



Preparing for Climate Change: Mapping Heat Vulnerability in Toronto

Presented by:
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Environmental Protection Office
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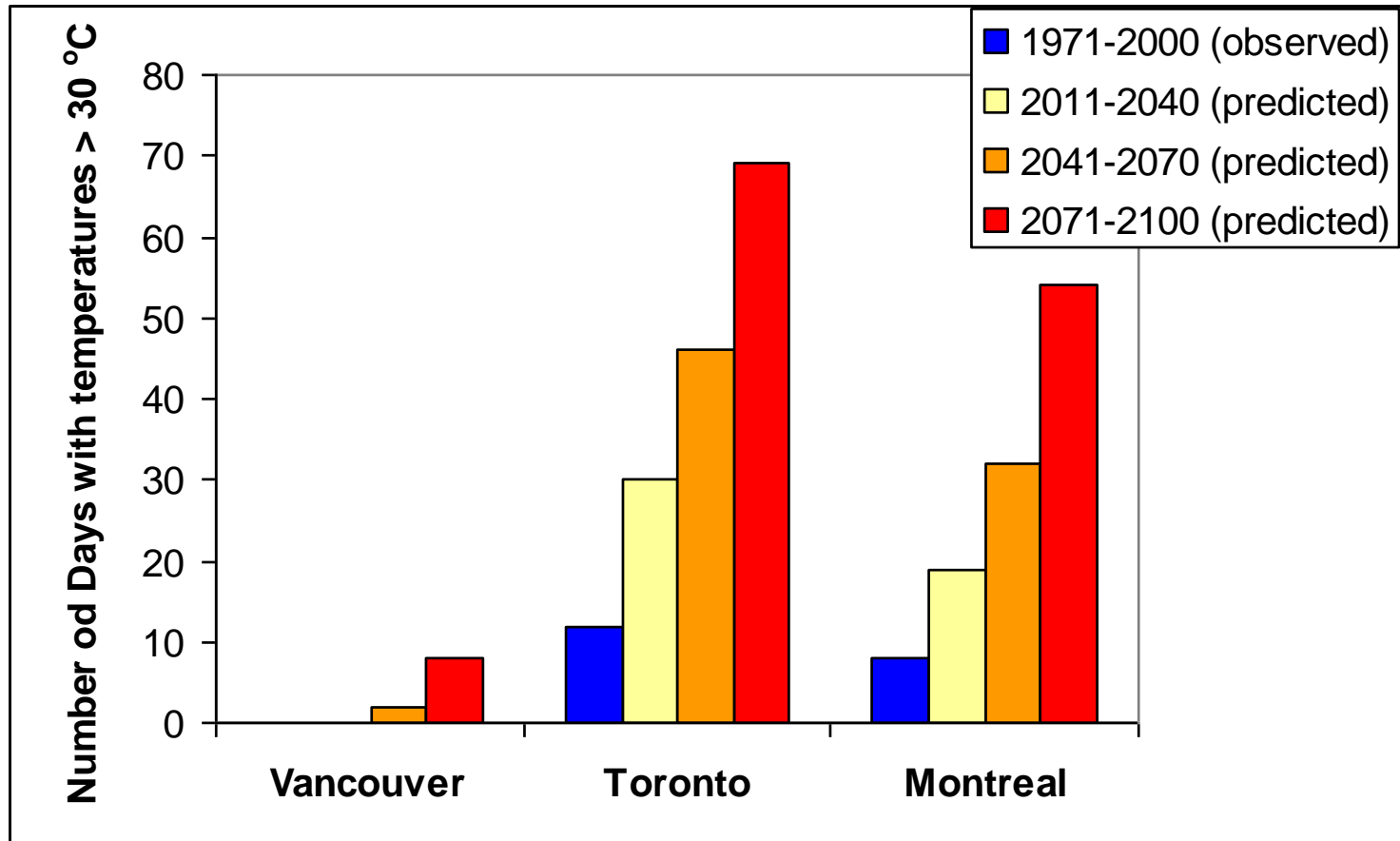
Co-Authors: Claus Rinner, Dianne Patychuk, Kate Bassil,
Suzanne Briggs, Monica Campbell, Carol Mee, Elaine
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May 3, 2010

- Extreme heat contributes to an estimated 120 premature deaths in Toronto each year
- Some people are especially vulnerable to heat



The number of hot days is expected to increase



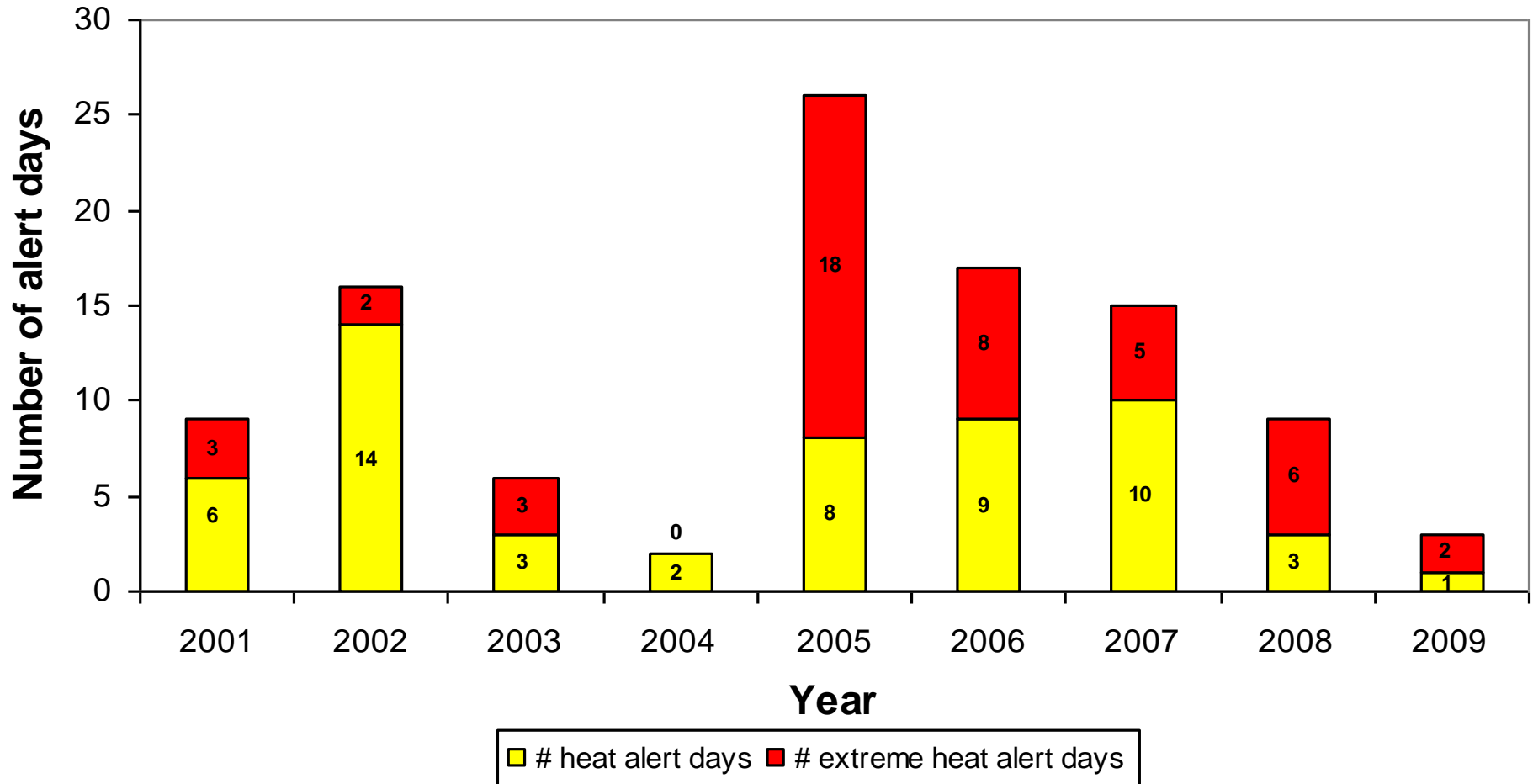
Data Source: Canadian Climate Change Scenarios Network (Environment Canada)



Toronto Public Health coordinates a Hot Weather Response Plan every summer

- Alerts those at risk to take precautions
- Education and outreach to **at-risk populations**
- Partnership with city and community agencies

Heat Alerts in Toronto 2001-2009



Types of Activities during Alerts



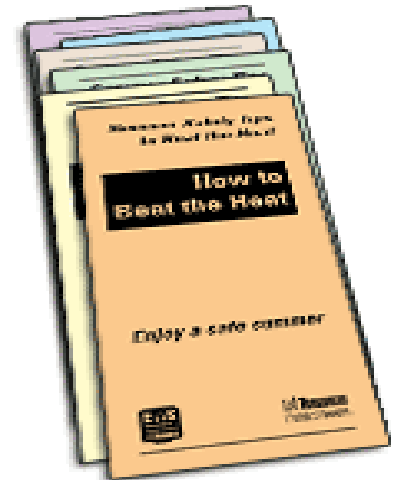
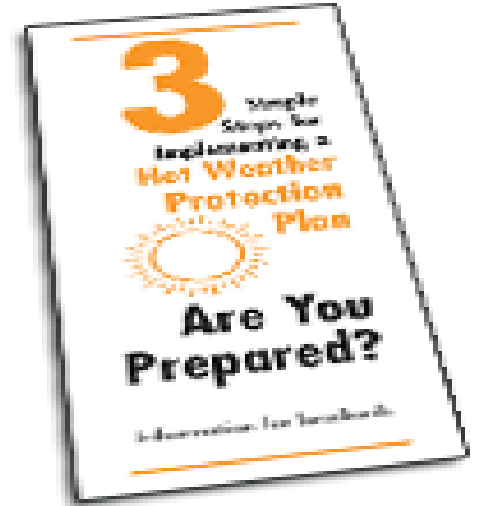
- **Heat Alert**

- Media Release
- Notification to Hot Weather Response Partners
- Telephone Information Line
- Bottled Water Delivery
- Street and Park Outreach
- Shelters with A/C extend hours
- Drop-ins with A/C extend hours
- TTC tokens distributed

- **Extreme Heat Alert**

- Open Cooling Centres
- Check in on boarding homes, rooming houses
- City pools may extend their operating hours

- We provide information about how to protect yourself and others from extreme heat
 - Advice to Landlords
 - Child Car Safety in Hot Weather
 - Fan Facts
 - Heat, Drugs and Alcohol
 - Help Pets Beat the Heat
 - How to Beat the Heat
 - Medications and Heat-Related Illness



People who are vulnerable to heat

- The hot weather response program intentionally targets people who are most vulnerable to heat
 - Elderly
 - People who are socially isolated
 - People with chronic illnesses
 - Infants and preschool children
 - People engaged in prolonged vigorous exercise or strenuous outdoor work
 - Those taking certain medications
 - Homeless or marginally housed persons



A Challenge...

- Where in Toronto are the people most vulnerable to heat located?
- Knowing where vulnerable people are helps to support
 - Hot weather response, both in terms of pre-season planning and delivery of services on hot days
 - Longer-term climate change adaptation planning



Spatial Heat Vulnerability Assessment

What do we know about risk factors for heat-related illness?

What do we know about populations in Toronto?

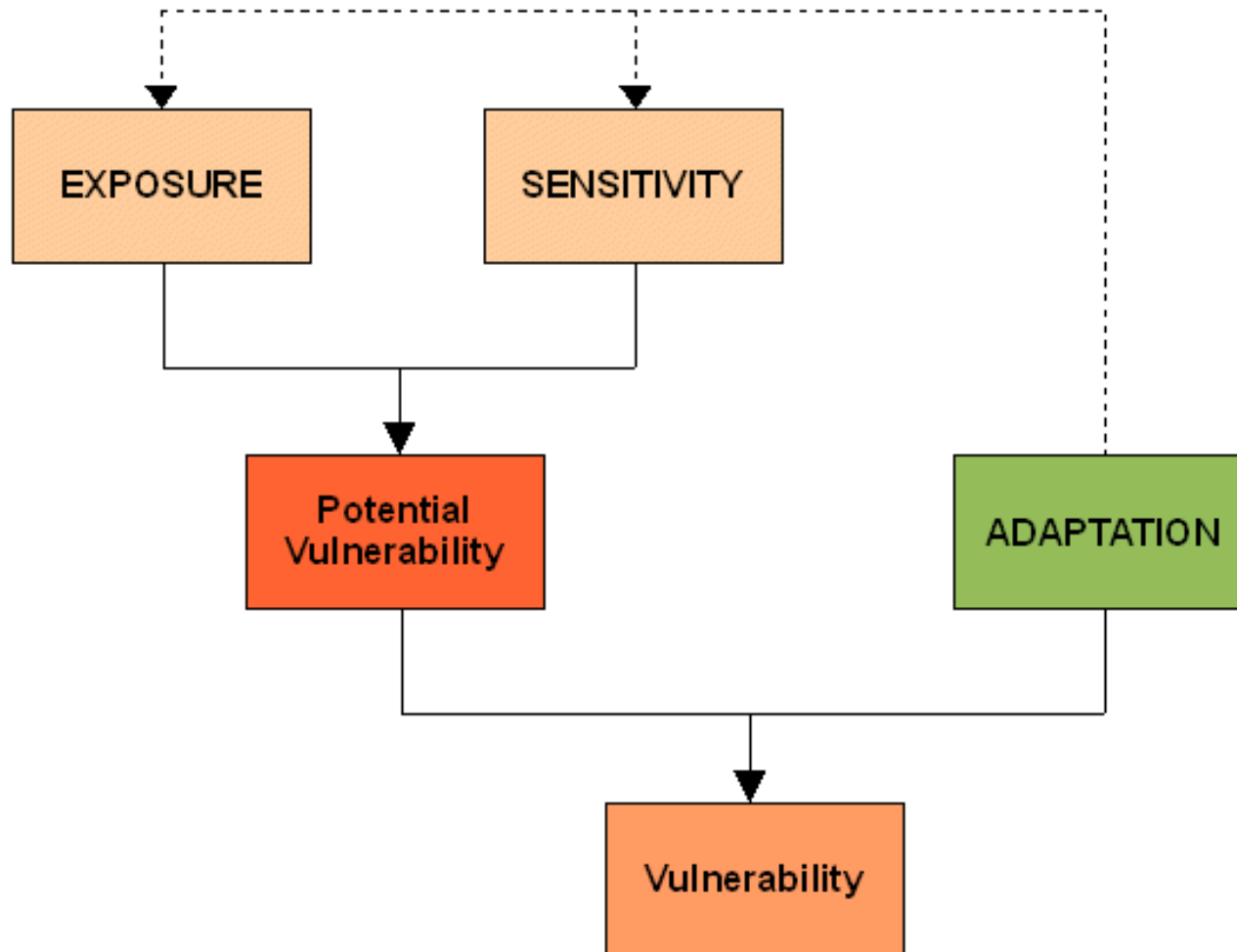
What adaptive resources are available that can mitigate vulnerability?

Maps of heat vulnerability

Team of experts

- Public Health
 - Research and Policy Team
 - Operational Team
- Geographic Information Systems (GIS) / Spatial analysis
- Heat-Health Epidemiology
- Clean Air Partnership (CAP)

Developing an Approach for Mapping Heat Vulnerability

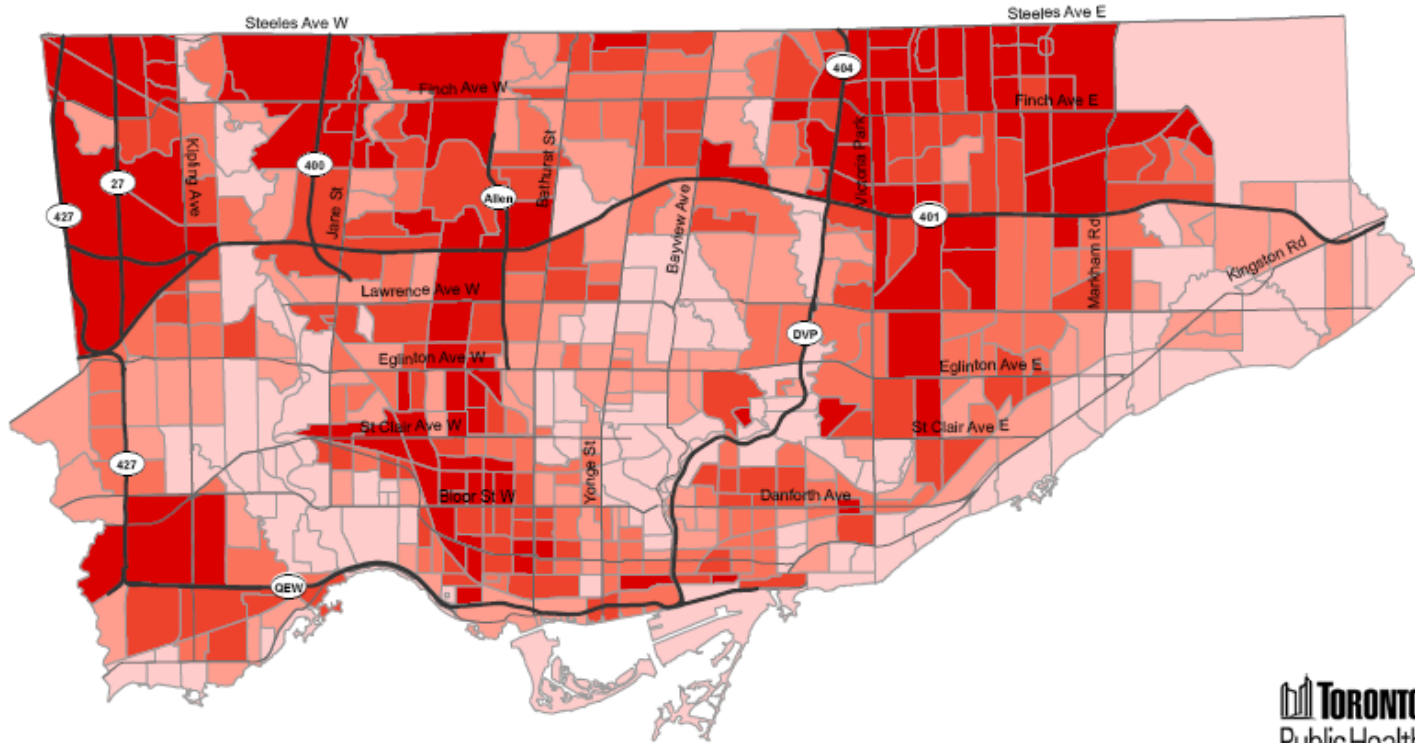


Indicators for Mapping Heat Vulnerability

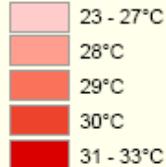
Exposure	Sensitivity	Adaptation
<p>Surface Temperature</p> <p>Access to Green Space</p> <p>Availability of Green Space</p> <p>Dwellings in high-rises</p> <p>Rented dwellings in older high-rises</p>	<p>Pre-existing/chronic illness</p> <p>Cognitive impairment</p> <p>Elderly residents</p> <p>Infants and young children</p> <p>Low-income households</p> <p>Rental households</p> <p>Socially isolated people</p> <p>Low education level</p> <p>Not English speaking</p> <p>Recent immigrants</p> <p>Racialized groups</p>	<p>Home cooling, common cooling rooms</p> <p>Hostels, drop-in centres</p> <p>Participating community outreach centres</p> <p>Cooling centres, libraries, malls</p>

Exposure - Temperature

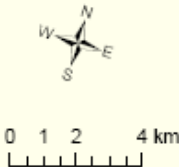
Mean Surface Temperature
(June 29, 2007 & September 3, 2008)



**Temperature
(by census tract)**



— Highway
— Major street

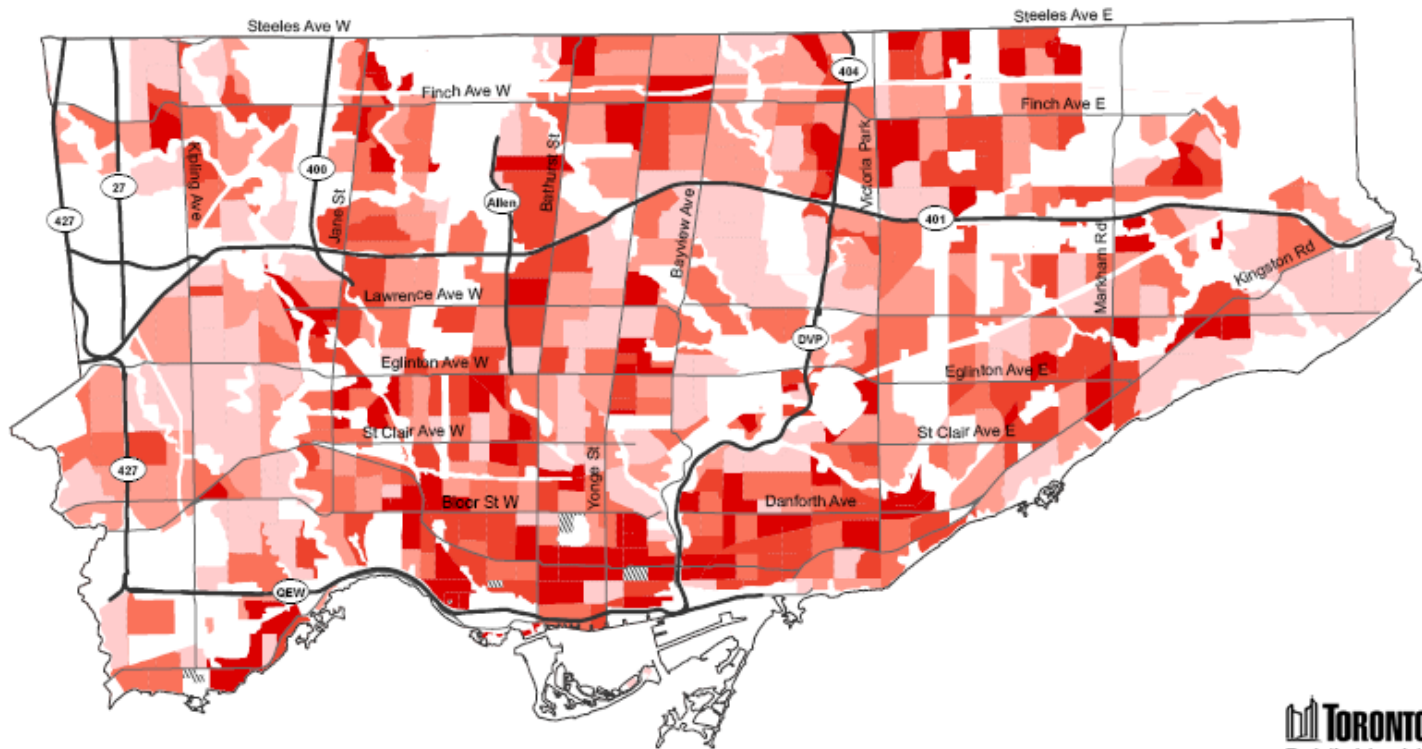


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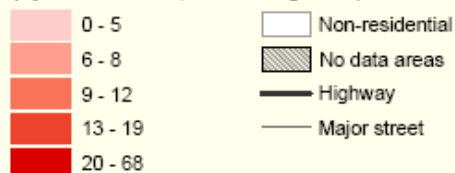
Source: NRCan; StatCan (LIT, CSDS)
Published: March, 2010
Prepared by: Toronto Public Health
Contact: Toronto Health Connection
Email: publichealth@toronto.ca
Telephone: 416-338-7800

Sensitivity – Low income, elderly

Low Income Seniors



Below 2005 after-tax LICO
(by census tract, % of all age 65+)

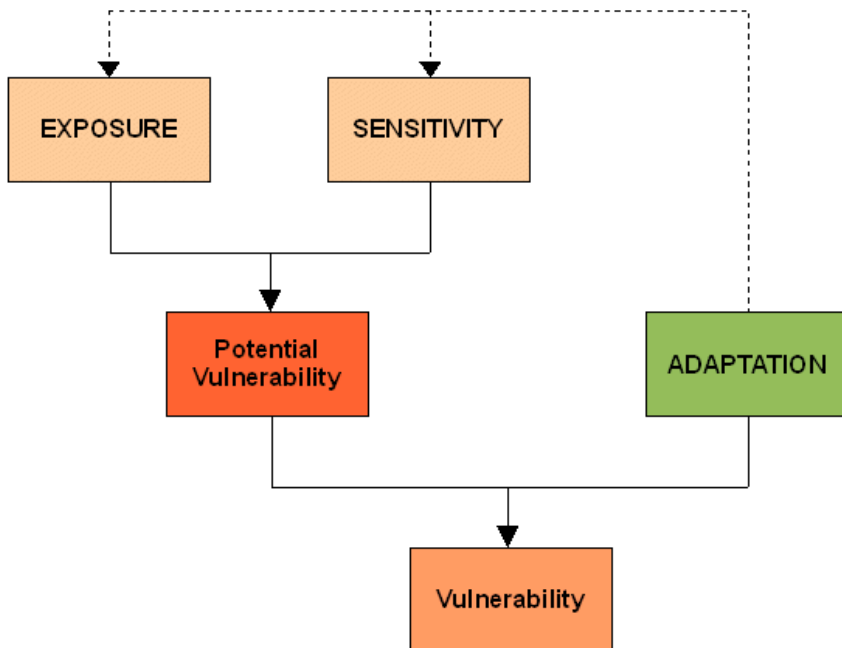


0 1 2 4 km

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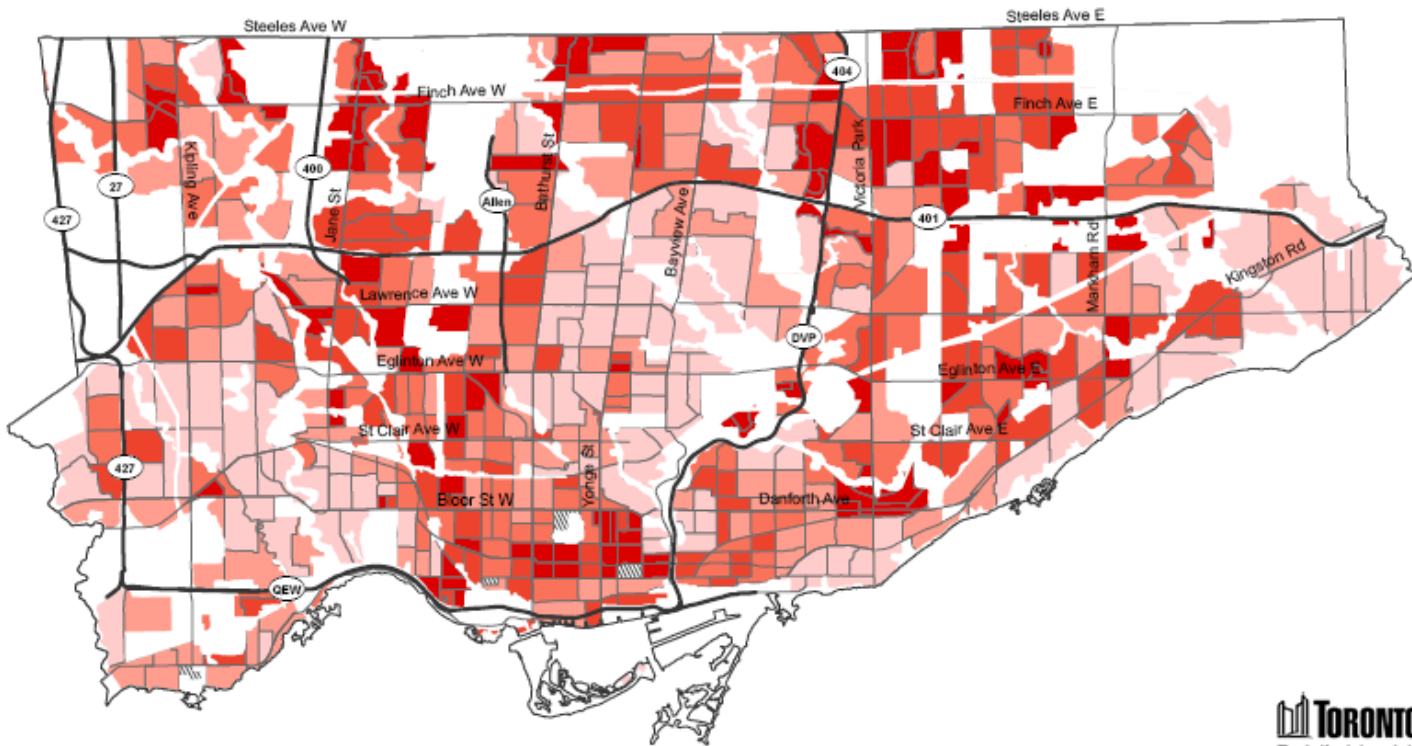
Creating a Vulnerability Index



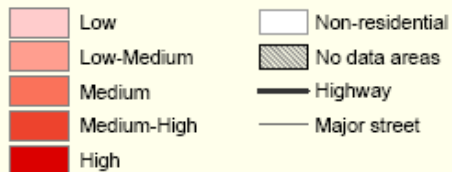
Composite indices for potential vulnerability integrate information about heat exposure and heat sensitivity and vulnerability

Estimating potential vulnerability

Vulnerability to Heat - General Population



**Vulnerability index
(by census tract)**



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- Access to cool places
 - Libraries
 - Community centres
 - Drop-ins
- A challenge:
 - Access to Air conditioning
 - How do people keep cool?



- Refining the maps and data
 - Seek input from others
 - Conduct research about how people keep cool
 - Conduct Spatial analysis
 - Develop Validation method

- Upcoming workshop: **June 14 2010**
 - How can our maps best support short- and long-term adaptation planning?
 - How might people use the maps?
 - How can we improve on the maps we've created so far?
 - Ways to explore how people keep cool?
- Contact Toronto Public Health Connection at 416-338-7600 to register for the workshop



For more information about the workshop contact sgower@toronto.ca

- Funding by Natural Resources Canada through the Ontario Regional Adaptation Collaborative (ORAC)
 - Province-wide collaboration to increase climate change adaptation capacity



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