



Training and Career Development: Wise Investment, Cheap Labor, or Welfare for Scientists ?

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A great team of people ...

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The NICHD



- Broad mission areas
 - Basic research in developmental sciences
 - Intellectual and developmental disabilities
 - Children's health
 - Women's health
 - Reproductive health
 - Social, demographic, behavioral sciences
 - Medical rehabilitation
- Focus on developmental processes thru life span
- Strong interest in training and career development, especially in key mission areas that are unique to NICHD



Today we will be talking about ...

1. Historical trends in training and career development at the NICHD and the NIH
2. Size, cost, and management of individual and institutional training grants
3. Subsequent research applications and grants of NICHD trainees
4. Future plans for mapping career trajectories, and workforce modeling
5. Comments, questions, suggestions



Data Sources

- NIH/NICHD administrative data (IMPAC II)
 - Analyzed at the IC; Branch; Program; Grant; PI; Institution; and Trainee levels
 - Allows for trends over time (1990, 1995, 2000, 2005, 2009, 2010)
- NIH/NICHD program documents (FOAs, NGAs, program officer documents, web site info, etc.)
- NICHD coding and program analysis data (CHIRP)
- Literature review on training and career development
- Interviews with NICHD program staff and leadership



Objectives for Training and Career Development Programs

- Major Objective: perpetuate the [researcher] species
- “Trouble in River City” reported in many specialties & science areas, but limited data to support or refute
- Intermediate and other objectives:
 - Build stronger research departments in key mission areas
 - Increase research workforce diversity
 - Provide labor for research projects

“The major difference between postdocs and migrant workers is that postdocs don’t pick fruit.”



Historical Trends in Training and Career Development at the NICHD and the NIH

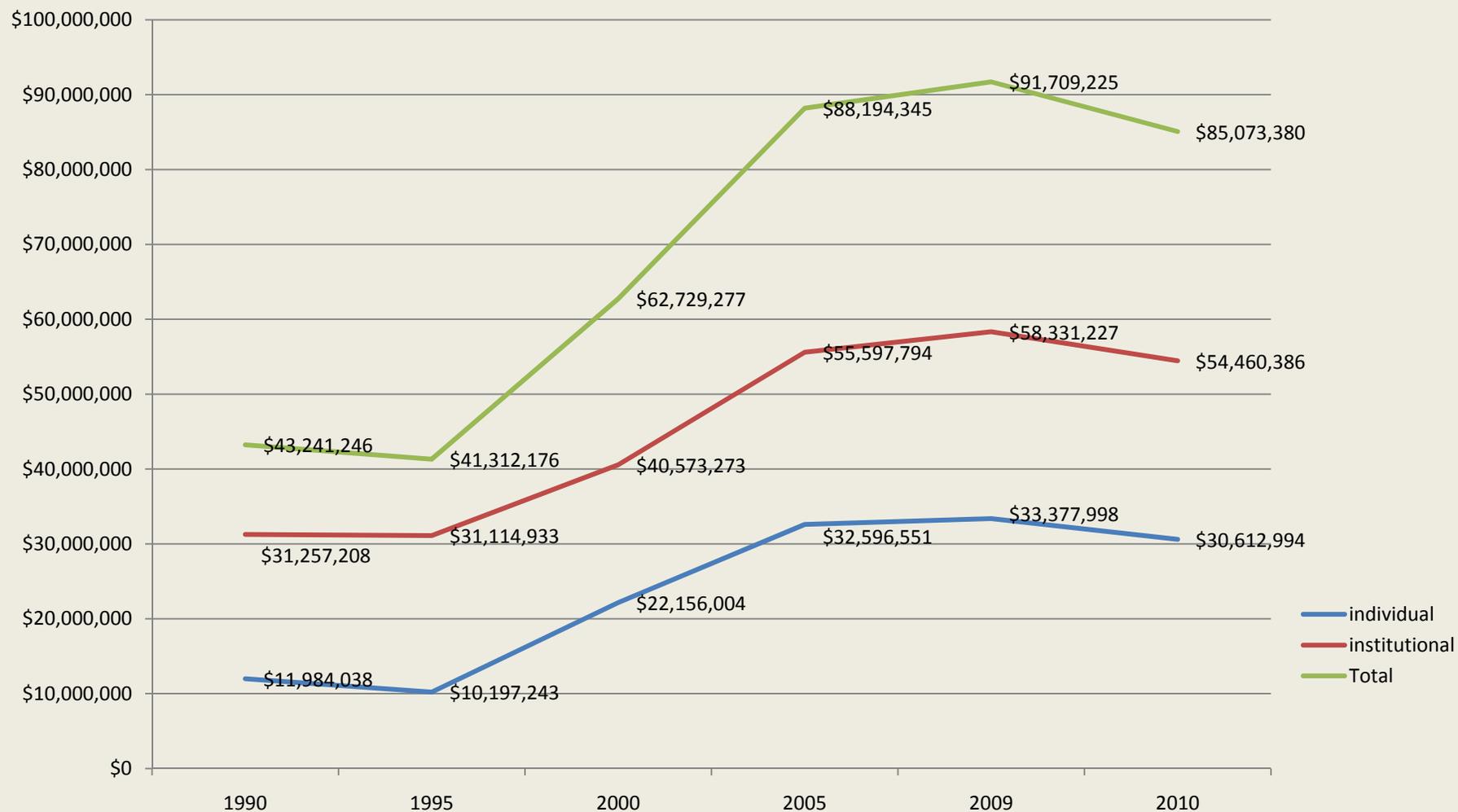


Funding Trends, NIH and NICHD

- For both NICHD and NIH, training and career development expenditures:
 - sharply increased during the doubling years
 - leveled off after 2005
 - decreased in 2010
 - strongly affected by inflation in biomedical research costs
- NICHD spends a higher proportion of funding on institutional grants (2/3) compared to NIH (1/2)
 - in doubling years, NIH devoted a larger share of funding growth to individual grants

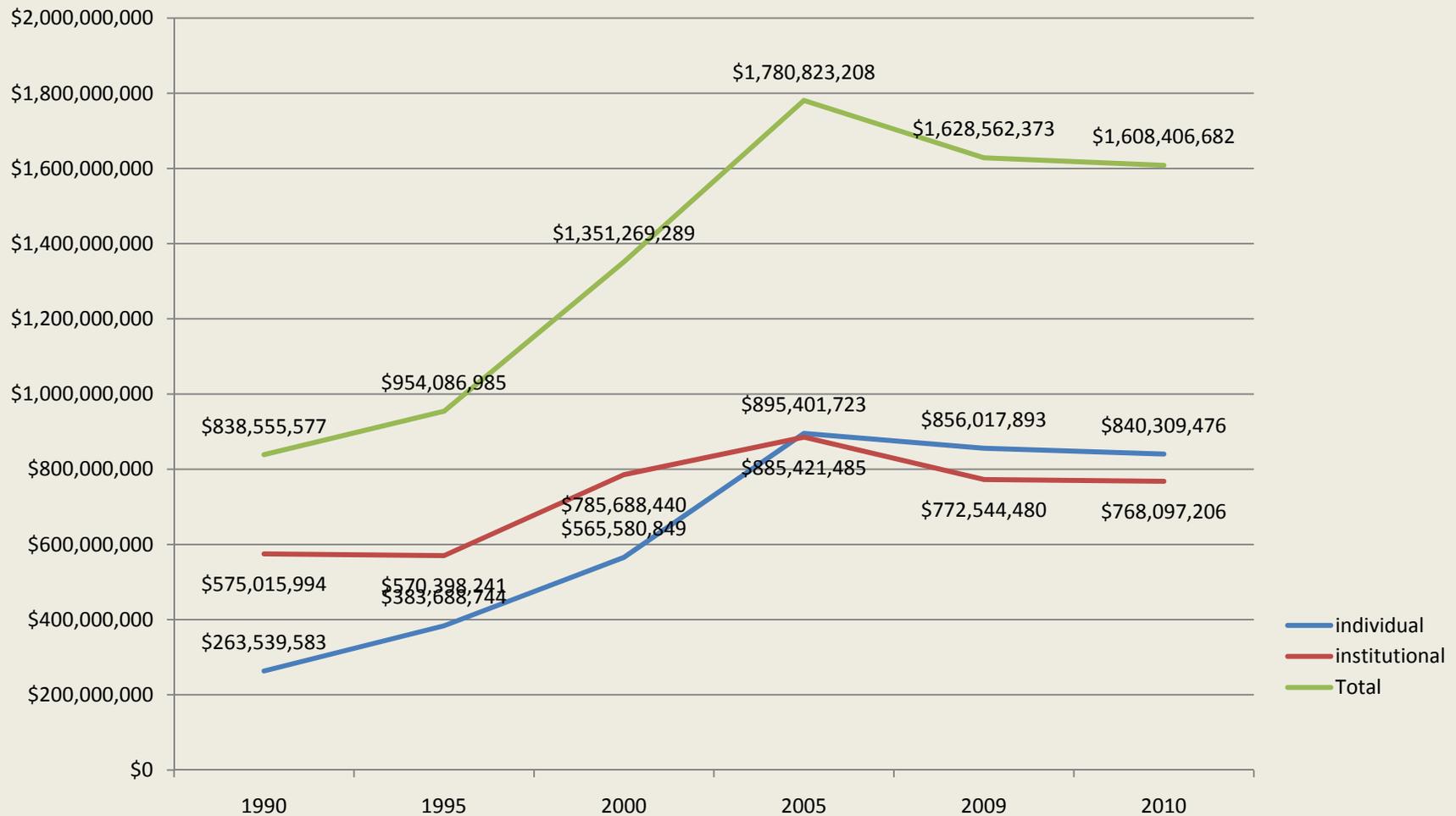


NICHD Training and Career Development Funding, after adjustment for BRDPI, 1990-2010





NIH Training and Career Development Funding, after adjustment for BRDPI, 1990-2010





**Approaches and Mechanisms: Size, Cost, and
Management of Individual and Institutional
Training & Career Development Grants**



Approaches and Mechanisms

- Institutional, individual, and research grants have advantages
- For both NIH and NICHD, T32 is largest mechanism
- Over time, K12 receiving increasing share of NICHD funds
- For both NIH and NICHD:
 - K23 expenditures up sharply in past 10 years;
 - F32 expenditures flat, while number of grants fell sharply;
 - K08 expenditures and grants flat
- Key components of training programs included mentoring, protected time, and allowing for work-life balance

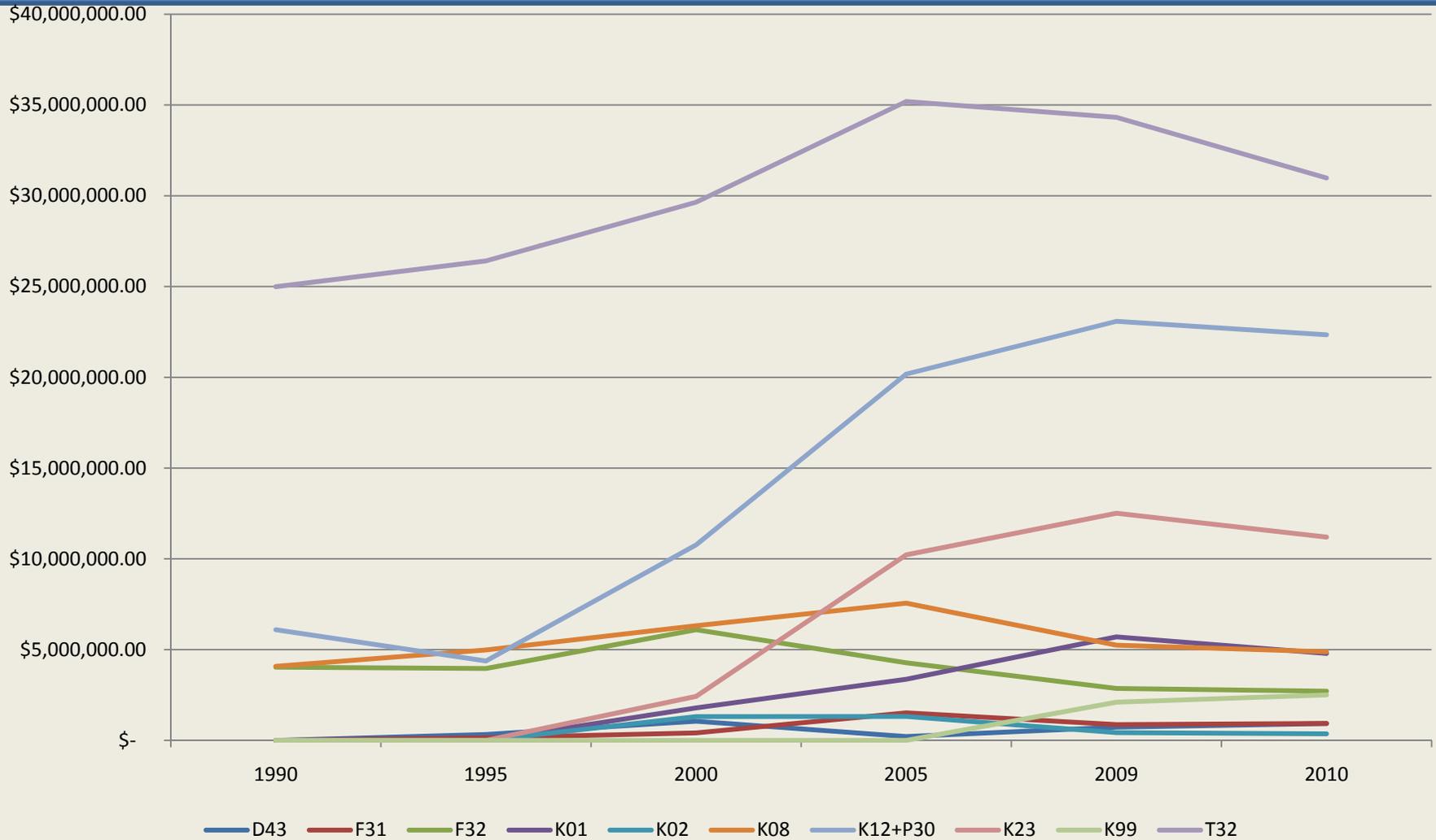


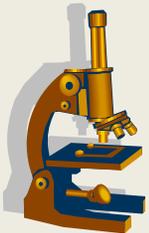
Program Perspective on the Advantages of Various Approaches/ Mechanisms for Training

Individual (F and K)	Institutional (T32, K12)	Research (R01 etc.)
Low administrative and indirect costs	Higher administrative costs but relatively small indirects	Higher indirect costs, less administrative costs
Gives trainees exposure to NIH grant, review processes	Trainees do not experience NIH grant, review processes	Trainees do not experience NIH grant, review processes
Trainees selected via NIH peer review	Trainees selected by institution	Trainees selected by PI
Total funding for institution, science area may be less consistent	Can provide stable funding source for institution, science area	Total funding for institution, science area may be less consistent
Less connected to department	Can build department strength	Less connected to department
Research project may be limited	Research experience can be variable	Proven research program already in place

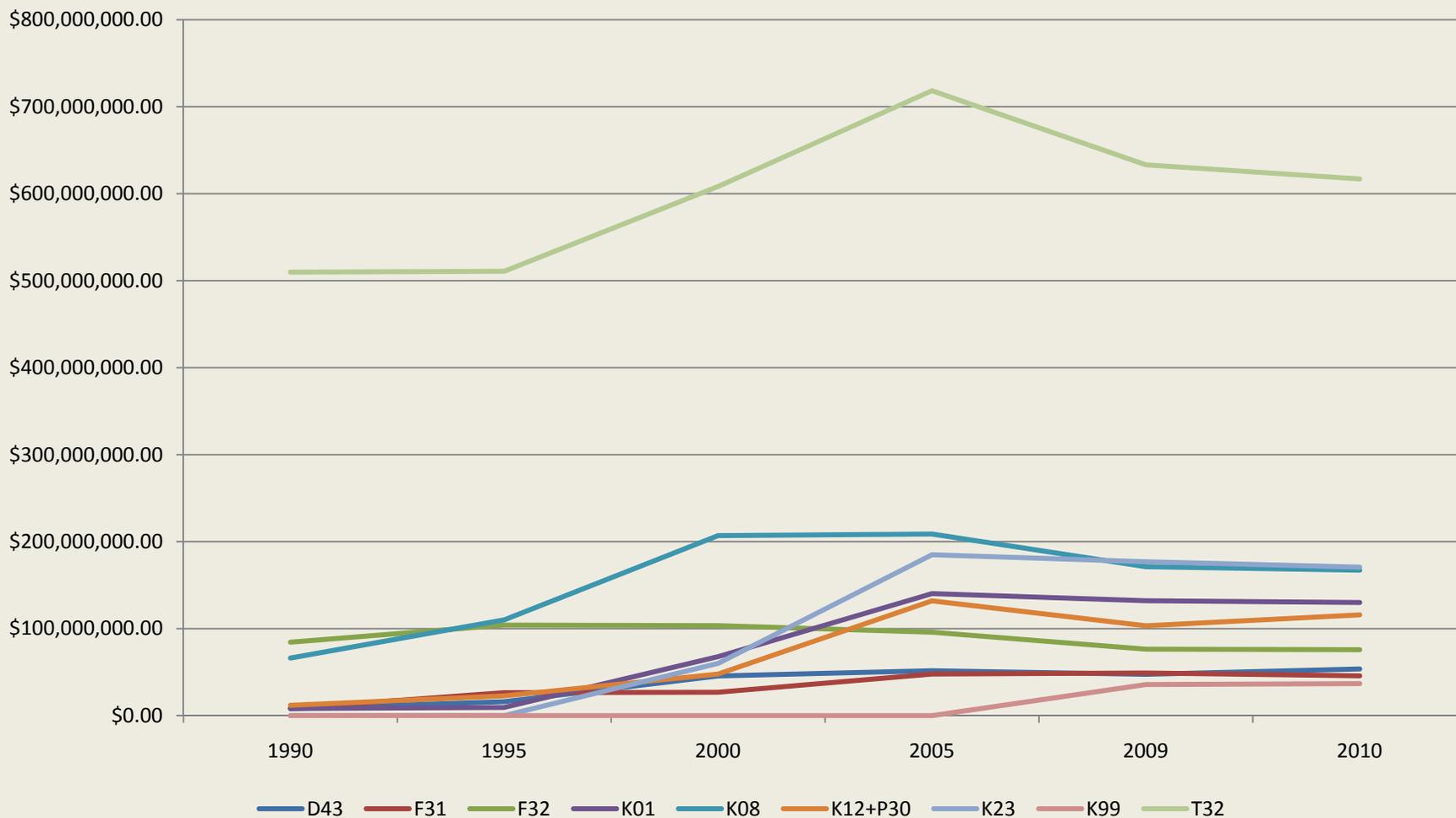


NICHD Training and Career Development Expenditures, by Activity Code, after BRDPI adjustment, 1990-2010





NIH Training and Career Development Expenditures, by Activity Code, after BRDPI adjustment, 1990-2010





Key Program Components

- Mentoring
- Protected Time
- Work/life balance
- Career and training plan
- Grantsmanship and NIH exposure
- Annual meeting
- Travel to conferences

“It doesn’t work if you don’t have the mentoring – without that it all falls apart.”

Spotlight: Institutional Programs (T32s and K12s)



- The most common size for T32 and K12 grant is 4-6 total trainees:
 - Also the most common size across the NIH
 - Corresponds to preferences of program staff
- Compared to NIH:
 - Fewer NICHD T32s/K12s are long term grants;
 - Type 1 applicants relatively more successful at NICHD
- Tradeoff between science and training program experience in review process

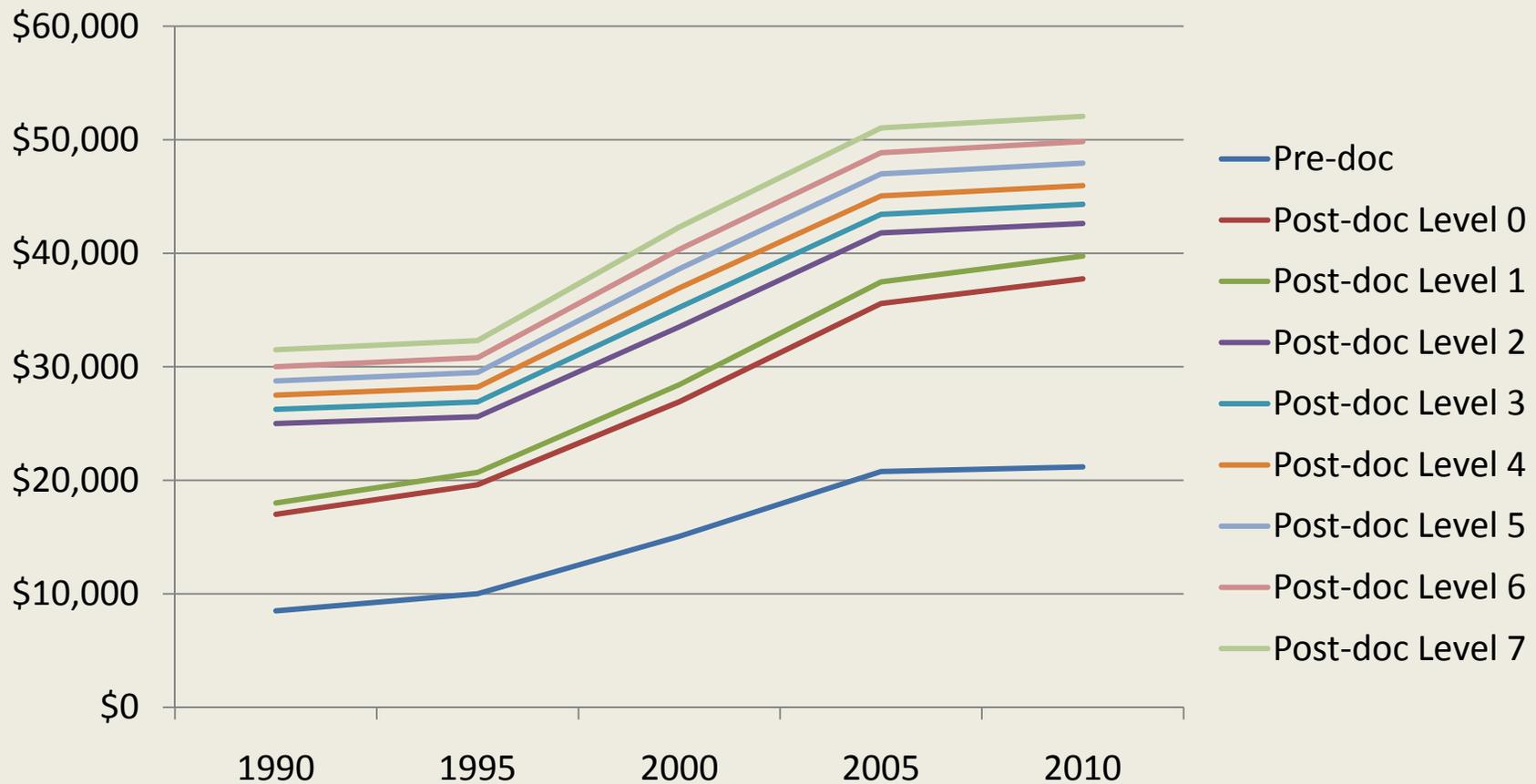


NICHD Training and Career Development, Number of T32 Grants and Postdoc Trainees, 1990-2010



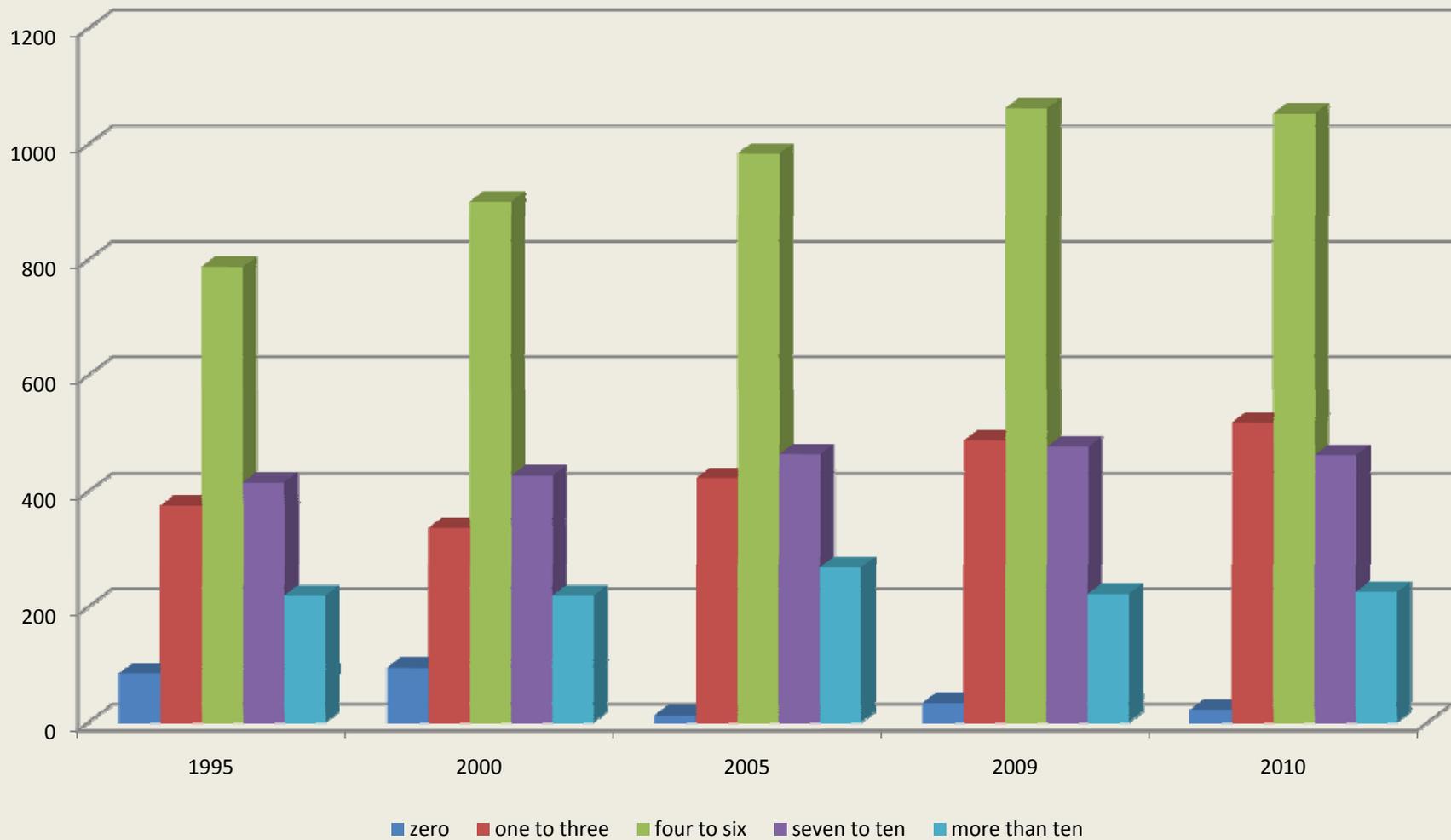


T32 Stipend History, not adjusted for inflation



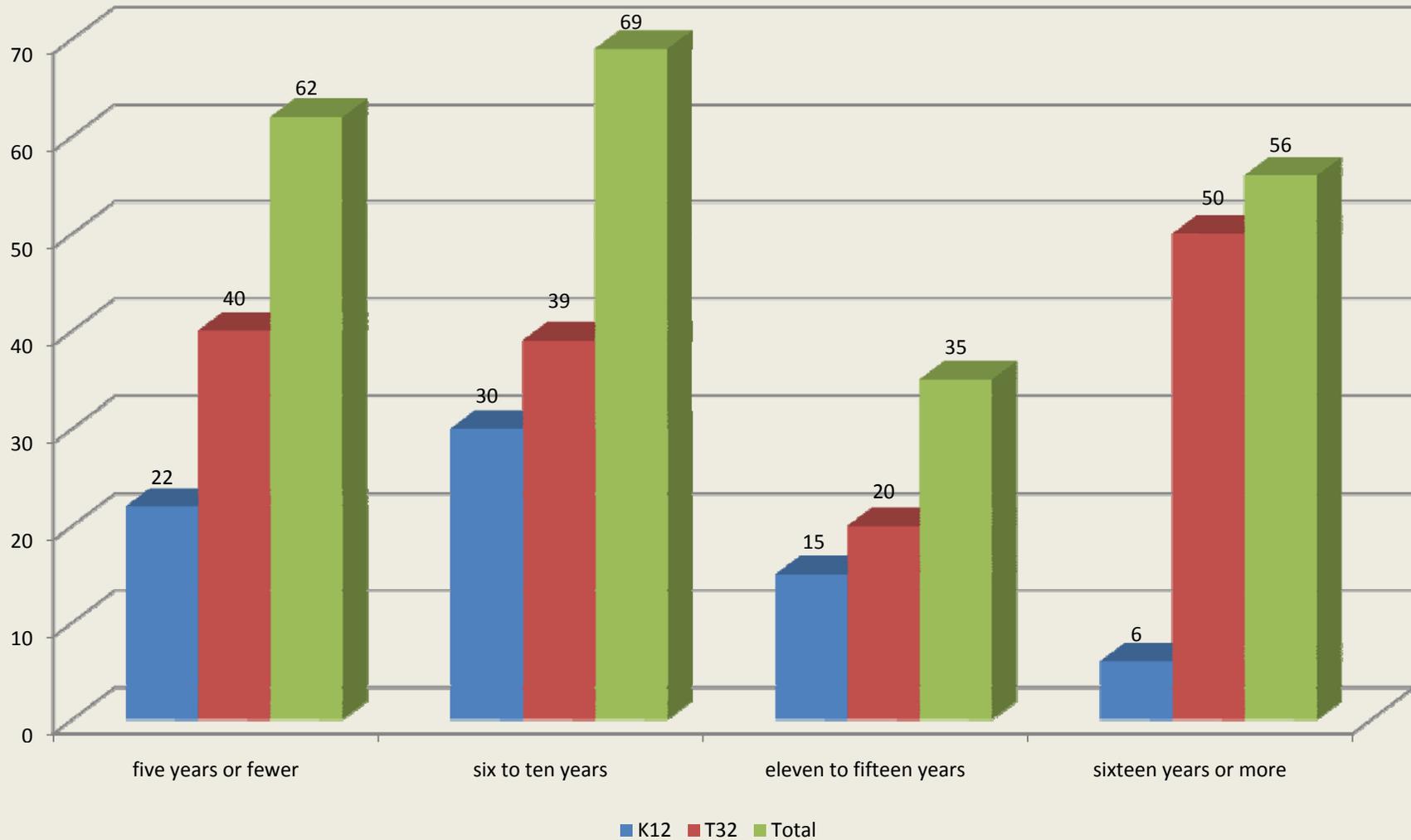


NIH T32 Grants, Distribution of Number of Total Trainees by Year



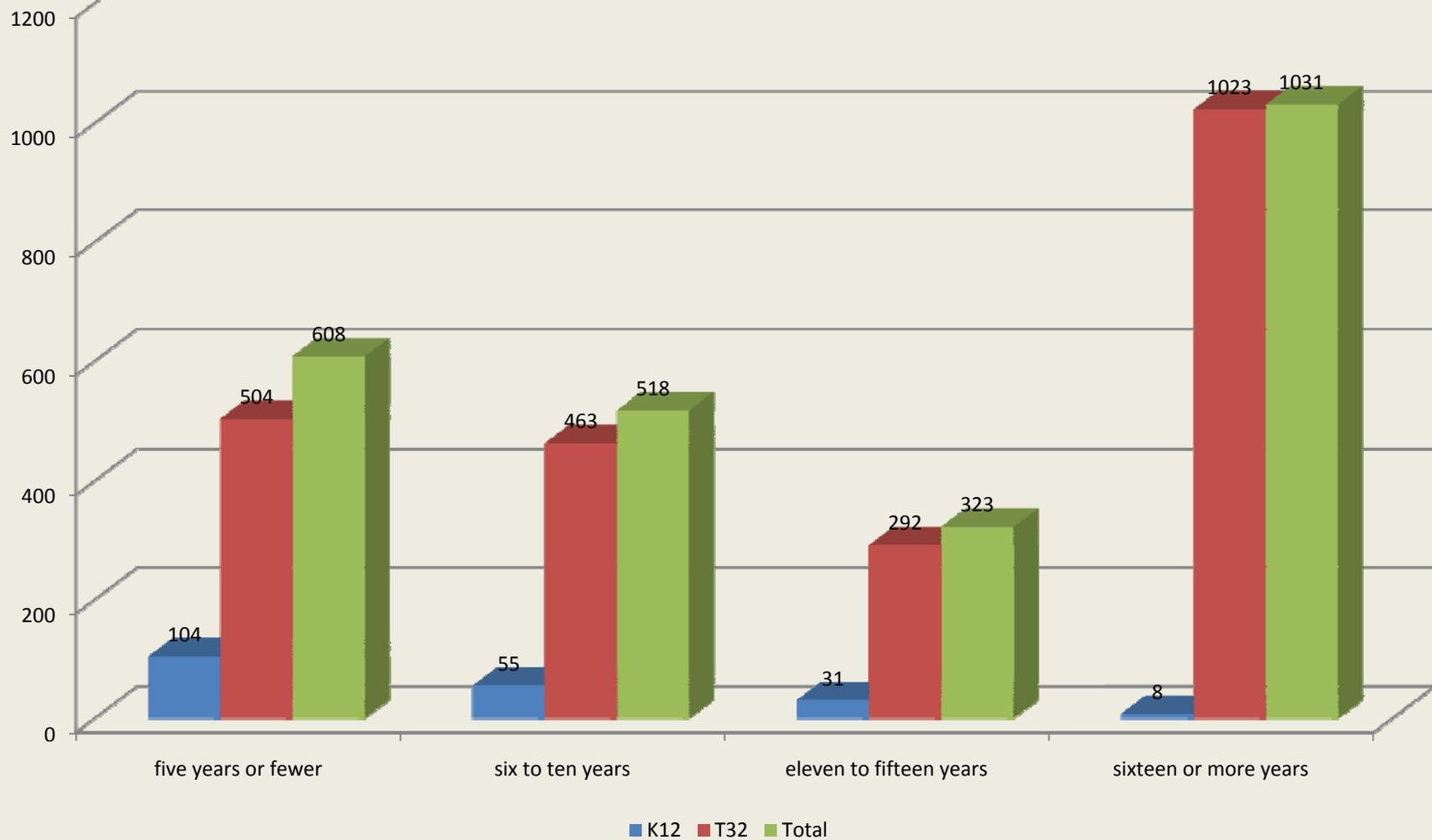


Number of **NICHD** Institutional Grants by Duration of Grant, 2010



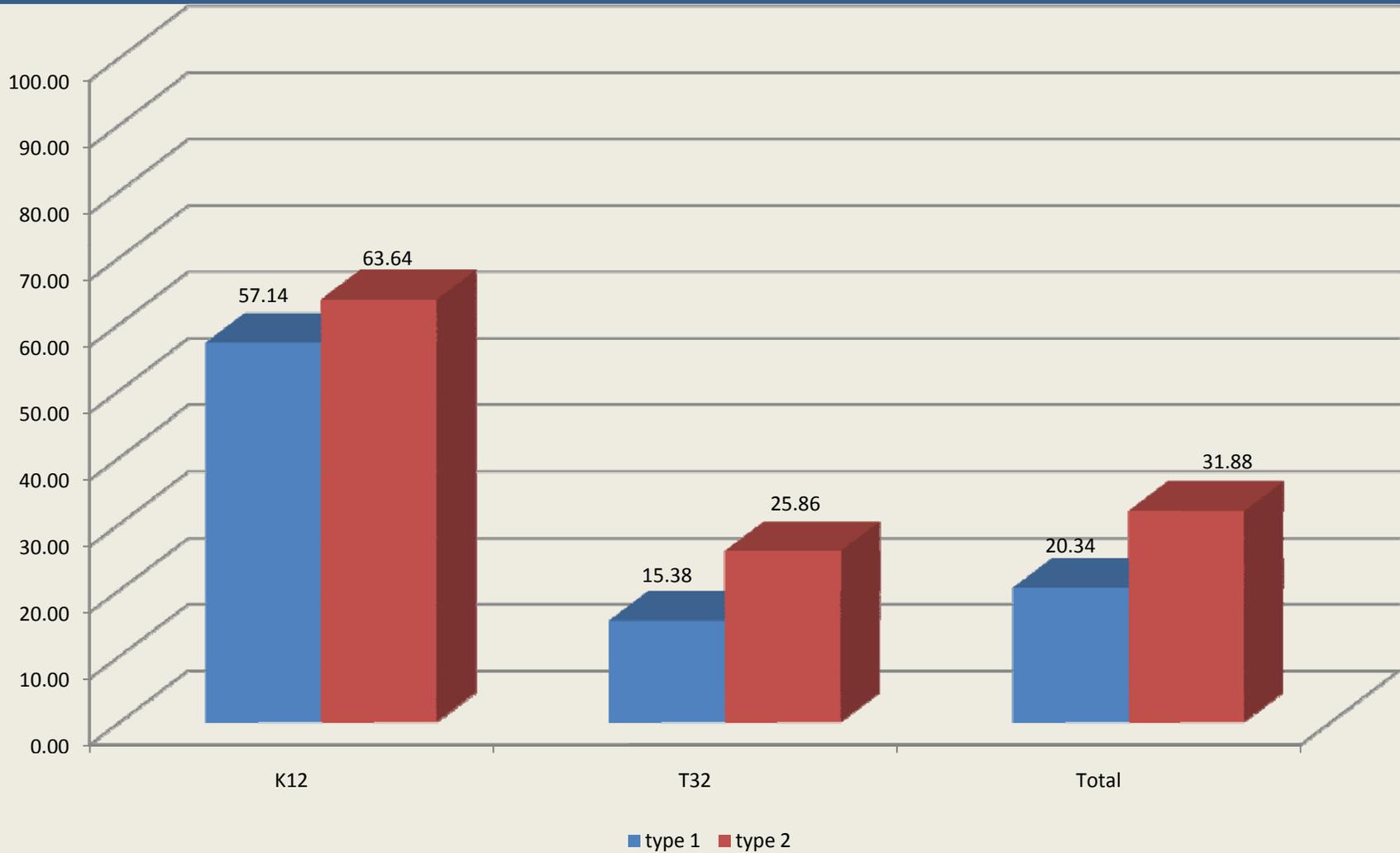


Number of NIH Institutional Grants by Duration of Grant, 2010



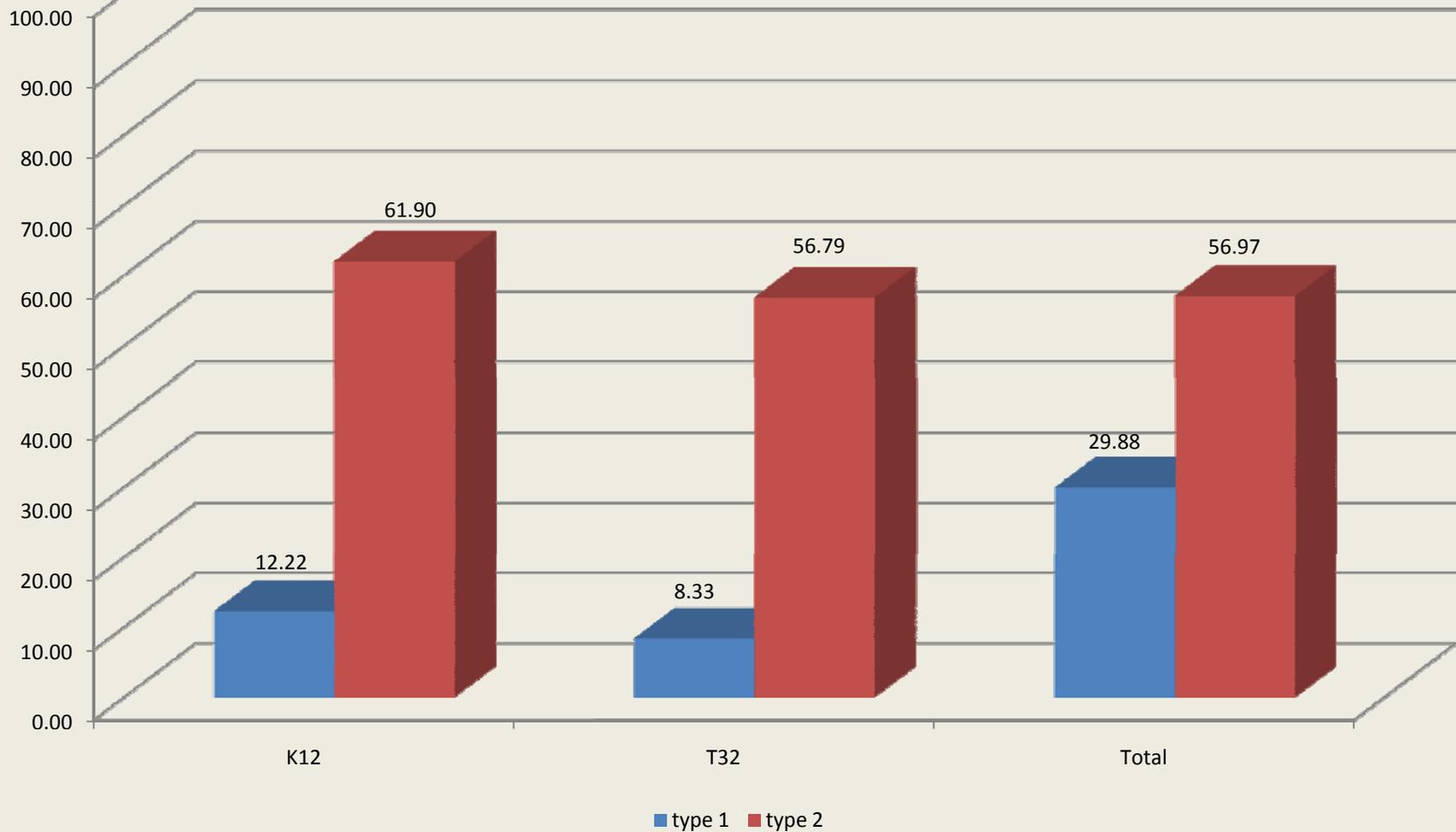


NICHD Competitive Grant Application Funding Rates, K12 and T32, FY 2009



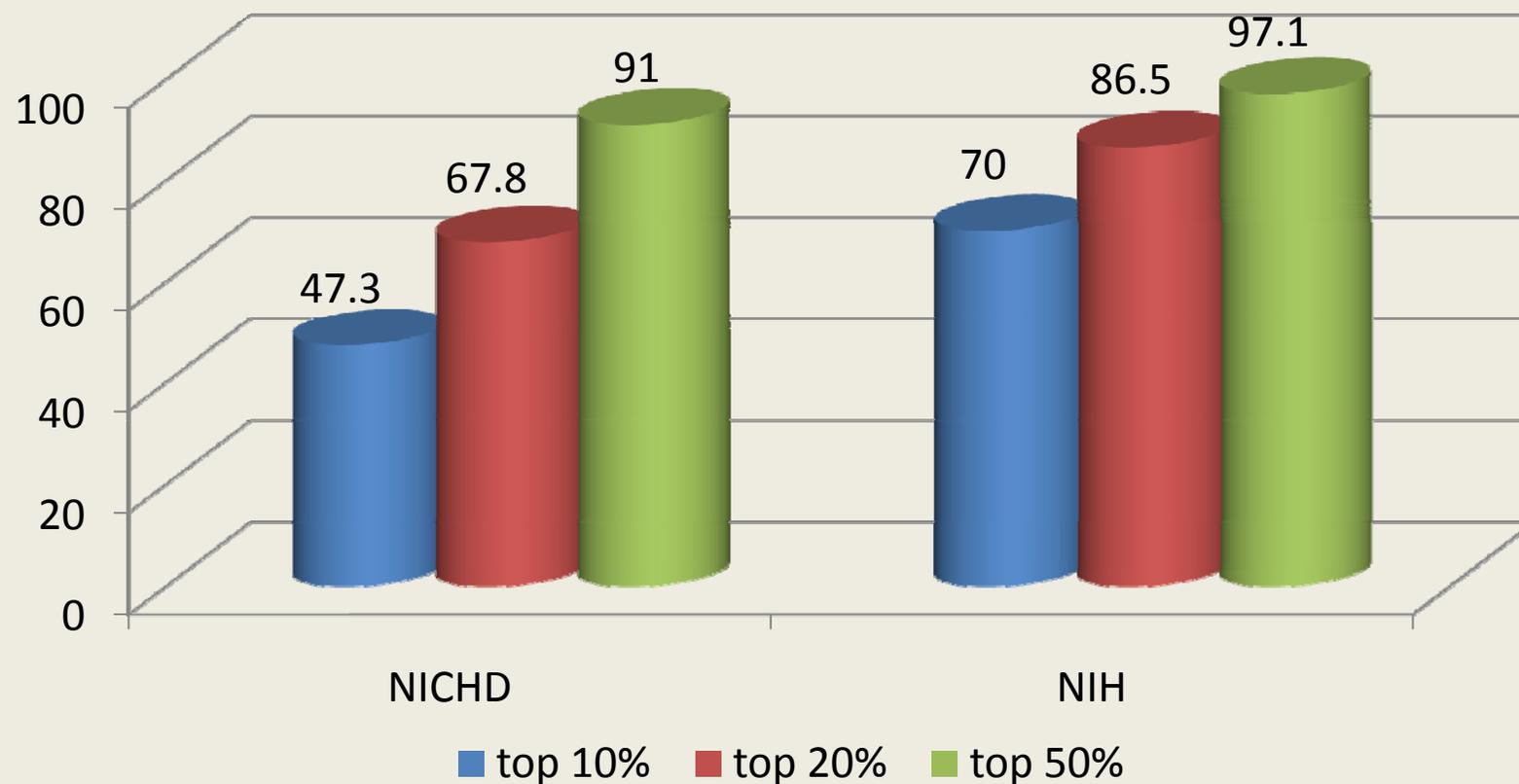


NIH Competitive Grant Application Funding Rates, K12 and T32, FY 2009





NICHD and NIH Training and Career Development Funding (all F, K, T grant types combined), Concentration by Institution, 2010



"We need to foster competition for training \$ to keep UCSF and Hopkins on their toes."

"Young people should get their experience at the top institutions."



Review of Institutional Grants

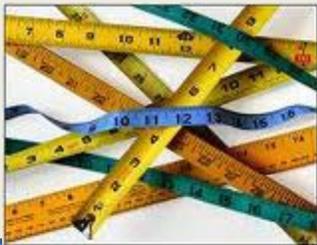
- Program staff viewed review scores as accurate and fair
- Staff frustrated with arbitrary cutoffs to distinguish among similar scores ... they attributed this to tight payline
- Opinions differed as to whether reviewers should be chosen based on scientific credentials or training experience
 - With scientific credentials, reviewers can reflect the reality of the scientific field
 - With experience running training programs, reviewers can assess mentoring, curriculum, etc.

“The ideas some reviewers have about the appropriate results for a training program might be right for their field, but are meaningless in ours”

“You can be a great scientist, but if you don’t know anything about training, you’re useless as a reviewer of a T32”



Funding Rates: Subsequent Research Applications and Grants of NICHD Trainees

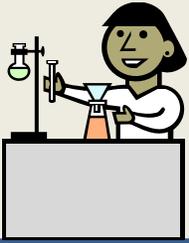


Measuring Success

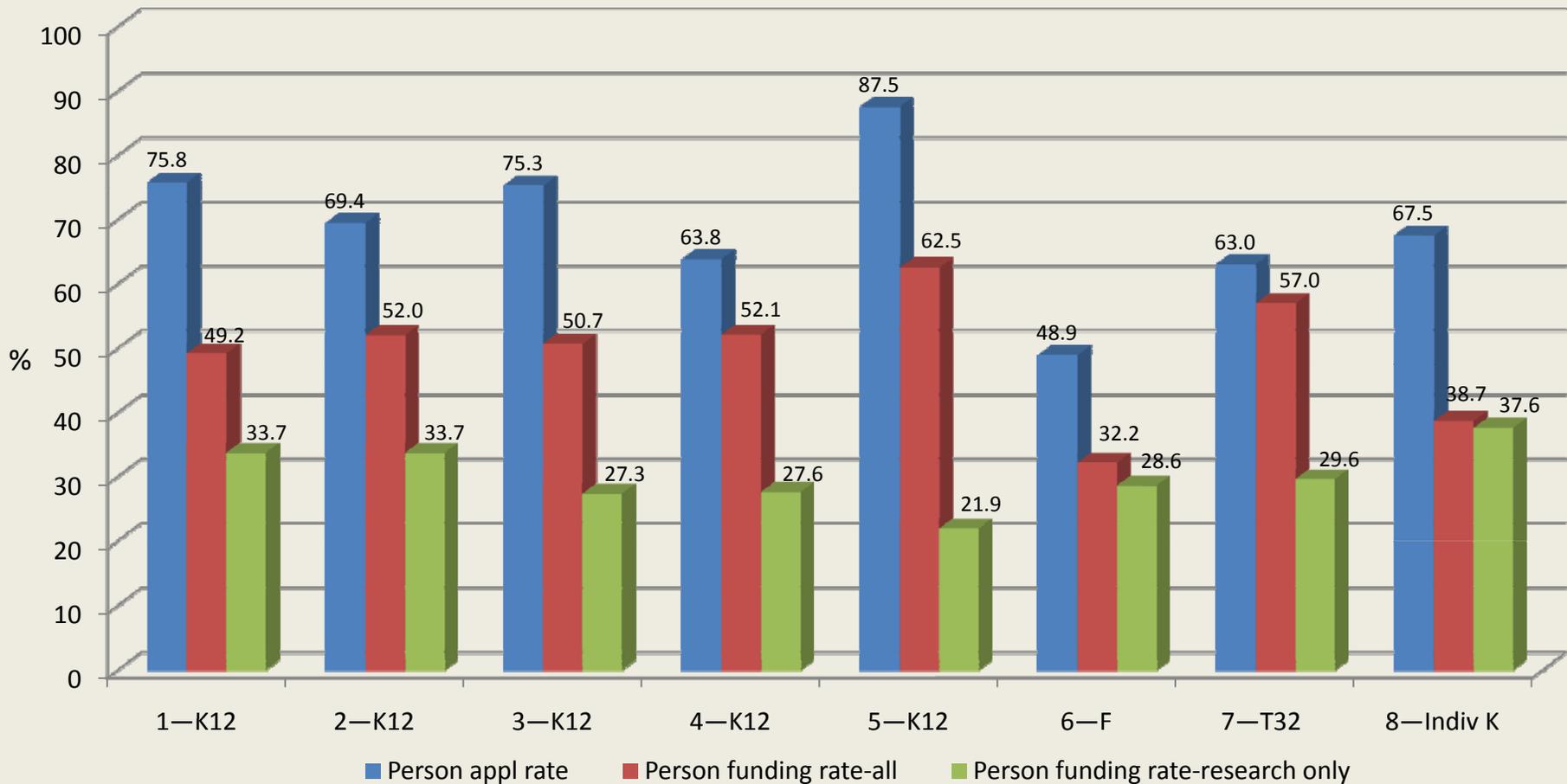
- Consensus that “Staying in research career” is important concept to measure
- Suggested benchmarks varied by field of science
- Measuring NIH grants:
 - Person success v. application success
 - Type of grant
 - Loan repayment
 - Research only
 - R01 only
 - Subject area/IC
 - By program, institution, sex, degree

“The only thing worth measuring is whether and when they get an R01.”

“If one of our trainees grows up to head a major ... agency, that’s not a failure.”



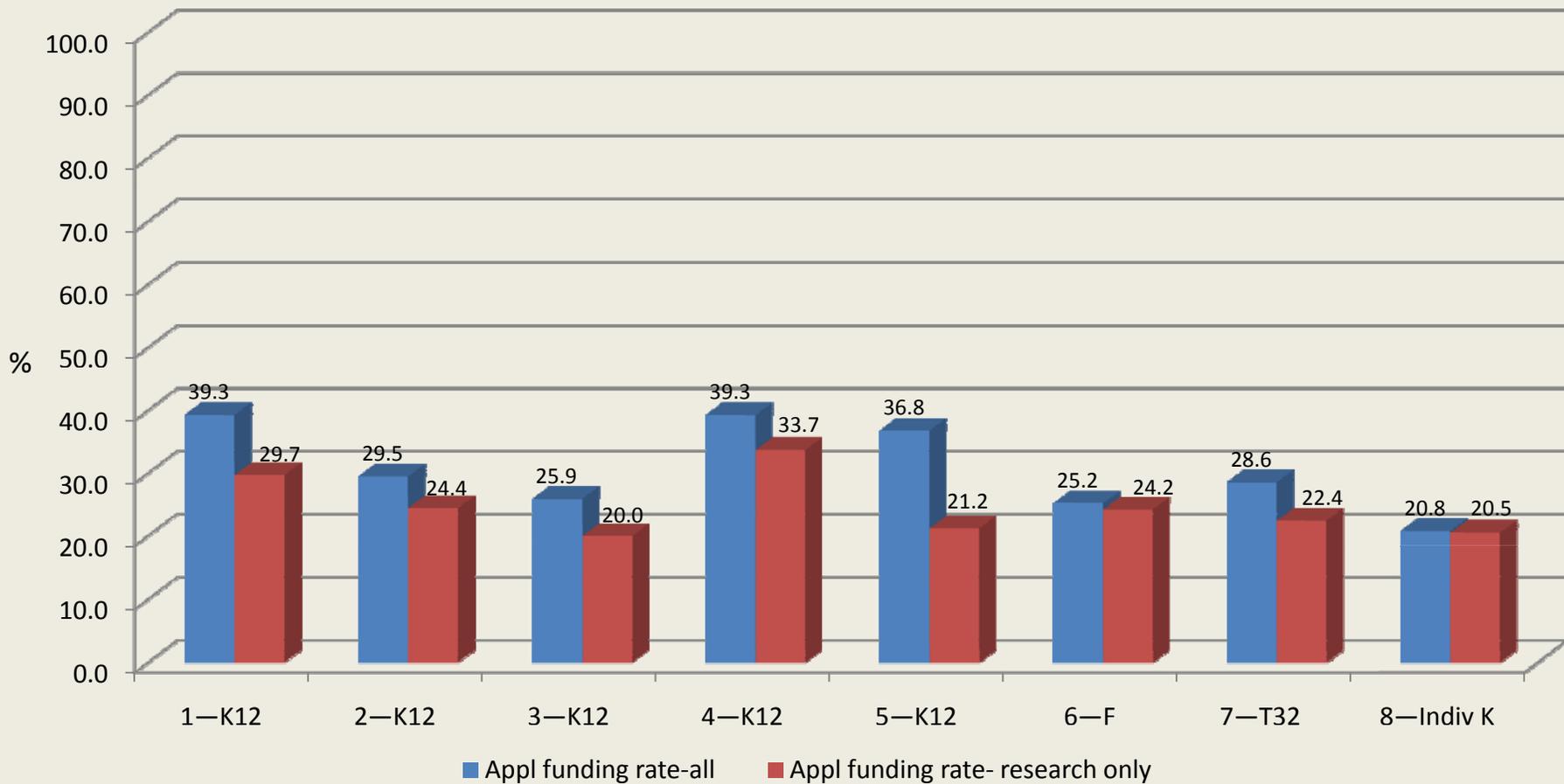
Person Success by Program



Not matched cohorts, so not strictly comparable. Most differences across programs not statistically significant. Figures are illustrative only.



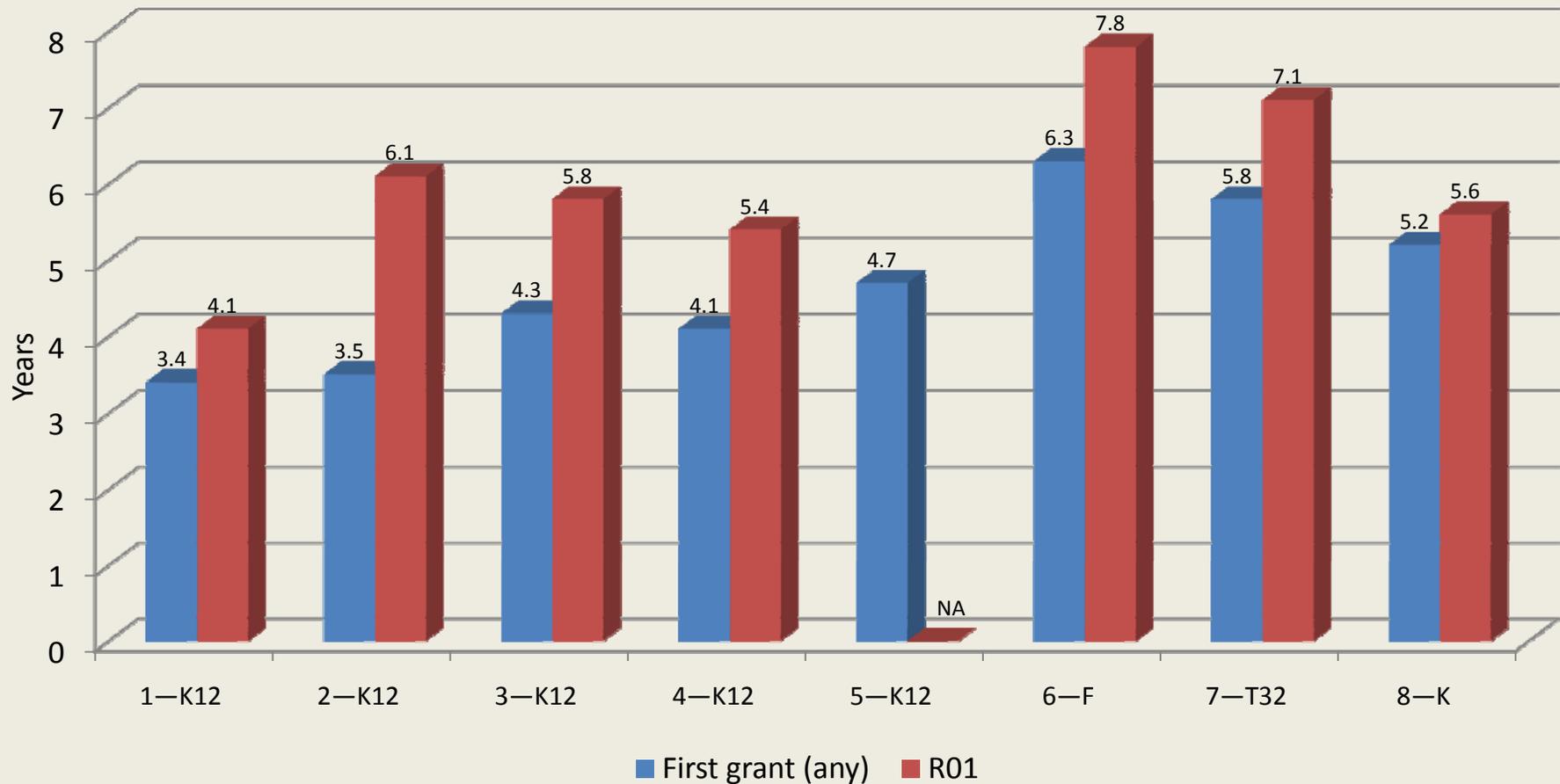
Application Success by Program



Not matched cohorts, so not strictly comparable. Most differences across programs not statistically significant. Figures are illustrative only.



Time to Funding, for Trainees who Received Subsequent Grants



Not matched cohorts, so not strictly comparable. Most differences across programs not statistically significant. Figures are illustrative only.



Subsequent NIH Grants for Former Trainees and NIH ICs

	1—K12	2—K12	3—K12	4—K12	5—K12	6—F	7—T32	8—K
Percent Subsequent grants from NICHD	13.5	10.0	68.0	15.2	76.2	40.4	30.8	41.8
Other ICs with highest rates of subsequent grants	NINDS NCI NIDDK NHLBI	NIDDK NIAID NHLBI NCI NINDS	NCI	NIAID NIDDK NHLBI	NIAMS NINDS	NIDDK NIGMS NIMH	NINDS NIGMS NIDDK NCI	NIDDK NINDS
Program subject area	Women's Health	Pediatrics	Reproduction	Pediatrics	Rehab	--	--	--

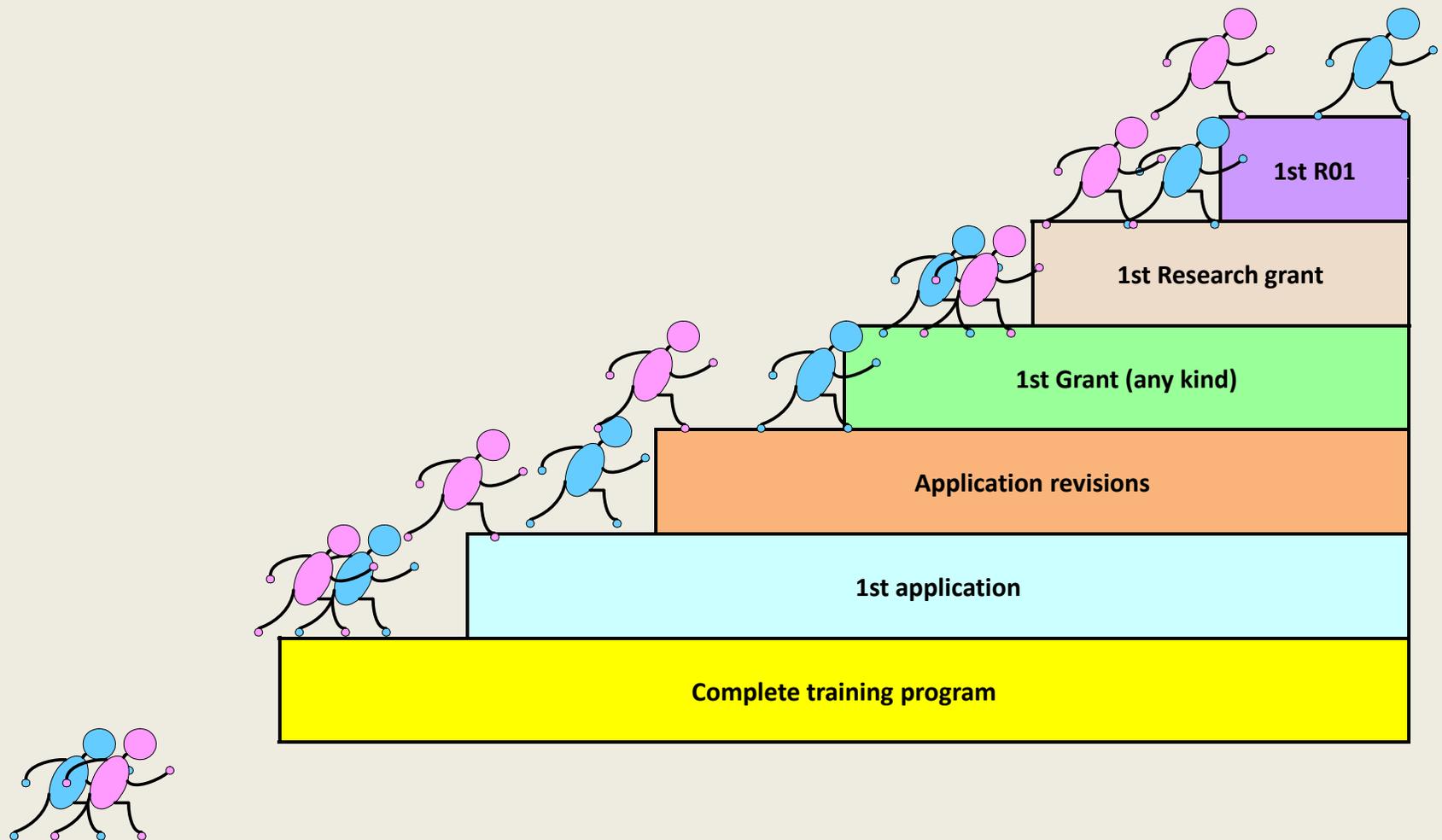
Not matched cohorts, so not strictly comparable. Most differences across programs not statistically significant. Figures are illustrative only.



Sex Differences in Obtaining NIH Grants

- Consistently across programs, MEN were more likely to :
 - Apply for grants overall
 - Submit more applications
 - Amend their applications
 - Apply for R01s as opposed to other mechanisms
- **However**, WOMEN were overall:
 - Obtaining about the same application success rates as men
- Some programs showed differences in probability of a person being funded, but results inconsistent across programs – sometimes men did better, sometimes women did

Sex Differences in Time to Obtaining NIH Grants

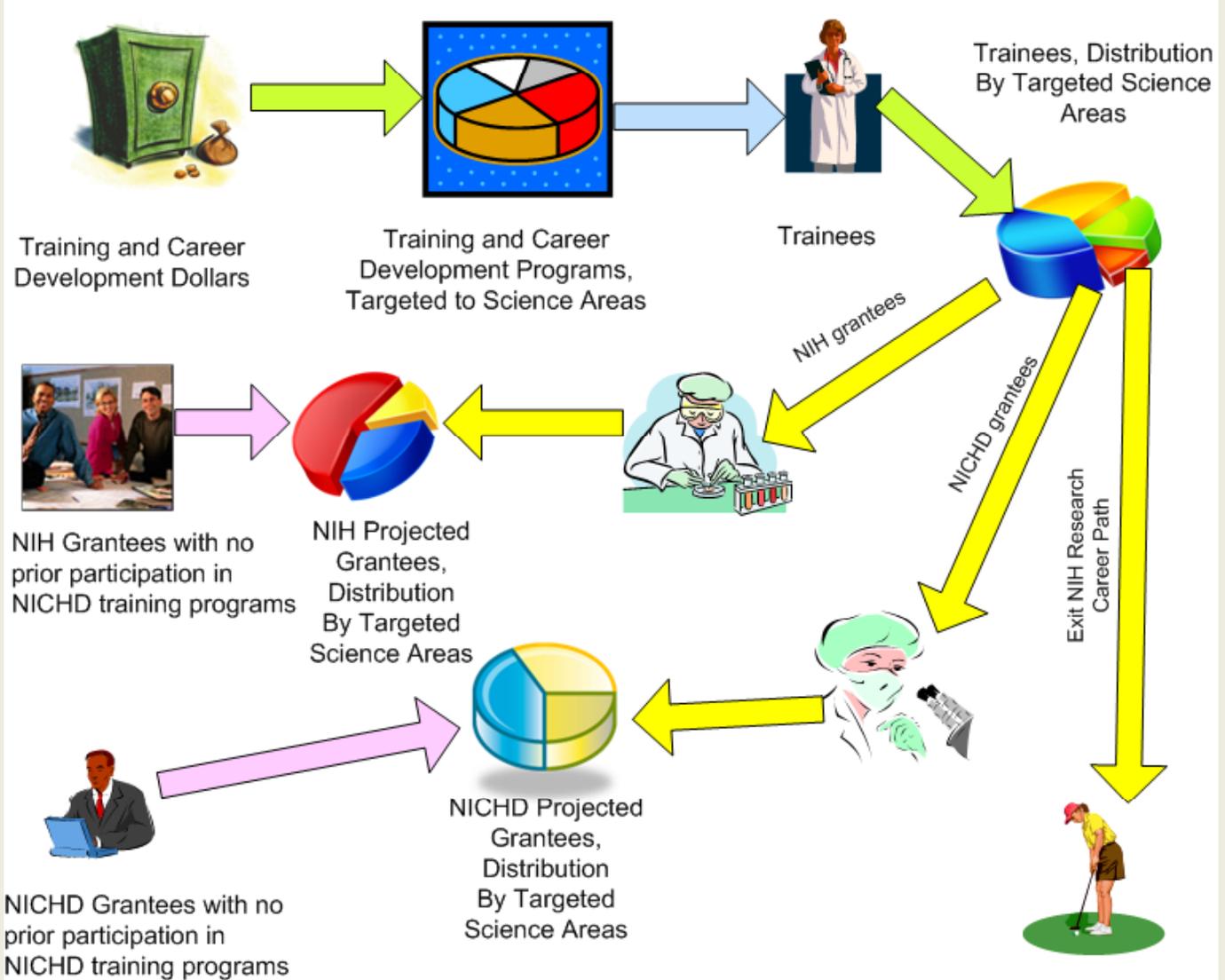




Future Plans



Future Plans: Workforce Projections





Key Questions

- How did investigators who began their NIH experience with the NICHD access NIH resources throughout the course of their careers?
- How did investigators who are current/recent NICHD grantees access NIH resources throughout the course of their careers?
- Did these trajectories vary with the characteristics of the investigator, and if so, how?
 - Degree type
 - Sex
 - Field of research
 - Starting program/grant at NIH or NICHD



Methods

- Selection:
 - Cohort from NICHD individual & institutional Ks, postdoctoral T32s, & F32s from 1986-1991 (n=1415)
 - NICHD grantees for 2010 (n=1442)
- Data:
 - NIH/NICHD administrative data (IMPAC II)
 - Analyzed at the IC; Branch; Program; Grant; PI; Institution; and Trainee levels



Questions and Comments