

Health Policy Research Program Summary of Research Results

Title:	Climate Change, Extreme Weather Events, and Health Effects in Alberta
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Summary

Extreme weather (weather of unusually high intensity) can permanently and profoundly affect lives and livelihoods, and place unexpectedly high pressures on social and health support structures. As current climate patterns suggest a trend towards global warming and an increase in these extreme weather events, Canada must assess the coping ability of its health and emergency measures and infrastructure. Understanding the extent, the impacts, and the costs of both the direct (e.g., death or injury) and indirect (e.g., mental illness) effects of climate change on health will be key to developing effective risk assessments as well as emergency preparedness policies and plans for action.

Human health is intimately linked to environment, climate, and weather patterns. This study was thus designed to help strengthen health and public policy through adaptation (short-term and long-term changes to prevent future ill-health effects from extreme weather) and mitigation (long-term changes to prevent continued climate change). A two-pronged approach was taken in support of this goal: (a) identify the health hazards associated with extreme weather events in Alberta, and (b) define a risk assessment framework to optimize risk management for climate change and extreme weather events. Specifically, the study gathered data from the print media (local newspapers across Alberta) to investigate the health effects and costs associated with disasters and extreme weather in the Canadian Prairies. This study focused on drought; heat and cold waves; wind, ice and snowstorms; forest fires; and floods or rainstorms.

Newspapers are often overlooked as an information resource. They can provide detailed long-term records of weather events, together with the actual and perceived impacts of these events on individuals and communities. The research team used newspaper archives to address the following objectives:

- Develop a hazard assessment for disasters and extreme weather events in Alberta from 1960 to 2000;
- Assess the potential consequences and impacts of future extreme weather events, including morbidity, mental health, injury, death, and infrastructure or property loss;
- Design an epidemiological study correlating newspaper reports of the event with meteorological and other data from Emergency Preparedness Canada (EPC) and Environment Canada (EC); and
- Evaluate the integration of weather data and health data for the advancement of public policy development at the national and provincial (Alberta) levels.

Our work identified and assessed the impacts of disasters and extreme weather events in Alberta during the period from 1960 to 2001. Our search focused on events (i) that fell under the jurisdiction of Health Canada, (ii) that are likely to become more severe due to climate change, and (iii) that are open to mitigation through long-term planning and policy solutions. Our analysis resulted in the following key findings:

- Significant health problems, such as morbidity, mental disorders, and injury, were associated with extreme weather.
- Mental health impacts corresponded closely with the occurrence of disasters that damaged property.
- Establishing a healthy physical environment decreased the economic costs associated with extreme weather events—a major source of stress in those affected.
- Snow, cold, and fire are the most costly events in terms of property and economic losses, and result in the most service interruption and institutional overload.
- The newspaper media often gave advance warnings for floods and fire, less so for cold, and not at all for snow.
- Early warning systems, when they were available, allowed those affected to take action and reduce their potential for damage, loss, and negative health consequences.
- Solutions, adaptations, and mitigations were often individualized to fit the requirements of the individual, the community, or the greater population in Alberta.
- There was no mention of adaptations, mitigations, or solutions for the majority of cold, snow, and drought events.
- Extreme weather events often drove technological improvements.
- The response of the federal government to extreme weather disasters was negligible in most cases. The primary responders to these events were most often the local stakeholders—individuals, communities or municipalities, and emergency personnel.

Based on these findings, we are proposing the following recommendations:

- To lessen the adverse health outcomes associated with extreme events,

- Increase mental health services and dialogue during drought years, especially in drought-prone areas
- Assess all evacuation routes for each community, noting that routes often differ depending on the types of disasters that could affect a community
- Implement health-related advance warnings of extreme weather
- To reduce the economic losses associated with extreme events,
 - Stop new construction in areas at risk for flooding
 - Implement mandatory flood proofing for buildings already constructed on floodplains
 - Assess the capacity of present technology to lessen the impact of flooding
 - Identify and rank severely drought-prone areas
- To reduce the impact of disasters and extreme weather at the local level,
 - Learn from the unique solutions of other communities to disasters
 - Learn from the mishaps and mistakes of other communities
 - Identify and inventory the vulnerable populations
 - Identify and inventory the key players in the disaster response
 - Improve infrastructure for advance warning of disasters or extreme weather events and improve preparation for unusual weather
 - Inventory the community resources for responding to and coping with a disaster
 - Invest in new infrastructure to address any identified gaps in capacity
 - Inventory the provincial and regional health authority resources available to respond to and cope with each disaster type
 - Devise coping strategies based on different perspectives (e.g., non-governmental organizations, community persons, and academic groups)

Advance warning is a necessity for reducing the adverse health outcomes associated with extreme weather events and disasters. Although Environment Canada currently provides an early warning service, our study showed that newspaper media rarely noted these warnings. Furthermore, some individuals who received the warnings did not heed them. By informing Canadians about the health dangers associated with type of weather predicted, Health Canada could play a more active role in reducing the adverse health effects of extreme weather.

These many recommendations address various aspects of Health Canada's Sustainable Development Strategy (SDS) theme of "Helping to Create Healthy Social and Physical Environments". They address the long-term SDS goals of (a) providing Albertans with information to support decision making, (b) increasing community response capacity, (c) supporting Canada's climate change commitments, (d) raising health awareness at the federal government level, and (e) strengthening the partnerships between the various stakeholders affected by a severe weather event. Our recommendations can lessen the economic, social, cultural, and environmental effects—and in particular, the related

health effects—of extreme weather events on affected populations, especially the more vulnerable groups.

Our media analysis demonstrated the scope of human drama that can occur during natural weather disasters. These events can create intense psychological distress, health concerns, financial ruin, social upheaval, and spiritual doubt. The individuals, organizations and institutions that respond to natural weather disasters are the major players in disaster response, and include government departments, community committees, businesses, emergency responders, and community representatives. Of these stakeholders, those closest to the event are most affected and involved. Our study makes it explicitly clear that Health Canada cannot successfully implement the recommendations above without the help and cooperation of other federal government departments, the government of Alberta, municipal governments, non-governmental organizations, and the public. In addition, communities will need appropriate funding from all levels of government, first to assess their capacities to cope with a variety of weather events and disasters, and then to support the necessary infrastructure changes. Ultimately, Health Canada needs to become part of a multi-stakeholder effort if it is to effectively protect and maintain the population health of Canadians when extreme weather conditions occur.

To support future archival studies of extreme weather, formal training programs should be established to develop Archive Researchers capable of handling the challenges associated with archival searches. In addition, an assessment of the usefulness of Statistics Canada's longitudinal mortality data should be undertaken prior to funding any further studies using these data.

Using the print media to achieve our objectives provided a uniquely Canadian perspective on the direct and indirect impacts of extreme weather in the Prairie regions, and a substantive basis upon which future policy and planning activities can proceed. The study is expected to be of significant value to public policy makers, emergency preparedness teams, and health and infrastructure planners at the local, regional, and national levels. In addition, it has potential value for audiences in other parts of the world that have similar kinds of extreme weather.

**The views expressed herein do not
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In addition to the above Summary, the full report can be accessed in the following ways:

- The print version of the full report can be obtained in the language of submission from the Health Canada Library through inter-library loan.
- An electronic version of the report in the language of submission is available upon request from Health Canada by e-mailing rmddinfo@hc-sc.gc.ca.

This research has been conducted with a financial contribution from Health Canada's Health Policy Research Program. For permission to reproduce all or part of the research report, please contact the Principal Investigator directly at the following address: colin.soskolne@ualberta.ca.

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