the reviewers); and (4) build collaborations with potential coinvestigators before writing the grant application. Time is of the essence for success, but surgeons with a strong desire to further the field of academic surgery should not have to sacrifice weekends or vacation time to do so.

Finally, it can be discouraging to be reminded that the majority of NIH-funded thoracic surgeons are at highly ranked academic institutions. Can you get NIH funding if you have a small division, little infrastructure, no mentorship, no research time, and no other advanced degree? Maybe, maybe, difficult, no, and apparently not (but consider a multiple-PI application with a PhD colleague). So don't knock the other funding avenues. Our societal organizations have robust and abundant funding

opportunities, and industry-sponsored research remains valuable despite conflict of interest challenges. But this is not a solo sport: strategize, collaborate, and we are all winners.

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See Article page 872.

Commentary: The National Institutes of Health and why we care

Paul Kurlansky, MD

With its 27 institutes and \$42 billion budget, the National Institutes of Health (NIH) is the largest source of funding of medical research in the world. NIH grants, with their high indirect institutional rewards, are the most prestigious awards in the academic community. Despite the large amounts of funding, competition is intense, with recent success rates consistently <20% (Figure 1, A).¹

Therefore, the analysis by Narahari and colleagues² of NIH funding for thoracic surgeons is encouraging. In the face of increasing competition, as well as the clinical and financial pressures of many departments for clinical productivity, the authors hypothesized that the NIH funding of thoracic surgeons would decline. After a remarkably

De novo research grant applications and awards that the National Institutes of Health received and issued since 1995.

CENTRAL MESSAGE

Despite limited physician participation, it is the educational enterprise that guarantees the vitality and progress of the profession.

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Disclosures: The author reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Received for publication Feb 5, 2021; revisions received Feb 5, 2021; accepted for publication Feb 5, 2021; available ahead of print Feb 16, 2021.

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J Thorac Cardiovasc Surg 2022;163:882-4
0022-5223/\$36.00

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<http://dx.doi.org/10.1016/j.jtcvs.2021.02.026>

painstaking compilation of funding history for 395 thoracic surgeons in the top 140 NIH-funded institutions, they discovered that NIH funding had actually progressively increased, with 63 surgeons receiving 136 grants totaling \$228 million and resulting in 1772 publications generating more than 50,000 citations. We do not know the success rate for these surgeons during this period of increasing competition. However, the increase in thoracic surgical funding appears to exceed the general increase in NIH funding (Figure 1, A). The renewal rate of R01 grants (17%) was lower than the success rate for grant renewal nationally

FIGURE 1. A, The figure shows the numbers of Type 1 (de novo) research program grant applications and awards that the NIH received and issued since 1995. B, The figure shows the numbers of Type 2 (competing renewal) research program grant applications and awards that the NIH received and issued since 1995.

(Figure 1, B); however, we do not know whether this represents rejections or a lack of applications. Although it may be reassuring to know that the pathway to success in NIH funding is open to thoracic surgeons, the

larger question is, why should we care? Even in those top 140 institutions, only 63 of the 395 thoracic surgeons (16%) were NIH-funded. Leaving the world of academia, that percentage is likely to approach zero. The vast bulk

of thoracic surgery is performed by surgeons with no NIH involvement. So why might this topic even be of interest to the vast majority of thoracic surgeons?

Permit me to share a personal experience. After training at a large academic medical center, I joined a cardiac surgical group that was performing bilateral internal mammary artery (BIMA) grafting as the preferred operation for coronary artery bypass surgery during the 1980s and 1990s, when much of the country was trying to come to terms with the use of a single IMA graft. Although a retrospective, careful analysis of long-term follow-up suggested a survival advantage³—a finding corroborated by multiple other retrospective studies,⁴ in examining the many reasons why <5% of coronary artery bypass grafting (CABG) recipients undergo BIMA grafting, one factor that clearly emerged was a failure of education. Our practice was composed of good surgeons who developed an excellent operation that helped many people—no regrets. But, as busy private practitioners, we trained no residents, provided no courses, and

offered no fellowships. The subtleties of patient selection and surgical technique that had been developed over decades disappeared with the end of the practice. The point? It is the educational enterprise that gives our profession its longevity/continuity, and it is the dedicated researchers who keep the profession fresh, innovative, and interesting for all of us, and for our patients.

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See Article page 872.

Commentary: National Institutes of Health–funded cardiothoracic surgeon-scientists: A scar is forming in the wound

John S. Ikonomidis, MD, PhD

There are numerous reports in the literature documenting the decline in number of surgeon-scientists in recent years. As outlined in recent editorials,^{1,2} there are numerous

John S. Ikonomidis, MD, PhD

CENTRAL MESSAGE

Thoracic surgeons have documented success in obtaining National Institutes of Health funding, but the future for cardiothoracic surgeon-scientists remains concerning.

reasons for this decrease. First, increasingly high clinical and administrative demands have become associated with clinical practice. Second, the environment of extramural funding is increasing in difficulty, with competition for grant funding having markedly increased in both the United States and Europe over time.

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Disclosures: The author reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Supported by National Heart, Lung, and Blood Institute Grants 2R01HL102121 and 1R2HL148363.

Received for publication Feb 5, 2021; revisions received Feb 5, 2021; accepted for publication Feb 5, 2021; available ahead of print Feb 16, 2021.

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J Thorac Cardiovasc Surg 2022;163:884-5

0022-5223/\$36.00

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<http://dx.doi.org/10.1016/j.jtcvs.2021.02.025>