Cancer Beliefs and Prevention Policies: Comparing Canadian Decision-Maker and General Population Views

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Purpose: The knowledge, attitudes, and beliefs of key policy influencers and the general public can support or hinder the development of public policies that support cancer prevention. To address gaps in knowledge concerning healthy public policy development, views on cancer causation and endorsement of policy alternatives for cancer prevention among government influencers (elected members of legislative assemblies and senior ministry bureaucrats), non-governmental influencers (school board chairs and superintendents, print media editors and reporters, and workplace presidents and senior human resource managers), and the general public were compared.

Methods: Two structured surveys, one administered to a convenience sample of policy influencers (government and non-governmental) and the other to a randomly selected sample of the general public, were used. The aim of these surveys was to understand knowledge, attitudes, and beliefs regarding health promotion principles and the priority and acceptability of policy actions to prevent four behavioral risk factors for cancer (tobacco use, alcohol misuse, unhealthy eating, and physical inactivity). Surveys were administered in Alberta and Manitoba, two comparable Canadian provinces.

Results: Although all groups demonstrated higher levels of support for individualistic policies (e.g., health education campaigns) than for fiscal and legislative measures, the general public expressed consistently greater support than policy influencers for using evidence-based policies (e.g., tax incentives or subsidies for healthy behaviors).

Conclusions: These results suggest that Canadian policy influencers may be less open that the general public to adopt healthy public policies for cancer prevention, with potential detriment to cancer rates.

Keywords: Cancer prevention; Healthy public policy; Decision-makers; Policy adoption; Public opinion

Introduction

Cancer is a leading cause of death worldwide, accounting for approximately 11 % of all deaths in 2008 [1], and it is anticipated that deaths from cancer worldwide will exceed 13 million by 2030 [2]. In Canada, approximately one out of four persons will die from cancer, while 41 % of women and 46 % of men will develop cancer in their lifetimes [3]. In addition to its social costs, the growing burden of cancer has major implications for healthcare services and resources for medical treatment and palliative care [3, 4]. Primary prevention of cancer is essential to mitigate this burden.

More than 30 % of cancer cases are preventable by modifying four major behavioral risk factors: tobacco use, alcohol misuse, unhealthy diet, and physical inactivity [5]. It is widely acknowledged that behavior change with respect to these risk factors contributes to a healthy lifestyle and cancer prevention. However, the determinants of these risk behaviors are embedded within physical, social, and economic environments [6]; environments that lend themselves to policy interventions. Effective cancer prevention thus requires a multi-faced, comprehensive approach that addresses the interplay between risk behaviors and environmental (physical, social, and economic) constraints and affordances [7]. Healthy public policy, independently or as part of comprehensive approaches, is a key strategy for addressing social determinants of health in prevention efforts [8]. For cancer prevention specifically, healthy public policies promote maintenance of long-term reductions in health risk behaviors [7]. Recent experiences from tobacco control have demonstrated that healthy public policies have been most effective in modifying social and structural environments to affect smoking behaviors and social norms [9, 10, 11, 12, 13]. Lessons from tobacco control are also increasingly applied to other areas, including obesity reduction and physical activity promotion. For example, school-based interventions and policies aimed at improving the availability of nutritious food and beverages in cafeterias, or at improving physical education curriculum, are widely used to improve health outcomes in children and youth [9, 14]. Similarly, active transportation research implements policies to improve community and street design as population-level strategies for increasing physical activity [15].

Across health issues and contexts, policy actors are individuals and groups who exercise agency to affect health policy advocacy and adoption, including all stakeholders in the policy process [16]. When policy actors are placed in positions of authority or embody representation with influence in multiple policy arenas (e.g., legislators, media editors, school board trustees, human resource managers, etc.), we refer to them as policy influencers. This term extends an early distinction in the literature to distinguish policy influencers as authorities or representatives who apply and validate their knowledge, attitudes, and beliefs (KAB) to motivate appropriate policy change [17, 18, 19]. Inside and outside of governments, policy influencers play a crucial role in shaping, reviewing, recommending, and implementing policies that impact public health; they can be advocates by drawing attention to health issues and can support policy initiatives upon implementation.

Recent research has revealed numerous instances where policy influencers have positively impacted policies for cancer prevention. Katikireddi et al. [20] recount the roles of various policy influencers (politicians, civil servants, media, the health sector, and industry leaders) in the adoption of minimum unit pricing for alcohol in Scotland. Henke et al. [21, 22] describe how

policy influencers in industry have implemented workplace cancer prevention policies across the tobacco, healthy eating, and physical activity domains through the CEO Gold Standard Program. Kolbe et al. [23] report on sample policies to encourage physical activity and healthy eating, and to discourage tobacco use, at schools throughout the USA. Research on the importance of media policy influencers is also increasing. In interviews with 36 top Australian public health practitioners (including experts in alcohol, obesity, and tobacco control), Chapman et al. [24] explained how participants viewed the reach of media as surpassing any academic forum for research dissemination and policy influence. Tan and Weaver [25] corroborate that finding quantitatively, reporting a significant, strong, and positive correlation between newspaper coverage and the introduction of bills in the legislature of 14 observed American states between 1989 and 2006.

Policy influencers' KAB have been associated with their support for healthy public policy, both in government and non-governmental roles. A recent systematic review of legislator voting determined—across risk factors—that knowledge (as to the severity of the problem) and attitude (as to the appropriateness of government intervention) were predictive of support for policy; normative pressure from constituents, lobbies, and other policy influencers also played a role [26]. A survey of elected Canadian politicians at the federal and provincial levels found that knowledge of the health risks of tobacco and positive attitudes about government interventions for health promotion (across healthy eating, physical activity, and alcohol reduction domains) were associated with increased support for tobacco control policies [27]. As a particularly salient example of how beliefs influence policy in community settings, religious school board officials in Alberta, Canada, controversially upheld a ban on human papillomavirus vaccination in nine publically funded Catholic School Districts over a 4-year period [28]. Finally, McCauley et al. [29] analyzed a national media survey of the USA, finding that the setting of news priorities, framing of stories, and selection of sources and resources differed across age, gender, and ethnicity, which they defined as a proxy for social group attitudes and beliefs.

The application of behavioral science perspectives to the process of developing healthy public policy for cancer prevention allows public health practitioners to address the knowledge, attitudes, and beliefs of policy influencers as a channel for advocacy and action [26]. Knowledge, attitudes, and beliefs appear to have a complementary, but differential impact on healthy public policy uptake. Knowledge is a necessary, but insufficient condition for policy support. Public health knowledge utilization research is particularly concerned with the instrumental, conceptual, and symbolic considerations for knowledge mobilization in the policy process [27, 30, 31, 32]. For cancer prevention, policy influencers must agree that cancer can be prevented and commit to being partners in the task of taking action [1]. Political commitment to implementing policies for cancer prevention thus requires knowledge of the issue as well as evidence of policy effectiveness and sustained public benefit. Attitude, as positive or negative evaluation of healthy public policy, is central to the issue of political commitment [26, 33]. Cohen [34] demonstrated experimentally that attitudes serve the social function of self-identification with a group, by showing that research participants' attitude toward hypothetical policy proposals shifted according to the political ideology attributed to them. Political ideology about healthy public policy, in turn, is founded on policy influencers' sets of beliefs; specifically, individual versus societal attribution of responsibility for cancer prevention [35]. Moreover, beliefs as ideological constructs inform social group orientation and thus engender the positive or

negative attitudes that drive political commitment [33]. Policy influencers are also influenced by the knowledge and beliefs of the general public [25, 26, 36]. Public support focuses attention on an issue and generates momentum to move prevention-focused policies forward [37]. Strong public opinion around a policy issue is also a determinant of the implementation and sustainability of healthy public policies [38].

In terms of cancer prevention KAB of the general public, systematic longitudinal research with the launch of the National Cancer Institute Health Information National Trends Survey (HINTS) in the USA has indicated high levels of knowledge for tobacco reduction and improved nutrition, but less familiarity with decreasing alcohol use, physical activity, maintaining a healthy body weight, and especially participation in screening initiatives [39, 40]. A recent scoping review of 200 studies on public attitudes toward government intervention for cancer prevention across the four risk factors found overall high support for government intervention for tobacco control, healthy eating, and physical activity, with more variable levels of support for alcohol control [41]. Less support for alcohol control was also found in the Canadian Addictions Survey, which showed a negative relationship between individual alcohol use and support for alcohol control policies [42]. Across the studies overall, Diepeveen et al. [41] found that attitudes varied across risk factors (as previously noted), with the intrusiveness of the intervention (less intrusive interventions garnering more support), with the stage of implementation (interventions becoming more acceptable over time), and with the target of the intervention (children and businesses being more acceptable than individual adults). Niederdeppe et al. [35] and others have investigated the nature of ideological beliefs underpinning these attitudes, demonstrating that framing cancer prevention as a societal versus individual responsibility affects positive or negative attitudes toward healthy public policy in various arenas [27, 34, 35, 43, 44, 45, 46].

Gathering public and policy influencer data on KAB provides an opportunity to create and disseminate evidence for policy change by gleaning information on priorities and barriers for implementing policies [47, 48, 49]. While interest in the area is growing, there remains little research that has described both policy influencers' (inside and outside of governments) and the public's attitudes toward specific prevention-oriented policy interventions designed to change four behavioral risk factors for cancer: tobacco use, alcohol misuse, unhealthy eating, and physical inactivity. Further, no extant research has explicitly compared government policy influencers (elected members of legislative assemblies and senior ministry bureaucrats) and non-governmental policy influencers (school board chairs and superintendents, print media editors and reporters, and workplace presidents and senior human resource managers) with respect to their views on cancer causation or their endorsement of policy alternatives for cancer prevention across these behaviors.

To address these gaps, we examined knowledge, attitudes, and beliefs regarding health promotion principles and the priority and acceptability of policy actions to prevent cancer across two surveys in the provinces of Manitoba and Alberta, Canada. One survey provided data for two groups (government and non-governmental policy influencers), while the other survey provided data for randomly selected members of the general public. Respondents to each survey were asked to provide their views on the acceptability and priority of policy actions concerning four behavioral risk factors for cancer: physical activity, healthy eating, tobacco use, and alcohol misuse. In the policy influencer KAB survey, three items directly measured the political views,

general attitude toward government intervention, and political party preference of respondents. This was an exploratory, descriptive study; thus, our team had no a priori hypotheses about group differences and compared all three groups to each other across the policy actions and behavioral risk factor domains. This paper will present and discuss the key findings from the surveys as evidence for developing healthy public policies that support cancer prevention aims.

Methods

Setting/Design

Two structured surveys, one administered to a convenience sample of government and non-governmental policy influencers and the other to a randomly selected sample of the general public, were administered in 2009. Each survey contained a subset of identical items that assessed the priority and acceptability of policy options for cancer prevention. Analyses of these items constitute the data for this study. Our team administered the policy influencer KAB survey. General public views were gathered through an Alberta-wide survey administered by the Population Research Laboratory (PRL) at the University of Alberta. The PRL survey included a compilation of questions from various academic researchers, government departments, and nonprofit organizations; one section contained the subset of the KAB survey questions utilized in the policy influencer survey.

Ethical approvals for both surveys were obtained from the Human Research Ethics Board at the University of Alberta. The complete policy influencer and general public KAB surveys are available upon request from the corresponding author.

Sample and Data Collection

Policy Influencers

A sampling frame for policy influencers was created prior to executing fieldwork. The frame included five settings and two Canadian provinces (Alberta and Manitoba)[1]: provincial government (i.e., all elected members of the legislative assembly and senior bureaucrats in each government ministry), municipal government (i.e., mayors and their chief administrative officers or equivalent), school board chairs and superintendents, print media companies (i.e., editors and health reporters), and workplaces with 500 or more employees (i.e., presidents and/or senior health and wellness managers or equivalent). Workplaces represented six sectors: construction; health care and social assistance; manufacturing; oil, mining and gas; professional and scientific services; and retail. Addresses for key policy influencers were obtained through: (a) Internet searches for provincial and municipal government, school boards, and print media information and (b) a purchased directory of Alberta and Manitoba workplaces. Two policy influencer subgroups were created for the purpose of group comparisons. The *government* subgroup represented population-level policy influencers and comprised respondents from municipal or

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[1] The two-province recruitment was employed to facilitate a future pre-post comparison of intervention (AB) and control (MB) provinces. The current paper does not focus on interventions, but reports on baseline differences between policy influencers and the general public.

provincial governments. The *non-governmental* subgroup represented settings-level policy influencers and included respondents from school, media, and workplace settings.

General Population

The sampling frame for this survey was composed of eight-digit telephone banks, which covered the Edmonton and Calgary metropolitan areas, as well as the rest of the province. The sample was generated from these banks by using a computer program to select, with replacement, a simple random sample of banks for each area. The sample was designed in two stages. In the first stage, households were selected with equal probability, from the database of banks in each area using a Random Digit Dialing (RDD). In the second stage, one respondent in each household was selected to participate in the survey using the following guidelines: (a) He/she must be 18 years of age or older; (b) if an adult male informant answers the phone and is willing to be interviewed, he is the respondent; (c) if an adult female informant answers the phone and there is an adult male present who is willing to be interviewed, interview the male as respondent. If the male refuses to be interviewed, and the female is willing, interview the female as respondent; (d) if an adult female informant answers the phone and there is no adult male present, choose her as the respondent; (e) if the quota for females is full and a female answers the phone, provided the household has eligible male, make an appointment to interview the male. This purposive within-household sample selection ensured an equal distribution of gender among respondents, by balancing the higher proportion of single-parent female-headed households in North American urban samples [50]. In their quasi-experimental comparison of purposive versus randomized within-household selection samples, Keeter et al. [51] found that ideological or opinion responses (i.e., KAB) did not vary significantly between the purposively and randomly sampled groups. Furthermore, the within-household sampling procedure was explained to informants and respondents as part of the survey administration to mitigate mind-set bias [52]. The total sample size of the survey was set at 1,200 households across Alberta, with a minimum of 400 respondents in Edmonton, 400 in Calgary, and 400 for the rest of the province.

Procedures

Policy Influencer Sample

A self-administered paper survey including information letter was mailed to the entire sampling frame of policy influencers described earlier (total identified population = 1,765 influencers in Alberta [n = 1,243] and Manitoba [n = 522]). Respondents had the option of completing the survey and mailing it back to the research team in the self-addressed postage paid envelope provided or a password-protected online version of the same survey. A final response rate of 15.0 % (n = 236/1,574; n = 153 from Alberta and n = 83 from Manitoba) among policy influencers was achieved, after adjusting for the 191 undeliverable/returned surveys due to incorrect addresses or defunct workplaces. Of the 236 completed policy influencer surveys, 45.3 % were received from government (provincial and municipal), 24.6 % from workplaces, 22.9 % from school boards, and 7.2 % from print media. Potential respondents were sent bi-weekly survey reminders over the survey period.

General Population

The survey was administered through computer-assisted telephone interviewing (CATI) system by trained research interviewers. Before administering the questionnaire, the interviewers informed the respondents that their participation was entirely voluntary, that their responses would be kept completely confidential, and that they could terminate the interview at any time. Completion of the KAB questions took approximately 5 min on average (the full PRL survey lasted 25–30 min). Each interview was monitored for quality assurance. The data were collected from 27 May 2010, to 16 July 2010, and a total of 1,203 respondents, consisting of 605 females and 598 males, completed the survey.

The survey response rate was 21.2 %, which was estimated by dividing the number of completed interviews (n = 1,203) by the number of people selected in the eligible sample (including the sum of completed interviews (n = 1,203), refusals (n = 4,283), incompletes (n = 46), and language problems (n = 135)).

Measures

Survey items were adapted from validated instruments previously used in tobacco control research and alcohol policy research surveys [27, 53, 54, 55, 56]. Questions were framed around respondents' KAB toward cancer prevention, emphasizing four behavioral risk factors for cancer: tobacco use, alcohol misuse, unhealthy eating, and physical inactivity. The survey items were grouped into three categories that assessed respondents' levels of policy support, beliefs about cancer etiology, and perceived responsibility for behaviors related to cancer. Subscales within these categories were devised by conducting factor analysis on the general public sample; no factor analyses were completed on the policy influencers' data due to the small sample size. The complete list of survey items by categories and subscales, including Cronbach's alpha for each item and in aggregate, is provided in Tables 1, 2, and 3.

Table 1
Survey items: policy support (common item stem: '*Please indicate your level of support for each of the following policy approaches related to…*')

Item	Factor loading
Tobacco use (α = .75)	
Ban flavored cigarettes, little cigars, and blunt wraps	.76
Increase the cost of cigarettes by $0.50–$1.00 per pack	.76
Sue tobacco companies to recover health care costs resulting from deception	.70
Ban smoking in motor vehicles with minors	.68

Item	Factor loading
Ban smoking in all public outdoor spaces	.66
Food policies (α = .77)	
Provide programs to educate the general public about healthy food choices	.52
Mandate policies for school nutrition programs	.58
Prohibit advertising and promotion of unhealthy foods and beverages to children under the age of 16	.67
Tax unhealthy food and beverage purchases	.66
Hold producers of unhealthy foods liable for health care costs associated with obesity	.71
Subsidize the purchase of healthy foods and beverages	.63
Zoning to limit the number of fast food restaurants per square kilometer	.68
Alcohol policies (α = .80)	
Mandatory health warning signs at places that serve or sell alcohol	.82
Mandatory health warning labels on alcoholic beverages	.**
Ban alcohol advertising on television and all other media outlets accessible to minors	.73
Tax alcoholic beverages based on ethyl alcohol content	.68
Fund media campaigns to educate the public about preventing the misuse of alcohol (e.g., how to follow low risk drinking guidelines)	.67
Increase health care services and programs for individuals suffering from alcohol dependence	.50
Increase enforcement of alcohol sales to minors	.45
Physical activity policies (α = .73)	
Provide incentives for workplaces to develop physical activity policies and access to physical activity facilities for workers	.76

Item	Factor loading
Provide programs to educate the general public about the importance of regular physical activity	.70
Implement transportation policies designed to promote physical activity through safe routes, cycle facilities, adequate lighting, etc.	.69
Tax credits or monetary incentives for people who are involved in physical activity	.67
Mandatory daily physical activity requirements in all schools	.63

Results from 4 principal components analyses presented (one per domain). A single component with an eigenvalue > 1 was obtained in each analysis

Table 2
Beliefs about cancer etiology (common item stem: '*Please indicate how much you think each of the following items is linked to a person's chances of getting or not getting cancer*')

Item	Factor 1: behavioral cancer etiology (subscale α = .74)	Factor 2: environmental cancer etiology (subscale α = .77)
The town or city where a person lives		.89
The neighborhood where a person lives		.86
Where a person goes to school		.78
Where a person works		.75
Eating a healthy diet, including sufficient servings of fruit and vegetables	.93	
Maintaining a healthy body weight	.87	
Participating in regular exercise	.87	
Drinking excessive amounts of alcohol	.27	

Item	Factor 1: behavioral cancer etiology (subscale α = .74)	Factor 2: environmental cancer etiology (subscale α = .77)
Smoking cigarettes	.21	

Results from a principal components analysis presented (2 factors with eigenvalues >1 obtained). The analysis accounted for 58.3 % of inter-item variance. Oblimin-rotated factor loadings displayed; loadings <.20 suppressed. Factor correlation = .22.

Table 3
Perceived responsibility for behaviors related to cancer (common item stem: '*When someone has a problem with…*')

Item	Factor 1: individual responsibility (subscale α = .77)	Factor 2: societal responsibility (subscale α = .77)
Tobacco it is their responsibility to deal with it	.78	
Tobacco it is their own fault	.73	
Obesity it is their responsibility to deal with it	.72	
Alcohol it is their responsibility to deal with it	.72	
Alcohol it is their own fault	.58	
obesity it is their own fault	.54	
Alcohol it is society's responsibility to deal with it		.82
Obesity it is society's responsibility to deal with it		.80
Tobacco it is society's responsibility to deal with it		.80
Obesity it is caused by circumstances out of their control		.53

Item	Factor 1: individual responsibility (subscale α = .77)	Factor 2: societal responsibility (subscale α = .77)
Alcohol it is caused by circumstances out of their control		.45
Tobacco it is caused by circumstances out of their control		.45

Results from a principal components analysis presented (2 factors with eigenvalues >1 obtained). The analysis accounted for 55.4 % of inter-item variance. Oblimin-rotated factor loadings displayed; loadings <.20 suppressed. Factor correlation = .36

Policy Support

Twenty-four items assessed respondents' level of support for policies designed to influence tobacco and alcohol use, food consumption, as well as physical activity. Items were assessed using a 4-point response scale (1 = strongly oppose; 2 = somewhat oppose; 3 = somewhat support; and 4 = strongly support). Principal components analysis was used to assess dimensionality of items measuring support for policies within each of these domains. Based on these results, four scales were constructed: (a) a 5-item tobacco policy support scale; (b) a 7-item food policy support scale; (c) a 7-item alcohol policy support scale; and (d) a 5-item physical activity policy support scale. Scale scores were formed by summing the item scores within each policy domain (Table 1).

Beliefs about Cancer Etiology

Nine items assessed respondents' beliefs about cancer etiology. Items were assessed using a 4-point response scale (1 = definitely not linked; 2 = probably is not linked; 3 = might be linked; and 4 = definitely linked). Principal components analysis was used to assess dimensionality of the items. Based on these results, two scales were constructed: (a) a 5-item *behavioral cancer etiology* belief scale and (b) a 4-item *environmental cancer etiology* belief scale. Scale scores were formed by summing the item scores within each policy domain (Table 2).

Perceived Responsibility for Behaviors Related to Cancer

Twelve items assessed respondents' beliefs about responsibility for behaviors related to cancer. Items were assessed using a 4-point response scale (1 = strongly disagree; 2 = disagree; 3 = agree; and 4 = strongly agree). Principal components analysis was used to assess dimensionality of the items (results not shown). Based on these results, two scales were constructed: (a) a 6-item *individual responsibility* scale and (b) a 6-item *societal responsibility* scale. Scale scores were formed by summing the item scores within each policy domain (Table 3).

Analyses

The set of four policy support scales and the set of four cancer belief scales were each subjected to a three-group multivariate analysis of variance (MANOVA) to determine whether the three samples of interest (general public, non-governmental policy influencers, and government policy influencers) differed with respect to policy perceptions and cancer beliefs. A MANOVA was chosen for each set of scales to protect against Type I error rate inflation [57] introduced by performing a separate ANOVA on each scale. A significant multivariate effect of respondent group (government policy influencers versus non-governmental policy influencers versus the general public) was observed across the four policy support scales (Wilks λ; multivariate $F(8, 2158) = 16.1$, $p < .001$), justifying the use of ANOVAs to explore group differences across individual scales. Follow-up ANOVAs revealed a significant effect of respondent group on each scale. Comparisons were made across the subscales, but the analysis did not adjust for any confounding effects of variables that were unique to either policy influencers (length of employment) or the general public (education, employment status, income), nor did it adjust for sex and age. While this is to some extent a limitation, this level of analysis was appropriate to the exploratory, descriptive nature of the study. Moreover, the general public survey represents a proportionate distribution of age and sex in the population.

Results

Description of the Samples

Table 4 presents the percent distribution of respondents in the policy influencer sample by organization type according to the demographic characteristics of province of residence, age, gender, and length of employment. More than three quarters of the sample comprised respondents in Alberta; therefore, our comparison of policy perceptions and cancer beliefs may correspond to a greater extent with the KAB of policy influencers in that province. In all of the policy influencer categories except the media, the vast majority of respondents were aged 40 years and older. In contrast with the other organization types, half of media policy influencers in the KAB survey were less than 40 years of age. Across all of the other organization types, only a small minority of the respondents were less than 40 years of age, ranging from none (provincial government) to 7.1 % (workplaces). As such, our sample of government policy influencers and non-governmental policy influencers outside of the media was more representative of middle aged to older adults in those organizations. The representation of genders among policy influencers by organization type was proportionately more male in all of the organization types except for the media, although the gender distributions of respondents in municipal governments and school boards were more or less commensurate. Therefore, our sample is more representative of male policy influencers, overall. Finally, our policy influencer sample represented various levels of experience by organization type. While most respondents in workplaces had six or more years of experience, the majority of respondents in the provincial governments, municipal governments, and school boards had 5 years or less. Media respondents had both short and long-term experience in equivalent proportions.

Table 4
Demographic profile of *policy influencer* respondents in the 2009 KAB survey

	Work sector				
	Provincial government	**Municipal government**	**School boards**	**Media**	**Workp laces**
Province					
Alberta	78.6	78.5	74.1	94.1	77.5
Manitoba	21.4	21.5	25.9	5.9	25.9
Age					
Less than 25 years	0.0	1.2	0.0	12.5	0.0
25–39 years	0.0	5.8	3.9	37.5	7.1
40–59 years	66.7	59.3	64.7	50.0	67.9
60 years or older	33.3	33.7	31.3	0.0	25.0
Sex					
Male	78.6	57.1	52.8	29.4	62.5
Female	21.4	42.9	47.2	70.6	37.5
Years of service					
Less than 1 year	0.0	5.7	7.7	0.0	3.6
1–2 years	70.0	28.4	9.6	25.0	20.0
3–5 years	10.0	25.0	34.6	25.0	10.9
6–9 years	10.0	12.5	21.2	18.8	16.4
10 years or more	10.0	28.4	26.9	31.3	49.1

Table 5 shows the percent distribution of the respondents in the general public survey by region of Alberta according to the demographic characteristics of age, education, employment, and

income. The age distribution was roughly proportionate across Edmonton, Calgary, and the rest of the province, with the majority of respondents in each region aged 25–59 years. Education and employment levels were higher in Calgary, followed by Edmonton, and then the rest of the province. Median household income was the same in Calgary and Edmonton, although slightly lower in rest of the province. Thus, the sample for the general public KAB survey presents a similar composition of respondents across demographic regions in terms of demographic characteristics, with some variation in terms of higher levels of education and employment in the urban centers.

Table 5
Demographic profile of *general public* respondents in the 2010 PRL survey

	Region		
	Edmonton	**Calgary**	**Rest of Alberta**
Age			
Less than 25 years	7.5	4.4	5.6
25–39 years	21.1	22.5	21.8
40–59 years	43.2	42.6	43.0
60 years or older	28.3	30.5	29.4
Education			
Less than high school	7.0	4.0	13.0
High school complete	22.4	12.8	25.0
Post-secondary	70.6	83.1	62.0
Employment status			
Full-time status	56.3	61.5	43.4
Part-time status	14.9	13.4	19.4
Unemployed	6.3	4.0	4.8
Retired	22.4	21.1	22.4
Income			

	Region		
	Edmonton	Calgary	Rest of Alberta
Median household income range	$100,000–124,999	$100,000–124,999	$95,000–99,999

Comparing Respondent Groups

Post hoc evaluation of mean differences across the three groups using Tukey's least-significant difference test (Table 6) indicated that government policy influencers reported significantly less support for tobacco and alcohol policies (Ms = 11.9 and 21.0) compared with the public and non-governmental influencers (Ms = 12.9 and 22.5 for tobacco, respectively; 22.5 and 22.9 for alcohol, respectively; ps < .05). Government policy influencers also reported significantly lower support for policies designed to influence physical activity and food consumption (Ms = 15.7 and 17.9) compared with the public and non-governmental influencers (Ms = 17.9 and 17.0 for physical activity, respectively; 22.2 and 20.2 for food, respectively; ps < .05). In addition, respondents in the general public sample reported greater support than both government and non-governmental policy influencers for policies designed to influence physical activity and food consumption (ps < .05).

Table 6
Group differences in policy support and cancer beliefs

Composite scale score	Public	Non-Government influencers	Government influencers	Statistical tests	
				Wilks' lambda	F
Policy support				0.89	16.1***
Tobacco	12.9$_a$	13.5$_a$	11.9		4.7**
Alcohol	22.5$_a$	22.9$_a$	21.0		3.7*
Physical activity	17.9$_a$	17.0$_b$	15.7$_c$		30.9***
Food	22.2$_a$	20.2$_b$	17.9$_c$		37.0***
Cancer beliefs				0.26	7.3***
Behavioral etiology	15.6	17.3$_a$	16.9$_a$		8.2***
Individual responsibility	17.8$_a$	18.1$_{ab}$	18.6$_b$		13.7***

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Composite scale score	Public	Non-Government influencers	Government influencers	Statistical tests	
				Wilks' lambda	F
Environmental etiology	11.7	11.0$_a$	10.7$_a$		3.2*
Societal responsibility	13.3$_a$	13.3$_a$	12.3		3.5*

Higher scores indicate greater endorsement of each scale. Means not sharing a subscript differ from each other ($p < .05$) using Tukey's least-significant difference test

A significant multivariate effect of group membership was also observed across the four cancer beliefs scales (Wilks $\lambda = 0.95$; multivariate F(8, 2174) = 7.3, p < .001), justifying the use of ANOVAs to explore group differences across individual scales. As indicated previously, potentially confounding covariates unique to either stakeholder group (education, income, employment status, and length of employment) were not included in the analysis, since it would not be possible to compare across all three groups. For the cancer beliefs scales, follow-up ANOVAs revealed a significant effect of respondent group on each scale. Post hoc evaluation of mean differences across groups using Tukey's least-significant difference test indicated that the public was significantly less likely to endorse cancer etiology beliefs based on individual behavior ($M = 15.6$) and significantly more likely to endorse cancer etiology beliefs based on environmental influences ($M = 11.7$), compared to both non-governmental and government policy influencers ($Ms = 17.3$ and 16.9 for behavioral etiology, respectively; $Ms = 11.0$ and 10.7 for environmental etiology, respectively; $ps < .05$). Government policy influencers agreed significantly more than the public that individuals should be held responsible for behaviors related to cancer ($Ms = 19.6$ versus 17.8, respectively, p < .05). Government policy influencers also expressed significantly less agreement ($M = 12.3$) than the public and non-governmental policy influencers that society should be held responsible for behaviors related to cancer ($Ms = 13.3$ and 13.3, respectively, $ps < .05$).

Discussion

Primary prevention of cancer requires policy intervention as part of a comprehensive, system-level approach for addressing behavioral risk factors. A deeper understanding of policy influencers' KAB—and how closely it reflects the general public's KAB concerning policy options to support prevention—is essential for successful development and effective implementation of policy. This study examined the KAB of government and non-governmental policy influencers and the general public in order to assess the priority and acceptability of various policy actions around four behavioral risk factors for cancer: physical activity, healthy eating, tobacco use, and alcohol misuse. These findings are related in terms of the broader KAB literature, indicating the particular challenges and opportunities facing government interventions for cancer prevention in a conservative political climate, despite the support of the general public for healthy public policies.

Generally, in comparative politics, and specifically in Canada, "right/conservative" versus "left/progressive" political orientation is associated with lower support for government intervention into the public sphere [58]. The political sentiments of individual policy-makers are expressions of ideological belief that direct their political orientation on an issue, and the political climate of a region or jurisdiction reflects the relative prevalence of political orientations within it [16, 59, 60].

Compared to a random sample of Alberta adults and non-governmental policy influencers (i.e., school board chairs and superintendents, print media editors and reporters, and workplace presidents and senior human resource managers), government policy influencers (i.e., elected members of legislative assemblies and senior ministry bureaucrats) were significantly: (a) less supportive of policies designed to reduce tobacco, alcohol, and food consumption, as well as policies designed to promote physical activity; (b) more likely to believe that cancer has behavioral etiology and that individuals should take responsibility for preventing cancer; and (c) less likely to believe that cancer has an environmental etiology and that society should take responsibility for preventing cancer. Such attitudes toward cancer prevention interventions and belief in individual responsibility have been associated with political conservatism in other studies of legislator policy support [26, 27, 61].

These findings reveal that government decision-makers/policy influencers fell behind the more progressive, intervention supporting sentiments of their non-governmental counterparts and the general public with respect to priorities for and acceptability of various policy options that would support cancer prevention. This is a missed opportunity for healthy public policy-making. As healthy public policies (e.g., legislation, taxation, fiscal incentives, etc.) are essential to comprehensive cancer risk-reduction approaches [38], it is critical that government policy influencers are aligned with their constituents' attitudes and beliefs. Evidence, political will, and public support are among the key factors that can be used to foster such alignment and thus influence health public policy implementation and sustainability [26].

Yet, it must be realized that political ideologies have a large impact on beliefs about the relative importance of individual versus structural components of health-promoting policies [62]. The KAB survey findings suggest, among government policy influencers, a belief in individualistic (rather than societal) responsibility for action concerning cancer prevention. The implications of emphasizing individual behavior over the structural factors that influence it have been criticized as "victim-blaming" [63]. Previous research examining policy support in relation to political partisanship has found that right-leaning political conservatives are usually less supportive of tobacco control and obesity-targeted policies than left-leaning progressive parties [64, 65, 66, 67]. Taking political views and party preferences into account (Alberta is a long-standing conservative province, politically), it is not surprising that the strongest-supported policies were related to individual-based public education campaigns for cancer prevention rather than to control-based approaches, such as fiscal measures, regulation, or legislative action.

Despite the strong support for educational approaches (including social marketing and mass media campaigns) among the government respondents, moreover, there is growing evidence that these types of interventions are not effective, are rarely individualized, and tend to neglect the context in which individuals live [68, 69]. The weaker support for policies that act on

environmental conditions known to influence behavior are contrary to evidence that suggests the most effective policies are environmental or structural and include: restriction of unhealthy behaviors (e.g., smoking) in public and work places, taxation and pricing on unhealthy products (such as tobacco, alcohol, or sugar sweetened beverages), and increasing physical activity access and education in schools [9].

Inconsistency of policy support between government policy influencers and non-governmental policy influencers observed in this study represents an opportunity for action. Government policy influencers were less supportive of evidence-based environment-level policies in comparison with non-governmental policy influencers, yet they generally have more authority to implement these policies at the population scale. This may reflect a more nuanced understanding of the pros and cons of various policy options among those with greater propensity (and responsibility) to affect policy change, or a reluctance among those elected to influential positions to support policies that may jeopardize (perceived) voter support for particular initiatives. At the same time, non-governmental policy influencers who indicated policy support for environmental interventions may implement cancer prevention strategies in smaller community settings, such as school board districts, workplaces, and media production [21, 23, 36, 70]. While the reasons for variation in levels of support were not examined in this study, there remains a clear opportunity to better utilize evidence to bolster policy influencers to use their decision-making power in order to stimulate policy development. Researchers must generate meaningful evidence concerning policy acceptability and impacts (and consequences) of implementation. Knowledge brokers, and government relations and advocacy practitioners, must effectively communicate that evidence to those with broad scale policy influence [46]. Further, this finding suggests that it may be worthwhile to work closely with supportive stakeholders tied to communities (e.g., schools, workplaces, and media) on issues with less support; here, advocacy efforts can generate political allies, networks, and momentum in favor of environment-level policies [38]. For example, strong local action on anti-smoking legislation has led to widespread policy adoption among municipalities and may play a role in local-to-state policy diffusion [71], and zoning strategies to improve the nutritional profile of a community have been the focus for advocates, policy-makers, and researchers in California [72].

The disconnection between government policy influencers' individualistic orientation and weaker support of policy intervention on the one hand, and the attitudes and beliefs of the general public on the other, was also surprising. This finding is particularly meaningful in cases where weak policy influencer support is a result of a fear of voter opinion. Across studies, the general population has increased support for public health interventions that have become established over time, that are less intrusive, and that are targeted at children and businesses as opposed to individuals [41]. At the same time, research shows that if strong public support for a policy is substantiated, policy influencers feel more comfortable supporting policy action [25]. Awareness of policy acceptability disconnects between policy influencers and the general public is invaluable for advocates looking to act on issues and to maximize policy windows, as it is known that public support plays a key role in ensuring the acceptability and sustainability of a policy [73]. Findings from the public KAB surveys can be used to push for areas with strong public support, and when supplemented by findings from policy influencer KAB surveys is one way to identify and act on gaps between public and policy-makers views on viable policy options.

Implications for Policy Advocacy and Implementation

Findings from this study provide several opportunities for policy advocacy and implementation. Overall, our results suggest a need to enhance the communication of evidence from public health research to make it more accessible to policy influencers. For example, recognition of behavioral over environmental risk factors for cancer persists, despite several prominent reports (c.f., the Canadian Partnership on Cancer Action, the Harvard Report on Cancer Prevention) that have outlined importance of environmental determinants of behavioral risk factors (e.g., nutrition policies, tobacco and alcohol taxation and restriction, and mandatory daily physical activity in schools) for cancer prevention. It is thus essential for knowledge brokers and others engaged in translating research to action to recognize these gaps between policy influencer KAB and existing evidence to more effectively communicate accurate messages that will encourage healthy public policy change.

Effective methods for delivering public health evidence include narrative communication (e.g., stories), policy briefs, and direct local data [74]. Generally, it is recommended that the type of communication be tailored to the needs of the targeted policy-maker, such as type of legislator and demographics [74]. Other research suggests that increasing opportunities for interaction and exchange between researchers and policy-makers is essential for promoting the use of evidence in policy [75]. This brokering of evidence may help each party become more aware of the other's needs and ultimately shape the health-promoting activities policy influencers choose to undertake in their organizations [75]. Moreover, research shows that knowledge brokers can help to mitigate the influence of ideological belief on policy support by addressing policy influencers' particular context [33, 34]. Knowing the KAB of particular sectors of policy influencers could be instrumental in tailoring messages to address knowledge gaps and foster positive attitudes toward cancer prevention policy. For example, policy briefs directed at improving knowledge around environmental determinants could be tailored to the characteristics of individual jurisdictions (i.e., what environmental policies currently exist in the jurisdiction, is there capacity and willingness to make policy change) or sector priorities. This knowledge could be combined with other related tools to support policy development; for example, a policy readiness tool to assess a jurisdiction's overall readiness to adopt certain policies [76] or the Canadian Partnership Against Cancer's [38] environmental scan of current policy and legislation in a given issue area.

Awareness of the political mood and agenda is also a key for fueling policy adoption [47]. As a result of understanding government policy influencers' individualistic KAB about risk factors (especially in this survey's context of a conservative government), policy advocates might strive to shift policy influencer views about alternate causes of cancer as part of a comprehensive advocacy strategy. Thus, it may be more effective to strengthen knowledge about the evidence concerning the underlying risk factors for cancer (e.g., unhealthy eating and cost barriers) and link this to evidence-based policy options. Or, in a case where government policy influencers favor public education or media campaigns over other policy options, advocates could use such knowledge of KAB views to advocate for more effective public education campaigns, such as those that utilize simple messages, have broad exposure, and work concomitantly with interventions to create supportive environments [77]. Overall, fostering opportunities for the exchange of information between researchers, policy practitioners, and policy influencers, and

refining communication strategies accordingly, may foster improved use of evidence in policy-making and more meaningful evidence generated by research.

In addition to improving communication, findings from a KAB survey with regards to support (or lack thereof) for specific public policies can be incorporated into the evidence base used by policy advocates. This creates an opportunity for advocates to strengthen policy influencer awareness of the policy areas that are of high(er) priority and acceptability to the public. When approaching changes to legislation, government policy-makers often consider strong public opinion in favor of the proposed change an essential component to policy development [25, 26]. The views of credible stakeholders (such as the media, schools, and workplaces) also play a key role [53], increasing the value of examining the priorities and opinions of individuals, families, and communities. Further, because schools, workplaces, and the media reach a diverse and broad audience, they can be effective gate-keepers in shaping and relaying public opinion on certain policy issues. Advocates in these sectors could utilize findings from a KAB survey to communicate public support for certain policy issues, increasing the likelihood that such issues will make it onto the policy agenda. Overall, because there are distinct stages of the policy process that when aligned correctly increase the likelihood of a policy being adopted, addressing gaps between public opinion and policy influencer views is a key task for policy advocates [47].

Finally, KAB surveys can be used to indicate regional variations in support of various policy options. Researchers have undertaken this approach with the HINTS survey, documenting geographic and socioeconomic variation in KAB across the USA [78, 79]. This knowledge may create policy windows that align advocate interests with the mindset of local policy influencers, particularly for environmental policies (such as smoke-free vehicle legislation, for example). Government decision-makers could be reassured (based on KAB findings) that, in fact, most policy influencers in the province along with the general public supported such a policy, then they may act on the issue without fear of upsetting constituents. A deeper understanding of public support patterns can then be used by advocates to support strategic policy diffusion across a region or state [80, 81, 82].

Strengths and Limitations

The practical implications derived from the KAB surveys should be approached cautiously, considering the cross-sectional nature of the surveys and the low response rate of the policy influencer survey, which may have introduced a selection bias into the responses. Further, measuring only the views of key policy influencers may not be sufficient for understanding the current planning and implementation processes that occur within the various organizations represented. Notwithstanding these limitations, one of the primary strengths of this study was the opportunity to compare government policy influencer, non-governmental policy influencer, and general public KAB on cancer risk-reduction policies. To our knowledge, no previous studies have collected data from such a wide variety of policy influencers and the public, especially in the context of cancer prevention. This is a unique strength of our study, even with the low response rate. The results presented in this study can also be used as a baseline to track changes in policy influencer and general public KAB over time, as well as to evaluate the impact of policy interventions and advocacy.

Conclusion

Primary prevention of four major behavioral risk factors for cancer (i.e., tobacco use, alcohol misuse, unhealthy diet, and physical inactivity) is essential for reducing cancer burden. There is growing evidence to suggest that healthy public policy interventions in these areas are an effective means of improving equitable access to healthy choices for individuals. Results from the KAB survey provided an opportunity to compare general public and government and non-governmental policy influencer views on policies directly and indirectly related to cancer risk reduction. Notably, government policy influencers are lagging behind in support for policies that could reduce cancer rates. Further, results suggested that both policy influencer groups and general public KAB generally remained embedded within individualistic views (i.e., emphasis on behavioral risk factors in comparison with environmental determinants and individual versus societal responsibility for action). These findings indicate a need to bridge knowledge gaps through effective communication of public health evidence to policy-making processes. Policy windows represent opportunities for advocates to act on. A clear understanding of government and non-governmental policy influencer and public KAB can ultimately facilitate healthy public policy adoption and sustainability.

Acknowledgements

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