



**SNAPSHOT OF ADAPTATION AND RESPONSE  
CAPACITY TO CLIMATE CHANGE  
IN PUBLIC HEALTH**

**FINAL REPORT**

**JULY 13, 2006**

**SUBMITTED TO:**

Peter Berry, Ph.D, Senior Policy Officer  
Climate Change and Health Office  
Health Canada

**SUBMITTED BY:**

Canadian Public Health Association  
1565 CARLING AVENUE, SUITE 400  
OTTAWA, ON, K1Z 8R1

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## Addendum

1. Questionnaire
2. Sample letter
3. Advisory Group
4. Breakdown by City
5. Role of provincial governments

## 1. INTRODUCTION

The Climate Change and Health Office at Health Canada is preparing the *Canadian Climate Change and Health Vulnerability Assessment 2007*. A major component of the assessment is a focused study on adaptive capacity.

A few studies have already documented some health outcomes and associated costs of different environmental changes associated with global warming and increased climate variability. Extreme weather events such as heat waves and cold snaps, floods and forest fires, and increased air pollution and allergen levels are some of the events that may be exacerbated under future climate change scenarios and which are known to affect the health of individuals and of specific population groups. While the state of knowledge of human-environment interactions is still growing, there is adequate existing evidence of the potential risks associated with a range of climatic events to provide a foundation for examining how different people cope with them and why some people are more vulnerable than others (Statement of Work).

The Climate Change Office, Health Canada, contracted the Canadian Public Health Association (CPHA) to provide an analysis of the degree to which public health decision-makers, practitioners, and organizations are considering climate change risks in their policies and planning, and are able to respond to anticipated impacts. This analysis should provide a better understanding of the vulnerability of individuals and populations to climate change impacts and will help identify actions needed to increase capacity and protect the health of Canadians.

Climate, in a narrow sense, is usually defined as the “average weather” over a period of time ranging from months to thousands or millions of years. Climate change refers to a statistically significant variation in either the mean state of the *climate* or in its variability, persisting for an extended period (typically decades or longer). Adaptive capacity is the ability of a system to adjust to climate change (including climate variability and extremes) and to moderate potential damages, to take advantage of opportunities, or to cope with the consequences. Finally, vulnerability is the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. (IPCC Third Assessment Report, Climate Change 2001)

### 1.1 Project Objectives

The objective of the project is to examine the degree to which public health decision-makers, practitioners, and organizations:

- Are aware of climate change risks;
- Are considering such risks in their policies and planning;
- Are able to respond to multiple vulnerabilities;
- Have identified key indicators or factors for adaptive capacity (for specified risks, e.g. extreme heat, waterborne outbreaks); and
- Have experienced significant capacity changes since the SARS outbreak of 2003.

## 1.2 Criteria

Health Canada asked that the scope of the investigation address, to the greatest degree possible, the four key health concerns related to climate change: 1) air pollution; 2) water and food-borne contamination; 3) infectious diseases; and 4) extreme weather events.

## 2. METHODOLOGY

The Canadian Public Health Association struck an Advisory Group to provide guidance to the project in terms of:

- Identifying key informants for interviews;
- Developing the survey instrument; and
- Providing comments on preliminary results.

### 2.1 Advisory Group

#### **Louise Aubin**

Chair, Environmental Health Workgroup, Ontario Public Health Association  
Research and Policy Analyst  
Environmental Health, Peel Health,  
Brampton, Ont.

#### **Dominique Charron Ph.D., D.V.M**

Senior Epidemiologist  
Public Health Agency of Canada  
Foodborne, Waterborne and Zoonotic Infections Division  
Ottawa, Ont.

#### **Christina Chociolka, Ph.D**

Project Manager  
National Collaborating Centre-Environmental Health  
Vancouver, B.C.

#### **Ray Copes, Ph.D**

Director  
National Collaborating Centre- Environmental Health  
Vancouver, B.C.

#### **Fred Ruf**

Head, Food Safety & Safe Water Unit (Acting)  
Food Safety and Safe Water Unit  
Ontario Ministry of Health  
Toronto, Ont.

Sylvia Fanjoy, Director of National Programs at CPHA, Peter Berry and Jacinthe Seguin of the Climate Change and Health Office, Health Canada, and David Noble, consultant with *2DegreesC*, also participated in project guidance.

The Climate Change and Health Office determined the criteria for selection of key informants, and the Office also developed the interview instrument, with input from members of the Advisory Group. CPHA sent a letter to potential key informants requesting the interview (see Addendum 2) and were successful in obtaining interviews with appropriate informants in all identified jurisdictions.

CPHA contracted with *2degreesC* to conduct the key informant interviews. *2degreesC* subsequently provided the data gathered in the interviews to CPHA in Excel format.

Three CPHA directors (Sylvia Fanjoy, Helen Simson and Maureen Hartigan) coded the data into categories that were created to capture key patterns in the comments, and undertook a comparative analysis across issues and jurisdictions. The data has been summarized by key question in tabular and narrative formats.

## 2.2 Sampling

Public health practice is highly inter-professional and is organized in different ways across the country. Each jurisdiction defines public health in its own way and has adopted a particular organizational structure, policy direction and set of priorities. Governments have devolved responsibility for public health planning and programming to regional structures. These factors required a strategic and regionally stratified approach to the key informant interviews.

The Climate Change and Health Office decided that key informants from all ten provinces should be interviewed, starting with the Medical Officer of Health from the largest city in each province. In order to gather preliminary information about provincial structures and stakeholders, CPHA contracted Allison Philpot to undertake an internet search of websites of provincial government departments and produce a report by province for the key health areas: drinking water standards and regulations, infectious disease control standards and practices, and food safety activities and regulations. The following factors were considered for each area:

- 1) Roles and responsibilities;
- 2) Key activities;
- 3) Awareness;
- 4) Implementation (policy and planning);
- 5) Significant capacity changes in the past two years; and
- 6) Resources dedicated to projects.

A summary of the findings are presented in Addendum 5. An internet research was also undertaken for the largest city in each province regarding drinking water sources, communicable/infectious disease control and food safety. This information is presented in Addendum 4. These two reports were forwarded to *2degreesC* prior to initiation of the interviews.

The initial survey strategy was to interview the Medical Officer of Health (MOH) of the largest city in each province and to have the MOH identify additional contacts who could provide further insight relevant to the study objectives. In some cases, the MOH was unavailable for an interview, or referred us to another individual (e.g. the Deputy Medical Officer of Health) who was considered to be better positioned to undertake the interview. Subsequently, Health Canada identified other cities (of comparable size) to add to the target areas, in order to provide a minimum of 30 interviews. As a result of this strategy, there is variation in the number of key informants from each province.

In order to support data analysis, key informants were categorized according to region and city size. Four regions and three groups of cities by population size were determined:

**Regions**

**Region 1:** Atlantic – Newfoundland and Labrador, New Brunswick, Nova Scotia, Prince Edward Island

**Region 2:** Central – Quebec, Ontario

**Region 3:** Prairies – Manitoba, Saskatchewan, Alberta

**Region 4:** West – British Columbia

**Cities Grouped by Size**

**City Size A** (the three largest cities in Canada) – Montreal, Toronto, Vancouver

**City Size B** (the largest city in each province not included in A above)—St. John’s, Halifax, Charlottetown, St. John, Winnipeg, Saskatoon, Calgary

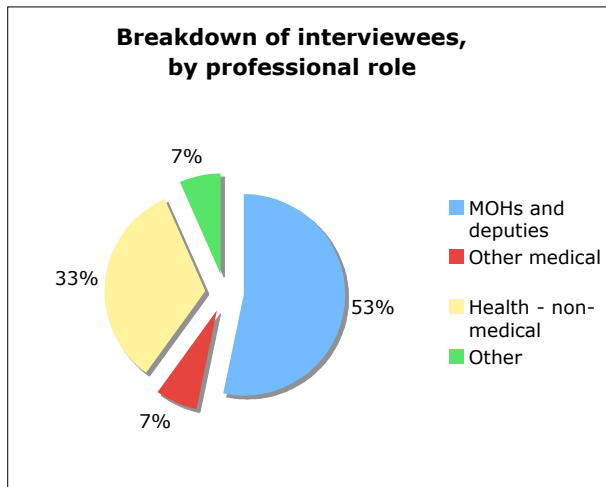
**City Size C** (other cities identified by the Climate Change and Health Office)--Fredericton, Kingston, Yorkton, Regina, Edmonton, Kelowna, Victoria

**TABLE 1: DISTRIBUTION OF KEY INFORMANTS**

	<b>Region 1: Atlantic</b>	<b>Region 2: Central</b>	<b>Region 3: Prairies</b>	<b>Region 4: West</b>	<b>TOTAL</b>
<b>City Size A</b>	0	5	0	2	<b>8</b>
<b>City Size B</b>	7	0	9	0	<b>15</b>
<b>City Size C</b>	2	1	2	2	<b>7</b>
<b>TOTAL</b>	<b>9</b>	<b>6</b>	<b>11</b>	<b>4</b>	<b>30</b>

The majority of interviewees (53%) were Medical Officers of Health or Deputy Medical Officers of Health. A breakdown of professional roles of interviewees is presented in the Figure below:

**FIGURE 1: BREAKDOWN OF INTERVIEWEES BY PROFESSIONAL ROLE**



### 2.3 Data Limitations

The breadth of issue areas to be probed and the limited time available to conduct the interviews limited the coverage that could be applied to each of the issue areas in each interview. Almost all of the interviews exceeded the thirty minutes that had been requested of key informants, and in three cases interviewees had to terminate the interview before all of the questions had been asked. In addition, interviewers used discretion in asking some questions (e.g. questions 1.3 and 3.4) based on answers to previous questions. Informants also expressed difficulty in answering question 4.1 because they found it too broad, loaded or difficult to answer. As a result, there is variation in the scope of discussion applied to the various questions, and the responses supplied to the questions do not necessarily provide a comprehensive representation of informants’ understandings of climate and weather change, or of initiatives undertaken in their jurisdictions to address climate and weather change.

## 3. OVERVIEW OF INFORMATION GATHERED FROM PROVINCIAL GOVERNMENT WEBSITES

### 3.1 Background Information on Drinking Water in Canada

The regulation of drinking water in Canada falls under provincial/territorial jurisdiction. Each province and territory is responsible for developing and enforcing all legislation pertaining to municipal and public water supplies, including their construction and operation.

Water supply regulation in Canada has changed significantly in the aftermath of the Walkerton tragedy of 2000. The most serious case of water contamination in Canadian history, the small rural Ontario town of Walkerton found its water supply contaminated with E. coli bacteria that resulted from manure spread on a

nearby farm. Seven people died and 2,300 became ill; it is expected that some people, particularly children, will experience lasting effects from exposure to the contaminated water. According to a judicial inquiry report on the Walkerton situation, the tragedy could have been prevented by proper chlorination of drinking water. While Canada has had a recommended set of guidelines for drinking water safety for years (Canadian Drinking Water Quality Guidelines), it was not until after the Walkerton situation that many provinces revised their standards to align with these national guidelines. In particular, Ontario, British Columbia, Quebec and Nova Scotia have made major revisions to their processes, based on these national standards. Before Walkerton, only Alberta and Quebec had instituted mandatory regulations. In general, city water services are municipally run, and all are fairly similar in terms of test procedures, standards and results.

### **3.2 Background Information on Infectious Disease Control in Canada**

Generally speaking, infectious disease control falls under the jurisdiction of public health in Canadian provinces, cities and regions. Most regions currently have campaigns underway for influenza control, sexually transmitted infections (STIs) and West Nile virus. These campaigns include awareness information, public health interventions such as vaccination and screening programs where applicable, and strategic plans dedicated to emergency or pandemic situations. Government structures, and roles and responsibilities of professionals such as Public Health Inspectors and Medical Officers of Health vary across provinces, but are generally similar in terms of a trend toward integrated or regionally-based care.

### **3.3 Background Information on Food Safety in Canada**

Responsibility for environment and health protection fall primarily under the jurisdictions of Health Canada, Agriculture and Agri-Food Canada, and Environment Canada. The primary bodies responsible for food safety include the Pest Management Regulatory Agency (PMRA), which reports to the Minister of Health, and the Canadian Food Inspection Agency (CFIA), which reports to the Minister of Agriculture and Agri-Food. The Total Diet Study Program is responsible for monitoring food contamination to ensure that average Canadian diets do not result in over-exposure to contaminants. The CFIA is mandated to protect the food supply from contamination.

Provincial and territorial governments have instituted legislation regulating the use of toxic substances that may end up in food within their jurisdictions. They are also responsible for inspecting food-processing establishments.

#### 4. FINDINGS FROM THE KEY INFORMANT INTERVIEWS

The individual questions and responses to them have been grouped in terms of issue areas. Commentary and analysis, where pertinent, has also been included.

##### Informants’ Awareness and Assessment of Climate Change Risks

Question 1: Do you believe that weather and climate have a significant impact on the health of people in your community?

All respondents (N=30) said that weather and climate DO HAVE a significant impact on health.

Question 1.1: Are there changes in patterns of diseases or health conditions emerging in your geographic area that you think may have a link to weather and climate?

The vast majority of respondents (N=25 / 83.3%) indicated they were unable to answer this question because they were Not Sure or did not have sufficient information. The balance (N=5) responded Yes; these respondents represented all three city groupings (A, B, C).

Question 1.2: Compared to other influences on health, how important are those related to weather and climate?

Informants were asked to rate their answers using a scale from 1 to 5, with 1 being Not Important and 5 being Very Important. The majority of the key informants rated the importance of weather and climate compared to other influences on health in the middle of the range (N=26 / 86%), with only two rating it as Very Important (both from the largest cities, category A) and two rating it as Not Important (both Prairie region cities).

**TABLE 2: RANKING OF EFFECT OF WEATHER AND CLIMATE ON HEALTH**

	Not Important								Very Important	
Rating	1		2		3		4		5	
Number of Interviewees	2	6%	8	26.6%	13	43.3%	5	16.6%	2	6%

Question 1.3: Are the changing or newly emerging patterns of disease or the other health issues related to climate that you have identified in question 1.1 of concern to your organization? If Yes, why are they of concern? If No, why not?

This question was asked of 13 informants. Eleven (84.6% of those asked) responded that it was of a concern to their organization; one indicated it was not a concern and one said he could not speak for his organization.

### **Consideration of Risks in Policies and Planning**

Question 2: As you may know, climate scientists have suggested that climate change will bring higher average temperatures to many parts of Canada, changes to the hydrological cycle (timing and amount of precipitation) and more frequent and intense extreme weather events. I would now like to obtain your views on the implications of climate change for health. Do you feel that climate change will increase risks to the health of people in your geographic jurisdiction? If YES, in what ways?

The majority of interviewees (N=23 / 76.6%) responded affirmatively, while one responded in the negative and six were not sure. Most commented that while the specific risks associated with climate change are not definitively identified, changes in weather and climate were of concern to their organizations. Some said that the unknown aspects could prove to be both positive and negative (examples of positive impacts included elevated property values and extended growing seasons).

Question 2.1: Has climate change been identified as a potential current or future public health issue for your geographical jurisdiction?

Respondents were almost evenly divided in their responses to this question. Fourteen (46.6%) said that climate change has NOT been identified as a public health issue in their geographic jurisdictions while 13 (43.3%) said it had. Three were unclear about whether this distinction had been made in their jurisdictions.

Respondents who stated that climate change had not been identified as an issue in their jurisdictions cited a number of reasons which tended to centre on lack of understanding of whether climate change is a pertinent issue for the public health sector. A sampling of comments include: "It's not clear what we need to do on the issue." "People give you a sideways look when you bring up climate change as a public health issue." "It's more of a future issue. Not a here and now concern." "It's not on the radar screen."

Respondents who reported that climate change was considered a public health issue in their jurisdiction also indicated that it was not a high priority. For example, one informant stated: "It's on the agenda but not necessarily at the top." Like the respondents who reported that climate change was not on the agenda in their jurisdictions, those who were not clear also indicated that the

reasons were mainly related to lack of clear understanding of the issues or their significance for public health: “It’s a low level concern that is out there. I’m not sure it’s a regional concern.” “People are concerned in a vague way but don’t see it applying to our area.” “People have talked about it but haven’t put it into the big picture.”

Key informants identified fifteen primary areas of climate change risks that they were aware of. These included (in order of number of jurisdictions that cited each risk): increased outdoor air pollution (7 areas); declines in water supply and quality (7 areas); declines in food security (7 areas); spread of infectious diseases (7 areas); extreme weather events (6 areas); extreme shifts in temperature (5 areas); increased UV exposure (4 areas); rising sea levels and flooding (3 areas); disruptions to agriculture (3 areas); disruptions to transportation (3 areas); damage to infrastructure (2 areas); damage to ecosystems (2 areas); increased pollen production (2 areas); declines in indoor air quality (1 area); and northward spread of tropical diseases (1 area).

Across the board, the top risk issues were increased air pollution, extreme shifts in temperature, declines in quality and supply of water, declines in food security, and the spread of infectious diseases. These were also the top issues for the three large cities. The Atlantic, Prairie and West region informants also expressed concern about the impact of weather change (increased frequency and volatility of storms) on systems such as agriculture, transportation and the ecosystem. While the Atlantic region identified rising sea levels as an issue, the West informants did not. The Central region identified damage to the ecosystem, increased UV exposure, and increased pollen production as being on the radar screen. The Prairie region informants identified concerns about flooding and, like the Atlantic region, also identified disruptions to the agricultural, transportation and ecosystems as concerns, while for the West, concerns were articulated regarding disruptions to the agricultural and transportation systems.

The table below provides an overview of climate and weather change issues of concern related to public health as identified by key informants from the different regional city size groups. Cells that are marked with a \* represent the identification of an action by one or more informants from that regional city size group. The shaded columns represent regional city size groups for which no informants were interviewed.

TABLE 3: ISSUES IDENTIFIED BY REGION AND CITY SIZE												
	Atlantic			Central			Prairies			West		
	A	B	C	A	B	C	A	B	C	A	B	C
Increased outdoor air pollution (7 areas)		*	*	*		*		*		*		*
Declines in water supply & quality (7 areas)		*	*	*		*		*		*		*
Declines in food security (7 areas)		*	*	*		*		*	*	*		
Spread of infectious diseases (West Nile, Lyme) (7 areas)		*	*	*		*		*	*			*
Extreme weather events (storms, avalanches) (6 areas)		*	*	*				*	*			*
Extreme shifts in temperature (heat waves, cold snaps) (5 areas)		*	*	*				*				*
Increased UV Exposure (4 areas)						*		*		*		*
Rising sea levels/flooding (3 areas)		*	*					*				
Disruptions to agricultural production (3 areas)		*						*	*			
Disruptions to transportation systems (3 areas)		*						*				*
Damage to local ecosystems (3 areas)		*		*					*			
Damage to infrastructure/homes (2 areas)		*							*			
Increased pollen production (2 areas)		*		*								
Declines in indoor air quality (1 area)								*				
Northward spread of tropical diseases (1 area)										*		

### Populations Considered to be at Particular Risk

Informants were asked to identify populations that they considered to be most at risk for health impacts of climate and weather change. These were broken out by city size groupings, in consideration of the fact that cities of different sizes will have differing levels of services and capacity available to intervene. When considered in terms of city size groupings, the top three populations were persons with chronic diseases, persons living in areas vulnerable to flooding, and seniors. Interestingly, persons living in vulnerable geographic regions were not identified as a population at risk by the three largest cities (group A), and only

minimally for group C, but for group B, the mid-sized cities, this was the most frequently cited population. The identifications of populations at risk, as identified by city size groupings, are displayed in Table 4.

**TABLE 4: POPULATIONS CONSIDERED MOST AT RISK**

	Persons with Chronic Diseases	Geography (i.e. flood prone regions)	Seniors	Children	Under-housed & Homeless Persons	Persons with Low Socioeconomic Status	Northern & Remote Communities	Persons With Psych. Disabilities
<b>A</b>	6	0	5	2	3	3	0	2
<b>B</b>	1	8	1	2	2	2	2	0
<b>C</b>	3	2	3	2	0	0	1	1
<b>T</b>	<b>10</b>	<b>10</b>	<b>8</b>	<b>6</b>	<b>5</b>	<b>5</b>	<b>3</b>	<b>3</b>

Question 3.0: I would now like to obtain information from you about your current activities to protect health and any changes you may face in this regard. What are you currently doing to protect population health from the specific climate-related health risks that you have identified as of concern to your organization in question 1.1?

Every city size group in each region identified West Nile virus and/or lyme disease monitoring and communications as an action being undertaken. All but one of the city size groups identified standards for air quality and/or monitoring as an action area. Monitoring of UV levels followed, with five city size groupings identifying this as an action area, and production of action and/or outreach plans was also cited by five groupings. It should be noted that these action/outreach plans, while varying in their scope, covered a number of areas such as response to extreme weather or temperature events, flooding, and water quality. Interestingly, only one city size grouping identified food quality standards and monitoring as an action area even though it ranked quite high in terms of issues of concern, but this might be attributable to the fact that food standards tend to fall under the jurisdiction of provincial ministries of agriculture and therefore might lie outside of the mandates of the individuals interviewed for this study. Other areas that were only cited by one or two city size groupings included advocacy on and promotion of clean air and green initiatives, reductions in use of pesticides and automobiles, and energy conservation.

The largest cities cited the broadest range of initiatives being undertaken, which is not surprising given that their resources and capacities will be more extensive than for the smaller cities. At the same time, in the West, both the largest and smallest cities identified equal numbers of initiatives (five for each).

The table below provides an overview of actions being taken in response to climate related health risks as identified by key informants from the different regional city size groups. Cells that are marked with a \* represent the identification of an action by one or more informants from that regional city size group. The shaded columns represent regional city size groups for which no informants were interviewed.

**TABLE 5: ACTIONS BEING TAKEN ON CLIMATE RELATED HEALTH RISKS BY JURISDICTION**

	Atlantic			Central			Prairies			West		
	A	B	C	A	B	C	A	B	C	A	B	C
West Nile Virus & Lyme Disease Monitoring and Communications (8 areas)		*	*	*		*		*	*	*		*
Air Quality Standards & Monitoring/Smog Alerts (7 areas)		*	*	*		*		*		*		*
UV Monitoring & Warnings (5 areas)		*	*			*		*				*
Production of action plans and outreach to community on climate change issues (5 areas)		*	*	*				*	*			
Water Quality Standards & Monitoring (4 areas)		*						*	*			*
Extreme Weather Monitoring & Warnings (4 areas)		*	*	*				*				
Anti-Idling Programs (3 areas)				*		*				*		
Greenhouse Gas Emissions Reduction Programs (3 areas)		*						*		*		
Advocacy at Provincial Level to address public health related to climate & weather change (2 areas)				*				*				
Advocacy on green initiatives (i.e. construction) (2 areas)								*		*		
Promotion of clean air and other partnerships (2 areas)				*				*				
Advocacy for control of ragweed (2 areas)		*		*								
Encouraging use of public transportation/ alternatives to cars (2 areas)				*								*
Research on health impacts of air pollution/pollens increases (1 area)				*								
Promotion of reductions in energy consumption (1 area)				*								
Identification of Vulnerable Populations (1 area)				*								
Food Quality Standards & Monitoring (1 area)				*								
Public Strategy & Communication on Pesticide Use (1 area)									*			
Outreach to landlords to protect tenant health during extreme weather (1 area)				*								
Investigating public understanding of/ response to public health communications (1 area)				*								

The four most common types of climate-related information used in planning and program development were: extreme weather warnings (N=10 / 33.3%); air quality reports (N=8 / 26.6%); West Nile virus surveillance (N=7 / 23.3%); and monitoring for flooding (N=2 / 6.6%).

A comparison of the actions being taken on climate related health risks with the issues of concern identified by the various city size groupings also provides interesting perspectives on the degree of fit between what is on the radar screen for the public health sector and what is actually being done in response. At the top end of the issues of concern (increased outdoor air pollution, declines in water supply and security, declines in food security, spread of infectious diseases, and extreme weather events), there is a fairly close fit with actions being undertaken. At the same time, there are discrepancies, most notably as mentioned above, in the area of food security (an issue of concern identified by seven of the eight city size groupings but an area of action for only one) and, in the opposite direction, increases in UV exposure, which was cited as an area of concern by four of the groupings but was identified as an action area by six. Another interesting discrepancy between issues of concern and areas of action is air pollution, which was the area of concern most frequently identified by the city size groupings (seven out of eight), while only one or two groupings said that they were taking proactive actions (e.g. encouraging use of alternative forms of transportation) beyond monitoring air quality and issuing smog alerts.

When comparing issues of concern and areas of action, it must be kept in mind that informants' responses to particular questions tended to flow across the questions due to the inter-relationships between the areas they addressed, and it is possible that time constraints and individual informants' personal perspectives and access to local information influenced or limited the scope of their identification of actions being undertaken. For example, a member of the advisory committee for this project reported after reading a draft of this report that Toronto Public Health is undertaking an extensive campaign on pesticides (they were one of the first in Ontario to pass a comprehensive pesticide by-law) and Toronto is involved in greenhouse gas emissions reduction programs (although this might be through the department of Public Works)

### **Ability to Respond to Multiple Vulnerabilities**

Question 3.1: Do you find it necessary within the next 10 years to take new actions, or to expand current efforts, to reduce climate-related risks to health in your geographical jurisdictions? If yes, what actions? Why do you find it necessary? If no, why do you find it unnecessary?

When asked whether they foresaw a need to undertake new initiatives during the next ten years in order to reduce climate change related risks to public health, informants were cautious, indicating that they lacked adequate knowledge to make an informed prediction. At the same time, some informants indicated that climate change will require ongoing monitoring in order to identify areas

requiring action, and that the public health sector will have to step up to the plate as new knowledge becomes available.

Question 3.2: Do you use climate-related information (e.g. information about extreme weather events, warmer temperatures) in planning and program development activities at your organization? If yes, please give examples.

Twenty-five (83.3%) of the 30 key informants reported that their organizations did use climate-related information in planning and program development, while four (13.3%) reported that their organizations did not and one did not report.

Question 3.3: In your planning activities, are other departments and agencies consulted and do they consult you in the development of their plans? Please provide examples.

**TABLE 6: OTHER DEPARTMENTS AND AGENCIES CONSULTED**

	Municipal	Provincial	Federal	Other (community groups, industry, NGOs)
Cities A	5	1	1	6
Cities B	7	7	3	6
Cities C	4	1	1	1

Question 3.4: Are you accounting for the possibility of multiple stressors or problems in your planning (e.g. heat wave occurring at the same time as an infectious disease outbreak)? How? Please provide examples.

Thirteen key informants (43.3%) reported that multiple stressors were not being taken into account in planning while 12 (40%) reported that they were and five were not asked the question (due to time constraints).

Five respondents specifically commented that pandemic planning is starting to prepare them for multiple stressors. Two spoke of using an all-hazards approach to planning.

The three largest cities were most likely to report that they were taking multiple vulnerabilities into account, perhaps because they are more likely to have the capacity to undertake such complex planning than are the smaller cities. In terms of the factors that influenced the undertaking of complex planning or were implicated in such planning, the largest cities identified a need for holistic surveillance that could capture interactions between different risks, as well as a need for such surveillance to be coordinated at the federal or provincial levels, and public and political understanding of the potential interconnections and commitment to address multiple vulnerabilities. The perceived long-term nature of many of the risk potentials was seen as a deterrent in terms of mobilizing

public and political understanding of and commitment to addressing the need for complex planning.

### Views on and Indicators of Capacity

Question 4.0: Do particular challenges exist in your efforts to reduce the health risks identified as a concern to you organization in question 1.1?

Lack of resources, lack of adequate knowledge about potential linkages between climate change and health, lack of leadership and lack of prioritization of climate change impacts on public health were identified as the primary factors limiting capacity to research, plan for and respond to climate and weather change. Underlying these, informants felt that a lack of funding, the complexity of the issues, lack of public awareness and lack of knowledge about vulnerable populations constrained their ability to reduce the health risks identified as concerns of their organizations.

**Table 7: Challenges in reducing health risks identified in question 1.1**

	City Size A	City Size B	City Size C
Insufficient resources	*	*	*
Insufficient link between climate change and health	*	*	*
Lack of leadership	*	*	*
Not perceived as a priority issue	*	*	*
Lack of funding	*	*	
Complex issue	*	*	
Lack of public awareness	*	*	
Identifying vulnerable populations	*	*	

Question 4.1: Assume, that over the next 5 to 10 years, you observe a significant increase in the incidences / outbreaks of a health outcome, e.g. spread of Lyme disease or more heat waves. You believe that this is attributable, in part, to increased temperature, precipitation or climate variability. Would your city be able to adequately protect health in the face of such risks? If no, would the challenges be similar to or different from those identified in question 4.0? Please provide examples.

Seven of the key informants (23.3%) reported that their cities would be able to adequately respond to future increases in the incidence of specific health risks, while five (16.6%) reported that their cities would not be able to respond to such increases. Eight (26.6%) reported that they were unsure or were unable to answer the question, four were not asked the question (due to time constraints) and in six instances the responses were not recorded.

Little explanation was given for the responses, with NO comments tending to be contextualized as: “It’s a loaded question” or “It’s a broad question.”

## 5. CONCLUSIONS

All key informants said weather and climate do have a significant impact on health and most felt that climate change would increase risks to the health of people in their geographic jurisdiction. The top risk issues identified were increased air pollution, extreme shifts in temperature, declines in quality and supply of water, declines in food security, and the spread of infectious diseases. Those considered most at risk from climate change are persons with chronic diseases, persons living in areas vulnerable to flooding, and seniors.

While most cities use climate-related information in planning and program development, the three largest Canadian cities undertake the broadest range of initiatives and have the capacity to take multiple stressors or problems into account in their planning.

Climate change, however, has not been identified as a public health priority, primarily because of shortage of funding and lack of knowledge about the issue. For example, the link between weather and climate and changes in patterns of diseases or health conditions is not well understood. Most informants said they did not have adequate knowledge to make an informed prediction about whether they would need to take new actions or extend current efforts within the next 10 years.