THE MUNICIPAL ADAPTATION AND RESILIENCY SERVICE (MARS)

WEBINAR 6

VULNERABLE POPULATIONS
MARS TRAINING SERIES OVERVIEW

9 webinars

- Webinar 1: Introduction to Municipal Climate Adaptation and Climate Projections for Great Lakes Region
- Webinar 2: Portal tour
- Webinar 3: Financial and Legal Implications of Climate Change for Municipalities
- Webinar 4: Transportation Infrastructure
- Webinar 5: Building Infrastructure and Land Use Planning

Webinar recordings stored on MARS Community of Practice (CoP) Portal: https://www.ccadaptation.ca/en/mars
SECTOR SPECIFIC WEBINARS (5-8) OVERVIEW

- Webinar 6 – Vulnerable Populations, **Today**
  
  *Guest Speaker: Karina Richters, City of Windsor*

- Webinar 7 – Urban Natural Systems, **March 20**\(^{th}\)
  
  *Guest Speaker: TBD*

- Webinar 8 – Water / waste water / storm water, **March 27**\(^{th}\)
  
  *Guest Speaker: John Nemeth, Region of Peel*

- Webinar 9- (Not sector specific), Communication and Collaboration, **April 10**\(^{th}\)
  
  *Guest Speaker: Dr. David Pearson, Laurentian University*
1. MARS Training Series Overview

2. Vulnerable populations: Health and social impacts of climate change

3. Recent municipal efforts to adapt vulnerable populations to climate change

4. Heat Alert and Response System, City of Windsor

   **Karina Richters**, Environmental Coordinator, City of Windsor

5. Resources
2 VULNERABLE POPULATIONS: HEALTH & SOCIAL IMPACTS OF CLIMATE CHANGE
Climate change, extreme weather events and associated impacts disproportionately affect:

- Individuals and groups lacking social support, education, or economic resources
- Residents of substandard housing, those who are homeless or under-housed
MORE EXTREME HEAT EVENTS

Associated increase in severity and frequency of:

- Heat-related illness (i.e.: heat stroke), dehydration
- Degraded air quality leading to illness, premature morality from cardiovascular and respiratory causes, increased risk of cancer
- Vector borne infectious diseases

Vulnerable Populations:

- Infants
- Seniors
- Chronically ill
- Those with existing cardiovascular and respiratory illness
- Those working outdoors for extended periods of time
- Individuals without access to adequate shelter or cooling mechanisms
- Those living in areas with poor air quality
T67 – Effects of heat and light
T67.0 – Heatstroke and sunstroke
T67.1 – Heat syncope
T67.2 – Heat cramp
T67.3 – Heat exhaustion, anhydrotic
T67.4 – Heat exhaustion due to salt depletion
T67.5 – Heat exhaustion, unspecified
T67.6 – Heat fatigue, transient
T67.7 – Heat edema
T67.8 – Other ...

Indirect effects like MI not classified here
DAILY MAX TEMP V MORTALITY (LOG)

Baccini et al., (2008)
MORE RAINFALL/ FLOODING EVENTS

Associated increase in severity and frequency of:
- Lake bacterial contamination, increase in waterborne disease
- Residential/commercial building structures contaminated by floodwater/sewage
- Mould development in built structures, leading to respiratory illness

Vulnerable Populations:
- Infants
- Seniors
- Residents of low-lying areas or flood plains
- Chronically ill or those with impaired immune systems, compromised health status
- Individuals with existing allergies, cardiovascular disease or respiratory illnesses
- Individuals and groups lacking social support, education, or economic resources
- Residents of substandard housing, those who are homeless or under-housed
Associated increase in severity and frequency of:

- Disease carrying insects with longer survival periods in milder winters
- Vector borne disease transmission
- Introduction of new local infectious diseases

Vulnerable Populations:

- Seniors
- Chronically ill or those with impaired immune systems, compromised health status
- Communities dependent on natural resources
Associated increase in severity and frequency of:

- Electricity failure, leading to food borne illness, hypothermia and other forms of thermal discomfort
- Knock on effects of displacement and crowding in emergency shelters
- Food or water shortages
- Physical injury, drowning, electrocution, death
- Health impacts from infrastructure damage and interruptions to health services
- Indirect psychological health effects, including mental health and stress related illness

Vulnerable Populations:

- Individuals and groups lacking social support, education, or economic resources
- Residents of substandard housing, those who are homeless or under-housed
- Residents of areas subject to environmental degradation (i.e.: Brownfield)
- Chronically ill
- Seniors
- Infants
3 RECENT MUNICIPAL EFFORTS TO ADAPT VULNERABLE POPULATIONS TO CLIMATE CHANGE
HEAT ISLAND REDUCTION
Albedo = coefficient of reflection (0-1)
Scope and Community Selection

- national scope
- large urban population
- already experience July mean daily temp. >25C
- likely to see increase in number of days >30C
- 36 reviewed and/or interviewed
- planning, environment/works and parks/rec staff
HEAT ISLAND AND VULNERABLE POPULATION IDENTIFICATION
% LOW INCOME (2005 NET)
% LOW INCOME W/ THERMAL
% LOW EDUCATION SENIORS = 53
# SENIORS = 635
% LOW INCOME SENIORS = 41
% RENTED DWELLINGS = 63
% SENIORS LIVING ALONE = 41
CONSTRAINTS

• Data holdings varied

• Time

• Technology

• Budget
SYNDRDROMIC SURVEILLANCE FOR HEAT RELATED ILLNESS
SYNDROMIC SURVEILLANCE FOR HEAT

Objective:
• Reduce morbidity and mortality due to extreme heat in four eastern Ontario health units

Context:
• EHEs expected to be more common and intense
• Large geography (24,000km$^2$) limits response
• Low population density limits response (27/km$^2$ – Toronto’s is about 4000/km$^2$)
• Institutional capacity to handle these events is a concern
1. Monitor populations for heat-related illness (HRI) 
   (Syndromic surveillance of ER visits)
2. Monitor environmental heat
3. Map occurrence of HRIs
4. Develop intervention strategies to integrate with the heat sensors and health data streams
SYNDROMIC SURVEILLANCE OF ER VISITS

– Builds on existing syndromic surveillance technologies (eg SARS)

– Real-time monitoring of visits to Emergency Departments

– Chief complaint of triage records used
  – Chief complaint = sunburn, sun stroke, heat stroke, exhaustion

– Over 70 hospitals monitored across Ontario in 18 Health Units

– Average feed is 7,000 Emergency Department visits per day with 600 admissions

– Analysis centre in Kingston, Ontario
• Collect important parameters of heat
  – Dry bulb temperature
  – Globe temperature
  – Relative humidity
  – Wind speed
  – Wet bulb temperature

• Combined to create an outdoor WBGT

• 13 sensors in place
• Long term financing
currently HC are funding it as a pilot

• Community capacity
identifying is one thing, acting is another – will take longer to implement

• Symptom limitations
does not account for co-morbidity eg: MI etc
SOME ADDITIONAL ADAPTATION EXAMPLES IN PUBLIC HEALTH
• Enhanced Surveillance
• Enhanced Research and Development
• Enhanced Public and health Professional Awareness
• Integrated and Adaptive Policy Development

Source: OMNR
Vector-Borne Disease Prevention Plan 2013

March 2013
Increased basement flooding means increased exposure to dampness leading to mould and bacterial growth:

- respiratory distress
- eye and nasal irritations
- laryngitis
- flu-like symptoms
- asthma and allergy aggravation

Source: Toronto Public Health, 2014
Needs to occur at 3 levels

1. Municipal/public level
2. Neighbourhood/community level
3. Individual level
4  HEAT ALERT AND RESPONSE SYSTEM, CITY OF WINDSOR

Karina Richters, Environmental Coordinator, City of Windsor
5- RESOURCES

- Climate Change Adaptation and Health Equity
  http://www.cleanairpartnership.org/files/Climate_Change_Adaptation_and_Health_Equity_Backgrounder.pdf

- Developing Evidence-based health policy in a changing climate

- Exploring Health and Social Impacts of Climate Change in Toronto

- Climate Change Adaptation: Linkages with Social Policy

- Impacts of Climate Change on Public Health

- Syndromic Surveillance System for Health-related Illnesses

- Adaptation to Climate Change in the Ontario Public Health Sector
  http://pubmedcentralcanada.ca/pmcc/articles/PMC3418204/
Webinar 7

*Urban Natural Systems*
March 20\textsuperscript{th} 2014

For more information, please visit:
https://www.ccadaptation.ca/en/mars