

DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

Office of AIDS Research Trans-NIH AIDS Research Budget

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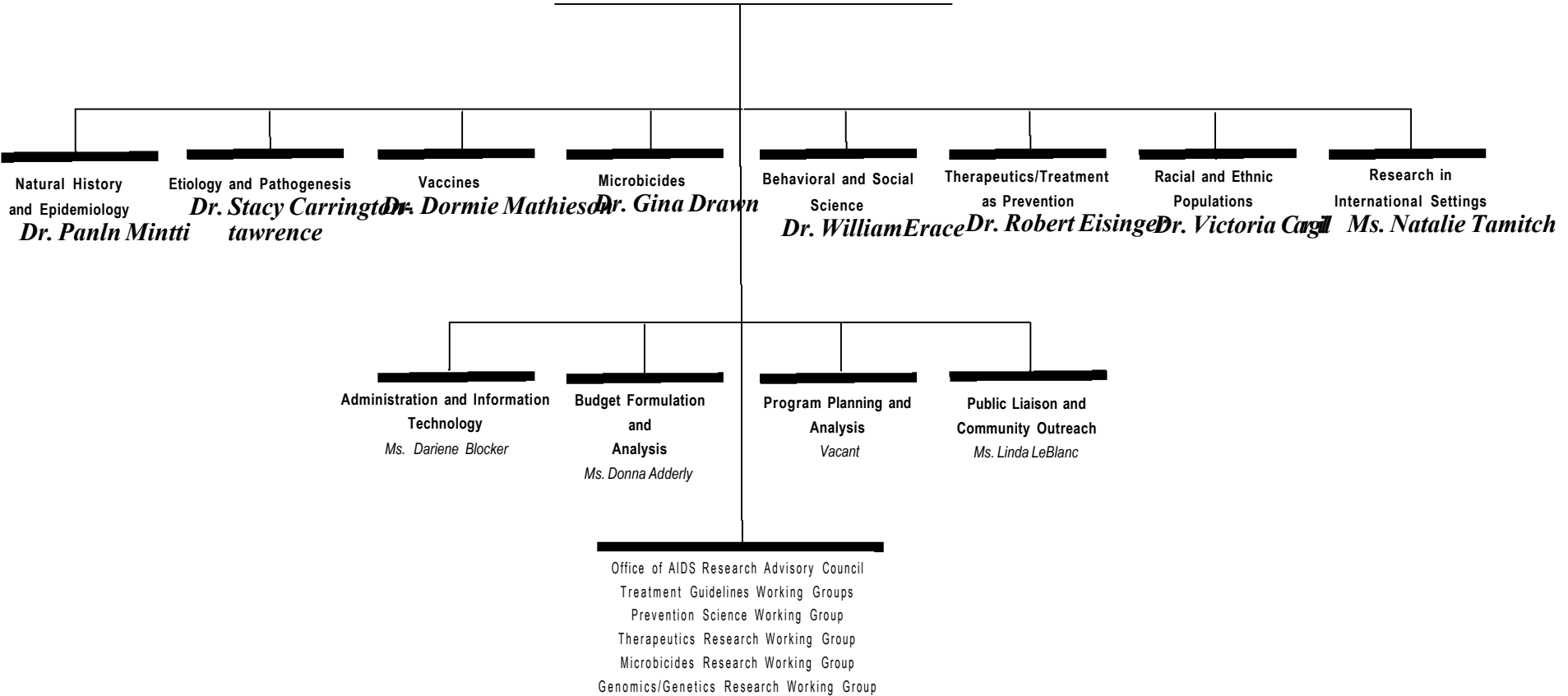
**Office of the Director**

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**National Institutes of Health  
Office of AIDS Research**

**Budget Authority by Institute and Center**

<b>Institute/Center</b>	<b>FY 2010 Actual</b>	<b>FY 2011 CR</b>	<b>FY 2012 PB 1/</b>	<b>Change FY 2010 Actual/ FY 2012 PB</b>
NCI	\$272,130,000	\$272,130,000	\$281,185,000	\$9,055,000
NHLBI	68,206,000	68,206,000	68,206,000	-
NIDCR	20,251,000	20,251,000	20,251,000	-
NIDDK	31,031,000	31,031,000	31,389,000	358,000
NINDS	47,027,000	47,027,000	47,886,000	859,000
NIAID	1,577,322,000	1,577,547,000	1,615,016,000	37,694,000
NIGMS	57,334,000	57,334,000	57,847,000	513,000
NICHD	145,652,000	145,652,000	149,758,000	4,106,000
NEI	10,631,000	10,631,000	9,094,000	-1,537,000
NIHES	5,347,000	5,347,000	5,347,000	-
NIA	5,645,000	5,645,000	5,645,000	-
NIAMS	4,938,000	4,938,000	4,938,000	-
NIDCD	1,880,000	1,880,000	1,788,000	-92,000
NIMH	191,025,000	191,051,000	195,443,000	4,418,000
NIDA	320,230,000	320,230,000	331,543,000	11,313,000
NIAAA	28,446,000	28,446,000	28,835,000	389,000
NINR	12,660,000	12,660,000	12,660,000	-
NHGRI	7,153,000	7,153,000	7,353,000	200,000
NIBIB	2,705,000	2,705,000	1,221,000	-1,484,000
NIMHD	6,000,000	6,000,000	6,000,000	-
NCRR	171,012,000	171,012,000	176,550,000	5,538,000
NCCAM	2,441,000	2,441,000	1,641,000	-800,000
FIC	24,356,000	24,356,000	25,932,000	1,576,000
NLM	7,683,000	7,683,000	8,243,000	560,000
OD	64,241,000	64,241,000	65,760,000	1,519,000
B&F	-	-	-	-
<b>TOTAL, NIH</b>	<b>3,085,346,000</b>	<b>3,085,597,000</b>	<b>3,159,531,000</b>	<b>74,185,000</b>

1/ Includes approximately \$27 million to be provided to the Office of the Assistant Secretary of Health (OASH) in support of the National HIV/AIDS Strategy.

**SUMMARY OF BUDGET BY MECHANISM**  
(Dollars in thousands)

MECHANISM	FY 2010 Actual		FY 2011 CR		FY 2012 PB 1/		Change vs. FY 2010	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
<b>Research Grants:</b>								
<u>Research Projects</u>								
Noncompeting	1,751	1,346,199	1,729	\$1,274,937	1,708	\$1,331,172	(43)	(\$15,027)
Administrative supplements	(24)	16,605	(5)	15,384	(8)	14,471	(32)	(2,134)
Competing	583	294,457	687	360,406	622	328,072	39	33,615
Subtotal, RPGs	2,334	1,657,261	2,416	1,650,727	2,330	1,673,715	(4)	16,454
<b>SBIR/STTR</b>	67	29,346	79	35,535	87	40,835	20	11,489
Subtotal, RPGs	2,401	1,686,607	2,495	1,686,262	2,417	1,714,550	16	27,943
<u>Research Centers</u>								
Specialized/comprehensive	66	143,547	69	132,944	87	133,104	21	(10,443)
Clinical research	0	55,027	1	55,127	1	55,127	1	100
Biotechnology	0	4,720	1	4,698	1	4,724	1	4
Comparative medicine	14	56,882	18	56,981	18	56,983	4	101
Research Centers in Minority Institutions	1	14,316	2	14,257	2	14,261	1	(55)
Subtotal, Centers	81	274,492	91	264,007	109	264,199	28	(10,293)
<u>Other Research</u>								
Research careers	248	42,364	237	41,385	237	41,726	(11)	(638)
Cancer education	0	0	0	0	0	0	0	0
Cooperative clinical research	13	20,687	12	18,326	20	20,239	7	(448)
Biomedical research support	0	1,717	1	1,710	1	1,710	1	(7)
Minority biomedical research support	1	140	1	141	1	142	0	2
Other	141	60,506	122	61,265	125	62,776	(16)	2,270
Subtotal, Other Research	403	125,414	373	122,827	384	126,593	(19)	1,179
<b>Total Research Grants</b>	2,885	2,086,513	2,959	2,073,096	2,910	2,105,341	25	18,828
<u>Ruth L. Kirschstein Training Awards:</u>	<u>FTTPs</u>		<u>FTTPs</u>				<u>FTTPs</u>	
Individual awards	86	3,541	86	3,528	86	3,568	0	27
Institutional awards	650	30,888	649	30,975	648	31,498	(2)	610
Total, Training	736	34,429	735	34,503	734	35,066	(2)	637
Research & development contracts (SBIR/STTR)	116	460,977	120	473,894	118	508,687	2	47,710
	(2)	(81,316)	(2)	(173)	(2)	(173)	(0)	(81,489)
Intramural research		313,648		314,147		317,749		4,101
Research management and support		125,538		125,716		126,928		1,390
Construction								0
Office of the Director		64,241		64,241		65,760		1,519
<b>Total Budget Authority</b>		3,085,346		3,085,597		3,159,531		74,185

1/ Includes approximately \$27 million to be provided to the Office of the Assistant Secretary of Health (OASH) in support of the National HIV/AIDS Strategy.

**Budget Authority by Activity  
(Dollars in thousands)**

<b>Area of Emphasis</b>	<b>FY 2008 Actual</b>	<b>FY 2009 Actual</b>	<b>FY 2010 Actual</b>	<b>FY 2011 CR</b>	<b>FY 2012 PB 1/</b>	<b>Dollar Change</b>
<b>HIV Microbicides</b>	\$115,495	\$128,670	\$143,162	\$143,162	\$146,741	\$3,579
<b>Vaccines</b>	556,139	560,956	534,972	534,972	551,021	16,049
<b>Behavioral and Social Science</b>	412,502	434,305	429,313	429,339	443,440	14,127
<b>Therapeutics</b>						
<i>Treatment as Prevention</i>	74	85	68	65	69	
<i>Drug Discovery, Development, and Treatment</i>	<u>698,387</u>	<u>670,476</u>	<u>684,923</u>	<u>685,151</u>	<u>699,983</u>	
<b>Total, Therapeutics</b>	<b>698,461</b>	<b>670,561</b>	<b>684,991</b>	<b>685,216</b>	<b>700,052</b>	<b>15,061</b>
<b>Etiology and Pathogenesis</b>	703,874	729,991	744,649	744,649	762,226	17,577
<b>Natural History and Epidemiology</b>	227,900	247,914	275,098	275,098	280,600	5,502
<b>Training, Infrastructure, and Capacity Building</b>	171,706	198,028	216,329	216,329	218,051	1,722
<b>Information Dissemination</b>	42,268	48,868	56,832	56,832	57,400	568
<b>Total</b>	<b>2,928,345</b>	<b>3,019,293</b>	<b>3,085,346</b>	<b>3,085,597</b>	<b>3,159,531</b>	<b>74,185</b>

1/ Includes approximately \$27 million to be provided to the Office of the Assistant Secretary of Health (OASH) in support of the National HIV/AIDS Strategy.

## Global estimates for adults and children, 2009

- **People living with HIV**      **33.3 million** [31.4 million - 35.3 million]
- **New HIV infections in 2009**      **2.6 million** [ 2.3 million - 2.8 million]
- **Deaths due to AIDS in 2009**      **1.8 million** [ 1.6 million - 2.1 million]

## Justification of Budget Request

### OFFICE OF AIDS RESEARCH

#### *Trans-NIH AIDS Research Budget Justification*

Budget Authority:

FY 2010 Actual	FY 2011 Continuing Resolution	FY 2012 President's <u>Budget</u>	FY 2012+/- FY 2010
\$3,085,346,000	\$3,085,597,000	\$3,159,531,000	\$74,185,000

### DIRECTOR'S OVERVIEW

***New Scientific Advances and Opportunities:*** The past year has been a significant one for AIDS research. The NIH investment in the priority areas of HIV prevention research and in basic science over the past several years has reaped rewards resulting in important progress in critical areas of the NIH AIDS research program. Recent research advances by NIH intramural and extramural investigators have opened doors for new and exciting research opportunities in the search for strategies to prevent and treat HIV infection. All of these important advances, while preliminary and incremental, provide the groundwork for further scientific investigation and the building blocks for the development of this Trans-NIH AIDS research budget:

- An HIV vaccine clinical trial conducted in Thailand by NIH and the Department of Defense demonstrated the first indication of a modest but positive effect in preventing HIV infection. The trial marked the first step in proving the concept that a vaccine to prevent HIV infection is feasible.
- A team of scientists led by researchers at the NIAID Vaccine Research Center discovered two potent human antibodies that can stop more than 90 percent of known global HIV strains from infecting human cells in the laboratory and determined the structural analysis of how they work. The novel techniques used in this research may accelerate HIV vaccine research as well as the development of vaccines for other infectious diseases.
- A study conducted in South Africa with NIH infrastructure support demonstrated the first proof of concept for the feasibility of a microbicide gel that could prevent HIV transmission.
- A large international NIH clinical trial provided strong evidence that the use of pre-exposure prophylaxis, that is, the use of antiretroviral treatment before exposure to prevent infection, can reduce risk of HIV acquisition.
- Progress in both basic science and treatment research aimed at eliminating viral reservoirs has for the first time led scientists to plan and conduct research aimed at a cure.
- NIH-sponsored researchers made an important discovery related to the genetics of an individual's immune system that appear to offer some protection from disease progression among a group of individuals considered "elite controllers," who have been exposed to HIV

over an extended period, but whose immune systems have controlled the infection without therapy and without symptoms.

**Mission:** The Office of AIDS Research (OAR) coordinates the scientific, budgetary, legislative, and policy elements of the trans-NIH research program on AIDS and its wide spectrum of associated malignancies, co-infections, and clinical complications. OAR functions as an "institute without walls," vested with responsibility for all NIH AIDS-related research supported by every NIH Institute and Center. This diverse portfolio requires unprecedented trans-NIH planning, scientific priority setting, and resource management. OAR has established unique trans-NIH processes to identify the highest priority areas of scientific opportunity, enhance collaboration, minimize duplication, and ensure that precious research dollars are invested effectively to lead to the development of new tools for use in the global fight against AIDS.

**The Pandemic:** AIDS remains a global scourge that affects people in nearly every country worldwide. UNAIDS reports that in 2009, more than 33 million people were estimated to be living with HIV/AIDS; 2.6 million were newly infected; and 1.8 million people died of AIDS-related illnesses. In the U.S., more than 1.1 million people are estimated to be HIV-infected; and someone is infected with HIV every nine and a half minutes, disproportionately affecting racial and ethnic populations, women of color, young adults, and men who have sex with men. In 2008, an estimated 29 percent of HIV-infected adults in the U.S. were at least 50 years old, and individuals 50 years of age and older accounted for approximately 15 percent of all new HIV infections.

**The National HIV/AIDS Strategy:** In July 2010, the Administration released the first comprehensive *National HIV/AIDS Strategy for the United States*. The National HIV/AIDS Strategy (NHAS) was the result of unprecedented public input, including 14 HIV/AIDS community discussions held across the country, as well as an online suggestions process, various expert meetings and other inputs. Senior officials from the NIH were involved in the Federal interagency working group that reviewed recommendations from the public and worked with the Office of National AIDS Policy to develop the NHAS.

The National Strategy focuses on three overarching goals: reducing the number of new HIV infections, increasing access to care for people living with HIV and improving disease outcomes, reducing HIV-related health disparities, and achieving a more coordinated national response.

With the authority to direct and coordinate resources for HIV/AIDS research across NIH, OAR has a critical role to play in ensuring that NIH funding for domestic HIV/AIDS research focuses on projects that support the goals of the NHAS.

**Trans-NIH Research Program:** NIH has established the largest and most significant AIDS research program in the world, a comprehensive program of basic, clinical, translational, and behavioral and social sciences research in domestic and international settings. NIH-funded research has led to: the critical discovery of antiretroviral therapies and regimens that have resulted in improved life expectancy for those with access to and who can tolerate these drugs; the development of treatments for many HIV-associated co-infections, co-morbidities, malignancies, and clinical manifestations; advances in HIV prevention, including groundbreaking strategies for the prevention of mother-to-child transmission; safety of the blood



supply; and critical basic science discoveries that continue to provide the foundation for novel research. Despite these important advances, the epidemic continues to expand, and improved prevention strategies and therapeutic regimens are urgently needed.

The AIDS pandemic, the deadliest epidemic of our generation, will continue to wreak devastating consequences around the world for decades to come in virtually every sector of society. The OAR has utilized its unique authorities to shift AIDS research program priorities and resources to meet the changing epidemic and scientific opportunities. This investment in AIDS research has produced groundbreaking scientific advances. However, serious challenges lie ahead. NIH will continue to focus on the need for comprehensive strategies to decrease HIV transmission and improve treatment options and treatment outcomes in affected vulnerable populations in the U.S. and in international settings.

## TRANS-NIH STRATEGIC PLAN AND BUDGET

OAR's trans-NIH planning process, involving both government and non-government experts, and representatives from community constituency groups results in the identification of clear, overarching AIDS-research priorities and specific research objectives and strategies. The priorities of the Plan guide the development of the trans-NIH AIDS research budget. OAR develops each IC's allocation based not on a formula but on the Plan, current scientific opportunities, and the IC's capacity to absorb and expend resources for the most meritorious science. This process reduces redundancy, promotes harmonization, and assures cross-Institute collaboration.

***Critical AIDS Research Priorities:*** The overarching research priorities of the FY 2012 Trans-NIH Strategic Plan and this trans-NIH AIDS research budget request will establish the scientific foundation to achieve the goals of the President's National HIV/AIDS Strategy and also are aligned with the NIH Director's themes. They include:

- **Expanding Basic Discovery Research:** Research is needed to better understand the virus and how it causes disease, including studies to delineate how gender, age, ethnicity, and race influence vulnerability to infection and HIV disease progression. OAR will increase support for genetic studies and breakthroughs in sequencing the human genome, and for new opportunities to apply these valuable tools to the search for new HIV prevention and therapeutics strategies. OAR will also increase research on eliminating viral reservoirs toward identifying a cure.
- **Reducing New Infections:** Key prevention research areas include vaccines, microbicides, and behavioral and social science. Another critical area is the study of treatment strategies as a method to prevent new infections. These include: post-exposure prophylaxis, the use of treatment to prevent HIV infection after exposure, including in a healthcare environment; pre-exposure prophylaxis (PreP), the long-term use of treatment regimens for high-risk uninfected individuals to prevent HIV acquisition; and a potential prevention strategy known as "test and treat," to determine whether a community-wide testing program with immediate treatment can decrease the overall rate of new HIV infections in that community. A better understanding of biological-behavioral interactions will lead to the development of

combination prevention interventions that can be used in different populations, including adolescents and older individuals.

- **Improving Disease Outcomes:** A growing proportion of patients receiving long-term antiretroviral therapy (ART) are demonstrating treatment failure, experiencing serious drug toxicities and side effects, and developing drug resistance. Studies continue to show an increased incidence of malignancies, cardiovascular and metabolic complications, and premature aging associated with long-term HIV disease and ART. There is a need to develop better, less toxic treatments and to investigate how genetic determinants, sex, gender, race, age, nutritional status, treatment during pregnancy, and other factors interact to affect treatment success or failure and/or disease progression.
- **Reducing HIV-Related Disparities:** Research is needed to better understand the causes of HIV-related health disparities, their role in disease transmission and acquisition, and their impact on treatment access and effectiveness. These include disparities among racial and ethnic populations in the U.S.; between developed and resource-constrained nations; between men and women; between youth and older individuals; and disparities based on sexual identity. NIH will support research training for new investigators from racial and ethnic communities, development of research infrastructure, community outreach, information dissemination, and research collaborations to help reduce these disparities.
- **Translating Research from Bench to Bedside to Community:** Research will focus on analyses of the feasibility, effectiveness, and sustainability required for the scale-up and implementation of interventions from a structured behavioral or clinical study to a broader "real world" setting, including critical epidemiologic and natural history studies, collaborative networks, and specimen repositories to evaluate various operational strategies that can be employed to scale up and evaluate treatment programs and successful prevention interventions in communities at risk.

**Global Impact of NIH AIDS Research:** Research to address the global pandemic is essential. Since the early days of the epidemic, NIH has supported research efforts in countries affected by AIDS. Beginning in 1983 with a research project in Haiti, NIH has maintained a strong international AIDS research portfolio that now includes projects in approximately 100 countries around the world. AIDS research represents the largest component of the total NIH global research investment. NIH AIDS research studies are designed so that the results are relevant both to the host nation as well as for the U.S. Implementation studies are critical to translating clinical trial research results into community based interventions that can be operational in international settings. The development of research infrastructure, including training of scientists and healthcare providers, is an essential component of these research programs. Most of these grants and contracts are awarded to US-based investigators to conduct research in collaboration with in-country scientists; some are awarded directly to investigators in international scientific or medical institutions.

**AIDS Research Conducted in International Settings**  
(Dollars in millions)

FY 2010 Actual	FY 2011 CR	FY 2012 PB
\$485.607	\$485.607	\$489.384

Overall Budget Policy: To address these priorities, the OAR FY 2012 President's Budget request for the trans-NIH AIDS research program is \$3,159,531,000 which represents an increase of \$74,185,000 and 2.4% over the FY 2010 Actual. This amount includes the total trans-NIH support for intramural and extramural research for basic, clinical, behavioral, social science, and translational research on HIV/AIDS and the wide spectrum of AIDS-associated malignancies, opportunistic infections, co-infections, and clinical complications; as well as research management support; research centers; and training. Descriptions and accomplishments in each program area follow. Also included in this amount is about \$27 million to be transferred to the Office of the Assistant Secretary of Health (OASH) in support of the National HIV/AIDS Strategy.

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**OFFICE OF AIDS RESEARCH**  
*Trans-NIH AIDS Research Budget Justification*

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**HIV MICROBICIDES**

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Microbicides are antimicrobial and other products that could be applied topically or orally as pre-exposure prophylaxis (oral PrEP), alone or in combination with other strategies, for the potential prevention of HIV and other sexually transmitted infections. These products may represent promising primary prevention interventions. NIH supports a comprehensive and innovative microbicide research program that includes the screening, discovery, development, preclinical testing, and clinical evaluation of microbicide candidates; basic science aimed at understanding how HIV transverse mucosal membranes and infects cells; behavioral and social science research on adherence to and acceptability and use of microbicides among different populations; studies of the safety of microbicide use during pregnancy; and implementation research to better understand how to integrate a potential product into community prevention practices.

**Budget Policy:** The FY 2012 President's Budget request for Microbicides is \$146,741,000 which represents an increase of \$3,579,000 and 2.5% over the FY 2010 Actual for this high priority area of research. In FY 2012, NIH will continue to support the discovery, design, development, and evaluation of microbicide candidates. Key ongoing activities include support for the microbicide clinical trials network and the necessary infrastructure to conduct microbicide trials and oral PrEP trials, especially to build on recent research advances; development of innovative, novel, and high risk-high reward approaches for the development and testing of microbicide candidates; the development of criteria for selecting potential products to be evaluated in clinical trials and for advancing them through the different phases of preclinical and clinical studies; and research on ethical, adherence, and other behavioral and social science research issues that can impact these clinical trials. A number of trans-governmental working groups, non-governmental expert meetings, conferences, and workshops will be supported to foster coordination and collaboration in innovative microbicide research that will lead to the development and testing of novel potential candidates that prevent HIV transmission and acquisition.

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**VACCINES**

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The best long-term hope for controlling the AIDS pandemic is the development of safe, effective, and affordable AIDS vaccines that may be used in combination with other prevention strategies. AIDS vaccine research remains a high priority to ensure that new and innovative concepts continue to be tested. NIH supports a broad AIDS vaccine research portfolio encompassing basic, preclinical, and clinical research including studies to identify and better understand potentially protective immune responses in HIV-infected individuals and studies of

improved animal models for the preclinical evaluation of vaccine candidates. Information gained from these studies is being used to inform the design and development of novel vaccine strategies. The recent release of data from several vaccine clinical studies presents new scientific opportunities for investigation that will require realignment of resources.

**Budget Policy:** The FY 2012 President's Budget request for Vaccines is \$551,021,000, an increase of \$16,049,000 and 3.0% over the FY 2010 Actual. Basic research studies, particularly those using samples from the clinical trials, are critically needed on the virus and host immune responses that can inform the development of new and innovative vaccine concepts; as well as the development of improved animal models to conduct pre-clinical evaluations of vaccine candidates. In FY 2012, NIH will fund additional basic research on HIV and host immune responses, as well as the design and development of new vaccine concepts and the pre-clinical/clinical development of vaccine candidates in the pipeline. Resources will be directed toward the development and testing of improved products in additional clinical studies, both in the U.S. and abroad, building on the results of the recent Phase III vaccine trial in Thailand. This also includes support for new initiatives to integrate systems biology with HIV vaccine discovery and for additional research involving non-human primates.

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## BEHAVIORAL AND SOCIAL SCIENCE

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NIH supports research to better understand how to change the risk behaviors that lead to HIV infection and disease progression, as well as how to maintain protective behaviors once they are adopted. Studies develop and evaluate interventions directly targeting the substance abuse and sexual behaviors associated with HIV transmission. Other research aims toward better understanding and changing the environmental, social and cultural factors associated with HIV infection and disease outcomes, including stigma. Determining effective strategies to test HIV-infected persons, link them to care, and promote adherence to antiretroviral therapy is another important area of research. Comprehensive approaches that integrate biomedical and behavioral science perspectives are necessary to develop the needed range of preventive and therapeutic strategies. NIH also supports research to improve behavioral methodologies, including ways to improve recruitment into clinical trials, to enhance statistical analysis of behaviors such as alcohol use that can affect medication studies, or to characterize behavioral traits relevant to genetic or genomic studies.

**Budget Policy:** The FY 2012 President's Budget request for Behavioral and Social Science is \$443,440,000 which is an increase of \$14,127,000 and 3.3% over the FY 2010 Actual. NIH will continue to fund research to develop and evaluate effective interventions to prevent HIV transmission and acquisition by reducing HIV-related risk behaviors and increasing protective behaviors. Resources will be directed toward several new prevention initiatives, including studies integrating behavioral and social science methods with biomedical prevention strategies, community-based approaches to engaging and retaining persons in care, and the impact of improved care on reducing HIV transmission.

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## THERAPEUTICS

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Antiretroviral treatment (ART) has resulted in improved immune function in patients who are able to adhere to the treatment regimens and tolerate the toxicities and side effects associated with antiretroviral drugs; and it has delayed the progression of HIV disease to the development of AIDS. However, an increasing number of patients receiving long-term antiretroviral therapy are demonstrating treatment failure, experiencing serious drug toxicities, and developing drug resistance. Recent epidemiologic studies continue to show an increasing incidence of co-infections, co-morbidities, AIDS-defining and non-AIDS defining malignancies, and complications associated with long-term HIV disease and ART, including tuberculosis, Hepatitis C, metabolic disorders, cardiovascular disease, conditions associated with aging, and neurologic and neurocognitive disorders. NIH supports a comprehensive therapeutics research program to design, develop, and test drugs and drug regimens to maintain long-term undetectable viral load, overcome drug resistance and treatment failure, prevent and treat HIV-associated co-morbidities and complications, and eradicate persistent viral reservoirs that may lead to a potential or functional cure for HIV disease.

**Budget Policy:** The FY 2012 President's Budget request for Therapeutics is \$700,052,000, which represents an increase of \$15,061,000 and 2.2% over the FY 2010 Actual. The increase in funding for therapeutics research will be less than other areas to allow for increased funding for HIV prevention science research. A portion of the funds from expiring grants and contracts for therapeutics research will be re-allocated to studies on the treatment and prevention of HIV-associated co-infections and co-morbidities and to support crucial basic research on HIV, genomics studies on the host immune response to HIV, and development and clinical testing of potential microbicides and behavioral and social science interventions. Resources within the area of Therapeutics also will be directed to several new and/or expanded initiatives for developing innovative therapies to control and eradicate HIV infection that may lead to a cure; identifying new drug targets based on the structure of HIV/host complexes; delineating the interaction of aging and neuro-AIDS; and discovering the next generation of drugs that may be used in potential "treatment as prevention" strategies.

***Treatment as Prevention:*** A critical new area of prevention research is the study of treatment strategies as a method to prevent new HIV infections. This approach builds on NIH-sponsored landmark clinical trials that successfully demonstrated that treatment of HIV-infected pregnant women could significantly reduce transmission of HIV from mother to child. Strategies currently being investigated include: post-exposure prophylaxis, the use of treatment to prevent HIV infection after accidental exposure, including in a healthcare environment; pre-exposure prophylaxis (PrEP), the long-term use of treatment regimens for high-risk uninfected populations

to prevent HIV acquisition; and a potential innovative prevention strategy known as "test and treat," to determine whether a community-wide HIV testing and counseling program with immediate treatment for HIV-infected individuals can decrease the overall rate of new HIV infections in that community.

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## ETIOLOGY AND PATHOGENESIS

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NIH supports a comprehensive portfolio of research focused on gaining a better understanding of how HIV infection is established and maintained and what causes the associated profound immune deficiency and severe clinical complications. Research on basic HIV biology and AIDS pathogenesis has revolutionized the design of drugs, methodologies for diagnosis, and monitoring of the safety and effectiveness of antiviral therapies. Ground-breaking strides have been made towards understanding the fundamental steps in the life-cycle of HIV, the host-virus interactions, and the clinical manifestations associated with HIV infection and AIDS. Additional research is needed to further the understanding of the virus and how it causes disease, including studies to delineate how sex, gender, age, ethnicity, race, pregnancy, nutritional status, and other factors interact to affect treatment success or failure and influence vulnerability to infection and HIV-disease progression, including the development of HIV-associated comorbidities, malignancies and coinfections. Additional studies of the genetic determinants associated with HIV susceptibility, disease progression and treatment response may lead to the development of customized therapeutic and preventive regimens formulated for an individual patient based on his or her genetic sequence. A gene sequence associated with adverse reactions to the drug abacavir already has been identified. This finding led the FDA to recommend that doctors conduct genetic screening before prescribing abacavir to patients. Research examining the mechanisms by which HIV establishes and reactivates latent reservoirs of infection is a high priority for the NIH. A better understanding of these processes could lead to the development of therapies that eradicate persistent viral reservoirs. Some have speculated that the eradication of these reservoirs might provide a cure for HIV disease.

**Budget Policy:** The FY 2012 President's Budget request for Etiology and Pathogenesis is \$762,226,000, which is an increase of \$17,577,000 and 2.4% over the FY 2010 Actual. The results from recent microbicide and vaccine clinical studies have revealed gaps in knowledge and understanding of HIV etiology and pathogenesis, particularly with regard to host immune responses, how HIV interacts with and transverse mucosal surfaces, and the establishment and maintenance of latent viral reservoirs. The amount requested includes funding for research on the biology of HIV transmission and pathogenesis, including studies on co-infections, malignancies, premature aging, and other complications.



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## NATURAL HISTORY AND EPIDEMIOLOGY

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Natural history and epidemiologic research is essential for monitoring epidemic trends, developing and evaluating prevention modalities, following the changing clinical manifestations of HIV disease in different populations, and measuring the effects of treatment regimens. NIH supports research in domestic and international settings to examine HIV transmission, HIV disease progression (including the occurrence of co-infections and opportunistic infections, malignancies, metabolic, cardiovascular, neurological, and other complications), the development of other HIV-related conditions, and improved methodologies to support this research. Epidemiologic research is instrumental in identifying and describing AIDS-related comorbidities, disentangling effects related to treatment from those related to HIV disease itself. As the AIDS epidemic continues to evolve, there is a crucial need to continue to conduct epidemiologic studies in both domestic and international settings. These studies have delineated the significant health disparities that are critical factors in the epidemic. These include racial and ethnic disparities in the U.S.; disparities between developed and resource-constrained nations; disparities between men and women; disparities within younger and older age groups; and health disparities based on sexual identity. NIH will continue to place high priority on understanding the causes of HIV-related health disparities, both in the United States and around the world, their role in disease transmission and acquisition, and their impact on treatment access and effectiveness.

**Budget Policy:** The FY 2012 President's Budget request for Natural History and Epidemiology is \$280,600,000, which represents an increase of \$5,502,000 and 2.0% above the FY 2010 Actual. NIH will continue to provide support for high-priority epidemiology studies of groups and populations affected by HIV and at high risk of infection, including individuals over fifty years of age, men who have sex with men (MSM), especially MSM of color, and adolescents. NIH also will increase support for critical studies on the mechanisms of disease progression, the specific role of race and gender, the effects of increased HIV testing and linkage to care on HIV transmission and disease progression, the impact of therapy in changing the spectrum of HIV disease, and the causes of death. In addition, resources will be directed towards implementation/operational science including the evaluation of strategies to scale-up efficacious and cost-effective interventions to the community level.

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## TRAINING, INFRASTRUCTURE, AND CAPACITY BUILDING

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NIH supports the training of domestic and international biomedical and behavioral AIDS researchers, and provides support for the equipment necessary for the conduct of AIDS-related research and clinical studies. The expansion of NIH-funded HIV research globally has necessitated the development of research infrastructure in many locations, including resource-

limited settings in Africa, the Caribbean, India, and Asia. Numerous NIH funded programs have increased the number of training positions for AIDS-related researchers, including programs specifically designed to recruit individuals from underrepresented populations into research careers and to build research infrastructure at minority-serving institutions in the United States.

**Budget Policy:** The FY 2012 President's Budget request for Training, Infrastructure, and Capacity Building is \$218,051,000, which represents an increase of \$1,722,000 and 0.8% above the FY 2010 Actual. NIH will continue to support ongoing efforts to increase the supply of non-human primates, particularly rhesus macaques, for AIDS research and other areas of biomedical research both in the United States and abroad. NIH also will support training programs for U.S. and international researchers to build the critical capacity to conduct AIDS research both in racial and ethnic communities in the United States and in developing countries. Support also will be provided for the NIH AIDS Research Loan Repayment Program and the Intramural AIDS Research Fellowship program that will help ensure an adequate number of trained AIDS researchers at NIH.

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## INFORMATION DISSEMINATION

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Effective information dissemination approaches are integral to HIV prevention and treatment efforts and critical in light of the continuing advent of new and complex antiretroviral treatment regimens, issues related to adherence to prescribed treatments, and the need to translate behavioral and social prevention approaches into practice. The changing pandemic and the increasing incidence of HIV infection in specific population groups in the United States, such as racial and ethnic populations, men who have sex with men, and women, underscore the need to disseminate HIV research findings and other related information to communities at risk. The flow of information among researchers, health care providers, and the affected communities represents new opportunities to rapidly translate research results into practice and to shape future research directions. NIH supports initiatives to enhance dissemination of research findings; develop and distribute state-of-the art treatment guidelines; and enhance recruitment and retention of participants in clinical studies, including women, adolescents, and racial and ethnic populations.

**Budget Policy:** The FY 2012 President's Budget request for Information Dissemination is \$57,400,000, which represents an increase of \$568,000 and 1.0% above the FY 2010 Actual. As the number and complexity of clinical studies increases, resources must be invested in clinical trials-related information dissemination to ensure recruitment of an adequate number of participants, particularly from populations at risk, including women and racial and ethnic populations in the United States. In addition, funding will be provided to ensure that critical federal guidelines on the use of antiretroviral therapy, as well as guidelines for the management of HIV complications for adults and children, will be updated regularly and disseminated to healthcare providers and patients through the AIDSinfo website ([www.aidsinfo.nih.gov](http://www.aidsinfo.nih.gov)).

***Benefits to other areas of research:*** Because of the unique nature of HIV--the way the virus enters a cell, causes infection, affects every organ system, and unleashes a myriad of opportunistic infections, comorbidities, cancers, and other complications--and the pace at which the knowledge base has been expanded, AIDS research also is helping to unravel the mysteries surrounding many other infectious, malignant, neurologic, autoimmune, and metabolic diseases, as well as complex issues of aging and dementia. Basic knowledge of the biology of HIV infection and the processes by which it causes disease benefits other areas of basic research including immunology, virology, microbiology, molecular biology, and genetics. AIDS research has provided an entirely new paradigm for drug design, development, and clinical trials to treat viral infections and to address the special recruitment requirements of women, minorities, and other underserved and at-risk populations. Drugs developed to prevent and treat AIDS-associated opportunistic infections also now benefit patients undergoing cancer chemotherapy or receiving anti-transplant rejection therapy; and AIDS research is providing a new understanding of the relationship between viruses and cancer.