

# UC Irvine

## UC Irvine Previously Published Works

### Title

Barriers to a Career Focus in Cancer Prevention: A Report and Initial Recommendations From the American Society of Clinical Oncology Cancer Prevention Workforce Pipeline Work Group

### Permalink

<https://escholarship.org/uc/item/34b951v4>

### Journal

Journal of Clinical Oncology, 34(2)

### ISSN

0732-183X

### Authors

Fabian, Carol J  
Meyskens, Frank L  
Bajorin, Dean F  
[et al.](#)

### Publication Date

2016-01-10

### DOI

10.1200/jco.2015.63.5979

### Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed

# Barriers to a Career Focus in Cancer Prevention: A Report and Initial Recommendations From the American Society of Clinical Oncology Cancer Prevention Workforce Pipeline Work Group

Carol J. Fabian, Frank L. Meyskens Jr, Dean F. Bajorin, Thomas J. George Jr, Joanne M. Jeter, Shakila Khan, Courtney A. Tyne, and William N. William Jr

## ABSTRACT

### Purpose

To assist in determining barriers to an oncology career incorporating cancer prevention, the American Society of Clinical Oncology (ASCO) Cancer Prevention Workforce Pipeline Work Group sponsored surveys of training program directors and oncology fellows.

### Methods

Separate surveys with parallel questions were administered to training program directors at their fall 2013 retreat and to oncology fellows as part of their February 2014 in-training examination survey. Forty-seven (67%) of 70 training directors and 1,306 (80%) of 1,634 oncology fellows taking the in-training examination survey answered questions.

### Results

Training directors estimated that  $\leq 10\%$  of fellows starting an academic career or entering private practice would have a career focus in cancer prevention. Only 15% of fellows indicated they would likely be interested in cancer prevention as a career focus, although only 12% thought prevention was unimportant relative to treatment. Top fellow-listed barriers to an academic career were difficulty in obtaining funding and lower compensation. Additional barriers to an academic career with a prevention focus included unclear career model, lack of clinical mentors, lack of clinical training opportunities, and concerns about reimbursement.

### Conclusion

Reluctance to incorporate cancer prevention into an oncology career seems to stem from lack of mentors and exposure during training, unclear career path, and uncertainty regarding reimbursement. Suggested approaches to begin to remedy this problem include: 1) more ASCO-led and other prevention educational resources for fellows, training directors, and practicing oncologists; 2) an increase in funded training and clinical research opportunities, including reintroduction of the R25T award; 3) an increase in the prevention content of accrediting examinations for clinical oncologists; and 4) interaction with policymakers to broaden the scope and depth of reimbursement for prevention counseling and intervention services.

*J Clin Oncol* 34:186-193. © 2015 by American Society of Clinical Oncology

## INTRODUCTION

Oncologists have and are expected to play a significant role in cancer prevention. Oncologist clinical and research careers that emphasize cancer prevention may take a variety of forms, requiring skill sets often not emphasized in traditional clinical oncology fellowships. These skills include risk and genetic counseling for unaffected high-risk individuals as well as those with cancer, knowledge of appropriate surveillance and prophylactic treatment of high-risk individuals, early- and late-phase primary

and secondary clinical prevention trial design, benign tissue sampling techniques for research purposes, knowledge of precancerous biology and experience with molecular biology techniques, and familiarity with epidemiology and biostatistics.<sup>1,2</sup> An oncology work force adequately trained in primary and secondary prevention is necessary for implementation of interventions already known to reduce cancer incidence, and a critical mass with training in prevention research is required for new discovery.<sup>3</sup> However, it is the opinion of many thought leaders that the number of oncologists engaged in cancer prevention

Carol J. Fabian, University of Kansas Medical Center, Kansas City, KS; Frank L. Meyskens Jr, University of California at Irvine, Irvine, CA; Dean F. Bajorin, Memorial Sloan Kettering Cancer Center, New York, NY; Thomas J. George Jr, University of Florida, Gainesville, FL; Joanne M. Jeter, University of Arizona, Tucson, AZ; Shakila Khan, Mayo Clinic, Rochester, MN; Courtney A. Tyne, Feinstein Kean Healthcare, Washington, DC; and William N. William Jr, The University of Texas MD Anderson Cancer Center, Houston, TX.

Published online ahead of print at [www.jco.org](http://www.jco.org) on November 2, 2015.

Reprint requests: 2318 Mill Rd, Suite 800, Alexandria, VA 22314; e-mail: [cancerpolicy@asco.org](mailto:cancerpolicy@asco.org).

Authors' disclosures of potential conflicts of interest are found in the article online at [www.jco.org](http://www.jco.org). Author contributions are found at the end of this article.

Corresponding author: Carol J. Fabian, MD, University of Kansas Cancer Center and Department of Internal Medicine, University of Kansas Medical Center, 3901 Rainbow Blvd, Kansas City, KS 66160; e-mail: [cfabian@kumc.edu](mailto:cfabian@kumc.edu).

© 2015 by American Society of Clinical Oncology

0732-183X/16/3402w-186w/\$20.00

DOI: 10.1200/JCO.2015.63.5979

activities, especially research, is dwindling. The reasons are uncertain, but according to a 2004 American Society of Clinical Oncology (ASCO) survey, 43% of oncologist respondents felt they were not adequately trained in prevention. Oncologists were also concerned about reimbursement for prevention services.<sup>2</sup> Only scant attention has been paid to future manpower needs in the area of cancer prevention, in contrast to cancer treatment,<sup>4</sup> although a few warning bells have been sounded.<sup>5,6</sup> Furthermore, the National Cancer Institute (NCI) R25T award, created in 1991 to support multidisciplinary mentors and trainees and their initial research efforts in cancer prevention research, was discontinued in 2013.<sup>7</sup>

With the widening gap between demand for oncology services and the supply of new oncology trainees, the proportion of oncologists working in prevention is not likely to increase in the near future without corrective action. According to a recent study by ASCO, the demand for oncology services in the United States is expected to grow by 40% over the next 10 years, but the physician workforce will increase by only 25%, generating a shortfall of  $\geq 2,500$  oncologists by 2025.<sup>8</sup> This may be a conservative estimate, given the recent information on oncology physician satisfaction, with 45% of  $> 1,000$  individuals completing a survey reporting burnout.<sup>9,10</sup> In 2012, the ASCO Cancer Prevention Committee identified the prevention research workforce as an issue of high priority, creating the Cancer Prevention Workforce Pipeline Work Group. The Cancer Prevention Workforce Pipeline Work Group initially reviewed data from the NCI, which in 2013 supported 30 training programs that had cancer prevention as a component. It was not clear how many of these trainees were oncology clinicians,<sup>11</sup> although representatives from the NCI commented that few physicians had enrolled in the NCI Cancer Prevention Fellowship program in the last several years.

In view of its charge to determine the interest level and perceived barriers to cancer prevention research or clinical practice harbored by oncology fellows, the work group undertook a survey of both oncology fellowship program directors and oncology fellows in the United States. The findings from this survey and next-step recommendations are reported here.

## METHODS

Separate surveys were created to be given to oncology fellows and their training directors to determine how they view careers in cancer prevention and identify potential barriers. These surveys contained similar questions adapted for the audience. Both surveys were first piloted at two of the work group member institutions: University of Kansas Medical Center and the Chao Family Comprehensive Cancer Center at the University of California Irvine. The final survey was approved by the ASCO Professional Development Committee. The training program director survey (Fig 1) was distributed as a hard copy at the ASCO training program fall 2013 retreat, at which 70 directors representing diverse sites of fellowship training across the United States were in attendance. The fellow survey questions (Fig 2) were incorporated into the ASCO annual in-training examination survey, given to 1,634 fellows and administered from February 25 to 26, 2014. Results were compiled by ASCO staff.

## RESULTS

### Training Program Director Survey Results

**Demographics of training directors and training programs.** Forty-seven (67%) of 70 training directors in attendance responded to the

survey. Fifty-seven percent of these were male, and the average age was 49 years (range, 33 to 71 years). Institutions represented are listed in Appendix Table A1 (online only). The average number of fellows within the fellowship programs represented was 13 (range, four to 42). Forty-three percent of training director respondents stated that their institution had an NCI-funded cancer center support grant, and for 36.2%, this was a comprehensive cancer center grant. Responding directors estimated that at least 46% of fellows had formal clinical or translational research training as part of the program (Clinical and Translational Science Award, Center for Transdisciplinary Research on Energetics and Cancer, K07, K12, K23, K30, KL1 or 2, R25, T32, T35, T90 or TL1, or other). A majority (70%) of oncology program training directors estimated that between 11% and 50% of their fellows embarked on a career in academic medicine, with the most frequent category of response being 11% to 25%.

**Training director estimates of fellow interest in careers in cancer prevention.** Whether their fellows went into academic medicine or private practice, there was agreement among training directors ( $> 85\%$ ) that  $\leq 10\%$  would embark on a career with a focus in cancer prevention (including cancer genetics and risk counseling). For fellows interested in having a research career in cancer prevention, program directors thought the interest was likely to be organ specific (yes, 48.9%; unsure, 31.9%).

**Training director opinions as to barriers to careers in academic medicine or cancer prevention.** Training directors cited difficulties in obtaining research funding (63.8%) as the most frequent barrier to an academic research career in general. Lack of interest and lower compensation were listed as barriers to a career in academic medicine by  $> 50\%$  of program director respondents, and lack of research training and lower quality of life as a result of competing pressures were cited by  $> one third$ . Additional barriers to a career in cancer prevention included lack of mentors, cited by  $> 85\%$  of respondents; lack of training opportunities for clinicians, unclear career path, and unclear economic future, cited by  $> two thirds$ ; and lower importance relative to cancer treatment, cited by 47%. Frequent comments were that institutional cancer prevention programs were often headed by PhDs rather than MDs and that teaching or mentoring, if performed, was not done by clinicians, thus providing limited numbers of role models.

**Opportunities for addressing barriers.** The survey also queried training directors on what types of materials would be most helpful to them in fellowship training in cancer prevention. Online modules dealing with risk prevention and screening, both in general and for specific organ sites, were thought to be the single most helpful training tool, but workshops at national meetings were also thought to be moderately helpful. In terms of what ASCO could do to raise interest in cancer prevention, all of the following were thought to be worthwhile by a majority of respondents: 1) a toolkit for program directors, 2) prevention educational sessions at ASCO meetings, 3) special sessions at ASCO meetings focused on what oncology careers emphasizing cancer prevention might look like, and 4) ASCO-sponsored mentored postdoctoral fellowships. Of these, the highest rating was for development of a toolkit.

### Oncology Fellow Survey Results

Of the 1,634 fellows taking the examination, 1,306 (80%) completed the fellow survey prevention questions. An overwhelming majority (1,202) of the respondents were currently in a training program. Of the 1,233 fellows providing demographic data, 47% were female,

Figure 1. Training Program Directors Survey Questions

The purpose of this survey is to ascertain current hematology/oncology training programs' offerings in the field of cancer prevention and cancer prevention research, in terms of curricula, training grants, and mentoring. For the purposes of this survey, cancer prevention research includes research into any or all of the following areas: cancer risk identification and reduction, genetics and familial risk assessment, biomarker identification, and screening/surveillance. The results of this survey will help ASCO understand and address training needs and workforce trends in this area.

1. Name \_\_\_\_\_  
2. Age \_\_\_\_\_

3. Gender ☐ Male ☐ Female

4. Institution \_\_\_\_\_

5. Do you have a NCI-funded Cancer Center Support Grant? ☐ Yes ☐ No ☐ Not Sure

6. Is your institution a NCI-funded Comprehensive Cancer Center? ☐ Yes ☐ No ☐ Not Sure

7. What is the average number of total fellows in your fellowship training program at one time?

8. What percentage of your fellows would you estimate embark on an academic career (versus private practice)?  
☐ < 5% ☐ 5-10% ☐ 11-25% ☐ 26-50% ☐ > 50%

9. Of those who enter private practice, what percentage would you estimate have a focus in cancer prevention (which includes cancer genetics & risk counseling) as part of their clinical practice?  
☐ < 5% ☐ 5-10% ☐ 11-25% ☐ 26-50% ☐ > 50%

10. Of those entering an academic setting, what percentage of your fellows would you estimate are interested in cancer prevention as a research focus?  
☐ < 5% ☐ 5-10% ☐ 11-25% ☐ 26-50% ☐ > 50%

11. If a fellow were to be interested in a cancer prevention research career, would that interest be focused around a specific organ site or cancer prevention in general?  
☐ Organ specific ☐ General cancer prevention ☐ Not sure

12. What would you say are major barriers to an academic career? (Check all that apply)

- ☐ Lack of interest
- ☐ Lack of research training
- ☐ Lower compensation
- ☐ Perceived difficulty in obtaining funding for research
- ☐ Perceived lower quality of life because of competing pressures
- ☐ Too little time for mentorship by senior faculty
- ☐ Other (please specify): \_\_\_\_\_

13. What additional barriers are there to a career in cancer prevention? (Check all that apply)

- ☐ Few mentors
- ☐ Lack of relevant training opportunities for clinicians in cancer prevention
- ☐ Not thought to be very important relative to cancer treatment
- ☐ Unclear what a career in cancer prevention might encompass
- ☐ Unclear career path/economic runway
- ☐ Other (please specify): \_\_\_\_\_

14. What part of your oncology fellowship training program is dedicated to screening, risk assessment, and prevention?

☐ < 5% ☐ 5-10% ☐ 11-25% ☐ 26-50% ☐ > 50%

15. How is clinical risk and cancer prevention training accomplished during the oncology fellowship?

	1 Never	2	3	4	5 Frequently
Clinical rotations with limited formal didactic instruction					
Didactic instruction from experts at the institution in epidemiology & risk factors					
Didactic instruction from experts at the institution in genetic & risk counseling					
Didactic instruction from experts at the institution in screening					
Didactic instruction from experts at the institution in prevention interventions					
Offering online courses in cancer prevention (i.e. ASCO)					
Offering reimbursement for intensive courses (i.e. City of Hope, Fox Chase, NCI)					
Other (please specify)					

16. Compared to training in cancer treatment research, how well prepared do you think your fellows would be to embark on a career in cancer prevention in general?

☐ 1-Never ☐ 2 ☐ 3 ☐ 4 ☐ 5-Frequently

17. Compared to training in cancer treatment research, how well prepared do you think your fellows would be to embark on a career in cancer prevention in a common single organ site (i.e. breast, colon, prostate)?

☐ 1-Never ☐ 2 ☐ 3 ☐ 4 ☐ 5-Frequently

18. What materials would be helpful to you in training fellows in cancer prevention?

	1 Never	2	3	4	5 Frequently
Online modules on specific topics with general area of cancer prevention					
Online modules dealing with risk, prevention, and screening for specific organ sites					
Webinars					
Cancer Risk Counseling & Prevention Workshops at national meetings (ASCO, ASPO, AACR, Frontiers in Cancer Research)					

19. What could ASCO do to increase interest in cancer prevention as a clinical or academic career amongst oncologists?

- ☐ Sponsor mentored postdoctoral fellowships in cancer prevention
- ☐ Develop a toolkit for training program directors
- ☐ Provide more educational sessions at ASCO in cancer prevention (include natural products, behavioral interventions such as weight loss, tobacco cessation)
- ☐ Provide special sessions for fellows on what a career in cancer prevention might look like
- ☐ Other (please specify): \_\_\_\_\_

20. Do you have a formal clinical and/or translational research training program in your institution that can be accessed by students interested in oncology and by oncology fellows? Examples of NIH-supported training programs include:

- CTREC (prior K30) and R25 (provide support for training content)
- KL2, K07, K12, K23, KL1, T32, T35, T90, TL1 (provide salary support for mentored trainees)

If yes, please indicate the funding source of your program.

☐ No ☐ I do not know ☐ Yes: Funding source \_\_\_\_\_

**Fig 1.** Training program director survey questions. AACR, American Association for Cancer Research; ASCO, American Society of Clinical Oncology; ASPO, American Society of Preventive Oncology; CTREC, Center for Transdisciplinary Research on Energetics and Cancer; NCI, National Cancer Institute; NIH, National Institutes of Health.

Figure 2. Oncology Fellows Survey Questions

1. Are you considering a career in research? (check one) ☐ Yes ☐ No ☐ Not Sure

2. Did you have any research exposure prior to starting your fellowship? (check one)  
☐ Yes-substantial ☐ Yes-limited ☐ No

3. What would you say are major barriers to an academic career? (Check all that apply)  
☐ Lack of interest  
☐ Lack of research training  
☐ Lower compensation  
☐ Perceived difficulty in obtaining funding for research  
☐ Perceived lower quality of life because of competing pressures  
☐ Too little time for mentorship by senior faculty  
☐ Other (please specify): \_\_\_\_\_

4. What barriers are there to a career in cancer prevention? (Check all that apply)  
☐ Unclear what a career in cancer prevention might encompass  
☐ Unclear career path/economic runway  
☐ Not thought to be very important relative to cancer treatment  
☐ Lack of relevant training opportunities for clinicians in cancer prevention  
☐ Few mentors  
☐ Other (please specify): \_\_\_\_\_

5. Would you consider a clinical career with a focus in cancer prevention and risk counseling if means of reimbursement were clearly identified?  
☐ Unlikely  
☐ Possibly in combination with cancer treatment—likely to be a single organ site based  
☐ Possibly in combination with cancer treatment—likely to be multiple organ site based  
☐ Possibly as the predominant clinical focus with minimum emphasis on cancer treatment

6. If you are considering an academic career with research as a substantial component, would you consider cancer prevention as a focus of that research?  
☐ No ☐ Unlikely ☐ Possibly ☐ Likely ☐ Very likely

\*\*If you answered possibly, likely, or very likely to Question 6, please complete questions 7 and 8.\*\*

7. Please rate the following statements:

	1 Very little	2	3	4	5 Great deal
How much has a mentor influenced your decision?					
Would your cancer prevention research likely to be combined with cancer treatment practice?					

8. Would your cancer prevention research likely to be (select all that apply):  
☐ Directed to single organ site (i.e. breast, colon, lung, prostate, etc.)  
☐ Directed to multiple organ sites  
☐ Primarily laboratory based  
☐ Clinical trial only  
☐ Epidemiological or database research  
☐ Translational in the context of clinical trials with laboratory components  
☐ Unsure

Fig 2. Oncology fellow survey questions.

and the average age was 34 years (range, 26 to 63 years). Eighty-seven percent had had some research training before beginning their fellowship, but this training was substantial for only 26%. In general, fellows' responses were as predicted by the training directors (Table 1 lists comparisons).

Top barriers to an academic career in general were perceived difficulty in obtaining funding for research (64%) and lower compensation (61%). Perceived lower quality of life because of competing pressures, too little mentorship, and lack of research training were also listed as barriers by 34% to 38% of fellow respondents. Lack of interest in a research career was a major factor for only 16%. Top additional barriers to a career with a focus in cancer prevention were lack of clarity as to what a career in cancer prevention might encompass (55%), economic uncertainty (37%), and lack of mentorship (35%). Lack of importance relative to cancer treatment was listed as a factor by only 12%. Two thirds of fellows would consider a career with a focus in cancer prevention but generally only if combined with cancer treatment. Only 15% of those considering an academic career thought it was likely or very likely that they would consider cancer prevention as a focus of their research. Most considering an academic career reported a mentor had influence on their decision making. Clinical and translational trials were the top type of prevention research for those interested, followed by epidemiologic or database studies, with only 5% likely to select primarily laboratory-based prevention research. Many respondents reported they were unsure of what type of prevention research they might pursue.

## DISCUSSION AND WORK GROUP RECOMMENDATIONS

Given the concerns expressed in the survey regarding adequacy of prevention training, reimbursement, and research opportunities, we examined current curriculum requirements for prevention, available postfellowship prevention educational resources, reimbursement climate for clinical prevention services, and funding mechanisms available to young researchers.

### Prevention in Curriculum of Oncology Training Programs

Cancer prevention activities include cancer risk assessment and genetic counseling, behavioral modification to prevent new primary cancers or recurrence, prescribing and managing cancer prevention therapies, and developing methods to reduce long-term adverse effects of cancer treatment without increasing risk of recurrence. The Accreditation Council for Graduate Medical Education (ACGME) has published requirements and curricula for all accredited training programs.<sup>12-14</sup> For pediatric oncology, there is no formal curriculum mandating training in prevention of second malignancies or other long-term complications of treatment. Most pediatric programs use the Children's Oncology Group long-term follow-up guidelines for survivors of childhood, adolescent, and young adult cancers,<sup>15</sup> appropriate for the routine long-term management and assessment of

**Table 1.** Comparisons of Answers in Training Program Director Versus Medical Oncology Fellow Surveys

Variable	Training Program Director Respondents (n = 47; 67% of those queried)	Fellow Respondents (n = 1,306; 80% of those queried)
Median age (range), years	49 (33-71)	34 (26-63)
Female sex, %	43	47
NCI-funded cancer center support grant, %	43	NA
Formal research training in program, %	46.5	NA
Average No. of fellows in program (range)	13 (4-42)	NA
Interested in academic career, %	11-50 (70% of respondents)	43
Cancer prevention as focus in academic career, %	≤ 10 (85% of respondents)	15 (likely or very likely); 42 (possibly)
Organ specific, %	49	Approximately half
Cancer prevention as focus in private practice, %	≤ 10 (87% of respondents)	65 (would consider if combined with cancer treatment and means of reimbursement identified); 3 (prevention as predominant clinical focus)
Major barriers to research career (top five reasons in order), %	Difficulty obtaining funding (64) Lower compensation (57) Lack of interest (57) Lack of research training (40) Lower quality of life (34)	Difficulty obtaining funding (64) Lower compensation (61) Lower quality of life (38) Too little mentorship (35) Lack of research training (34) Lack of interest (16)
Additional barriers to cancer prevention research (five reasons in order), %	Few mentors (85) Lack of training opportunities for clinicians (70) Unclear career model (68) Unclear economic runway (66) Not important or relative to treatment (47)	Unclear career model (55) Unclear economic runway (37) Lack of training opportunities for clinicians (35) Few mentors (30) Not important or relative to treatment (12)
Portion of training program dedicated to risk, screening, or prevention, %	≤ 10 (86% of respondents)	NA
Most frequent type of instruction	Didactic by prevention experts and online courses	NA
Preparedness in prevention compared with cancer treatment	Not very well (87% of respondents)	NA
What area of prevention research most likely, %	NA	Clinical or translational trials (48) Epidemiology or database (31) Laboratory (5) Unsure (38)
Helpful training materials	Online modules on specific topics within general area of prevention (73% answered helpful or very helpful) Online modules dealing with risk, screening, or prevention for specific organ sites (75% answered helpful or very helpful)	
Top ways ASCO could help, %	Toolkit for training program directors (77) Special career sessions (70) More prevention education sessions at ASCO annual meeting (66) Sponsor-mentored postdoctoral fellowship in cancer prevention (52)	

Abbreviations: ASCO, American Society of Clinical Oncology; NA, not applicable; NCI, National Cancer Institute.

asymptomatic childhood, adolescent, and young adult cancer survivors. For general surgical oncology, none of the competencies included in the ACGME program requirements specifically address cancer prevention.<sup>16</sup> Prophylactic or surgical prevention interventions are not discussed, nor is management of acute and long-term effects associated with surgery that cancer survivors may experience. ACGME educational requirements for fellows training in adult hematology and oncology include a provision that they demonstrate medical knowledge and practice competence in prevention and survivorship, but details are lacking as to how training programs should comply.<sup>17</sup> Furthermore, the only prevention and survivorship competency requirements explicitly identified in the ACGME policies include genetic testing for high-risk individuals and cancer screening. Exposure to prevention and survivorship during medical oncology

training is variable.<sup>18</sup> Except in larger training programs, education on these topics may be relegated to didactic lectures or on-line materials. Both ASCO and the American Society of Hematology have recently provided more granular recommendations on curricular milestones for oncology trainees in the United States and Canada,<sup>19</sup> including expectations for cancer prevention and survivorship knowledge (Table 2). For individuals interested in pursuing a career in cancer prevention research, dual degrees (MD and PhD, MD and MPH, or MD and Masters of Clinical Research) may also be helpful.

The ASCO Cancer Prevention Workforce Pipeline Work Group recommends that ASCO join efforts to collaborate with ACGME and the American Board of Internal Medicine to increase emphasis on competency in prevention and survivorship in their training program accreditation requirements, in-service examinations, and maintenance



**Table 2.** ASCO and ASH Hematology-Medical Oncology Curricular Milestones Specific to Cancer Prevention and Survivorship (ASCO 2014)

Competency Category	Milestone	Specific Training Requirement to Be Met for Unsupervised Practice
Patient care	Demonstrates ability to effectively recognize and promote cancer prevention and control strategies and survivorship	Consistently promotes proven cancer prevention or control strategies and individual needs of cancer survivors and participates in cancer control and prevention strategies aimed at disparate populations
Medical knowledge	Demonstrates knowledge of, and indications for, genetic, genomic, molecular, and laboratory tests related to hematologic and oncologic disorders	Consistently demonstrates knowledge about molecular pathways; appropriate cytogenetic or molecular tests; and clinical genetic syndromes; including diagnosis and management of inherited or acquired common, rare, and complex disorders
Systems-based practice	Demonstrates ability to use and access information that incorporates cost awareness and risk-benefit analysis in patient or population-based care	Incorporates cost-awareness principles into standard clinical judgments and decision making, including use of screening tests

Abbreviations: ASCO, American Society of Clinical Oncology; ASH, American Society of Hematology.

of certification requirements. Other potential possibilities include supplemental awards to cancer center core grants to support pre- and postdoctoral training in cancer prevention, which could cover a range of activities including partial tuition coverage for Masters of Public Health training.

### **Mentorship**

In general, interest in academic medicine wanes as trainees progress through their residency.<sup>20</sup> The reasons for this are not completely clear, but financial considerations and debt play major roles.<sup>21</sup> Active mentorship, engagement in research, and publication of this research during the training period can increase the likelihood of retention of a trainee in academic medicine.<sup>21</sup> Increasingly, it is thought that a network of mentors, with skills individualized to the mentees' needs, may be more critical than a single mentor.<sup>22</sup> Through earlier exposure to cancer prevention principles and career opportunities (eg, during medical school), formative impressions may be made that may follow trainees into cancer prevention career development paths, not only within oncology but also in surgery, primary care, obstetrics and gynecology, and pediatrics.

The work group recommends continued liaison with the ASCO Professional Development Committee to offer written materials and meet-the-experts sessions in the fellows lounge at the annual meeting. An easily updated mentor list should also be incorporated into an online toolkit for training directors. Inclusion of cancer prevention career paths with ASCO medical student initiatives is recommended. Reinstitution of the NCI R25T award mechanism, which provides funding for mentors, partial stipends for trainees, funds for trainee research, and travel funds, would likely generate both trainee and mentor interest. Finally, ASCO and/or NCI initiatives to fund short trainee externships with established cancer prevention researchers to learn skill sets specific to their research areas of interest should be encouraged.

### **NCI Federal Funding for Young Researchers**

The NCI offers training and career development grants. The career development award program (ie, K grants) are intended for individual clinical investigators building toward an independent research career and are of particular interest to young investigators, including those potentially interested in cancer prevention research.<sup>23</sup> An evaluation of the K award portfolio (K01, K07, K08, K11, K22, K23, and K25) was undertaken by the NCI in 2012 primarily to assess whether and how K awards affected awardees' future research careers.<sup>13</sup> More than half of K awardees were MDs, with medical

oncology and hematology in the top three medical specialties. K awardees were more likely to pursue an academic career, with more subsequent grants and publications than nonawardees. However, only 14% of institutions received the majority (60%) of awarded K grants.<sup>13</sup> Thus, NCI-funded career development awards may not be accessible to the broad base of trainees potentially interested in cancer prevention research careers.

The work group recommends a more granular review of the NCI funding portfolio to assess how much research funding is currently being provided to clinical trainees with an interest in cancer prevention and can work with the NCI to identify special funding opportunities or incentives such as loan repayment. Awareness of prevention-focused funding opportunities can be increased by listing them in the training program director toolkit and by having clinical research mentors available at the annual meeting in the fellows lounge. Grant-writing resources, prevention research methodology, and updated lists of mentors available for long and short externships in cancer prevention should also be included in the toolkit.

### **Increasing Prevention and Survivorship Competencies for Practicing Oncologists**

Although there are oncologists who have as their primary focus risk assessment and genetic counseling, they are relatively rare. More often, in the current workforce, oncologists combine cancer treatment with cancer risk and genetic counseling practices. These individuals often specialize in a single organ or multiple closely related organ sites and have had special postdoctoral training in cancer genetics and risk counseling. Continuing medical education offerings in this area should be ongoing and include the spectrum of services involved in risk assessment and counseling, genetic testing, and postassessment decision making regarding surveillance and preventive therapy. ASCO has developed education on cancer prevention topics, both as part of its ASCO University learning modules library and as part of the ASCO annual meeting education and scientific sessions, available online at the ASCO University Web site. In addition, ASCO has authored position papers on prevention topics of high interest, such as obesity.<sup>24</sup> ASCO has also released a cancer prevention and screening maintenance of certification module as well as a tobacco cessation maintenance of certification module. In 2014, ASCO University released a highly successful multimodule cancer genetics program, designed specifically to increase providers' knowledge in the area of hereditary cancer genetics. In addition to educational opportunities, cancer program standards should include prevention measures relevant to all

practicing oncologists. Sources for information include National Comprehensive Cancer Network Guidelines, ASCO's Quality Oncology Practice Initiative, and the Commission on Cancer Hospital Accreditation Program.<sup>25-27</sup>

The work group recommends that ASCO expand and maintain ASCO-sponsored education in cancer prevention, including an online portfolio of general and organ site-specific prevention topics, and that prevention topics be fully integrated into treatment and survivorship education. The work group will work with the education committee to ensure prevention educational sessions and topics of high interest are cross referenced with the prevention track and appropriate disease-specific tracks, an effort that was initiated during the 2015 ASCO Annual Meeting planning process. ASCO should also work with other organizations to ensure that prevention is integrated into early career professional development, including research and grant-writing training workshops such as the American Association for Clinical Research/ASCO Vail Methods Workshop.

### **Financial Implications of Prevention Activities in Clinical Practice**

From a coverage and reimbursement perspective, the Affordable Care Act has broadly outlined a group of core services called essential health benefits, which must be offered by individual and group insurers. These benefits include some cancer preventive services (colon and cervical cancer screening, mammography, and human papilloma virus vaccination) that are to be provided with no copay.<sup>28</sup> However, the law is unclear on whether coverage for follow-up diagnostic tests or coverage without deductibles or copays must be included and gives states leeway in interpretation and implementation, leading to patchwork coverage.<sup>29</sup> Medicaid beneficiary data suggest that even these simple preventive screenings are unlikely to be routinely adopted unless reimbursement for office visits is increased commensurate with the time it takes for providers to explain the necessity for these procedures to their patients<sup>30-32</sup> or arrange a follow-up procedure after a positive screen.<sup>33</sup> There is uneven commercial coverage for risk and genetic counseling and genetic testing. Counseling time, if covered, is often poorly reimbursed.<sup>34</sup> The complexity of risk and genetic counseling, poor reimbursement for counseling time, and relative scarcity of qualified counselors too often result in lack of referral for testing.<sup>35</sup> A recent study from Michigan reported only half of women with breast cancer age < 50 years received genetic counseling and testing, citing lack of referral or insurance issues as the primary reasons for this shortcoming.<sup>34</sup> The advent of gene panel testing, with the increase in mutations of uncertain significance and deleterious mutations that are nonactionable or for which action is uncertain, will only serve to exacerbate the manpower problem.<sup>35,36</sup>

The work group recommends that the ASCO Cancer Prevention and Cancer Survivorship Committees continue to identify strategies to increase counseling for prevention and survivorship interventions as well as increase uptake of the interventions covered as essential health benefits. Furthermore, oncologists should be reimbursed for providing the counseling or intervention, if they choose to do so.

In summary, surveys of medical oncology fellows conducted on behalf of the ASCO Cancer Prevention Workforce Pipeline Work Group suggest interest in prevention as a focus for careers both in academic medicine and clinical practice, but little likelihood of uptake because of concerns regarding adequate training resources, mentorship, and reimbursement. Fellows favored a clinical or research career in which they could perform treatment as well as prevention activities.

**Table 3.** ASCO Cancer Prevention Research, Education, and Policy Recommendations

Recommendation
Optimize research funding by conducting assessment of NCI prevention research funding and increasing awareness of prevention-focused funding opportunities
Develop training and education resources, with priority given to creating ASCO-sponsored education in cancer prevention, developing training program director toolkit, increasing awareness of cancer prevention careers at ASCO annual meeting, and working to incorporate competencies in prevention and survivorship into ACGME training program requirements
Advocate for increased reimbursement by more fully including prevention reimbursement in ASCO policy efforts
Abbreviations: ACGME, Accreditation Council for Graduate Medical Education; ASCO, American Society of Clinical Oncology; NCI, National Cancer Institute.

Lack of clinicians as prevention role models was a significant deterrent. General barriers to a career in academic medicine were perceived difficulty in grant funding and reduced quality of life because of competing pressures. Training directors did not think their fellows were well trained in prevention relative to treatment. They were in favor of toolkits and integrated prevention sessions at ASCO.

The ASCO Cancer Prevention Workforce Pipeline Work Group plans several approaches, including: 1) assessment of the NCI cancer prevention funding portfolio for clinicians and efforts to increase funding opportunities; 2) reinstatement of the NCI R25T award mechanism to increase multidisciplinary mentorship and research training in cancer prevention; 3) continued offerings of ASCO-sponsored education in cancer prevention; 4) development of a cancer prevention toolkit for training program directors; 5) collaboration with ACGME and the American Board of Internal Medicine to increase emphasis on competency in prevention and survivorship in their training program accreditation requirements, in-service examinations, and maintenance of certification requirements; 6) efforts to improve awareness of early career professional development opportunities in prevention, including ASCO- and/or NCI-supported short externships with mentors in cancer prevention; and 7) efforts to increase the scope of prevention counseling and services covered under essential health benefits (Table 3). Survivorship in pediatric cancer and transitional care for adolescent and young adults should also be addressed separately.

### **AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST**

Disclosures provided by the authors are available with this article at [www.jco.org](http://www.jco.org).

### **AUTHOR CONTRIBUTIONS**

**Conception and design:** All authors

**Administrative support:** Courtney A. Tyne

**Provision of study materials or patients:** Carol J. Fabian, Frank L. Meyskens Jr

**Collection and assembly of data:** Courtney A. Tyne

**Data analysis and interpretation:** Carol J. Fabian, Frank L. Meyskens Jr, Dean F. Bajorin, Thomas J. George Jr, Joanne M. Jeter, Courtney A. Tyne, William N. William Jr

**Manuscript writing:** All authors

**Final approval of manuscript:** All authors



## REFERENCES

1. Zon RT, Goss E, Vogel VG, et al: American Society of Clinical Oncology policy statement: The role of the oncologist in cancer prevention and risk assessment. *J Clin Oncol* 27:986-993, 2009
2. Ganz PA, Kwan L, Somerfield MR, et al: The role of prevention in oncology practice: Results from a 2004 survey of American Society of Clinical Oncology members. *J Clin Oncol* 24:2948-2957, 2006
3. Umar A, Dunn BK, Greenwald P: Future directions in cancer prevention. *Nat Rev Cancer* 12:835-848, 2012
4. Erikson C, Salsberg E, Forte G: Future supply and demand of oncologists: Challenges to assuring access to oncology services. *J Oncol Pract* 3:79-86, 2007
5. Chang S, Cameron C: Addressing the future burden of cancer and its impact on the oncology workforce: Where is cancer prevention and control? *J Canc Educ* 27:S118-S127, 2012 (suppl)
6. Chang S, Collie CL: The future of cancer prevention: will our workforce be ready? *Cancer Epidemiol Biomarkers Prev* 18:2348-2351, 2009
7. Chang S: In memoriam: An appreciation for the NCI R25T cancer education and career development program. *Cancer Epidemiol Biomarkers Prev* 23:1133-1136, 2014
8. Yang W, Williams JH, Hogan PF, et al: Projected supply of and demand for oncologists and radiation oncologists through 2025: An aging, better-insured population will result in shortage. *J Oncol Pract* 10:39-45, 2014
9. Shanafelt TD, Gradishar WJ, Kosty M, et al: Burnout and career satisfaction among US oncologists. *J Clin Oncol* 32:678-686, 2014
10. Shanafelt TD, Raymond M, Kosty M, et al: Satisfaction with work-life balance and the career and retirement plans of US oncologists. *J Clin Oncol* 32:1127-1135, 2014
11. Nelson DE, Faupel-Badger J, Phillips S, et al: Future directions for postdoctoral training in cancer prevention: Insights from a panel of experts. *Cancer Epidemiol Biomarkers Prev* 23:679-683, 2014
12. Accreditation Council for Graduate Medical Education: ACGME program requirements for graduate medical education in pediatric hematology-oncology. [http://acgme.org/acgmeweb/Portals/0/PFAssets/2013-PR-FAQ-PIF/327\\_hematology\\_oncology\\_peds\\_07012013.pdf](http://acgme.org/acgmeweb/Portals/0/PFAssets/2013-PR-FAQ-PIF/327_hematology_oncology_peds_07012013.pdf)
13. Mason JL, Lei M, Faupel-Badger JM, et al: Outcome evaluation of the National Cancer Institute career development awards program. *J Cancer Educ* 28:9-17, 2013
14. Commission on Cancer: Cancer program standards 2012: Ensuring patient-centered care. <https://www.facs.org/~media/files/quality%20programs/cancer/coc/programstandards2012.ashx>
15. Children's Oncology Group: Long-term follow-up guidelines for survivors of childhood, adolescent, and young adult cancers (version 3.0). [www.survivorshipguidelines.org/pdf/ltfuguidelines.pdf](http://www.survivorshipguidelines.org/pdf/ltfuguidelines.pdf)
16. Accreditation Council for Graduate Medical Education: ACGME program requirements for graduate medical education in complex general surgical oncology. [www.acgme.org/acgmeweb/Portals/0/PFAssets/ProgramRequirements/446\\_complex\\_general\\_surgical\\_oncology\\_2016\\_1-YR.pdf](http://www.acgme.org/acgmeweb/Portals/0/PFAssets/ProgramRequirements/446_complex_general_surgical_oncology_2016_1-YR.pdf)
17. Accreditation Council for Graduate Medical Education: ACGME program requirements for graduate medical education in hematology and medical oncology (internal medicine). [https://www.acgme.org/acgmeweb/Portals/0/PFAssets/2013-PR-FAQ-PIF/155\\_hematology\\_oncology\\_int\\_med\\_07132013.pdf](https://www.acgme.org/acgmeweb/Portals/0/PFAssets/2013-PR-FAQ-PIF/155_hematology_oncology_int_med_07132013.pdf)
18. Halpern MT, Viswanathan M, Evans TS, et al: Models of cancer survivorship care: Overview and summary of current evidence. *J Oncol Pract* [epub ahead of print on September 9, 2014]
19. American Society of Clinical Oncology: Hematology-oncology curricular milestones: A collaboration of the American Society of Hematology and the American Society of Clinical Oncology. [www.asco.org/sites/www.asco.org/files/ho\\_curricular\\_milestones\\_4.18.14\\_final.pdf](http://www.asco.org/sites/www.asco.org/files/ho_curricular_milestones_4.18.14_final.pdf)
20. Straus SE, Straus C, Tzanetos K: International campaign to revitalise academic medicine: Career choice in academic medicine—Systematic review. *J Gen Intern Med* 21:1222-1229, 2006
21. Borges NJ, Navarro AM, Grover A, et al: How, when, and why do physicians choose careers in academic medicine? A literature review. *Acad Med* 85:680-686, 2010
22. DeCastro R, Sambuco D, Ubel PA, et al: Mentor networks in academic medicine: Moving beyond a dyadic conception of mentoring for junior faculty researchers. *Acad Med* 88:488-496, 2013
23. National Cancer Institute: Funding opportunities for training by award type. [www.cancer.gov/researchandfunding/cancertraining/funding/awardtype](http://www.cancer.gov/researchandfunding/cancertraining/funding/awardtype)
24. Ligibel JA, Alfano CM, Courneya KS, et al: American Society of Clinical Oncology position statement on obesity and cancer. *J Clin Oncol* 32:3568-3574, 2014
25. Denlinger CS, Carlson RW, Are M, et al: Survivorship: Introduction and definition—Clinical practice guidelines in oncology. *J Natl Compr Canc Netw* 12:34-45, 2014
26. American Society of Clinical Oncology: Quality Oncology Practice Initiative, measures summary, fall 2014: Manual submission. [http://qopi.asco.org/documents/Fall\\_2014\\_Measures\\_Summary-Manual\\_Submission\\_\(2\).pdf](http://qopi.asco.org/documents/Fall_2014_Measures_Summary-Manual_Submission_(2).pdf)
27. McNiff K: The Quality Oncology Practice Initiative: Assessing and improving care within the medical oncology practice. *J Oncol Pract* 2:26-30, 2006
28. Zhang SQ, Polite BN: Achieving a deeper understanding of the implemented provisions of the Affordable Care Act. *Am Soc Clin Oncol Educ Book* 2014:e472-e477, 2014
29. Haeder SF: Balancing adequacy and affordability? Essential health benefits under the Affordable Care Act. *Health Policy* 118:285-291, 2014
30. Halpern MT, Romaine MA, Haber SG, et al: Impact of state-specific Medicaid reimbursement and eligibility policies on receipt of cancer screening. *Cancer* 120:3016-3024, 2014
31. Williams WW, Lu PJ, Saraiya M, et al: Factors associated with human papillomavirus vaccination among young adult women in the United States. *Vaccine* 31:2937-2946, 2013
32. Brown ML, Klabunde CN, Cronin KA, et al: Challenges in meeting Healthy People 2020 objectives for cancer-related preventive services, National Health Interview Survey, 2008 and 2010. *Prev Chronic Dis* 11:E29, 2014
33. Green BB, Coronado GD, Devoe JE, et al: Navigating the murky waters of colorectal cancer screening and health reform. *Am J Public Health* 104:982-986, 2014
34. Anderson B, McLosky J, Wasilevich E, et al: Barriers and facilitators for utilization of genetic counseling and risk assessment services in young female breast cancer survivors. *J Cancer Epidemiol* 2012:298745, 2012
35. George R, Kovak K, Cox SL: Aligning policy to promote cascade genetic screening for prevention and early diagnosis of heritable diseases. *J Genet Couns* 24:388-399, 2015
36. Maxwell KN, Wubbenhorst B, D'Andrea K, et al: Prevalence of mutations in a panel of breast cancer susceptibility genes in BRCA1/2-negative patients with early-onset breast cancer. *Genet Med* 17:630-638, 2015

## AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

### Barriers to a Career Focus in Cancer Prevention: A Report and Initial Recommendations From the American Society of Clinical Oncology Cancer Prevention Workforce Pipeline Work Group

*The following represents disclosure information provided by authors of this manuscript. All relationships are considered compensated. Relationships are self-held unless noted. I = Immediate Family Member, Inst = My Institution. Relationships may not relate to the subject matter of this manuscript. For more information about ASCO's conflict of interest policy, please refer to [www.asco.org/rwc](http://www.asco.org/rwc) or [jco.ascopubs.org/site/ifc](http://jco.ascopubs.org/site/ifc).*

**Carol J. Fabian**

**Research Funding:** DSM (Inst), Lignan Research (Inst)

**Frank L. Meyskens Jr**

**Stock or Other Ownership:** Cancer Prevention Pharmaceuticals (co-founder and member of the Scientific Review Board. No fiduciary obligations.)

**Patents, Royalties, Other Intellectual Property:** Patents (Inst; several patents related to chemoprevention usage of eflornithine and polyamine metabolism in a number of malignant and nonmalignant conditions. Jointly held by institution and Cancer Prevention Pharmaceuticals)

**Travel, Accommodations, Expenses:** Cancer Prevention Pharmaceuticals

**Dean F. Bajorin**

**Travel, Accommodations, Expenses:** Merck, Genentech/Roche

**Thomas J. George Jr**

**Consulting or Advisory Role:** Bayer

**Research Funding:** Bayer (Inst), Bristol-Myers Squibb (Inst)

**Joanne M. Jeter**

**Honoraria:** Genentech

**Consulting or Advisory Role:** Genentech

**Shakila Khan**

No relationship to disclose

**Courtney A. Tyne**

**Employment:** Feinstein Kean Healthcare

**William N. William Jr**

**Research Funding:** Astellas Boehringer Ingelheim

*Appendix***Table A1.** Institutions of Program Director Survey Respondents

Institutions Represented
Baylor University Medical Center, Dallas, TX
Baystate Medical Center, Springfield, MA
Beth Israel, New York, NY
Carter Medical Center, Miami, FL
Columbia University, New York, NY
Georgetown University, Washington, DC
Gundersen Health Systems, La Crosse, WI
Howard University Hospital, Washington, DC
John H. Stroger Hospital of Cook County, Chicago, IL
Marshall University School of Medicine, Huntington, WV
Mayo Clinic, Rochester, MN
MD Anderson Cancer Center, Houston, TX
Medical University of South Carolina, Charleston, SC
Mount Sinai Medical Center, New York, NY
NCC–Walter Reed National Military Medical Center, Bethesda, MD
NSLIJ/Lenox Hill Hospital, New York, NY
Ochsner Health System, Jefferson, LA
Oregon Health Sciences University, Portland, OR
Oklahoma University Health Sciences Health Center, Oklahoma City, OK
Penn State Hershey Cancer Institute, Hershey, PA
Providence Health and Services, Renton, WA
San Antonio Military Medical Center, San Antonio, TX
Scripps Clinic, San Diego, CA
Staten Island University Hospital, New York, NY
University of Massachusetts Medical Center, Worcester, MA
University of California Davis, Davis, CA
University of California Irvine, Irvine, CA
University of Chicago, Chicago, IL
University of Cincinnati, Cincinnati, OH
University of Florida, Gainesville, FL
University of Louisville, Louisville, KY
University of Northern Carolina, Chapel Hill, NC
University of Ottawa, Ottawa, Ontario, Canada
University of Penn Medical Center/University of Pittsburgh, Pittsburgh, PA
University of South Florida and Moffitt Cancer Center, Tampa, FL
University of Tennessee, Knoxville, TN
University of Utah, Salt Lake City, UT
University of Vermont, Burlington, VT
University of Virginia, Charlottesville, VA
Vanderbilt University, Nashville, TN
Wake Forest University, Winston-Salem, NC
West Virginia University, Morgantown, WV
Yale University, New Haven, CT
Abbreviations: NCC, National Capital Consortium; NSLIJ, North Shore–Long Island Jewish.