

DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

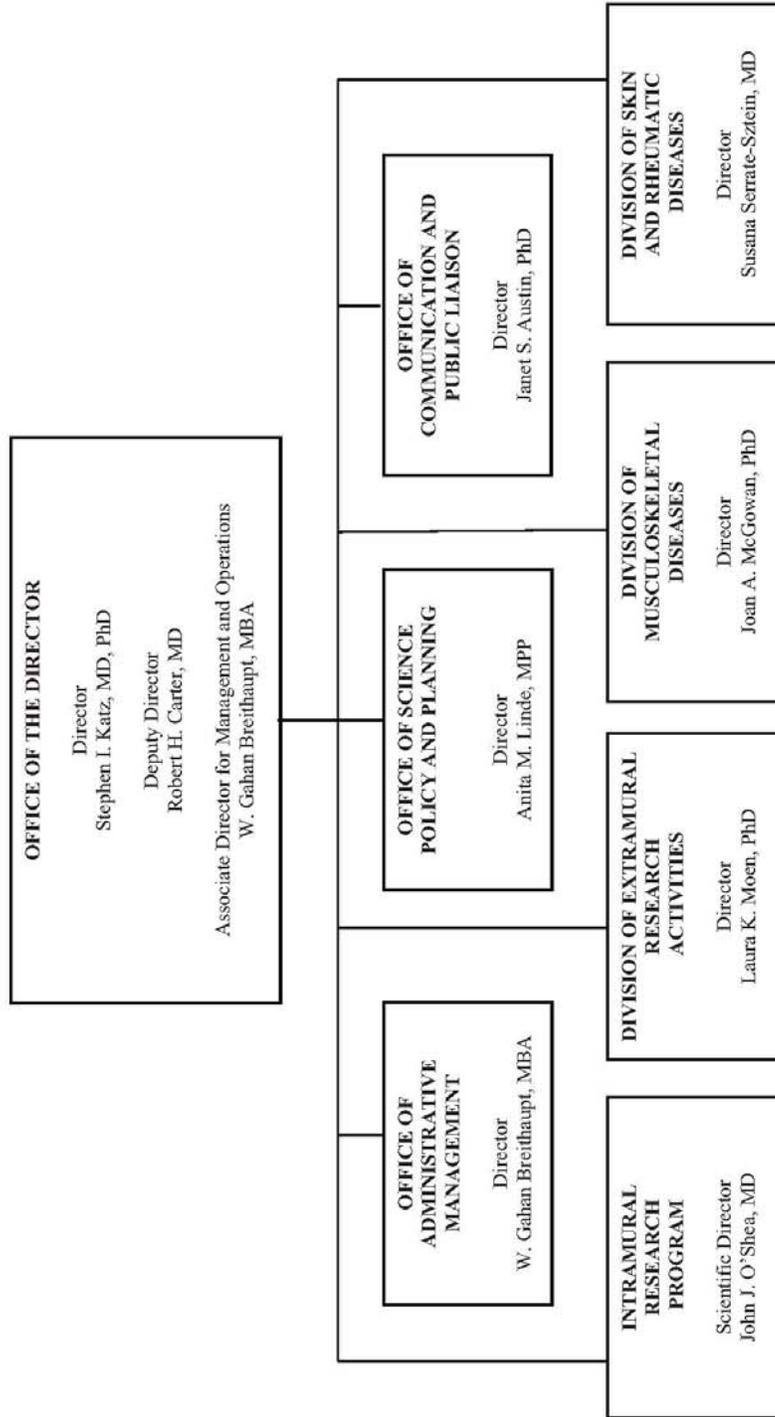
National Institute of Arthritis and Musculoskeletal and Skin Diseases

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NATIONAL INSTITUTES OF HEALTH

National Institute of Arthritis and Musculoskeletal and Skin Diseases

Organizational Structure



NATIONAL INSTITUTES OF HEALTH

National Institute of Arthritis and Musculoskeletal and Skin Diseases

For carrying out section 301 and title IV of the Public Health Services Act with respect to arthritis and musculoskeletal and skin diseases \$547,891,000.

NATIONAL INSTITUTES OF HEALTH
National Institute of Arthritis and Musculoskeletal and Skin Diseases

Amounts Available for Obligation ¹
(Dollars in Thousands)

Source of Funding	FY 2010 Actual	FY 2011 CR	FY 2012 PB
Appropriation	\$539,082	\$539,082	\$547,891
Type 1 Diabetes	0	0	0
Rescission	0	0	0
Supplemental	0	0	0
Subtotal, adjusted appropriation	539,082	539,082	547,891
Real transfer under Director's one-percent transfer authority (GEI)	(866)	0	0
Real transfer under Secretary's one-percent transfer authority	(81)	0	0
Comparative Transfers to NLM for NCBI and Public Access	(242)	(459)	0
Comparative transfer under Director's one-percent transfer authority (GEI)	866	0	0
Subtotal, adjusted budget authority	538,759	538,623	547,891
Unobligated balance, start of year	0	0	0
Unobligated balance, end of year	0	0	0
Subtotal, adjusted budget authority	538,759	538,623	547,891
Unobligated balance lapsing	(107)	0	0
Total obligations	538,652	538,623	547,891

¹ Excludes the following amounts for reimbursable activities carried out by this account:
FY 2010 - \$3,550 FY 2011 - \$7,550 FY 2012 - \$11,550

NATIONAL INSTITUTES OF HEALTH
National Institute of Arthritis and Musculoskeletal and Skin Diseases
Budget Mechanism - Total ^{1/}
(Dollars in Thousands)

MECHANISM	FY 2010 Actual		FY 2011 CR		FY 2012 PB		Change vs. FY 2010	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Research Grants								
<u>Research Projects</u>								
Noncompeting	699	\$242,415	782	\$266,808	745	\$262,399	46	\$19,984
Administrative Supplements	26	2,222	28	1,854	28	1,854	2	(368)
Competing:								
Renewal	61	24,555	45	18,523	49	20,268	(12)	(4,287)
New	224	67,036	166	50,568	180	55,332	(44)	(11,704)
Supplements	16	2,296	12	1,732	13	1,895	(3)	(401)
Subtotal, Competing	301	\$93,887	223	\$70,823	242	\$77,495	(59)	(\$16,392)
Subtotal, RPGs	1,000	\$338,524	1,005	\$339,485	987	\$341,748	(13)	\$3,224
SBIR/STTR	37	\$12,734	37	\$12,720	37	\$12,934	0	\$200
Research Project Grants	1,037	\$351,258	1,042	\$352,205	1,024	\$354,682	(13)	\$3,424
<u>Research Centers</u>								
Specialized/Comprehensive	40	\$41,820	40	\$41,820	40	\$42,239	0	\$419
Clinical Research	0	0	0	0	0	0	0	0
Biotechnology	0	0	0	0	0	0	0	0
Comparative Medicine	0	30	0	30	0	30	0	0
Research Centers in Minority Institutions	0	0	0	0	0	0	0	0
Research Centers	40	\$41,850	40	\$41,850	40	\$42,269	0	\$419
<u>Other Research</u>								
Research Careers	150	\$18,745	150	\$19,120	150	\$19,311	0	\$566
Cancer Education	0	0	0	0	0	0	0	0
Cooperative Clinical Research	0	0	0	0	0	0	0	0
Biomedical Research Support	0	0	0	0	0	0	0	0
Minority Biomedical Research Support	0	0	0	0	0	0	0	0
Other	34	3,001	34	3,061	34	3,092	0	91
Other Research	184	\$21,746	184	\$22,181	184	\$22,403	0	\$657
Total Research Grants	1,261	\$414,854	1,266	\$416,236	1,248	\$419,354	(13)	\$4,500
<u>Research Training</u>	<u>FTIPs</u>		<u>FTIPs</u>		<u>FTIPs</u>			
Individual Awards	68	\$3,292	68	\$3,351	68	\$3,472	0	\$180
Institutional Awards	244	12,262	244	12,483	244	12,932	0	670
Total Research Training	312	\$15,554	312	\$15,834	312	\$16,404	0	\$850
Research & Development Contracts (<i>SBIR/STTR</i>)	55	\$26,651	55	\$23,086	55	\$27,831	0	\$1,180
	<i>0</i>	<i>\$25</i>	<i>0</i>	<i>\$25</i>	<i>0</i>	<i>\$0</i>	<i>0</i>	<i>\$25</i>
Intramural Research	<u>FTEs</u>		<u>FTEs</u>		<u>FTEs</u>		<u>FTEs</u>	
Research Management and Support	141	\$55,009	141	\$56,109	141	\$56,670	0	\$1,661
Construction	104	26,691	104	27,358	104	27,632	0	941
Buildings and Facilities		0		0		0		0
Buildings and Facilities		0		0		0		0
Total, NIAMS	245	\$538,759	245	\$538,623	245	\$547,891	0	\$9,132

1/ All items in italics are "non-adds"; items in parenthesis are subtractions

Major Changes in the Fiscal Year 2012 Budget Request

Major changes by budget mechanism and/or budget activity detail are briefly described below. Note that there may be overlap between budget mechanism and activity detail and these highlights will not sum to the total change for the FY 2012 budget request for NIAMS, which is \$9.132 million more than the FY 2010 Comparable, for a total of \$547.891 million.

Research Project Grants (+\$3.424 million; total \$354.682 million): NIAMS will support a total of 1,024 Research Project Grant (RPG) awards in FY 2012. Noncompeting awards will increase by 46 awards and \$19.984 million. Competing RPGs will decrease by 59 awards and \$16.392 million. The NIH budget policy for RPGs in FY 2012 is to provide an inflationary increase of 1% in noncompeting awards and allow a 1% increase in the average cost of competing RPGs. NIAMS continues to place a priority on support to new investigators.

Research Training (+\$0.850 million; total \$16.404 million): NIAMS will support 312 pre- and postdoctoral trainees in full-time training positions, the same number as in FY 2010. An across-the-board stipend increase of 4 percent has been provided in FY 2012. When coupled with the 2 percent increase in stipend levels provided in FY 2011, the total reflects a 6 percent increase in stipends over FY 2010. The increase in stipend levels will allow NIAMS to sustain the development of a highly qualified biomedical research workforce.

Intramural Research (+\$1.661 million; total \$56.670 million): In FY 2012 the NIAMS research plans include a continued focus on translational research in order to facilitate patient-oriented studies in the areas of arthritis, musculoskeletal, and skin diseases, including their genetic, inflammatory, and immune mechanisms.

NATIONAL INSTITUTES OF HEALTH
National Institute of Arthritis and Musculoskeletal and Skin Diseases
Summary of Changes
(Dollars in Thousands)

FY 2010 Actual				\$538,759
FY 2012 Estimate				547,891
Net change				\$9,132
CHANGES	2012 Estimate		Change from FY 2010	
	FTEs	Budget Authority	FTEs	Budget Authority
A. Built-in:				
1. Intramural Research:				
a. Annualization of January 2010 pay increase		\$20,850		\$126
b. January FY 2011 pay increase		0		0
c. One less day of pay (n/a for 2011)		0		(81)
d. Payment for centrally furnished services		9,296		92
e. Increased cost of laboratory supplies, materials, and other expenses		26,524		260
Subtotal				\$397
2. Research Management and Support:				
a. Annualization of January 2010 pay increase		\$14,324		\$86
b. January FY 2011 pay increase		0		0
c. One less day of pay (n/a for 2011)		0		(55)
d. Payment for centrally furnished services		4,268		42
e. Increased cost of laboratory supplies, materials, and other expenses		9,040		87
Subtotal				\$160
Subtotal, Built-in				\$557

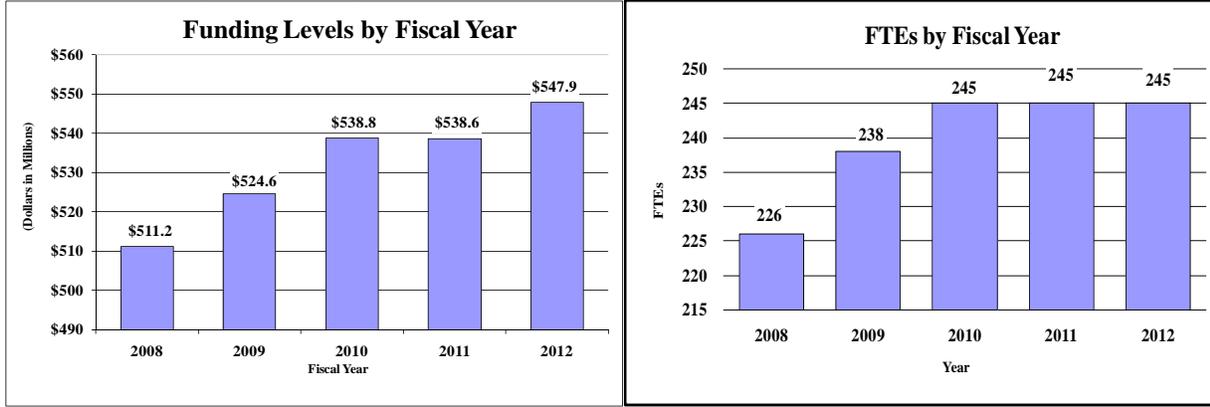
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National Institute of Arthritis and Musculoskeletal and Skin Diseases

Summary of Changes--continued

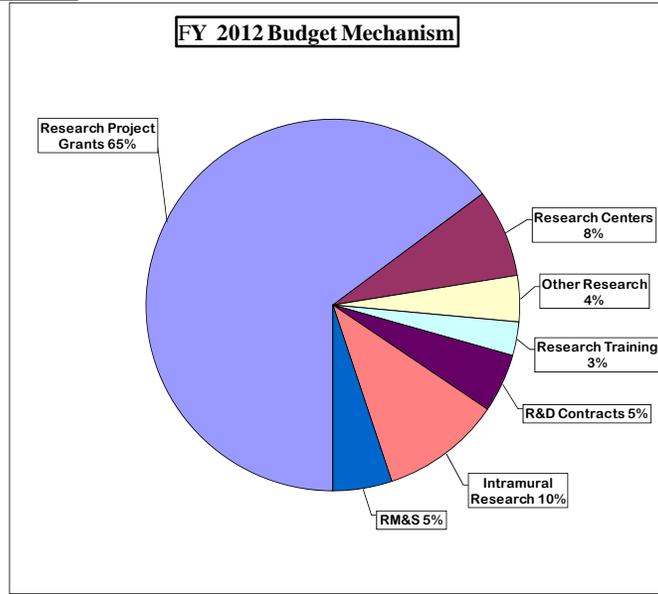
CHANGES	2012 Estimate Base		Change from FY 2010	
	No.	Amount	No.	Amount
B. Program:				
1. Research Project Grants:				
a. Noncompeting	745	\$264,253	46	\$19,616
b. Competing	242	77,495	(59)	(16,392)
c. SBIR/STTR	37	12,934	0	200
Total	1,024	\$354,682	(13)	\$3,424
2. Research Centers	40	\$42,269	0	\$419
3. Other Research	184	22,403	0	657
4. Research Training	312	16,404	0	850
5. Research and development contracts	55	27,831	0	1,180
Subtotal, Extramural		\$463,589		\$6,530
6. Intramural Research	<u>FTEs</u> 141	\$56,670	<u>FTEs</u> 0	\$1,264
7. Research Management and Support	104	27,632	0	781
8. Construction		0		0
9. Buildings and Facilities		0		0
Subtotal, program	245	\$547,891	0	\$8,575
Total changes			0	\$9,132

Fiscal Year 2012 Budget Graphs

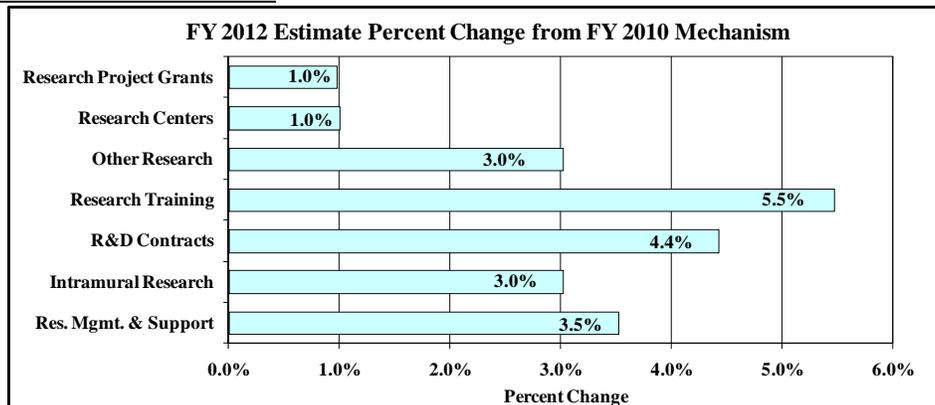
History of Budget Authority and FTEs:



Distribution by Mechanism:



Change by Selected Mechanism:



NATIONAL INSTITUTES OF HEALTH
National Institute of Arthritis and Musculoskeletal and Skin Diseases
Budget Authority by Activity
(Dollars in thousands)

	FY 2010		FY 2011		FY 2012		Change vs.	
	Actual		CR		PB		FY 2010	
<u>Extramural Research</u>	<u>FTEs</u>	<u>Amount</u>	<u>FTEs</u>	<u>Amount</u>	<u>FTEs</u>	<u>Amount</u>	<u>FTEs</u>	<u>Amount</u>
<u>Detail:</u>								
Arthritis and Other Rheumatic Diseases		\$113,977		\$113,500		\$115,603		\$1,626
Skin Biology and Diseases		69,821		69,529		\$70,818		\$997
Muscle Biology and Diseases		73,834		73,528		\$74,891		\$1,057
Musculoskeletal Development and Repair		130,815		130,272		\$132,684		\$1,869
Bone Biology and Diseases		68,612		68,327		\$69,593		\$981
Subtotal, Extramural		\$457,059		\$455,156		\$463,589		\$6,530
Intramural Research	141	\$55,009	141	\$56,109	141	\$56,670	0	\$1,661
Research Management & Support	104	\$26,691	104	\$27,358	104	\$27,632	0	\$941
TOTAL	245	\$538,759	245	\$538,623	245	\$547,891	0	\$9,132

1. Includes FTEs which are reimbursed from the NIH Common Fund for Medical Research.
2. Includes Real Transfers and Comparable Adjustments as detailed in the "Amounts Available for Obligation" table.

**NATIONAL INSTITUTES OF HEALTH
National Institute of Arthritis and Musculoskeletal and Skin Diseases**

Authorizing Legislation

	PHS Act/ Other Citation	U.S. Code Citation	2010 Amount Authorized	FY 2010 Actual	2012 Amount Authorized	FY 2012 PB
Research and Investigation	Section 301	42§241	Indefinite		Indefinite	
National Institute of Arthritis and Musculoskeletal and Skin Diseases	Section 401(a)	42§281	Indefinite	\$538,759,000	Indefinite	\$547,891,000
Total, Budget Authority				\$538,759,000		\$547,891,000

NATIONAL INSTITUTES OF HEALTH
National Institute of Arthritis and Musculoskeletal and Skin Diseases

Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation
2003	\$485,851,000	\$485,851,000	\$489,324,000	\$489,324,000
Rescission				(\$3,181,000)
2004	\$502,778,000	\$502,778,000	\$505,000,000	\$504,300,000
Rescission				(\$3,234,000)
2005	\$515,378,000	\$515,378,000	\$520,900,000	\$515,378,000
Rescission				(\$4,221,000)
2006	\$513,063,000	\$513,063,000	\$525,758,000	\$513,063,000
Rescission				(\$5,131,000)
2007	\$504,533,000	\$504,533,000	\$508,585,000	\$508,240,000
Rescission				\$0
2008	\$508,082,000	\$516,044,000	\$519,810,000	\$517,629,000
Rescission				(\$9,043,000)
Supplemental				\$2,705,000
2009	\$509,080,000	\$526,583,000	\$523,246,000	\$524,872,000
Rescission				\$0
2010	\$530,825,000	\$543,621,000	\$533,831,000	\$539,082,000
Rescission				\$0
2011	\$555,715,000		\$554,846,000	
Rescission				
2012	\$547,891,000			

Justification of Budget Request

National Institute of Arthritis and Musculoskeletal and Skin Diseases

Authorizing Legislation: Section 301 and title IV of the Public Health Service Act, as amended.

Budget Authority (BA):

	FY 2010 Actual	FY 2011 Continuing Resolution	FY 2012 Budget Request	FY 2012 + / - FY 2010
BA	\$538,759,000	\$538,623,000	\$547,891,000	+9,132,000
FTE	245	245	245	0

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

Director's Overview

The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) supports a broad range of research, training, and information dissemination activities related to arthritis, musculoskeletal, and skin diseases. Some are rare disorders, but many are very common, and all have a major influence on the quality of people's lives. Diseases addressed by NIAMS affect individuals of all ages, of all racial and ethnic backgrounds, and across all economic strata; many disproportionately affect women and minorities. Over the years, NIAMS-funded research teams have made significant progress in uncovering the causes and improving the treatment of many disorders of the bones, muscles, joints, and skin. Many of the Institute's ongoing activities are advancing the five initiatives put forth by the NIH Director.

As part of its mandate to devise strategies to treat, and even prevent, the diseases within its mission, NIAMS is committed to supporting timely and informative investigator-initiated clinical trials. Implementation of a clinical trial can require a substantial commitment by the Institute in terms of financial and personnel resources. NIAMS has enhanced its clinical trials portfolio by initiating a two-part grant process. Beginning with its FY 2012 awards, NIAMS will strongly encourage investigators to apply for a clinical trial planning grant in advance of support for the full clinical trial. Moreover, in FY 2011 and FY 2012, the Institute will fund a series of exploratory, short-term clinical studies by investigators who have new ideas for clinical trials but need preliminary data. It will continue its FY 2010 effort to leverage the Nation's considerable investment in large clinical studies by encouraging investigators to tap established resources when asking research questions that they could answer through existing trials and clinical studies. Examples of ongoing NIAMS-supported clinical research include:

- A large, multicenter trial comparing the outcomes of surgery and nonoperative treatments for patients with low back pain. Findings continue to provide clinicians with data that are guiding discussions with their patients regarding treatment options¹.

¹ Weinstein JN, et al. Surgical versus nonoperative treatment for lumbar spinal stenosis four-year results of the Spine Patient Outcomes Research Trial. *Spine*. 2010 Jun 15;35(14):1329-38. [PMID: 20453723](https://pubmed.ncbi.nlm.nih.gov/20453723/)

- Comparative effectiveness research to evaluate treatments for children and adults who have rheumatic or skin diseases.
- New clinical trials of a treatment for children who have a rare blistering skin condition (recessive dystrophic epidermolysis bullosa), and a treatment for children with a rare brittle bone disease (osteogenesis imperfecta). These interventions are based on strategies derived from animal models of these diseases.

NIAMS recognizes the important role animal studies play in translating basic science discoveries into improved human therapies, and the promise that tissue engineering and regenerative medicine hold for musculoskeletal and skin diseases. In FY 2011, NIAMS will support pre-clinical animal studies that have the potential to lead immediately to human trials of tissue engineering and regenerative medicine therapies. The awards will allow investigators to develop large animal models, demonstrate the pre-clinical efficacy of tissue engineering or regenerative medicine therapies in musculoskeletal and skin conditions, and collect other data required for clinical trials.

As part of the Institute's planning process, NIAMS hosted a full-day discussion with extramural investigators to identify research needs related to the integration of psychosocial and behavioral therapies with other treatments for patients with musculoskeletal or rheumatic diseases. Research into how health care providers can combine non-invasive, non-pharmacological approaches with other modalities to improve patients' function could directly influence health care reform by allowing individuals to benefit more fully from existing treatments. Another scientific planning meeting addressed research needs and opportunities regarding how increased exercise contributes to disease prevention and increased overall health. Because exercise effects are systemic, exploration of the mechanisms linking exercise and disease prevention may also contribute to the benefits of physical activity as a treatment for multiple diseases and disorders.

Efforts to encourage collaborative, multi-disciplinary research are a large component of the Institute's strategy to reinvigorate and empower the biomedical research community. In FY 2010, NIAMS funded research under a trans-NIH solicitation that it spearheaded in partnership with the National Aeronautics and Space Administration (NASA); the project requires biomedical researchers, NASA engineers, and astronauts to collaborate to answer fundamental questions surrounding human health issues such as osteoporosis. NIAMS will consider funding additional grants under the NASA program in FY 2011 and FY 2012.

Recognizing that the scale and complexity of today's biomedical research problems demand that scientists move beyond their individual disciplines and explore new organizational models for team science, NIAMS will continue to evaluate the success of the Building Interdisciplinary Research Teams (BIRT) initiative in FY 2012. This program has provided support to grantees to facilitate the establishment of collaborations with other groups of investigators. Ongoing assessments of this initiative will allow the NIAMS to examine how the biomedical research community is using this opportunity to develop new disciplines and approaches with which to tackle increasingly complex questions.

Other FY 2012 plans include offering institutions the opportunity to establish Multidisciplinary Clinical Research Centers or Centers of Research Translation focusing on rheumatologic,

musculoskeletal, or skin conditions. Support for both types of centers stem from the Institute's commitment to develop new and better treatments that improve patient care and public health. Researchers at an existing center were part of a multi-site study that recently published exciting findings about treatments for people with a rare autoimmune disease that destroys blood vessels (anti-neutrophil cytoplasmic antibody-associated vasculitis)².

NIAMS devoted a portion of its annual scientific planning retreat to key gaps and opportunities in the Institute's comparative effectiveness research portfolio. Staff discussed specific disease areas—such as rheumatoid or juvenile idiopathic arthritis, psoriasis, and osteoporosis—that NIAMS-funded researchers are addressing or that are primed for future comparative effectiveness research efforts. Institute staff and extramural researchers discussed strategies that NIAMS could establish to engage key stakeholders and enhance its interactions with patients, health care providers, and researchers when bolstering its comparative effectiveness research investment. Discussion also focused on approaches to develop a research base to enable future comparative effectiveness research opportunities (e.g., the leveraging of electronic medical records and coordination via clinical research networks to generate or obtain outcomes data).

Overall Budget Policy: The FY 2012 request for NIAMS is \$547.891 million or an increase of \$9.132 million or 1.7 percent over the FY 2010 Comparable level. Investigator-initiated research project grants and research conducted by new scientists continue to be the Institute's highest priorities. Funds are included in R&D contracts to reflect NIAMS share of NIH-wide funding required to support several trans-NIH initiatives, such as the Therapies for Rare and Neglected Diseases program, the Basic Behavioral and Social Sciences Opportunity Network (OppNet), and support for a new synchrotron at the Brookhaven National Laboratory; For example, each IC that will benefit from the new synchrotron will provide funding to total NIH's commitment to support this new technology--\$10 million.

NIH will provide an increase of four percent for stipends levels under the Ruth L. Kirschstein National Research Service Award training program to continue efforts to attain the stipend levels recommended by the National Academy of Sciences. This will build on the two percent increase in stipend levels for FY 2011. Stipend levels were largely flat for several years, and the requested increase will help to sustain the development of a highly qualified biomedical research workforce.

Program Descriptions and Accomplishments

Arthritis and Rheumatic Diseases: The goals of this program are to advance high-quality basic, translational, and clinical biomedical and biopsychosocial research to treat, cure, and prevent arthritis and other rheumatic diseases. It utilizes new insights in the fields of genetics, genomics, proteomics, immunology, and imaging to understand how the immune system interacts with various tissues in normal and pathological conditions and to ensure a continuous supply of new targets on which therapies can be based. NIAMS is committed to pursuing new opportunities that identify risk factors for these disorders, to enhance disease prediction, and advance prevention strategies. In FY 2011, NIAMS held a roundtable discussion on the

² Stone JH et al. Rituximab versus cyclophosphamide for induction of remission in ANCA-associated vasculitis. *N Engl J Med.* 2010 Jul 15;363(3):221-32. PMID: 20647199

molecular indicators of the earliest stages of autoimmune rheumatic diseases, before the appearance of symptoms, to explore the application of basic research findings to disease prevention, early diagnosis, and therapeutic intervention. The Institute also cosponsored a conference held on the NIH campus on translating scientific advances into clinical treatment of pain disorders, including arthritis and other rheumatic diseases.

Budget Policy: The FY 2012 budget estimate for this program is \$115.603 million, an increase of \$1.626 million or 1.4 percent over the FY 2010 Comparable level. In FY 2012, NIAMS will implement the testing and validation of tools created by the Common Fund's Patient-Reported Outcomes Measurement Information System (PROMIS) initiative, to measure health care outcomes in the diverse populations represented by the NIAMS portfolio, including arthritis and other rheumatic diseases. The Institute will also support studies utilizing genomics and high throughput technologies to enable researchers to identify and study gene variants associated with rheumatic diseases and other conditions within the NIAMS mission.

Musculoskeletal Development and Repair: This program focuses on understanding the fundamental biology of tissues that constitute the musculoskeletal system, and on translating and applying this knowledge to a variety of diseases and conditions including osteoarthritis. It studies the causes and treatment of acute and chronic injuries including repetitive stress and sports injuries, and is funding a long-term study into the effectiveness of various treatments for patients who have low back pain. The program supports the development of technologies—such as bone and joint imaging, tissue engineering, and regenerative medicine—to improve the diagnosis and treatment of skeletal disorders, or to facilitate repair of damage caused by trauma to otherwise healthy tissue. As part of its FY 2010 scientific planning effort, NIAMS organized a discussion on research directions regarding chronic low back pain. NIAMS also solicited input from the scientific community on emerging research needs and opportunities related to osteoarthritis that occurs following an acute, traumatic injury to a joint. In FY 2011, the Institute collaborated with physicians and health professionals to explore further the strong association between joint injury and the development of osteoarthritis, and how research in this area can be applied to patient care. NIAMS also partnered with professional societies to address how advances in tissue engineering can be applied to musculoskeletal diseases, and how advances in genetics and genomics can be leveraged to develop therapies against osteoarthritis.

Budget Policy: The FY 2012 budget estimate for this program is \$132.684 million, an increase of \$1.869 million or 1.4 percent over the FY 2010 Comparable level. In FY 2012, NIAMS will continue to promote the use of the Osteoarthritis Initiative (OAI) data and images, as described below (see Program Portrait: The Osteoarthritis Initiative). The OAI provides an unparalleled state-of-the-art database showing both the natural progression of the disease and information on biomarkers, x rays and outcome measures. This database should allow investigators to identify potential new disease targets and develop tools for understanding how to measure clinically meaningful improvements.

Program Portrait: The Osteoarthritis Initiative

FY 2010 Level: \$7.214 million (total NIH investment)

FY 2012 Level: \$7.214 million (total NIH investment)

Osteoarthritis (OA) is the most common form of arthritis and the major cause of activity limitation and physical disability in older people. The Centers for Disease Control and Prevention estimates that 12.1 percent of the U.S. population (nearly 27 million Americans) age 25 and older have OA. By 2030, about 72 million Americans will have passed their 65th birthday and will be at high risk for the disease.

A limited number of therapies exist for OA treatment. Most are designed only to relieve pain; no existing treatment inhibits the structural changes that cause painful and disabling OA symptoms. One barrier to the development of drugs that block joint degradation is the lack of objective and measurable markers of disease progression by which new drugs can be evaluated. To help address this barrier, NIH—with input from the U.S. Food and Drug Administration—partnered with private sponsors to create the Osteoarthritis Initiative (OAI), a publicly available research resource that investigators can use to identify and evaluate biomarkers of OA.

By the end of FY 2010, more than 1700 researchers from 77 countries had registered to access OAI data through the OAI Web site, and had downloaded nearly 6900 clinical datasets. In FY 2010, at least 25 articles using OAI data were published or accepted for publication in peer-reviewed journals; this brings the total number of articles about OAI data to 55. The OAI data also were featured in posters and oral presentations at major scientific conferences, such as the American College of Rheumatology and the Osteoarthritis Research Society International annual meetings.

Bone Biology and Diseases: This program studies the regulation of bone formation, resorption, and mineralization, and the effects of hormones, growth factors, and cytokines on bone cells. It supports several large epidemiologic cohorts for characterization of the natural history of osteoporosis, and for identification of genetic and environmental risk factors that contribute to bone disease. Although bone mass is closely related to fracture risk, the trait does not lend itself readily to a dichotomy between people who are at risk of fracture and those who have strong, healthy bones. NIAMS has encouraged investigators to collect high-density genotype information on participants, so subsequent studies to identify genetic risk factors (as well as new targets for therapeutic intervention) can leverage these resources. As in recent years, the NIAMS will continue to support the field's burgeoning interest in the genetics of bone diseases and research related to the integration of bone with other organ systems affected by chronic illness.

Budget Policy: The FY 2012 budget estimate for this program is \$69.593 million, an increase of \$0.981 million or 1.4 percent over the FY 2010 Comparable level. Program plans for FY 2012 include efforts to encourage research that builds on initial discoveries regarding the human genomics of complex bone diseases.

Muscle Biology and Diseases: This program objective is to advance the understanding of the role that muscle plays in musculoskeletal and whole body health and, ultimately, to treat or prevent skeletal muscle diseases and disorders (including muscular dystrophies, inflammatory myopathies, muscle ion channel diseases, disuse atrophy, skeletal muscle injury and loss of muscle mass associated with aging and diseases). It focuses on fundamental biology of muscle development, physiology, and muscle imaging. As part of its FY 2010 scientific planning effort, the Institute organized a discussion on an emerging therapeutic approach that scientists are testing against diseases such as Duchenne muscular dystrophy. Other FY 2010 activities

included renewal of a major research effort, under the Senator Paul D. Wellstone Muscular Dystrophy Cooperative Research Centers program, to develop treatments to inhibit muscle scarring and enhance muscle regeneration.

Budget Policy: The FY 2012 budget estimate for this program is \$74.891 million, an increase of \$1.057 million or 1.4 percent over the FY 2010 Comparable level. For FY 2012, the program will continue to participate in the Senator Paul D. Wellstone Muscular Dystrophy Cooperative Research Centers program. Other FY 2012 plans include renewing an effort to encourage applications for training and career development in the muscular dystrophies including, but not limited to, Duchenne, myotonic, facioscapulohumeral, and congenital disease.

Skin Biology and Diseases: This program supports basic, translational, and clinical research in skin, including work on the developmental and molecular biology of skin, the study of skin as an immune organ, and the genetics of skin diseases. The Institute is pursuing opportunities in developing artificial skin, and imaging technologies for diagnosis and tracking progression of skin diseases. In FY 2010, a session at the Institute's annual scientific planning retreat focused on research on the bacteria that live on human skin (i.e., the skin microbiome), which relies heavily on high throughput sequencing technologies. The discussion addressed ongoing research on the skin microbiome's role in maintaining health and causing disease. In FY 2011, NIAMS conducted a roundtable discussion on itch research to explore the potential application of basic research models to human studies that pertain to the development of new therapies where itching is a primary symptom.

Budget Policy: The FY 2012 budget estimate for this program is \$70.818 million, an increase of \$0.997 million or 1.4 percent over the FY 2010 Comparable level. In FY 2012, the Institute will encourage multidisciplinary research projects on the biology of itch, towards the development of new, effective treatments. NIAMS will also continue its support of research on the influence of imbalances in the skin microbiome on skin diseases, such as eczema.

Intramural Research Program: The mission of this program is to conduct innovative basic, translational, and clinical research relevant to the health concerns of the Institute, and to provide training for investigators who are interested in related research careers. The program conducts clinical studies on the genetics, etiology, pathogenesis, and treatment of a variety of rheumatic, autoimmune, inflammatory, joint, skin, and muscle diseases. The program has recently expanded its capacity by diversifying its current expertise, connecting with future scientists, and investing in new technologies. The addition of clinical staff with backgrounds in health outcomes research, including orthopaedics and pediatric rheumatology, has complemented ongoing scientific pursuits. Furthermore, the program's continued support for scientific and clinical fellows, in addition to providing laboratory access to promising local high school students, is an important investment in the research pipeline.

Budget Policy: The FY 2012 budget estimate for this program is \$56.670 million, an increase of \$1.661 million or 3 percent over the FY 2010 Comparable level. NIAMS plans for FY 2012 include a continued focus on translational research, in order to facilitate patient-oriented studies in the areas of arthritis, musculoskeletal, and skin diseases, including their genetic, inflammatory, and immune mechanisms. NIAMS will also continue its commitment to

multidisciplinary training of rheumatology research fellows, including interactions with other NIH intramural training programs with common scientific interests, to strengthen the pipeline of highly qualified physician-scientists in this field. The Institute's intramural research program also anticipates building upon its recent collaborative scientific activities in rheumatic diseases across various Institutes at NIH. This mimics the continued research partnerships that NIAMS scientists have with experts around the world, which have led to fundamental insights into basic biology and the genetics of diseases that carry the promise of new treatments and interventions.

Program Portrait: NIAMS Intramural Research Program

FY 2010 Level: \$55.009 million

FY 2012 Level: \$56.670 million

The NIAMS Intramural Research Program (IRP) continues to support a wide range of activities that span basic, translational, and clinical research, as well as training opportunities. Scientists recently found that the prolonged activity of the inflammation-causing cells in the eye is due to their ability to resist programmed cell death. This unique behavior could be beneficial to the body as it battles invading microorganisms, but it may also explain why the cells, called Th17 cells, appear to be a major player in several autoimmune conditions. These results may point to a strategy to treat autoimmune diseases.

NIAMS IRP researchers also found susceptibility to Behçet's disease to be associated with genes involved in the immune response. In collaboration with Turkish investigators studying this painful inflammatory condition, which is common in select Mediterranean populations, IRP researchers examined a gene associated with immune reactions (the interleukin 10 (IL10) gene). They showed that people with two copies of the Behçet's disease variant produced significantly lower levels of IL10 protein than people with only one copy or none of the gene variant. This indicates that IL10 might be a risk factor for Behçet's disease, suggesting possible therapeutic targets.

NIAMS also recently partnered with several other NIH components to host a two-day conference on Systemic Lupus Erythematosus: From Mouse Models to Human Disease and Treatment. The meeting brought together basic research scientists working on animal models of autoimmune disease relevant to systemic lupus erythematosus, with clinicians treating lupus patients. Attendees discussed the clinical and molecular similarities in human disease and animal models as they sought to identify the most important features of lupus, and what models might be most useful in developing markers and treatments.

Research Management and Support (RMS): NIAMS' RMS supports the scientific, administrative management, and information technology activities associated with day-to-day operations. It supports long-term investments in the research enterprise, including the review and financial management of applications for grants and contracts, and dissemination of research. In FY 2010, the Institute managed 1,261 research grants and centers, as well as 55 research and development contracts and 312 individual and institutional full-time research training positions. NIAMS supported 535 clinical research studies, including 59 clinical trials. In FY 2010, NIAMS released its Long-Range Plan for FY 2010 through FY 2014. The plan brings attention to many areas that need to be addressed in the coming years in order to propel progress related to the understanding, diagnosis, treatment, and prevention, of diseases within the NIAMS mission. To further its commitment to information dissemination, NIAMS expanded its use of social media tools in order to facilitate the rapid distribution of research-based materials. NIAMS also used these tools for recruitment efforts in the Institute's Intramural Research

Program to help maintain a strong stream of new investigators interested in the diseases and conditions within the NIAMS portfolio.

Program Portrait: NIAMS Information Dissemination and Outreach

FY 2010 Level: \$4.677 million

FY 2012 Level: \$4.874 million

NIAMS supports a robust information dissemination and outreach program to distribute research-based information to the public, patients, and their health care providers. For example, the NIAMS National Multicultural Outreach Initiative is creating a sustainable network of partners to assist in the development and dissemination of health messages and materials for racial and ethnic minority populations. The Initiative will reach African Americans, Hispanics/Latinos, Asians and Pacific Islanders, and American Indians/Alaska Natives and Native Hawaiians. Working with existing NIAMS partners, the Institute will develop research-based self-care messages and products, and ensure their distribution through trusted health and multicultural community channels. NIAMS implemented critical phases of the Initiative in FY 2011, namely, the development and pretesting of culturally and linguistically appropriate health messages and materials through audience research.

Additionally, NIAMS recently developed a new Web site to help children and their parents find credible health information about bone, muscle, joints, and skin, and revitalized its Web site for the NIH Osteoporosis and Related Bone Diseases ~ National Resource Center (Center). The Center, which is funded by multiple NIH and DHHS components, provides the public, patients, and health professionals with an important link to resources and information on metabolic bone diseases. The updated site features tools that help locate information by audience type, language, reading level, and disease, resulting in easy access to bone health information by underserved and at-risk individuals. Other resources include the new NIAMS Multimedia page, which provides a centralized place on the NIAMS Web site where visitors can access videos, images, and audio publications. It brings together two existing resources—the NIAMS Image Gallery, an online searchable database of NIAMS photos and illustrations, and audio publications in both English and Spanish—and will soon add video.

Budget Policy: The FY 2012 request for RMS is \$27.632 million, an increase of \$0.941 million or 3.5 percent over the FY 2010 Comparable level. In FY 2012, the Institute will celebrate its 25th anniversary by highlighting achievements of NIAMS-supported scientists and future research directions within the Institute’s mission. National leaders in arthritis and musculoskeletal and skin diseases research, along with patient representatives, will participate in a scientific symposium to discuss how support provided by NIAMS has helped to shape the biomedical and behavioral science landscapes. They also will discuss future research and training needs and opportunities. Additionally, NIAMS will continue to sponsor roundtable discussions and a scientific retreat with extramural investigators and lay representatives to inform the Institute’s priority-setting and strategic planning process. These meetings help to position NIAMS to appropriately guide research efforts and improve the health of the American public.

NATIONAL INSTITUTES OF HEALTH
National Institute of Arthritis and Musculoskeletal and Skin Diseases

Budget Authority by Object
(Dollars in Thousands)

	FY 2010 Actual	FY 2012 PB	Increase or Decrease	Percent Change
Total compensable workyears:				
Full-time employment	245	245	0	0.0%
Full-time equivalent of overtime and holiday hours	0	0	0	0.0%
Average ES salary	\$179,700	\$182,216	\$2,516	1.4%
Average GM/GS grade	11.6	11.5	(0.1)	-0.9%
Average GM/GS salary	\$90,551	\$91,822	\$1,271	1.4%
Average salary, grade established by act of July 1, 1944 (42 U.S.C. 207)	\$81,978	\$84,289	\$2,311	2.8%
Average salary of ungraded positions	120,079	121,761	1,682	1.4%
OBJECT CLASSES	FY 2010 Actual	FY 2012 Estimate	Increase or Decrease	Percent Change
Personnel Compensation:				
11.1 Full-time permanent	\$15,133	\$15,164	\$31	0.2%
11.3 Other than full-time permanent	8,939	8,959	20	0.2%
11.5 Other personnel compensation	906	907	1	0.1%
11.7 Military personnel	352	355	3	0.9%
11.8 Special personnel services payments	2,645	2,651	6	22.7%
Total, Personnel Compensation	\$27,975	\$28,036	\$61	0.2%
12.0 Personnel benefits	\$6,819	\$6,833	\$14	20.5%
12.2 Military personnel benefits	304	304	0	0.0%
13.0 Benefits for former personnel	0	0	0	0.0%
Subtotal, Pay Costs	\$35,098	\$35,173	\$75	21.4%
21.0 Travel and transportation of persons	\$856	\$948	\$92	10.7%
22.0 Transportation of things	147	158	11	7.5%
23.1 Rental payments to GSA	0	0	0	0.0%
23.2 Rental payments to others	0	0	0	0.0%
23.3 Communications, utilities and miscellaneous charges	531	575	44	8.3%
24.0 Printing and reproduction	60	70	10	16.7%
25.1 Consulting services	1,177	1,353	176	15.0%
25.2 Other services	2,962	3,234	272	9.2%
25.3 Purchase of goods and services from government accounts	50,272	56,019	5,747	11.4%
25.4 Operation and maintenance of facilities	434	487	53	12.2%
25.5 Research and development contracts	13,701	10,226	(3,475)	-25.4%
25.6 Medical care	2,958	3,146	188	6.4%
25.7 Operation and maintenance of equipment	1,219	1,302	83	6.8%
25.8 Subsistence and support of persons	0	0	0	0.0%
25.0 Subtotal, Other Contractual Services	\$72,723	\$75,767	\$3,044	4.2%
26.0 Supplies and materials	\$3,952	\$4,212	\$260	6.6%
31.0 Equipment	3,655	3,901	246	6.7%
32.0 Land and structures	0	0	0	0.0%
33.0 Investments and loans	0	0	0	0.0%
41.0 Grants, subsidies and contributions	421,737	427,087	5,350	1.3%
42.0 Insurance claims and indemnities	0	0	0	0.0%
43.0 Interest and dividends	0	0	0	0.0%
44.0 Refunds	0	0	0	0.0%
Subtotal, Non-Pay Costs	\$503,661	\$512,718	\$9,057	1.8%
Total Budget Authority by Object	\$538,759	\$547,891	\$9,132	1.7%

Includes FTEs which are reimbursed from the NIH Common Fund for Medical Research

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Salaries and Expenses
(Dollars in Thousands)

OBJECT CLASSES	FY 2010 Actual	FY 2012 PB	Increase or Decrease	Percent Change
Personnel Compensation:				
Full-time permanent (11.1)	\$15,133	\$15,164	\$31	0.2%
Other than full-time permanent (11.3)	8,939	8,959	20	0.2%
Other personnel compensation (11.5)	906	907	1	0.1%
Military personnel (11.7)	352	355	3	0.9%
Special personnel services payments (11.8)	2,645	2,651	6	0.2%
Total Personnel Compensation (11.9)	\$27,975	\$28,036	\$61	0.2%
Civilian personnel benefits (12.1)	\$6,819	\$6,833	\$14	0.2%
Military personnel benefits (12.2)	304	304	0	0.0%
Benefits to former personnel (13.0)	0	0	0	0.0%
Subtotal, Pay Costs	\$35,098	\$35,173	\$75	0.2%
Travel (21.0)	\$856	\$948	\$92	10.7%
Transportation of things (22.0)	147	158	11	7.5%
Rental payments to others (23.2)	0	0	0	0.0%
Communications, utilities and miscellaneous charges (23.3)	531	575	44	8.3%
Printing and reproduction (24.0)	60	70	10	16.7%
Other Contractual Services:				
Advisory and assistance services (25.1)	1,177	1,353	176	15.0%
Other services (25.2)	2,962	3,234	272	9.2%
Purchases from government accounts (25.3)	28,721	29,815	1,094	3.8%
Operation and maintenance of facilities (25.4)	434	487	53	12.2%
Operation and maintenance of equipment (25.7)	1,219	1,302	83	6.8%
Subsistence and support of persons (25.8)	0	0	0	0.0%
Subtotal Other Contractual Services	\$34,513	\$36,191	\$1,678	4.9%
Supplies and materials (26.0)	\$3,949	\$4,209	\$260	6.6%
Subtotal, Non-Pay Costs	\$40,056	\$42,151	\$2,095	5.2%
Total, Administrative Costs	\$75,154	\$77,324	\$2,170	2.9%

NATIONAL INSTITUTES OF HEALTH
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Details of Full-Time Equivalent Employment (FTEs)

OFFICE/DIVISION	FY 2010 Actual			FY 2011 CR			FY 2012 PB		
	Civilian	Military	Total	Civilian	Military	Total	Civilian	Military	Total
Office of the Director	57		57	57		57	57		57
Extramural Program	44	3	47	45	2	47	45	2	47
Intramural Research Program	139	2	141	139	2	141	139	2	141
Total	240	5	245	241	4	245	241	4	245
Includes FTEs which are reimbursed from the NIH Common Fund for Medical Research									
FTEs supported by funds from Cooperative Research and Development Agreements									
	0	0							0
FISCAL YEAR	Average GS Grade								
2008	11.6								
2009	11.7								
2010	11.6								
2011	11.5								
2012	11.5								

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Detail of Positions

GRADE	FY 2010 Actual	FY 2011 CR	FY 2012 PB
Total, ES Positions	1	1	1
Total, ES Salary	179,700	179,700	182,216
GM/GS-15	17	17	17
GM/GS-14	28	28	28
GM/GS-13	40	40	40
GS-12	29	29	29
GS-11	15	15	15
GS-10	0	0	0
GS-9	9	9	9
GS-8	9	9	9
GS-7	11	11	11
GS-6	6	6	6
GS-5	3	3	3
GS-4	2	2	2
GS-3	2	2	2
GS-2	0	0	0
GS-1	0	0	0
Subtotal	171	171	171
Grades established by Act of July 1, 1944 (42 U.S.C. 207):			
Assistant Surgeon General	0	0	0
Director Grade	1	1	1
Senior Grade	0	0	0
Full Grade	3	3	3
Senior Assistant Grade	0	0	0
Assistant Grade	0	0	0
Subtotal	4	4	4
Ungraded	74	74	74
Total permanent positions	171	171	171
Total positions, end of year	250	250	250
Total full-time equivalent (FTE) employment, end of year	245	245	245
Average ES salary	179,700	179,700	182,216
Average GM/GS grade	11.6	11.5	11.5
Average GM/GS salary	90,551	90,331	91,822