

Project 2: Helping North American Communities Adapt to Climate Change: A Pilot Syndromic Surveillance System for Extreme Heat		Operating Year(s): 2015–2016
<div>Planned Budget for Two Years: C\$400,000</div> <div>Year 1 (1 July 2015–30 June 2016): C\$205,000</div> <div>Year 2 (1 July 2016–30 June 2017): C\$195,000</div>		
<div>Strategic Priority/Subtheme</div> <div><ul style="list-style-type: none">Climate Change Mitigation and Adaptation</div>		
<div>How will this project address the cross-cutting themes?</div> <div>This project aligns with the following CEC cross-cutting themes: (1) learning from and assisting vulnerable groups and communities and (2) enhancing information sharing, capacity building and communication. The project is intended to help selected North American communities increase their adaptation capacity to the adverse environmental health effects of extreme heat. This will be achieved through the development of a pilot syndromic surveillance system for heat and through the identification of the associated health impacts on vulnerable populations within each community. The pilot syndromic surveillance system could be used as a situational awareness tool to support decision-making, allow early detection of heat-related health risks in geographically distinct locations, and enhance targeted communication measures designed to raise awareness among the general public and the most vulnerable groups about the dangers of extreme heat. Another important output from this project is a summary report, containing methodological information as well as guidelines and lessons learned on the design and implementation of real-time syndromic surveillance systems that can be shared with other North American communities.</div>		
<div>Project Summary (including a clear statement of project goal)</div> <div>In the context of climate change, extreme heat events (EHEs) are expected to significantly increase in frequency, duration and intensity in several regions of North America enduring the course of this century. This would result in an increase of heat-related morbidity and mortality especially among vulnerable populations and in communities that have limited capacity to respond and adapt to this environmental health risk. In parallel, several communities are taking important actions to build resiliency and adapt to the effects of extreme heat by implementing heat alert and response systems and monitoring health indicators that will aid understanding the health impacts of extreme heat. Syndromic surveillance systems are increasingly being expanded to monitor the impact of climate and environmental exposures on populations in a timely manner. These systems are an efficient way to build resiliency to climate change as they are designed to give early detection of public health threats and to support decision-making during an emergency.</div> <div>The main goal of this project is to develop a pilot operational, real-time syndromic surveillance system for EHEs in three at-risk communities in Canada, Mexico and the United States, and to highlight in a guidance document best practices and lessons learned on developing a syndromic surveillance system for EHEs. Throughout this project, a number of activities are suggested that will produce a database of comparable health, climate and population information, GIS maps of populations vulnerable to EHEs, and facilitated discussions and knowledge transfer between North American public health professionals and experts.</div>		

The proposed syndromic surveillance system could be used as a tool for situational awareness and could support local public health professionals and emergency management officials as they respond to EHEs. The project will be completed in collaboration with selected health authorities who currently have existing capacity with similar systems to take advantage of their expertise and knowledge. This approach should facilitate completion of the project and help avoid delays in the development and implementation of the system.

Short-term Outcomes (at halfway point)

- Pilot communities from Canada, US and Mexico identified and engaged in project.
- Needs identified through a literature review and through a survey on the use of syndromic surveillance systems.
- A better understanding of the relationship between extreme heat and health outcomes through data collection and statistical analysis in the selected communities.
- Groups and populations vulnerable to extreme heat in the selected communities identified and mapped.
- Enhanced capacity of each participating community through the design and development of a pilot syndromic surveillance system for heat.

Long-term Outcomes (by the end of the project)

- Reduction of environmental health risks due to extreme heat and better situational awareness in each participating community through the use of an operational pilot syndromic surveillance system for heat.
- Knowledge sharing provided via a public web-based tool on the potential populations and areas vulnerable to extreme heat in participating communities.
- Knowledge transfer through a guidance report on developing syndromic surveillance for heat including lessons learned from the three case studies and detailed information about each database used in the project.
- Enhanced awareness through a North American workshop on syndromic surveillance and climate change.

Longer-term, Environmental Outcomes (post-project)

- Promotion of healthy communities and building capacity of the health care sector to better respond during extreme heat events in a changing climate (through a situational awareness tool: a real-time syndromic surveillance system for heat).
- Improvement of the environment of North America through the use of syndromic surveillance that provides evidence-based information on vulnerable populations and targeted urban areas where specific environmental measures are needed. These measures include the protection of existing green spaces, the promotion of green buildings, the reduction of urban heat island effects, and the reduction of outdoor air pollution.
- Facilitate knowledge transfer and promote capacity building through a possible expansion of the pilot syndromic surveillance system to other communities and through the establishment of a North American Working Group on syndromic surveillance of health and climate-related impacts.

Performance Measures (quantified SMART measures)

- Identification of communities that have syndromic surveillance systems in place.
- Implementation of a pilot real-time syndromic surveillance system for extreme heat in three at-risk communities in North America.
- Generation of maps of vulnerable populations that can be used for analysis and knowledge transfer.
- Number of heat-related illness detected by the pilot syndromic surveillance system.
- Identification of populations potentially vulnerable to extreme heat in participating communities (such children or seniors with existing medical conditions).

Tasks necessary to reach the environmental outcome:

- 1) Research and vulnerability assessment (C\$105,000)
- 2) Design and development of the pilot SS system (C\$90,000)
- 3) Implementing, testing and validating the pilot SS system (C\$75,000)
- 4) Knowledge sharing and transfer (C\$130,000)

Task #1) Research and vulnerability assessment

Subtask	Project outputs	How does the subtask/output move the project towards the environmental outcome	Timing	Budget (C\$) (activities)
1.1 Needs assessment and consultation with partners to select participating communities	Collect feedback from local and regional health authorities on the needs in terms of syndromic surveillance in North America and selection of three at-risk communities in Canada, US and Mexico based on defined criteria	This subtask is key to the achievement of the project. Its output allows the identification of the participating communities and initiates discussions with multiple partners to have a better understanding of the population needs and vulnerabilities in the selected communities	Year 1 (July–Sep 2015)	Year 1: \$21,000 (contracts) Year 2: \$0
1.2 Literature review and collection of historical health, climate (weather and air) and census data	A summary on the types of syndromic surveillance systems in North America and on methods to implementing real-time health surveillance. A community-based database that includes health, population, climate data and other sources of information such land cover, vegetation, urban heat islands, etc.	Having an overview of existing methods of human health surveillance in North America and building a multi-source database will help the design and development of the pilot syndromic surveillance. It is also the foundation towards a better understanding of heat health risks in participating	Year 1 (Aug–Dec 2015)	Year 1: \$42,000 (contracts) Year 2: \$0

		communities.		
1.3 Statistical analysis of historical data and mapping vulnerabilities	<ul style="list-style-type: none"> - A consistent method to quantify the relationship between extreme heat and health outcomes - A series of GIS maps, publicly available, on the types vulnerable populations and targeted areas at risk to extreme heat - A definition of a syndrome for heat that could be used in the pilot syndromic surveillance system 	Provides evidence-based information on heat health risks and on potentially vulnerable populations in the participating communities	Year 1 (Sep 2015–March 2016)	Year 1: \$32,000 (contracts, report) Year 2: \$0
1.4 Summary of the findings and description of vulnerabilities in the selected three pilot communities	An internal report that includes key results from Task #1 and recommendations on relevant health and climate variables to monitor during an extreme heat event	This report could be used by the participating communities as a working document to support the design and development of the pilot syndromic surveillance system.	Year 1 (March–Apr 2016)	Year 1: \$10,000 (contracts, report) Year 2: \$0
Task #2) Design and development of the pilot SS system				
Subtask	Project outputs	How does the subtask/output move the project towards the environmental outcome	Timing	Budget (C\$) (activities)
2.1 Identification of data sources and preparation of data sharing agreements	<ul style="list-style-type: none"> - Formal discussions between local/regional health authorities and health data providers or owners - A consistent reporting approach to collect real-time health and climate data 	Having formal agreements for data sharing and transfer between data providers and the host organization will facilitate the development and implementation of the pilot syndromic surveillance system.	Year 1 (Feb–June 2016)	Year 1: \$36,000 (contracts) Year 2: \$0
2.2 Development of a protocol to collect and	- Identify/implement a computer-based platform to	This task will enhance the capacity of local	Year 1 (Feb–June 2016)	Year 1: \$45,000 (contracts) Year 2: \$0

communicate real-time health and climate data	receive and store real-time data - Develop health indicators that capture heat-related illness or death and Identify links with other climate and population databases	community respond during an extreme event by using a solid platform to collect real-time data and by linking health outcomes with climate and population data.		
2.3 Training sessions to health care providers	Provide guidelines to health care providers to better recognize, diagnose and code heat-related illness	Providing training and guidance materials to targeted health care providers is crucial to the success of the pilot syndromic system.	Year 1 (June 2016)	Year 1: \$9,000 (contracts) Year 2: \$0
Task #3) Implementing, testing and validating the pilot syndromic surveillance system				
Subtask	Project outputs	How does the subtask/output move the project towards the environmental outcome	Timing	Budget (C\$) (activities)
3.1 Implementing of and testing the pilot syndromic surveillance system	Piloting the syndromic surveillance system for heat during the summer of 2016	This sub-task will provide the participating communities with increased capacity to respond to extreme heat events.	Year 2 (Jul–Aug 2016)	Year 1: \$0 Year 2: \$15,000 (contracts)
3.2 Analysis of data collected during Summer 2016	-Identification of the number of heat-related illness captured by the pilot system and comparison with historical data - Identification of weather-related conditions or thresholds that are correlated with the number of heat-related illness	Analysis of data collected from the pilot syndromic surveillance system will help participating communities assess and understand the impact of extreme heat on health, especially among the most vulnerable.	Year 2 (Sep–Dec 2016)	Year 1: \$0 Year 2: \$37,500 (contracts)
3.3 Evaluation and validation of the pilot syndromic surveillance system	- Identification of the strengths and weaknesses of the pilot system and preparation for full implementation in summer	Evaluating the pilot system will confirm the utility of the variables monitored during an extreme heat event and	Year 2 (Dec 2016–May 2017)	Year 1: \$0 Year 2: \$22,500 (contracts)

	2017 - Guidelines for public health professionals to support the community with evidence-based information during extreme heat events	improve internal communications among the system's stakeholders.		
Task #4) Knowledge sharing and transfer				
Subtask	Project outputs	How does the subtask/output move the project towards the environmental outcome	Timing	Budget (C\$) (activities)
4.1 Develop a summary report on methodology, results, and lessons learned from the three participating communities	A guidance document on the use of syndromic surveillance systems for heat with lessons learned and recommendations from the three pilot communities	The report could be a reference for other North American communities interested in developing a similar syndromic surveillance system to protect their vulnerable populations and build resilience to extreme heat events.	Year 2 (March 2016–June 2017)	Year 1: \$10,000 (contracts) Year 2: \$40,000 (contracts, report)
4.2 Face-to-face meeting of representatives from participating communities	<ul style="list-style-type: none"> - Sharing information on successes and technical issues - Discussion of lessons learned and challenges during the implementation of the system - Identification of next steps to improve the pilot system 	The meeting is an opportunity for the three pilot communities to exchange information, share best practices, and explore options to resolve ongoing issues related to the development or implementation of the pilot syndromic surveillance system.	Year 2 (Sep–Oct 2016)	Year 1: \$0 Year 2: \$25,000 (meeting, report)
4.3 Conduct a workshop to present the three systems to partners and other communities	<ul style="list-style-type: none"> - Presentations of the development and implementation of the three pilot syndromic surveillance systems - Dissemination and 	Conducting this workshop will promote the use of syndromic surveillance for extreme heat in North America and will provide	Year 2 (May–June 2017)	Year 1: \$0 Year 2: \$55,000 (facilitator, meeting, workshop report)

	presentation of the guidance report on syndromic surveillance systems - Knowledge sharing and transfer to other communities through visual demo of the pilot systems	participants with practical information on the identification of vulnerable population to extreme heat. It is an opportunity to build networking among participants to the workshop.		
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Explain how this project meets the selection criteria adopted by Council in the Strategic Plan (see below)

The goal of all projects funded by the CEC will be to support the efforts of the Parties to conserve, protect and/or enhance the North American environment. The following criteria will guide the Secretariat, Working Groups, Committees, and other appropriate officials of the Parties in considering cooperative activities for Council approval under operational plans. These selection criteria do not apply for activities to be funded through the NAPECA grant program.

- ***How does the project contribute to achieving Council's strategic objectives as described within the current Strategic Plan, or as related to other priorities subsequently confirmed by Council?***

This project contributes to achieving the Council's strategic objectives in addressing adaptation to climate change in selected North American communities and in enhancing environmental and health data sharing among several partners and stakeholders. The collaborative efforts expected in this project will help build capacity within the stakeholders and professionals of the target communities. This will be accomplished through the implementation of heat-related illness syndromic surveillance capabilities in each target community and the creation of a platform for sharing knowledge and exchanging best practices in order to increase the capacity of the three pilot communities to respond to extreme heat event and to protect their vulnerable populations. It is anticipated that the increased resources created through this project and the information sharing through documentation exchange will lead to follow-on development of similar capacity in other communities across Canada, Mexico, and the United States, through existing networks and public health associations.

- ***Are the proposed objectives North American in scope? In other words, how are the proposed results relevant to protecting the environment in North America? (For example, what would Council members announce to the press at the successful completion of this project?)***

The proposed project aims to increase the adaptive capacity to climate change of three selected vulnerable communities in Canada, US and Mexico and to provide these communities with an evidence-based tool to support decision-making during periods of extreme heat. As knowledge transfer is a key task in this project, it is expected that other North American communities will benefit from these cases studies and develop a similar system for climate-related and health syndromic surveillance. This project will make use of

existing networks and stakeholder organizations to ensure the efficient and accessible translation of this knowledge both in the development stage, as well as the post-project stage.

A syndromic surveillance system for heat is primarily developed to detect the prevalence of heat-related illness and deaths in a selected community. However, it is also a tool that provides information on the location of vulnerable populations that are often socio-economically deprived and are located in urban areas with limited green spaces and high air pollution rates. Outcomes from syndromic surveillance systems for heat can support the identification of targeted areas in an urban agglomeration where there is a need to have more green spaces and green buildings, to reduce the effects of urban heat islands and therefore improve the quality of outdoor air. For these reasons, we consider that the proposed results of this project are relevant to protecting the environment and to promoting sustainable and healthy communities.

- ***What specific, clear and tangible results will be achieved and how will progress toward each result be measured over time? Identify performance measures to be used to indicate success at reaching all outcomes and/or performance.***

The main results from this project are:

- Identification of communities that have syndromic surveillance systems in place
- Implementation of a pilot real-time syndromic surveillance system for extreme heat in three at-risk communities in North America
- Generation of vulnerable population maps that can be used for analysis and knowledge transfer
- Number of heat-related illness detected by the pilot syndromic surveillance system
- Identification of potential vulnerable population to extreme heat in participating communities (such children or seniors with existing medical conditions)

Performance will be measured through achieving a number of milestones. These milestones have been identified in each task and sub-task of the project with specific deliverables and timelines. This will facilitate the monitoring of work progress over the two-year period of the project. In addition, monthly teleconference meetings will be scheduled to provide the participating communities and other partners with an ongoing opportunity to discuss the status of work progress and to address common issues and challenges.

- **Explain why the CEC is the most effective vehicle for the Parties to use in undertaking this project, considering these points:**
 - **The value-added of doing it under the CEC cooperative program**
The CEC is a unique organization that brings together several stakeholders and key partners from the environment sector in North America and has existing mechanisms to promote collaborative efforts in terms of adaptation to climate change.
 - **Any other public, private or social organizations that work on such activities**
Public health organizations have usually the mandate to develop and implement syndromic surveillance systems that detect and report communicable diseases such as infectious syndromes. However, there are very few organizations that have adapted their system to capture real-time health outcomes from extreme weather events.

- **Opportunities to cooperate and/or leverage resources with such organizations**

There are definitively opportunities to leverage knowledge and expertise with health authorities that have already developed similar systems in North America or internationally. As one the leads of the project, Health Canada can rely on its expert network to engage partners such as local and regional Canadian health authorities, the US CDC and the Federal Commission for Protection against Sanitary Risk in Mexico.

- **Does the project propose a clear timeline for implementation of the activities, including a target end-date for CEC involvement? Where applicable, describe how the work will continue after CEC involvement ends.**

This project defines clear timelines for each step of the development and implementation of the pilot syndromic surveillance system and for other outcomes identified in the project proposal. The selected communities are expected to continue to rely on their syndromic surveillance systems for heat as a tool for situational awareness and decision-making during extreme heat events. It is also expected that these types of systems will be expanded to other communities using the guidance document and current knowledge of the pilot communities.

- **Where applicable, identify with reasonable specificity:**

- **Linkages with other relevant CEC projects, past or present, in order to create synergies, capitalize on experience, or avoid duplication**

The project builds upon the CEC's experience in providing information about environmental stressors in their communities through projects such as Tracking Pollutant Releases and Transfers in North America, and AirNow. The project could capitalize on the Secretariat's experience with geographic information systems and the mapping component could be integrated into the CEC's North American Environmental Atlas. Climate and population density data gathered under this project could be used to update the existing Atlas map layers. In the future, vulnerability maps may be combined with information about pollutant releases from the CEC's Taking Stock Online and North American Portal on Climate Pollutants to assess cumulative exposures of communities to multiple environmental stressors.

- **The target audience, as well as its receptivity and capacity to use the information that may be produced as a result of the project**

Output from the pilot syndromic surveillance system for heat along with GIS maps on vulnerable populations can be used by public health professionals, emergency management officials, municipalities, academia and environmental specialists. The guidance report can be used as a reference document by other North American communities that envisage developing and implementing a real-time syndromic surveillance system.

- **The beneficiaries of capacity building activities that the project may include**

Vulnerable populations and the general public by raising awareness to the health effects of extreme heat.

- **The relevant stakeholders, with particular attention to communities, academia, NGOs and industry, and their involvement and contribution to a successful outcome**

Local and regional health authorities, municipalities and environmental agencies are key stakeholders of the project.