Climate Change Sensitivity Profiles for New Brunswick Health Council Communities

Provincial Profile

February 28, 2022

Sandra Magalhaes, PhD
Kyle Rogers, MSc
Tracey Wade, RPP, MSc

Project Title

Climate change sensitivity profiles for New Brunswick Health Council Communities: Provincial profile: February 28, 2022

Principal Investigator

Sandra Magalhaes, Research Associate, NB-IRDT

Research Team

Kyle Rogers, Data Analyst, NB-IRDT
Tracey Wade, NB HealthADAPT Lead, GNB

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How to Cite This Product

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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, pp. 1-2).

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**) 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.

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

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 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.

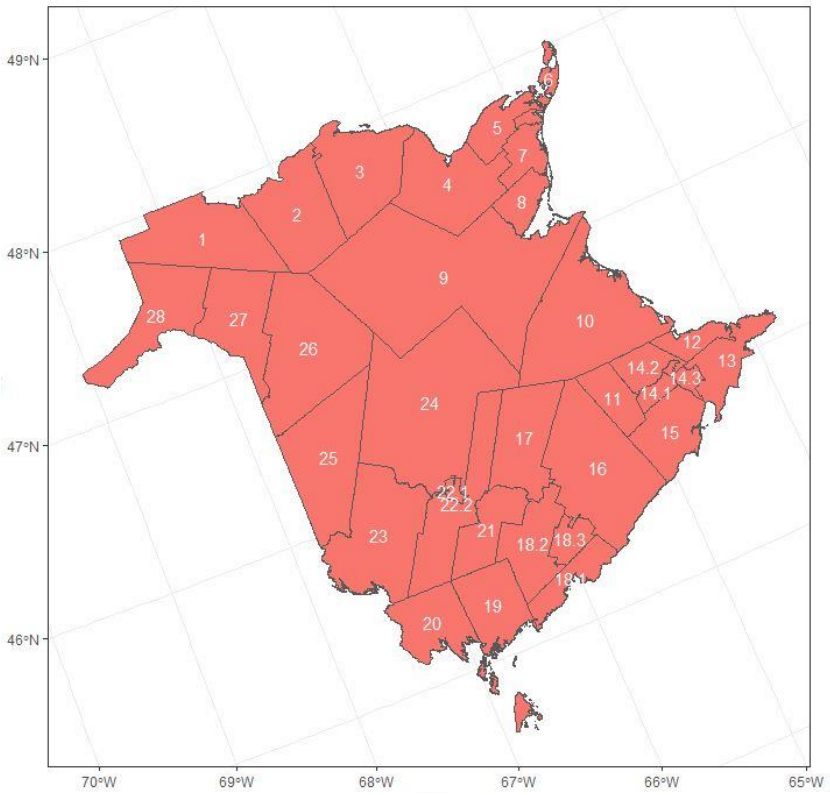
The CD is used to assign individuals to a specific HCC and to calculate the number of people residing in each HCC. To protect confidentiality, all frequencies were randomly rounded to zero or five. The area-level estimates represent estimates for the HCC where individuals reside, not where they sought 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.

List of Indicators

New Brunswick Health Council Communities

NB HCC Name	#
Kedgwick	1
Campbellton	2
Dalhousie	3
Bathurst	4
Caraquet	5
Shippagan	6
Tracadie-Sheila	7
Neguac	8
Miramichi	9
Bouctouche	10
Salisbury	11
Shediac	12
Sackville	13
Riverview	14.1
Moncton	14.2
Dieppe	14.3
Hillsborough	15
Sussex	16
Minto	17
Saint John	18.1
Grand Bay-Westfield	18.2
Quispamsis	18.3
St. George	19
St. Stephen	20
Oromocto	21
Fredericton	22.1
New Maryland	22.2
Nackawic	23
Douglas	24
Florenceville-Bristol	25
Perth-Andover	26
Grand Falls	27
Edmundston	28



Profiles of Community Hazards to Climate Change

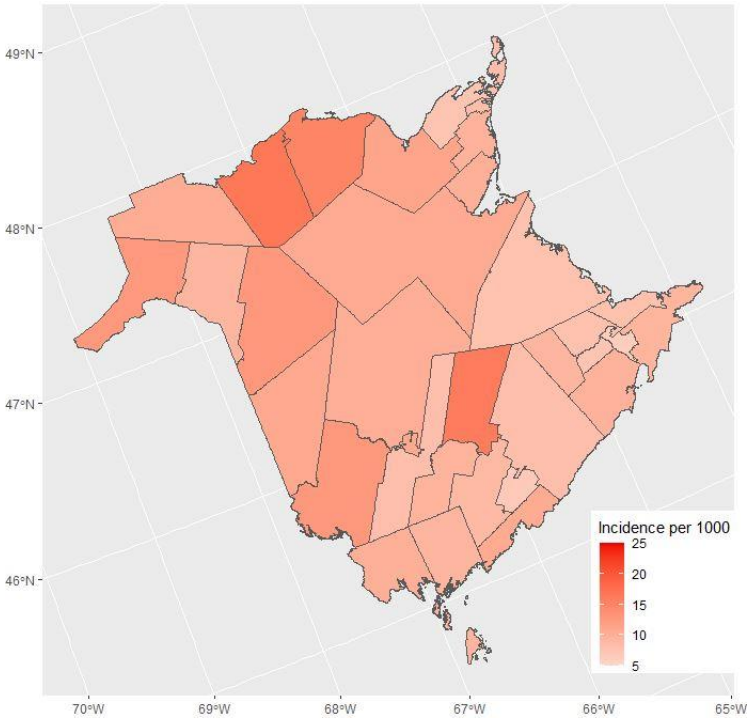
Incidence of Hospitalizations Related to Heat

NB HCC	Incidence (per 1000)
Kedgwick	10.3
Campbellton	16.6
Dalhousie	15.1
Bathurst	11.3
Caraquet	7.4
Shippagan	8.3
Tracadie-Sheila	9.7
Neguac	10.0
Miramichi	10.7
Bouctouche	7.6
Salisbury	9.2
Shediac	7.7
Sackville	9.4
Riverview	7.3
Moncton	7.7
Dieppe	6.3
Hillsborough	9.6
Sussex	8.1
Minto	16.1
Saint John	10.5
Grand Bay-Westfield	8.7
Quispamsis	6.8
St. George	9.2
St. Stephen	10.0
Oromocto	9.4
Fredericton	10.9
New Maryland	8.1
Nackawic	12.8
Douglas	10.1
Florenceville-Bristol	10.8
Perth-Andover	12.9
Grand Falls	9.3
Edmundston	12.7
Provincial	9.6

Based on climate projections for New Brunswick, extreme heat events are one of the main climate change impacts expected. While direct links between climate change and incidence of hospitalizations related to heat cannot be drawn, these baseline data will provide policymakers a point of comparison over time to consider with observed changes in heat and population health.

This indicator shows the number of hospitalizations (per 1000 population) involving rhabdomyolysis, heat stroke, heat exhaustion, heat syncope, hyponatremia, myocardial infarction, or hypertension.

Areas coloured darker red have higher level of hospitalizations related to heat.



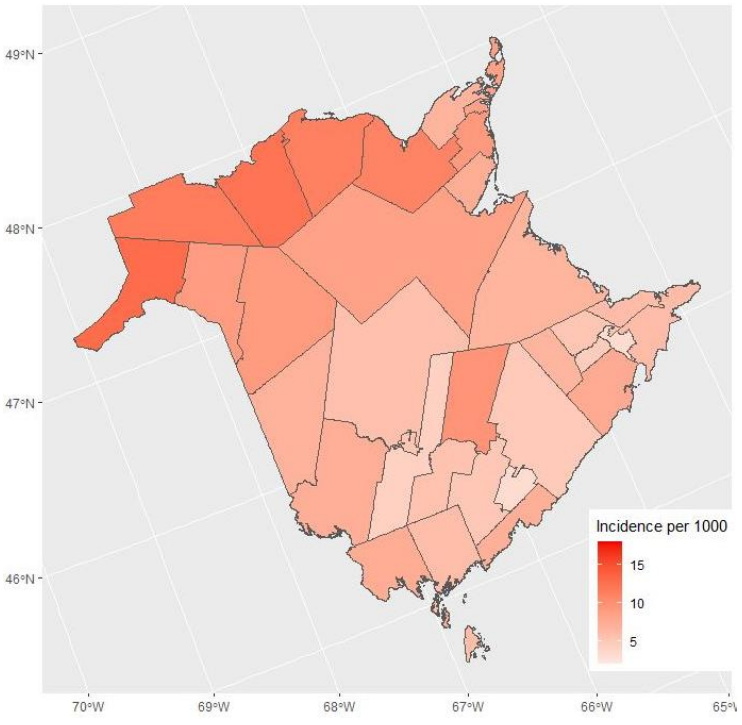
Incidence of Hospitalizations Related to Air Quality

NB HCC	Incidence (per 1000)
Kedgwick	11.7
Campbellton	12.3
Dalhousie	11.2
Bathurst	11.1
Caraquet	6.8
Shippagan	8.4
Tracadie-Sheila	9.1
Neguac	7.4
Miramichi	8.5
Bouctouche	6.8
Salisbury	6.6
Shediac	6.1
Sackville	6.0
Riverview	4.5
Moncton	5.2
Dieppe	3.2
Hillsborough	7.7
Sussex	4.8
Minto	9.6
Saint John	7.2
Grand Bay-Westfield	5.1
Quispamsis	3.2
St. George	5.9
St. Stephen	7.4
Oromocto	5.5
Fredericton	5.2
New Maryland	4.2
Nackawic	7.3
Douglas	5.7
Florenceville-Bristol	6.9
Perth-Andover	9.0
Grand Falls	8.9
Edmundston	12.9
Provincial	6.8

Poor air quality related to a changing climate is expected to have a growing impact on health. While direct links between climate change and incidence of hospitalizations related to air quality cannot be drawn, these baseline data will provide policymakers a point of comparison over time to consider with observed changes in air quality and population health.

This indicator shows the number of hospitalizations (per 1000 population) involving asthma, COPD, allergy to pollen, or lung/bronchus cancer.

Areas that are coloured darker red have higher levels of hospitalizations related to poor air quality.



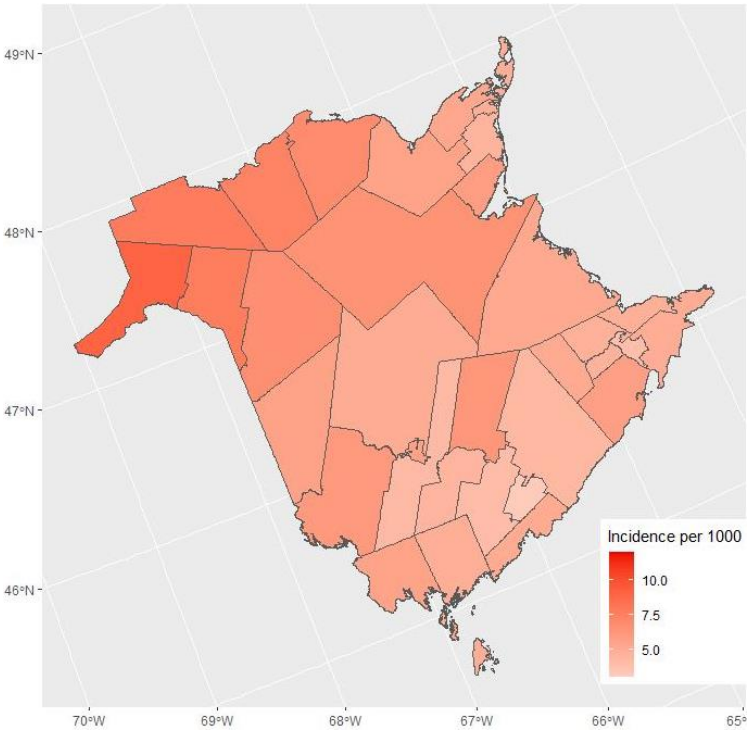
Incidence of Hospitalizations Related to Extreme Weather Events and Accidents

NB HCC	Incidence (per 1000)
Kedgwick	7.7
Campbellton	7.3
Dalhousie	6.9
Bathurst	5.6
Caraquet	5.3
Shippagan	4.8
Tracadie-Sheila	4.5
Neguac	5.9
Miramichi	6.5
Bouctouche	5.2
Salisbury	5.1
Shediac	4.8
Sackville	5.0
Riverview	4.6
Moncton	4.7
Dieppe	3.9
Hillsborough	5.8
Sussex	4.3
Minto	6.2
Saint John	5.1
Grand Bay-Westfield	4.1
Quispamsis	3.1
St. George	4.8
St. Stephen	5.6
Oromocto	4.5
Fredericton	5.6
New Maryland	4.2
Nackawic	6.1
Douglas	5.0
Florenceville-Bristol	5.6
Perth-Andover	6.7
Grand Falls	7.7
Edmundston	9.0
Provincial	5.3

Extreme weather events are a well-known and observed impact of climate change. While direct links between climate change and incidence of hospitalizations 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. Mental health impacts from extreme weather events are also expected but have not been included at this time.

This indicator shows the number of hospitalizations (per 1000 population) involving injury due to outdoor falls, drowning, or vehicular accidents.

Areas that are coloured darker red have higher level of hospitalizations related to extreme weather events and accidents.



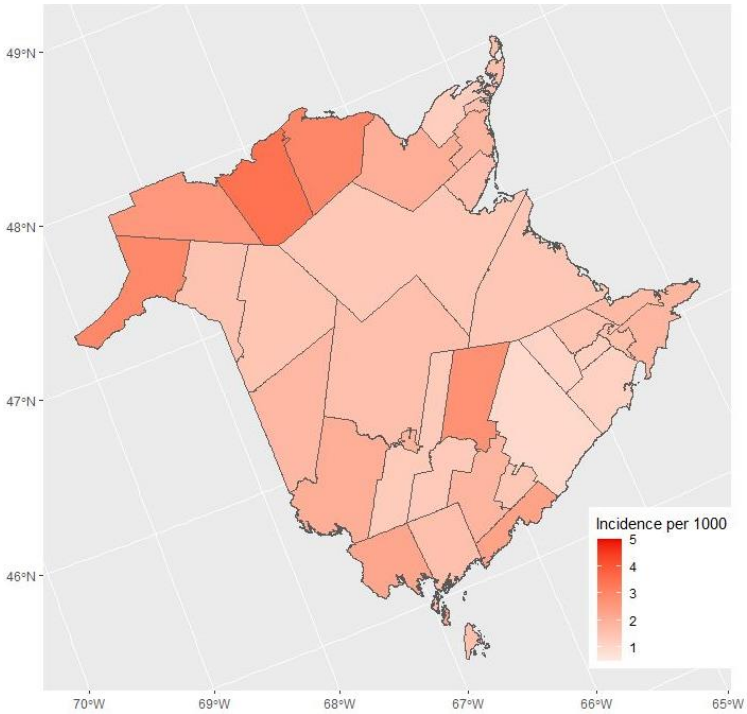
Incidence of Hospitalizations Related to Food and Water-Borne Diseases

NB HCC	Incidence (per 1000)
Kedgwick	2.6
Campbellton	3.4
Dalhousie	3.0
Bathurst	2.0
Caraquet	1.3
Shippagan	1.6
Tracadie-Sheila	1.8
Neguac	1.6
Miramichi	1.4
Bouctouche	1.4
Salisbury	1.1
Shediac	1.7
Sackville	1.8
Riverview	1.2
Moncton	1.5
Dieppe	1.6
Hillsborough	1.2
Sussex	1.0
Minto	2.7
Saint John	2.3
Grand Bay-Westfield	1.8
Quispamsis	1.4
St. George	1.6
St. Stephen	2.2
Oromocto	1.4
Fredericton	1.9
New Maryland	1.3
Nackawic	2.0
Douglas	1.6
Florenceville-Bristol	1.8
Perth-Andover	1.4
Grand Falls	1.5
Edmundston	2.9
Provincial	1.8

Increasing temperatures will impact long-term water quality and quantity in New Brunswick. 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. While direct links between climate change and incidence of hospitalizations 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.

This indicator shows the number of hospitalizations (per 1000 population) involving Giardia, Cryptosporidiosis, E. Coli, Salmonella, or Campylobacteriosis.

Areas that are coloured darker red have higher levels of hospitalizations related to food and water-borne diseases.



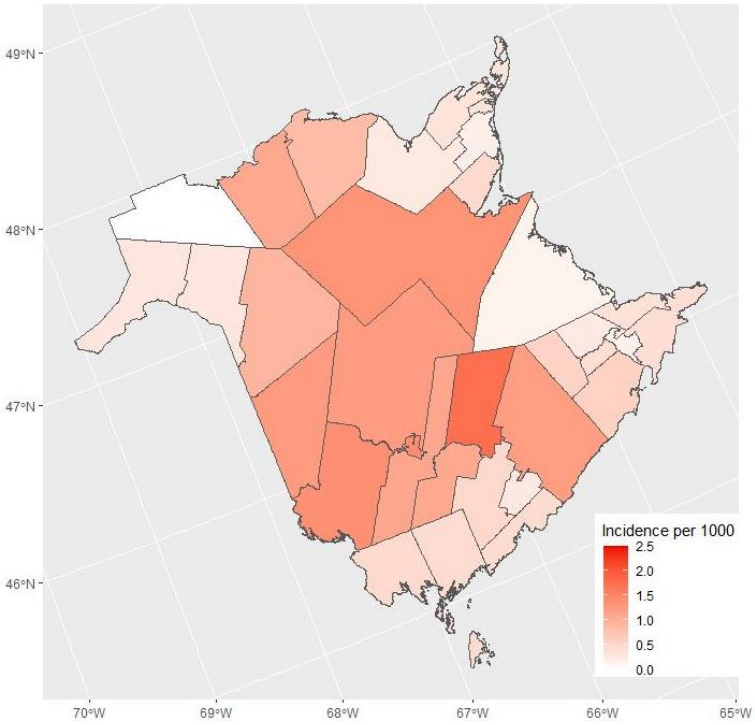
Incidence of Hospitalizations Related to Ultraviolet Radiation

NB HCC	Incidence (per 1000)
Kedgwick	0.0
Campbellton	1.1
Dalhousie	0.8
Bathurst	0.3
Caraquet	0.3
Shippagan	0.3
Tracadie-Sheila	0.2
Neguac	0.5
Miramichi	1.3
Bouctouche	0.2
Salisbury	0.6
Shediac	0.4
Sackville	0.4
Riverview	0.4
Moncton	0.3
Dieppe	0.2
Hillsborough	0.6
Sussex	1.2
Minto	1.8
Saint John	0.4
Grand Bay-Westfield	0.5
Quispamsis	0.3
St. George	0.4
St. Stephen	0.5
Oromocto	1.1
Fredericton	1.4
New Maryland	1.1
Nackawic	1.4
Douglas	1.2
Florenceville-Bristol	1.3
Perth-Andover	0.9
Grand Falls	0.3
Edmundston	0.3
Provincial	0.6

Impacts from ultraviolet radiation are expected to increase due to climate change. While direct links between climate change and incidence of hospitalizations related to UV radiation cannot be drawn, these baseline data will provide policymakers a point of comparison over time to consider with observed changes in ultraviolet radiation and population health.

This indicator shows the number of hospitalizations (per 1000 population) involving melanoma or sunburn.

Areas that are coloured darker red have higher levels of hospitalizations related to ultraviolet radiation.



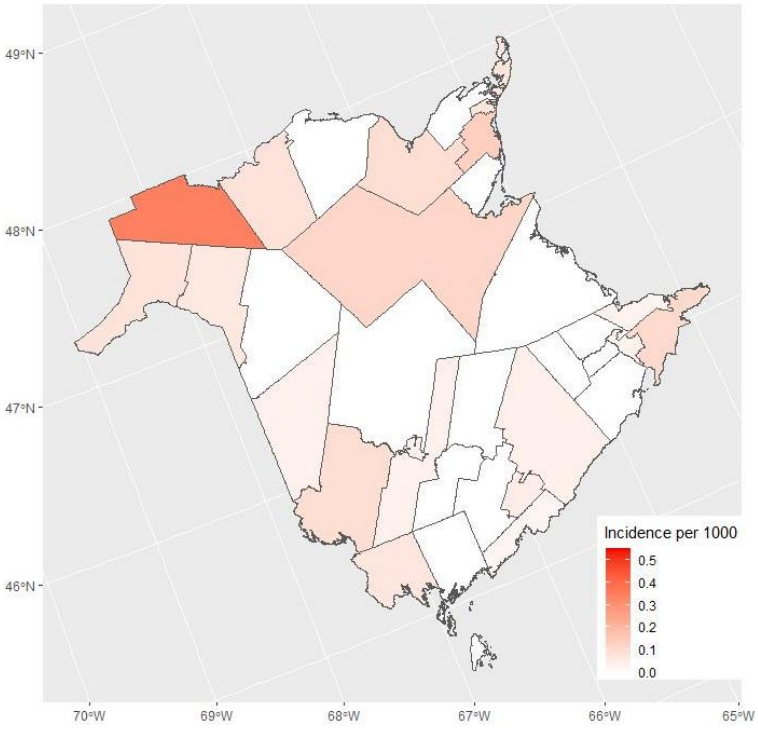
Incidence of Hospitalizations Related to Cold

NB HCC	Incidence (per 1000)
Kedgwick	0.34
Campbellton	0.08
Dalhousie	0.00
Bathurst	0.09
Caraquet	0.00
Shippagan	0.07
Tracadie-Sheila	0.13
Neguac	0.00
Miramichi	0.11
Outcoached	0.00
Salisbury	0.00
Shediac	0.03
Sackville	0.10
Riverview	0.00
Moncton	0.00
Dieppe	0.03
Hillsborough	0.00
Sussex	0.04
Minto	0.00
Saint John	0.03
Grand Bay-Westfield	0.00
Quispamsis	0.05
St. George	0.00
St. Stephen	0.07
Oromocto	0.00
Fredericton	0.04
New Maryland	0.04
Nackawic	0.09
Douglas	0.00
Florenceville-Bristol	0.04
Perth-Andover	0.00
Grand Falls	0.06
Edmundston	0.08
Provincial	0.03

As average temperatures increase, projections for extreme cold events decrease over time. While direct links between climate change and incidence of hospitalizations related to cold 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.

This indicator shows the number of hospitalizations (per 1000 population) involving frostbite, hypothermia, or carbon monoxide poisoning.

Areas that are coloured darker red have higher levels of hospitalizations related to cold; and areas that are white indicate no hospitalizations related to cold.



Incidence of Hospitalizations Related to Vector-Borne Diseases

NB HCC	Incidence (per 1000)
Kedgwick	0.0
Campbellton	0.0
Dalhousie	0.0
Bathurst	0.0
Caraquet	0.0
Shippagan	0.0
Tracadie-Sheila	0.0
Neguac	0.0
Miramichi	0.0
Bouctouche	0.0
Salisbury	0.0
Shediac	0.0
Sackville	0.0
Riverview	0.0
Moncton	0.0
Dieppe	0.0
Hillsborough	0.0
Sussex	0.0
Minto	0.0
Saint John	0.0
Grand Bay-Westfield	0.0
Quispamsis	0.0
St. George	0.0
St. Stephen	0.0
Oromocto	0.0
Fredericton	0.0
New Maryland	0.0
Nackawic	0.0
Douglas	0.0
Florenceville-Bristol	0.0
Perth-Andover	0.1
Grand Falls	0.0
Edmundston	0.0
Provincial	0.002

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.

This indicator has been suppressed, as fewer than five hospitalizations related to vector-borne diseases (Lyme disease or West Nile virus) were identified among individuals living in each community. For this reason, no map is displayed.

Profiles of Community Sensitivity to Climate Change

Social Determinants of Health

In addition to considering how specific climate hazards may impact health, it is recognized there are many social and health 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 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

There are several pre-existing health conditions that also increase sensitivity and may make communities more vulnerable to impacts of climate change. Here we detail four of these key health conditions recognized to make individuals more vulnerable to climate change.

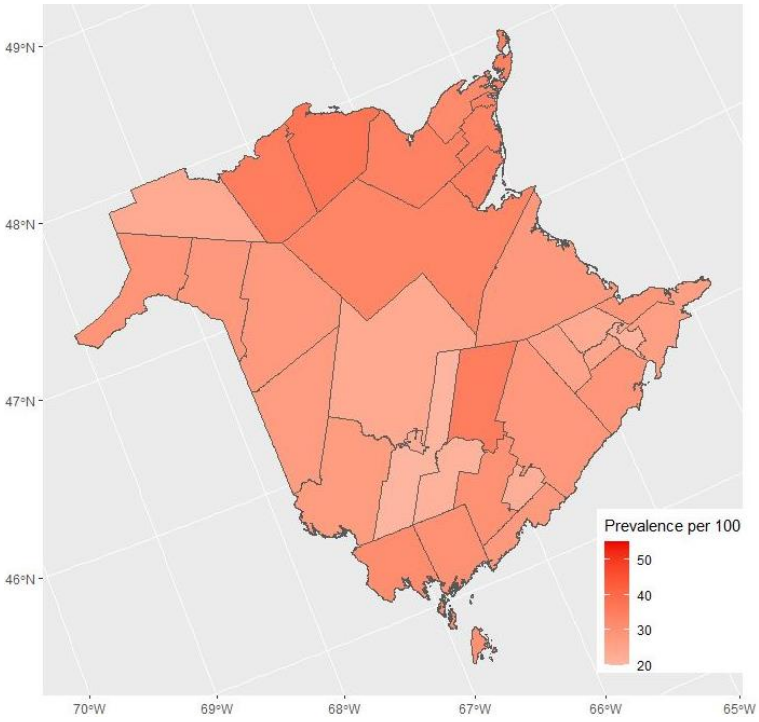
Prevalence of Hypertension (High Blood Pressure)

NB HCC	Prevalence (per 100)
Kedgwick	23.2
Campbellton	35.1
Dalhousie	37.2
Bathurst	34.0
Caraquet	32.2
Shippagan	34.2
Tracadie-Sheila	33.9
Neguac	34.4
Miramichi	33.2
Bouctouche	28.2
Salisbury	25.3
Shediac	28.6
Sackville	26.6
Riverview	24.8
Moncton	23.6
Dieppe	21.0
Hillsborough	29.1
Sussex	28.4
Minto	35.1
Saint John	28.0
Grand Bay-Westfield	30.2
Quispamsis	22.2
St. George	30.1
St. Stephen	31.2
Oromocto	21.0
Fredericton	23.1
New Maryland	20.3
Nackawic	27.2
Douglas	23.7
Florenceville-Bristol	27.1
Perth-Andover	28.0
Grand Falls	28.2
Edmundston	29.1
Provincial	27.4

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. While direct links between climate change and hypertension cannot be drawn, these baseline data will provide policymakers a point of comparison over time.

This indicator shows the number of individuals (per 100 population) who have hypertension, living in each community.

Areas that are coloured darker red have higher prevalence of hypertension.



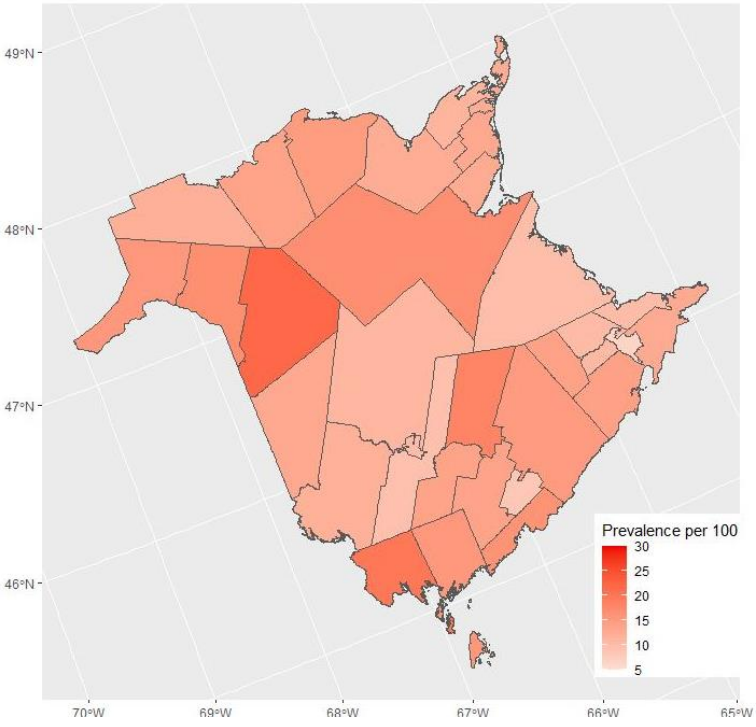
Prevalence of COPD

NB HCC	Prevalence (per 100)
Kedgwick	12.0
Campbellton	13.9
Dalhousie	14.8
Bathurst	12.4
Caraquet	11.3
Shippagan	12.4
Tracadie-Sheila	13.1
Neguac	12.6
Miramichi	16.8
Bouctouche	9.8
Salisbury	14.0
Shediac	10.1
Sackville	12.7
Riverview	10.4
Moncton	10.3
Dieppe	6.4
Hillsborough	14.1
Sussex	15.0
Minto	18.2
Saint John	16.1
Grand Bay-Westfield	13.8
Quispamsis	8.5
St. George	15.4
St. Stephen	20.0
Oromocto	13.9
Fredericton	10.0
New Maryland	9.5
Nackawic	11.8
Douglas	10.9
Florenceville-Bristol	13.0
Perth-Andover	22.1
Grand Falls	16.8
Edmundston	15.4
Provincial	12.7

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. While direct links between climate change and COPD cannot be drawn, these baseline data will provide policymakers a point of comparison over time.

This indicator shows the number of individuals (per 100 population) with the chronic lung condition Chronic Obstructive Pulmonary Disease, also referred to as COPD, living in each community.

Areas that are coloured darker red have higher prevalence of COPD



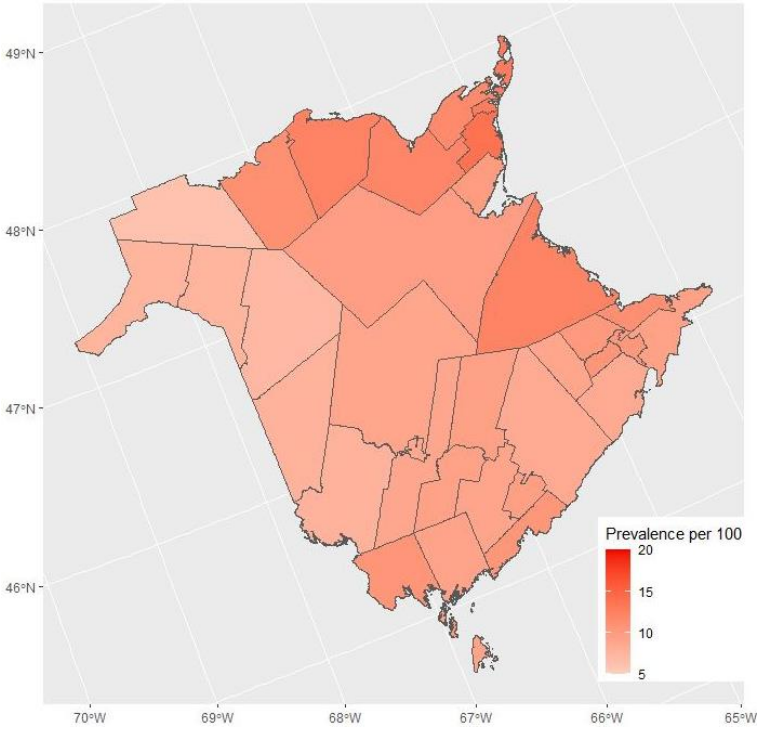
Prevalence of Asthma

NB HCC	Prevalence (per 100)
Kedgwick	6.1
Campbellton	11.1
Dalhousie	12.3
Bathurst	12.0
Caraquet	11.7
Shippagan	12.8
Tracadie-Sheila	13.8
Neguac	9.9
Miramichi	9.7
Bouctouche	12.2
Salisbury	8.9
Shediac	11.1
Sackville	9.3
Riverview	10.6
Moncton	10.2
Dieppe	10.3
Hillsborough	8.5
Sussex	8.5
Minto	9.5
Saint John	10.5
Grand Bay-Westfield	9.0
Quispamsis	9.6
St. George	9.1
St. Stephen	10.5
Oromocto	9.4
Fredericton	8.7
New Maryland	8.9
Nackawic	7.7
Douglas	9.0
Florenceville-Bristol	7.7
Perth-Andover	7.2
Grand Falls	7.5
Edmundston	7.5
Provincial	9.9

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. While direct links between climate change and asthma cannot be drawn, these baseline data will provide policymakers a point of comparison over time.

This indicator shows the number of individuals (per 100 population) with the chronic lung condition asthma, living in each community.

Areas that are coloured darker red have higher prevalence of asthma.



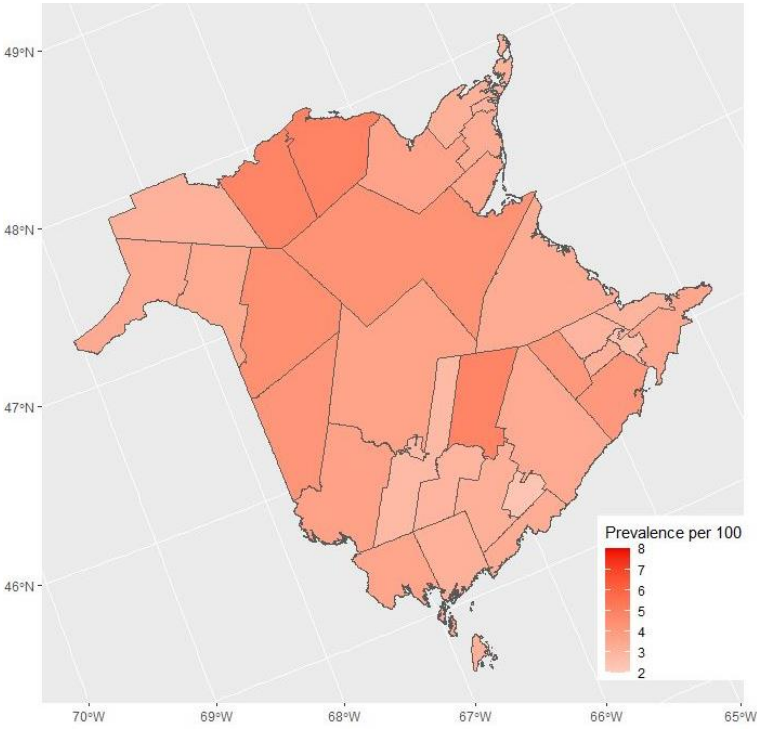
Prevalence of Acute Myocardial Infarction (Heart Attack)

NB HCC	Prevalence (per 100)
Kedgwick	3.1
Campbellton	4.9
Dalhousie	4.9
Bathurst	3.7
Caraquet	3.2
Shippagan	3.1
Tracadie-Sheila	3.3
Neguac	3.6
Miramichi	4.3
Bouctouche	3.4
Salisbury	4.1
Shediac	3.0
Sackville	3.5
Riverview	3.2
Moncton	3.0
Dieppe	2.5
Hillsborough	4.1
Sussex	3.4
Minto	4.9
Saint John	3.3
Grand Bay-Westfield	3.2
Quispamsis	2.4
St. George	3.2
St. Stephen	3.6
Oromocto	3.0
Fredericton	2.9
New Maryland	2.8
Nackawic	3.7
Douglas	3.7
Florenceville-Bristol	4.2
Perth-Andover	4.4
Grand Falls	3.4
Edmundston	3.4
Provincial	3.4

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 diseases. While direct links between climate change and heart attack cannot be drawn, these baseline data will provide policymakers a point of comparison over time.

This indicator shows the number of individuals (per 100 population) who have had a heart attack, living in each community.

Areas that are coloured darker red have higher prevalence of heart attack.



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