



Published in final edited form as:

Cancer Epidemiol Biomarkers Prev. 2009 September ; 18(9): 2348–2351. doi:
10.1158/1055-9965.EPI-09-0664.

The future of cancer prevention: will our workforce be ready?

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Keywords

cancer prevention; workforce; training; education

At no other time in our recent history has the need for cancer prevention been more urgent. World-wide, cancer is poised to overtake heart disease as the leading cause of mortality (1). In the U.S., where cancer mortality rates are gaining on those of heart disease (2), recent reports project serious shortages by 2020 of oncology health care providers available to treat and manage the care of those afflicted with cancer (3–4). These concerns have been brought to national attention by a 2007 Association of American Medical Colleges report (5) commissioned by the American Society for Clinical Oncologists (ASCO), and the standing ASCO Workforce Advisory group that developed ASCO's Workforce Strategic Plan (6). At the national level, the *National Cancer Policy Forum* of the *Institute of Medicine* convened a meeting last year in Washington, DC, to assemble leaders and stakeholders in order to summarize challenges facing the oncology workforce, to identify potential solutions, and to discuss policy implications. Although many effective plans have been proposed already, throughout these deliberations and in the workforce reports published to date, no role for prevention has been described.

Excluding cancer prevention activities from strategic planning becomes a critical missed opportunity to alleviate the projected burden of cancer on the public health and its oncology workforce. Indeed, the impact of cancer prevention activities would be substantial. Scholarly analyses estimate that nearly two-thirds of new cancers could be prevented by successful interventions against tobacco use and obesity (7). Other efforts in primary cancer prevention could increase those numbers. For example, primary prevention of cancer can result from reduced exposure to ionizing (e.g., x-rays, radon) and ultraviolet radiation (e.g., sunlight, tanning beds), and from protection against infection either by bacteria (e.g., *Helicobacter pylori*) or by cancer-related viruses (e.g., human papillomavirus, hepatitis B virus, Epstein-Barr virus). Other primary prevention of cancer may result from the use of a variety of promising chemopreventive agents currently under intensive investigation such as thiazolidinedione drugs (pioglitazone, rosiglitazone) (8–9). Secondary cancer prevention strategies, such as skin cancer checks, screening mammography, fecal occult blood test, colonoscopy, and digital rectal exams aim to detect cancer at early stages when intervention and treatment are more effective and can result better survival and possibly in cure. While such prevention methods have been tested and validated for a variety of populations, uptake has not been completely achieved for all methods or in all populations, such that the numbers of cancers detected early could be increased further by removing barriers to screening for disadvantaged groups and by increasing compliance for less preferred but proven methods. These strategies

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¹The authors are supported in part by grant funds awarded to the Cancer Prevention Research Training Program at The University of Texas M. D. Anderson Cancer Center (NCI R25 CA57730 and NCI R25 CA56452, PI: Robert M. Chamberlain)

are particularly relevant for cancer survivors who require long-term surveillance because they have risk for recurrent cancer and greater risk of second primary cancers than healthy people have. Altogether, such prevention activities form the bedrock of clinical and public health practice in cancer prevention and control. However, these strategies are both proven and recognized, indeed, having already been incorporated into standard clinical practice, which raises two questions: 1) Why isn't cancer prevention central or even included in strategic planning to meet and minimize the impact of the future cancer burden on the health of the public? and 2) Given the shortage anticipated for the oncology workforce by 2020, does the cancer prevention workforce unknowingly face a similar shortage?

Exclusion of cancer prevention from oncology strategic planning

Many reasons, individually or in combination, may explain the absence of cancer prevention from discussions to address the projected workforce shortage in oncology care. Two potential reasons are unawareness or forgetfulness of the impact of prevention. Another reason could be that the organizers of strategic planning activities do not know people in cancer prevention or have excluded them intentionally. Organizers may have little interest in the benefit to be gained from cancer prevention or they may not be convinced that prevention is relevant to workforce issues in oncology. Alternatively, they may feel that involving cancer prevention would detract or overwhelm other issues and planning activities, or that prevention is just too complicated to include in discussion. Indeed, conducting an inventory of cancer prevention activities is a major task, given the broad and multi-disciplinary nature of the field, which could complicate the inclusion of cancer prevention activities in economic models for workforce projections. Whatever the reasons, and they are likely to be numerous, some are more plausible than others. Regardless, the relevant point is to bring cancer prevention into discussions in order to form the most effective plans for minimizing the future impact of cancer on the health of the public.

Evidence for a workforce shortage in cancer prevention

To answer the second question by demonstrating that “workforce demand” outpaces “workforce supply” requires knowledge of the current cancer prevention workforce (i.e., “supply”), as well as the current opportunities available and potential for growth in the field (i.e., “demand”). However, both are difficult to assess accurately for a variety of reasons. First, enumerating the individuals involved in cancer prevention is complex. Those in this field range widely in their training, from patient advocates trained on the job, to doctoral-level scientific investigators with post-graduate training, to clinicians with subspecialty expertise. Individuals in the field with professional degrees come from a variety of disciplines, none of which are exclusive to cancer prevention. Moreover, no degree programs in “Cancer Prevention” exist, nor are there specific credentialing bodies in cancer prevention and control through which individuals in cancer prevention can be counted. Some training and educational programs and funding agencies recruit and support scientists and practitioners specifically for careers in cancer prevention, but awards that support such programs may be difficult to distinguish easily from those that support other types of cancer training programs. Detailed characteristics of such programs are also largely inaccessible from funding agencies, except from the National Cancer Institute. For many programs, numbers of individuals supported are not available and whether graduates of such programs continue in careers in cancer prevention and control is also unknown. To complicate the task of enumerating those aiming for careers in cancer prevention further, far greater numbers of individuals work in the field without consciously identifying themselves as professionals in cancer prevention and control. As a result, many do not belong to professional membership organizations formed around preventing cancer, such as the *American Society for Preventive Oncology (ASPO)* and the *American Association for Cancer Research (AACR)*. These organizations annually convene scientific meetings on cancer

prevention research and practice that serve the needs of professionals in the field, scientists and clinical practitioners, but their members and meeting participants account for only a fraction of those engaged in cancer prevention activities.

Another challenge to assessing workforce issues facing the field of cancer prevention and control is the range and diversity of settings where cancer prevention activities are based. First, cancer prevention research and practice occurs in cancer centers and hospitals, at university schools of public health and medicine, but also at schools of pharmacy and nursing. Other cancer prevention activities focusing on health promotion and screening happen in communities, based at local health clinics, for-profit-pharmacies, schools, and churches. These settings are diverse in structure, location, mission and goals, and staffing and are infrequently self-identified or recognized as centers or settings for cancer prevention activities, all of which complicate identifying cancer prevention job opportunities in such settings.

In spite of these workforce complexities, some limited evidence exists for increased “demand” in cancer prevention. For example, the field itself has grown over time, such that in 2008, AACR started a second journal on the topic, *Cancer Prevention*. Also, in AACR’s first cancer prevention journal, *Cancer Epidemiology, Biomarkers, and Prevention (CEBP)*, which serves as the official journal of ASPO, we found a four-fold increase over the five years from 1999 to 2004 in listings for Assistant Professor positions (10). Our follow-up to this initial observation appears to confirm that job opportunities in cancer prevention have increased since then, at least in academic settings. One force that drives the creation of such job opportunities is the requirement for cancer centers to have cancer prevention and control activities in order to achieve and maintain ‘comprehensive status’ as recognized by the NCI. For example, in 2007, St. Jude Children’s Research Hospital posted eight positions in *CEBP* (11), which undoubtedly enhanced its cancer center’s promotion to NCI comprehensive status in 2008. Overall, whether classical indicators of workforce shortages, such as insufficient numbers of qualified candidates applying for positions, or positions posted for long periods before being filled or withdrawn, are at play in cancer prevention and control is largely unknown. Also unknown are the topics and disciplines most needed by employers in cancer prevention and control, as these have not been systematically assessed to date. Such information is necessary for complete and accurate assessment of workforce demand, both current and future.

Evidence for an insufficient workforce “supply” in the field is also limited. The NCI has been a leader in supporting the recruitment and preparation of professionals for research and practice in cancer prevention through specific funding mechanisms. In 1998, in the review of its cancer prevention and control science activities, “the scientific experts conducting these reviews noted a national shortage of cancer prevention and control researchers, and a pressing need for researchers educated in the new scientific paradigms that require collaborations with researchers in disparate disciplines” (12). Since then, expanded funding through five award mechanisms currently support 230 prevention-focused awards across the United States, including 36 R25T training programs and a series of individual career development awards [i.e., K-series, K07 (n=105), K05 (n=20), K22 (n=48), and K25 (n=21)] (13). Such awards result from free-market competition by talented individuals and well-resourced organizations that are scored in peer-review and funded through NCI, rather than from a prescribed plan for training and education of individuals in the field per se. While the cancer prevention ‘K’ awards currently support 194 individuals, the number of all individuals being prepared for careers in cancer prevention who are supported by the NCI or other funding agencies (e.g., Prevent Cancer Foundation, American Cancer Society, Susan G. Komen for the Cure) is not currently known. Whether this rate of preparing future professionals in cancer prevention and control is sufficient to meet current and future capacity and need in the field is not clear.

In spite of the complexities involved with assessing the cancer prevention workforce, there is some good news, albeit anecdotally, that interest for pursuing careers in cancer prevention and control appears to be thriving. At The University of Texas M. D. Anderson Cancer Center in the *Cancer Prevention Research Training Program*, we have had no difficulty each year filling up to 16 funded trainee slots on our NCI-funded R25 training program (CA057730) in cancer prevention over the past 17 years. In fact, we have had rigorous competition for each call for applications for both the pre-doctoral traineeships and the postdoctoral fellowships supported by this award. Also, free career training for junior scientists funded by the *Prevent Cancer Foundation* offered in conjunction with the annual ASPO meeting and organized by its junior members has been consistently well attended, with 75 to 90 individuals participating each year since 2000 (14). Unfortunately, whether the growth of jobs in cancer prevention and control is outpacing the recruitment and preparation of qualified individuals for those positions is not clear.

Nonetheless, as potential strategies to influence workforce issues are proposed to meet the future burden for the health care delivery system overall and specifically for oncology, it is critical to ensure that such efforts include and address issues unique to the research and practice of cancer prevention and control. To begin to prepare effective plans for the future workforce in cancer prevention and control, a better understanding is needed of the current status of the cancer prevention workforce and opportunities for employment and of the recruitment and preparation of those coming into the field. As a first step, we have planned a symposium for everyone interested in cancer prevention workforce issues.

Cancer Prevention Workforce Project and Symposium

On Saturday and Sunday, October 17 and 18, 2009, we will hold a symposium in Houston, Texas at The University of Texas M. D. Anderson Cancer Center to take initial steps to characterize the current state of cancer prevention workforce, to identify existing gaps, to anticipate needs, and to describe the roles of constituents. We will facilitate discussion between multiple stakeholders within cancer prevention and control in order to identify data resources and gather data about the cancer prevention workforce, both employed and in training, to describe issues and factors that influence the cancer prevention workforce and our ability to forecast future needs. Our goal for the symposium is to form constituent-specific recommendations published together as a series of related articles in a journal supplement for strategies to prevent workforce shortages and strengthen the field. Ultimately, our goal is to create a knowledge base and tools for planning the training of future generations of cancer prevention scientists, practitioners, and educators in order to meet the public's current and future needs in cancer prevention. For more information on the symposium, please visit our website.³

Summary

If the shortage of medical oncologists and oncology nurses becomes realized in 2020, its burden is not likely to be distributed evenly. Large and prestigious centers that can attract the best clinicians seeking careers in academic medicine will continue to be able to provide cutting-edge care to patients. However, other sectors of society will experience the greatest impact of the workforce shortage. For example, rural communities that already struggle to recruit health care providers will face even greater challenges to compete for fewer qualified oncology specialists available in 2020. Indigent and other disadvantaged groups will face similar problems. In the future, those who serve rural communities or special populations will have greater patient loads, particularly if oncology clinical practice continues to evolve away from

³<http://sites.google.com/site/cancerprevwfcBobChamberlain/>

treatment at tertiary care centers, and those without local oncology services will have to travel farther for their care. Not only will patient loads grow, the number of cases diagnosed at later stages, and therefore harder to treat and less likely to result in cure, will also increase if cancer prevention activities do not fully saturate such locations and populations.

In summary, this symposium and project focus on a vital issue that affects the continued and future success of cancer prevention and control, to minimize the burden of cancer on the health of the public and the clinicians who safeguard it. To prepare, we must initiate systematic and comprehensive assessment and provide recommendations now to ensure continued growth and adequate preparation of the cancer prevention workforce. Tools are needed to track cancer prevention trainees and to assess workforce needs by topic area and discipline, geographic location, type of institution, and other relevant characteristics. Such tools will facilitate future evaluation of both the adequacy of the numbers of individuals in training, and the best allocation of resources for training and education, and ensure that all efforts and resources are strategically aligned for maximum positive impact for cancer prevention. These recommendations and tools would be useful to policymakers and funding agencies for planning, to professional membership societies for recruiting and providing career development to their members, to educational institutions for teaching students and shaping curricula in relevant disciplines, and to training programs, cancer centers, and other health institutions for training and hiring future professionals in cancer prevention and control. Ultimately, to minimize the cancer burden on the health of the public and the workforce shortfall predicted for oncology care in 2020, our goal is to expand effective cancer prevention activities, in part by coordinating efforts to prepare the next generation of cancer prevention practitioners, scientists, and educators who will lead this work.

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