# A retrospective analysis of the Dermatology Foundation's Career Development Award Program

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***Background:*** To provide research support that develops and retains leaders, educators, and investigators in dermatology and cutaneous biology, the Dermatology Foundation (DF) has designed and implemented a comprehensive Career Development Award (CDA) Program.

***Objective:*** To assess the impact of the DF's 3-year CDA, a comprehensive survey of recipients who received this mechanism of support between 1990 and 2007 was performed.

***Methods:*** Of 196 individuals receiving a DF CDA, 181 were identified and asked to complete a comprehensive questionnaire concerning their career status, employment history, professional rank, and record of independent research funding (private foundation, federal, other). A personal assessment of the impact of this funding on these individuals' career trajectory was also requested.

***Results:*** Eighty percent of 181 CDA recipients identified currently hold full- or part-time positions in academic medicine. The faculty rank of 112 survey respondents included 46 assistant professors (41%), 41 associate professors (37%), 18 professors (16%), and 7 division or departmental chairs (6%). Of respondents, 84% reported that they have received subsequent independent research funding; 95 of these individuals (86%) have received funding from a federal agency (235 federal grants awarded to date with funding >$318M).

***Limitations:*** The study was retrospective and self-reported; some awardees did not respond to the survey.

***Conclusions:*** The DF's CDA Program has succeeded in supporting the early career development of talented investigators, educators, and leaders; fostered the promotion and retention of these individuals in academic medicine; and nucleated numerous investigative careers that have successfully acquired independent research funding. ( J Am Acad Dermatol 2012;67:969-74.)

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

The Dermatology Foundation (DF) was founded in 1964 as a nonprofit charitable organization whose mission is to identify and support early career development of future leaders, educators, and investigators in dermatology and cutaneous biology. It is understood that this core mission of the DF will advance the care of patients with a broad array of dermatologic diseases and systemic diseases with cutaneous manifestations.[1] To achieve these proximal and global goals, the DF has designed and implemented a comprehensive awards program.

*Abbreviations used:*

| | |
|---|---|
| CDA: | Career Development Award |
| DF: | Dermatology Foundation |
| NIH: | National Institutes of Health |
| PIs: | principal investigators |

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During the first 26 years of its existence (ie, 1964-1990), the DF made a notable impact on research by awarding a series of 1-year fellowships and grant awards. To increase the impact of its research awards program, in 1990 the DF initiated a series of Career Development Awards (CDAs) providing $40,000 to $55,000 of support for 3 consecutive years. These awards were intended to provide early, stable, and meaningful support for the career development of scholars interested in a variety of dermatology-related content areas[2] (Table I). To assess the impact of the DF's CDA Program, a comprehensive survey of principal investigators (PIs) receiving this mechanism of support between 1990 and 2007 was performed.

**CAPSULE SUMMARY**

- Early career support is essential for professional development.
- The Dermatology Foundation's Career Development Award Program has supported the early careers of investigators, educators, and leaders; fostered the development and retention of academicians; and launched the careers of numerous investigators currently supported by independent research funding.
- The Career Development Award Program has had a major favorable impact on the academic workforce and supported numerous individuals who have advanced knowledge and patient care.

## METHODS

### Subjects

A total of 196 individuals received DF CDA funding between 1990 and 2007. The known age of these PIs ranged from 29 to 49 years (average age, 34 years); 62% were men, 38% were women. Stratification based on training background revealed that 38%, 34%, and 28% of PIs held MD, MD/PhD, or PhD degrees, respectively.

### Survey

Of these 196 PIs, 181 individuals (92%) were located and queried by survey. The survey consisted of a comprehensive questionnaire concerning career status, employment history, professional rank, record of independent funding (private foundation, federal, other), number of publications (peer-reviewed and total), and a personal assessment of the DF's CDA Program on the subjects' career trajectory.[2] A copy of the survey questionnaire can be found on the DF's World Wide Web site.[2]

### Estimated amount of federal funding acquired by CDA recipients to date

The National Institutes of Health (NIH) Research Portfolio Online Reporting Tool was used to develop an estimate of how much federal funding has been acquired by CDA recipients to date.[3] This online application estimates the cost of various funding mechanisms (eg, research grants, contracts, training awards), award categories (eg, K, R, or P series research grant awards), and types of grants (eg, new, competing, noncompeting) during a given year.

## RESULTS

### Response rate

Of the 181 PIs queried, 132 individuals (73%) completed and returned the survey. Although 45 PIs (25%) did not respond to the query, it was possible to define their career status by other means (eg, analysis of faculty rosters, personal contacts). Four individuals (2%) were excluded because their CDA was returned before funding began as a result of their successful acquisition of federal research funding. (Note: CDA funding eligibility ceases when an individual receives research support from a federal agency [eg, NIH, Department of Defense, Department of Veterans Affairs, Environmental Protection Agency]. Conversely, CDA recipients are allowed to hold support from private foundations such as the American Cancer Society or the Burroughs Wellcome Fund.)

### Percent of CDA recipients in academic medicine

In all, 112 of 132 PIs (85%) completing the survey hold full- or part-time positions in academic medicine in the United States or abroad. Moreover, two individuals who had CDAs returned before funding, and 30 nonresponders to the survey, had professional addresses indicating that they hold full- or part-time positions in academic medicine. Hence, 144 PIs (ie, 112 responders [78%], 30 nonresponders [21%], and 2 individuals with awards returned before activation [1%]) or 80% of the 181 individuals queried hold full- or part-time positions in academic medicine. Of the 132 PIs who completed the survey, 104 (79%) are in academic medicine on a full-time basis; another 8 responders (6%) currently hold academic positions on a part-time basis. Of the remaining 20 respondents, two (1%) hold full-time or part-time nonacademic, research-based positions, 13 (10%) are in private practice, and 5 (4%) are active in other endeavors.

The academic rank of PIs responding to the survey is shown in Table II. In sum, among this group of 132 responders, 112 individuals (85%) are

**Table I.** Career Development Award categories and funding 1990-2011

| Type of CDA | Criteria* | Years available | Awarded to date | Total no. recipients |
|---|---|---|---|---|
| Research | MD, MD/PhD, PhD, or DO; completed appropriate initial training in biomedical research (ie, 2- to 3-y fellowship or postdoctoral experience); junior faculty (through assistant professor level) at time of funding | 1990 to date | $13,180,000 | 118 |
| Physician-scientist | MD, MD/PhD, or DO; completed US dermatology residency program; junior faculty (through assistant professor level) at time of funding | 1993 to date | $9,735,000 | 90 |
| Dermatologic surgery | MD, MD/PhD, or DO; completed at least 1-y US postresidency surgical training; junior faculty member (through assistant professor level) at time of funding | 2002 to date | $2,750,000 | 19 |
| Medical dermatology | MD, MD/PhD, or DO; completed training in US dermatology residency program; junior faculty (through assistant professor level) at time of funding; under mentorship of expert medical dermatologist | 2004 to date | $2,530,000 | 20 |
| Health care policy | MD, MD/PhD, or DO; completed US dermatology residency program; junior faculty (through assistant professor level) at time of funding; formal relationship with mentor who possesses recognized expertise in health policy or public health research | 1995 to date | $1,600,000 | 12 |
| Science of human appearance | MD, MD/PhD, PhD, or DO; MD: completed US dermatology residency program and must have strong laboratory collaborator; PhD: completed at least 2 y postdoctoral training and must have strong connection with MD conducting appearance work; junior faculty member (through assistant professor level) at time of funding | 2007 to date | $605,000 | 5 |
| Women's health | MD, MD/PhD, PhD, or DO; appropriate initial training in biomedical research (ie, 2- to 3-y fellowship or postdoctoral experience); junior faculty (through assistant professor level) at time of funding; research focuses on a women's health issue | 2006 to date | $385,000 | 3 |
| Psoriasis | MD, MD/PhD, PhD, or DO; completed appropriate initial training in biomedical research (ie, 2- to 3-y fellowship or postdoctoral experience); junior faculty (through assistant professor level) at time of funding; research focuses on psoriasis | 2005-2009 | $275,000 | 2 |

Continued

**Table I.** Cont'd

| Type of CDA | Criteria* | Years available | Awarded to date | Total no. recipients |
|---|---|---|---|---|
| Dermatopathology research | MD, MD/PhD, or DO; completed US dermatology or pathology residency and US fellowship in dermatopathology; under mentorship of recognized investigator(s); mentor must have academic appointment in dermatology or another program at sponsoring institution that is approved by dermatology chair; junior faculty member (through assistant professor level) at time of funding | 2012 | New award in 2012 | Not applicable |
| | | Total | $31,060,000 | 269 |

*CDA*, Career Development Award.
*All CDA categories require that applicants demonstrate strong commitment to research and that their host institution in turn pledge to support applicant's project and career development. CDAs are only available to junior investigators in early stages of academic career. Applicants are not eligible to receive support from US federal agency during period they hold a CDA. More specific eligibility criteria for these awards are detailed on Dermatology Foundation's World Wide Web site. Funding for these awards was initially $40,000 annually for 3 y; since 2000, awards have provided $55,000 annually for 3 y.

**Table II.** Current faculty rank of survey respondents in academic medicine (n = 112)

| Rank | No. | Percent |
|---|---|---|
| Assistant professor | 46 | 41 |
| Associate professor | 41 | 37 |
| Professor | 18 | 16 |
| Division chief/department chair | 7 | 6 |

in academic medicine and hold the following academic rank (or its equivalent): assistant professor, 46 (41%); associate professor, 41 (37%); professor, 18 (16%); division or departmental chair, 7 (6%). Of CDA recipients currently engaged in academic medicine, responders noted that on average they devote 45% of their professional effort to bench research, 24% to patient care, 12% to clinical research, 10% to teaching, and 9% to administrative activities. CDA recipients averaged 58 publications to date, 48 in peer-reviewed journals.

## Percent of CDA recipients receiving subsequent independent research funding

Of the 132 survey respondents, 110 PIs (84%) reported that they had received independent research funding subsequent to their original DF CDA. Eleven PIs (8%) reported that they had not received funding subsequent to their CDA; 11 survey respondents (8%) did not provide a response to this question. Of the 110 PIs who received funding subsequent to their DF CDA, 95 individuals (86%) have received funding from a federal agency (eg, NIH, Environmental Protection Agency, Department of Defense). In addition, 5 additional survey respondents (5 of 132, or 4%) indicated that they were awaiting opinions from federal funding agencies and/or grant review study sessions. The 235 grants from the NIH that have been awarded to these 95 DF CDA recipients to date are summarized in Table III. Data summarizing DF funding support to various CDA categories between 1990 and 2011 are shown in Table I.

## Estimated amount of federal funding acquired by CDA recipients to date

A partial estimate of funding that CDA recipients have received to date from the NIH is shown in Table III. This estimate is based on NIH Research Portfolio Online Reporting Tool analysis of the average costs of research grants across all NIH institutes and centers for various award categories (ie, K, R, and P series) and all types of funded applications (eg, new, competing, noncompeting) in 2010 dollars (note: the NIH Research Portfolio Online Reporting Tool database contains comprehensive financial data for years 2009-2011).[3] Given that the average duration of funding for most awards from the NIH approximates 4 years, it is possible to translate the average costs of research grants in a given year (ie, 2010) to aggregate funding received to date.[4,5] As shown in Table III, it is estimated that CDA recipients have received more than $318M from the NIH to date. This partial estimate is deemed conservative in that it was not

**Table III.** National Institutes of Health grants awarded to prior Career Development Award recipients (n = 95)

| Type of grant | No. | Annual funding/grant* | Total funding† |
|---|---|---|---|
| Early career | | | |
| K01 | 2 | $133,000 | $1,064,000 |
| K02 | 2 | $125,000 | $1,000,000 |
| K07 | 3 | $144,000 | $1,728,000 |
| K08 | 21 | $140,000 | $11,760,000 |
| K11 | 1 | — | — |
| K22 | 1 | $151,000 | $604,000 |
| K23 | 5 | $148,000 | $2,960,000 |
| K24 | 5 | $165,000 | $3,300,000 |
| Established PIs | | | |
| R01 | 92 | $398,000 | $146,464,000 |
| R03 | 16 | $83,000 | $5,312,000 |
| R21 | 18 | $211,000 | $15,192,000 |
| R25 | 1 | $296,000 | $1,184,000 |
| R29 | 7 | — | — |
| R55 | 1 | — | — |
| Project/center | | | |
| P01 | 1 | $1,768,000 | $7,072,000 |
| P20 | 1 | $1,495,000 | $5,980,000 |
| P30 | 11 | $1,709,000 | $75,196,000 |
| P50 | 5 | $1,974,000 | $39,480,000 |
| Other | | | |
| Challenge | 3 | — | — |
| Miscellaneous | 28 | — | — |
| Not specified | 11 | — | — |
| Total = 235 | | | $318,296,000 |

*PIs*, Principal investigators.

*All data are based on National Institutes of Health Research Portfolio Online Reporting Tool analysis using the following parameters: average costs of research grants; all institutes and centers; specific K, R, and P award categories shown above; all types of funded applications (eg, new, competing, noncompeting); year 2010.[3]

†Given that average duration of funding for awards from National Institutes of Health approximates 4 y, it is possible to translate average costs of research grants in given year to aggregate funding received to date.[4,5]

possible to include several award categories in this analysis and that many larger grants (eg, those in the R and P series) are often awarded for 5 rather than 4 years. Moreover, this analysis does not include funding these PIs have received from other federal agencies or private foundations. Despite these limitations, this analysis shows that each dollar of CDA funding (ie, $31M) can be linked to greater than $10 in NIH grant support (ie, $318M) to date.

## DISCUSSION

Since its founding in 1964, the DF has allocated $62M to support the career development of investigators, educators, and leaders in dermatology and cutaneous biology. The DF's CDA Program represents a key mechanism to address these important goals. CDAs are multiyear awards designed to develop highly qualified physician scientists, basic investigators, medical dermatologists, and dermatologic surgeons along with qualified professionals interested in health policy, epidemiology, outcomes research, the science of human appearance, and (beginning in 2012) dermatopathology. Since 1990, the DF has invested $31M to support the CDA Program. This commitment is based on the premise that leaders, educators, and investigators early in their career need significant multiyear salary support, protected time for professional development, superb mentorship, and a strong academic environment that will steward the trainee to successfully leverage the DF's resources.

The DF's CDA Program initially focused on supporting the early careers of physician scientists and basic investigators. Based on its success and the generous support this program has received from the greater DF community, it was subsequently expanded to foster the career development of selected subspecialties within dermatology (eg, dermatologic surgery, medical dermatology, and dermatopathology) and emerging content areas where expertise within the field was deemed somewhat limited (eg, research concerning health policy, public health, women's health, human appearance). Support for the DF's CDA Program remains strong. Approximately half of the funds used to support this program are derived from members of the DF (ie, dermatologists and their professional colleagues in related fields); the other half of funds used to support this program is provided by unrestricted donations from industry.

In a process modeled after NIH study sections, all CDA applications are rigorously reviewed by the DF's Medical and Scientific Review Committee or the DF's Clinical/Medical/Surgical/Dermatopathology Review Panel. Criteria for awards are published annually and emphasize the qualifications of the applicant, the quality of the proposal, the character of the environment where the applicant will work, and the requirement that the host department provide protected time needed to carry out the proposed research.[2] Neither applicants nor recipients are allowed to hold funding from a federal agency concurrently with a DF CDA. During the past decade, approximately 3% to 10% of annual research funding has been returned by CDA recipients who have received federal grant support or pursued other professional opportunities. The variance in this practice is thought to reflect NIH funding trends and/or federal budgetary constraints. The DF has

assigned all monies captured in this manner to fund future awards.

The distribution of CDAs awarded to MDs, MD/PhDs, and PhDs has been roughly equal (ie, approximately one third of funding has been apportioned among each cohort during the past 18 years). Of note, the average age of CDA recipients (ie, 34 years) is notably below the current average age of individuals receiving their first independent research award (ie, R01) from the NIH. More specifically, in 1990 when the DF's CDA Program was established, the average age of MDs, MD/PhDs, and PhDs receiving their first R01 award was approximately 38 years.[6] By 2005, the average age of MDs, MD/PhDs, and PhDs receiving such federal support had climbed to 43, 43, and 42 years of age, respectively, thus creating an 8- to 9-year gap between the time most CDAs and NIH grants for independent investigators are awarded.[6] The support, protected time, and nurturing environment nucleated by the DF's CDA has provided a secure start for young investigators and academicians. CDA support has also allowed this cohort to establish and maintain the momentum required to obtain and renew major federal research awards later in their career. Nonetheless, it is evident that the pathway to independence for investigators and academicians in the 21st century requires support considerably greater than that provided by a CDA. Such support is typically derived from host departments, other private foundations, industry, mentors, and/or collaborating senior investigators. This matrix of support builds on the foundation created by the CDA Program to sustain young investigators while they seek and obtain early and established career awards from the NIH and other federal agencies.

This survey provides data supporting the premise and basis for the creation and maintenance of the DF's CDA Program. More specifically, this survey determined that 80% of individuals receiving CDAs between 1990 and 2007 currently hold positions in academic medicine. The vast percentage of these CDA recipients holds these positions on a full-time basis. Moreover, more than half of these full-time faculty members hold the academic rank of associate professor or above. Seven CDA recipients now serve as division or department chairs—an achievement that further attests to the effectiveness of this award mechanism to promote leadership in the field. Of particular importance, 110 of 132 survey respondents (84%) reported that they have received additional independent research funding subsequent to receipt of CDA. Moreover, 95 respondents (95 of 132 PIs, or 72%) reported that they have received independent research funding from a federal agency subsequent to receipt of CDA. As shown in Table III, CDA recipients have received a total of 235 grant awards from the NIH to date. A conservative analysis indicates that this amount of federal funding exceeds $318M to date. Hence, each dollar of DF CDA "investment" has yielded greater than $10 in NIH funding to date. This analysis is deemed conservative because it does not include all types of NIH awards received by CDA recipients to date, grant support from other federal agencies (eg, Department of Defense, Department of Veterans Affairs, Environmental Protection Agency), or funding from various private foundations. This estimate of productivity and yield is particularly meaningful when one considers that this cohort largely consists of younger investigators funded in recent years when the CDA Program has grown in size. In sum, the findings of this survey demonstrate that the DF's CDA Program successfully meets its goal of developing talented leaders, educators, and investigators who are building durable and productive careers in academic medicine.[7]

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