

Climate Change Sensitivity Profiles for New Brunswick Health Council Communities

Dieppe

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Project Title

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Project Overview

It is generally agreed that climate change will have significant impacts on health from exposure to climate hazards like extreme heat or cold, extreme weather events, and poor air quality (Berry et al., 2022, pp. 39-41). These hazards will also likely impact water quality which could impact health; both from drinking water and recreational water perspective. They may also affect the ability for vectors like ticks and mosquitoes to become more persistent in our environment, which could lead to increased health risk from diseases like Lyme disease or West Nile virus. While very few direct links can be made between climate change and health outcomes, we anticipate the potential health impacts are wide-ranging (e.g., heat illness, skin cancer, Lyme disease, mental health issues) (Clark et al., 2021, p. 5). Climate change can also exacerbate existing health problems (e.g., asthma, COPD) because people living with these conditions can be more sensitive to these extreme environmental conditions (Clark et al., 2021).

The New Brunswick (NB) HealthADAPT project was a multi-year initiative funded by the Climate Change Innovation Bureau of Health Canada and led by the Government of New Brunswick's Department of Health.¹ The goal of NB HealthADAPT was to test tools for assessing health-related vulnerability and adaptation to climate change in an urban and rural setting.

An approach that can be helpful to policymakers in understanding the potential impact of climate change in New Brunswick communities over time, is to identify and track relevant health indicators. To address this need, the Department of Health partnered with the New Brunswick Institute for Research, Data and Training (NB-IRDT; [UNB.ca/nbirdt](https://unb.ca/nbirdt)) to characterize baseline health-related vulnerabilities for all communities in NB. NB-IRDT is the administrative data custodian for NB, housing and providing access to a variety of population-based administrative databases through a rigorous approval process.

Health related conditions are influenced by different determinants of health (e.g., social factors, economic factors, behaviours, and health services), and both the physical environment and climate change can contribute to increases in relevant health outcomes (Berry et al., 2022, p. 44). While direct links between the data presented in this report and climate change cannot be drawn, the baseline data detailed in this report will provide policymakers a point of comparison over time to consider with observed changes in climate and population health. Tracking changes in health-related vulnerabilities over time can provide insight into how climate changes may be impacting the health of our communities, as well as how adaptation plans may modify these impacts. For example, increases in hospitalizations related to heat are expected as extreme heat events become more frequent, with anticipated changes in our climate. However, communities that implement adaptation plans to mitigate impacts may have smaller changes in rates of hospitalizations than communities that did not. This project provides a starting point to help track potential health impacts into the future.

Profiles of health-related vulnerabilities for each of NB's 33 Health Council Communities (HCCs) are presented in this report. While there are potentially hundreds of indicators for health impacts

¹ More information on HealthADAPT is available at <https://www.canada.ca/en/health-canada/programs/health-adapt.html>.

that may be associated with climate change, these profiles are based on priority areas identified by the Department of Health during the HealthADAPT project, and they are characterized using 11 indicators derived from administrative data for the entire population residing in each HCC.

Vulnerability to climate change is defined as exposure to climate hazards plus the population's sensitivity to those hazards, offset by the community's ability to cope (Enright et al., 2019). The climate change **hazards** profiled in this report are the following:

- Heat
- Air quality
- Extreme weather events and accidents
- Food and water-borne diseases
- Ultraviolet radiation
- Cold
- Vector-borne diseases

Incidence of vector-borne diseases and food and water-borne diseases are relevant to track because increasing average temperatures create conditions that allow certain bacteria and disease-carrying vectors (like mosquitoes and ticks) to establish and propagate to new areas of the province.

Indicators relating to these climate change hazards are characterized by hospitalizations for specific health conditions. The conditions considered for each of these hazard areas are listed below in the description of each indicator. Hospitalization data were used for the profiles, given these are the best available data to characterize these specific conditions in the population. However, for some health conditions (e.g., sunburn), indicators derived from data collected at lower levels of care, such as visits to a doctor's office in the community or to an emergency room, may be more informative. Data at these levels are not currently readily available in NB.

In addition to considering how specific climate hazards impact health, it is recognized there are many conditions that make people more sensitive to climate impacts compared to the rest of the population. The social determinants of health (e.g., age, socio-economic status, education level, ethnicity, housing status, place of work, etc.) can also create increased sensitivity to health impacts of climate change.

Population **sensitivity** to climate change is characterized by health-related factors, such as the population burden of specific chronic conditions. Again, while direct links cannot be drawn, these baseline numbers provide insights into which communities may be more vulnerable to rising temperatures and other effects of climate change. The health conditions profiled in this report are the following:

- Hypertension (high blood pressure)
- Chronic obstructive pulmonary disease (COPD)
- Asthma
- Acute myocardial infarction (heart attack)

Linked data at NB-IRDT were used to derive each of the 11 indicators profiled in this report. The data sets that were used include the Citizen Database (CD), Discharge Abstract Data (DAD), and the Canadian Chronic Disease Surveillance System (CCDSS).

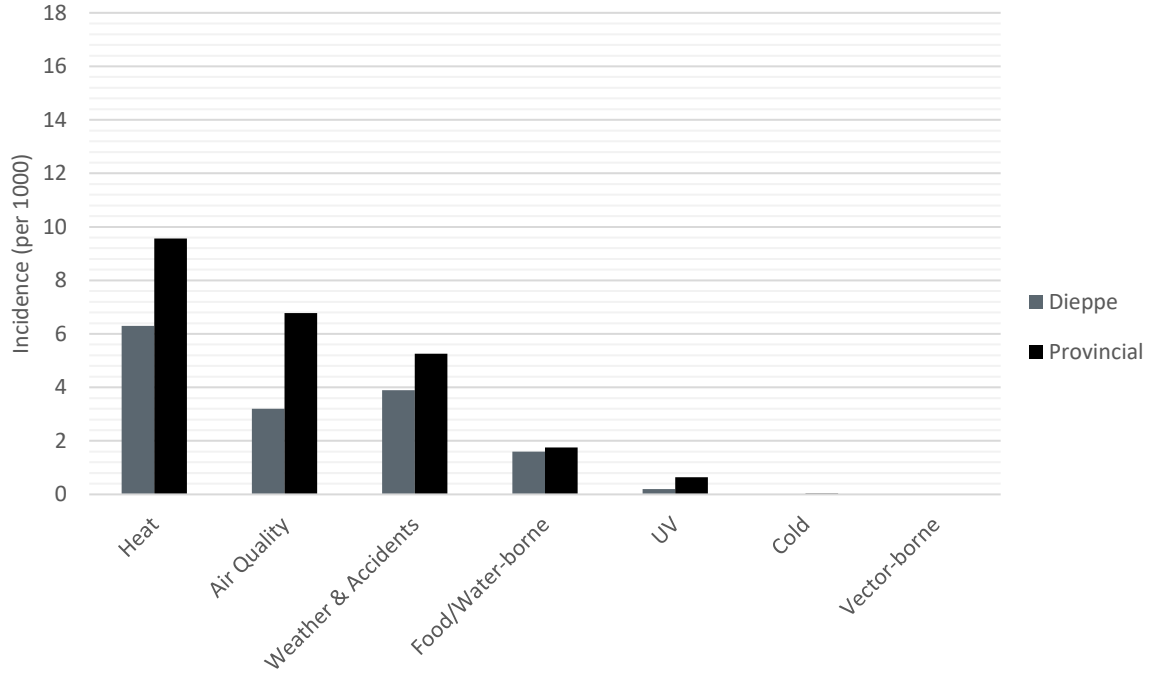
- The **Citizen Database (CD)** is a registry of all NB residents who have applied for an NB Medicare card and includes basic demographic and residential information.
- The **Discharge Abstract Data (DAD)** has records of all hospitalizations for residents of NB and includes details on patient diagnoses and comorbidities.
- The **Canadian Chronic Disease Surveillance System (CCDSS)** holds information on individuals with specific chronic conditions identified using validated algorithms that search databases containing data on hospitalization (DAD), doctor visits, and prescriptions.

The CD is used to assign individuals to a specific HCC and to calculate the number of people residing in each HCC. To protect confidentiality, all frequencies were randomly rounded to zero or five. The area-level estimates represent estimates for the HCC where individuals reside, not where they sought healthcare services. Indicators for climate change hazards are defined using incidence of hospitalization per 1000 person-years. Indicators for population sensitivity by health-related factors are defined using prevalence per 100 people for each chronic condition. Prevalence of chronic conditions and incidence of hospitalizations are estimated using the five most recent available years of data (2014-2018). Annual estimates are presented in the NB HealthADAPT Community Profiles Supplemental File (Feb 2022).

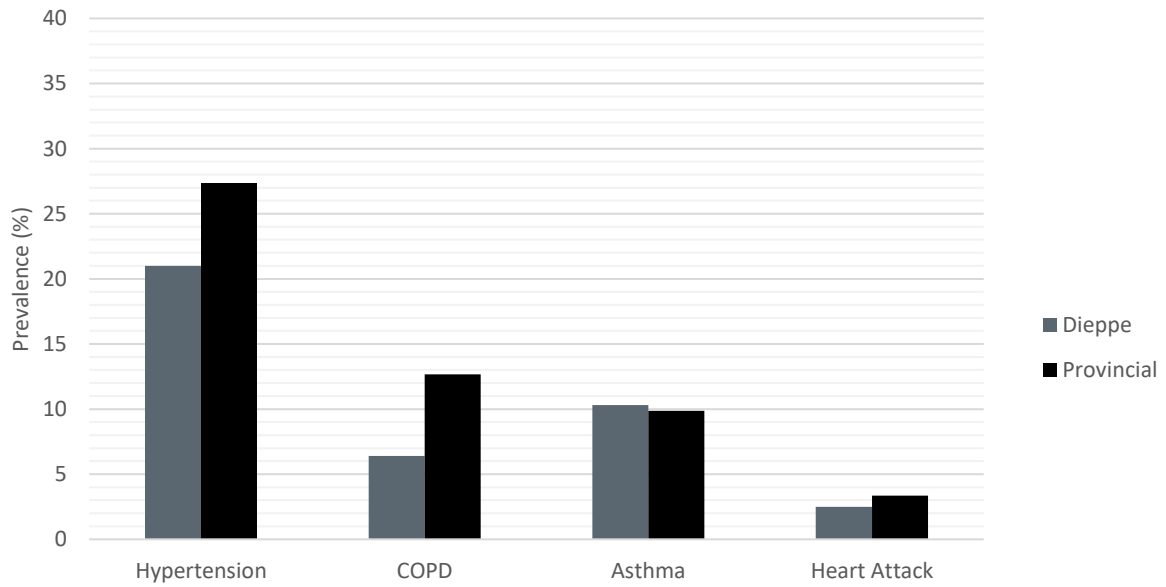
This **project's goal** is to develop health-related vulnerability profiles for New Brunswick Health Council Communities (HCCs) representing climate change hazards and sensitivity. These profiles can support policy makers in decision-making related to climate impacts and facilitate community-based climate change and health vulnerability adaptation assessments to be undertaken. This is a baseline study focusing on the burden of illnesses that may contribute to climate change vulnerability, not climate change impacts themselves. However, the indicators are derived from routinely collected data, and thus they can be updated over time to facilitate assessment of the potential health impacts of climate change in the future.

Community Profile

Profile of Community Hazards to Climate Change



Profile of Community Sensitivity to Climate Change



Description of Indicators

Description of Community Hazards to Climate Change Indicators

While direct links between climate change hazards and incidence of hospitalizations presented in this report cannot be drawn, these baseline data will provide policymakers a point of comparison over time to consider with observed changes in climate and population health.

Indicator	Rationale for Inclusion	Data Presented
Heat	Based on climate projections for New-Brunswick, extreme heat events are one of the main climate change impacts expected.	Hospitalizations related to extreme heat events, including hospitalization for rhabdomyolysis, heat stroke, heat exhaustion, heat syncope, hyponatremia, myocardial infarction, or hypertension.
Air Quality	Poor air quality related to a changing climate is expected to have a growing impact on health.	Hospitalizations related to poor air quality, including hospitalization for asthma, COPD, allergy to pollen, or lung/bronchus cancer.
Weather & Accidents	Extreme weather events are a well-known and observed impact of climate change.	Hospitalizations related to extreme weather events and accidents, including hospitalization for injury due to outdoor falls, drowning, or vehicular accidents.
Food/Water-Borne Diseases	Increasing temperatures will impact long-term water quality and quantity. Food security and food safety are also concerning as flood events or increased water temperatures can create conditions that impact our ability to cultivate food or that support disease-causing bacterial growth in food.	Hospitalizations related to food and water-borne diseases, including hospitalization for Giardia, Cryptosporidiosis, E. Coli, Salmonella, or Campylobacteriosis.
Ultraviolet Radiation	Impacts from ultraviolet radiation (UV) are expected to increase due to climate change.	Hospitalizations related to ultraviolet radiation, including hospitalization for melanoma or sunburn.

Cold	As average temperatures increase, projections for extreme cold events decrease over time.	Hospitalizations related to cold temperatures/weather, including hospitalization for frostbite, hypothermia, or carbon monoxide poisoning.
Vector-Borne Diseases	Increasing temperatures mean the habitat for certain disease-carrying vectors like mosquitoes or ticks is expanding northward throughout the province. Over time, this may result in increased incidences of certain diseases that have not historically been encountered in New Brunswick.	Hospitalizations related to vector-borne diseases, including hospitalization for Lyme disease or West Nile virus.

Description of Community Sensitivity to Climate Change Indicators

While direct links between climate change and the specific health conditions presented in this report cannot be drawn, these baseline data will provide policymakers a point of comparison over time.

Indicator	Rationale for Inclusion	Data presented
Hypertension	Extreme heat, extreme weather events, and other climate hazards create additional challenges for people who are already more at risk because of pre-existing conditions such as hypertension.	Individuals identified as having hypertension based on one or more hospitalizations, or two or more physician visits within two years for hypertension.
COPD	Extreme heat, poor air quality, and other climate hazards create additional challenges for people who are already more at risk because of pre-existing conditions like COPD.	Individuals identified as having COPD based on one or more hospitalizations, or one or more physician visits for COPD.
Asthma	Poor air quality, longer growing seasons, and other climate hazards create additional challenges for people who are already more at risk because of pre-existing conditions such as asthma.	Individuals identified as having asthma based on one or more hospitalizations, or two or more physician visits within two years for asthma.

Heart Attack	Extreme heat, extreme weather events, and other climate hazards create additional challenges for people who are already more at risk because of pre-existing conditions like cardiovascular disease.	Individuals identified as having an acute myocardial infarction (heart attack) based on one or more hospitalizations for heart attack.
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Social Determinants of Health

In addition, it is recognized there are many social conditions that can increase sensitivity to climate impacts (Clark et al., 2021, p. ix). Disparities in the social determinants of health (e.g., age, socio-economic status, education level, ethnicity, housing status, place of work, etc.) among the population may lead to increased sensitivity to health impacts of climate change. Indicators related to the social determinants of health are not presented in this report but are readily available on the [**New Brunswick Health Council's \(NBHC\) community data website**](#) and the [**Statistics Canada Census Profiles website**](#). Key indicators that can be used to help assess a community's level of sensitivity based on the social determinants of health include:

Summarized for each HCC

- % of population more than 75 years of age
- % of population under 5 years of age
- % of population living alone
- % of single-parent families
- % of low-income households
- % of population with less than a high school equivalent diploma
- % of persons with a disability
- % of population who are recent immigrants (moved from another country within last year)
- % of population who are a visible minority
- % of population who work outdoors (occupations in agriculture, fishing, forestry, hunting, mining, quarrying, oil and gas extraction, utilities, or construction)
- Prevalence of chronic health conditions for the population (mental health and premature death rates)

Summarized for Statistics Canada geographical areas

- % of population spending 30% + of their income on shelter costs
- % of population who do not speak either official language (FR or EN)
- % of population who are of Aboriginal ancestry

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