

What progress has been made on the cancer prevention agenda?

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The World Health Organization estimates that a vigorous program of prevention has the potential to reduce the overall cancer burden by up to 50 per cent. Some may question the exactness of that figure but a cancer control strategy must include prevention as a major component.

In order to avoid confusion we should first define terms. Primary prevention includes measures taken to prevent cancer in otherwise healthy people. Screening typically is referred to as secondary prevention. Tertiary prevention refers to measures taken to prevent recurrence of cancer in those who have already survived an episode of the disease.

Primary Prevention

With Ottawa's creation and funding this year of the Canadian Partnership Against Cancer (CPAC) to implement the Canadian Strategy for Cancer Control (CSCC), there is good reason to hope that the prevention agenda can be strengthened. The funding includes \$41-million for primary prevention over the next five years (more than 16 per cent of the total funds allocated). The money will be available whether programs have been initiated (British Columbia, Alberta, Ontario and Quebec), are beginning (Saskatchewan, Manitoba and Nova Scotia), or have not yet been planned.

Primary cancer prevention should be linked to other ongoing activities such as: prevention of other non-communicable diseases (diabetes, heart and lung); other programs already in place designed to control cancer risk factors (e.g. the tobacco-free initiative); and programs being developed (e.g. the National Nutrition Strategy). Recognizing this, the CSCC Primary Prevention Action Group held a series of planning meetings, culminating in a Summit. Representatives of programs aimed at other chronic diseases tried to put forward an integrated strategy, to the extent that the risk factors overlap. Table 1 lists these important risk factors, the proportion of cancer believed to be caused by them, and whether or not national programs are in place for their control.

TABLE 1 **RISK FACTORS AND NATIONAL CONTROL PROGRAMS**

Factor	PAR*	National programs in place
Diet	24%	No
Tobacco	22%	Yes
Genetic predisposition	20%	No
Infections	10%	No
Family history	8%	No
Alcohol	6%	Yes
Occupation	6%	Partial
Obesity	5%	No
Physical inactivity	4%	No
Sunlight	1% **	No
Environment	1%	No
Ionising radiation	<1%	Yes

Source: Miller AB. Planning cancer control strategies. Chronic Disease in Canada 1992; 13, Supplement 1; and authors' knowledge of current programs.

* PAR = Population Atttributable Risk, proportion of all cancer cases caused by the listed factor.

** Cutaneous melanoma only, but sunlight is also the main cause of non-melanoma skin cancer.

*** Figures total more than 100 per cent due to overlap.

The attributed risks in the table require some explanation. It is thought that some of the factors listed may initiate the cancerous transformation of cells (e.g. smoking, radiation, infections, some chemicals) but the transformed cells may not have acquired the capacity to invade surrounding tissues and spread to distant sites. Other listed factors (e.g. physical inactivity, obesity, diet), may not initiate transformation to the malignant state but instead may promote already transformed cells to acquire the capability for invasion and spread.

This hypothesized progression from the pre-invasive forms to invasive disease could occur over a variable period of time (or might not occur at all), but almost all cancers are thought to go through this transition.

It is apparent from the table that the cancer-specific risk factors of sun, occupation, environment and infections account for a smaller proportion of cancer than the other risk factors that overlap with other diseases. This large degree of overlap underlines the necessity for joint planning.

The tobacco-free initiative has perhaps had the most success of all existing programs, largely because when

the importance of second-hand smoke was recognized, public and then political support were assured for the necessary legislation. Further, the quest of governments for funds helped to create support for one of the most effective measures to reduce smoking: increased taxation. But it is clear that much more needs to be done, both in preventing the young from taking up smoking and in helping those addicted to tobacco to quit as soon as possible. Whether it will be possible to take the lessons from the tobacco control programs and apply them to the control of other risk factors is unknown. It is already clear from the increase in obesity that new societal-based approaches will be required, independently of individual decisions on healthy lifestyle choices. These include government action in supporting the necessary social changes including, but not limited to, providing facilities for physical activity and changing urban planning.

Obtaining the necessary public and political support for these social changes is hampered by the fact that although 40 per cent of all Canadians are destined to develop cancer sometime during their lifetime, we are not yet able to characterize individual risk with great precision. The future cancer patient is largely unknown, unrepresented and relatively inactive in espousing the necessary initiatives. Public advocacy for cancer prevention is absent, while advocacy for access to treatments and services is growing.

The situation is compounded by the fact that, except for tobacco control, research funds allocated for prevention have continued to be pitifully small. The thrust of research is still and understandably focused on the genetic and molecular origins of cancer but cancer prevention is not likely to ever reside in changing one's genetics. Prevention of cancer in Canadian adults will be a consequence of understanding and changing unhealthy lifestyles and avoidance of toxic environmental exposures that induce the cancer processes, thus modifying the individual genetic predisposition and cancer risk. Prevention is one of the most cost effective approaches towards overall mortality reduction.

Viruses are being recognized as initiating an increasing number of types of cancer and vaccines are becoming available to prevent infection with these viruses. An example is the family of Human Papilloma Viruses (HPV). Approximately 75 per cent of all sexually active Canadians will have at least one HPV infection in their lifetime and the majority will clear the infection on their own. However, some HPV subtypes may cause genital warts, or initiate cell changes that may progress to cancers of the cervix, vagina and vulva. Cervical

cancer is the second most common cancer in Canadian for women 20-44 years of age. Approximately 1,400 Canadian women are diagnosed with it each year, and 400 die as a result. Vaccines effective in preventing infection with two HPV high risk types (responsible for 70 per cent of cervical cancer) have now been developed, and further evaluation is ongoing to be certain that prevention of infection translates into long term cancer prevention. As well, the durability of protection remains to be determined. Vaccination programs are in the planning stages, and concern has been expressed that vaccination against HPV infection could divert attention from and cause problems with Pap testing. On the other hand, vaccination programs may result in a switch from sole reliance on Pap testing to surveillance for and prevention of HPV infection. In that case, control of all genital cancers would be enhanced.

Secondary Prevention

Screening populations for cancer or predisposition to the disease has been proven effective for relatively few types of cancer and, with a few notable exceptions, has been relatively ineffectively deployed by the provinces. This aspect of cancer control is dealt with elsewhere in the Report Card.

Tertiary Prevention

Some of the listed risk factors not only influence the initiation of the cancer process and promote its advance to the invasive form, but probably also hasten the recurrence of the disease after it has been brought under initial control. Examples include the adverse effect of continued smoking on the survival of those diagnosed with lung and breast cancer, the effect of high saturated fat consumption in promoting breast cancer recurrence and the effect of lack of physical activity in hastening recurrence in both breast and colon cancer survivors. Although the two manoeuvres are not mutually exclusive, it should be pointed out the effectiveness of dietary fat restriction on breast cancer mortality is a cost-effective buttress to adjuvant therapy with Herceptin and deserves much more attention than it receives.

The list of effective tertiary preventive interventions continues to grow. As a result, the American Cancer Society regularly publishes guidelines and detailed recommendations for tertiary prevention in cancer survivors. Regrettably, these have generally not been put into practice. Indeed, tertiary prevention has not usually been part of cancer control strategy and was not even mentioned in the CSCC mandate. It is also largely neglected by the formal cancer system. In fact, just as the knowledge builds indicating how lifestyle changes can prevent cancer from recurring, over-loaded cancer centres are discharging survivors from surveillance, without instructions or resources for tertiary prevention.

With rare exceptions, primary prevention trials testing

chemo-preventive agents or dietary changes have all been negative or have produced equivocal results of borderline significance. The outstanding exceptions have been in those instances where the agent or manoeuvre being tested has also been found capable of causing regression or preventing recurrence of invasive cancers. This has led to the suggestion that more emphasis should be placed on cancer prevention trials in cancer survivors, i.e., first find what is effective in tertiary prevention and then test that manoeuvre in high-risk healthy individuals.

Conclusion

We cannot afford to continue on the path we have taken in cancer control. Prevention, whether primary, secondary, or tertiary must come to the fore. Those of us who have seen the devastation wrought by cancer must be part of the solution, lest we become part of the problem by wrangling over resource allocation.

Recommendations

- 1 CACC welcomes the new focus on primary cancer prevention. We urge that all factions of disease interests support it, as money spent on common risk factors and prevention benefits all.
- 2 It is not clear what organizational structure will emerge to support prevention of cancer and other chronic diseases. However, it is clear that it must support collaboration, such as with the federal government's Integrated Healthy Living Strategy, and not be in opposition to other similar initiatives. Some of the cancer prevention funds need to support this collaboration, perhaps through the Chronic Disease Prevention Alliance of Canada.
- 3 Provinces with existing programmes should collaborate, learn from each other and advance their mutual interests. In this respect, CPAC's Primary Prevention Action Group could be the facilitator and provider of some seed funds, while leaving the control and funding of these programs to the provinces.
- 4 Several agents have been found to reduce the incidence of cancer in individuals at high risk (e.g. tamoxifen, raloxifene for breast cancer). However, these have not been generally prescribed because of concern over their side effects. More research is needed in order to understand the risk/ benefit equation, and to identify the appropriate target population for these effective new agents, and the barriers preventing their use.
- 5 Translational research must be one of the high priority items for the CPAC research allocation, to permit a more refined selection of individuals who would benefit from what we know in primary prevention.
- 6 Tertiary prevention needs the attention of cancer agencies so that patients are given the instruction and resources to avoid a recurrence.