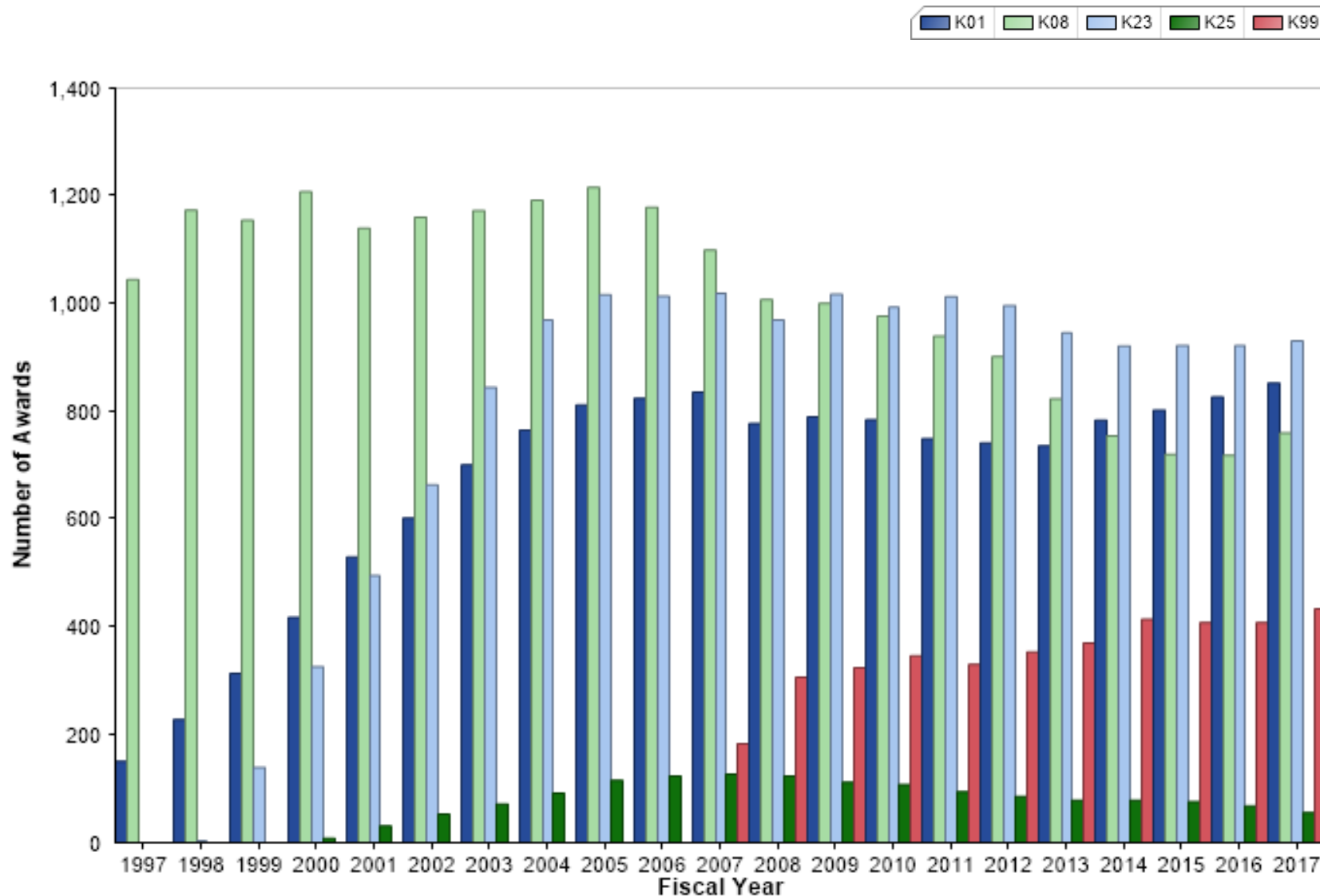
- Independent (tenure-track or equivalent), own lab limited teaching and/or clinical responsibilities to assist pathway to next independent award.
- ‘Quality’ of tenure-track offer administratively reviewed by NIH staff before R00 awarded

- There is **no U.S. citizenship requirement** for applicants to the parent K99 ([PA-18-397](#); [PA-18-398](#))
- **New BRAIN Initiative K99-R00 to promote diversity requires citizenship or permanent residence:** ([PAR-18-814](#); [PAR-18-813](#))



# Individual Research Career Development Awards

## Number of entry-level awards



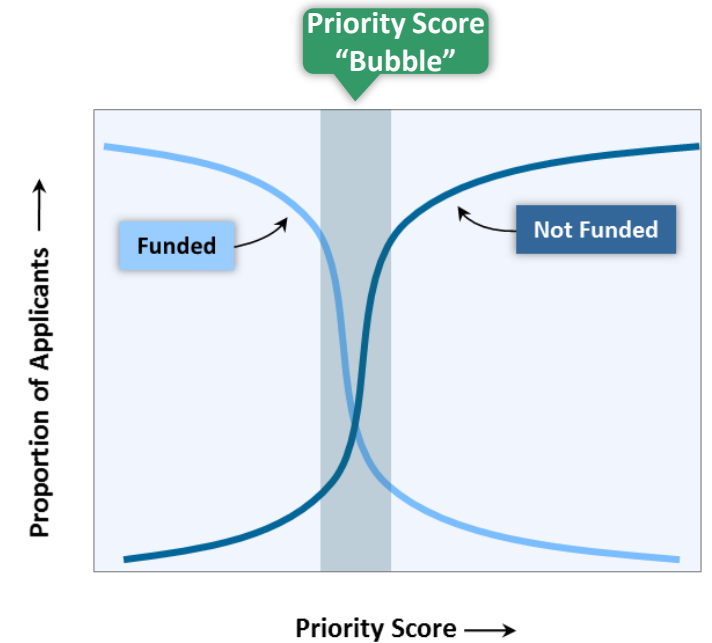
# How to evaluate programs

## Metrics:

- Number of applicants and awardees
- Number who continue in research and specific programs
- Demographics of applicants & awardees proceeding to 'next stage'
- Representation ratio (NIH funded versus relevant labor market)

## Evaluation of Program Impact:

- Regression Discontinuity analyses compare applicants with similar 'scores' & 'characteristics' who were **funded** or received an excellent score but just missed an award (**unfunded**) to more directly assess the impact of the award itself
- Percentage of those who go on to next award or 'independence' (R01 equivalent)
- Periods of differing NIH budget allocations (doubling 1998-2003; post-doubling 2004-2016)



# Impact of K awards on success in R01 Eq applications during doubling of NIH budget & Post doubling

- K01 Award:
  - Doubling no significant effect
  - *Post-doubling 44% more likely to receive an R01*
- K08 Award:
  - Doubling 53% more likely to receive an R01
  - *Post-doubling no significant effect*
- K23 Award
  - *Doubling 61% more likely to receive an R01*
  - *Post-doubling 55.4% more likely to receive an R01*
- Time to first R01 increased by 0.6-1.6 years but no significant increase in time to second R01

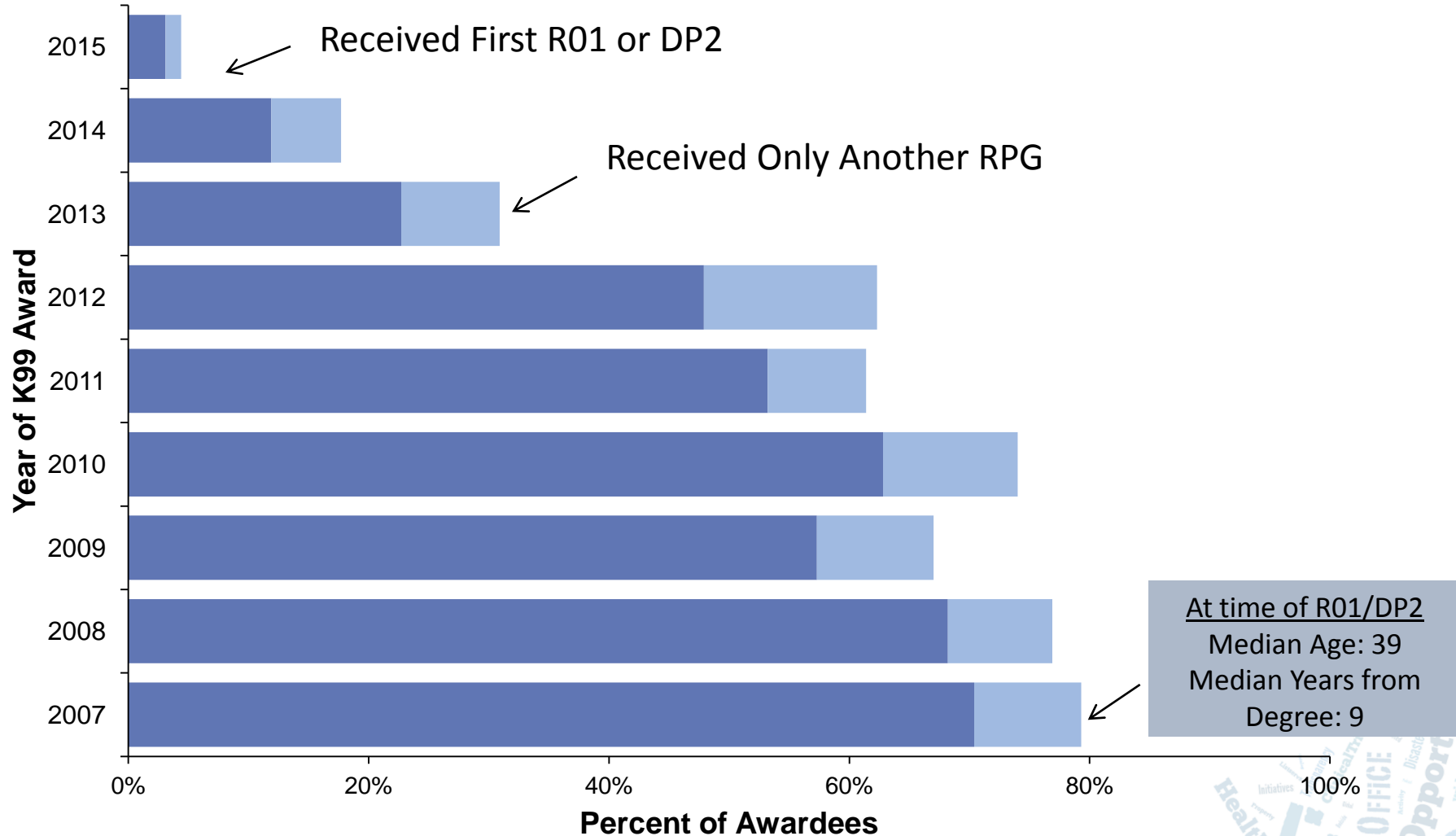


Impact greater for women & under-represented groups

*Nikaj S, Lund PK, The Impact of individual mentored career development (K) awards on the research trajectories of early career scientists: Academic Medicine, Accepted for Publication.*



# R00 Awardees: Subsequent R01eq. or RPG Awards





# Pros & Cons of K01, K08, K23 & K99-R00 awards



## Pros:

- All awards - a period of mentored training with a goal to promote successful independent careers.
- K23>K01>K08 awards have highly significant impact on receipt of independent NIH R01 awards with greater impact for women and under-represented groups.
- R00 promotes earlier independence/success in independent R01 awards (but evaluations comparing those with similar scores/characteristics **funded or not** is complicated because peer review occurs at the K99 stage).

## Cons:

- Delay in time to first R01/independence for K01, K23 and K08 awardees.
- Some extramural institutions/departments accept only applications from candidates with R00.
- Varied levels of salary and research support across different NIH Institutes & Centers.
- Feasibility of 75% effort for clinicians.

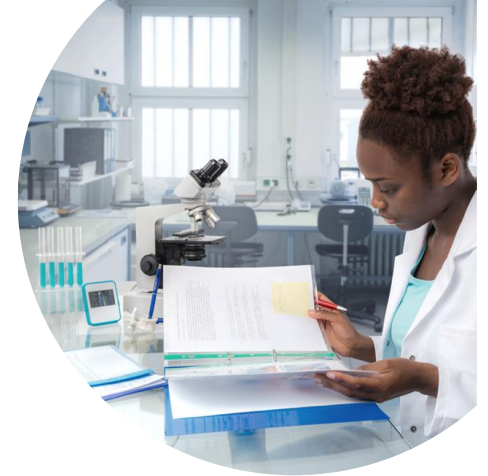
Future K award working group will discuss strategies to enhance & harmonize awards across NIH & extramural institutions



# Discussion points 1

## Benefits of institutional training awards versus individual fellowships

- Fellowships may promote independence
- Institutional awards provide a network for trainees
- Institutional awards *may* benefit graduate students more than postdocs (would awards combining pre- and postdocs better promote networks for retention?)



## How to evaluate/compare outcomes of students and postdocs supported on ‘Research Grants’ rather than training awards/fellowships?

## Novel models ‘Institutional Research & Career Development Awards (IRACDA)’

- Partners research intensive and less resourced/minority serving institutions; Postdocs do research & teaching and encourage students to do research
- Majority of postdocs go on to faculty positions at research intensive or less resourced institutions

<https://www.nigms.nih.gov/News/reports/Documents/IRACDA-outcomes-report.pdf>

Postdoctoral Training Aligned with the Academic Professoriate. BioScience 2011 61 699--705



# Discussion points 2



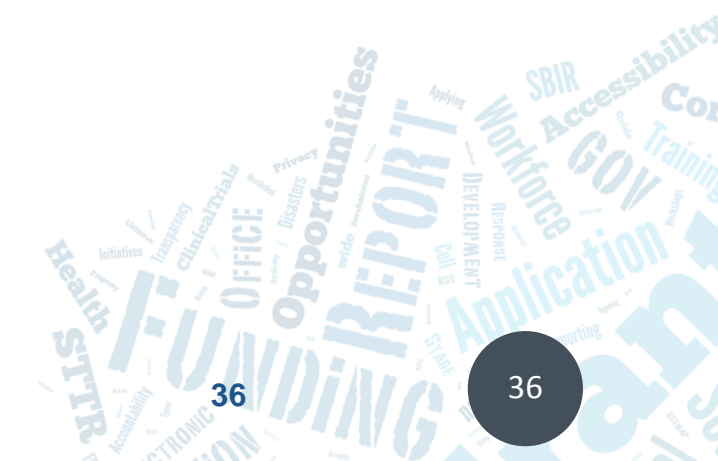
## Career Development (K) awards

- Clear benefit to career advancement & retention in research as well as diversity
- Similarities/differences between NIH and Canadian models?

## Physicians in biomedical research

- Residency and medical school debt can be exit points from research careers
- New Institutional 'Research in Residency' R38 Program [NOT-HL-18-639](#)
  - Followed by individual K38 award designed to promote retention in research [NOT-HL-17-533](#)
- LRP program: <https://www.lrp.nih.gov/>

## Canadian models?



# THANK YOU! QUESTIONS?

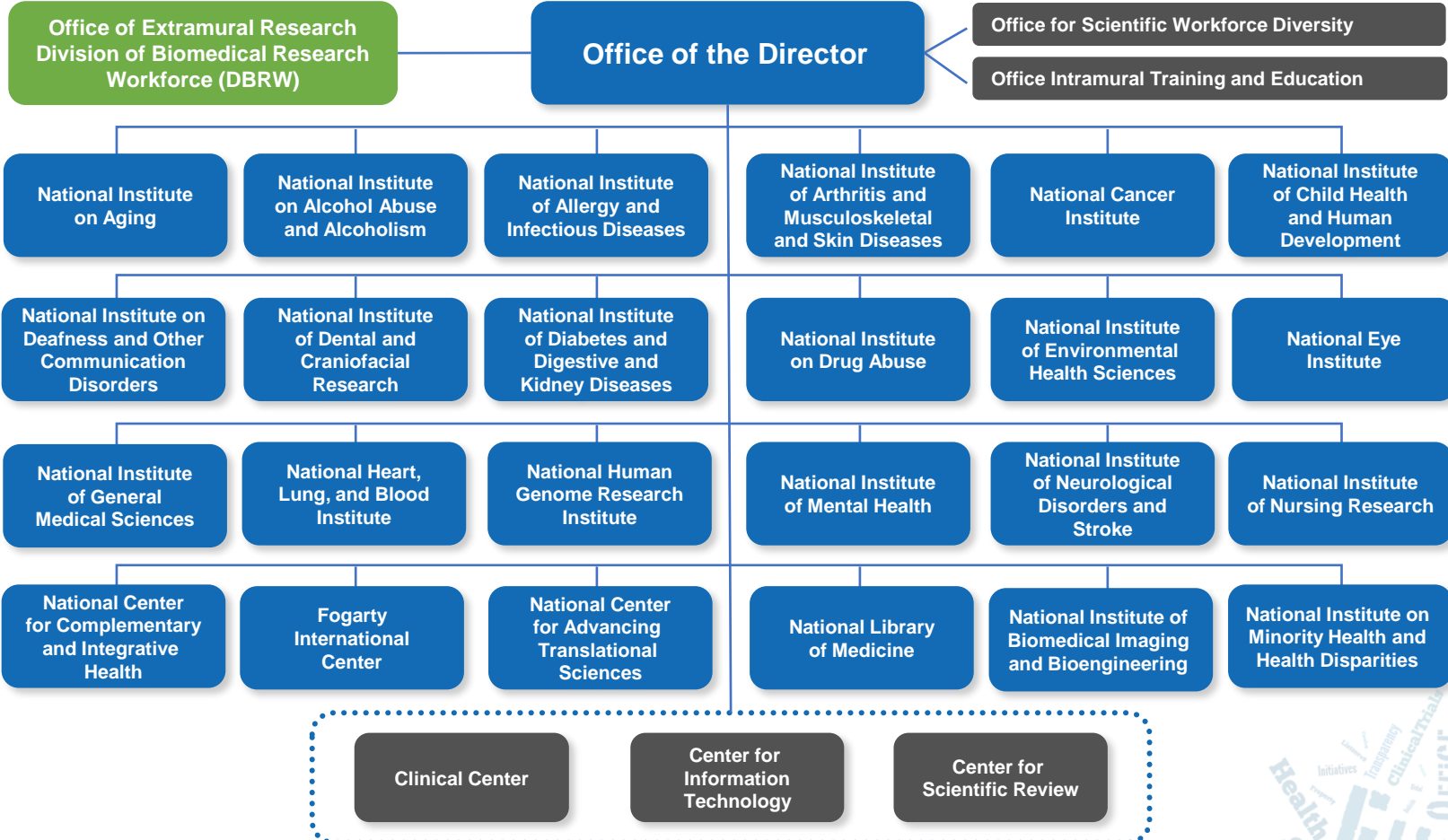
*Keep the Joy in Research  
Writing a Grant is Fun & Rewarding  
Trainees and Mentees Provide a  
Scientific Family Forever*

**Websites:** <https://grants.nih.gov/grants/oer.htm>

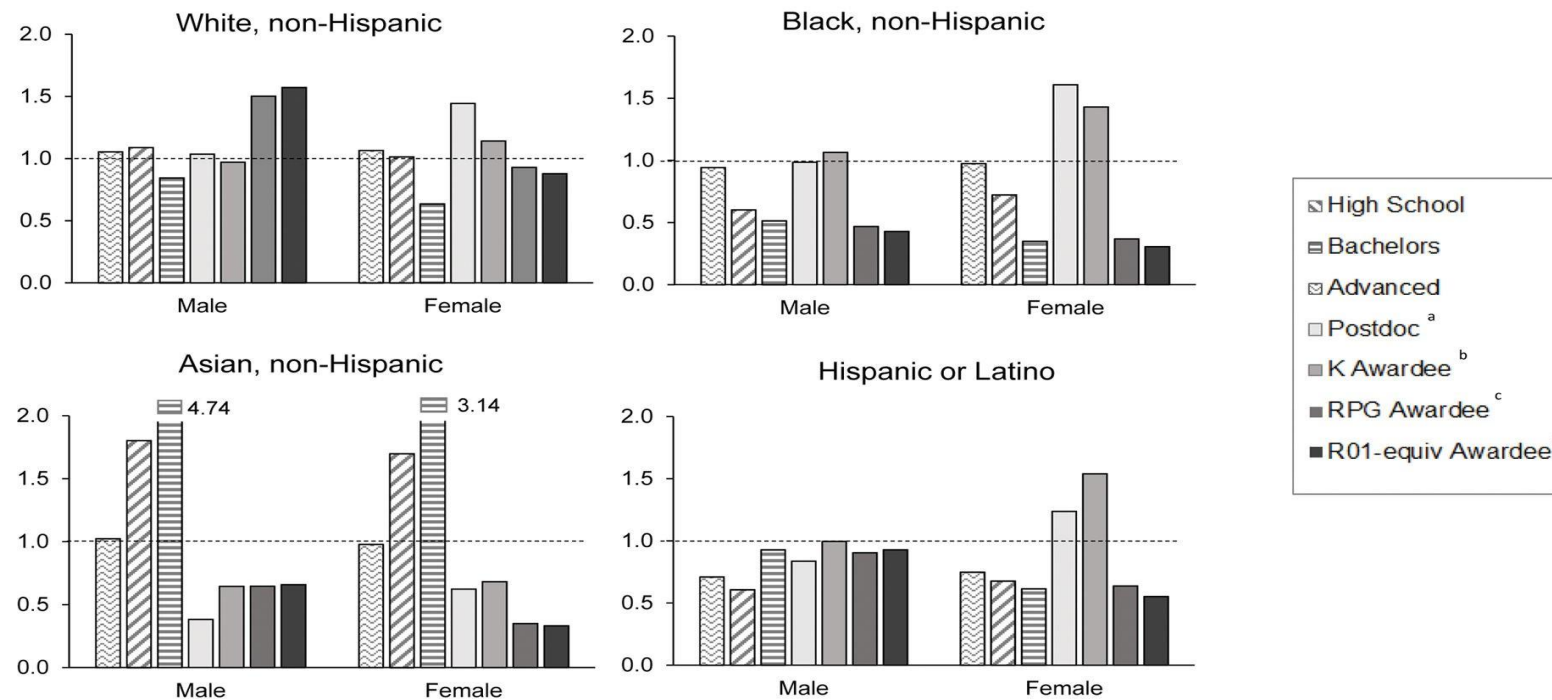
**Contact us:** [NIHTrain@mail.nih.gov](mailto:NIHTrain@mail.nih.gov)



# NIH includes 27 Institutes and Centers (IC) 24 provide extramural funding



# Major decline in women & under-represented groups between postdoc & independent (RPG/R01) awards



Representation ratios of NIH-funded workforce versus the relevant labor market, by race, ethnicity, and female vs male, 2008–2012. The dashed line at 1.0 indicates the transition point between over-representation (>1) or underrepresentation (<1).

<sup>A</sup> Includes all NIH trainee and fellowship award mechanisms.

<sup>B</sup> Includes the following NIH mentored award mechanisms: K01, K07, K08, K22, K23, K25, K99, R00.

<sup>C</sup> Includes the following NIH independent research award mechanisms: R01, R23, R29, R37, DP2, R03, R15, R21, R22, R33, R34, R35, R36, R55, R56, RC1, P01, P42, PN1, U01, U19, UC1.

<sup>D</sup> Includes the following NIH independent research award mechanisms: R01, R23, R29, R37.



# Common Features of K Awards



- By the time of award/appointment, candidates must be citizens, non-citizen nationals, or lawfully admitted for permanent residence in the U.S. (**Except for the parent K99-R00**)
- Awardees/appointees must have a research or clinical doctoral degree from an accredited domestic (U.S.) or foreign institution
- Awardees or appointees must have a **full-time appointment** at the institution, and must commit a minimum of 9 person-months (75% of full-time professional effort) to research career development
- Former PD/PIs on major NIH research grants (e.g., R01), other career development awards (i.e., K awards), or the equivalent are **not eligible**

K-Kiosk: <https://researchtraining.nih.gov/programs/career-development>



# Institutional Mentored K Awards



**K12/KL2:** Support training of postdocs or early career scholars for careers in **specified research areas of interest** to one or more NIH Institutes and Centers (IC)

- Some support clinicians or clinically relevant research (e.g BIRWCH K12 scholars program; NCATS KL2 programs)
- [IRACDA](#) K12 programs: combine postdoctoral research at a research intensive institution & teaching/mentoring undergraduates at partner institutions committed to training, students from groups underrepresented in biomedical research
- Provide institutions with flexibility to prepare clinically-trained scientists or PhDs for independent research careers or academic careers at multiple institution types
- Individualized mentored research experiences and career development guidance for scholars selected by the grantee institution
- Encouragement/expectation to apply for either individual K award (K08, K23, K01) or research project grants (R03/R21/R01/Foundation)

[Learn more](#)





# Mentored Research Scientist Awards (K01)



**K01:** Supports mentored research experience & career development in the biomedical or behavioral sciences leading to research independence

- Provide **salary and research support for up to 5 years** of protected time under the guidance of an experienced mentor
- Expectation that the K awardee will launch an independent research career and be competitive for new research project grant (e.g., R01)
- Some NIH IC use the K01 for individuals who propose to train in a new field or those who had a hiatus in their research career
- Some NIH IC utilize the K01 award to increase **research workforce diversity**

[Learn more](#)



# Mentored Clinical Scientist Awards (K08)



**K08:** Supports protected time for mentored research & career development in biomedical, behavioral, or clinical research, including **translational research**

- For individuals with **clinical doctoral degrees**
- Supports candidates with different levels of prior research training and at different stages in their mentored career development
- Candidates with limited experience may propose a period of didactic training followed by a period of mentored research
- Candidates with previous research experience and training may use the entire award period to support research & career development that focuses on **transition to independence**



# Mentored Patient-Oriented Research Awards (K23)



**K23:** Supports mentored research & career development for investigators who committed to **Patient-Oriented Research (POR)**

- Encourage research-oriented clinicians to develop independent research skills & gain experience in advanced methods and experimental approaches needed to become **independent investigators**
- **POR:** research conducted with human subjects (or on material of human origin such as tissues, specimens, and cognitive phenomena) for which an investigator directly interacts with human subjects.
- **POR:** includes research on mechanisms of human disease, therapeutic interventions, clinical trials & development of new technologies

[Learn more](#)



# Mentored Quantitative Research Awards (K25)



**K25:** Supports investigators whose quantitative science and engineering research has not previously focused primarily on health & disease

- Candidates must have **advanced degree in a quantitative area of science or engineering** (e.g., M.S.E.E., Ph.D., D.Sc.)
- Provides a unique opportunity for candidates to embark on special study, including course work, seminars, meetings, and mentored research
- Encourages research-oriented quantitative scientists (e.g., mathematics, statistics, economics, computer science, imaging science, informatics, physics, chemistry) and engineers with little or no experience in biomedicine to conduct basic or clinical research

[Learn more](#)



# Panel Discussion, Q&A

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## **Dr. Alejandro Adem**

Chief Executive Officer and Scientific Director, Mitacs Inc.

## **Prof. Martha Crago**

Vice-Principal, Research and Innovation, McGill University

## **Dr. Bonnie Le**

Banting Postdoctoral Fellow, Rotman School of Management, University of Toronto

## **Dr. P. Kay Lund**

Director, Division of Biomedical Research Workforce and the NIH Extramural Research Training Officer in the Office of Extramural Research, Office of the Director, National Institutes of Health (NIH)

# Which model would you prefer to have in place for distribution of funding? (Post-discussion question)

Scholarships and fellowships to trainees

Scholarships and fellowships to institutions to award to trainees

Support to trainees through supervisor research operating grants