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Commentary: Research success in an ever-challenging environment

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CENTRAL MESSAGE

Cardiac surgeons continue to generate influential and high-quality research despite increasing clinical workloads.

Surgeons are uniquely poised to provide a synergism with basic science research. Having access to patients, patient information, and tissue specimens affords a direct connection between true disease pathology and subsequent lab experimentation. However, this may be tempered by the substantial amount of time surgeons must spend perfecting and maintaining their art, leaving less time for the pursuit of research and grant applications. Narahari and colleagues¹ report on the past 30 years of National Institutes of Health Research Project Grant Program funding for cardiac transplantation, with particular attention to the recipients of the grants as well as productivity compared with the cost of each grant. The authors are to be commended for this tedious and important work. Their primary findings include greater funding results in more citations, there are similar numbers of publications per \$1 million in grant funding between those with a doctorate in medicine (ie, MDs) and non-MDs as well as between surgeons and internists, and surgery departments receive the most grants for cardiac transplantation research.

Today's research environment continues to be competitive with a publish or perish mantra, sometimes to the detriment of scientific rigor.² However, basic science research is dependent on funding. To secure it, researchers must prove themselves a good investment by publishing influential work, typically measured by publication in

high-influence-factor journals as well as number of citations—which are interrelated. Although a manuscript may be inherently influential, a significant amount of data and experimentation is required to publish in higher-influence journals, which requires funding. The authors emphasize this point, demonstrating that more grant funding correlates with increased citations.

The authors also found that despite similar amounts of funding and number of publications, internists had a higher grant metric than surgeons. This illustrates another measure of success, the audience of your work. One might expect that 2 groups with similar funding and publication history should generally have the same influence from their work, yet this is not the case. This is due to differences in the audience of the works. For example, the pool of active cardiac surgeons is several-fold smaller when compared with cardiovascular physicians.^{3,4} This difference in readership should be accounted for when evaluating influence. Although research may have equal merit, the potential audience can affect citations. Most importantly, surgeons may want to publish their findings in surgery-focused journals that have lower influence factors and may not necessarily generate the most citations. However, those journals may actually be the most influential venue to disseminate their findings to their targeted audience.

Despite this, surgeon funding and productivity have been increasing over time, suggesting that surgeons are responding to the changing academic landscape and doing so successfully. Surgeons must continue to compete in the academic research arena because they provide unique insights

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Disclosures: The authors 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 July 1, 2020; revisions received July 1, 2020; accepted for publication July 2, 2020; available ahead of print July 13, 2020.

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J Thorac Cardiovasc Surg 2021;162:1766-7

0022-5223/\$36.00

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<https://doi.org/10.1016/j.jtcvs.2020.07.022>

and skill sets not found elsewhere. For surgeons wishing to pursue this, success is not only attainable, as these authors show, but for areas intimately tied with surgery, surgeons lead the way forward for research.

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Commentary: The return on investment for cardiothoracic surgeon-scientists

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Health research informs decision making and promotes health, economic, and social prosperity. The US National Institutes of Health provides approximately \$40 billion for health research each year, the most massive public funding envelope on the planet. Agencies who directly fund health research are challenged to develop and apply appropriate methods and quality metrics to evaluate the impact of their investments. Surprisingly, there is no single best tool or indicator to measure the return on investment (ROI) for health research.

Biomedical research has resulted in unprecedented advances in cardiovascular health outcomes in the last 50 years. Without question, cardiothoracic surgeons have played an important role. Above and beyond sewing polypropylene circles, what is the ROI of a cardiac surgeon who performs research? Can a surgeon be both a

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CENTRAL MESSAGE

The impact of health research achieved by cardiothoracic surgeon-scientists is worth continued investment and increased advocacy.

productive scientist and a contributing clinician? Can surgeons make an equally substantive impact in the laboratory outside of the operating room? Should we invest in cardiac surgeons who lead a formal program of research? We need answers.

Francis Robicsek, a cardiac surgeon and innovator, once told me that surgeons should simply innovate within the operating room walls—we are “technicians.” In support of his wise perspectives, formal research methodology is sometimes not feasible for the unique problems that we face in surgery. Accordingly, the value proposition for surgical scientists remains hotly debated. An objectively measured ROI for the academic cardiothoracic surgeon remains elusive. The survival of academic cardiothoracic surgeons is threatened by external forces that conspire to keep them excessively occupied in operating suites, where the ROI for a surgeon is well-defined and indisputable.

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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 July 19, 2020; revisions received July 19, 2020; accepted for publication July 21, 2020; available ahead of print July 24, 2020.

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J Thorac Cardiovasc Surg 2021;162:1767-8

0022-5223/\$36.00

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<https://doi.org/10.1016/j.jtcvs.2020.07.064>