Surgery investigators funded through the National Institutes of Health: A rebirth

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Background. *Funding toward surgical research through the National Institutes of Health has decreased relative to other medical specialties. This study was initiated to characterize features of academically successful surgeon-scientists and departments of surgery. We hypothesized that there may be decreases in young investigators obtaining independent National Institutes of Health awards and that successful academic departments of surgery may be depending increasingly on PhD faculty.*

Methods. *The National Institutes of Health RePORTER database was queried for grants awarded to departments of surgery during fiscal years 2003 and 2013. Grant summaries were categorized by research methodology. Training of the principal investigator and academic position were determined through the RePORTER database and publicly available academic biographies. Institutions were ranked by number of grants funded.*

Results. *Between 2003 and 2013, total surgery grants awarded decreased by 19%. The number of National Institutes of Health-funded, clinically active surgeons (MDs) decreased 11%, while funded PhDs increased 9%; however, clinically active junior faculty have comprised an increasing proportion of funded MDs (from 20–38%). Shifts in research topics include an increasing proportion of investigators engaged in outcomes research. Among institutions ranking in the top 20 for surgical research in both 2003 and 2013 (N = 15), the ratio of MDs to PhDs was 2:1 in both fiscal years. Among institutions falling out of the top 20, this ratio was less than 1:1.*

Conclusion. *There has been an expansion of outcomes-based surgical research. The most consistently successful institutions are those that actively cultivate MD researchers. Encouragingly, the number of young, independently funded surgeon-scientists in America appears to be increasing. (Surgery 2016;■:■-■.)*

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Research by clinically active surgeons has led to some of the greatest advances in medical science, including transplantation,[1] cancer therapy,[2,3] coronary and cardiac physiology,[4] and countless others. Moreover, research and innovation are tied closely to professional achievement at academic centers. At the individual level, the ability to obtain funding and complete groundbreaking projects is often considered for recruitment and promotion.[5,6] At the institutional level, laying the foundation for innovation garners multi-institutional collaboration and provides competitive advantages in the clinical market share.[7] For departments of surgery within the United States, the most broadly recognized measure of academic achievement is consistent funding support through the National Institutes of Health (NIH).[8]

During the past decade, the adjusted NIH budget has decreased to its lowest point in 13 years.[9,10] Surgeon-scientists who have had traditionally a lesser volume of NIH award applications and lesser success rate of their applications have been especially affected.[11-13] A part of this trend may be attributable to increasing clinical and administrative responsibilities in an era of resident work-hour restrictions and stringent outcomes reporting.[14] Consequently, many institutions are turning to dedicated PhD personnel to contribute to research endeavors.[15]

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Nevertheless, there remain many incentives that support the cultivation of a consistent physician-scientist workforce. The share of US medical research support attributable from industry is increasing. These industry funders are gradually shifting away from basic science research toward late-phase clinical trials.[16] In the public sector, the NIH is an especially efficient springboard for clinical inventions. Products developed through the NIH have a high rate of attaining orphan drug status and priority review by the Food and Drug Administration.[17]

There remains, however, a constant need to refocus the NIH toward clinically relevant pursuits—a need filled most appropriately by practicing physicians. Thus far, no study has stratified national research contributions within surgery across clinical MDs, nonclinical MDs, and PhDs. In light of this, the purpose of this study was to characterize NIH-funded researchers within departments of surgery across the United States.

By comparing the recipients of NIH funding in the years 2003 and 2013, we sought to provide insight into factors that contribute to a consistently successful academic surgery department. We hypothesized that the number of junior faculty—assistant and associate professors—obtaining independent NIH awards have decreased and that successful academic departments of surgery are depending increasingly on PhD faculty.

METHODS

Using previously reported methods of data collection,[18] the NIH RePORTER database (Research Portfolio Online Reporting Tool [http://report.nih.gov]) was queried for all active research project grants within the United States and territories during the fiscal years of 2003 and 2013. The "Department" search field was used to identify grants allocated to departments of surgery. Because the project focused on faculty research, F and T awards were excluded, because these represent resident and student training grants.

As the purview of surgery departments varies across institutions, only grants allocated to core surgical disciplines were retained; thus, we excluded grants awarded to divisions of neurosurgery, orthopedics, otolaryngology, ophthalmology, urology, and gynecology. Grants were included regardless of the advanced degree of the principal investigator (MD, PhD, etc). The exported data included summary descriptions of research, total costs, and investigator information. For each grant, only the principal investigator was recorded in our data set. Total costs of grants were adjusted to 2013 equivalent dollars using an inflation adjustment factor of 1.27.[19]

The protocol used to categorize NIH grants by methodology has been reported previously.[18] Briefly, research summary descriptions for all grants were reviewed by 1 of 2 study investigators (Y. H., B. E.). Each investigator reviewed grants from both data sets (2003 and 2013). Based on these descriptions, the primary methodology for each grant was classified into 1 of 6 categories: basic science, translational, clinical trial, outcomes, operative technique, and other. Projects that incorporated several methodologies were classified as translational. A total of 150 grants were reviewed by both reviewers to assess inter-rater agreement (0.85); all disagreements originated from the differentiation between basic science and translational research.

The academic position and advanced degree (MD versus PhD) of the principal investigator for each NIH grant was extracted from the NIH RePORTER investigator description page. When these data were not immediately available, investigator curricula vitae or professional biographies were acquired through an online search, and the academic position of the investigator at the time of funding was recorded. Among MD researchers, those who did not have an active clinical practice were designated as nonclinical MD researchers. Faculty with both MD and PhD degrees were classified as clinically active MDs if they were practicing clinicians or as PhDs if they held a research position only.

Departments of surgery were ranked by total number of active NIH grants in 2003 and in 2013. Proportional composition of MDs and PhDs was compared among the top 20 surgery departments and all remaining surgery departments using the χ^2 test. Due to overlap in principal investigators between 2003 and 2013, tests of statistical significance between these 2 data sets were not performed.

RESULTS

We identified 1,125 grants (613 from 2003 and 512 from 2013) that met inclusion criteria. Inflation-adjusted NIH funding to surgical research decreased by 19.1% from $270.4 million in 2003 to $218.7 million in 2013. Details regarding trends in funding across methodologic and specialty subgroups have been reported previously.[18] In 2013, the majority of active surgery grants were funded through the National Cancer