INTRODUCTION AND MISSION

The mission of the National Institutes of Health (NIH) is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability. In pursuit of this mission, NIH conducts and supports biomedical research focused on fostering fundamental creative discoveries, innovative research strategies, and their applications towards improving human health.

As the Nation's premier biomedical research agency, NIH plays a critical role in advancing basic and clinical biomedical research to improve human health and pave the foundation for ensuring the Nation's economic well-being. NIH also works to develop, maintain, and renew scientific human and physical resources that will drive the Nation's capability to prevent disease and disability. The biomedical research enterprise depends upon not only NIH's support of cutting-edge science and technology but also its wise investment of tax dollars. Through careful stewardship of public resources in pursuit of its mission, NIH strives to enhance the lives of all Americans.

OVERVIEW OF BUDGET REQUEST

Introduction

For FY 2021, the National Institutes of Health (NIH) requests a total program level of $38.7 billion, which is $3.0 billion less than the FY 2020 Enacted level. This budget reflects the need for fiscal austerity, but will still fuel NIH's mission to seek fundamental knowledge about the nature and behavior of living systems and to apply that knowledge to enhance health, lengthen life, and reduce illness and disability. As a leader of the biomedical research enterprise, NIH will leverage public and private resources to tackle major health challenges and take advantage of emerging scientific opportunities to improve diagnosis, prevention, and treatment options for numerous diseases and disorders. Investing in new technology will push the boundaries of what is possible in imaging, device design, health monitoring, bioinformatics, and countless other areas. Today, thanks in large part to the rich evidence base of fundamental knowledge of living systems, technological advances, and the ability to integrate and translate vast amounts of information into innovative interventions, the possibilities for groundbreaking approaches to better human health never have been greater.

The request of $38.7 billion incorporates investments to address several national priorities, including combatting the opioid epidemic, eradicating HIV, supporting neonatal research, developing novel approaches to treating sickle cell disease, supporting the Childhood Cancer Data Initiative, increasing investments to develop a universal influenza vaccine, improving prevention and treatment of tick-borne diseases, continuing the precision medicine initiative, developing new approaches to address chronic disease with artificial intelligence, and establishing a consortium charged with innovating large-scale gene vector production.

The request proposes to move the highest priority activities of the Agency for Healthcare Research and Quality (AHRQ) into NIH as a new National Institute for Research on Safety and Quality (NIRSQ). The creation of NIRSQ, which was included in the Administration's June 2018 Government Reform Plan, would improve the coordination of research within the Department of Health and Human Services (HHS), with a continued emphasis on NIRSQ's integral role in support of the Secretary's priority to transfer the Nation's health care system to one that pays for value.

The Buildings & Facilities (B&F) account budget request is $300.0 million, a $100.0 million increase over the FY 2020 Enacted level, and part of NIH's long-term effort to stem the deterioration of its facilities. NIH's Backlog of Maintenance & Repair (BMAR) is approximately $2.1 billion. An independent review of the facility needs of NIH's main campus by the National Academies of Sciences, Engineering, and Medicine that was released last August highlights pressing campus-wide infrastructure needs and recommends improvements to NIH's capital planning and funding processes, including prioritizing projects of highest functional research value. In addition to the $100.0 million increase, the Budget proposes a general provision that would permit NIH to supplement the B&F account through a new transfer authority. Institute and Center appropriations generally have a one-year period of availability, which is not sufficient for construction projects, and the new transfer authority would provide the funds with the same five-year period of availability as funds appropriated directly to the B&F

account. Together, these changes would allow NIH to halt the growth of BMAR and provide the necessary infrastructure for cutting-edge science.

In striving to achieve its mission, NIH supports a world-class research workforce that aims to increase understanding of the fundamental nature of disease. The knowledge from this research can then be harnessed to move the biomedical research enterprise forward, ultimately benefiting the human and economic health of our country.

Supporting and Training World-Class Researchers

More than 80 percent of the NIH's funding is awarded for extramural research, largely through almost 50,000 competitive grants to more than 300,000 researchers at more than 2,500 universities, medical schools, and other research institutions in every state. A recent study showed that NIH directly supported the training of more than 9,500 pre-doctoral and almost 5,900 post-doctoral fellows through training grants.[1] To date, 156 NIH-supported researchers, including 24 intramural investigators, have been awarded the Nobel Prize.[2] The Lasker Prize, which is often called "America's Nobel," recognizes researchers and clinicians for their contributions to medicine and has been awarded to 195 NIH-supported researchers, including 33 intramural investigators.[3]

Harnessing New Knowledge for Biomedical Advances

There are many examples of how NIH-supported research has helped build a solid foundation for new innovations or discoveries. For example, researchers have identified more than 25 additional genes involved in Alzheimer's disease and what role they may play. Discovering these pathways could help identify potential targets for drug and non-drug interventions to stop or prevent the disease.[4] NIH-supported research has also led to a significant reduction in organ transplantation rejection, identified specific disease-related genes that could be targeted by cutting-edge gene therapies, and led to the development of methods to transform induced pluripotent stem cells into neurons that may be useful in repairing brain injuries. In addition, a suite of vaccines commonly used to protect newborns, including the *Haemophilus influenzae* B vaccine, was developed from discoveries made possible by NIH support.

Management Efficiencies

NIH has implemented and continues to pursue efficiencies in its internal operations, in order to use taxpayer dollars wisely and maximize the intramural and extramural research that can be funded within available appropriations. One area of focus is category management, which leverages the Government's combined purchasing power to obtain the best value in its acquisitions. Another focus area for cost savings is energy efficiency. Investments in the NIH Central Utility Plant and building-specific energy efficiencies reduced facility energy consumption through FY 2018 by 29 percent from the 2003 baseline, the equivalent of

[1] www.ncbi.nlm.nih.gov/pubmed/26625903
[2] www.nih.gov/about-nih/what-we-do/nih-almanac/nobel-laureates
[3] www.nih.gov/about-nih/what-we-do/nih-almanac/lasker-awards
[4] www.nia.nih.gov/about/advances-alzheimers-disease-related-dementias-research

$54 million in savings annually. Two large Utility Energy Savings Contracts (UESCs) covering the Bethesda campus were executed in FY 2019, leading to further savings. NIH will continue to identify and pursue activities to improve management of the biomedical research enterprise.

With an Eye Towards the Future: The Arc of Biomedical Research

Advances in preventative measures, diagnostics, and treatment don't happen overnight. Typically, they are built upon knowledge amassed over time. Below are a few compelling examples of how NIH supports the fundamental understanding of human disease in order to positively influence human health.

Understanding and Treating Drug Misuse and Addiction

Over the last four decades, NIH-supported research has revolutionized our understanding of drug use and addiction, driving a new understanding of the neurobiological, genetic, epigenetic, social, and environmental factors that contribute to substance use disorders. These advances have helped to transform how drug use and addiction are conceptualized. Society's responses to drug use have often been shaped by the misconception that people with addictions are morally flawed and lacking in willpower, resulting in an emphasis on punishment rather than prevention and treatment. Today, thanks to groundbreaking scientific discoveries about the brain and its role in addiction, society's views are changing in ways that will enable us to respond more effectively to the problem. Recent scientific advances helped us gain an understanding of addiction as a chronic, relapsing disease. Scientists, through sophisticated neuroimaging techniques, have identified the specific sites of action in the brain where many of the major drugs of abuse have initial effect.

Many of the current tools at our disposal are being used to combat the public health crisis posed by opioid misuse and addiction in America. More than 47,000 Americans died of opioid overdose in 2017, and over 2 million Americans live with an addiction to opioids. Moreover, more than 50 million Americans suffer from chronic pain, and of those, 25 million live with daily chronic pain and lack effective and safe non-opioid options for pain management. These staggering numbers are likely underestimated. With the full support of the Administration, NIH launched an integrated set of research initiatives, collectively called the Helping to End Addiction Long-term (HEAL) initiative, to provide scientific solutions to the opioid crisis and offer new hope for individuals, families, and communities affected by this devastating crisis.

Congress initially provided $500 million in funding for HEAL in FY 2018, split equally between the National Institute on Drug Abuse (NIDA) and National Institute of Neurological Disorders and Stroke (NINDS), along with authority to transfer funding to other Institutes and Centers (ICs) in support of the initiative. The same level of funding was provided in the FY 2019 and FY 2020 enacted appropriations. NIH allocated $515.7 million to HEAL in FY 2019 and $532.6 million in FY 2020. The FY 2020 funding augments the estimated $900 million in resources in FY 2020 for base (non-HEAL) research related to opioids and pain across NIH. The FY 2021 request maintains a total of $1.4 billion for opioids and pain research across NIH, including $532.6 million for HEAL. In addition, NIH will allocate $50 million to support

research to develop medication-assisted treatment and evidence-based psychosocial treatment as part of the Department's priorities and strategies for reducing the use of methamphetamines.

Recently, NIH awarded 15 grants to form the Justice Community Opioid Innovation Network (JCOIN) to support research on quality addiction treatment for opioid use disorder in criminal justice settings nationwide. The awards, totaling approximately $141.3 million, will support the multi-year innovation network, including research institutions and two centers that will provide supportive infrastructure. JCOIN will establish a national network of investigators collaborating with justice and behavioral health stakeholders to research promising interventions and other approaches to improve the capacity of the justice system to respond to the opioid crisis. Awarded research centers will study evidence-based medications, behavioral interventions, digital therapeutics, and comprehensive patient-centered treatments in 15 states and Puerto Rico.

The scientific knowledge that we have, and will continue to accumulate, will transform the way we treat addiction and prevent drug misuse. Some of these advancements could include vaccines to sustain drug abstinence, refined prevention and treatment interventions targeted to individual risk, and a new generation of emerging medications.

Eliminating HIV/AIDS

The Presidential initiative *Ending the HIV Epidemic: A Plan for America* aims to reduce new HIV infections in the United States by 75 percent by 2025 and by 90 percent by 2030. As part of this initiative, FY 2020 enacted appropriations included $6 million for NIH to expand the Centers for AIDS Research (CFAR) within the National Institute for Allergy and Infectious Diseases (NIAID) to perform several pilot studies to jump-start evidence-based research on new strategies for the delivery of integrated prevention and treatment. The FY 2021 budget includes an additional $10 million in funding, for a total of $16 million, to support this initiative by leveraging the CFAR's pilot data to design and evaluate effective, sustainable systems for the implementation of prevention and treatment interventions, with a focus on implementing strategies at scale that will be the most effective. This will ensure that promising strategies, such as the use of long-acting sustained-release medications for prevention and treatment, are brought rapidly into clinical use.

NIH-supported basic research has allowed us to gain a deep understanding of the biology of HIV. This, in turn, has led to the development of effective treatments, rapid diagnostics, and other approaches that now allow HIV-infected individuals to live a nearly normal lifespan. This is an amazing accomplishment considering that at the beginning of the HIV epidemic, there were limited treatment options, aside from palliative care, and infection meant death.

An especially tragic result of the HIV epidemic was the transmission of HIV from infected mothers to their infants. A landmark NIH-funded study demonstrated that the antiretroviral drug AZT reduced by two-thirds the risk of HIV transmission from an HIV-infected mother to her infant. Current antiretroviral drug therapy has now nearly eliminated that risk in the United States.

Research has also firmly established that people who take antiretroviral therapy daily as prescribed, and who achieve and maintain undetectable levels of HIV in their blood, cannot sexually transmit the virus to others. In short, "undetectable equals untransmittable."[5] While these advances are undeniably positive, they do require staying on medication for life. That makes finding a cure for HIV, where the virus is completely and permanently eliminated from the body, the ultimate goal.

A cure has proven to be a very tough endeavor. However, there is promise on the horizon. A hopeful avenue of research involves a one-two punch of medication and gene editing. In a recent experiment, scientists first treated HIV-infected mice with a long-acting form of antiretroviral therapy to suppress viral replication. They then snipped out any remaining HIV DNA still lurking in the genomes of the cells by utilizing the CRISPR/Cas9 gene editing system. The result was that no signs of HIV could be detected in more than one-third of the mice.[6]

Even though the mice in this experiment had humanized immune systems, they are not human. More research is needed to figure out how to make this approach to HIV treatment more effective in animal models before researchers can consider moving into clinical trials. With that said, these findings provide a new reason for increased hope that a cure may be found for the millions of people around the world suffering from HIV.

Childhood Cancer Data Initiative (CCDI)

FY 2020 enacted appropriations included $50.0 million for the first year of a planned 10-year initiative in the National Cancer Institute (NCI) to establish a data resource that will aggregate data from pediatric cancer cases and coordinate with partners that maintain data sets on pediatric patients to create a federated, comprehensive, and shared resource to support childhood cancer research in all its forms. The same amount, $50.0 million, is included in the FY 2021 request to support the second year of this initiative. Planning for the initiative included an NCI-hosted symposium last July focusing on opportunities to improve outcomes for children with cancer through enhanced sharing and use of data. Discussions with leaders in the field attending the symposium affirmed the tenets of the initiative. The CCDI plans to build a connected data infrastructure to enable childhood cancer data sharing from multiple sources; to identify opportunities to employ that data better for patients, clinicians, and researchers; and to develop and enhance tools and methods to extract knowledge from the data to directly address challenges in caring for children with cancer. In parallel, NCI has solicited ideas for advancing data sharing for pediatric cancer through an online platform, input from which will inform NCI's efforts to further its investment to collect, analyze, and share data to address the burden of cancer in children, adolescents, and young adults. A public webinar was held in October 2019 to discuss the ideas generated during the July symposium as well as to provide an update on plans for the CCDI.[7]

[5] www.nih.gov/news-events/news-releases/science-clear-hiv-undetectable-equals-untransmittable
[6] www.ncbi.nlm.nih.gov/pubmed/31266936
[7] https://www.cancer.gov/research/areas/childhood/childhood-cancer-data-initiative

IDeA States Pediatric Clinical Trials Network (ISPCTN)

The FY 2021 request level continues the annual funding for the ISPCTN in FY 2020 enacted appropriations at $15 million. NIH created the ISPCTN in FY 2016 with up-front funding to address the under-enrollment in clinical trials of children living in rural and medically underserved states. The program leverages the Institutional Development Award (IDeA) program to broaden access to cutting-edge clinical trials, apply findings from other relevant pediatric cohort studies to children in IDeA state locations, and build national pediatric research capacity by providing professional development opportunities for faculty and their support teams as well as supporting investments in infrastructure. Maintaining the annual funding for the ISPCTN in FY 2021 will allow continued support of studies such as the multi-site clinical trial on the Pharmacokinetics of Understudied Drugs Administered to Children per Standard of Care (POPS) Study, which evaluates the dosing, safety, and efficacy of drugs that are commonly prescribed to children. The ISPCTN is also partnering on Advancing Clinical Trials in Neonatal Opioid Withdrawal Syndrome (ACT NOW) pilot studies to develop best practices for treatment of NOW syndrome, as well as advancing clinical trial protocols for a study that aims to decrease pediatric obesity rates in rural areas through use of mobile health technology.

Artificial Intelligence to Address Chronic Disease

The annual economic impact of chronic diseases is an estimated $3.7 trillion, equivalent to nearly one-fifth of U.S. economic production. NIH proposes an initiative that aims to use Artificial Intelligence (AI) to gain a deeper understanding of the underlying causes of chronic diseases and to identify successful early treatments. The FY 2021 request includes $50.0 million for an initiative that would employ AI, Machine Learning (ML), Deep Learning (DL), and related approaches to enhance the collection, integration, analyses, and interpretation of data related to the onset and progression of chronic diseases. To accomplish these goals, NIH will need to develop new approaches beyond standard grant mechanisms to make existing data AI/ML-ready, support new AI/ML methods, and design new AI/ML-based interventions. The initiative will support new career pathways for investigators who can work at the interface of medicine and computational science and will jumpstart new efforts by articulating bold, scalable problems for the community to engage in through prizes and code-a-thons. The AI/ML effort is in alignment with the HHS-wide AI strategy and in response to the President's February 2019 Executive Order on Maintaining American Leadership in Artificial Intelligence, and also supports the Administration's Industries of the Future initiative.

Tickborne Disease Research

Reported cases of tickborne diseases (TBDs) continue to increase in the United States as tick species expand their geographical reach and new tick-transmitted pathogens emerge. In 2019, NIH published the NIH Strategic Plan for Tickborne Disease Research with five scientific priorities to address the growing threat of TBDs. NIH is committed to implementing this plan by building on existing trans-NIH research efforts to advance fundamental knowledge of TBDs and enable the development of improved diagnostics as well as treatment and prevention strategies. Recent progress in TBD diagnostics includes the newly developed TBD Serochip, which can diagnose up to eight different tick-borne diseases from a single blood sample. Additionally, the

Food and Drug Administration (FDA) recently approved several serological tests for Lyme disease developed by NIH-funded researchers and commercial partners, which has impacted clinical practice with regards to Lyme disease diagnostics. These recently approved tests can now be used in an alternative two-step testing strategy in lieu of the standard two-tier testing algorithm. To improve prevention and treatment strategies, researchers are exploring approaches to develop a vaccine against Lyme disease and are evaluating multiple antibiotics and drug combinations in animal models for activity against Borrelia burgdorferi, the causative agent of Lyme disease. The discovery that a form of red meat allergy can be caused by a tick bite has expanded NIH TBD research to include efforts to better understand the mechanisms regulating the development of this food allergy and the tick and human factors involved in this process. Additionally, researchers are investigating the diagnosis, treatment, and follow-up of Lyme disease patients to assess host and pathogen factors leading to different disease presentations and outcomes of Lyme disease, such as Post Treatment Lyme Disease Syndrome, Lyme arthritis, and encephalopathy. The FY 2021 request level includes an additional $44 million to accelerate NIH's priorities outlined in the Strategic Plan.

Consortium for Innovation in Large-Scale Gene Vector Production

Gene therapy and gene editing approaches are some of the most promising treatment modalities for a growing number of disease conditions. Vectors are the "vehicle" by which a gene can be delivered to a targeted location in the body, and Adeno-Associated Viruses (AAVs) are currently the most prevalent type of vector used in both gene therapy and gene editing studies. Wait times to produce vector therapies that meet the manufacturing standards necessary for clinical trials are long, often one to two years. Resolving this production bottleneck is critical for gene-based therapies to reach all people who need them.

The FY 2021 budget request includes $30.0 million to create a consortium to: 1) establish expanded clinical-grade material production capacity using current methods; 2) develop technologies to increase the efficiency of vector production; 3) design the next generation of vectors with more definable tissue environment or tropism; 4) develop vector methodologies to enable control of their level of expression with an externally applied signal; and 5) avoid use of vectors with complicated and implementation-blocking intellectual property issues. The consortium will focus on providing vectors for academic and government-funded researchers, but standardization and data sharing efforts will produce payoffs for private sector research as well. In the short term, the proposed consortium would plan to fund additional good manufacturing practices (GMP) vector production capacity at existing academic or industry GMP production facilities.

Promoting Influenza Research Innovation

In the United States, the effectiveness of seasonal influenza vaccines, which must be updated each year, ranges from 10 percent to 60 percent. NIH supports a broad research program to improve seasonal influenza vaccines, including through the use of adjuvants that may enhance and broaden protection against diverse influenza strains.

Because different strains of flu respond differently to available drugs, healthcare providers must be able to quickly distinguish one flu strain from another. NIH supports research to design diagnostics that are faster, more accurate, more cost-effective, and more portable. Specifically, NIAID has worked to develop diagnostic platforms capable of examining influenza viruses at the molecular level and rapidly distinguishing flu type A and flu type B as well as the wide variety of subtypes of the type A virus.

Antiviral medicines are an important tool in both controlling influenza by treating the patient's infection and helping to prevent severe illness that can result from flu, including bacterial pneumonia. Because the influenza virus can develop resistance to antiviral drugs, NIAID is working to find new and better treatments to fight the flu. These efforts include supporting the development and testing of the next generation of antiviral drugs. For example, three NIAID clinical trials are currently exploring the effectiveness of novel flu therapeutics in high-risk populations, including human plasma containing high levels of anti-flu antibodies, concentrated human immunoglobulin with high levels of anti-flu antibodies, and a cocktail of the three licensed flu antiviral medicines.

In 2019, NIAID established the Collaborative Influenza Vaccine Innovation Centers, a multidisciplinary program to support research to improve seasonal vaccines and develop promising new influenza vaccine candidates. These activities align with the Executive Order on Modernizing Influenza Vaccines in the United States to Promote National Security and Public Health that was issued on September 19, 2019. The FY 2021 budget maintains the FY 2020 Enacted level for influenza research, including efforts to develop a universal flu vaccine which protects adults and children without the need for a booster.

Improving Research to Save America's Youngest Lives

The Administration wants every child to have the very best chance to live and thrive. In order to help save more pre-mature babies, the Budget prioritizes funding for neonatal research and provides an additional $100 million over 2020 and 2021 dedicated to advancing research and care for America's youngest patients.

Imagining the Future

This is a remarkable time in biomedical research. Truly exciting, world-class science is taking place through NIH support, and leading to breakthroughs in multiple areas as described above. However, there is still much to be done. NIH sees the opportunity for many promising areas of research in the future. Some of the most promising opportunities for transforming human health that the FY 2021 Budget proposes include:

- Enhancing quality of life for those living with diabetes through the development of an artificial pancreas that can automatically sense a person's blood sugar level and adjust insulin dosage precisely.

- Utilizing gene-editing technology to develop a hand-held device capable of detecting gene mutations in minutes, as opposed to weeks, allowing for a quicker start to treatment.

- Improving cancer prognosis through the engineering of nanomedicines that can precisely target cancer cells while limiting toxicity to healthy surrounding cells.

- Pinpointing the mechanism of action of drugs like ketamine, which studies have shown can lift the symptoms of depression within hours instead of weeks.

Conclusion

NIH is at the vanguard of biomedical research, leading the world in support of groundbreaking science. Strategically investing in scientific opportunities such as those described above will help NIH ensure the U.S. remains at the forefront of innovation and discovery. The fruits of NIH research include healthier, longer-living populations as well as substantial economic benefits. Continued, targeted support of NIH is therefore an investment not only in the health and well-being of Americans, but the economic health of our country.

OVERVIEW OF PERFORMANCE

The NIH mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability. Investments in basic biomedical and behavioral research make it possible to understand the causes of disease onset and progression, design preventive interventions, develop better diagnostics, and discover new treatments and cures. Realizing the benefits of fundamental biomedical discoveries depends on the translation of that knowledge into the development of new diagnostics, therapeutics, and preventive measures to improve health. Investments in translational research are leading to the identification of new targets and pathways for the development of new therapeutics.

The FY 2021 budget request reflects the Agency's longstanding commitment to invest strategically using performance-based analysis, as emphasized in the Government Performance and Results Act (GPRA) (P.L. 103-62), as amended by the GPRA Modernization Act of 2010 (P.L. 111-352). Through the continuous evaluation and strategic management of its research portfolio, NIH focuses on funding research that shows the greatest promise for improving the overall health of the American people. In addition, NIH continually seeks to identify and address high-priority scientific opportunities and emerging public health needs. By managing its research portfolio to support key research priorities, NIH ensures the most effective use of funds to achieve the greatest impact on the health and welfare of the Nation. In particular, NIH's strong peer-review process, site visits, performance monitoring, program evaluation, and performance-based contracting enable the Agency to ensure that its investments generate results for the American people.

NIH strives to achieve transparency and accountability by regularly reporting results, achievements, and the impact of its activities. To increase transparency and promote effective use of resources, NIH began reporting the amount of indirect costs paid per grant on its Research Portfolio Online Reporting Tools website (NIH RePORT)[8] in October 2013. NIH supports a wide spectrum of biomedical and behavioral research and engages in a full range of activities that enable research, its management, and the communication of research results. Because of this diversity and complexity, NIH uses a set of performance measures that is representative of its activities and is useful for tracking progress in achieving performance priorities. This representative approach has helped NIH to share progress of its performance priorities with HHS, the rest of the Executive Branch, the Congress, and the public.

Collectively, the NIH performance measures reflect the Agency's overall goals to: 1) advance the full continuum of biomedical research; 2) strengthen the scientific workforce and biomedical research infrastructure; 3) facilitate the communication of research findings and transfer of knowledge to other sectors for further development; and 4) enhance internal management processes, policies, and systems to support programmatic and organizational oversight. Furthermore, the measures support the Administration's goal of protecting and improving the health and well-being of the American people. In particular, NIH substantially contributes to HHS Strategic Goal 4 – Foster Sound, Sustained Advances in the Sciences. For example, in

[8] https://report.nih.gov/

support of Objective 4.3 (Advance basic science knowledge and conduct applied prevention and treatment research to improve health and development) under Goal 4, NIH continues to support promising research with the goals of: 1) developing, optimizing, and evaluating the effectiveness of nano-enabled immunotherapy (nano-immunotherapy) for one cancer type; 2) evaluating the safety and effectiveness of one to three long-acting strategies for the prevention of HIV; and 3) identifying risk and protective alleles that lead to one novel therapeutic approach, drug target, or pathway to prevention for late-onset Alzheimer's disease.

Performance Management

Performance management at NIH is an integrated and collaborative process to ensure that the Agency is achieving its mission to conduct and support research to improve public health. At the Agency level, the NIH Director sets priorities, monitors performance, and reviews results across the 27 Institutes and Centers (ICs) and the Office of the Director (OD). OD is the central office responsible for setting policy for NIH, and for planning, managing, and coordinating the programs and activities of all NIH components. The NIH Director provides leadership to the ICs and helps identify needs and opportunities, especially for efforts that involve multiple ICs. ICs and OD offices carry out priority setting, performance monitoring, and progress reviews, and also make adjustments based on progress achieved in their respective areas of science. In addition to the performance management processes that occur for the NIH research program, there are equivalent processes for administrative management functions.

The NIH performance framework includes: 1) priority setting with input from key stakeholders; 2) implementation and management of activities that support priorities; 3) monitoring and assessment of progress, and identification of successes and challenges; 4) oversight by IC leadership and OD office directors in assessing overall progress toward priorities and identification of best practices, appropriate next steps, and corrective actions (as needed); 5) incorporation of regular feedback from IC and OD office leadership to enhance activities; 6) regular reviews of priorities, progress, and outcomes by the NIH Director and IC Directors; and 7) regular review of performance and priorities by external expert review groups including grant peer-review groups, Advisory Councils, and ad hoc working groups.

Qualitative and quantitative information is used to monitor progress and help to identify successes, as well as obstacles in achieving short- and long-term goals. Supporting high-performing research is a process of adapting to new developments or newly identified barriers, or shifting resources to pursue promising unanticipated results that may provide critical new information. Moreover, the impact of research may not be immediately known and may depend on additional development or on advances in other fields. Despite these challenges, NIH leadership is able to manage performance effectively by using the best available information to assess progress toward achieving priorities and making appropriate adjustments.

All scientific research carried out through NIH support is subjected to a rigorous and consistently applied review process. For example, the Extramural Research Program, which includes the largest category of NIH-funded research, utilizes two levels of peer review. The first level, in which scientific excellence is assessed, consists of chartered scientific review groups composed of outside experts in particular scientific disciplines. The second level, in which public health

relevance is assessed, is conducted by National Advisory Councils of the ICs. For the Intramural Research Program, the progress of individual scientists and their laboratories is evaluated once every four years by Boards of Scientific Counselors composed of external experts. These reviews enable ongoing assessments of all intramural labs and the accomplishments of the scientists who contribute to them. It is through this well-honed system of peer review that NIH maintains its focus on supporting research of the highest possible quality with the greatest potential of furthering NIH's mission.

The NIH approach to performance management is undergirded by the NIH Governance Structure. That structure includes the NIH Steering Committee and seven standing Working Groups.[9, 10] Ad-hoc working groups are established, as needed, to address emerging issues. The premise of the structure is that shared governance, which depends on the active participation of the IC Directors with the NIH Director, will foster the collaborative identification of corporate issues and a transparent decision-making process. With active participation by the IC Directors in NIH-wide governance, NIH can maximize its perspective and expertise in the development and oversight of policies common to NIH and its ICs. Through the governance process, corporate decisions are made; these may be long-term and strategic (e.g., facilities planning, budget strategy, and research policy direction) or short-term and tactical (e.g., stipend levels, resource allocations, and compliance oversight). This process does not include issues related to the setting of scientific priorities, which is reserved for meetings of all IC Directors. The NIH Director meets with the IC Directors on a bi-weekly basis, and scientific initiatives are discussed, as well as major management issues that affect the Agency. In addition, scientists – from within and outside the Agency – are invited to present on new or emerging research opportunities. The NIH Director stays informed of priorities through regular meetings with IC and OD Office Directors. Similarly, the IC Directors monitor performance through regular meetings with the Division Directors and Scientific/Clinical Directors in their respective ICs.

Based on these reviews, leadership and their staff take appropriate actions to support research activities. For example, the reviews may lead to the development of new award programs for early-career researchers, the development of new funding announcements for promising research areas, or new collaborations across NIH and/or with other Federal and non-Federal partners. The NIH Director and senior leadership receive regular updates on the progress of the priorities, provide feedback, and incorporate the latest information into the NIH's overall planning and management efforts. This constant feedback loop enables NIH to make critical adjustments periodically to align activities and target resources in support of its research priorities.

[9] The NIH Steering Committee is composed of the NIH Director, Deputy Director (ex-officio), the Directors of the National Cancer Institute, National Heart, Lung, and Blood Institute, and National Institute of Allergy and Infectious Diseases, as well as a balance of Directors from the smaller and medium-sized institutes.

[10] The seven standing working groups are: Extramural Activities, Diversity, Facilities, Management and Budget, Scientific Data Council, Administrative Data Council, and Data Science Policy Council.

ALL PURPOSE TABLE

(Dollars in Thousands)[1,2,3]	FY 2019 Final[6]	FY 2020 Enacted[7]	FY 2021 President's Budget	FY 2021 +/- FY 2020
Total, NIH Program Level	**$39,183,862**	**$41,685,000**	**$38,693,631**	**-$2,991,369**
Less mandatory and funds allocated from different sources:				
PHS Program Evaluation	1,146,821	1,230,821	741,000	-489,821
Mandatory Type 1 Diabetes Research - Enacted	150,000	96,575	0	-96,575
Mandatory Type 1 Diabetes Research - Proposed	0	53,425	150,000	96,575
Patient-Centered Outcomes Research Trust Fund	0	0	98,452	98,452
Total, NIH Discretionary Budget Authority	**$37,887,041**	**$40,304,179**	**$37,704,179**	**-$2,600,000**
Interior Budget Authority	79,000	81,000	73,688	-7,312
Total, NIH Labor/HHS Budget Authority	**$37,808,041**	**$40,223,179**	**$37,630,491**	**-$2,592,688**
Number of Competing RPGs[3]	*11,020*	*11,379*	*9,505*	*-1,874*
Total Number of RPGs[3]	*40,667*	*43,027*	*41,607*	*-1,420*
FTE[4]	*17,231*	*18,105*	*18,350*	*245*
NEF[5]	*83,041*	*225,000*	*NA*	*NA*

1 Numbers may not add due to rounding.

2 Includes 21st Century Cures Act funding.

3 Figures for FY 2021 reflect the proposed consolidation of Agency for Healthcare Research and Quality (AHRQ) activities into NIH as the National Institute for Research on Safety and Quality (NIRSQ). Figures for FY 2019 and FY 2020 do not include AHRQ.

4 FTE levels include 4 NIH FTEs funded by PHS trust funds in FY 2019 through FY 2021 and 7 FTEs funded by the Patient-Centered Outcomes Research Trust Fund in FY 2021. Figures for FY 2019 and FY 2020 do not include AHRQ.

5 Amounts for FY 2019 reflect notifications submitted to the Committees on Appropriations in the House of Representatives and the Senate on December 4, 2018, and apportioned for use by NIH. Amounts for FY 2020 reflect amounts allocated for NIH from the NEF by sec. 237 of Division A of P.L. 116-94.

6 Excludes hurricane-related supplemental financing.

7 Amounts for FY 2020 reflect directive transfer of $5.0 million from OD to the HHS Office of Inspector General, HIV/AIDS transfers across ICs under the authority of the Office of AIDS Research, and $150.0 million for Type 1 Diabetes Research (enacted amount of $96.575 million through May 22, 2020 plus extension request of $53.425 million).

IMPACT OF BUDGET LEVEL ON PERFORMANCE

Programs and Measures (Dollars in Millions, except where noted)	**FY 2020 Enacted**[4]	**FY 2021 President's Budget**[5]	**FY 2021 +/- FY 2020**
Research Project Grants	$23,849.842	$22,089.780	-7.4%
Competing Average Cost (in thousands)	$547.060	$541.278	-1.1%
Number of Competing Awards (whole number)	11,379	9,505	-16.5%
Estimated Competing RPG Success Rate[1]	20.3%	16.5%	-18.7%
Research Centers	$2,663.777	$2,405.752	-9.7%
Other Research	$2,663.482	$2,440.458	-8.4%
Training	$909.923	$847.703	-6.8%
Research & Development Contracts	$3,349.392	$3,077.107	-8.1%
Intramural Research	$4,445.880	$4,076.559	-8.3%
Research Management and Support	$2,014.642	$1,926.132	-4.4%
Common Fund (non-add)	*$639.111*	*$596.467*	*-6.7%*
Buildings & Facilities Appropriation	$200.000	$300.000	50.0%
Other Mechanisms[1]	$1,588.063	$1,431.688	-9.8%
Consolidations (PCORTF)[2]	n/a	$98.452	n/a
Total, Program Level[3]	**$41,685.000**	**$38,693.631**	**-7.2%**

[1] Includes Office of the Director-Other, Buildings and Facilities funding in the National Cancer Institute, and Superfund Research activities funded from the Interior appropriations bill.

[2] Includes mandatory funding from the Patient-Centered Outcomes Research Trust Fund (PCORTF).

[3] Includes discretionary budget authority received from Labor/HHS appropriations bill and the Interior appropriations bill (Superfund). Also includes mandatory budget authority derived from the Type 1 Diabetes account and PCORTF, and Program Evaluation Financing.

[4] Amounts for FY 2020 reflect directive transfer of $5.0 million to the HHS Office of Inspector General and $150.0 million for Type 1 Diabetes Research (enacted amount of $96.575 million through May 22, 2020 plus extension request of $53.425 million).

[5] Includes the proposed consolidation of Agency for Healthcare Research and Quality activities into NIH as the National Institute for Research on Safety and Quality (NIRSQ).