

## Meeting Report

# The Characteristics and Training of Professionals in Cancer Prevention and Control: A Survey of the American Society for Preventive Oncology

Shine Chang,<sup>1</sup> Diana S.M. Buist,<sup>2</sup> Mary Reid,<sup>3</sup> Mary Beth Terry,<sup>4</sup> and Amy Trentham-Dietz<sup>5</sup>

<sup>1</sup>Office of Preventive Oncology, Division of Cancer Prevention, National Cancer Institute, NIH, Bethesda, Maryland; <sup>2</sup>Center for Health Studies, Group Health Cooperative, Seattle, Washington; <sup>3</sup>Roswell Park Cancer Institute, Buffalo, New York; <sup>4</sup>Columbia University Joseph L. Mailman School of Public Health, New York, New York; and <sup>5</sup>University of Wisconsin Department of Population Health Sciences, Madison, Wisconsin

### Abstract

To secure continuous stewardship in the field of cancer prevention requires in part training the next generation of scientists and practitioners effectively. We characterized members and meeting registrants of the American Society for Preventive Oncology and assessed their career needs using an electronic survey. From 380 valid email addresses, 233 respondents (61%) included 143 physicians and 81 respondents with other doctorates. More than one third worked at cancer centers (36%), while others worked at schools of medicine (25%) and public health (17%) and other institutions and businesses (22%). Among all respondents, 52% reported having at least one mentor but time spent advising by mentors was generally low. Many were less than satisfied with the amount of mentoring received (44%) and 52% reported interest in matching with an American Society for Preventive Oncology mentor. All were interested in grantsmanship training but junior and

senior respondents differed in their preference for other topics, reflecting needs that change with career advancement. Other analyses focused on aspects of institutional commitment, which did not differ by type of degree, even after age adjustment. However, by gender and degree, men were completely supported by institutional funds more often than women among non-medical doctorates [age-adjusted odds ratio (OR) = 3.3, 95% confidence interval (CI) = 1.1-9.8] but not among physicians (age-adjusted OR = 1.3, 95% CI = 0.5-3.1). Men were also more often in tenure-track positions than women (age-adjusted OR = 1.9, 95% CI = 1.1-3.3). In sum, addressing the career development needs of future leaders in the field by providing career and mentoring sessions at annual meetings may help individuals in the field and enrich the discipline overall. (Cancer Epidemiol Biomarkers Prev 2004; 13(7):1094-8)

### Introduction

Maintaining continuous progress in the prevention of cancer requires leadership and a cadre of well-trained scientists and practitioners in the field of cancer prevention and control. Because the prevention and control of cancer is a multi-disciplinary endeavor, such a cadre of scientists and practitioners must be recruited from a variety of disciplines and work collaboratively to advance knowledge and practice. The National Cancer Institute has supported the recruitment and training of such individuals since 1991 through a variety of funding mechanisms, including the "Cancer Education and Career Development Program" (National Cancer Insti-

tute R25T series) and the "Cancer Prevention, Control, Behavioral, and Population Sciences Career Development Award" (National Cancer Institute K07 award), and the National Cancer Institute Cancer Prevention Fellowship Program. In 1996, Love and Engstrom (1) discussed the need for investigators in cancer prevention and control and outlined several recommendations for their training. Research focus and mentoring were critical issues described. Currently, little information exists about the professionals in cancer prevention and control, the broad variety of disciplines that they represent, and what their career needs are.

To identify the characteristics of professionals active in the field of cancer prevention and control, we undertook a survey of the members and annual meeting participants of a professional organization centered on the prevention of cancer, the American Society for Preventive Oncology (ASPO). We specifically focused on the interests of the junior members to identify the career needs for which professional training activities could be developed and implemented through annual meetings of professional membership organizations.

Received 2/17/04; accepted 3/12/04.

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Note: This work was presented in part at the 26th annual meeting of the American Society of Preventive Oncology, Bethesda, March 2002.

Requests for reprints: Shine Chang, Office of Preventive Oncology, Division of Cancer Prevention, National Cancer Institute, 6120 Executive Boulevard, Suite T-41 MSC 7105, Bethesda, MD 20892-7105. Phone: (301) 496-8640; Fax: (301) 480-2669. E-mail: ChangSh@mail.nih.gov

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## Materials and Methods

ASPO was established in 1976 as a multi-disciplinary professional membership society committed to "promoting and fostering the exchange and dissemination of information and ideas relating to the prevention and control of cancer" and "identifying problems in preventive oncology which require action or study programs and fostering the implementation of such programs." To conduct our cross-sectional survey, we obtained a waiver of informed consent from the Health Sciences Human Subjects Committee at the University of Wisconsin. For the survey, ASPO staff provided a list of electronic mail addresses for people who were ASPO members in the years 2001 to 2002 ( $n = 356$ ) and for registrants to the 2001 annual ASPO meeting ( $N = 234$ ), not all of whom were ASPO members. After merging the two groups and eliminating duplicate addresses, we sent emails to 380 individuals with valid e-mail addresses on Monday, February 26, 2001. In the e-mail message, individuals were offered a choice of methods to complete the survey: respondents could use a secure Internet website (courtesy of Group Health Cooperative), or respondents could print, complete, and fax the survey to study offices at the University of Wisconsin Comprehensive Cancer Center for data entry. Respondents were asked to complete the survey before Tuesday, March 6, 2001. The survey response rate was 61% (233 of 380). Identifiers were removed from all completed surveys before analysis, and paper copies of completed surveys were destroyed. To preserve anonymity, no information was sought about non-responders.

The 19-item survey solicited information about age (in categories), gender, highest degree obtained, employment position, type of institution, tenure-track status, and main areas of research. The survey also gathered information about mentors and mentorship and interest in other career development issues. Sources of salary support (i.e., extramural funds versus institutional resources) and access to institutional support during temporary gaps between research grant awards ("bridge funding") were also assessed.

In descriptive comparisons, we evaluated differences between groups using the  $\chi^2$  and Fisher's exact tests (2). We distinguished junior ASPO members from senior members if respondents reported being in training (including postdoctoral fellows or trainees, and pre-doctoral or undergraduate students), being an instructor, masters-level professional, or being an assistant professor, scientist, or researcher. We categorized medical doctors with other advanced degrees (e.g., Ph.D., Sc.D.) with doctors of osteopathy (i.e., M.D./D.O.). In analyses of those who have completed their doctoral-level degrees, we used unconditional logistic regression to adjust for the potential effect of age (3). We used two-sided statistical tests for all comparisons.

## Results

Most respondents were employed at cancer centers (36%), schools of medicine (25%), and schools of public health (17%, Table 1). Most responses were from women ( $N = 142$ , 61%) and women were less likely to be medical doctors (54%) than men (73%,  $P = 0.02$ ). Women were

also younger (82% were of ages <50 years) than men (60% were of ages <50 years,  $P < 0.001$ ). Less than half of all the respondents had tenure-track positions (47%), and men were more likely to have tenure-track positions (62%) than women (38%,  $P = 0.005$ ). Just more than one fifth of all respondents (22%) had salaries supported completely by non-extramural institutional funds ("hard money") and 32% had salaries supported completely by extramural grant funding. Women were less likely than men to have their salaries supported completely from institutional funds ( $P = 0.03$ ) and were more likely than men to be completely dependent on extramural funding for salary support ( $P < 0.001$ ). These relationships persisted after adjusting for age; men were almost twice as likely as women to report being in a tenure-track position [age-adjusted odds ratio (OR) = 1.90, 95% confidence interval (CI) = 1.08-3.36], and men were 77% less likely than women to have their entire salary supported through grant funds (age-adjusted OR = 0.33, 95% CI = 0.17-0.66). The majority of respondents had access to bridge funding between grants (72%) and this did not vary according to gender ( $P = 0.34$ ).

Respondents identified a wide range of research areas in cancer prevention and control (not mutually exclusive): 146 in epidemiology (63%), 79 in behavioral science (34%), 73 in screening (31%), 62 in nutrition (27%), 50 in chemoprevention (21%), 47 in genetics (20%), and 35 in tobacco control (11%; data not shown). Among all respondents, 30% were required to teach one or more classes a year; 8% spent no time doing research, and 42% spent 90% or more of their time actively conducting research.

**Mentoring.** Almost two thirds of respondents (62%) reported serving as mentors (Table 2). Mentors tended to be older than those they mentored; 32% of mentors were  $\geq 50$  years of age, while 9% of those being mentored were in the same age category (data not shown). Because the older respondents overall tended to be male and medical doctors, more of the mentors than those being mentored reported being male and medical doctors. Mentors reported spending a median of 2 hours each month mentoring junior colleagues (range: 0 to 40 h/mo) and 39% of mentors reported spending no time each month mentoring junior faculty. The median hours spent each month by mentors was 5 hours for mentoring students (range: 0 to 40 h/mo) and 26% of mentors spent no time each month mentoring students.

Fifty-two percent of all respondents reported having a mentor (Table 2). Of those being mentored, one third had at least one mentor and 58% reported having two to three mentors (data not shown). The majority of respondents with mentors (83%) were at the same institution as their mentor. Mentors were the top source for cancer development information (49% of respondents) but peers were also an important resource (33% of respondents). Mentors initiated career discussions half of the time for 28% of respondents with mentors. Twenty-six percent of respondents had mentors who initiated discussions most of the time, but 29% of those being mentored had to initiate discussions with their mentors most of the time. In general, almost half of respondents (44%) were less than satisfied with the amount of mentoring they received about career decisions and 52% reported interest in being matched with an ASPO mentor.

**Table 1. Percentage distributions of ASPO survey respondents by selected characteristics, gender, and degree**

Characteristics	Gender			P value*	Degree			P value*
	Total (N = 233)	Women (N = 142)	Men (N = 91)		Total (N = 224)	M.D./D.O. (N = 143)	Ph.D./Dr.P.H./Sc.D. (N = 81)	
Degree				0.02†				–
M.A./M.S./M.P.H.	3	4	1		–	–	–	
M.D./D.O.	61	54	73		64	100	–	
Ph.D./Dr.P.H./Sc.D.	35	40	26		36	–	100	
Other	1	1	0		–	–	–	
Age in years				<0.0001†				0.03†
<30	7	10	3		5	6	5	
30-39	29	35	20		29	25	37	
40-49	37	37	37		38	36	41	
50-59	17	14	21		17	19	15	
≥60	9	4	19		10	14	2	
Type of institution				0.01*				0.66
Cancer center	36	39	33		36	32	42	
School of medicine	25	20	34		26	29	21	
School of public health	17	22	10		16	17	14	
Research institute	7	9	4		8	7	9	
Federal government	7	5	10		7	7	7	
Other	7	6	9		7	7	7	
Tenure track position				0.005				0.09
Yes	47	38	62		48	52	41	
No	53	62	38		52	48	59	
100% "hard money" salary support				0.03				0.52
Yes	22	18	30		22	21	25	
No	78	82	70		78	79	75	
100% "soft money" salary support				<0.0001				0.61
Yes	32	43	15		31	30	33	
No	68	57	85		69	70	67	
Bridge funding available				0.34				0.44
Yes	72	74	68		71	69	74	
No	28	26	32		29	31	26	

\*P value calculated from  $\chi^2$  test.

†P value calculated from Fisher's exact test.

**Career Development.** Individuals were asked to rate their interest (i.e., very interested, neutral, not at all interested) in attending seminars or workshops on 11 career development topics (Table 3). The majority of senior respondents expressed interest in grant submission strategies (62%) and identifying funding sources (56%), as well as in strengthening their scientific presentation skills (63%). A slightly higher proportion of junior respondents were also interested in grant-related topics: submission strategies (78%), identifying funding sources (74%), and writing grants and manuscripts (69%). In addition, more than two thirds of junior respondents wanted training in networking (76%) and tips for success and productivity (72%).

**Comparisons by Training.** Among respondents with doctoral-level degrees (N = 224, 96% of all respondents), the majority of responses were from medical doctors (M.D. and D.O.: 64%, Table 1). Medical doctors were older on average than respondents with Ph.D., Dr.P.H., and Sc.D. degrees ("non-medical doctorates," P = 0.03). Less than half of all non-medical doctorates had tenure-track positions (41%), and the proportion of medical doctors with tenure-track positions was slightly higher (52%, P = 0.09). Equal proportions of medical doctors and non-medical doctorates were supported completely by hard money as were supported completely by grant funds. Medical doctors and non-medical doctorates also had equal access to bridge funding between funded

grants. Adjustment for age did not substantially affect these comparisons (data not shown).

Among non-medical doctorates, men were more than three times as likely as women to have their salaries completely supported by hard money (age-adjusted OR = 3.34, 95% CI = 1.14-9.75); by contrast, the same association among only medical doctors was not significant (age-adjusted OR = 1.27, 95% CI = 0.53-3.05). A borderline association was observed for being male and being in a tenure-track position for medical doctors (age-adjusted OR = 1.93, 95% = 0.95-3.93), but not among non-medical doctorates (age-adjusted OR = 1.65, 95% CI = 0.62-4.37). Among men, medical doctors were less likely to have their salaries supported completely by institutional hard money as compared with non-medical doctorates (age-adjusted OR = 0.33, 95% CI = 0.11-0.96); this association was not observed among women (age-adjusted OR = 1.08, 95% CI = 0.44-2.64).

## Discussion

Mentoring practices are naturally relevant to developing the future leaders in cancer prevention and control, as good mentoring can help accelerate the career trajectories of individuals. Among our respondents, many reported having mentors but several aspects of the mentoring relationship were less than ideal. On a brighter note,

**Table 2. Distribution (%) of ASPO survey respondents according to mentoring status and other selected characteristics**

	The mentors (N = 145)		The mentored (N = 121)	
	N	%	N	%
Gender				
Female	82	57	91	75
Male	63	43	30	25
Degree				
M.S./M.A./M.P.H.	1	1	5	4
M.D./D.O.	92	63	67	55
Ph.D./Dr.P.H./Sc.D.	52	36	49	41
Rank				
In training	6	4	41	34
Assistant*	35	24	43	36
Associate*	42	29	26	21
Full*	53	37	4	3
Other†	9	6	7	6
Age (years)				
<30	4	3	15	12
30-39	28	19	56	46
40-49	66	46	40	33
50-59	32	22	8	7
≥60	15	10	2	2

NOTE: Out of the total 233 respondents, 33 reported both being a mentor and being mentored by someone else.

\*Includes professors, scientists, and researchers.

†Includes masters-level trained respondents and instructors (i.e., not in training).

more than half of respondents were interested in being matched with mentors through ASPO, which signals an opportunity for professional membership organizations to address a critical need that may directly benefit the field. Membership organizations like ASPO, particularly those that are small in size and able to create friendly atmospheres conducive to mentoring, can offer excellent opportunities for junior investigators to meet and develop professional relationships with senior scientists. Organizations can also identify mentors and educate them and those they mentor on good mentoring practices.

All respondents expressed high interest in grant-related topics regardless of educational background, rank, or experience. Such interest reflects the important role that grant funding plays in sustaining and advancing the careers of professionals in cancer prevention and control, both junior and senior scientists. However, junior and senior respondents responded differently in their level of interest on other career development issues. The greatest disparities between junior and senior respondents lay in topics that are typically important to professionals at the beginning of their careers; junior respondents reported higher interest than their seniors in topics related to networking, tips for success and productivity, and balancing family and careers. Senior respondents were considerably more interested than junior respondents in improving their skills in scientific presentations. While reasons for preferences were not captured in our survey, it is likely that such "polish" skills probably become more important for career advancement as scientists mature because other skills have already been mastered. It is important to note that the topics we selected for ranking in the survey were based on their relevance to junior scientists; senior scientists may have other career needs that were not listed in our survey. However, recognizing that the needs of professionals change with career advancement is critical for creating useful and targeted career development activities for scientists at different stages of their careers. Indeed, attesting to both the need and high level of interest in career development workshops, the attendance of such workshops organized by ASPO Junior Members at the annual meetings in the past 4 years has included approximately 30% of *all* meeting registrants, from students to senior level investigators.

Many organizations offer professional development opportunities, but these are often available only for a select group and often for a price. At ASPO since 1993, Dr. Alfred Neugut has headed the New Investigators Workshop, an intensive, small group Master class in which senior investigators critique brief presentations by graduate students and postdoctoral fellows. These successful workshops were intended to create a setting

**Table 3. Distribution (%) of the level of interest for selected career development topics by rank**

Topic	% Difference* between Junior† and Senior‡ respondents	"Junior" respondents			"Senior" respondents		
		Very interested (%)	Neutral (%)	Not at all Interested (%)	Very interested (%)	Neutral (%)	Not at all interested (%)
Grant submission strategies	16	78	20	2	62	25	13
Identifying funding sources	18	74	26	0	56	34	11
Writing grants and manuscripts	17	69	29	2	52	34	14
Scientific presentations	-17	46	46	8	63	27	10
Time management	8	53	42	5	45	37	18
Tips for success and productivity	21	72	27	2	51	38	12
Balancing family and career	19	50	42	8	31	47	22
Networking	35	76	20	3	41	41	18
Communication skills	4	40	49	12	36	42	21
Job hunting	11	43	38	19	32	43	25
Interviewing techniques	4	27	85	18	23	44	33

\*Percentage difference between Junior and Senior respondents answering "very interested" to each topic.

†Postdoctoral fellows or trainees, pre-doctoral or undergraduate students, instructors, masters-level professionals, assistant professors/scientists/researchers.

‡Associate or full professors/scientists/researchers.

conducive for networking among people at the same level of training who were from different institutions. Although this workshop is available free of charge in hopes of reaching a broad audience, both the desire to provide a high quality learning experience and a competitive admission process constrain its size. Thus, the ASPO Junior Members organized themselves in 1999 to offer career development workshops at the annual meetings that would be open to all meeting registrants free of charge. Past workshops have addressed time management, scientific writing and publishing, the peer-review journal process, NIH study section grant evaluation process, networking, achieving balance between personal and professional responsibilities, and becoming an independent scientist in cancer prevention and control. These programs have been supported by ASPO and funding from the Cancer Research and Prevention Foundation, which have a history of supporting junior investigators in cancer prevention and control. Recognizing the valuable contribution of its junior members, ASPO has included junior member representatives since 1999 on the board of directors and the program organizing committee as ways to integrate junior members into critical aspects of the organization.

Offering career development activities through professional membership organizations and their annual scientific meetings has many advantages for any discipline. Such activities can help recruit and retain members and enhance their participation in other activities sponsored by the organizations, which is important to a growing multi-disciplinary field like cancer prevention and control. For new investigators or those whose institutions provide little support or guidance in cancer prevention and control, these activities at annual meetings can help fight isolation, create opportunities for networking, and provide a forum for learning. When junior members organize career development activities themselves as they do for ASPO, they practice building teams, facilitating group process, working with senior member panel speakers, moderating panel discussions, and planning workshops for national conferences. Mastering such skills prepares junior investigators for other conference organizing opportunities, which can contribute to developing their reputations as professionals in the field. Senior members can help build the field by serving as role models in career development programs. Recruiting such experts from the members who are already planning to attend the annual meetings can help minimize costs.

A first step toward building the future leadership can include assessing the demographics of those in the field and identifying the needs of those currently entering the field. Use of an online, web-based survey was an ideal method to collect data from members and meeting registrants of a professional membership organization; survey administration was inexpensive, respondent burden was low, data entry was minimal, and a reasonably high response rate was achieved in a short

period of time (63% in a 2-week period). Junior scientists in other disciplines and other professional membership organizations can apply our model of junior members organizing and developing workshops to address self-identified training needs with the support of the organization's leadership.

Although limitations exist to a cross-sectional survey like ours, our results may be informative to ASPO and its members because respondents were likely to include active members who would participate in ASPO and its activities. While it is not possible to draw inferences from cross-sectional survey data, many of our observations warrant further inquiry, particularly the differences in institutional support by gender and training. Gender patterns like this have been reported from surveys of scientists and engineers (4) and in academic medicine (5). Issues related to job equity and security, salary support, and research opportunities will be important to monitor as the tenure systems at many academic centers are under review. Ultimately, the systems that are adopted by academic institutions to support faculty, who is supported and, consequently, has a better chance of long-term success, are likely to influence who is available to lead and conduct research in cancer prevention and control. Whether and how institutions may change over time in their support of individuals and what could be done to ensure continued diversity among the professionals in the field are important to the future of cancer prevention and control. Our hope is that the information from our survey can be used to meet the career development needs of the future leaders in cancer prevention and control.

### Acknowledgments

We thank all the ASPO members and meeting registrants for participating in the survey. The authors also thank Judy Bowser and Heidi Sahel of the American Society for Preventive Oncology ([www.ASPO.org](http://www.ASPO.org)) for their assistance with identifying e-mail addresses for the survey. We also thank Garth Arnold and Bob Hartl of Group Health Cooperative, and Jerry Phipps of the University of Wisconsin, for their technical support of the Internet survey.

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# BLOOD CANCER DISCOVERY

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