

NIDDK Extramural Funding Trends and Support of Guiding Principles

The NIDDK [Mission and Vision](#) outline the Institute's guiding principles toward achieving its core mission and the vision of the NIDDK Director, Dr. Griffin P. Rodgers.

These principles include:

- *maintaining a vigorous investigator-initiated R01 research portfolio*
- *supporting pivotal clinical studies and trials*
- *promoting a steady and diverse pool of talented new investigators*
- *fostering exceptional research training and mentoring opportunities.*

To highlight its dedication to these principles, the NIDDK generates data and analyses of application and funding trends. The data that the NIDDK generates on application and funding trends help the research community understand application and funding dynamics over recent years and demonstrate the NIDDK's commitment to research and programs associated with the guiding principles.

An analysis of application and funding trends was first highlighted at the NIDDK's [May 2012 Advisory Council meeting](#) by NIDDK Deputy Director Dr. Gregory Germino, who highlighted NIDDK's core values and reviewed the NIDDK's resource focus on areas supporting them. Following that presentation, the NIDDK committed to generating additional data on application and funding trends and posting updated data on the NIDDK website annually.

NIDDK Funding Outcomes for Fiscal Year 2019 As Part of Historical Application and Funding Trends

With the exception of Figure 8 (which includes initiative data), the data in all charts exclude initiatives (*i.e.*, Requests for Applications, or RFAs) and funds appropriated through the *American Recovery and Reinvestment Act (ARRA)*. Figures do not include grants funded through the Special Statutory Funding Program for Type 1 Diabetes Research.

Most charts and tables in this report show data for the past 10 Fiscal Years (FYs). Figure 1 focuses only on FY 2019. In Figures 3 and 5 through 7, the time horizon is expanded to include FYs starting in 1997, the year before the start of the doubling of the NIH budget from FYs 1998 through 2003. This expansion provides some perspective on application and funding trends occurring through the doubling period and then in the post-doubling era. Figures 11 and 12 are focused on Early Stage Investigators (ESIs) and build upon an initial set of charts that include data starting in FY 2010.

Download a copy of [Extramural Funding Trends](#) (PDF, 1.27 MB)

Executive Summary

The increase in the NIDDK budget from \$1,963 million in FY 2018 to \$2,029 million in FY 2019 enabled NIDDK to support more new research projects and more investigators. The flattening of the NIH budget followed by sequestration in FY 2013, resulted in tightening of the NIDDK general pay line and a decrease in number of awards funded until FY 2015. Subsequent increases in the NIDDK budget and pay lines resulted in a gradual increase in number of R01 awards over the last five years, and a more rapid increase in the number of principle investigators (PIs) supported by NIDDK R01 awards. In FY 2019 NIDDK supported a record number of R01 PIs, and an increasing number of these researchers were supported through multiple PI (multi-PI) awards. In FY 2019 a record 20 percent of NIDDK R01s supported multi-PI R01

awards. The cost of an R01 award continues to increase each year, reaching a record median cost of \$426,097 in FY2019, but NIDDK’s commitment to supporting a strong investigator-initiated research portfolio continues, with 77 percent of NIDDK Research Project Grant funding supporting R01 awards. One factor contributing to the recent increases in cost of R01 awards is the increasing number of multi-PI awards, which tend to have slightly higher costs than single PI awards.

NIDDK’s support of ESIs through extended pay lines for first R01 award and first renewal of an R01 award has strengthened the entry of new investigators into the workforce. This can be seen, in part, by the stabilization of the median age of NIDDK investigators, which has held steady at 52 years since the inception of the ESI program. Following a particularly strong year for NIDDK ESIs in FY 2018, there was a slight drop in ESI applications and awards in FY2019. NIDDK is continues to monitor ESI applications to determine if the reduction in FY 2019 was an anomaly.

Figure 1: Number of NIDDK Paid and Unpaid Applications in FY 2019, By Percentile

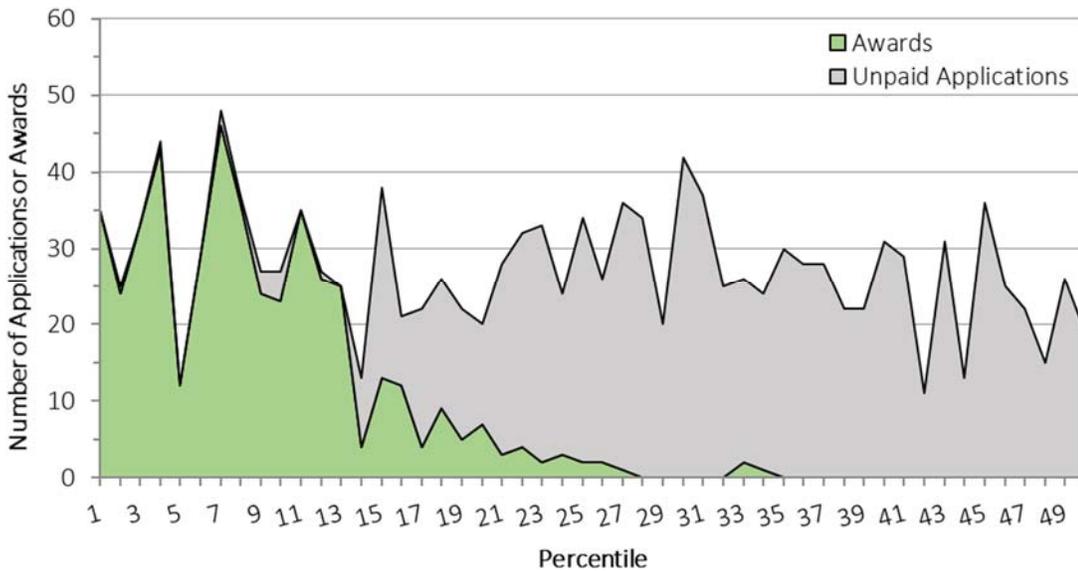
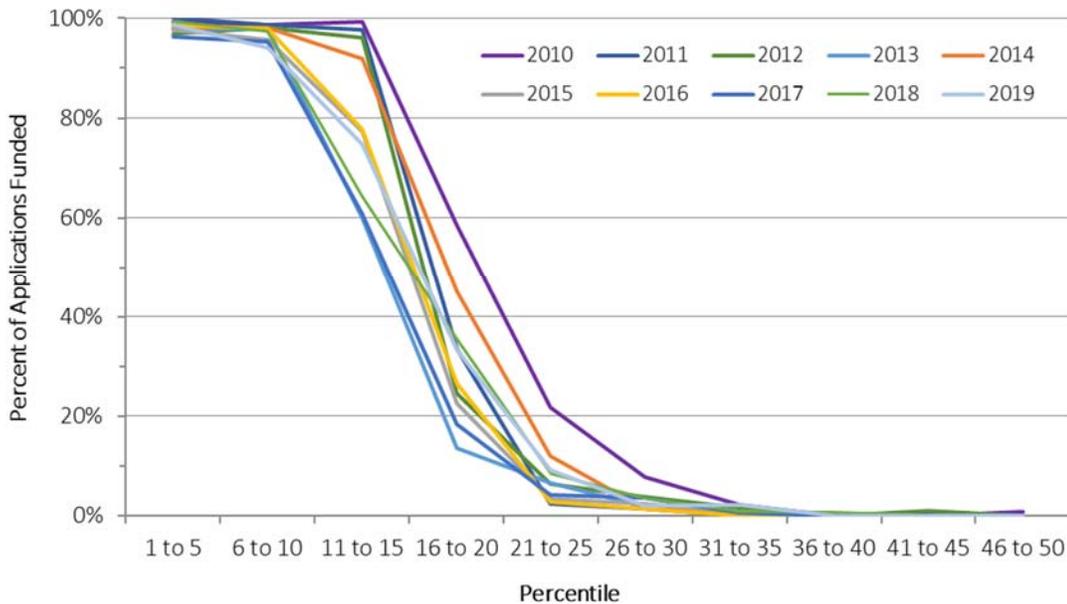


Figure 1 shows that the NIDDK adheres closely to its payline but does exercise programmatic discretion to include a limited number of programmatically important applications beyond the general payline. The NIDDK general payline in FY 2019 for most R01 applications was the 13th percentile for established investigators and the 18th percentile for ESIs. R01 applications requesting \$500,000 or more in direct costs are subject to additional programmatic scrutiny and a stricter payline (8th percentile).

Note: “Applications” shown in the chart above include all NIDDK R01 applications that scored 50th percentile or better. Unscored applications, scored applications with no percentiles, and applications scoring above the 50th percentile are not shown. (Fifty percent [n=1,392] of the applications received were unscored, scored but did not receive a percentile, or scored above the 50th percentile.) No unscored applications were funded in FY 2019.

Figure 2: NIDDK Competing R01 Application Funding Curves by Percentiles for FYs 2010-2019



To generate the data for Figure 2, R01 applications were placed into “percentile bins” as follows: bins 1 to 5 include all applications with percentile scores from 0.1 to 5.0, bins 6 to 10 include applications with percentile scores from 5.1 to 10.0, etc. Only R01 applications that scored 50th percentile or better were included in the analysis. The data demonstrate steep deflections in the percentage of applications funded at or above the general payline for each year. The R01 paylines for the years included in Figure 2 are shown in Table 1. To support ESI researchers, NIDDK supports a differential payline for ESI first R01 awards that was 5 percentiles higher than NIDDK’s general payline, as well as a payline for ESI’s first competitive renewal that was 3 percentiles higher than the general payline.

Table 1

Fiscal Year	General Payline	≥\$500K Payline	New Investigator Payline	Early Stage Investigator (ESI) Payline	ESI First Competitive Renewal Payline
2010	17	11	19		
2011	15	10	17		
2012	13	9	13	18	
2013	11	7	11	16	
2014	13	8	13	18	
2015	13	8	13	18	15
2016	13	8	13	18	15
2017	12	7	12	17	15
2018	13	8	13	18	16
2019	13	8	13	18	16

Note: In FY 2012, the NIDDK began focusing on ESIs (see definition on the NIH “New and Early Stage Investigator Policies” webpage at http://grants.nih.gov/grants/new_investigators/index.htm), a subset of New Investigators. For more information on the benefits that the NIDDK conveys to ESIs, see the NIDDK New and Early Stage Investigators page at <https://www.nidDK.nih.gov/research-funding/process/apply/new-early-stage-investigators> (see also Figures 11 and 12).

Figure 3: Number of Competing NIDDK R01 Applications (Including Resubmissions) Received for Funding Consideration in Fys 1997-2019

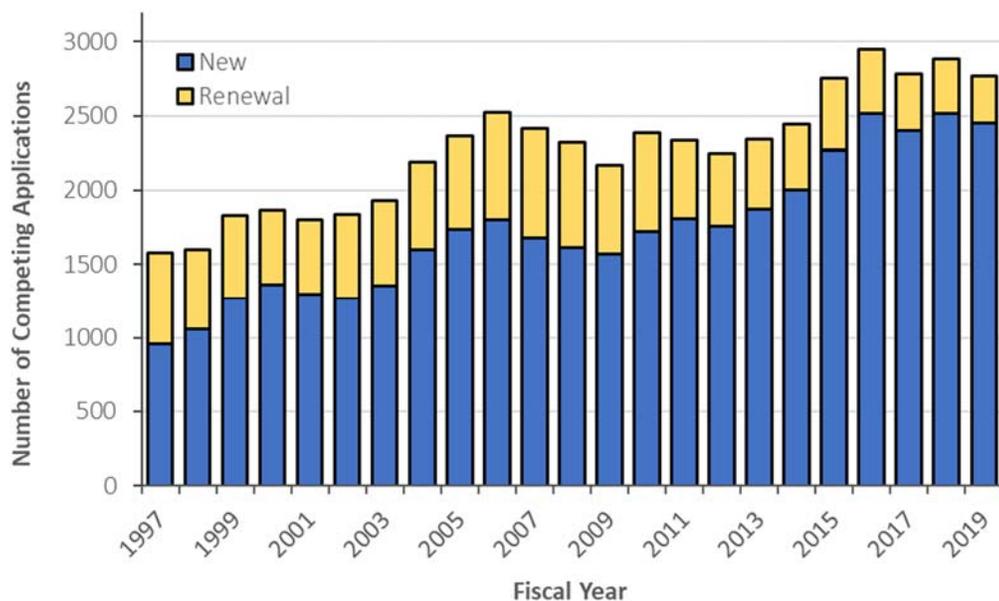


Figure 3 shows a substantial increase in the number of competing R01 applications received by the NIDDK between Fys 1997 and 2019. The number of R01 applications received rose from just over 1,500 applications in FY 1997 to just over 2,500 applications in FY 2006, then leveled out to approximately 2,330 a year from FY 2007 through FY 2014. In the last 5 years (Fys 2015-2019), the number of competing R01 applications have surged to a new level (approximately 2,800 a year).

Since FY 1997, the NIDDK R01 portfolio has shifted to have a greater proportion of new applications (blue bars) and fewer competing renewals (yellow bars) of ongoing R01 awards. In FY 1997, competing renewal applications comprised 39 percent of all R01 competing applications received, but by FY 2019 competing renewals accounted for only 12 percent of all competing applications.

Figure 4: Number of Competing NIDDK R01 Applications Received for Funding Consideration in FYs 2010-2019: New Versus Renewal Application Numbers

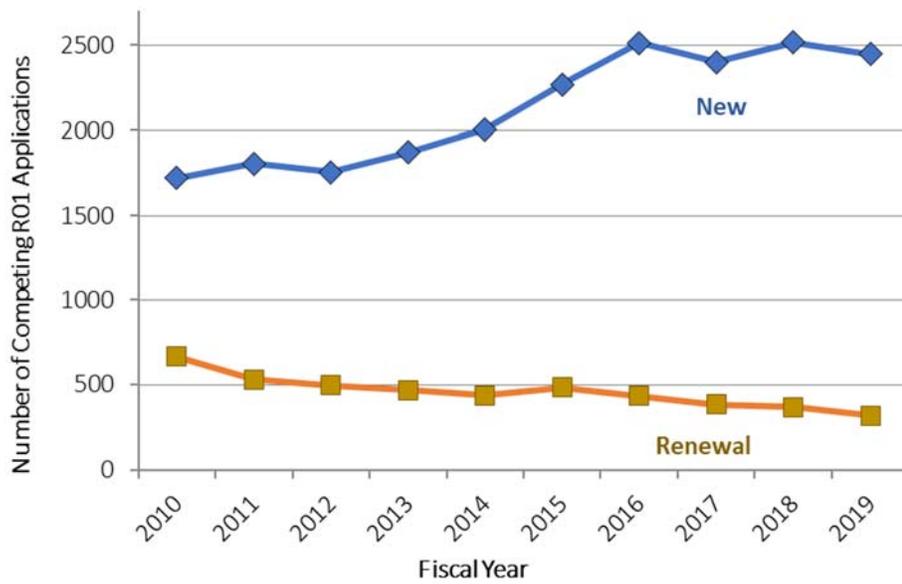


Figure 4 shows the last 10 years of competing and non-competing NIDDK R01 application numbers from Figure 3, to allow more detailed visualization. In the last decade (FY 2010 to FY 2019) the number of competing R01 applications submitted to the NIDDK has risen by 15 percent. This increase resulted from the receipt of more new applications, which rose from approximately 1,750 in FYs 2010 through 2012 to about 2,500 in FYs 2016 through 2019. In FY 2019, 88 percent of competing R01 applications received by the NIDDK were new, and only 12 percent were competing renewals. During the past 10 years, the number of renewal R01 applications has steadily decreased: half as many competing renewal applications were received in FY 2019 as compared to FY 2010. The recent surge in new applications may, in part, be explained by the change in NIH policy that discontinued A2 submissions, but the reason for the decrease in the number of renewal applications is less clear.

Figure 5: Number of NIDDK R01 and R37 Grants (Competing and Non-Competing) Funded in FYs 1997-2019

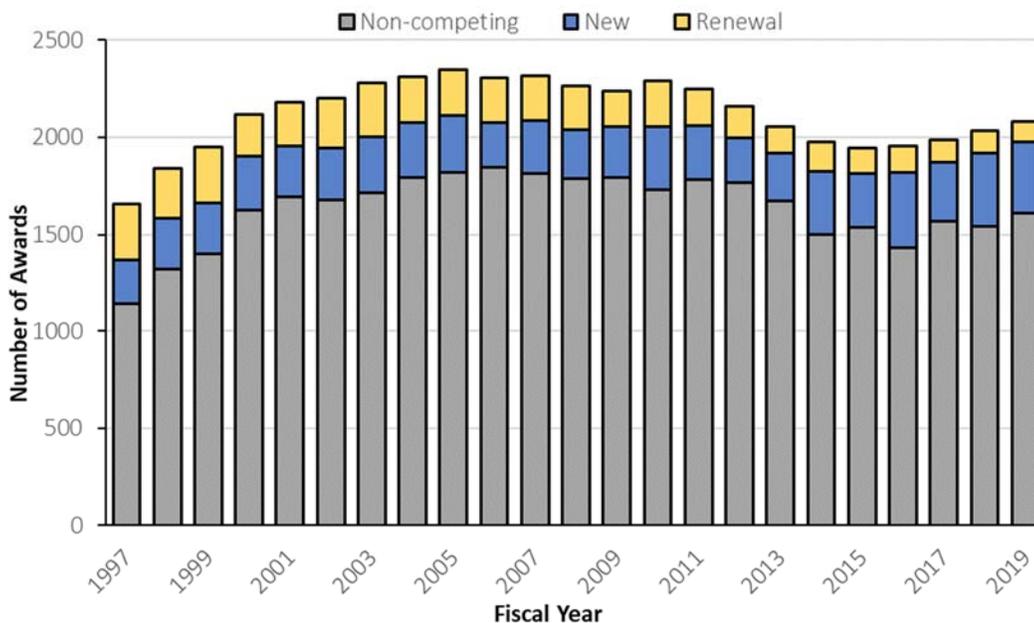


Figure 5 shows R01 and R37 awards issued by the NIDDK each year, from FY 1997 through FY 2019, and notes noncompeting awards and both new and renewal competing awards. During the doubling of the NIH budget (FYs 1998-2003), the total number of R01/R37 grants funded by the NIDDK increased significantly. After leveling off following the doubling, the number of R01/R37 grants funded by the NIDDK from FY 2010 to FY 2015 declined. From FY 2016 through FY 2019, there was a steady increase in the number of R01/R37 awards supported by the NIDDK. Prior to FY 2009, about half of the competing grants funded by the NIDDK were new (Type 1) awards, but in the last 10 years, the majority of competing awards were new; in FY 2019, 78 percent of competing NIDDK R01/R37 awards were new.

Figure 6: Overall NIDDK Expenditures (Includes Direct and Facilities and Administrative Costs) on R01 and R37 Awards (Competing and Non-Competing) in FYs 1997-2019

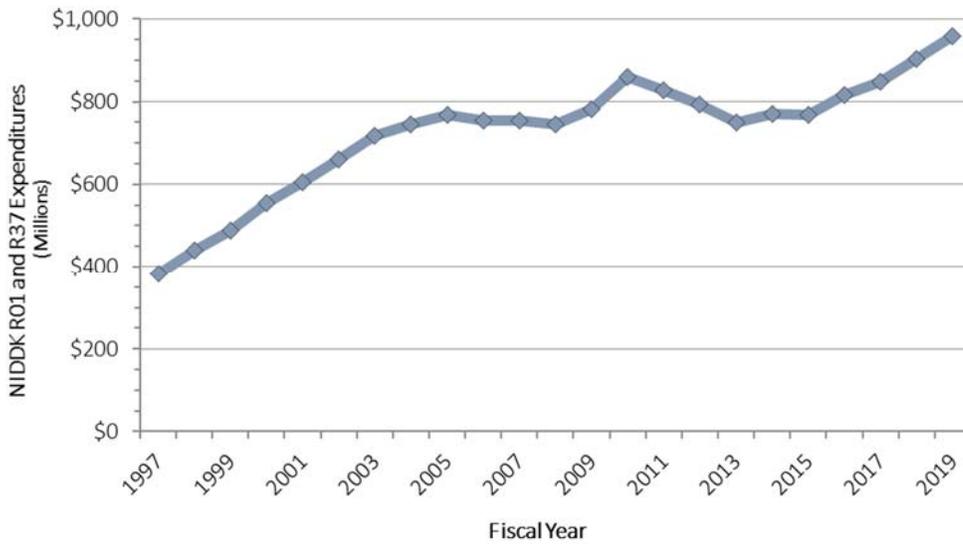


Figure 6 shows that NIDDK total expenditures on R01 and R37 grants have more than doubled since FY 1997 (from \$383.5M to \$958.5M). This increased R01/R37 funding is due to the NIDDK supporting a larger number of R01/R37 awards (see Figure 5) and also to the substantial increase in median R01 cost since FY 1997 (see Figure 7).

Figure 7: Median Total Costs (Includes Direct and Facilities and Administrative Costs) of NIDDK R01 and R37 Grants (Competing and Non-Competing) in FYs 1997-2019

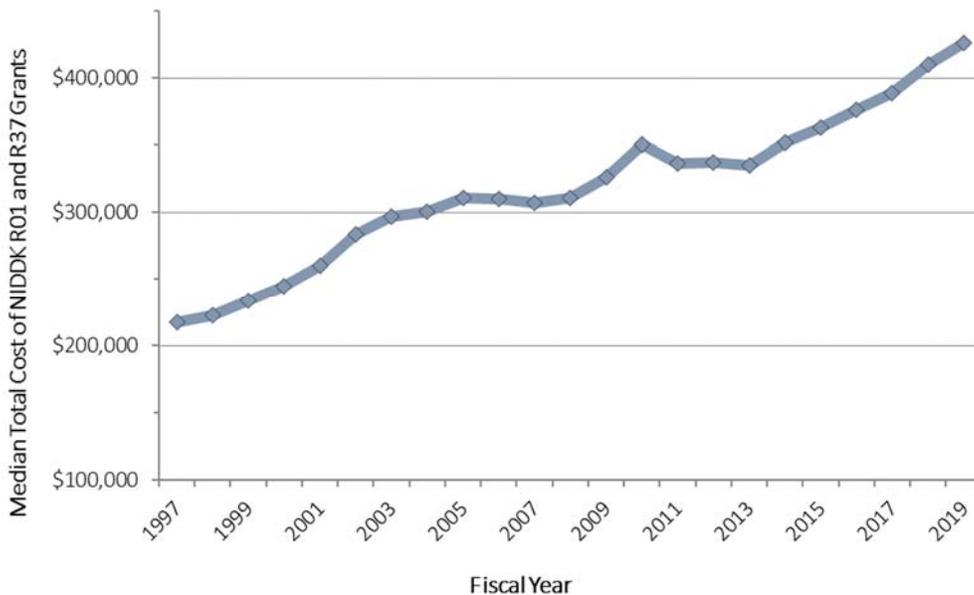


Figure 7 illustrates that the median cost of R01 and R37 awards has doubled since FY 1997 from \$217,638 to \$426,097 in FY 2019.

Figure 8: NIDDK Extramural Research Funded in FYs 2010-2019 (Competing and Non-Competing), By Funding Mechanism

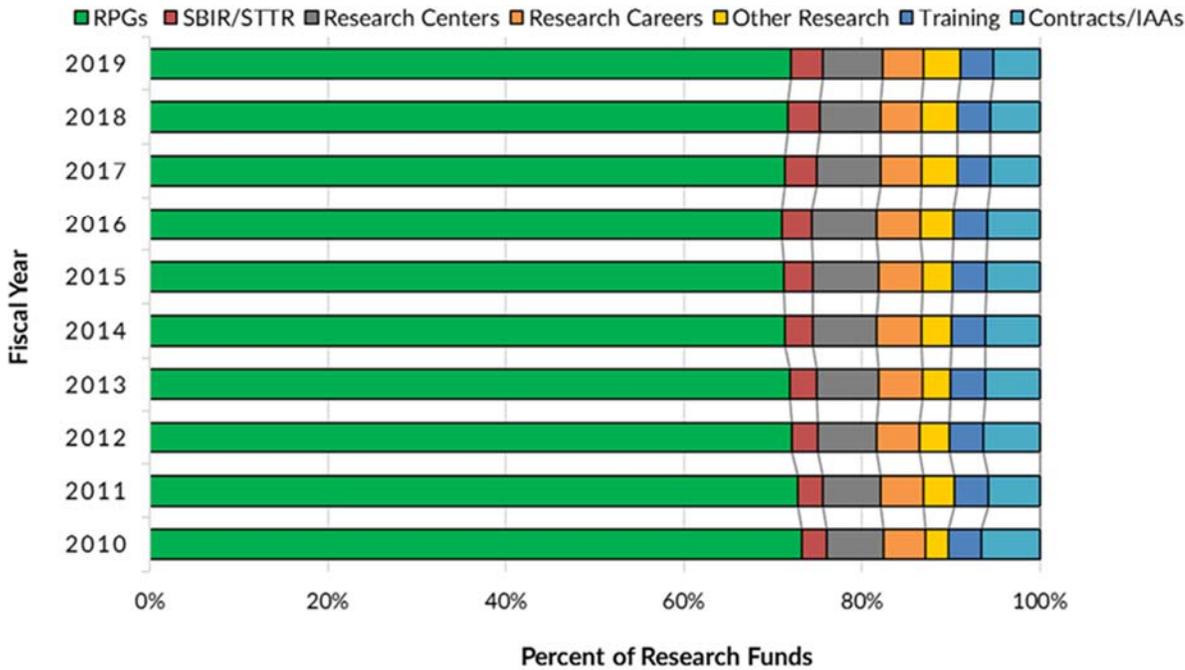


Figure 8 shows that relative funding levels of most NIDDK extramural research funding mechanisms have remained fairly stable since FY 2010. The majority of the NIDDK’s extramural research funding awards are Research Project Grants (RPGs), of which the largest portion goes to investigator-initiated research awards, particularly R01 grants.

NIDDK portfolio funding mechanisms:

- **RPGs:** Includes investigator-initiated awards, large clinical trials, collaborative and other research project grants (i.e. R01, U01, P01, R37, R21, DP1, DP2, R00, R03, R15, R33, R34, R56, RC4, RL1, U19, U34, UG3, UH2, UH3, and UM1) which is consistently over 70% of NIDDK’s research funding.
- **SBIR/STTR:** Includes Small Business Technology Transfer and Innovation Research Grants Phases I and II (i.e. R41, R42, R43, R44, SB1).
- **Research Centers:** Includes all specialized/comprehensive, and comparative medicine centers (i.e. P20, P30, P50, P60, U42, and U54).
- **Research Careers:** Includes all Ks (including K99) research career and development awards.
- **Other Research:** Includes all other research-related grant awards not captured in the other categories (i.e. D43, R13, R18, R24, R25, S06, SC1, SC2, U13, U24, and U2C awards).
- **Training:** Includes all F and T pre/postdoctoral individual and institutional awards.
- **Contracts and Interagency Agreements (IAAs):** Includes research and development (R&D) contracts and collaborative IAAs.

Figure 8A: NIDDK Research Project Grants Funded in FYs 2010-2019 (Competing and Non-Competing), by Activity Code

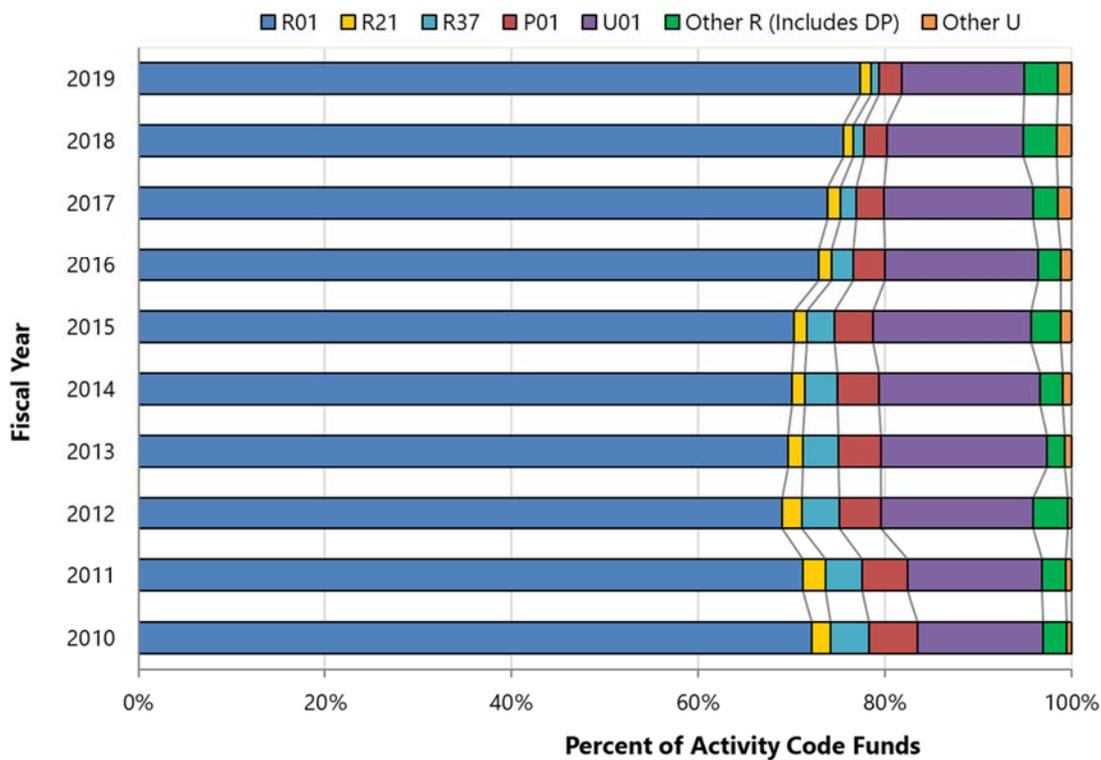


Figure 8A shows the NIDDK Research Project Grants (RPGs) category from the previous figure, broken down by activity code. The figure illustrates that the relative funding levels of most of these subcategories of awards have remained fairly stable since FY 2010.

NIDDK Research Project Grant Activity Codes:

- **R01** – The most common type of Research Project Grant funded by the NIH
- **R21** – Exploratory/Developmental Research Grant
- **R37** – Method to Extend Research in Time (MERIT) Grant
- **P01** – Research Program Project Grant
- **U01** – Research Project Cooperative Agreement
- **Other R in RPGs** – Includes R00, R03, R15, R34, R56, RC2, and DP grants
- **Other U in RPGs** – Includes U34, UG3, UH3, and UM1 grants

Figure 9: Maintaining a Stable Pool of NIDDK Investigators—Number of Investigators Supported by at Least One R01 or R37 in FYs 2010-2019

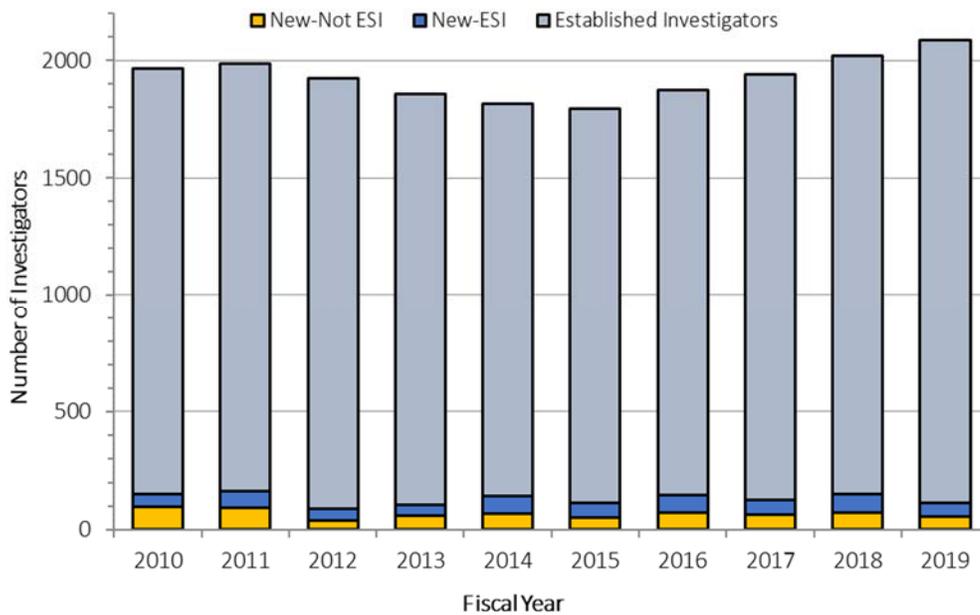


Figure 9 shows that the number of principal investigators (PIs) supported by at least one NIDDK R01 or R37 award, identifying established PIs who have previously been awarded NIH R01 awards and new PIs who have their first NIDDK R01 award. These new PIs are identified as either [Early Stage Investigators](#) (New-ESI) or new investigators who do not qualify as ESIs (New-Not ESI). Over the last ten years, NIDDK has supported on average approximately 1800 established PIs, about 65 ESIs, and about 65 non-ESI, new investigators each year. The NIDDK supported just under 2,000 R01 or R37-funded PIs in FYs 2010 and 2011, but number of PIs supported declined modestly to approximately 1,800 total PIs in FYs 2014 and 2015. The number of PIs funded by R01/ R37 has increased steadily since and just exceeded 2,000 PIs in FYs 2018 and 2019.

Figure 10: Maintaining a Stable Pool of NIDDK Investigators—Number of Investigators Supported by at Least One R01/R37 and Growth of Multiple PI (MPI) Awards in FYs 2010-2019

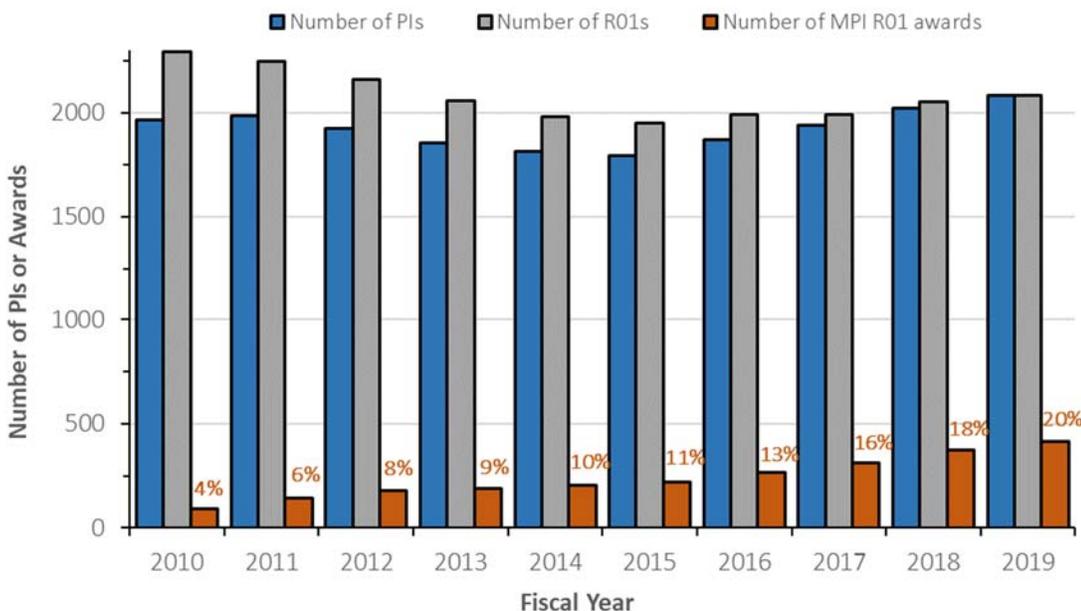


Figure 10 shows that despite a decline in number of R01/R37 awards in the last decade (grey bars), the number of PIs supported by NIDDK (blue bars) has held relatively steady, due in part to the rising number of Multiple Principal Investigator (MPI) awards. In FYs 2010 and 2011, the NIDDK supported more R01/R37 awards than PIs, because virtually all awards were single PI and some PIs had more than one award. MPI awards have risen from being only four percent of the R01/R37 portfolio in FY 2010 to twenty percent in FY 2019 (orange bars). Since FY 2015, both the number of R01/R37 awards and number of PIs have increased. Because the number of PIs increased more rapidly than have the number of R01/R37 awards over the last 5 years, by FY2019 the NIDDK supported an essentially equal number of R01/R37 awards and PIs (2085 unique PIs and 2083 R01/R37 awards).

Figure 11: Preserving a Stable Pool of New Investigators—Number of NIDDK ESI R01 Applications and Number of Unique ESIs Applying and Awarded in FYs 2010-2019

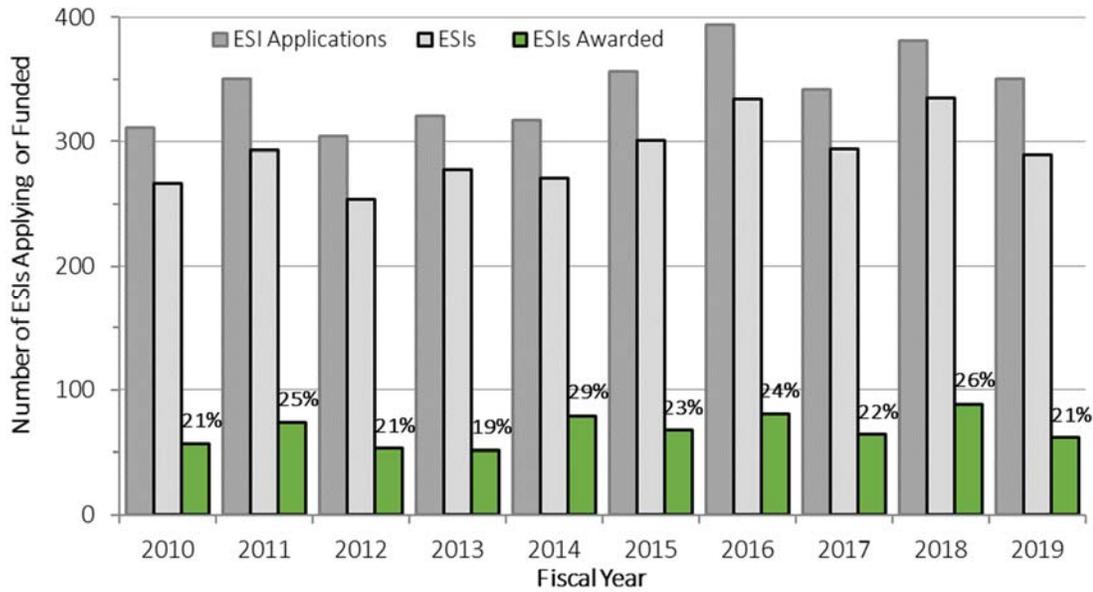


Figure 11 shows the NIDDK ESI trends. Both the number of ESI R01 applications received and the number of ESIs applying to NIDDK have increased in the last ten years. The numbers of ESI applications are higher than the numbers of unique ESIs applying, because some ESIs submit multiple R01 applications in a given FY. Although there is moderate fluctuation from year to year in the numbers of ESI applications and awards, the differential payline is contributing to a healthy success rate for these applications. Success rate is shown in Figure 11 above the bar indicating the number of ESIs awarded and is calculated as the percentage of unique ESIs that applied to the NIDDK that were funded.

Figure 12: Preserving a Stable Pool of New Investigators—Percent of NIDDK New Competing R01 Applications Submitted and Awards Received by ESIs in FYs 2010-2019

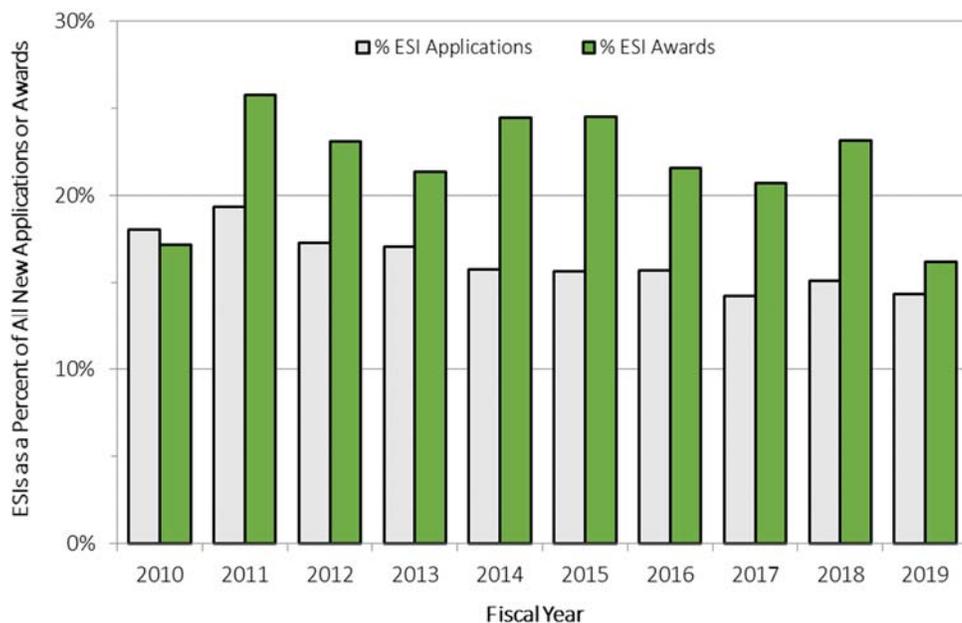
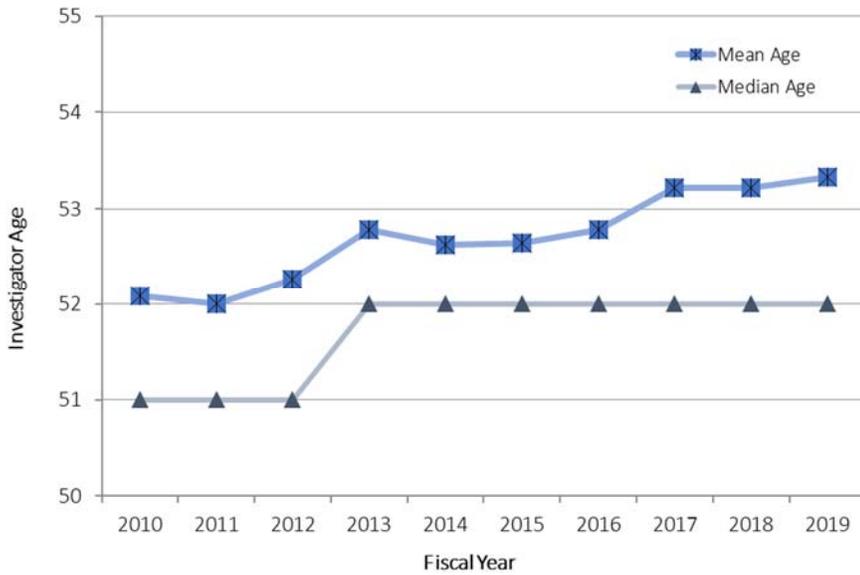


Figure 12 shows the impact of NIDDK’s differential payline for ESIs from FYs 2012-2019 (see Table 1 accompanying Figure 2 and the NIDDK New and Early Stage Investigators page at <https://www.niddk.nih.gov/research-funding/process/apply/new-early-stage-investigators>). Throughout the past decade, the number of ESI applications has held relatively steady at about 340 ESI applications received each year (Figure 11), while the number of competing R01 application from non-ESI investigators has steadily increased. As a result of this imbalance, ESI applications as a percentage of all applications received has been gradually decreasing, from about 18 percent in FY 2010 through 2012 to about 14% in FY 2017 through 2019 (grey bars). Starting in FY 2011, despite the shrinking proportion of ESI applications among NIDDK R01 competing applications, ESI awards comprise about 22 percentage of all NIDDK competing R01 awards. In FY 2019, NIDDK received 30 fewer ESI applications than in FY 2018, and fewer scored meritoriously, resulting in ESI awards dropping to be only 16 percent of all competing R01 awards. While the drop in the percentage of ESI awards in FY 2019 was unexpected, NIDDK is monitoring the trend and expects that this is a single year anomaly and not a trend.

Figure 13: Median and Mean Ages of NIDDK R01 and R37 Investigators in FYs 2010-2019



Over the past 10 years, the median ages of investigators holding R01 or R37 awards (competing and noncompeting) increased by 1 year, and mean age of these investigators has increased by 1.2 years. Mean age was approximately 52.1 years from FY 2010 through FY 2012, then rose to approximately 52.7 years from FY 2013 through FY 2016. In FY 2017 through FY 2019, mean age increased to approximately 53.2 years, continuing the overall upward trend over time. Median age increased from 51 to 52 in FY 2013 and has remained constant since. The increased support of ESIs since FY 2013 may have contributed to stabilization of median investigator age since FY 2013, as the unchanging median age indicates that the number of people over 52 years old are leaving the workforce at around the same rate as people under age 52 are entering the workforce.

Figure 14: Support Pivotal Clinical Studies and Trials—NIDDK Human Subjects (HS+) Research Funding as a Proportion of All Extramural Research Funding in FYs 2010-2019

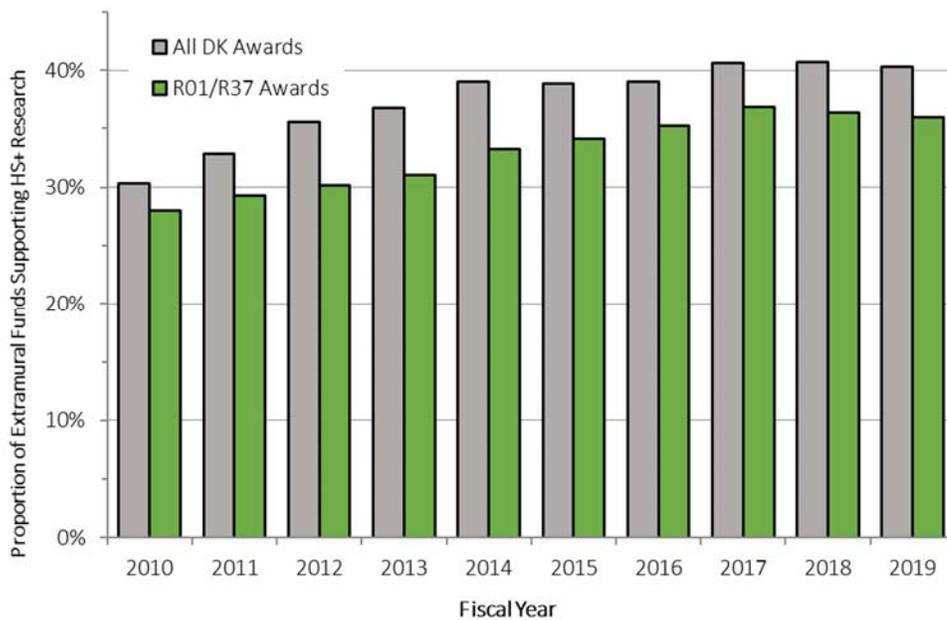


Figure 14 demonstrates that the NIDDK continues to commit a substantial proportion of its research funding to the support of clinical research involving human subjects (HS+). The percentage of NIDDK extramural budget supporting human subjects research for all NIDDK extramural research awards rose from about 30 percent from FY 2010 to about 40 percent in FY 2014, and has remained at about 40% through 2019. The percentage of the NIDDK extramural budget supporting human subjects research for NIDDK R01 and R37 awards climbed from just under 30 percent in FY 2010 to about 35 percent in FY 2016 and has remained at about 36 percent through FY 2019. For the purpose of this analysis, we used the definition described in Kotchen *et al.* (*JAMA* 291:836-843, [doi:10.1001/jama.291.7.836](https://doi.org/10.1001/jama.291.7.836), 2004) and included all studies coded as HS+. The proportion of NIDDK funding to HS+ research appears to be holding steady.

Figures 15A to 15E: The NIDDK Is Committed to Training the Next Generation of Scientists

Figures 15A to 15E demonstrate that the NIDDK’s commitment to training and developing the careers of the next generation of scientists remains strong.

Figure 15A: NIDDK Fellowship (F), Career Development (K), and Training (T) Awards as a Percent of Total Extramural Research Funding in FYs 2010-2019

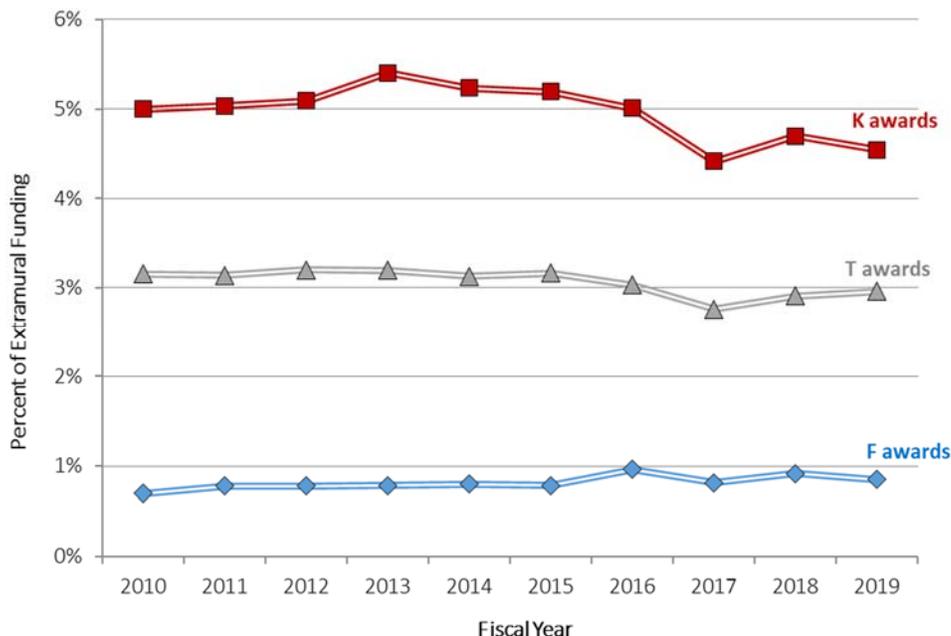


Figure 15A shows that overall support of training and career development programs has remained fairly stable in the past decade. Funding for K awards remained at about \$72 million a year in FYs 2010–2017, with an increase to about \$74 million in FYs 2018 and 2019. K awards comprise about 5 percent of the NIDDK overall extramural research budget, T awards about 3 percent, and F awards just under 1 percent.

Figure 15B: Numbers of NIDDK Fellowship (F), Career Development (K), and Training (T) Awards by Fiscal Year in FYs 2010-2019

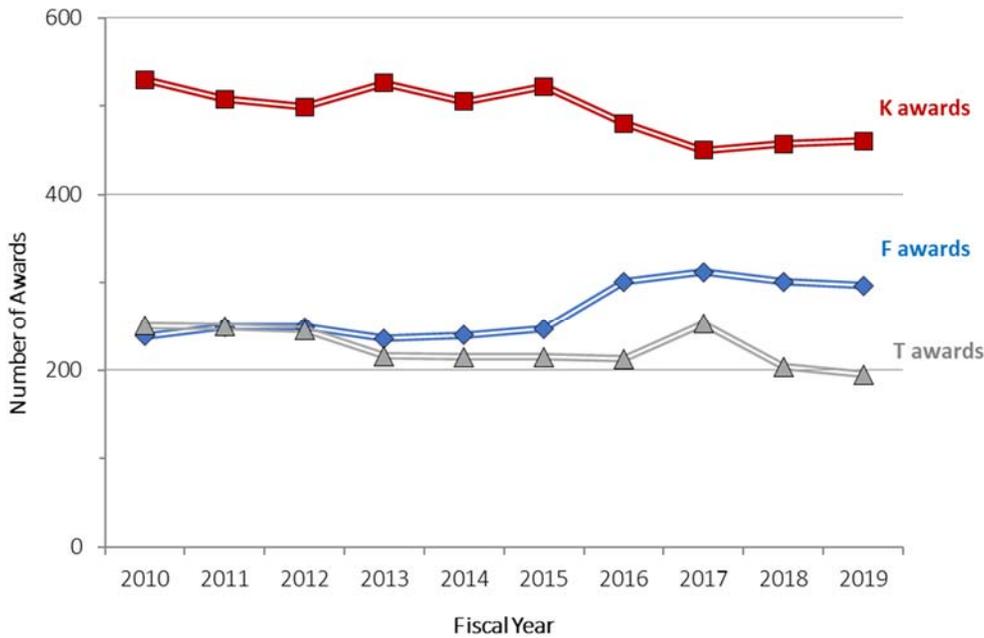


Figure 15B shows the number of K, F, and T awards supported by the NIDDK. The number of NIDDK F awards has increased since FY 2010, rising from approximately 240 in FYs 2010-2015 to approximately 300 from FYs 2016-2019. The number of K awards has decreased in the last decade, dropping from about 530 awards in FYs 2010-2015 to approximately 460 awards in FYs 2016-2019. Trends in specific K mechanism awards that contributed to this effect are shown in detail in Figure 15C. The number of T awards has held relatively constant over the last 10 years at about 200.

Figure 15C: Numbers of NIDDK Career Development (K) Awards by Activity and Fiscal Year in FYs 2010-2019

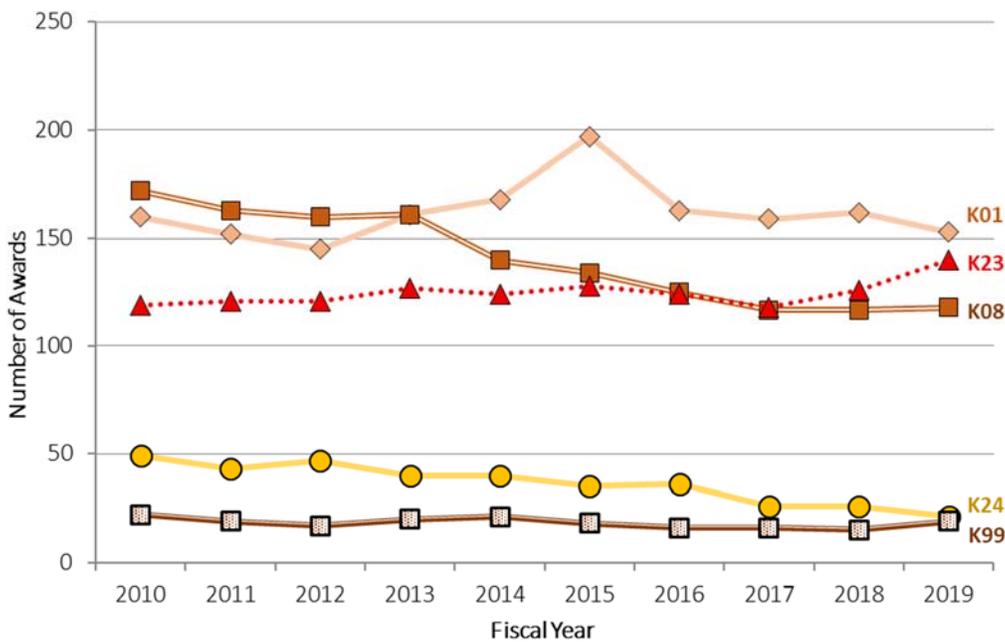


Figure 15C shows that the decrease in numbers of K awards in the last 4 years (Figure 15B) is due primarily to a decrease in numbers of K08 (Mentored Clinical Scientist Development Awards) and K24 (Midcareer Investigator Awards in

Patient-Oriented Research). The numbers of other K mechanism awards have shown no such overall trend. FY 2017 was the last year that the NIDDK accepted K24 applications, and no new K24 awards were made after FY 2018.

Figure 15D: Numbers of NIDDK Career Development (K) Applications by Activity and Fiscal Year in FYs 2010-2019

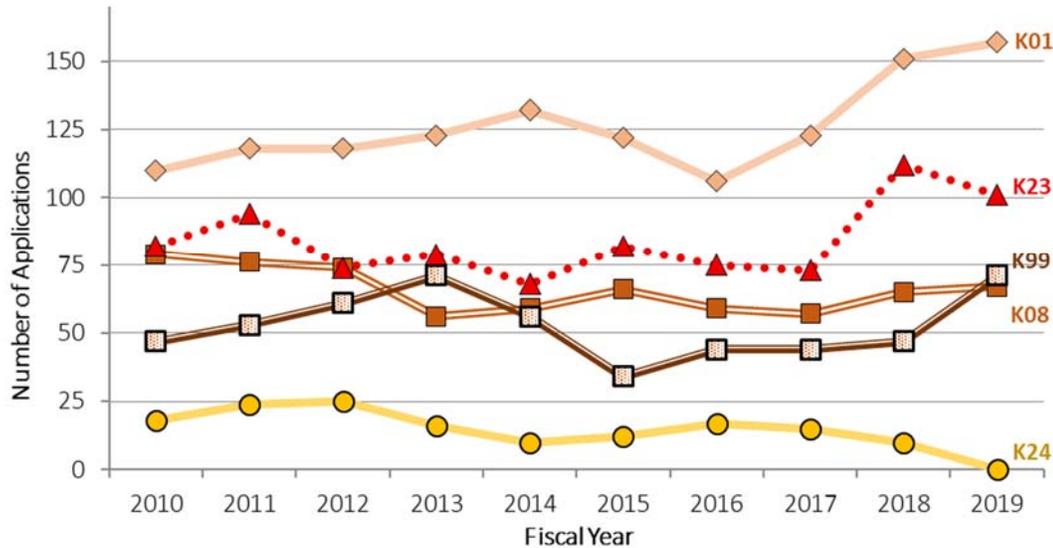


Figure 15D shows that K application numbers have fluctuated over time, with substantial increases in K01, and K99 applications in FY 2019. K01 and K23 applications remained high in both FY 2018 and FY 2019, and K99 applications showed an increase in FY 2019 to a number not seen since FY 2013. The number of K08 applications, which had declined from FY 2012 to FY 2013, has since stabilized to approximately 61 per year. FY 2017 was the last year that the NIDDK accepted K24 applications, which is why there were no K24 awards in FY 2019.

Figure 15E: Numbers of NIDDK Training (T32) Award Slots by Fiscal Year in FYs 2009-2018

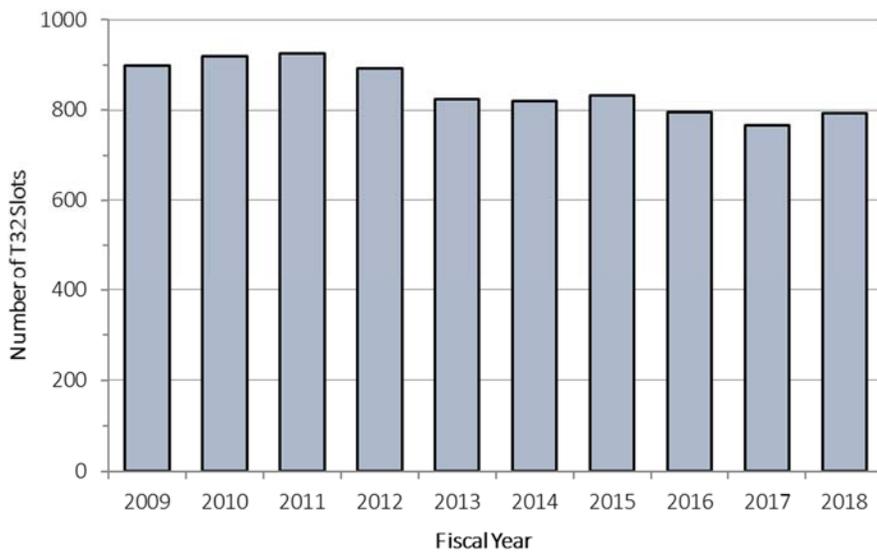


Figure 15E illustrates that the numbers of NIDDK T awards and associated training slots/positions have decreased slightly in the last decade. Between FYs 2009–2012, the NIDDK supported about 900 T32 training slots, which dropped to about

800 slots in FYs 2013-2018. The NIDDK will continue to monitor carefully its training and career development programs to identify factors behind trends and to ensure appropriate balance.

Note: *T32 awards made in FY 2019 continue into FY 2020. The total number of T32 slots is reported at the end of the award period. Therefore, the FY 2019 information on T32 slots will not be available until later in FY 2020. Thus, unlike the other charts in this section, FY 2019 data are not included here.*