The ACADEMY for Radiology & Biomedical Imaging Research

Advancing Innovation in Imaging Science

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Written Statement

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Subcommittee on Labor, Health and Human Services,
Education and Related Agencies,
Senate Appropriations Committee
In Support of FY2021 Appropriations for the National Institutes of Health

Mr. Chairman and Members of the Subcommittee, my name is Dr. Mitchell Schnall, and I am privileged to serve as President of the Academy for Radiology & Biomedical Imaging Research ("the Academy"). I am testifying today to thank you for your dedicated support of medical imaging, and to request your support for raising the funding for the National Institutes of Health (NIH) to no less than $44.7 billion and increasing the funding for the National Institute of Biomedical Imaging and Bioengineering (NIBIB) to no less than $428.6 million.

In my "day job" I am Eugene P. Pendergrass Professor and Chair of the Department of Radiology at the Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA. I am also a member of the American Society of Clinical Investigation and the Association of American Physicians. Throughout my career, I have worked on the interface between basic imaging science and clinical medicine. My work has led to fundamental changes in imaging approaches to breast and prostate cancer, as well to emerging technologies such as optical imaging.

On behalf of the Academy, I would like to begin by thanking you for your generous support for the NIH in the FY20 LHHS appropriations bill. The increase in funding of $2.6 billion is critical to the important work of improving our biomedical research infrastructure while also ensuring that the United States remains the leader in medical innovation and technology.

As this subcommittee knows well, funding for NIH is spread throughout the country. Approximately 83 percent of the amount appropriated for NIH budget is used for peer-reviewed extramural grants to researchers at universities, hospitals, and institutes in all 50 states. Approximately ten percent funds very high-end research and patient care on the NIH campus. Only about seven percent of funding is used for administrative purposes, maximizing the return on the investment.

Nowhere is the return on investment and impact on healthcare diagnosis and treatment more significant than in the growing field of biomedical imaging and bioengineering.

Our requests of this Subcommittee are critically important to the physical and economic health of the nation, and I would like to state them clearly here:

- **Please fund the NIH at no less than $44.7 billion for FY21.**
- **Please fund NIBIB at no less than $428.6 million for FY21.**

Mr. Chairman, medical imaging plays a unique and substantial role in health care, both as an instrumental part of the medical care delivery system and as a catalyst for innovation and technological advancement in service of patient care. Imaging performs increasingly central and irreplaceable roles in early disease detection, diagnosis, treatment planning and monitoring. Precise and personalized care and treatment plans are often developed based on decisions made through imaging analysis and review. The Subcommittee's investment in NIH broadly, and in NIBIB in particular, helps make this possible.

NIBIB's imaging and bioengineering research and development create the vital methodology and tools utilized in so many areas of biomedical research by other institutes, and more generally in America's health care delivery system. Imaging and bioengineering research is a significant component of the work of many institutes of the NIH, representing 13% of all NIH research, while having a budget that is less than 1% of the total NIH budget. It is important to note that NIBIB research itself has led to an impressive number of approved patents. In a study covering the 14-year period from 2000 to 2013, *Battelle et al. found that for every $100 million of research funding, NIBIB generated 25 patents and more than $575 million in resulting economic activity and growth.

For nearly every patient – nearly every constituent – who receives a cancer diagnosis, suffers a head injury, or experiences any of thousands of other medical issues, or who cares for family members experiencing such difficulties, the health benefits of imaging and bioengineering research are profoundly felt. Few medical conditions do not already benefit from any of the wide range of clinical imaging modalities, from x-rays to MRI, CT, PET, fluoroscopy, angiography, and ultrasound. Furthermore, scientific discoveries and technological innovations are rapidly expanding the power of biomedical imaging and bioengineering to improve medical care.

In the area of cancer, for example, emerging techniques for molecular imaging will play a key role in realizing the dream of molecularly-targeted treatment. Unlike biopsies, they can give a non-invasive picture of the biological heterogeneity of cancer within and across all tumors in a patient. Progress is accelerating rapidly in the use of computer tools, including artificial

*Report available at: https://www.acadrad.org/battelle-report/

intelligence (AI) and machine learning (ML). Such tools are utilized to analyze both anatomical and molecular images and identify mathematically defined features not perceptible to the human eye. These tools can predict the presence of cancer, its genetic profile, and how well it is likely to respond to specific treatments. The use of increasingly advanced imaging tools to guide medical interventions is allowing more precise, less invasive procedures, in some cases with immediate assessment of efficacy to enable necessary adjustments before a procedure is concluded. Exploratory surgery is now far less common due to these new advancements.

The Academy is involved in a broad effort to help maximize the efficiency with which medical imaging is applied in research and patient care. Since 2017, when the Interagency Working Group on Medical Imaging (IWGMI) within the White House Office of Science Technology Policy (OSTP) released its *Roadmap* report, the Academy has been working to advance the report's four key objectives for "high-value" imaging:

- Standardizing image acquisition and storage;
- Applying advanced computation and machine learning to medical imaging;
- Accelerating the development and translation of new, high-value imaging techniques; and
- Promoting best practices in medical imaging.

The Academy is working closely across academia, government, and industry to identify and pursue specific, effective steps to implement the building of the Diagnostic Cockpit (DxCP), as envisioned by IWGMI. The DxCP initiative will empower precision medicine by bringing together the latest diagnostic sensor technology with advanced AI-based computing to match patients to the best treatments. The Academy has convened leaders in biomedical imaging and bioengineering from academia, government, and industry to work collaboratively on this initiative toward the development of tools that will leverage advances in AI and ML to aggregate and synthesize medical data to improve patient care. The DxCP is a vision for today and for the future that will be made possible by a consistent and robust investment in biomedical imaging research. The sooner we invest, the sooner your constituents benefit.

Mr. Chairman, innovation is what keeps America healthy – both physically and economically – and the NIH is a major contributor to our strength. Since its creation, NIBIB has proven to have a significant impact by creating the imaging and bioengineering tools that improve the health care of Americans and contribute to our nation's economic vitality and global leadership.

Thank you again for the opportunity to present this testimony to you on behalf of the Academy for Radiology & Biomedical Imaging Research. The Academy welcomes the opportunity to work with the Congress to ensure that the American people benefit from their investment in research and have access to the best technology to address their imaging needs.

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