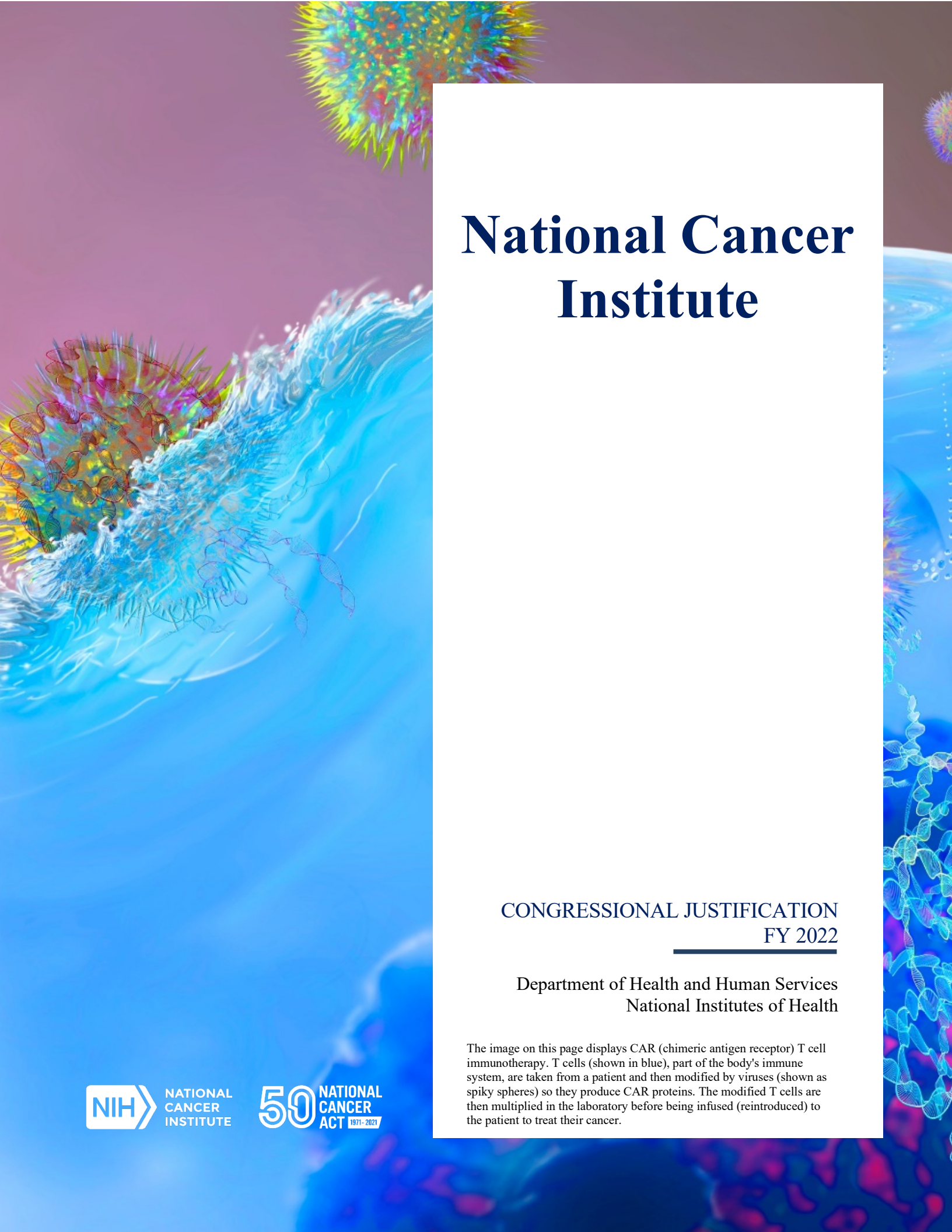


National Cancer Institute

CONGRESSIONAL JUSTIFICATION
FY 2022

Department of Health and Human Services
National Institutes of Health

The image on this page displays CAR (chimeric antigen receptor) T cell immunotherapy. T cells (shown in blue), part of the body's immune system, are taken from a patient and then modified by viruses (shown as spiky spheres) so they produce CAR proteins. The modified T cells are then multiplied in the laboratory before being infused (reintroduced) to the patient to treat their cancer.

NIH NATIONAL CANCER INSTITUTE

50 NATIONAL CANCER ACT 1971-2021

DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

National Cancer Institute (NCI)

FY 2022 Budget Table of Contents Page No.

NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

NCI Director's Overview

NCI Director Norman E. "Ned" Sharpless, M.D.

Years from now, we will recall 2020 as a year like no other, a year when coronavirus disease 2019 (COVID-19) threatened the health of all, a threat that was especially profound for those living with cancer, those at risk of cancer, and cancer survivors. The grim toll levied by the pandemic stunned and humbled us.

While the dire health consequences of COVID-19 emerged swiftly for some, it will be years before the full effect of the pandemic on cancer is known. Cancer is a complex set of diseases where a patient's prognosis is influenced by the timing of diagnosis and intervention. Most often, the earlier someone receives treatment, the better the results. But during much of 2020, fears of contracting coronavirus discouraged many from seeking screening, diagnosis, and treatment.

In the months after COVID-19 grew to pandemic proportions, we saw a steep drop in cancer diagnoses in the U.S. Yet, there is no reason to believe the development and incidence of cancer actually dropped. Rather, the pandemic delayed diagnosing cancer and limited cancer care. The missed cancers will surface eventually, but at more advanced stages of disease and with worse prognoses.

To cite an example, breast and colorectal cancers account for nearly one-sixth of U.S. cancer deaths. Modeling conducted on the effect of COVID-19 suggests nearly 10,000 excess deaths from these two cancers over the next decade. This insight comes from NCI's Cancer Intervention and Surveillance Modeling Network, a program that since 2,000 has used simulation modeling to improve our understanding of cancer control. Most likely, this analysis for breast and colorectal cancer is conservative, and it's also likely that the situation is similar for other cancers.

The pandemic caused other profound effects as well – disrupting cancer research, shuttering labs, and slowing clinical trials. This delay must be reversed, because trials are essential to translate research into new therapies. We must ensure that one public health crisis does not beget another.

NCI Pandemic Response – In April 2020, NCI received a $306 million supplemental appropriation from Congress to advance serological testing for the virus that causes COVID-19. NCI quickly converted its Human Papillomavirus (HPV) Serology Lab at the Frederick National Laboratory for Cancer Research to assist the federal response. The lab is serving a vital role in pandemic response, evaluating the sensitivity and specificity of tests to detect the virus and supporting U.S. Food and Drug Administration (FDA) decisions on the test kits manufacturers can market.

Since May 2020, NCI evaluated more than 100 commercial assays to assist FDA regulatory decisions. The results of this analysis are published on FDA and CDC websites. In December 2020, the COVID-19 Serology Lab also produced the U.S. Serology Standard, a tool that scientists conducting serology studies can use to calibrate their research, to harmonize assays that measure SARS-CoV-2 antibodies, and to make comparisons across studies, including different vaccines.

The NCI Serology Lab is part of an array of programs NCI launched with the emergency appropriation from Congress. Examples of other initiatives include –

- **Serological Sciences Network (SeroNet)**, the largest coordinated research effort to understand immune response to SARS-CoV-2, the virus responsible for the pandemic. SeroNet involves 25 academic institutions along with the National Institute of Allergy and Infectious Diseases (NIAID), other NIH Institutes, and others working to answer fundamental questions about the virus and support vaccine development.
- **Serological Sciences Hub (SeroHub),** launched in collaboration with NIAID and the Centers for Disease Control and Prevention, SeroHub is a central repository for studies of SARS-CoV-2 seroprevalence. Seroprevalence shows how the virus is spreading within the population and allows scientists to better understand populations most at risk for the disease and those that might be protected from infection. SeroHub's interactive dashboard allows scientists, clinicians, and policymakers to compare seroprevalence by geography, testing date, and other factors.
- **Digital Health Solutions** funds seven businesses and universities to develop user-friendly tools, smartphone apps, and wearable devices to support pandemic response, such as efficiently identifying and tracing contacts with infected individuals. In partnership with the National Institute of Biomedical Imaging and Bioengineering, this NCI initiative is supporting new technologies to meet urgent pandemic-related needs.

Cancer Moonshot^{SM} at the Mid-Point – In 2016, Congress took a bold, visionary step by enacting the Cancer Moonshot, authorizing $1.8 billion for cancer research across seven years. In addition to funding science to speed the pace of discovery for preventing and treating cancer, the Cancer Moonshot also seeks to reduce research barriers, expand partnerships, and enhance collaboration.

As of the end of FY 2020, NCI reached the mid-point of the Cancer Moonshot, having invested nearly $1 billion to support 240 new research projects across 70 cancer science initiatives. Some initiatives are less than a year old, while others funded during early Cancer Moonshot years are already reporting results. Even at this early stage, Cancer Moonshot funding is leading to new translational research and clinical approaches that are improving prevention, screening, and cancer care for patients.

One Moonshot legacy is a cultural shift driven by research principles that include –

- **Sharing data**, which leverages expertise throughout the cancer research enterprise, accelerates discovery, and yields insights to previously unanswered questions. In 2020 alone, more than 70,000 users of the cloud-based, Cancer Moonshot-supported data infrastructure performed nearly 70 million hours of cancer research analysis.
- **Launching research networks** to collaborate, share expertise, foster creativity, speed progress, and tackle challenges that are only possible through federated research.
- **Requiring open access publications** to ensure that research results are widely available as promptly as possible to help accelerate the pace of discovery.

NCI Extramural Grants – Despite the unprecedented challenges of the COVID-19 pandemic, FY 2020 was a landmark year for new, NCI competing grants. The NCI appropriation included a $212.5 million increase for NCI competing and continuing (non-competing) grants. With this funding, NCI –

- Raised the NCI payline for highly competitive R01 grants by 25 percent to the 10th percentile.
- Increased new 5-year R01 and 7-year R37 grants funded within the payline by 134 awards, a jump of more than 20 percent.
- Paid all continuing grants at 100 percent.

With appropriations in FY 2021, NCI further raised the R01 payline to the 11th percentile, while once again paying continuing grants at 100 percent.

NCI met other important priorities, most notably launching the Childhood Cancer Data Initiative (CCDI) to optimize how researchers collect, analyze, and share data on childhood, adolescent, and young adult cancers. NCI also funded new awards to advance a priority of the STAR Act (Survivorship, Treatment, Access, and Research Act) – research to improve outcomes for pediatric, adolescent, and young adult cancer survivors.

Cancer Workforce Diversity – NCI is committed to a broad range of priorities that advance our mission. Foremost of these is the long-standing, essential, overarching priority of a cancer research workforce that genuinely reflects the diversity of our nation. NCI funds an array of programs to achieve this goal. For example, to attract and mentor those at an early age who aspire to a career in research, NCI established the Youth Enjoy Science (YES) Research Education Program to provide training and support for teachers and faculty. NCI is also committed to new initiatives, such as the Faculty Institutional Recruitment for Sustainable Transformation (FIRST) program, launched in collaboration with the NIH Common Fund and other institutes. FIRST uses evidence-based practices to enhance diversity and inclusion among biomedical faculty and prepare early-stage research faculty to thrive as NIH-funded researchers.

These and other programs ensure that NCI fulfills its mission and fosters a cancer research enterprise that reflects the diverse nation that NCI serves.

Overall Budget Policy:

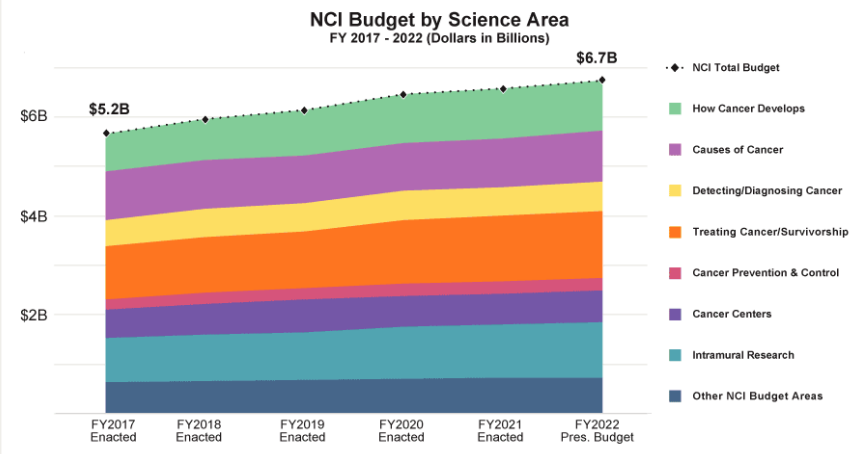
The FY 2022 President's Budget request is $6,733.3 million, an increase of $174.5 million or 2.7 percent compared with the FY 2021 Enacted level. The Budget includes $194.0 million to support the ongoing 21st Century Cures Act Cancer Moonshot efforts.

NCI History: Established under the National Cancer Act of 1937, NCI is the Federal Government's principal agency for cancer research, training, and education. In 2021, NCI will celebrate the 50th anniversary of the National Cancer Act of 1971. The 1971 statute expanded NCI's scope and responsibilities, and included a requirement that NCI submit an annual plan and professional judgment budget directly to the President, and thereafter to Congress.

NCI Mission & Budget: NCI leads, conducts, and supports cancer research to advance scientific knowledge and help all people live longer, healthier lives. To perform its mission, NCI funds basic and applied cancer research to advance the scientific priorities highlighted in Fig. 1.

Norman E. "Ned" Sharpless, M.D., was sworn in as 15th director of NCI on October 17, 2017. Dr. Sharpless also served as Acting Commissioner of the U.S. Food and Drug Administration for 7 months during 2019.

Fig. 1



NCI Intramural Research: More than 300 principal investigators (PIs) perform research within the intramural program, which complements all aspects of the national cancer program. As of October 2020, NCI intramural researchers had on-going collaborations with more than 2,000 extramural investigators at more than 800 academic institutions in 46 states, the District of Columbia, and 66 countries around the world.

NCI Extramural Grants: NCI uses an array of programs and financial mechanisms to support cancer science and the NCI mission. Foremost among these are extramural grants to fund investigator-initiated research, as Fig. 2 illustrates. Extramural grants support research by more than 7,000 PIs, yielding new insights to understand, prevent, diagnose, and treat cancer.

There is unprecedented enthusiasm for cancer research within the science community. For example, between 2013 and 2019 grant applications to NCI rose by 50 percent, based on analysis of NIH grants data (data not displayed).

Fig. 2 * Data excludes Nat. Research Service Training Awards[1]

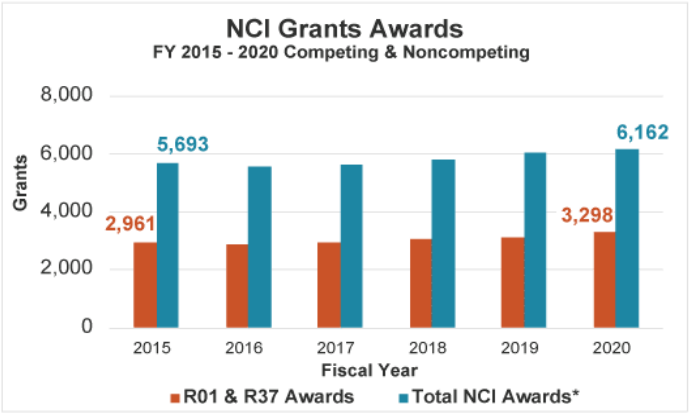
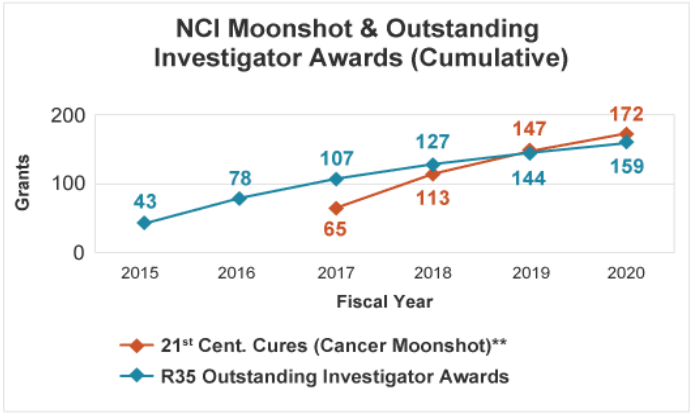


Fig. 3 **NCI received its first Moonshot funding in FY 2017



[1] These grant counts include grants awarded in FY 2020 from Cures funding carried over from previous years, and exclude grants anticipated to be awarded from FY 2020 Cures funding carried over into future years.

Cancer Moonshot / Outstanding Investigators – Fig. 3 displays the history of Moonshot and Outstanding Investigator Awards (OIA) grant awards. In December 2016, Congress enacted the Cancer Moonshot, which authorizes $1.8 billion across seven fiscal years to accelerate the pace of cancer discovery. Another innovation is NCI's OIA Program, which provides seven years of funding to investigators with outstanding records in cancer research. OIA researchers test high-risk hypotheses supported by a higher award level and for more years of funding than NCI typically provides.

Current Activities and Accomplishments

Cancer Mortality Declines – Cancer mortality declined 29% from 1991 to 2017. This includes the largest 1-year drop in mortality of 2.2% during 2016-2017, the most recent period for which we have complete statistics.

FDA Approvals – The rewards of research include FDA-approved cancer drugs that rely on the results of NCI-supported basic science. During the 4-year period of 2017-2020, FDA approved 77 new drugs and 11 biosimilars to treat cancer. FDA also approved 145 expanded uses for previously approved oncology drugs and biologics.

Viral Vectors for Immunotherapy – Beginning in 2020, NCI is manufacturing and distributing laboratory modified viruses to clinical researchers. These research tools are essential for producing genetically engineered human immune cells used as cancer therapies.

HPV-35 Risks for Women of African Ancestry – Human Papillomavirus-35 (HPV-35) is relatively uncommon, and not a strain in approved HPV vaccines. However, a 2020 NCI study found HPV-35 was more prevalent among African American women, causing more cervical precancers in them than in women of other races and ethnicities. This study suggests the need for a next generation HPV vaccine that protects against HPV-35.

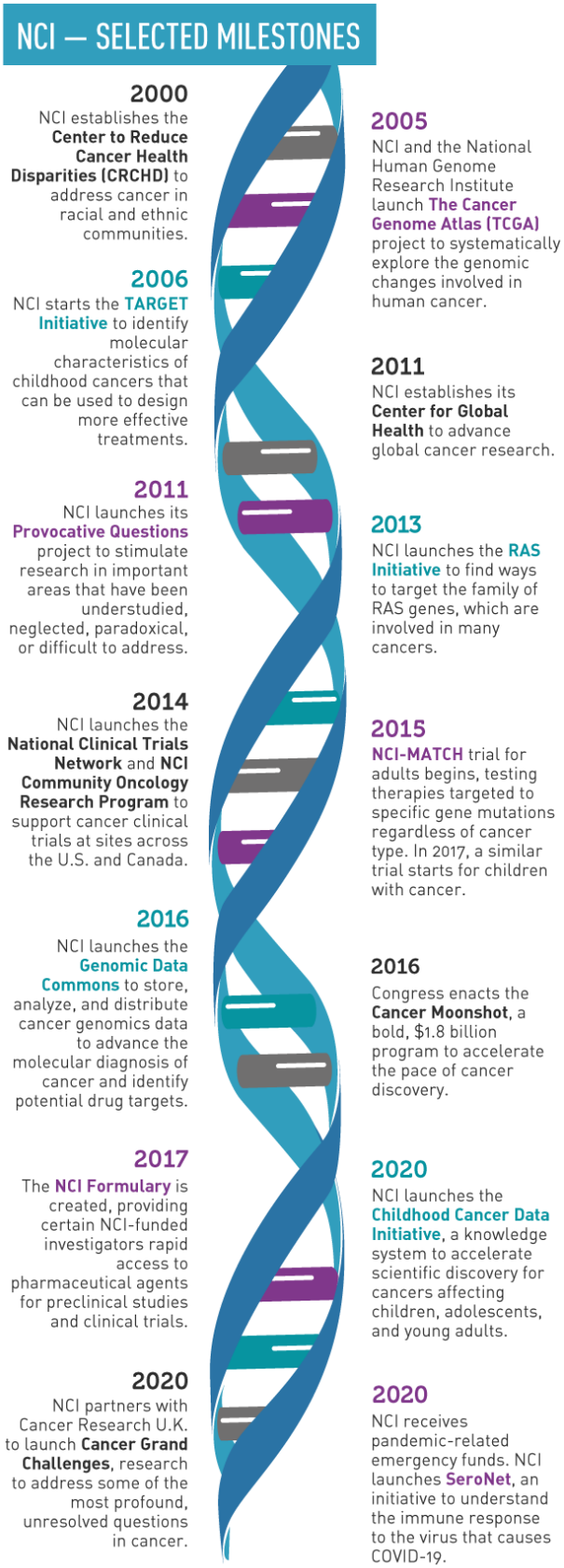
2020 Presidential Award for Mentoring – Mentoring those who aspire to a career in research is central to NCI's mission. In 2020, NCI won a Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring for high school students. Through this program, NCI provides an authentic cancer research experience to nurture students' interest in cancer and science.

Nobel Awards – During the 10-year period beginning in 2009, 5 Nobel Prizes in Physiology or Medicine were awarded to scientists who received NCI R01 grants.

NCI Future Research

ComboMATCH Trial – For many cancers, combinations of drugs offer the potential for greater clinical benefit than single agents. With this principle in mind, NCI is expanding its Molecular Analysis for Therapy Choice (MATCH) clinical trials by introducing ComboMATCH. Like other NCI MATCH trials, ComboMATCH selects combination therapies based on molecular analysis of a patient's cancer.

Improving Cancer Survival – The effectiveness of several new anticancer agents that specifically target molecular alterations in malignant melanoma and non-small cell lung cancer have significantly improved survival for patients with advanced stages of these diseases. In years to come, NCI foresees further improvements in survival rates for individuals with these and other cancers.



Major Changes in the Fiscal Year 2022 President's Budget Request

Major changes by budget mechanism or budget activity are briefly described below. Note that there may be overlap between budget mechanisms and activity detail, and the highlights on this page will not sum to the total change for the FY 2022 President's Budget for NCI, which is $174.5 million more than the FY 2021 Enacted level, for a total of $6,733.3 million, an increase of 2.7 percent. The total budget level includes $50.0 million for the Childhood Cancer Data Initiative (CCDI) and $194.0 million to support the ongoing 21st Century Cures Act Cancer Moonshot℠. Within the FY 2022 request level, NCI will pursue its highest research priorities through strategic investments and careful stewardship of appropriated funds.

Research Project Grants (+$85.0 million; total $2,927.4 million): Increased funding in FY 2022 will allow NCI to pay continuing non-competing Research Project Grants (RPGs) at 96 percent of the commitment levels. In addition to increased costs to support the commitment base for continuing grants, NCI plans to fund R01 investigator awards at the 10th percentile and early-stage investigator awards at the 15th percentile.

Research Centers (+$12.0 million; total $625.8 million): The increase will support costs for any competitively awarded new centers and renewing centers in the NCI-designated Cancer Centers and Specialized Programs of Research Excellence (SPOREs) programs. The NCI Cancer Centers program is a cornerstone of the nation's cancer research program. Together with their community partners, the 71 NCI-designated Cancer Centers form the backbone of NCI's extramural program for studying, controlling, and preventing cancer.

Other Research (+$22.3 million; total $604.7 million): The increase will support NCI large-scale treatment trials and a new partnership with Cancer Research U.K. to launch Cancer Grand Challenges (CGC). Historically, more than 30,000 patients are annually enrolled in large-scale treatment trials through participating institutes that collaborate in the Cooperative Clinical Research Program. NCI considers the Cooperative Clinical Research Program to be a high value to advance the National Cancer Program and an ongoing priority for FY 2022. CGC is an initiative to fund research to address some of the most profound, unresolved questions in cancer. By joining forces, NCI and Cancer Research U.K. are working to accelerate the pace of cancer science, stimulate scientific creativity of the highest caliber, and make bold progress to understand, prevent, detect, and treat cancer.

Training Awards (+$3.9 million; total $101.8 million): The increase will support stipend increases and childcare allowances for NCI trainees. Programs to train and retain a diverse workforce of researchers with the skills required to conduct demanding and sophisticated cancer research remain a high priority for NCI. NCI training programs help maintain a strong cadre of future researchers capable of delivering important research results for the patients NCI serves.

Research & Development Contracts (+$18.0 million; total $849.2 million): A combination of increased funding and offsetting internal programmatic reductions will support critical shared cybersecurity and infrastructure across NIH and enhanced information technology. Information technology accelerates cancer research by empowering scientists and clinicians with the data and tools they need to drive their research.

Intramural Research (+$27.4 million; total $1,117.6 million): A combination of increased funding and offsetting internal programmatic reductions will support increases in pay for intramural investigators and critical NIH shared infrastructure and high priority intramural science that remains an important priority within the overall NCI cancer research portfolio. NCI intramural research will emphasize high-risk, high-reward cancer research that would otherwise not be conducted by other entities.

Research Management and Support (+$5.8 million; total $476.8 million): A combination of increased funding and offsetting internal programmatic reductions will support increases in pay for NCI research management and support staff and critical NIH shared, enterprise-wide infrastructure. NCI staff serve an indispensable role by enabling the success of all NCI programs. Their activities include central administration, program direction, grant and contract administration, human resources, program coordination, and financial management.

Buildings and Facilities (+$0.0 million; total $30.0 million): The NCI Federally Funded Research and Development Center in Frederick, MD, has many buildings that are over 50 years old. During FY 2022, NCI will use these funds to replace aging building infrastructure, modify laboratories to install new state-of-the-art research instrumentation and equipment, reconfigure laboratory space to support emerging cancer research needs, and provide new infrastructure to protect mission-critical operations of the Frederick National Laboratory for Cancer Research.

NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

Budget Mechanism - Total[1]
(Dollars in Thousands)

MECHANISM	FY 2020 Final[2]		FY 2021 Enacted		FY 2022 President's Budget		FY 2022 +/- FY 2021 Enacted	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Research Projects:								
Noncompeting	3,648	$1,921,130	3,720	$2,026,350	3,800	$2,112,362	80	$86,012
Administrative Supplements	*(225)*	31,212	*(242)*	33,810	*(242)*	33,760	*(0)*	-50
Competing:								
Renewal	107	130,103	110	119,191	112	116,815	2	-2,376
New	1,116	552,991	1,137	504,728	1,169	503,658	32	-1,070
Supplements	11	2,885	7	4,289	3	527	-4	-3,762
Subtotal, Competing	1,234	$685,978	1,254	$628,208	1,284	$621,000	30	-$7,208
Subtotal, RPGs	4,882	$2,638,320	4,974	$2,688,367	5,084	$2,767,122	110	$78,754
SBIR/STTR	217	151,141	218	153,955	224	160,235	6	6,280
Research Project Grants	5,099	$2,789,461	5,192	$2,842,323	5,308	$2,927,357	116	$85,034
Research Centers:								
Specialized/Comprehensive	243	$613,721	244	$613,809	246	$625,831	2	$12,021
Clinical Research	0	0	0	0	0	0	0	0
Biotechnology	0	50	0	0	0	0	0	0
Comparative Medicine	0	0	0	0	0	0	0	0
Research Centers in Minority Institutions	0	0	0	0	0	0	0	0
Research Centers	243	$613,771	244	$613,809	246	$625,831	2	$12,021
Other Research:								
Research Careers	487	$96,578	461	$92,765	461	$92,765	0	$0
Cancer Education	59	14,878	83	20,939	85	21,439	2	500
Cooperative Clinical Research	106	295,622	113	315,741	115	322,241	2	6,500
Biomedical Research Support	0	0	0	0	0	0	0	0
Minority Biomedical Research Support	0	98	0	98	0	98	0	0
Other	193	140,958	183	152,833	206	168,182	23	15,349
Other Research	845	$548,134	840	$582,375	867	$604,725	27	$22,349
Total Research Grants	6,187	$3,951,366	6,276	$4,038,507	6,421	$4,157,912	145	$119,405
Ruth L Kirschstein Training Awards:	FTTPs		FTTPs		FTTPs		FTTPs	
Individual Awards	640	$29,185	640	$29,623	640	$30,808	0	$1,185
Institutional Awards	1,053	67,240	1,053	68,248	1,053	70,978	0	2,730
Total Research Training	1,693	$96,425	1,693	$97,871	1,693	$101,786	0	$3,915
Research & Develop. Contracts	401	$839,606	403	$831,196	412	$849,178	9	$17,981
(SBIR/STTR) (non-add)	*(47)*	*(23,956)*	*(54)*	*(27,153)*	*(65)*	*(31,593)*	*(11)*	*(4,440)*
Intramural Research	1,755	1,072,602	1,831	1,090,169	1,892	1,117,593	61	27,425
Res. Management & Support	1,238	450,438	1,259	471,062	1,301	476,832	42	5,771
SBIR Admin. (non-add)	*(0)*	*(2,893)*	*(0)*	*(3,000)*	*(0)*	*(3,000)*	*(0)*	*(0)*
Construction		0		0		0		0
Buildings and Facilities		30,000		30,000		30,000		0
Total, NCI	2,993	$6,440,438	3,090	$6,558,805	3,193	$6,733,302	103	$174,497

[1] Of which $195.0 million in FY 2020, $195.0 million in FY 2021, and $194.0 million in FY 2022 is derived by transfer from the NIH Innovation Account under the 21st Century Cures Act.
[2] Includes 21st Century Cures Act funding not obligated in FY 2020, and carried over into FY 2021
** All items in italics and brackets are non-add entries*

NATIONAL INSTITUTES OF HEALTH

NATIONAL CANCER INSTITUTE

For carrying out section 301 and title IV of the PHS Act with respect to cancer, [$6,364,852,000] *$6,539,302,000*, of which up to $30,000,000 may be used for facilities repairs and improvements at the National Cancer Institute-Frederick Federally Funded Research and Development Center in Frederick, Maryland.

NIH INNOVATION ACCOUNT, CURES ACT

(INCLUDING TRANSFER OF FUNDS)

For necessary expenses to carry out the purposes described in section 1001(b)(4) of the 21st Century Cures Act, in addition to amounts available for such purposes in the appropriations provided to the NIH in this Act, **[**$404,000,000**]***$496,000,000*, to remain available until expended: *Provided*, That such amounts are appropriated pursuant to section 1001(b)(3) of such Act, are to be derived from amounts transferred under section 1001(b)(2)(A) of such Act, and may be transferred by the Director of the National Institutes of Health to other accounts of the National Institutes of Health solely for the purposes provided in such Act: *Provided further*, That upon a determination by the Director that funds transferred pursuant to the previous proviso are not necessary for the purposes provided, such amounts may be transferred back to the Account: *Provided further*, That the transfer authority provided under this heading is in addition to any other transfer authority provided by law.

NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

Summary of Changes
(Dollars in Thousands)

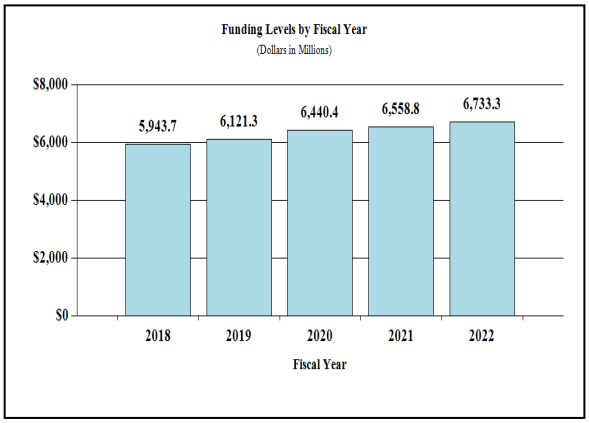
FY 2021 Enacted	$6,558,805
FY 2022 President's Budget	$6,733,302
Net change	$174,497

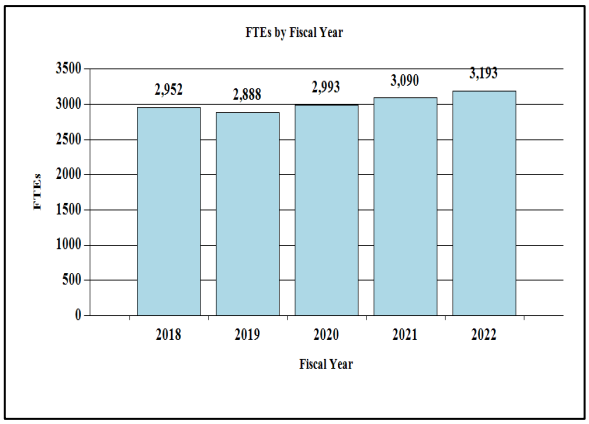
CHANGES	FY2021 Enacted FTEs	FY2021 Enacted Budget Authority	FY 2022 President's Budget FTEs	FY 2022 President's Budget Budget Authority	Built-In Change from FY 2021 Enacted FTEs	Built-In Change from FY 2021 Enacted Budget Authority
A. Built-in:						
1. Intramural Research:						
a. Annualization of January 2021 pay increase & benefits		$368,630		$383,147		$992
b. January FY 2022 pay increase & benefits		368,630		383,147		10,164
c. Paid days adjustment		368,630		383,147		0
d. Differences attributable to change in FTE		368,630		383,147		3,360
e. Payment for centrally furnished services		171,122		179,678		8,556
f. Cost of laboratory supplies, materials, other expenses, and non-recurring costs		550,416		554,768		14,794
Subtotal						$37,866
2. Research Management and Support:						
a. Annualization of January 2021 pay increase & benefits		$241,410		$250,961		$651
b. January FY 2022 pay increase & benefits		241,410		250,961		6,660
c. Paid days adjustment		241,410		250,961		0
d. Differences attributable to change in FTE		241,410		250,961		2,240
e. Payment for centrally furnished services		31,109		32,664		1,555
f. Cost of laboratory supplies, materials, other expenses, and non-recurring costs		198,543		193,207		5,525
Subtotal						$16,632
Subtotal, Built-in						$54,498

CHANGES	FY2021 Enacted No.	FY2021 Enacted Amount	FY 2022 President's Budget No.	FY 2022 President's Budget Amount	Program Change from FY 2021 Enacted No.	Program Change from FY 2021 Enacted Amount
B. Program:						
1. Research Project Grants:						
a. Noncompeting	3,720	$2,060,159	3,800	$2,146,122	80	$85,962
b. Competing	1,254	628,208	1,284	621,000	30	-7,208
c. SBIR/STTR	218	153,955	224	160,235	6	6,280
Subtotal, RPGs	5,192	$2,842,323	5,308	$2,927,357	116	$85,034
2. Research Centers	244	$613,809	246	$625,831	2	$12,021
3. Other Research	840	582,375	867	604,725	27	22,349
4. Research Training	1,693	97,871	1,693	101,786	0	3,915
5. Research and development contracts	403	831,196	412	849,178	9	17,981
Subtotal, Extramural		$4,967,575		$5,108,876		$141,301
	FTEs		FTEs		FTEs	
6. Intramural Research	1,831	$1,090,169	1,892	$1,117,593	61	-$10,442
7. Research Management and Support	1,259	471,062	1,301	476,832	42	-10,861
8. Construction		0		0		0
9. Buildings and Facilities		30,000		30,000		0
Subtotal, Program	3,090	$6,558,805	3,193	$6,733,302	103	$119,999
Total built-in and program changes						$174,497

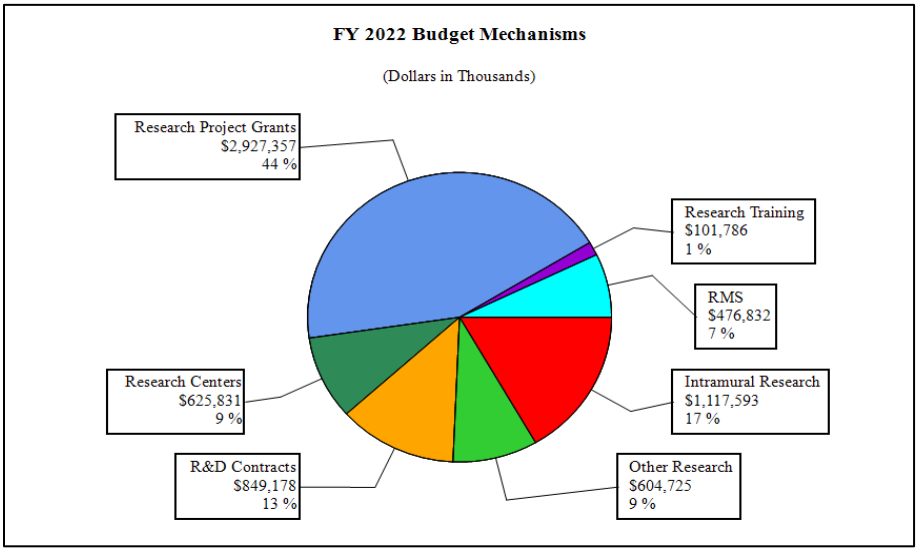
Fiscal Year 2022 Budget Graphs

History of Budget Authority and FTEs:

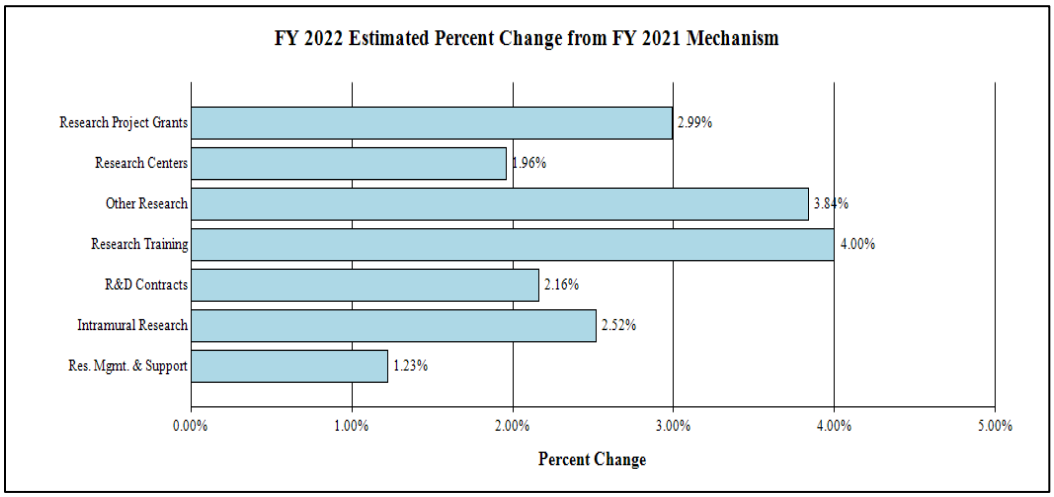




Distribution by Mechanism:

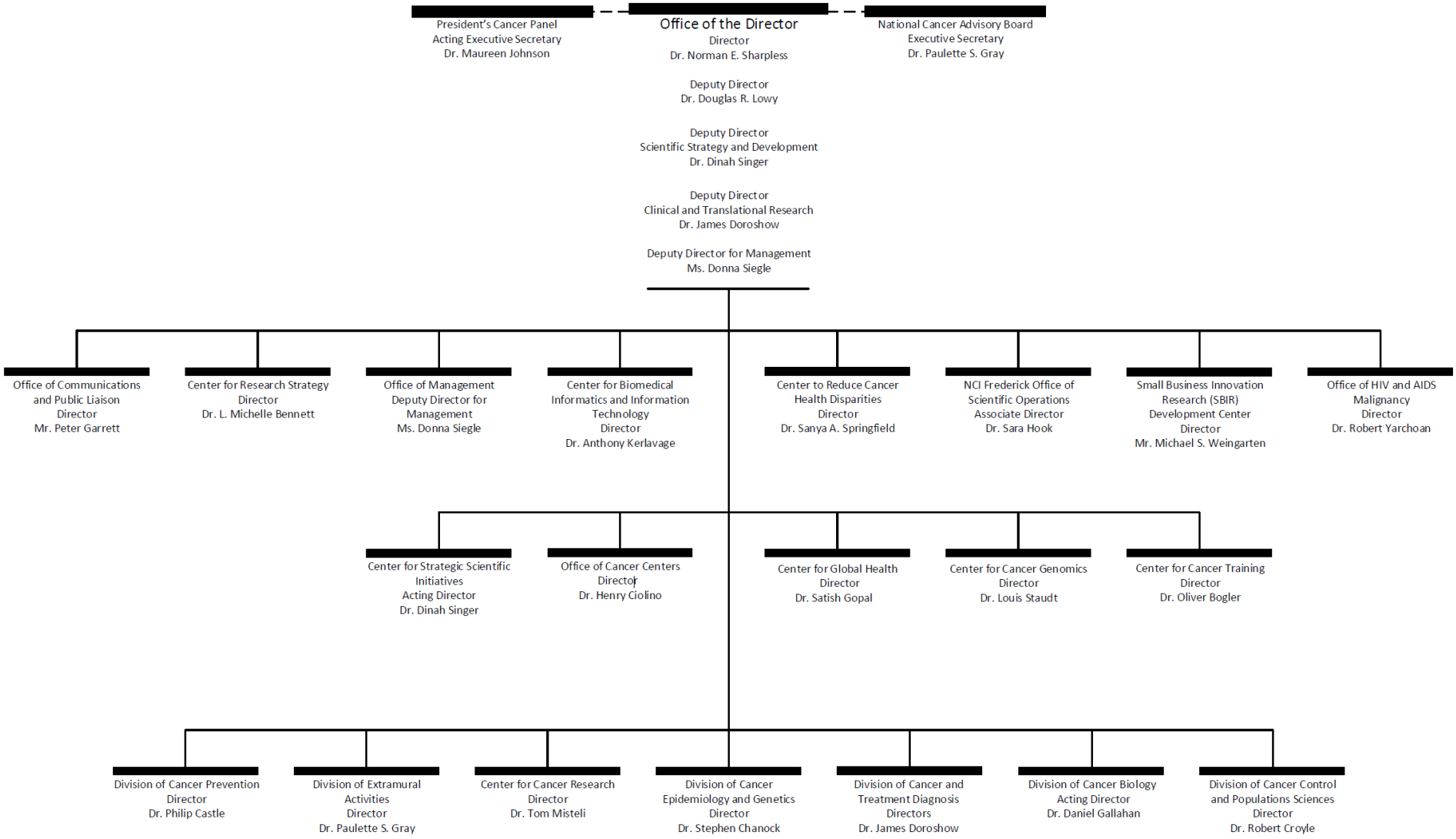


Change by Selected Mechanism:



NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

Organization Chart



NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

Budget Authority by Activity[1]
(Dollars in Thousands)

	FY 2020 Final		FY 2021 Enacted		FY 2022 President's Budget		FY 2022 +/- FY 2021 Enacted	
Extramural Research	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**
Detail								
Understanding How Cancer Develops		$963,250		$981,486		$1,010,182		$28,696
Understanding the Causes of Cancer		963,408		980,548		1,009,973		29,425
Detecting and Diagnosing Cancer		575,032		584,114		602,434		18,320
Treating Cancer and Improving Survivorship		1,285,725		1,306,416		1,347,126		40,710
Improving Cancer Prevention and Control		240,412		244,127		251,840		7,714
Cancer Centers		606,286		613,809		625,831		12,021
Research Workforce Development		207,881		211,575		215,990		4,415
Repairs and Improvements		30,000		30,000		30,000		0
Childhood Cancer Data Initiative (CCDI)[2]		45,404		45,500		45,500		0
Subtotal, Extramural		**$4,917,397**		**$4,997,575**		**$5,138,876**		**$141,301**
Intramural Research	**1,755**	**$1,072,602**	**1,831**	**$1,090,169**	**1,892**	**$1,117,593**	**61**	**$27,425**
Research Management & Support	**1,238**	**$450,438**	**1,259**	**$471,062**	**1,301**	**$476,832**	**42**	**$5,771**
TOTAL	**2,993**	**$6,440,438**	**3,090**	**$6,558,805**	**3,193**	**$6,733,302**	**103**	**$174,497**

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund.
[2] Includes CCDI extramural program costs. Total CCDI costs, including intramural research, are $50.0 million in each year from FY 2020 through FY 2022.

FY 2022 Justification of Budget Request
National Cancer Institute

Authorizing Legislation: Section 301 and title IV of the Public Health Service Act, as amended.
Budget Authority (BA):

	FY 2020 Actual	FY 2021 Enacted	FY 2022 President's Budget	FY 2022 +/- FY 2021
BA	$6,440,438,000	$6,558,805,000	$6,733,302,000	$174,497,000
FTE	2,993	3,090	3,193	103

Program funds are allocated as follows: Competitive Grants/Cooperative Agreements; Contracts; Direct Federal/Intramural and Other.

Program Descriptions and Accomplishments

NCI supports basic and applied research that advances five broad scientific goals:

- Understanding How Cancer Develops
- Understanding the Causes of Cancer
- Detecting and Diagnosing Cancer
- Treating Cancer and Improving Survivorship
- Improving Cancer Prevention and Control

In order for NCI to continue pursuing these goals, NCI issues grants for investigator-initiated research, conducts clinical trials, and finances a broad range of other science programs. NCI selects and supports NCI-designated Cancer Centers, and conducts basic, clinical, and population research through its intramural program. NCI also manages research contracts, including a Federally Funded Research and Development Center (FFRDC) to serve the Frederick National Laboratory for Cancer Research, and operates research facilities to support NCI FFRDC and intramural science.

Investigator-initiated research project grants constitute a large portion of the research investment for all five scientific goals. During FY 2020, NCI issued 6,162 grant awards across all grant mechanisms, including 3,298 traditional research project (R01) and 320 exploratory (R21) grants.[1] These grant awards include 93 grants through the 21st Century Cures Act. Also during FY 2020, more than 50,000 new patients enrolled in over 750 clinical trials that NCI sponsored or supported. Half of these patients are enrolled in trials supported by the National Clinical Trials Network (NCTN) and the NCI Community Oncology Research Network (NCORP).

The narratives that follow highlight NCI programs and progress in each scientific area, as well as future activities. However, virtually all NCI research under one scientific goal influences the approaches used to advance other areas of science. The breadth and complexity of NCI research precludes a complete review of all NCI programs in this document. Further details appear at www.cancer.gov. The examples that follow offer an overview of initiatives and accomplishments but understate the vast amount of NCI work that advances the National Cancer Program.

[1] These grant counts include grants awarded in FY 2020 from Cures funding carried over from previous years, and exclude grants anticipated to be awarded from FY 2020 Cures funding carried over into future years.

I. Understanding How Cancer Develops

Cancer is driven by alterations of a cell's genome (DNA) as well as the RNAs and proteins that its DNA encodes. During this process, abnormal types and amounts of proteins emerge that lead to a variety of molecular abnormalities. These abnormalities cause a normal cell to transform into a tumor cell and lead to a diminished ability to control growth and other hallmarks of cancer. Precision medicine, in all its forms, depends on a deeper understanding of the genetic, epigenetic, and non-genetic changes that occur in cancer cells and the surrounding tumor microenvironment.

To better understand how cancer develops, NCI supports large-scale, high-throughput studies of the genes, RNAs, proteins, and pathways altered in cancer. In addition, NCI funds studies of basic cell biology, cell interactions, tumor angiogenesis (blood vessels that form to support a tumor), immune responses, and related research to understand the mechanisms that cause cancer to develop and progress. NCI also supports laboratory studies in model systems, including animal and computational models, to investigate the functions of these systems and their relationship to cancer. Examples of initiatives under this NCI research goal include:

Rare Tumors – Rare cancers make up about 25 percent of all cancers and include all brain and childhood cancers. Developing therapies to target these cancers requires a deep understanding of the mutations responsible for cell growth and survival. The Rare Tumor Patient Engagement Network – an intramural project funded by the Cancer Moonshot^{SM} – works with patients to learn how rare cancers develop and progress, their genetic origins, and how rare cancers affect patients' lives. As we learn about abnormalities that play a role in cancer cell growth and survival, research on rare cancers can offer insights to help patients with more common cancers.

Cancer Dormancy – Cancer cells can travel to distant sites in the body. Yet, the cells sometimes do not immediately grow to form metastatic lesions. The cancer cells are alive, but dormant – a state that can last for months or years. The triggers that cause cells to become dormant and then resume growth are poorly understood. The triggers appear to depend on properties of cancer cells and interactions of the cells with local tissue, the immune system, and the micro-environment. Thanks to new technologies to trace, track, and visualize single cells, research on these interactions is possible. This research may lead to therapies to ensure that cancer cells remain permanently dormant – or are eliminated – as a way to prevent such metastases.

Cancer Health Disparities – Some populations experience higher incidence of cancer, and for some cancers, higher mortality compared to the general population. Multiple factors – biological, environmental, societal, lifestyle, economic, as well as access to care – drive cancer disparities. NCI strives to understand the causes of cancer disparities and identify ways to reduce them.

To understand and address disparities, NCI emphasizes recruiting minority populations to clinical trials to ensure valid, generalizable evidence. Through NCORP and NCTN, NCI successfully increased enrollment of minority populations. During 2017-2019, minority enrollment in NCTN and NCORP trials averaged 27 percent, nearly twice the rate compared to two decades ago. Overall, the NCI investment in cancer disparities rose to $500 million in FY 2020, twice the funding level in FY 2015. This investment may help us understand why some cancers are more aggressive in minority populations and may lead to targeted prevention and treatment options.

Budget Policy: The FY 2022 President's Budget request is $1,010.2 million, an increase of $28.7 million or 2.9 percent compared with the FY 2021 Enacted level.

II. Understanding the Causes of Cancer

Cancer develops through a complex interplay of factors, including genetics, environmental exposures, and changes that occur through aging. These factors probably influence the likelihood of developing almost all cancers. In some cases, cancer risk is more strongly influenced by inheriting a mutation, a variant of a gene, or a combination of genes. In other cases, cancer risk is influenced by external factors, such as exposure to tobacco or infectious agents.

Understanding the interactions among genetic, environmental, and lifestyle factors will improve the ability of scientists to prevent, detect, diagnose, and treat cancers at the earliest possible time. NCI-funded studies on the causes of cancer range from laboratory-based research to large-scale studies that use population cohorts or case-controlled comparisons of subpopulations. The studies may also involve modeling to determine cancer risk for individuals or within populations. Through such studies, NCI research continues to strive to identify the causes of cancer. Examples include:

Ovarian Cancer – Ovarian cancer is often fatal because it is detected late when the cancer has progressed to an advanced stage. Other challenges, such as the absence of effective screening and the heterogeneity of ovarian cancer, also contribute to ovarian cancer deaths. To address these concerns, NCI investigators are conducting studies to improve the ability to identify and predict risks for subtypes of ovarian cancer.

Preventing Cervical Cancers – Human papillomavirus (HPV), the primary cause of cervical cancer, offers opportunities for primary and secondary prevention. To advance primary prevention, NCI sponsored a large, randomized trial with Moonshot[sm] funds to determine if one dose of HPV vaccine is as effective as two or three doses. The ability to protect against cancer-causing HPV infections with one dose, rather than the two or three doses as is currently recommended, could possibly prevent 500,000 or more cases of cervical cancer worldwide each year. To advance secondary prevention, NCI discoveries have led to new molecular and other methods to screen for these cancers. These discoveries led to developing and implementing new screening and clinical management guidelines that are improving the efficiency and effectiveness of cancer screening programs.

Budget Policy: The FY 2022 President's Budget request is $1,010.0 million, an increase of $29.4 million or 3.0 percent compared with the FY 2021 Enacted level.

III. Detecting and Diagnosing Cancer

Many deaths occur because cancers are diagnosed at late stages when treatment is often less effective. NCI-supported researchers are working on techniques to image tumors earlier and identify molecules – including nucleic acids, proteins, metabolites, and other substances – that may improve early detection and diagnosis. This often involves uncovering the distinct molecular signatures of cancers and developing and refining molecular tests to detect cancer.

NCI has an array of programs to advance early cancer detection and diagnosis. These include –

- Developing new technologies and improving existing methods of noninvasive imaging to support cancer diagnosis, to identify disease subsets in patients, to determine the stage of disease, and to monitor the progress of cancer treatment.
- Coordinating efforts to obtain high-quality tissue specimens and data for the research community, and developing databases of molecularly characterized specimens.
- Maintaining infrastructure and programs such as the Genomic Data Commons, the Cancer Genome Characterization Initiative, and The Cancer Genome Atlas (a collaboration with the National Human Genome Research Institute) to support the cancer research enterprise.

Investigator-initiated research project grants are one mechanism NCI relies on to support and improve early detection and diagnosis of cancer. Other initiatives under this goal include:

Cancer Research Data Commons – NCI supports efforts to share, aggregate, and analyze the large volume of data generated across the continuum of cancer research, surveillance, and clinical care. Through the NCI Cancer Research Data Commons, researchers aggregate and share cancer data from studies that involve genomics, proteomics, imaging, immuno-oncology, and clinical trials. The Data Commons relies on cloud computing and offers a virtual workspace environment to collaborate. This essential infrastructure helps cancer researchers work together to store, access, analyze, and share data without the burden and downtime associated with downloading.

Artificial Intelligence in Research and Cancer Care – Artificial Intelligence (AI) is accelerating discoveries that support cancer detection, diagnosis, and therapy. In the field of cancer imaging, AI-driven research advances are detecting precancers with greater accuracy and are improving MRI-guided biopsies. AI is also a research tool to support molecular simulations and to classify cancer subtypes. NCI continues to spur advances in all these areas through a myriad of partnerships that apply advanced computing to cancer research and cancer care.

Artificial Intelligence for Cancer Risk Stratification and Early Detection – AI offers cancer clinicians improved tools for detection, diagnosis, and risk-adjusted screening. NCI-supported studies apply AI tools in combination with molecular markers to enhance diagnostic accuracy. AI also offers opportunities to better predict cancer risks, identify nodules before symptoms emerge and distinguish benign and aggressive nodules to support treatment decisions.

DOE Partnerships – With support from Cancer Moonshot^{SM} funding, NCI is collaborating with the Department of Energy (DOE) and five DOE national laboratories to apply high-performance computing to cancer science. To cite one example, the DOE partnership has improved the NCI SEER program, the data source for virtually all information about cancer incidence, survival, and mortality in the United States. Through the DOE collaboration, NCI is using natural language processing algorithms to electronically extract key information from millions of pathology documents submitted by hundreds of pathology labs. The result is a shorter timeline for uploading the pathological characteristics of each SEER record. The new process is 4,500 times faster than the conventional one and is equally accurate.

Budget Policy: The FY 2022 President's Budget request is $602.4 million, an increase of $18.3 million or 3.1 percent compared with the FY 2021 Enacted level.

IV. Treating Cancer and Improving Survivorship

Research on cancer therapy has many facets that go beyond developing and testing drugs, radiotherapy, immunotherapy, and surgery. These include controlling symptoms, improving care, and enhancing long-term survivorship and quality of life. Developing new therapies and the means to monitor cancers before and during treatment are central to successfully treating patients. Increasingly, progress is linked to knowledge about molecular fingerprints of tumors, the structure of cancer-associated molecules and how to target them with new drugs, how cancer cells interact with the host environment and the immune system, and the altered behaviors of cancer cells.

To develop and improve cancer treatments, NCI supports basic, translational, and clinical research to identify therapeutic targets and strategies. Commercial entities frequently validate these targets and develop interventions against them. NCI also supports clinical research to develop and test interventions at sites across the country. Examples of these priorities include:

Childhood Cancer Data Initiative (CCDI)

FY 2021 Budget Level: $50.0 million
FY 2022 Budget Level: $50.0 million
Change $ 0.0 million

With so few patients for each type of childhood cancer, NCI must optimize how researchers collect, analyze, and share research and clinical care data for childhood, adolescent, and young adult cancers. Doing so will allow researchers to learn from every child and their cancer. To advance these goals, NCI launched CCDI to:

- Collect and support standardized, high-quality research and clinical care data sets.
- Connect and federate repositories and registries that hold data of all types, from basic research, to clinical treatments, to surveillance data.
- Foster a culture of collaboration and data sharing to speed childhood cancer research.

Early CCDI accomplishments include laying foundations for a pediatric cancer data ecosystem and a Pediatric Preclinical Data Commons, essential resources to advance this research.

Viral Vectors for Cell-Based Immunotherapy – Through NCI's Biopharmaceutical Development Program (BDP) at the Frederick National Laboratory for Cancer Research (FNLCR), NCI is producing viral vectors to support research on new cancer immunotherapies. These laboratory-modified viruses are essential tools to develop and produce genetically engineered human immune cells used for cancer therapies.

Research to Reduce Cancer Health Disparities – In FY 2017, as a component of the Cancer Moonshot℠, NCI established a network to develop patient-derived xenograft (PDX) models to support cancer research. In FY 2018, NCI expanded the network, known as PDXNet, adding new centers to develop research models from racially and ethnically diverse populations. These projects aim to advance the important Moonshot priority of reducing cancer health disparities.

NCI recently issued planning and feasibility awards to institutions developing translational research programs focused on cancer disparities. The awards will help the programs mature and compete for a SPORE award. SPORE program sites can improve our understanding of cancer health disparities and translate this understanding into ways to prevent and treat cancer among racially and ethnically diverse patients.

Improving Outcomes for Cancer Survivors – The burden of cancer treatment and the long-term effects of cancer are a challenge for survivors of all ages. A series of NCI FY 2020 awards is funding research to achieve the priorities of the STAR Act. One STAR Act priority is improving outcomes for pediatric, adolescent, and young adult cancer survivors. NCI is funding research on methods to analyze patient-reported outcomes and to understand treatment side effects and how patients tolerate cancer treatments.

Budget Policy: The FY 2022 President's Budget request is $1,347.1 million, an increase of $40.7 million or 3.1 percent compared with the FY 2021 Enacted level.

V. Improving Cancer Prevention and Control

Cancer prevention and control research focuses on identifying ways to reduce cancer risk and improve cancer outcomes at the individual and population levels. NCI supports a broad range of research, such as studies to characterize molecular changes associated with cancer initiation and progression, that can become the basis for developing therapies and other interventions to target these mechanisms. NCI research also focuses on developing interventions to reduce exposures to cancer-causing substances and increase healthy behaviors. Other research focuses on the ways to integrate proven, effective interventions into routine care. NCI also funds studies in underserved communities to advance the goal of controlling cancer more effectively for all populations. Through education, behavior modification, vaccination or other preventive treatments, and through policies that limit exposures to carcinogens, 30 percent to 50 percent of cancers could be prevented.

Cancer control science relies on basic and applied research in behavioral, social, and population sciences to reduce cancer risk, incidence, morbidity, and mortality, and improve quality of life. Cancer control seeks to understand the causes and distribution of cancer in the population, identify and implement effective healthcare practices to reduce cancer incidence, and monitor and explain cancer trends and disparities in the population. Cancer control research generates basic knowledge about monitoring and changing behavior and translates that knowledge into practice. To improve cancer prevention and control, NCI supports research to understand the factors that influence cancer outcomes, quality of care, and quality of life. NCI also promotes studies in underserved communities to advance the goal of controlling cancer more effectively for all populations. Examples of initiatives under this NCI research goal include:

HPV-35 Poses Greater Risks for Women of African Ancestry – More than 40 types of HPV spread through sexual contact. Of these, about a dozen are high-risk. Persistent infection with high-risk HPV types may progress to cancer. HPV-35 is relatively uncommon and is not an HPV strain included in approved vaccines. Although uncommon within the total population, a 2020 NCI study found that HPV-35 was more prevalent among African American women and caused more cervical precancers in these women than in patients of other races and ethnicities. To improve prevention of cervical cancer and precancer for women of African ancestry, the 2020 study suggests that the next generation of HPV vaccines include HPV-35 and that HPV tests distinguish HPV-35 from other strains of this common virus.

Tracking Cancer Deaths in the Era of COVID-19 – COVID-19 has disrupted health care delivery in many ways, and NCI is especially concerned about the effect of the pandemic on cancer prevention, screening, diagnosis, and treatment. Soon after the pandemic emerged, NCI began developing data visualization tools to identify the patterns of excess deaths from major causes, including cancer. The NCI tools track deaths by cause across the United States. As a next step, NCI investigators are conducting in-depth analyses of the data to gain insights into the broader impact of the pandemic on deaths due to cancer.

SeroNet – In April 2020, NCI received an emergency appropriation for the COVID-19 pandemic response. NCI immediately began developing the SeroNet, the nation's largest coordinated effort to understand the immune response to SARS-CoV-2. SeroNet engaged 25 universities and NCI-designated Cancer Centers to address fundamental questions about the virus, such as –

- Why do some people get sick from SARS-CoV-2 infection, while others do not?
- Why do some experience severe symptoms, while others have mild symptoms?
- How long-lasting is the immune response to the virus; will it protect against future infection?

SeroNet is a highly collaborative effort. NCI is working closely with NIAID and other components of NIH, with the Department of Health and Human Services, and with the nation's top biomedical research institutions. SeroNet also funds 4 Capacity Building Centers to expand U.S. capacity for serological testing and to develop and distribute assays to harmonize testing.

Cancer Grand Challenges – In August 2020, NCI joined with Cancer Research U.K. to launch Cancer Grand Challenges (CGC), an initiative to fund research to address some of the most profound, unresolved questions in cancer. CGC posed nine cancer challenges to the research community and seeks bold and compelling ideas from multidisciplinary, multi-national teams to solve these compelling research challenges. By joining forces, NCI and Cancer Research U.K. are working to accelerate the pace of cancer science, stimulate scientific creativity of the highest caliber, and make bold progress to understand, prevent, detect, and treat cancer.

NCI SEER Program – NCI's Surveillance, Epidemiology, and End Results (SEER) Program, a population-based cancer surveillance initiative, captures data from a broad range of sources. SEER serves as essential infrastructure to support cancer research, from epidemiologic, to clinical, to genomic. One example of the power of SEER data is a 2020 NCI-led study that showed U.S. mortality rates from the most common lung cancer – non-small cell lung cancer (NSCLC) – fell sharply in recent years and that improved treatments contributed to this success. For the first time, nationwide mortality for NSCLC is declining much faster than its incidence, a promising development that correlates with FDA approval of several therapies for this cancer.

Improving Cancer Control for Rural Communities – Compared to urban counties, rural areas have higher average death rates for all cancers. During FY 2019, NCI awarded more than 40 grant supplements to NCI Cancer Centers to expand capacity to conduct rural cancer control research. For FY 2021, NCI plans to award a new series of grants to support cancer prevention research that addresses the risk factors that contribute to cancer disparities in rural populations.

SBIR / STTR – Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs are longstanding NCI priorities. Examples of recent awards include:

- A Fast-Track Award (combining phase I and II SBIR research), where an SBIR innovator successfully developed nine new patient-derived xenograft models for prostate cancer. These include five models to support research that may benefit African Americans.
- An NCI SBIR award to develop digital tools that streamline how patients connect with their clinical trials. This technology has become especially useful during the COVID-19 pandemic. The platform supports clinical research in 30 countries and 26 languages.

Budget Policy: The FY 2022 President's Budget request is $251.8 million, an increase of $7.7 million or 3.2 percent compared with the FY 2021 Enacted level.

VI. Cancer Centers

The NCI Cancer Centers program is a cornerstone of the nation's cancer research program. Together with their community partners, the 71 NCI-designated Cancer Centers form the backbone of NCI's extramural program for studying and controlling cancer. NCI Cancer Centers are the nation's single most important source of new insights into the causes of cancer and strategies to prevent, diagnose, and treat cancer. Research proposals from Cancer Center investigators account for about three-quarters of the investigator-initiated grants NCI issues.

Examples of the important disparities-focused research at NCI Cancer Centers include:

- Knight Cancer Institute (KCI), Oregon – NCI's National Outreach Network works through NCI Cancer Centers to develop culturally appropriate, evidence-based cancer information for underserved communities. With Network support, KCI trained 18 community health educators to expand cancer screening and improve prevention for American Indian, Native American, and sexual and gender minority populations.
- Hollings Cancer Center, South Carolina – Another National Outreach Network priority at the Hollings Cancer Center is increasing awareness among Black and African American communities about cancer disparities, screening guidelines, and cancer prevention.
- The American Indian Colorectal Cancer Screening Consortium (Cancer Centers in Arizona, New Mexico, and Oklahoma) – This consortium is a Cancer Moonshot[SM]

Center to Reduce Cancer Health Disparities at NCI

FY 2021 Budget Level:	$98.4 million
FY 2022 Budget Level:	$98.9 million
Change	$ 0.5 million

NCI supports programs to develop and maintain a robust cancer research workforce that reflects the nation we serve. At NCI, the Center to Reduce Cancer Health Disparities (CRCHD) plays a vital role to advance this goal. Examples of the breadth of CRCHD programs in health disparities include:

Continuing Umbrella of Research Experiences (CURE), provides research training and career development to middle school students through early stage investigators for those from underrepresented backgrounds, supporting their progress along the academic pathway to achieve research independence.

Intramural Continuing Umbrella of Research Experiences (iCURE), provides mentored research experience for post-baccalaureate and graduate students and postdoctoral fellows, many from underrepresented backgrounds, who are engaged in intramural research at NCI.

Youth Enjoy Science (YES) Research Education Program, promotes cancer research careers among underrepresented students by supporting institution-level, early intervention education for grades 6-12 and for undergraduate students, as well as training to support their teachers and faculty.

Partnerships to Advance Cancer Health Equity (PACHE), supports partnerships between NCI-designated Cancer Centers and institutions serving underserved populations and under-represented students, with special focus on cancer health disparities, research education, and community outreach.

Collaborative Research Supplements, are grant supplement awards to allow investigators that are new to cancer disparities research to collaborate with experienced disparities researchers, and thereby advance the science of cancer disparities and the pool of competitive cancer disparities researchers.

Faculty Institutional Recruitment for Sustainable Transformation (FIRST), in collaboration with the NIH Common Fund and other NIH institutes, NCI is supporting FIRST, an initiative to advance, enhance, and sustain cultures of inclusive excellence within the biomedical research community. FIRST relies on evidence-based practices to foster biomedical workforce diversity and inclusive scientific excellence.

priority to increase screening among American Indians. The consortium provides evidence-based intervention through Tribal and community engagement to reach thousands of American Indian adults who would otherwise go unscreened.

Budget Policy: The FY 2022 President's Budget request is $625.8 million, an increase of $12.0 million or 2.0 percent compared with the FY 2021 Enacted level.

VII. Research Workforce Development

NCI has a longstanding commitment to train, develop, and support a strong and diverse work-force of researchers spanning the career continuum. Support for early stage investigators attracts talented scientists and ensures the future strength of cancer research. In addition to direct support for training, NCI grants awarded to established investigators – scientists with a proven ability to conduct robust science – fosters mentoring for the next generation of cancer researchers.

Training Cancer Researchers of the Future

NCI supports a broad array of training to develop cancer researchers of the future. Through formal training, individual fellowships, and career development awards, NCI supports training in basic, clinical, and behavioral research at institutions across the country. Those receiving training grants include pre-doctoral candidates, postdoctoral fellows, and new faculty in independent research positions. NCI also supports research training experiences for high school, college, graduate, and medical school students, and postdoctoral fellows working in NCI intramural research programs.

NCI continues to advance new approaches to strengthen the cancer research workforce. In FY 2020, NCI initiated the NCI Awardee Skills Development Consortium (NASDC) to support training and mentorship for junior faculty. These faculty investigators are at a critical point in their careers. They are expected to survive in a hyper-competitive funding climate and become academic leaders who teach, mentor, and manage research programs. Through NASDC, NCI delivers a suite of courses to teach skills in areas critical to achieving an independent career in academic research. The

NASDC network is an opportunity for grantees serving as junior faculty to improve their professional, research, and clinical skills, and enhance their cancer research careers.

NCI is committed to supporting a well-defined career path to research independence for scientists. During FY 2020, NCI funded the fifth F99/K00 training award cohort, supporting the transition from pre-doctoral research to postdoctoral training. This positions awardees to be competitive for a second transition award to advance their research independence, the K99/R00, supporting the transition to tenure-track investigators. Collectively, these mechanisms offer a smoother pathway for making these challenging transitions. Ninety percent of the first two cohorts of F99 awardees successfully transitioned to the K00 phase, securing postdoctoral positions in top laboratories.

Budget Policy: The FY 2022 President's Budget request is $216.0 million, an increase of $4.4 million or 2.1 percent compared with the FY 2021 Enacted level.

VIII. Intramural Research

NCI intramural research complements all aspects of the National Cancer Program. The scientists, physicians, and clinicians in the NCI Intramural Research Program conduct basic, clinical, genomic, and population research. NCI intramural research emphasizes high-risk, high-reward research that would otherwise not occur. Accomplishments of the intramural research program appear within the program descriptions for the five NCI scientific goals of this budget document.

Budget Policy: The FY 2022 President's Budget request is $1,117.6 million, an increase of $27.4 million or 2.5 percent compared with the FY 2021 Enacted level.

IX. Research Management and Support

NCI research management and support staff serve an indispensable role by enabling the success of all NCI programs. Their activities include central administration, program direction, grant and contract administration, human resources, program coordination, and financial management.

Budget Policy: The FY 2022 President's Budget request is $476.8 million, an increase of $5.8 million or 1.2 percent compared with the FY 2021 Enacted level.

X. Repairs and Improvements

Funding for Repairs and Improvements allows NCI to operate facilities at the Frederick National Laboratory for Cancer Research at Fort Detrick, Maryland, as a modern research enterprise.

Budget Policy: The FY 2022 President's Budget request is $30.0 million, unchanged from the FY 2021 Enacted level.

NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

Appropriations History[1]

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation
2013	$5,068,864,000		$5,084,227,000	$5,072,183,421
Rescission				$10,144,367
Sequestration				($254,588,730)
2014	$5,125,951,000		$5,091,885,000	$4,923,238,000
Rescission				$0
2015	$4,930,715,000			$4,950,396,000
Rescission				$0
2016	$5,098,479,000	$5,081,812,000	$5,204,058,000	$5,214,701,000
Rescission				$0
2017[2]	$5,893,509,000	$5,388,444,000	$5,429,769,000	$5,689,329,000
Rescission				$0
2018	$4,474,222,000	$5,771,181,000	$5,858,270,000	$5,964,800,000
Rescission				$0
2019	$5,626,312,000	$6,136,037,000	$6,147,125,000	$6,143,892,000
Rescission				$0
2020	$5,246,737,000	$6,444,165,000	$6,351,863,000	$6,440,442,000
Rescission				$0
2021	$5,881,173,000	$6,494,155,000	$6,722,656,000	$6,559,852,000
Rescission				$0
2022	$6,733,302,000			

[1] Includes funds derived by transfer from the NIH Innovation Account under the 21st Century Cures Act
[2] Budget Estimate to Congress includes mandatory financing

NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

Authorizing Legislation

	PHS Act/ Other Citation	U.S. Code Citation	2021 Amount Authorized	FY 2021 Enacted	2022 Amount Authorized	FY 2022 President's Budget
Research and Investigation	Section 301	42§241	Indefinite	$6,558,805,000	Indefinite	$6,733,302,000
National Cancer Institute	Section 401(a)	42§281	Indefinite		Indefinite	
Total, Budget Authority				$6,558,805,000		$6,733,302,000

NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

Amounts Available for Obligation[1]
(Dollars in Thousands)

Source of Funding	FY 2020 Final	FY 2021 Enacted	FY 2022 President's Budget
Appropriation[2, 3]	$6,440,442	$6,559,852	$6,733,302
Secretary's Transfer	0	0	0
OAR HIV/AIDS Transfers	-4	-1,047	0
Subtotal, adjusted budget authority	$6,440,438	$6,558,805	$6,733,302
Unobligated balance, start of year[4]	166,121	196,342	0
Unobligated balance, end of year[5]	-196,342	0	0
Subtotal, adjusted budget authority	$6,410,217	$6,755,147	$6,733,302
Unobligated balance lapsing	-255	0	0
Total obligations	$6,409,963	$6,755,147	$6,733,302

[1] Excludes the following amounts (in thousands) for reimbursable activities carried out by this account:
FY 2020 - $21,356 FY 2021 - $25,000 FY 2022 - $30,000

[2] Of which $195.0 million in FY 2020, $195.0 million in FY 2021, and $194.0 million in FY 2022 is derived by transfer from the NIH Innovation Account under the 21st Century Cures Act

[3] Of which $50.0 million is included for the Childhood Cancer Data Initiative (CCDI) in FY 2021 and FY 2022.

[4] In FY 2020, reflects 21st Century Cures Act funding carried over from FY 2017, FY 2018, and FY 2019 into FY 2020. In FY 2021, reflects 21st Century Cures Act funding carried over from FY 2017 through FY 2020 into FY 2021.

[5] Reflects 21st Century Cures Act funding carried over from FY 2017 through FY 2020 into FY 2021.

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Budget Authority by Object Class[1]
(Dollars in Thousands)

		FY 2021 Enacted	FY 2022 President's Budget	FY 2022 +/- FY 2021 Enacted
Total compensable workyears:				
	Full-time equivalent	3,090	3,193	103
	Full-time equivalent of overtime and holiday hours	4	4	0
	Average ES salary	$197	$202	$5
	Average GM/GS grade	12.6	12.6	0.0
	Average GM/GS salary	$122	$125	$3
	Average salary, Commissioned Corps (42 U.S.C. 207)	$110	$113	$3
	Average salary of ungraded positions	$122	$124	$3
	OBJECT CLASSES	**FY 2021 Enacted**	**FY 2022 President's Budget**	**FY 2022 +/- FY 2021**
	Personnel Compensation			
11.1	Full-Time Permanent	243,233	250,903	7,670
11.3	Other Than Full-Time Permanent	130,506	134,609	4,103
11.5	Other Personnel Compensation	13,571	13,999	428
11.7	Military Personnel	3,459	3,586	127
11.8	Special Personnel Services Payments	66,351	68,440	2,089
11.9	**Subtotal Personnel Compensation**	**$457,120**	**$471,537**	**$14,417**
12.1	Civilian Personnel Benefits	150,192	159,739	9,547
12.2	Military Personnel Benefits	2,728	2,832	104
13.0	Benefits to Former Personnel	0	0	0
	Subtotal Pay Costs	**$610,040**	**$634,108**	**$24,068**
21.0	Travel & Transportation of Persons	4,921	4,830	-91
22.0	Transportation of Things	1,451	1,431	-20
23.1	Rental Payments to GSA	25,186	24,977	-209
23.2	Rental Payments to Others	1,044	987	-57
23.3	Communications, Utilities & Misc. Charges	7,554	7,331	-224
24.0	Printing & Reproduction	65	63	-2
25.1	Consulting Services	346,467	355,804	9,336
25.2	Other Services	592,459	598,755	6,295
25.3	Purchase of goods and services from government accounts	593,360	603,282	9,922
25.4	Operation & Maintenance of Facilities	2,578	2,466	-112
25.5	R&D Contracts	224,394	229,560	5,166
25.6	Medical Care	8,801	8,893	92
25.7	Operation & Maintenance of Equipment	29,220	28,901	-319
25.8	Subsistence & Support of Persons	0	0	0
25.0	**Subtotal Other Contractual Services**	**$1,797,279**	**$1,827,660**	**$30,381**
26.0	Supplies & Materials	45,496	45,133	-363
31.0	Equipment	18,397	18,181	-215
32.0	Land and Structures	7,810	7,656	-154
33.0	Investments & Loans	0	0	0
41.0	Grants, Subsidies & Contributions	4,039,557	4,160,940	121,384
42.0	Insurance Claims & Indemnities	0	0	0
43.0	Interest & Dividends	3	3	0
44.0	Refunds	0	0	0
	Subtotal Non-Pay Costs	**$5,948,765**	**$6,099,194**	**$150,429**
	Total Budget Authority by Object Class	**$6,558,805**	**$6,733,302**	**$174,497**

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund

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Salaries and Expenses

(Dollars in Thousands)

OBJECT CLASSES	FY 2021 Enacted	FY 2022 President's Budget	FY 2022 +/- FY 2021
Personnel Compensation			
Full-Time Permanent (11.1)	$243,233	$250,903	$7,670
Other Than Full-Time Permanent (11.3)	130,506	134,609	4,103
Other Personnel Compensation (11.5)	13,571	13,999	428
Military Personnel (11.7)	3,459	3,586	127
Special Personnel Services Payments (11.8)	66,351	68,440	2,089
Subtotal Personnel Compensation (11.9)	**$457,120**	**$471,537**	**$14,417**
Civilian Personnel Benefits (12.1)	$150,192	$159,739	$9,547
Military Personnel Benefits (12.2)	2,728	2,832	104
Benefits to Former Personnel (13.0)	0	0	0
Subtotal Pay Costs	**$610,040**	**$634,108**	**$24,068**
Travel & Transportation of Persons (21.0)	$4,921	$4,830	-$91
Transportation of Things (22.0)	1,451	1,431	-20
Rental Payments to Others (23.2)	1,044	987	-57
Communications, Utilities & Misc. Charges (23.3)	7,554	7,331	-224
Printing & Reproduction (24.0)	65	63	-2
Other Contractual Services:			
Consultant Services (25.1)	263,105	270,462	7,357
Other Services (25.2)	592,459	598,755	6,295
Purchases from government accounts (25.3)	384,551	393,493	8,942
Operation & Maintenance of Facilities (25.4)	2,578	2,466	-112
Operation & Maintenance of Equipment (25.7)	29,220	28,901	-319
Subsistence & Support of Persons (25.8)	0	0	0
Subtotal Other Contractual Services	**$1,271,913**	**$1,294,076**	**$22,163**
Supplies & Materials (26.0)	$45,496	$45,133	-$363
Subtotal Non-Pay Costs	**$1,332,446**	**$1,353,852**	**$21,406**
Total Administrative Costs	**$1,942,486**	**$1,987,960**	**$45,474**

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Detail of Full-Time Equivalent Employment (FTE)

OFFICE/DIVISION	FY 2020 Final			FY 2021 Enacted			FY 2022 President's Budget		
	Civilian	Military	Total	Civilian	Military	Total	Civilian	Military	Total
Center for Cancer Research									
Direct:	1,320	15	1,335	1,379	15	1,394	1,425	15	1,440
Reimbursable:	7	-	7	7	-	7	7	-	7
Total:	1,327	15	1,342	1,386	15	1,401	1,432	15	1,447
Division of Cancer Biology									
Direct:	48	-	48	48	-	48	50	-	50
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	48	-	48	48	-	48	50	-	50
Division of Cancer Control and Population Sciences									
Direct:	164	2	166	174	3	177	181	3	184
Reimbursable:	2	-	2	2	-	2	2	-	2
Total:	166	2	168	176	3	179	183	3	186
Division of Cancer Epidemiology and Genetics									
Direct:	169	2	171	175	2	177	181	2	183
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	169	2	171	175	2	177	181	2	183
Division of Cancer Prevention									
Direct:	99	1	100	98	1	99	101	1	102
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	99	1	100	98	1	99	101	1	102
Division of Cancer Treatment and Diagnosis									
Direct:	222	4	226	228	4	232	236	4	240
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	222	4	226	228	4	232	236	4	240
Division of Extramural Activities									
Direct:	88	1	89	91	2	93	94	2	96
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	88	1	89	91	2	93	94	2	96
Office of the Director									
Direct:	842	6	848	856	4	860	884	4	888
Reimbursable:	1	-	1	1	-	1	1	-	1
Total:	843	6	849	857	4	861	885	4	889
Total	2,962	31	2,993	3,059	31	3,090	3,162	31	3,193
Includes FTEs whose payroll obligations are supported by the NIH Common Fund.									
FTEs supported by funds from Cooperative Research and Development Agreements.	0	0	0	0	0	0	0	0	0

FISCAL YEAR	Average GS Grade
2018	12.5
2019	12.6
2020	12.6
2021	12.6
2022	12.6

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Detail of Positions[1]

GRADE	FY 2020 Final	FY 2021 Enacted	FY 2022 President's Budget
Total, ES Positions	2	4	4
Total, ES Salary	381,795	787,261	807,730
General Schedule			
GM/GS-15	309	306	306
GM/GS-14	488	497	529
GM/GS-13	565	592	630
GS-12	388	388	413
GS-11	160	154	164
GS-10	10	9	10
GS-9	107	103	109
GS-8	47	46	46
GS-7	37	38	38
GS-6	11	12	12
GS-5	8	6	6
GS-4	6	6	6
GS-3	5	4	4
GS-2	5	6	6
GS-1	1	0	0
Subtotal	2,147	2,167	2,279
Commissioned Corps (42 U.S.C. 207)			
Assistant Surgeon General	0	0	0
Director Grade	13	14	14
Senior Grade	6	4	4
Full Grade	6	7	7
Senior Assistant Grade	6	6	6
Assistant Grade	0	0	0
Subtotal	31	31	31
Ungraded	990	1,035	1,066
Total permanent positions	2,110	2,161	2,264
Total positions, end of year	3,170	3,237	3,380
Total full-time equivalent (FTE) employment, end of year	2,993	3,090	3,193
Average ES salary	190,898	196,815	201,932
Average GM/GS grade	12.6	12.6	12.6
Average GM/GS salary	121,016	122,226	125,007

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund