Written Testimony for the Record

Mitchell Schnall, M.D., Ph.D., President, Academy for Radiology & Biomedical Imaging Research
202-347-5872; Email: mheintz@acadrad.org
1101 Connecticut Avenue NW, Suite 601; Washington D.C. 20036

Subcommittee on Labor, Health and Human Services, Education and Related Agencies
Senate Appropriations Committee
In Support of FY2023 Appropriations for the National Institutes of Health

Chair Murray, Ranking Member Blunt, and members of the Subcommittee, I am Mitchell Schnall, President of the Academy for Radiology & Biomedical Imaging Research (Academy), and the Eugene P. Pendergrass Professor of Radiology and Chair of the Radiology Department at the Perelman School of Medicine at the University of Pennsylvania. The Academy is comprised of more than 200 academic research departments, patient advocacy groups, industry partners, and imaging societies, representing thousands of radiologists and researchers in all 50 states. We are the only advocacy organization representing the broad spectrum of the imaging research community by collectively advocating for robust and consistent federal research funding.[1] It is my pleasure to submit this testimony on behalf of the Academy. **We strongly support at least $49.048 billion for the National Institutes of Health's base appropriation**. This figure represents an increase of $3.5 billion over FY2022 plus the release of the 21st Century Cures funds. The Academy also supports a proportional increase to the National Institute of Biomedical Imaging and Bioengineering (NIBIB), resulting in at least $458.5 million for FY2023—a $33.6 million increase over the FY2022 enacted level. Further, should the Advanced Research Projects Agency for Health (ARPA-H) or pandemic preparedness efforts progress, funding should be designated separately from NIH's base and should supplement, not supplant, investment in basic research. While the Academy is supportive of ARPA-H and pandemic preparedness, and acknowledges they hold significant and exciting potential, investigator-initiated research is the foundation of basic science.

Moreover, Congress must work to ensure federal appropriations are enacted on time to avoid disruptive interruptions to the research continuum. We must avoid relying on continuing resolutions, which are insufficient to meet evolving needs. At the end of FY2021 and beginning of FY2022, we received many examples of research left unpursued because funding was not available because of reliance on continuing resolutions. Delaying otherwise meritorious research only serves to further extend the time until we make lifesaving discoveries that help patients fighting deadly and debilitating diseases. Through consistent, robust funding for NIH and our national research infrastructure, we can continue to make advancements that will improve the lives of patients. The Academy is extremely grateful for the Subcommittee's long-running support of NIH and encourages you to prioritize NIH for consistent and dependable funding levels for biomedical research, radiology, and imaging science.

Imaging Advancements and Innovations Help Patients

Imaging serves as a necessary diagnostic tool that researchers and clinicians of all types use to help advance our understanding of biology and to develop and deliver treatments. This is particularly evident in the research examples provided below and through discussions about

[1] https://www.acadrad.org/about-the-academy/

ARPA-H. A review of the past ARPA-H listening sessions and discussions with Congressional offices shows the value of improved imaging and diagnostics in support of a spectrum of biomedical research advances—resulting in direct benefits to patients. By improving our imaging tools and techniques, we broaden the resources available to address many challenging medical conditions. In my own work as a clinician-scientist, I use state-of-the-art technologies like specialized magnetic resonance imaging (MRI) and 3-dimensional mammography to improve the diagnosis and treatment of multiple cancer types, including breast, prostate, and pancreatic. Imaging research serves many purposes and can significantly improve patient outcomes.

Basic science advancements translate into a variety of clinical applications benefitting patients. Included below are examples of imaging applications to the Covid-19 pandemic, leveraging innovative, artificial intelligence technologies, and detecting and treating diverse types of cancer.

Detecting Covid-19 Quickly and Easily: From 0 to 1 billion+

Launched in April 2020 and led by the National Institute of Biomedical Imaging and Bioengineering, the Rapid Acceleration of Diagnostics (RADx)-Tech program has been instrumental in the nation's Covid-19 testing strategy and response.[2] This Congressionally supported program utilizes a competitive system to funnel the best ideas quickly toward implementation. In short, RADx-Tech accelerated the development and availability of Covid-19 tests. In September 2020, there were limited testing options, accounting for fewer than 700,000 Covid-19 tests per day for laboratory and point of care use. As of February 2022—less than 18 months later—there were 41 FDA-approved tests, including at-home, point of care, and laboratory options, resulting in over 1.8 billion tests produced cumulatively. That same month, over 5.6 million tests per day were manufactured – over 168 million in total for the month.[3] These tests contributed directly to our understanding of a devasting pandemic and put tools directly into patient's hands. When coupled with strong support from policymakers, the funneling pipeline used by NIBIB can accelerate extraordinary advancements.

Machine Learning Technology Improves Diagnostic Imaging and Patient Outcomes

Applying artificial intelligence and machine learning tools to the imaging space continues to improve our diagnostic capabilities. In my testimony last year, I highlighted the efforts of the Medical Imaging and Data Resource Center. MIDRC continues to apply artificial intelligence and machine learning technology for screening, detection, staging, and follow-up for Covid-19 patients. Throughout 2021 and into 2022, MIDRC collected over 85,000 images and is progressing toward an artificial intelligence algorithm for automating image analysis to diagnose patients and provide a disease prognosis more quickly and efficiently.

In further examples of AI/ML applications, the University of Washington is pursuing multiple strategies to improve mammography. A 7-year MERIT award from the National Cancer Institute has enabled building AI algorithms for breast cancer analysis, building off a crowdsourced challenge. UW also recently launched a five-year initiative funded by NIH to create an academia-industry collaboration to validate multiple, commercial AI algorithms for

[2] https://www.nibib.nih.gov/covid-19/radx-tech-program
[3] https://www.nibib.nih.gov/covid-19/radx-tech-program/radx-tech-dashboard

automated mammography screening interpretation. Like in the Covid-19 context, reliably automating the review and evaluation of screenings, especially as it adapts to new variables, could significantly improve the detection, treatment, and outcomes of breast cancer.

In a final example of AI-based applications, academic-industry partnerships are working to optimize imaging and diagnosis using AI-enabled Magnetic Resonance Imaging (MRI). This effort, which improves image quality and processes those images efficiently, is cutting exam times by over 30%. These advances are being disseminated broadly throughout the industry and are reshaping diagnostic capabilities and patient experience. Reducing the length of an examination accelerates the time to diagnosis and treatment, increases the efficiency of the imaging center to see more patients, and has a significant patient impact through reduced anxiety and increased satisfaction during a stressful time.

Better Images, Less Radiation, Faster Results

Finally, work conducted at the University of California-Irvine is improving a well-known and trusted tool, x-ray technology. The new imaging system, x-ray-induced acoustic computed tomography (XACT), is a promising alternative to traditional technology. Supported by an NIH grant, XACT can image the human body much faster while requiring a lower radiation dose for the patient. Moreover, a portable model is in development that can reach more patients, particularly in remote areas that may have difficulty accessing doctors' offices and care centers. XACT can be used for a wide range of image-guided procedures, such as biopsies, placement of drainage tubes, catheters, tumor ablation, and injections. The improved tool generates faster diagnosis and treatment, lowers radiation exposure, and reaches underserved communities, all leading to improved outcomes across a wide range of treatment or imaging interventions.

Summary and Conclusion

Sustained and robust NIH funding is crucial to advancing our efforts to understand and treat a myriad of diseases and disorders. NIH investments are also a key economic driver. In 2022, NIH funds generated $2.60 in economic activity for every $1 of research and flowed to every state in the nation.[4] Funding NIH's base program with at least $49.048 billion will provide the robust support needed to sustain growth and secure advancements in biomedical research.

Thank you for your strong, continued support of NIH, NIBIB, and all the Institutes and Centers working to advance our biomedical research efforts and to improve the lives of patients worldwide. On behalf of the Academy, I urge you to continue your strong support of our nation's research and innovation enterprise.

[4] https://unitedformedicalresearch.org/wp-content/uploads/2022/03/UMR_NIHs-Role-in-Sustaining-the-U.S.-Economy-FY21.pdf