



Published in final edited form as:

Wound Repair Regen. 2014 May ; 22(3): 295–300. doi:10.1111/wrr.12175.

Wound Research Funding from Alternative Sources of Federal Funds in 2012

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Abstract

Chronic wounds represent a major health care burden, costing \$25 billion annually, and are associated with high mortality. We previously reported that cutaneous wound healing represented only 0.1% (\$29.8 million) of the National Institutes of Health budget. This current study focuses on quantifying the contribution by federal agencies other than the National Institutes of Health for fiscal year 2012. Federal databases including USA spending, Veterans Affairs, Tracking Accountability in Government Grants Systems, Health Services Research Projects in Progress, and Patient-Centered Outcomes Research Institute, were searched for individual projects addressing wound healing. Twenty-seven projects were identified, totaling funding of \$16,588,623 (median: \$349,856). Four sponsor institutions accounted for 74% of awarded funds: Department of the Army, National Science Foundation, Department of Veterans Affairs, and Agency for Healthcare Research & Quality. Research projects and cooperative agreements comprised 44% and 37% of awarded grants. New applications and continuing projects represented 52% and 37%. Wound healing represented 0.15% of total medical research funded by the non-National Institutes of Health federal sector. Compared to potential impact on US public health, federal investment in wound research is exiguous. This analysis will draw attention to a disproportionately low investment in wound research and its perils to American public health.

Keywords

Wound research; federal; funding

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Conflicts of Interest: The authors have no financial relationships that may pose a conflict of interest.

INTRODUCTION

In the United States, chronic wounds affect more than 6 million annually, costing the healthcare system an estimated \$25 billion.(1) Chronic wounds are a major cause of morbidity and mortality and a challenge to healthcare systems. Intensive basic and clinical research will be needed to resolve this circumstance. We recently reported that cutaneous wound healing research funding represents only 0.1% of the overall National Institutes of Health (NIH) funding, the main federal source of funding in this field.(2)

Biomedical research support enables investigators to search for more effective treatments and preventive measures for various diseases, and it serves as a guide for new policies, economic development, and new commercial products.(3) It has been shown that total research funding and industry funding are correlated to projected disease burden in high-income countries; NIH funding, meanwhile, is correlated to disease burden globally.(4) A recently published article, carried out in part by the Wound Healing Society (WHS) Government Relations Committee, found total funding of approximately \$30 million for the fiscal year 2012 for NIH cutaneous wound healing–related research.(2) In part as members of the WHS Government Relations Committee, we now report non-NIH sources of federal spending for the same fiscal year of 2012.

METHODS

Our aim was to determine the amount of non-NIH federal funding allocated for cutaneous wound research for the fiscal year 2012 (October 2011–September 2012). The federal databases used for our search included USA Spending, Veterans Affairs (VA) database, Tracking Accountability in Government Grants Systems (TAGGS), the Health Services Research Projects in Progress (HsrProject) from the National Library of Medicine, and the Patient-Centered Outcomes Research Institute (PCORI) (Table 1). During these database searches, information was captured from the Department of Defense, National Science Foundation, Department of Veterans Affairs, Department of Health and Human Services, Agency for Healthcare Research and Quality (AHRQ), Centers for Disease Control and Prevention, the Administration for Children and Families, and the Food and Drug Administration. If the information was unavailable online, the agencies were contacted via email or phone. Several attempts to collect information from the Defense Advanced Research Projects Agency (DARPA) were unsuccessful, and analysis of 27 individual projects funded as part of program projects through the Armed Forces Institute of Regenerative Medicine (AFIRM) was not available.

We used the same key terms from our previous report,(2) “wound”, “wound healing”, “chronic wound”, “diabetic ulcer”, “venous ulcer”, “arterial ulcer”, “burn”, “skin ulcer”, “skin regeneration”, “sickle cell ulcer”, “pressure ulcer”, “scleroderma”, “pyoderma gangrenosum”, “hyperbaric oxygen”, “wound infection”, and “cutaneous wound”. These terms were used, individually or in combination when possible, to search abstracts of 4 of the 5 grant databases listed above (USAspending, TAGGS, HsrProj, and VA). The PCORI database was searched for all the projects funded in the 2012 fiscal year. As in our previous report because of the ability to obtain needed data, we included only single projects or

grants; large program projects, multi-investigator projects or project consortiums were excluded. Duplicate projects, projects funded by private institutions or the NIH, or projects not relevant to fiscal year 2012 were excluded. Project abstracts that contained one or more key terms were further screened for appropriateness. Three authors independently reviewed each abstract of the selected projects. Research projects that focused primarily on cutaneous wound prevention or education, mechanism, complications, treatment, and imaging or monitoring were included in our analysis. Projects that used wound models as means of evaluating healthcare quality were excluded. Data examined included source agency, recipients, assistance type, activity type, and fiscal year total cost.

RESULTS

Of the initial 2,178 results identified through the search of the 5 databases, 27 projects were found to be relevant to cutaneous wounds for the 2012 fiscal year. Information regarding grant value was available for all of these projects, amounting to a total funding of \$16,588,623 and a median funding per project of \$ 349,856 (Table 2). Seven institutions from the federal government were responsible for awarding funds, of which four (Department of the Army, National Science Foundation, VA, and AHRQ) accounted for 74% of the granting agencies (Table 3). Overall, the Department of Defense was the non-NIH agency that contributed most to wound research, representing 78% of the non-NIH funding allocated in the fiscal year 2012 (Table 4).

Most of the grants awarded were research projects (44%) and cooperative agreements (37%) (Table 5). New applications represented 52% of grants awarded, while 37% represented continuation awards. (Table 6) The grantees were mostly affiliated with universities (48.1%), foundations (11%), and VA institutions (11%) (Table 7). The majority of awards were granted to clinical research and drug development projects (26% each), basic science projects (19%), and prevention projects (15%). Common areas of research included wound infections (30%), diabetic foot ulcers and burns, (11% each), and pressure ulcers and hyperbaric oxygen therapy (7% each). Biomedical research and development expenditures in the United States for the year 2012 were \$48.9 billion by the public sector defined as all governmental funding,(5) \$41 billion by the federal government,(6) and \$30.8 billion by the NIH.(7) Chronic wound care consumes 0.9% of the National Health Expenditure (NHE) of \$2.7 trillion.(8) Excluding program projects, total federal funding for cutaneous wound healing was \$46.39 million. This includes 2 components; NIH funding (\$29.80 million,(2) 0.11% of total 2012 NIH funding), and non-NIH funding (\$16.59 million, 0.15% of the total 2012 non-NIH funding). Together they represent 0.11% of total federal biomedical research spending for fiscal year 2012.

To put these figures into perspective, Lyme disease,(9) chronic wounds,(1) Parkinson's disease,(10) and cancer(11) represent 0.007%, 0.9%, 0.5%, and 4.6% of the NHE, while they represent 0.1%, 0.1%, 0.5% and 18.3% of the NIH funding for the fiscal year 2012 and chronic wounds, Parkinson's disease,(12) and cancer(13) (historical data) represent 0.11%, 0.58%, and 7.46% of total federal funding (Table 8, Figure 1).

DISCUSSION

Allocation of research funding is based on several criteria, one of the main ones being public health needs.(14) Chronic wounds cost the U.S. approximately \$25 billion per year,(1) which accounts for 0.9% of the overall NHE of \$ 2.7 trillion.(8) This high cost should warrant an important presence in the research budget. However, as opposed to other areas of medicine, information on the levels of funding for wound healing research is limited.

Federal and industry funding represent two of the most important sources of biomedical research funding.(3, 4, 15) Despite the expected explosion of federal health care spending over the coming decades, propelled by aging population, returning veterans, and the associated increase in the number of Medicare and Medicaid enrollees with disabling and deadly conditions,(6) it has been observed in recent years that both public and private spending in medical research has been at or below previous levels. Public expenditure in biomedical research and development went from \$48 billion in 2007 to \$48.9 billion in 2012, while industry expenditure went from \$83.3 billion to \$70.4 billion for the same period.(5)

Little data are available on wound healing research support. Zanca et al found that federal sources provided 95% of \$21.6 million invested in pressure ulcer research in the early 2000s. However, due to the lack of accessible databases, they acknowledged the underrepresentation of industry support in their investigation.(16) This deficiency demonstrates the need for studies regarding the national allocation of funds for wound research, though additional information was provided by Richmond et al.(2) In that study, we found that the allocation of NIH funds for this topic in 2012 was \$29.8 million, representing only 0.1% of the total NIH budget for that year, even though chronic wounds represent 0.9% of the NHE. By comparison Parkinson's disease (consuming 55% of the expense of chronic wound treatment), received five times more from federal agencies than wound healing.(12, 17) Lyme disease, a less frequent pathology that costs ten times less than chronic wounds, received equal research funding from the NIH than wound healing.(17) This disproportionate allocation highlights the need for a more comprehensive evaluation at the time of allocating funds to research in various medical disciplines.

In this work to better understand the scope of federal funding from wound research, we evaluated non-NIH federal sources of funding, and observed that these sources contributed \$16.6 million, representing 36% of the overall federal research expenditure for wound healing.

Comparing total biomedical research outlays, combined public and private expenditure for 2012 was \$130.4 billion, and federal sources contributed \$41 billion or 31%.(6) The actual NIH expenditure for research in 2012 was 30 billion, the overall non-NIH federal budget for 2012 was \$11 billion.(6) As funding for wound healing was \$ 16.6 million in 2012, it therefore represents 0.15% of the medical research for the non-NIH federal sector. This suggests that funding for wound healing research from both NIH and non-NIH sources are disproportionately low relative to the high healthcare costs that these conditions represent (0.9% of the NHE).

Although historically NIH contributes the majority of federal medical research funding, there is a trend of increasing support from other federal sources; from 4% in 2003 to 21% in 2011(7, 18) (Figure 2). This may represent an increase in combat-related injury during the last decade. Interestingly, non-NIH federal funding for wound healing research in 2012 represented 36% of total federal funds that were invested towards wound research. We recognize that challenges to federal funding exist. For example, the NIH success rate of overall applications has been falling during the last decade, despite a slight decrease of applications in the last 2 years.(19) Wound researchers have pursued alternative opportunities for federal funding at times where NIH budget is under great pressure. However, since the federal funding share for wound healing research is disproportionately low for the healthcare system costs that chronic wounds represent, we need to continue to advocate for a better distribution of the research funding.

Chronic wounds not only represent high healthcare costs -- \$25 billion annually,(1) 0.9% of the NHE-but are also associated with increased mortality.(20, 21) The 5-year mortality rate for neuropathic diabetic ulcers is 45%, a higher rate than many common cancers.(20) Other chronic wounds may also be associated with increased mortality, for example, pressure ulcers have a higher risk of death than their age-matched counterparts.(21) Despite these facts, there has been a lack of new pharmacological interventions over the last 10 years,(22) suggesting wound healing research requires greater support from federal agencies. Researchers should be aware that although the NIH contributed the greatest amount of funding, other federal agencies contributed a substantial proportion to wound healing research. This also should prompt the wound healing community to continue to demand more transparency in the federal awarding process; although the information is mostly publicly available, its collection is burdensome. Wound healing is not listed as an area of research in the NIH annual funding data, and other federal sources do not publish their data by topic, making data collection difficult. Given the impact of chronic wounds in the healthcare system, we recommend that wound healing be considered as an independent topic in the annual report of NIH RePORT and that other federal agencies publish research funding by medical topics.

We are aware of the limitations of our study. Our search methodology, although extensive, did not evaluate multiproject or program grants for wound healing research, and despite several attempts, we could not retrieve information from DARPA.

CONCLUSION

Despite the risk that chronic wounds represent to society, representing 0.9% of the NHE along with increased mortality, the proportion of federal funding that wound healing research receives is low, 0.11% of the total federal funding being allocated to research and development. As wound researchers, we need to advocate for a more proportionate distribution of federal research funding.

Acknowledgments

Source of Funding: JMD is supported by: NIH R01 AR056138, NIH R01 EB002825, and the Department of Veterans Affairs; MMG is supported by: NIH R03 AI068139, and NIH R21 AI078208; CKS is supported by NIH

R01 GM069589, NIH R01 GM077185, NIH R01 NR013898, and NIH R01 NS042617; and MTC is supported by: NIH R01 NR013881, NIH R21 AR060562, and NIH RC1 DK086364. The contents do not represent the views or policy of the Department of Veterans Affairs, the National Institutes of Health, or the United States Government.

ABBREVIATIONS

NIH	National Institutes of Health
WHS	Wound Healing Society
VA	Veterans Affairs
TAGGS	Tracking Accountability in Government Grants Systems
HsrProject	Health Services Research Projects in Progress
PCORI	Patient-Centered Outcomes Research Institute
AHRQ	Agency for Healthcare Research and Quality
DARPA	Defense Advanced Research Projects Agency
NHE	National Health Expenditure
USUHS	Uniformed Services University of the Health Sciences

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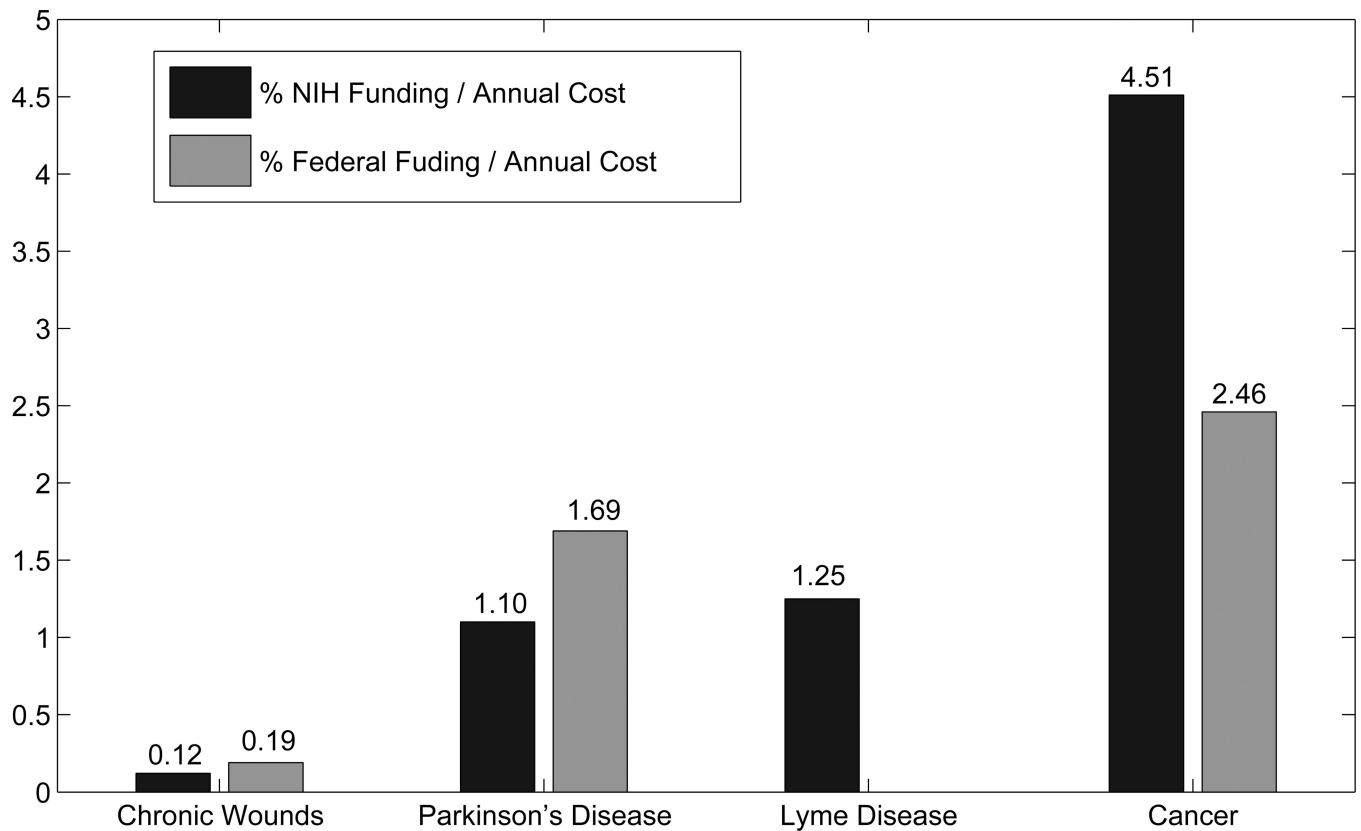


Figure 1.

Proportion of NIH and total federal funding versus annual healthcare cost of disease for chronic wounds, Parkinson's disease, Lyme disease, and cancer.

^aApproximate costs for chronic wounds, Parkinson disease, Lyme disease, and cancer are \$25 billion,(1) \$14 billion,(10) \$2billion,(9) \$ and \$124 billion,(11) respectively.

^bNIH funding for the FY 2012 was \$30.69 billion. NIH funding for chronic wounds, Parkinson disease, Lyme disease, and cancer are \$30 million, \$154 million, \$25 million, and \$5,621 million,(17) respectively.

^cChronic wound data per our report, historical data for Parkinson disease,(12) and cancer. (13) Lyme disease data not available.

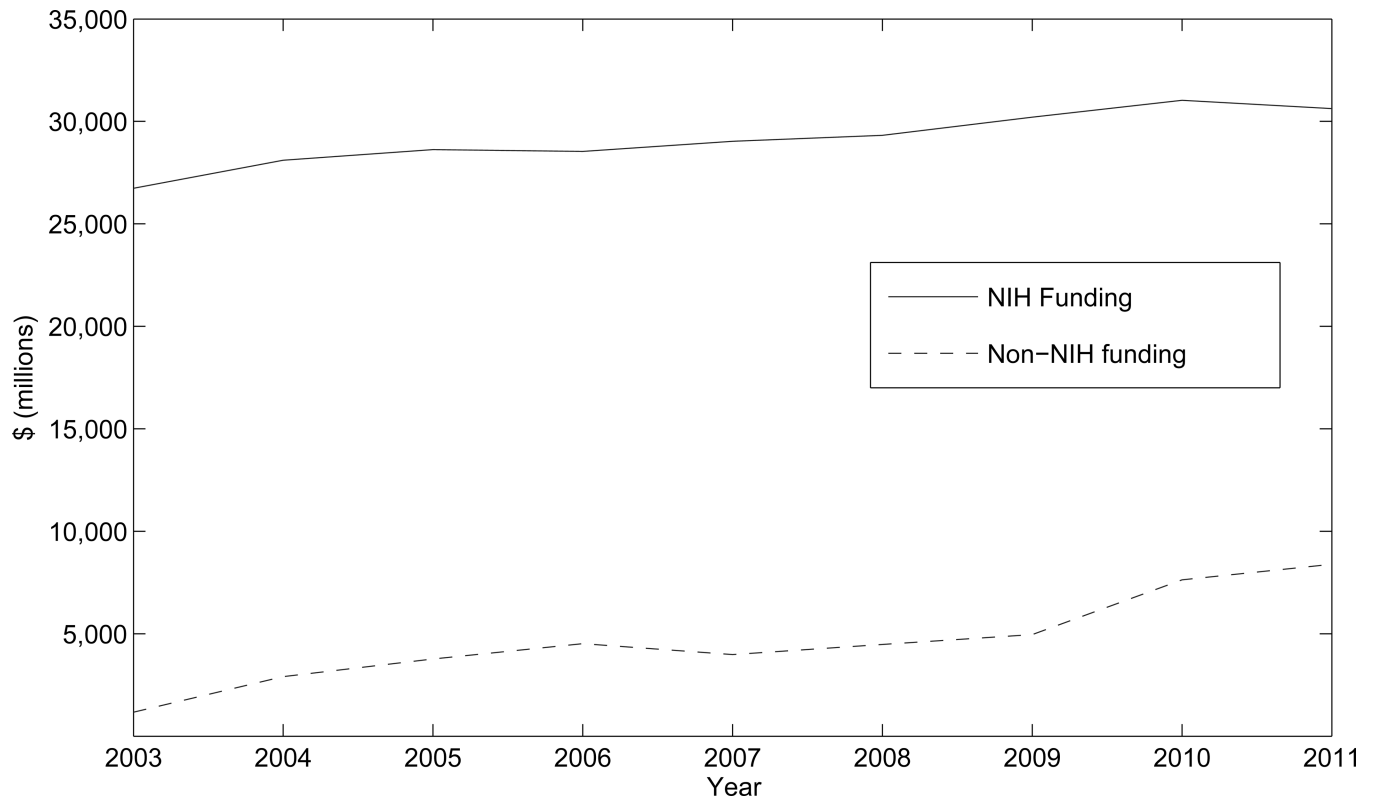


Figure 2.
Federal funding for biomedical research 2003–2011. Funding in millions of dollars.
NIH funding according to (7)
Other federal funding calculated by subtraction of NIH funding from total federal funding(18, 23)

Table 1

Federal databases searched for cutaneous wound healing funding

Database	Description	URL
USA Spending	USAspending.gov is an online reporting tool, that was first launched in December 2007 to fulfill the requirements of a single searchable website for federal awards that is accessible to the public at no cost.	http://www.usaspending.gov/advanced-search
Veterans Affairs (VA) database	Online tool administered by the Health Services Research & Development Service of the U.S. Department of Veterans affairs.	http://www.hsrd.research.va.gov/research/
Tracking Accountability in Government Grants Systems (TAGGS)	TAGGS is a reporting tool developed by the Department of Health and Human Services (HHS) Office of Grants and Acquisition Policy and Accountability (OGAPA). The TAGGS database is a central repository for grants awarded by the eleven HHS Operating Divisions (OPDIVs). TAGGS tracks obligated grant funds at the transaction level.	http://taggs.hhs.gov/AdvancedSearch.cfm
Health Services Research Projects in Progress (HsrProject) from the National Library of Medicine	HSRProject is a database providing access to ongoing grants and contracts in health services research, and it is accessible to the public through the National Library of Medicine.	http://wwwcf.nlm.nih.gov/hsr_project/home_proj.cfm
Patient-Centered Outcomes Research Institute (PCORI)	PCORI is an institute authorized by Congress to conduct research to provide information about the best available evidence to help patients and their health care providers make more informed decisions.	http://www.pcori.org/pfaawards/

Table 2

2012 Non-NIH federal funding in wound projects

2012 fiscal year funding	American Dollars
Total funding	\$16,588,623
Median	\$349,856
Mean	\$614,393

Table 3

Wound grants awarded by federal agency. Fiscal year 2012.

Agency	Number	%
Department of the Army	11	40.7
National Science Foundation	3	11.1
Veterans Affairs	3	11.1
AHRQ	3	11.1
Department of the Navy	2	7.4
Other Department of Defense	2	7.4
Center for Disease Control	2	7.4
USUHS	1	3.7
Total	27	100

AHRQ. Agency for Healthcare Research and Quality

USUHS. Uniformed Services University of the Health Sciences

Table 4

Amount granted by federal agency. Fiscal year 2012.

Federal agency	Amount in American dollars (%)
Department of the Army	9,022,691 (54.5)
National Science Foundation	2,305,479 (13.9)
Veterans Affairs	447,768 (2.7)
AHRQ	362,720 (2.2)
Department of the Navy	345,672 (2.1)
Other Department of Defense	3,350,214 (20.2)
Center for Disease Control	587,152 (3.5)
USUHS	166,927 (1)
Total	16,563,483

AHRQ. Agency for Healthcare Research and Quality

USUHS. Uniformed Services University of the Health Sciences

Table 5

Federal non-NIH funding by assistance type. Fiscal year 2012.

Assistance type	Number (%)
Project grants	12 (44.4)
Cooperative agreement	10 (37)
Career award	2(7.4)
Discretionary	3 (11.1)

Table 6

Federal non-NIH funding by application types. Fiscal year 2012.

Application type	Number (%)
New	14 (51.85)
Continuation	10 (37)
Revision	3 (11.1)

Table 7

Federal non-NIH funding by grantee. Fiscal year 2012.

Grantee	Number (%)
University	13 (48.1)
Foundations	3(11.1)
Veteran Affairs	3 (11.1)
Institutes	2 (7.4)
Hospitals	2 (7.4)
State government	1 (3.7)
Department of Education	1 (3.7)
Other	2 (7.4)

Table 8

Comparative table of annual cost of disease versus NIH funding.

Condition	Estimated annual (\$ million)	% National Health Expenditure ^a	NIH funding (\$ million) ^b	% NIH funding ^b	Total federal funding (\$ million) ^c	% Total federal funding ^d
Chronic wounds	25,000(1)	0.9%	30	0.1%	46.39	0.11%
Lyme disease	2,000(9)	0.07%	25	0.1%	N/A	N/A
Parkinson disease	14,000(10)	0.5%	154	0.5%	236(12)	0.58%
Cancer	124,600(11)	4.6%	5,621	18.3%	3,060(13)	7.46%

^a Estimated in base of National Health Expenditure of 2.7 trillion dollars.(8)

^b Based on NIH categorical spending for FY 2012.(17)

^c Historical data for Parkinson disease, and cancer.(12, 13)

^d Estimated in base of total federal funding of \$41 billion.(6)

N/A Not available.