
A cross-sectional survey and analysis of Dermatology Foundation Career Development Award recipients



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Background: The Dermatology Foundation (DF) has a comprehensive career development award (CDA) program.

Objective: To assess the impact of this program, a cross-sectional survey of recipients receiving support between 1990 and 2012 was performed.

Methods: Award recipients completed a questionnaire concerning their career status and record of research funding. To verify the self-reported funding data, information about each awardee was extracted from the National Institutes of Health Research Portfolio Online Reporting Tools database and used to define funding acquired by CDA recipients.

Results: In all, 84% of CDA recipients responded to the survey. A total of 213 awardees (79%) hold full- or part-time positions in academic medicine. Approximately 70% of the award recipients in academic medicine have received federal research funding. The National Institutes of Health Research Portfolio Online Reporting Tools database and other sources indicated that the funding acquired by CDA recipients through 2015 and 2017 amounted to approximately \$365.4 million and \$451.8 million, respectively. Each dollar of DF CDA funding through 2015 (ie, \$36.2 million) was linked to more than \$10 in grant support through 2015 and \$12 through 2017.

Limitations: This cross-sectional survey was retrospective and (in part) self-reported.

Conclusions: The DF has succeeded in supporting the career development of basic, translational, and clinical investigators and fostered the promotion and retention of these individuals in academic medicine. (J Am Acad Dermatol 2019;81:1093-8.)

Key words: basic research; clinical research; education; leadership; postgraduate training; professional development.

The Dermatology Foundation (DF) has developed and implemented a comprehensive research award program to shape the future of the specialty by supporting young leaders in all aspects of dermatology. Over the course of 50 years, this research award program has been steadily expanded to meet the growth and needs of the specialty. To assess the impact of this program, a

Abbreviations used:

DF:	Dermatology Foundation
CDA:	Career Development Award
NIH:	National Institutes of Health
NIH RePORTER:	National Institutes of Health Research Portfolio Online Reporting Tools
PI:	principal investigator

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survey of individuals who received a Career Development Award (CDA) (the DF's major funding mechanism) between 1990 and 2007 was conducted in 2010.¹ The survey found that 80% of CDA recipients held full- or part-time positions in academic medicine and approximately 80% of the respondents had received additional extramural support subsequent to their DF award. The 2010 self-reported data indicated that each dollar of DF support yielded more than \$10 in support from the National Institutes of Health (NIH), as well as additional funding from other sources. To reassess the impact of the DF's research award program, update the career progress of awardees, and verify the self-reported funding data, a second and more comprehensive analysis of individuals receiving funding through the DF CDA program was conducted.

MATERIALS AND METHODS

Study design

A cross-sectional survey of CDA recipients receiving DF support between 1990 and 2012 was performed.

Subject sample

This study polled MDs, MD-PhDs, and PhDs who received a CDA (ie, a 3-year award) between 1990 and 2012. Of the 288 the CDA recipients, 265 were located and surveyed.

Survey content and outcomes of interest

CDA recipients were asked to complete a questionnaire concerning career status, employment history, academic rank, record of independent funding (federal and private), number of publications, and personal assessment of the DF CDA program's impact on their career trajectory.² A copy of the survey questionnaire can be found on the DF's website.² To verify the self-reported funding data, information about each awardee was extracted from the NIH Research Portfolio Online Reporting Tools (NIH RePORTER) database and used to define funding acquired by CDA recipients.³ Award data were identified for each CDA recipient on the basis of contact principal investigator (PI)/leader status. NIH project numbers were used to identify grants. Valuations of support from sources other than the NIH (ie, the Burroughs Wellcome Fund, the Doris

Duke Charitable Foundation, the Howard Hughes Medical Institute, the Department of Defense, the Department of Veterans Affairs, and other private foundations) were based on publicly available sources. Extracted data regarding total support of each CDA recipient were compared with the self-reported data. The ratio of total independent

research funding of CDA recipients (in 2015 and 2017) to the amount of DF funding awarded to these individuals was used as 1 estimate of program effectiveness. To conform to prior estimates of returns on investment,¹ funding data from the DF, federal foundations, and private foundations have been stated in nominal dollars (ie, dollars not adjusted for inflation).

RESULTS

Survey respondents

In all, 288 individuals received DF CDAs between 1990 and 2012. The age of the PIs ranged from 30 to 54 years (average age, 36 years); 59% were men and 41% were women. Stratification based on training background revealed that 39%, 34%, and 27% of the PIs held MD, both MD and PhD, and PhD degrees, respectively. Summary data regarding DF CDA awardees are outlined in Fig 1. Of the 288 awardees, 3 are deceased. In all, 265 awardees were located and queried; 222 individuals (84%) completed and returned the survey. Although 43 PIs (16%) did not respond to the survey, it was possible to define their career status by other means (eg, analysis of faculty rosters, personal contacts). Six recipients were excluded because their CDA was returned before funding began because of their successful acquisition of federal research funding (it should be noted that CDA recipients during this period were not eligible to hold federal research awards).

Distribution of funding

In 2015, 57 different institutions in the United States and 10 foreign universities employed faculty who had received a DF CDA (Fig 2). As of 2015, a total of 288 individuals had been awarded CDAs totaling \$36,230,000 and distributed across 9 content areas (Table I).

CDA recipients in academic medicine

Of the 222 PIs completing the survey, 189 (85%) held full- or part-time positions in academic

CAPSULE SUMMARY

- The Dermatology Foundation's Career Development Award Program has had a major favorable impact on the academic workforce and has supported innovations that have led to improved patient care.
- Each dollar of Career Development Award funding through 2015 (ie, \$36.2 million) can be linked to more than \$10 in grant support through 2015 and \$12 through 2017.

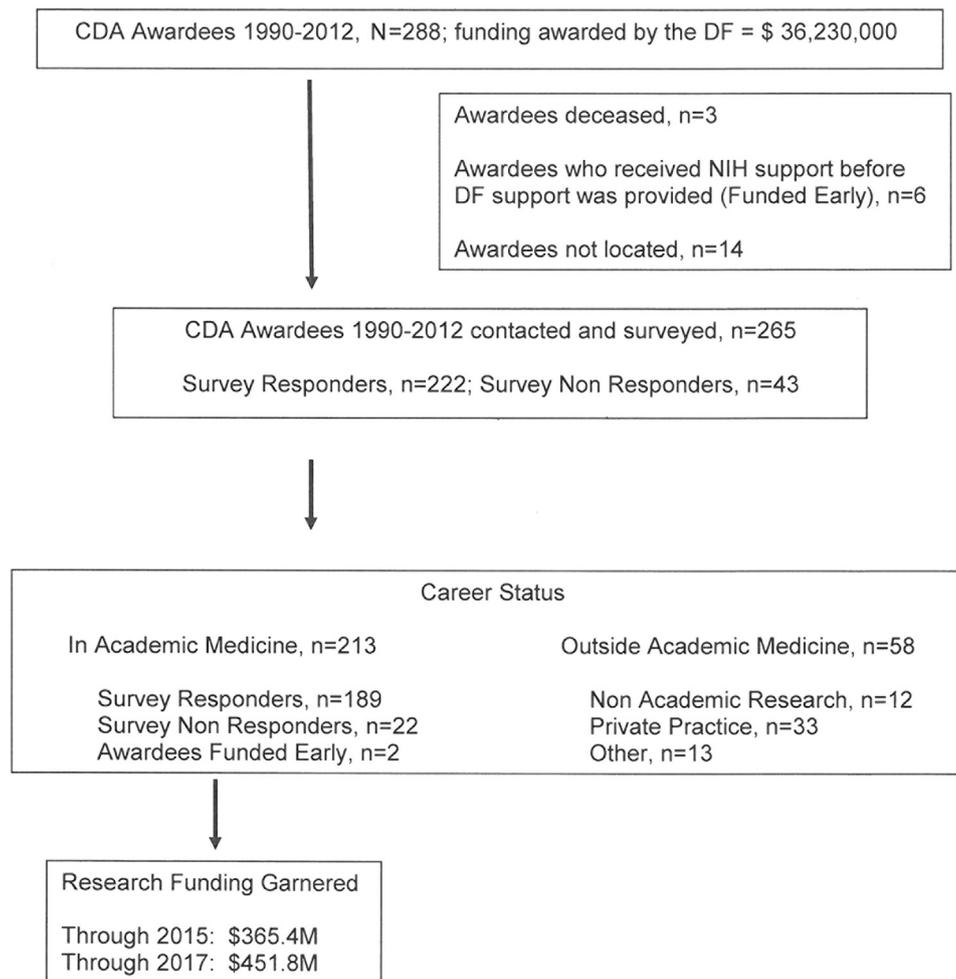


Fig 1. Flow diagram summarizing data regarding Dermatology Foundation (DF) Career Development Award (CDA) awardees. *NIH*, National Institutes of Health.

medicine in the United States or abroad in 2015. Two individuals whose CDAs were returned before funding, as well as 22 nonresponders to the survey, had professional addresses, duties, and/or records indicating that they held full- or part-time positions in academic medicine. Hence, 213 PIs (ie, 189 responders, 22 nonresponders, and 2 individuals whose awards were returned before activation) or 79% of the 271 awardees identified held full- or part-time positions in academic medicine (Fig 1). Of these 213 awardees, 204 were in academic medicine on a full-time basis and 9 individuals held academic positions on a part-time basis. Of the remaining CDA awardees, 12 held full- or part-time nonacademic, research positions, 33 were in private practice, and 13 were active in other endeavors. Among the CDA awardees in academic medicine, the following faculty ranks (or their equivalents) were held: assistant professor, 62; associate professor, 81; professor, 66; and division chief or departmental

chair, 18 (it should be noted that some awardees, especially those with administrative responsibilities, held more than 1 faculty designation).

Career impact

When asked how DF funding had affected their career, 222 respondents categorized their answers as follows (more than 1 response per PI was recorded): (1) “it jump-started my career” (29%), (2) “it helped me obtain a grant from a federal funding agency” (24%), (3) “it proved critical to my career” (22%), (4) “it led to a transition to independence” (12%), (5) “it led to my academic promotion” (10%), (6) “it allowed me to continue my career in academic medicine” (9%), or (7) other (21%). The scholarly productivity of CDA recipients (including those pursuing careers in academic medicine or other domains) featured the following performance benchmarks: manuscripts (>100 [13% of respondents], 50-100 [24% of respondents], 0-50 [60% of

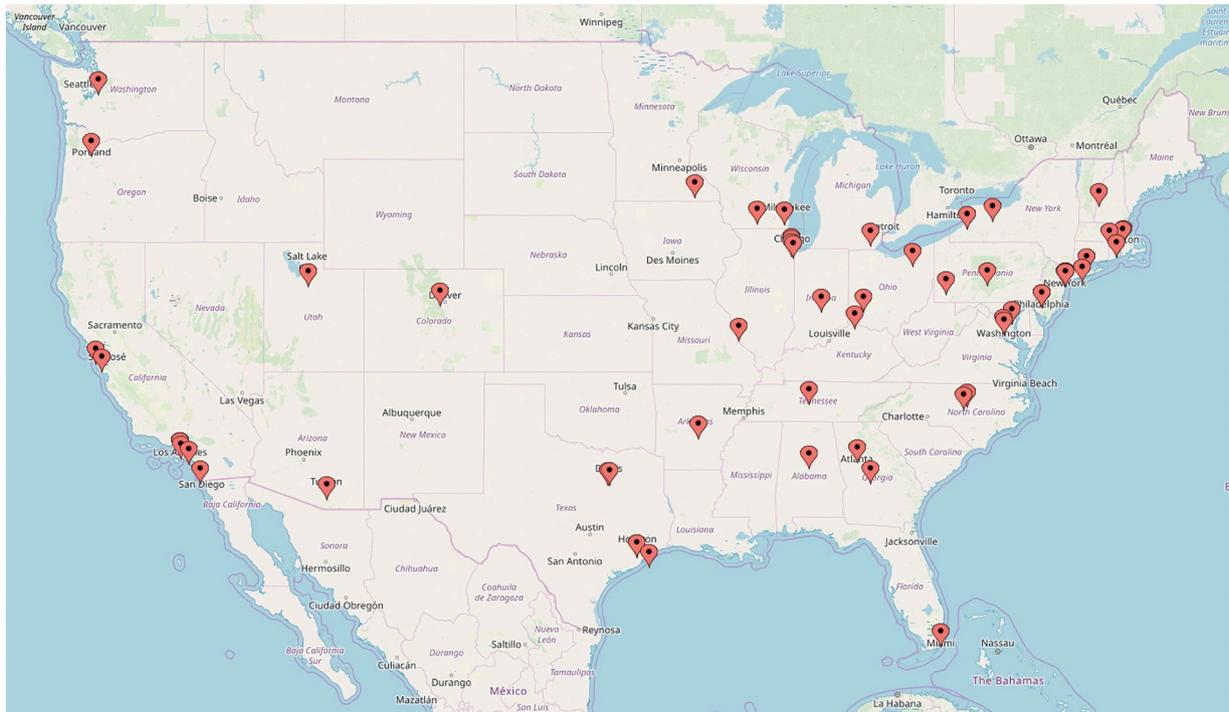


Fig 2. As indicated by the pins in the map, in 2015, Dermatology Foundation (DF) Career Development Award (CDA) recipients worked at 57 different scholarly institutions in the United States; 10 CDA recipients worked at 10 different scholarly institutions outside the United States (4 in the United Kingdom and 1 each in France, Australia, Japan, Hungary, China, and Canada).

respondents], or no response [3% of respondents]), monographs and chapters (>50 monographs [3% of respondents], 25-50 monographs [9% of respondents], 0-25 monographs [86% of respondents], or no response [2% of respondents]), and scientific abstracts (>100 [9% of respondents]; 50-100 [14% of respondents], 0-50 [70% of respondents], or no response [7% of respondents]). Among those in academia who completed the survey, 47% and 24% have devoted the majority of their professional effort (ie, at least 50% of their time) to bench or clinical research, respectively. Of the others in this group, 8% have devoted the majority of their professional effort to patient care whereas 1% and 3% have focused on administrative responsibilities and teaching, respectively.

CDA recipients and subsequent independent research funding

Of the 189 survey respondents in academic medicine, 139 (74%) reported having received federal research funding. When the NIH RePORTER database was queried, the percentage of DF CDA recipients in academic medicine who were found to have subsequently received NIH support was 69%. The

difference between self-reported and extracted data regarding NIH support of these awardees was 5%.

The 397 NIH grants (ie, new, competing, noncompeting, etc) awarded to DF CDA recipients through 2015 and listed in the NIH RePORTER database are summarized in Table II. The total value of NIH support garnered through 2015 by these CDA recipients amounted to approximately \$343.4 million. In addition to garnering support from the NIH, these DF CDA recipients also obtained support from the Department of Veteran Affairs, the Department of Defense, the Environmental Protection Agency, the Burroughs Wellcome Fund, the Doris Duke Charitable Foundation, the Howard Hughes Medical Institute, other private foundations, host institutions, and industry. Estimates place funding from these sources for these CDA recipients at \$22 million through 2015. In aggregate, these DF awardees leveraged \$36.2 million in DF support to capture \$365.4 million in research funding through 2015 (ie, \$343.4 million in NIH support plus \$22 million from other sources). This ratio represents a return on investment of more than \$10 in subsequent grant support through 2015 for each \$1 of CDA funding. When the NIH RePORTER data on the same CDA recipients were summarized through 2017

Table I. CDA categories and DF funding profiles, 1990-2012

Type of CDA	Years of award's availability	Funding awarded to date	Total recipients, n
Research	1990 to date	\$14,610,000	123
Physician-scientist	1993 to date	\$10,890,000	95
Health care policy/public health	1995 to date	\$1,820,000	13
Dermatologic surgery	2002 to date	\$2,970,000	19
Medical dermatology	2004 to date	\$3,740,000	24
Psoriasis	2005-2009	\$275,000	2
Women's health	2006 to date	\$660,000	4
Science of human appearance	2007 to date	\$1,100,000	7
Dermatopathology research	2012 to date	\$165,000	1
	Total	\$36,230,000	288

The principal investigators in this study received 3-year CDAs between 1990 and 2012; hence, the total research support devoted to the principal investigators in this study included funding support awarded through 2015. A CDA concerning pediatric dermatology was started in 2013 and hence is not listed in this table.

CDA, Career Development Award; DF, Dermatology Foundation.

(ie, \$429.8 million in NIH support plus \$22 million from other sources), the return on investment of each original DF dollar amounted to approximately \$12.50 in subsequent extramural funding.

DISCUSSION

Since its founding in 1964, the DF has awarded approximately \$70 million to shape the future of dermatology. The DF initially supported the early careers of physician-scientists and basic investigators through fellowship and grant awards. On the basis of the success of these programs and the awareness that larger, multiyear awards provide more stable and meaningful support for the development of highly qualified professionals, the DF's CDA program was developed in 1990. This program has expanded over time to provide funding opportunities for physician-scientists, medical dermatologists, dermatologic surgeons, dermatopathologists, pediatric dermatologists, and basic investigators, as well as for scholars interested in related and/or emerging fields. Because CDAs have been the major funding emphasis of the DF since 1990, this study focused on the recipients of these awards.

This cross-sectional survey found that the DF's CDA program has had a notable impact on academic dermatology, as approximately 80% of award recipients have remained in academic medicine. Given that the DF's CDA program supports virtually every subspecialty in the field, this outcome is significant. Moreover, when faculty numbers and the academic ranks of DF CDA awardees surveyed in 2010 and 2015 were compared, the following trends were documented: the number of assistant professors increased from 46 in 2010 to 62 in 2015, the number of associate professors increased from 41 in 2010 to 81 in 2015, the number of professors

increased from 18 in 2010 to 66 in 2015, and the number of division chiefs/departments chair increased from 7 in 2010 to 18 in 2015. When one considers that the DF's research award program has directed support to 288 individuals who work at 57 different US and 10 foreign scholarly institutions, the impact of the DF is apparent. The return on this investment in academic medicine has not been limited to education and research. It includes societal dividends through the care that academic departments provide to patients with advanced and/or complicated medical problems and hospitalized patients at tertiary care medical centers, as well as support for the medically underserved.

This study also demonstrated that approximately 70% of CDA recipients in academic medicine have received federal and private research funding subsequent to their initial DF support. The difference between the self-reported data concerning NIH support and the data extracted from the NIH RePORTER database was low (ie, approximately 5%). Such a difference may be accounted for by over-reporting, self-reporting of participation in NIH projects in a lesser capacity than that of the PI (eg, the NIH RePORTER database lists only PIs), or other reasons. The small difference between the self-reported and verified data provides confidence in this study. The extramural funding acquired by CDA recipients through 2015 exceeds \$365.4 million. The 2017 summary data regarding the same CDA recipients suggest that their extramural support now exceeds \$451.8 million. Because many CDA awards are directed toward young scholars pursuing fields in which federal grant support largely does not exist (eg, adult medical dermatology, dermatologic surgery, pediatric dermatology), the relative amount of federal funding captured by CDA award

Table II. NIH grants awarded to prior CDA recipients

Type of grant	Through 2015		Through 2017	
	No.	Total funding*	No.	Total funding*
Early career				
KO1	2	\$368,570	2	\$852,198
KO2	3	\$1,389,938	3	\$1,389,938
KO7	2	\$1,397,005	2	\$1,397,005
KO8	40	\$20,939,472	42	\$22,946,346
K22	1	\$560,520	1	\$560,520
K23	7	\$3,973,673	7	\$4,312,253
K24	4	\$4,058,339	4	\$4,764,007
K76	0	\$0	1	\$430,702
K99	1	\$176,882	1	\$176,882
KL2	0	\$0	1	\$1,943,320
Established PIs				
RO1	132	\$210,674,311	150	\$252,833,140
RO3	31	\$5,334,687	32	\$6,133,087
R13	8	\$334,587	10	\$387,087
R21	41	\$15,126,041	48	\$17,160,580
R25	1	\$1,502,368	1	\$1,502,368
R29	12	\$5,238,271	12	\$5,238,271
R33	1	\$979,154	1	\$979,154
R35	0	\$0	1	\$1,698,734
R41	4	\$492,611	4	\$492,611
R43	2	\$296,280	2	\$296,280
R44	1	\$377,628	1	\$377,628
R55	3	\$300,000	3	\$300,000
R56	9	\$3,695,982	10	\$3,895,982
R61	0	\$0	1	\$418,750
RC1	2	\$1,869,165	2	\$1,869,165
RC4	1	\$3,084,337	1	\$3,084,337
Project/center				
P01	5	\$4,100,113	6	\$5,550,417
P20	2	\$1,548,267	2	\$1,548,267
P30	28	\$12,611,114	34	\$17,843,333
P41	1	\$14,909	1	\$14,909
P50	3	\$12,163,901	5	\$26,209,045
P51	1	\$294,062	1	\$294,062
P60	1	\$609,603	1	\$609,603
Miscellaneous/ other				
DP2	1	\$2,370,000	3	\$7,117,500
DP3	1	\$6,608,013	1	\$6,608,013
F30	1	\$50,360	1	\$50,360
F31	2	\$252,901	2	\$252,901
F32	8	\$751,882	8	\$751,882
M01	11	\$999,105	11	\$999,105
N01	2	\$99,997	2	\$99,997
N43	3	\$399,616	3	\$399,616
N44	1	\$745,047	1	\$745,047

Continued

Table II. Cont'd

Type of grant	Through 2015		Through 2017	
	No.	Total funding*	No.	Total funding*
S10	1	\$451,110	3	\$1,304,555
T32	6	\$5,610,548	6	\$6,520,208
U01	6	\$7,171,589	7	\$10,747,614
U18	1	\$1,008,490	2	\$1,643,690
U19	2	\$1,122,430	2	\$1,330,365
U34	1	\$677,600	1	\$677,600
UH2	0	\$0	1	\$319,999
UM1	1	\$1,559,322	1	\$2,756,777
Totals	397	\$343,389,800	448	\$429,835,210

CDA, Career Development Award; NIH, National Institutes of Health.

*All data were extracted from the NIH Research Portfolio Online Reporting Tools database and based on each individual's status as the contact PI/project leader. Each unique grant was identified by a single NIH project number.

winners takes on greater significance. To date, each dollar of DF investment in these PIs has yielded approximately \$10 and \$12.50 in research support entering dermatology in 2015 and 2017, respectively.

This cross-sectional survey has limitations. It was retrospective and (in part) self-reported. Amounts of funding awarded by the DF and other groups are reported in nominal dollars that are not inflation-adjusted. In addition, some large awards (eg, project or center grants) attributed to selected CDA recipients may skew comparisons and reflect the efforts of a group rather than those of an individual. However, such awards were included only if the PI was a prior DF CDA recipient. When viewed broadly, the DF's CDA program has demonstrated a high yield of extramural funding, durable retention of awardees in academic medicine, development of all aspects of the specialty, and creation of new knowledge and innovations in dermatology.

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