Forum

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Health Disparities Grants Funded by National Institute on Aging: Trends Between 2000 and 2010

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Purpose of the Study: The present study examined the characteristics of health disparities grants funded by National Institute on Aging (NIA) from 2000 to 2010. Objectives were (a) to examine longitudinal trends in health disparities–related grants funded by NIA and (b) to identify moderators of these trends. ***Design and Methods:*** Our primary data source was the National Institutes of Health Research Portfolio Online Reporting Tools Expenditures and Results (RePORTER) system. The RePORTER data were merged with data from the Carnegie Classification of Institutions of Higher Education. General linear models were used to examine the longitudinal trends and how these trends were associated with type of grant and institutional characteristics. ***Results:*** NIA funded 825 grants on health disparities between 2000 and 2010, expending approximately 330 million dollars. There was an overall linear increase over time in both the total number of grants and amount of funding, with an outlying spike during 2009. These trends were significantly influenced by several moderators including funding mechanism and type of institution. ***Implications:*** The findings highlight NIA's current efforts to fund health disparities grants to reduce disparities among older adults. Gerontology researchers may find this information very useful for their future grant submissions.

Key Words: Health disparities, National Institute on Aging (NIA), Funding, Grants, National Institutes of Health (NIH), Aging

Since President Clinton's health disparities initiative launched in 1998 (Brooks, 1998), there have been significant efforts to close the gaps in health status and health care between racial/ethnic minority and nonminority groups. Given that reducing or eliminating health disparities has been our nation's priority during the past decade (Smedley, Stith, & Nelson, 2003; Williams, 2007), federal funding agencies such as National Institutes of Health (NIH) and Centers for Disease Control and Prevention have made special efforts to fund programs addressing ways to reduce or eliminate health disparities. The National Institute on Aging (NIA, 2010) has also focused on supporting aging researchers, centers, and institutions that can benefit from funding for health disparities–related programs. Given these trends and efforts to address disparities in minority health and health care, the present study examines how the NIA has funded health disparities grants during the past decade to understand how these global policies have had practical effects on aging research.

The NIA's (2010) emphasis on funding health disparities programs is reflected in their strategic plan goals. Among the six current strategic plan research goals (A–F) that were stated in the NIA's (2010) Strategic Plan on Health Disparities, Goal E specifically addresses the NIA's current effort to fund health disparities programs: "Improve our ability to reduce health disparities and eliminate health inequalities among older adults." Under this goal, the NIA (2007) stated three specific objectives: (a) understand health differences and health inequities among older adults; (b) develop strategies to promote active life expectancy and improve the health status of older adults in minority and other underserved populations; and (c) use research insights and advances to inform policy on the health, economic status, and quality of life of all older adults.

In recent years, the NIA has participated in numerous program announcements with regard to aging and health disparities, reflecting the institute's strong efforts to support research projects or centers that can address that issue. Some examples of such funding opportunity announcements include (a) Behavioral and Social Science Research on Understanding and Reducing Health Disparities (R01; PAR-10-136, PAR-07-379; R21; PAR-10-137, PAR-07-380); (b) Promoting Careers in Aging and Health Disparities Research (K01; RFA-AG-06-008, PAR-08-033, PAR-09-136); and (c) Resource Centers for Minority Aging Research (RCMAR) and Coordinating Center (P30; RFA-AG-02-004, RFA-AG-07-005, RFA-AG-12-012; see http://www.nia.nih.gov/research/dea/research-support).

A relatively large portion of the minority aging research programs at NIA has been sponsored by the Behavioral and Social Science Program (BSR). One of the most significant funding mechanisms is the RCMAR, which supports centers at the University of Alabama at Birmingham (Deep South RCMAR); University of California, Los Angeles (Center for Health Improvement for Minority Elders); University California, San Francisco (Center for Aging in Diverse Communities); University of Colorado Denver (Native Elder Research Center); University of Michigan/Wayne State University (Michigan Center for Urban African American Aging Research); and University of Pennsylvania (PENN MARCH). The primary missions of these RCMARs are to reduce disparities in the research workforce and to decrease health disparities among diverse older adults (The Evaluation Advisory Panel and Carlyn Consulting, 2008) by (a) increasing the number of researchers who focus on the health of minority elders, (b) enhancing the diversity in the professional workforce by mentoring minority academic researchers for careers in minority elders health research, (c) improving recruitment and retention methods used to enlist minority elders in research studies, (d) creating culturally sensitive health measures that assess the health status of minority elders with greater precision, and (e) increasing the effectiveness of interventions designed to improve their health and well-being (see http://www.rcmar.ucla.edu/mission.php).

As research on health disparities in later life continues to expand, it will be helpful to examine characteristics of NIA-funded health disparities grants and to use this information as a means of identifying areas of continuing need. Therefore, the objectives of the present study are (a) to examine trends in NIA funding of health disparities grants from 2000 to 2010 and (b) to identify moderators of the 11-year funding trends. To accomplish these objectives, data available on the NIH Research Portfolio Online Reporting Tools Expenditures and Results (RePORTER) webpage were first collected and then merged with institutional data from the Carnegie Classification System. Findings from the present study will be a valuable resource for many gerontologists who are seeking grants for research related to health disparities.

Methods

Data Sources

Primary Data Source: RePORTER.—To investigate the 11-year trends in NIA-funded health disparities grants, we conducted an extensive search employing the NIH RePORTER (National Institutes of Health, 2011) module. The RePORTER is an electronic tool provided by NIH that allows users to search a repository of NIH-funded research projects and access publications and patents resulting from NIH funding. The keyword "health disparit%"

was used in the "term search" function to search project titles, abstracts, and scientific terms for all health disparities–related research activities (the % symbol acts as a wild card, allowing the search to find projects using different forms of the word "disparity"). Fiscal years of funding from 2000 to 2010 were included in the search, and the output was restricted to grants funded by the NIA. We considered all funding mechanisms, award types, and activity codes. A total of 825 health disparities grant activities over this 11-year period met the search criteria, with nearly one third (29%; $n = 257$) of all the research activities funded in 2009.

Secondary Data Source: Carnegie Classification System.—To further understand the nature of the funded research institutions, we incorporated information from the Carnegie Classification of Institutions of Higher Education (2010 edition, see http://classifications.carnegiefoundation.org/descriptions/). The Carnegie Classification is a widely used framework for identifying institutional diversity in U.S. higher education represented in the National Center for Education Statistics Integrated Postsecondary Education Data System. These data were combined with data from the RePORTER system to provide detailed information on potential moderators of longitudinal trends of health disparities grants.

Measures

Variables From the NIH RePORTER.—Funding mechanism. Eight types of NIH funding mechanisms were funded during FY 2000 and FY 2010, including F, K, P, R, S, T, U, and Z. F grants (e.g., F30, F31, and F32) represent the Ruth L. Kirschstein National Research Service Award Individual Fellowship. K grants (e.g., K01, K02, K08, K23, and K99) are given for NIH Career Development Awards. P grants (e.g., P01, P30, and P51) are given for program projects or center grants. R grants (e.g., R01, R03, R15, R21, RC1 [NIH challenge grants and partnerships programs], and RC2 [High impact research and research infrastructure programs]) include a series of research, resource, and educational grants. S grants (e.g., S06, S07, S10, and S21) represent the Human Subjects Research Enhancement Awards that were active sometime during the 11-year period but are currently inactive. T grants (e.g., T32, T34, and T35) stand for the Ruth L. Kirschstein National Research Service Award Institutional Training Grant initiative. U grants (e.g., U01, U09, and U13) represent Research Project Cooperative Agreements. Z awards are given for intramural research projects such as Z01 (intramural research projects), ZIA (investigator-initiated intramural research projects), and ZIC (scientific cores intramural research).

Different Types of R Mechanisms.—Given that the R mechanisms are the most funded mechanism at NIH and/or NIA, different types of R mechanisms such as R01, R21, and R03 were also examined in addition to basic funding mechanism. We specifically focused in the current moderator analysis on R01s, R03s, R13s, and R21s because these were the most commonly funded R grants for aging and health disparities research during FY 2000 and FY 2010 (R01s [$n = 304$, $13,755,464 per year], R03s [$n = 87$, $501,884 per year], R13s [$n = 28$, $112,993 per year], and R21s [$n = 27$, $466,820 per year]). The R01, the Research Project Grant Program, is used to support a discrete, investigator-initiated research project. This is the NIH's most commonly used research grant mechanism. The R03 or NIH Small Grant Program supports a variety of types of projects such as pilot or feasibility studies, secondary analysis of existing data, and development of new research technology that can be completed with limited funding for a short period of time (limited to 2 years of funding). The R13 is a mechanism used to support high-quality conferences/scientific meetings that are relevant to NIH's mission and to the public health. The R21 represents the NIH Exploratory/Developmental Research Grant Award that encourages new, exploratory, and developmental research projects by providing support for the early stages of project development. Detailed information on the NIH grant programs is available at http://grants.nih.gov/grants/funding/funding_program.htm.

Variables From the Carnegie Classification System.—(a) Type of Institution: Carnegie Classification System classifies research institutions into a number of different categories based on their focus and scholarly activity. Among over 30 categories, only three categories received health disparities grant funding from NIA between FY 2000 and FY 2010: (1) research universities (very high research activity; RU/VH), (2) research universities (high research activity; RU/H), and (3) medical schools and medical centers (Spec/Medical).

Additional institution-related variables were (b) region (New England [CT, ME, MA, NH, RI, and VT], Mideast [DE, DC, MD, NJ, NY, and PA], Great Lakes [IL, IN, MI, OH, and WI], Plains [IA, KS, MN, MO, NE, ND, and SD], Southeast [AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV], Southwest [AZ, NM, OK, and TX], Rocky Mountains [CO, ID, MT, UT, and WY], Far West [AK, CA, HI, NV, OR, and WA], and Outlying areas [AS, FM, GU, MH, MP, PR, PW, and VI]); (c) public/private control; (d) presence of a medical school; (e) the state in which the research institution is located; and (f) Historically Black Colleges and Universities (HBCU), coding whether the institution is one of the minority-serving institutions such as HBCU. Only HBCU institutions were included in the present analysis because none of the other minority serving institutions such as Hispanic-serving institution, tribal college, and women's college coalition member institution received NIA funding on health disparities between FY 2000 and FY 2010.

Data Analyses

Our primary aim is to examine trends in NIA funding for health disparities grants between 2000 and 2010 and to determine how these trends are moderated by the type of grant and characteristics of the institutions receiving funding. We initially explored both the amount of funding provided and the number of grants funded, but given that results for these two outcomes showed almost identical patterns across the different moderating variables, we decided to focus on the amount of funding provided to test the effect of moderators. Information on the number of grants by moderators was provided in tables but was not used to test the moderating effect.

For each moderating variable, the general linear model (GLM) was used to determine the main effects of year (treated numerically) and the moderator (treated categorically) as well as the interaction between year and the moderator. Year was standardized in our analyses to remove nonessential collinearity and improve the interpretability of the main effects (Cohen, Cohen, West, & Aiken, 2003). We considered models that included quadratic and cubic terms for year, but none of the coefficients for the higher-order terms was significant. Least significant difference (LSD) post hoc analyses were used to explore significant main effects (comparing group means) and interactions (comparing group slopes). All analyses were conducted using SPSS version 19.

Table 1. Descriptive Characteristics of National Institute on Aging Health Disparities Grants From 2000 to 2010

Characteristic	*n* or $
Total number of grants	825
Total amount funded	$332,853,584
M (*SD*) funding per grant	$403,459 ($714,518)
Median funding per grant	$228,750
Funding per grant range	$1–$11,879,313

Results

Descriptive Characteristics and Funding Categories

Statistics describing the average and total funding levels are provided in Table 1. Over the 11-year period from 2000 to 2010, NIA funded 825 grants investigating health disparities, expending approximately 330 million dollars. Figure 1 provides a histogram illustrating funding provided to each grant, showing a large amount of variability across grants along with a strong positive skew.

Starting in 2008, grants were labeled as falling into one or more spending categories that were determined by NIH (see http://report.nih.gov/rcdc/categories/). Table 2 provides the number and percent of aging and health disparities grants that were assigned to the 15 most common spending categories between 2008 and 2010. Grants could be assigned to multiple categories, so the percentages will not add up to 100%. Not surprisingly, of the total of 431 health disparities grants funded by NIA between 2008 and 2010, the majority (89.6%) fell into the "aging" category. In addition, more than half of the grants fell into the "clinical research" (66.8%) and "behavioral and social science" (55.8%) categories.

Overall Longitudinal Trends

Figure 2 displays the total amount of funding that NIA provided for health disparities grants

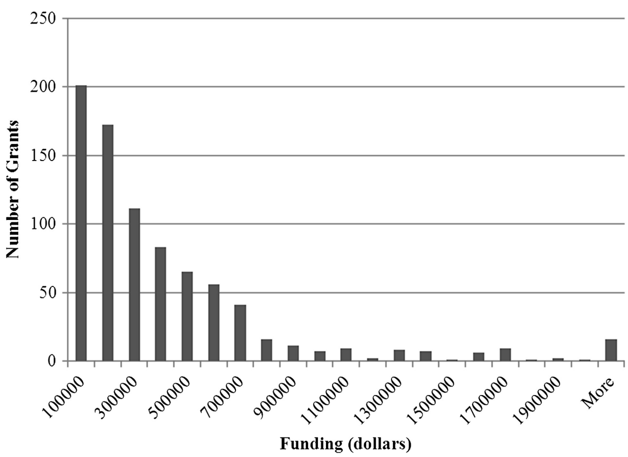

Figure 1. Histogram of amount of funding per grant.

Table 2. Number of Grants From 2008 to 2010 Assigned to Each Spending Category (n = 431)

Spending category	Number of grants (%)
Aging	386 (89.6)
Clinical research	288 (66.8)
Behavioral and social science	241 (55.9)
Basic behavioral and social science	159 (36.9)
Prevention	94 (21.8)
Health services	77 (17.9)
Neurosciences	56 (13.0)
Brain disorders	55 (12.8)
Neurodegenerative	44 (10.2)
Mental health	42 (9.7)
Alzheimer's disease	39 (9.0)
Cardiovascular	37 (8.6)
Genetics	32 (7.4)
Mind and body	31 (7.2)
Nutrition	26 (6.0)

Note: A total of 431 grants were funded between 2008 and 2010.

broken down by year. There was a notable increase in funding in 2009: Two hundred and fifty-seven grants were funded that year with a total expenditure of approximately 122 million dollars. In the 9 years prior to that (2000–2008), an average of 53 grants were funded per year with an average expenditure of approximately 18 million dollars. The correlations of year with both expenditure (r = .985) and the number of grants (r = .938) indicate an almost completely linear relation when excluding 2009 but drop notably when including 2009 (r = .737 for expenditure, r = .726 for number of grants). Simple linear regression models show significant linear trends for both expenditure (b = 7,441,565, $t(9)$ = 3.27, p = .01) and number of grants (b = 14.58, $t(9)$ = 3.17, p = .01), even when including 2009.

Moderators of the Longitudinal Trends

We wanted to determine how longitudinal trends in health disparities funding varied across grant types and across institutional characteristics. We therefore used the GLM to determine how different moderators (mechanism type, university research activity, geographical region, state, and whether institutions were public or private, had a medical school, or were HBCUs) influenced the overall mean and the longitudinal trend of grant expenditure. As noted earlier, we present only the results for expenditure because the number of funded grants was highly correlated with expenditure across years (r = .990) and showed the same basic pattern of results across the moderators.

Separate GLMs were run for each moderator on a data set aggregating over the individual combinations of year and moderator level. We aggregated the data set by year so that analyses would be testing trends in total funding rather than average amount given to each grant. Each GLM included main effects for the moderator and year and interaction effects between the moderator and year. A significant main effect of the moderator indicates that different groups have different mean expenditures, and a significant moderator by year

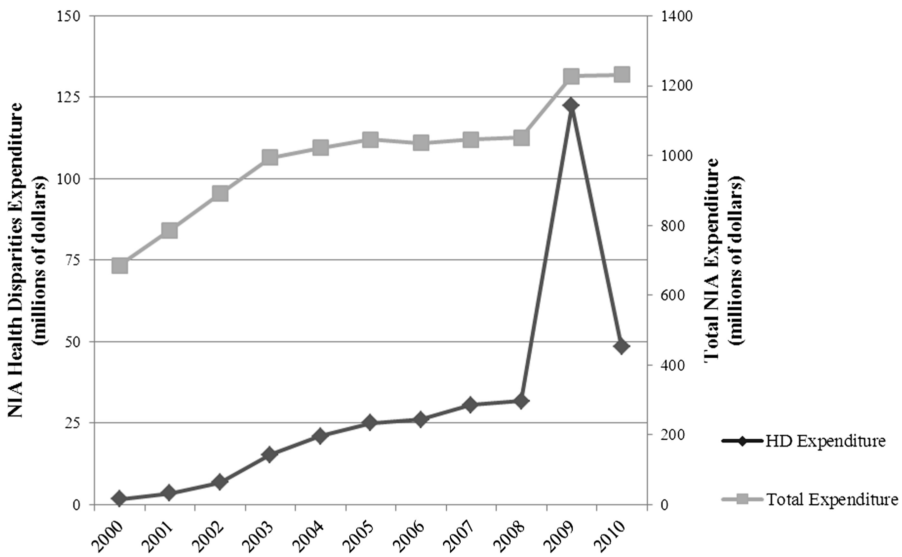

Figure 2. Amount of National Institute on Aging (NIA) health disparities grants and total NIA funding by year.
Notes: Data for the total amount of NIA funding were drawn from two sources: (a) the NIH Office of Budget web page (http://officeofbudget.od.nih.gov/spending_hist.html) and (b) the NIA National Advisory Council on Aging web page (http://www.nia.nih.gov/about/naca). Fiscal years 2009 and 2010 include funds from the American Recovery and Reinvestment Act.

Table 3. Estimates by Group and Homogenous Subsets for Moderator Analyses

Moderator	Level	Number of grants	Mean amount of funding per year ($)		Slope for year ($ per year)	
Mechanism^{M,I}	F	16	87,254	A	60,114	A
	K	90	1,208,275	A	857,829	A
	P	136	8,024,107	B	3,345,369	A
	R	501	17,591,447	C	10,819,492	B
	S	4	224,420	AB	−3,978	AB
	T	45	1,140,439	A	366,148	A
	U	21	6,226,833	AB	6,679,228	AB
	Z	12	4,591,567	ABC	586,154	AB
Type of R grant^{M,I}	R01	304	13,755,464	B	9,150,603	B
	R03	87	501,884	A	30,293	A
	R13	28	112,993	A	43,259	A
	R21	27	466,820	A	467,462	A
Type of institution^{M,I}	Very high research	482	19,019,947	B	13,797,246	B
	High research	47	1,331,306	A	898,331	A
	Medical	119	3,125,963	A	1,895,386	A
Public/private	Public	399	12,713,803	A	9,879,901	A
	Private	266	10,129,908	A	7,286,662	A
Presence of a medical school^{M,I}	Medical school	579	22,368,525	B	15,244,561	B
	No medical school	86	1,691,959	A	1,347,022	A
HBCU^{M,I}	HBCU	14	119,681	A	1,621	A
	Non-HBCU	651	23,996,191	B	16,492,102	B
Region^{M}	Great Lakes	149	8,287,415	D	5,902,559	B
	Mideast	165	6,532,362	D	4,929,849	AB
	Far West	180	6,124,228	CD	3,650,426	AB
	New England	123	5,386,320	BCD	2,961,350	AB
	Southeast	109	2,637,215	ABCD	1,434,875	A
	Southwest	37	1,195,393	AB	797,039	AB
	Rocky Mountains	21	664,901	A	295,322	A
	Plains	9	111,147	ABC	242,240	AB
	Outlying areas	4	45,000	ABCD	0	AB
State	California	165	4,982,972	A	3,247,917	A
	Michigan	96	3,512,231	A	2,846,211	A
	Massachusetts	55	2,755,086	A	2,501,883	A
	Maryland	66	4,083,077	A	3,672,668	A

Note: All analyses were conducted including the main effect of the moderator, the standardized main effect of year, and the year by moderator interaction. Within a moderator, means that do not share a subscript are significantly different from each other and slopes that do not share a subscript are significantly different from each other ($p < .05$ using least significant difference post hoc analyses). HBCU = Historically Black Colleges and Universities; I = significant interaction between the moderator and year; M = significant main effect of moderator.

interaction indicates that different groups have different longitudinal trends. The mean expenditure and estimated slopes are provided for each level of the moderators in Table 3. LSD post hoc comparisons were used to generate homogenous subsets indicating which means and which slopes were significantly different from each other.

Funding Mechanism.—The GLM investigating the influence of type of funding mechanism (grouping grants together by the letter in the mechanism name such as R, P, and K) showed a significant main effect, $F(7, 43) = 5.43$, $p < .001$. Post hoc analyses indicate that significantly more funding was provided to R grants than to any other type of grants except Z awards. However, the failure to find a significant difference between R and Z mechanisms is at least partly because Z awards have not been reported in the electronic system until 2007, so the estimated mean funding for Z awards has a large standard error. P grants received the second greatest amount of funding, significantly greater than any other mechanism type except for S, U, and Z mechanisms. Funding levels for the remaining mechanism types were not significantly different from each other. The main effect of year was not significant, $F(1, 43) = 2.07$, $p = .16$. The funding mechanism by year interaction was significant, $F(7, 43) = 2.25$, $p = .05$. The increase in funding for R grants over time was significantly greater than that for F, K, T, and P grants, but none of the other slopes were significantly different from one another.

Types of R Grants.—Given that the majority of the funding went to R grants, a second analysis was performed to examine differences across R01, R03, R13, and R21 grants (the most commonly funded types of R grants for aging and health disparities topics). Results from the GLM showed a significant main effect of mechanism, $F(3, 28) = 10.60$, $p < .001$, such that R01 grants received significantly more funding than any of the other R grants, which were not significantly different from each other. The main effect of year was not significant, $F(1, 28) = 3.51$, $p = .07$, indicating that funding for R grants did not increase over time. The mechanism by year interaction was significant, $F(3, 28) = 4.45$, $p = .01$, indicating that the increase over time for R01 grants was significantly greater than the increases for the other types of R grants, whose slopes did not significantly differ from each other.

Type of Institution.—A GLM examining the influences of institution type showed a significant main effect, $F(2, 26) = 11.24$, $p < .001$, indicating that research universities with very high research activity (RU/VH) received significantly more funding than research universities with high research activity (RU/H) and medical schools/medical centers (Spec/Medical), but the latter two did not significantly differ from each other. The main effect of year was significant, $F(1, 26) = 10.24$, $p = .004$, indicating that funding significantly increased over time. The institution type by year interaction was significant, $F(2, 26) = 6.03$, $p = .007$, indicating that the increase in funding over time for research universities with very high research activity (RU/VH) was significantly greater than that for research universities with high research activity (RU/H) and medical schools/medical centers (Spec/Medical), whose slopes did not significantly differ from each other.

Public/Private Control.—The GLM examining the influence of whether the grant was hosted at a public or private institution showed that neither the main effect of type of control, $F(1, 18) = .302$, $p = .59$, nor the type of control by year interaction, $F(1, 18) = .29$, $p = .60$ was significant. The main effect of year was significant, $F(1, 18) = 12.73$, $p = .002$, indicating that funding increased over time.

Presence of a Medical School.—We examined the influence of whether the funded institution had a medical school (independent of whether or not the grant was funded through the medical school). The GLM indicated a significant main effect, $F(1, 17) = 11.45$, $p = .004$, such that institutions with medical schools received more funding than those without. There was a significant main effect of year, $F(1, 17) = 7.16$, $p = .02$, indicating that funding increased over time. A significant interaction, $F(1, 17) = 5.02$, $p = .04$, was found, indicating that the increase in funding over time was significantly greater for institutions with medical schools than for those without.

Historically Black Colleges and Universities.—The GLM showed a significant main effect, $F(1, 17) = 13.17$, $p = .002$, with non-HBCU institutions received significantly more funding than HBCU institutions. There was a significant main effect of year, $F(1, 17) = 6.11$, $p = .02$, indicating that funding increased over time. A significant HBCU by year interaction was also found, $F(1, 17) = 6.11$, $p = .02$, indicating that the increase in funding over time for non-HBCU institutions was significantly greater than that for HBCU institutions.

Region.—The GLM showed a significant main effect for geographic region, $F(8, 63) = 3.04$, $p = .006$. The Great Lakes region received the most funding, significantly more than the Southwest, Rocky Mountain, Plains, and Southeast regions. The Mideast region received the second most funding, significantly more than the Plains, Southwest, and Rocky Mountain regions. The Far West received the third most funding, significantly more than the Southwest and Rocky Mountain regions. The remaining regions did not significantly differ from one another. The main effect of year was significant, $F(1, 63) = 5.52$, $p = .02$, and the region by year interaction was not significant, $F(8, 63) = 1.39$, $p = .22$.

Table 4. Total Amount of Funding Provided to the 30 States Receiving the Most Funding

No.	State (abbreviation)	Region	Amount of funding ($)
1	California (CA)	Far West	67,333,741
2	Michigan (MI)	Great Lakes	59,072,349
3	Massachusetts (MA)	New England	49,606,973
4	Maryland (MD)	Mideast	39,950,961
5	Wisconsin (WI)	Great Lakes	20,495,292
6	Pennsylvania (PA)	Mideast	20,444,322
7	New Hampshire (NH)	New England	15,791,313
8	Illinois (IL)	Great Lakes	13,953,146
9	New York (NY)	Mideast	13,721,872
10	North Carolina (NC)	Southeast	13,667,359
11	Kentucky (KY)	Southeast	13,331,426
12	Texas (TX)	Southwest	11,759,094
13	Indiana (IN)	Great Lakes	8,954,587
14	New Jersey (NJ)	Mideast	8,486,084
15	Colorado (CO)	Rocky Mountains	7,308,917
16	Oregon (OR)	Far West	6,900,684
17	South Carolina (SC)	Southeast	5,941,404
18	Arizona (AZ)	Southwest	5,415,629
19	Florida (FL)	Southeast	4,848,198
20	Ohio (OH)	Great Lakes	2,921,987
21	Connecticut (CT)	New England	2,691,809
22	Alabama (AL)	Southeast	2,387,468
23	Georgia (GA)	Southeast	1,940,410
24	West Virginia (WV)	Southeast	1,365,431
25	Tennessee (TN)	Southeast	1,268,004
26	Rhode Island (RI)	New England	1,046,543
27	Virginia (VA)	Southeast	988,534
28	Missouri (MO)	Plains	713,175
29	Iowa (IA)	Plains	577,255
30	Puerto Rico (PR)	Outlying areas	495,000

State.—The 30 states receiving the most funding for NIA health disparities grants are depicted in Table 4. There is a notable drop in funding levels after the first four states, so we decided to focus our analyses on the funding provided to California, Michigan, Massachusetts, and Maryland. The GLM did not show a significant main effect of state, $F(3, 36) = .60$, $p = .62$. The main effect of year was significant, $F(1, 36) = 25.07$, $p < .001$. The state by year interaction was not significant, $F(3, 36) = .17$, $p = .92$.

Discussion

Given the NIA's current efforts to reduce or eliminate health disparities between minorities and nonminorities among older adults, the present study explored the characteristics of NIA funding trends for health disparities grants over the past 11 years from 2000 to 2010. To our knowledge, this is the first attempt to investigate federal funding trends in the field of gerontology, and results presented in the present study may be beneficial to many gerontologists who want to submit grant proposals relating to health disparities to NIA.

As expected, there was an overall linear increase in both the total number of grants and amount of funding for health disparities–related topics over the past 11 years, with an outlying spike in 2009. These increasing trends clearly reflect NIA's strong emphasis over the past decade on funding programs that can reduce disparities existing among older adults as well as in the research workforce. As shown in Figure 2, the increasing trends for NIA health disparities grants also reflect overall increases in NIA grant funding. The spike in 2009 reflects the influence of the NIH challenge grants—new funds that NIH received for fiscal years 2009 and 2010 as part of the American Recovery and Reinvestment Act of 2009 (Recovery Act). NIA distributed funds from the Recovery Act through the various Recovery Act initiatives as well as through extending the overall funding line, which explains the 2009 spike. The present analyses, in fact, included five RC2 grants (i.e., high impact research and research infrastructure programs) funded in fiscal years 2009 and 2010, with total funding of $9,889,887. These results illustrate how overall NIH funding trends can be influenced by and be closely linked to the economy and current U.S. government policy.

Of particular interest to researchers seeking grants for aging and health disparities topics, as well as to NIA administration, may be the moderators of funding trends that were identified in the present study. These significant moderators can be categorized into two groups: (a) type of grant and (b) institution characteristics. First, the type of grant was significantly associated with overall funding as well as 11-year funding trends. Our results showed that the total amount of funding and the increase in funding over time provided to R grants were significantly greater than that for F, K, T, and P grants. Additional analyses also revealed that the total amount of funding and the increase in funding over time provided to R01 grants were significantly greater than that for R03, R13, and R21 grants. This may reflect budget allocated for certain type of grant, but information on budget allocated for health disparities grants in each type of grant is currently not available, which limits our ability to further elucidate our findings. Gerontologists interested in submitting health disparities grants to NIA should keep this information in mind.

Second, the important role of institution characteristics (i.e., type of institution, presence of a medical school, and HBCU) on overall funding and funding trends for NIA-funded health disparities grants must also be recognized. As expected, we found clear evidence that significantly more funding was provided to institutions with very high research activity (RU/VH), and the increase in funding over time for the very high research activity institutions (RU/VH) was significantly greater than that for high research activity institutions (RU/H) and medical schools/medical centers (Spec/Medical). Institutions that have a medical school or are not historically black (i.e., non-HBCU) also received more funding than their counterparts, and the increase in funding over time for those institutions was greater than that for their counterparts. The low number of funded grants at HBCUs can be explained by the fact that a significant number of HBCUs are liberal arts colleges that focus more on teaching but are becoming more in tuned with conducting research. There are some NIH grant mechanisms such as R15 and T34 that aim to increase the number of applications for those at institutions that have not been major recipients of NIH grant funds. A recent study by Ginther and colleagues (2011) also reported the significant effect of working at an institution with the most NIH funding on the probability of receiving an R01 award. These findings clearly suggest how important institutional characteristics are in terms of successfully receiving federal grants; this turned out to be true for receiving health disparities grants from NIH as well. In fact, this is formally endorsed in the NIH review criteria, where one of the five main NIH review criteria for research grants is the "environment," in which reviewers are asked to evaluate grant proposals in terms of how the institution's scientific environment would contribute to the probability of success, institutional support, equipment, physical resources, as well as how the institutions and unique features of the scientific environment, subject populations, or collaborative arrangements might affect the success of the grant (http://grants.nih.gov/grants/peer/critiques/rpg.htm#rpg_05).

An institution's geographic location (i.e., region and state) on overall funding and funding trends should be discussed. Neither region nor state (at least with regard to the top four funded states) was significantly associated with funding trends over the past 11 years. However, region was substantially associated with overall funding between 2000 and 2010, with the Great Lakes (i.e., five states including Illinois, Indiana, Michigan, Ohio, and Wisconsin) being the top funded region for grants focused on aging and health disparities. These results indicate that regional variations of funding in each year did not change much over the past 11 years, suggesting that geographic variations in NIA funding for health disparities grants were approximately the same between 2000 and 2010. The geographic differences in health disparities funding reflect the fact that a large number of grant-funded institutions are in certain regions or states. Health disparities funding mirrors overall grant funding, which goes disproportionately to certain high-power institutions that are geographically clustered. Although our analyses identified no differences in overall funding and funding trends across states, it is important to note that these only considered the four states receiving the most funding. It should be also noted that the top funded states for aging and health disparities research (i.e., California [Far West region], Michigan [Great Lakes region], Massachusetts [New England region], and Maryland [Mideast region]) and the top funded regions (i.e., Great Lakes and Mideast) were not concordant. The regions differed in how many states they included, which may have contributed to these discrepancies. Further investigation should target exploring geographic variations of federal grant funding by research topic beyond the aging and health disparities areas, which may provide us with insightful policy implications (McDonough et al., 2004).

The content areas of health disparities grants funded by NIA should be highlighted. Since 2008 (when grants began being labeled as falling into one or more spending categories determined by NIH), the top spending area for health disparities grants of 229 NIH-determined research areas was the broad category of aging. Although the latter is to be expected, given the fact that data were restricted to NIA funding, the following two categories of highest prevalence are more informative: clinical research and behavioral and social science. Other content areas frequently funded by NIA include "basic behavioral and social science," "prevention," "health services," "neurosciences," "brain disorders," "neurodegenerative," "mental health," "Alzheimer's disease," "cardiovascular," "genetics," "mind and body," and "nutrition." It is worth mentioning that the salience of specific content areas was strongly influenced by the challenge grants for fiscal years 2009 and 2010, so researchers should be careful when interpreting these results. The NIH challenge grants aimed to support short-term grants that focused on specific scientific challenges, new research that expanded the scope of ongoing projects, and research on public and international health priorities. Thus, future analyses might supplement the present study by distinguishing content areas supported by regular NIA appropriations from areas solely supported by the challenge grants.

The present study has several limitations. First, although information on the total number of funded health disparities grants was available through the RePORTER system, we were not able to get information on the total number of submitted health disparities grant applications, which prevents us from exploring funding success rates for NIA health disparities grants. NIA informed us that NIA does not maintain records of submissions by topic as the specificity involved leads to some risk of identification, which would break confidentiality. Given that the average NIA funding success rate between 2001 and 2010 was 19.3% for newly submitted grants (with a total range from 28.7% in 2001 to 11.6% in 2010; http://report.nih.gov/success_rates/index.aspx), important insights could be gained by understanding variations in success rates by year and topic. Information on funding success rates for aging and health disparities grants may be very useful to many gerontologists seeking grants. Second, there are other moderators not included in the present analysis that should be considered by future research. Although the present study did not analyze data based on Principle Investigator's (PI) background information such as age, sex, and race/ethnicity because of the limitations of data from the NIH RePORTER system, recent studies on NIH funding reported differences in funding for NIH programs by background characteristics of the PI. For example, Ginther and colleagues (2011) used NIH R01 applicant's self-identified race/ethnicity as an independent variable to explain the probability of receiving an R01 award and found that applicants who self-identified as Asian and Black/African American were less likely to receive funding compared with White applicants. Pohlhaus, Jiang, Wagner, Schaffer, and Pinn (2011) examined sex differences in NIH award programs and reported that although men and women were not significantly different in receiving most NIH award programs at all career stages, men with previous experience as NIH grantees had higher application and funding rates than women at similar career points. Third, some potentially interesting three-way interactions have not been examined (e.g., funding mechanism [type of grant] by time by other moderators such as region [state], type of institution, presence of medical school, HBCU, etc.). Last, because we did not compare trends between health disparities grants and nonhealth disparities grants, we could not tell that the growth of health disparities grants was greater than the growth of nonhealth disparities grants, which should be further investigated in future research.

Despite these limitations, the findings from the present study provide a useful overview of funding trends for aging and health disparities grants, information that will be beneficial to many gerontology researchers interested in health disparities. It is our opinion that NIA's strong efforts to reduce health disparities among older adults were clearly reflected by the observed increase in funding they provided to health disparities research. Gerontologists who are interested in health disparities should be aware of these and other funding trends as well as changes in public policy, which may be highly associated with funding level of federal funding agencies.

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