Canada’s Air Quality Health Index (AQHI)

GEO User Interface Committee
Washington, DC
Kenneth Korporeal
Canadian GEO Secretariat
1 August 2007
Overview

- Status Quo and Rationale
- AQHI development
- AQHI health messaging
- AQHI forecasting and monitoring
- Concluding messages
Current Canadian Air Quality Indices

- Puts each of six pollutants on a common scale
- Pollutants are compared to a standard
- The highest relative to its standard is reported as the AQI value e.g. “AQI today is 27, good air quality, due to ozone”
- In Ontario, MOE provides forecast for today, tomorrow and the next day
- Advisories used when AQI forecast to reach (or has reached) 50 – transition from fair to poor
Reasons to revise the AQI

• Existing AQIs do not reflect current scientific evidence:
  – Additive effects of multiple pollutants (only count one pollutant)
  – Effects at low levels of exposure (no-threshold)

• Unevenly applied across Canada
  – Formulations (pollutant averaging times, pollutants included, thresholds)
  – Health protective advice

• Public misperceptions of air quality and health
  – Confirmed by Public Opinion Research
HAMILTON DOWNTOWN: Current Air Quality Reading

![Air Quality Index](image)

<table>
<thead>
<tr>
<th>Air Quality Readings HAMILTON DOWNTOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
</tr>
<tr>
<td>Time:</td>
</tr>
<tr>
<td>AQI:</td>
</tr>
<tr>
<td>Reason:</td>
</tr>
<tr>
<td>Health Effects:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Air Quality Index (AQI) Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQI</td>
</tr>
<tr>
<td>0-15</td>
</tr>
<tr>
<td>16-31</td>
</tr>
<tr>
<td>32-50</td>
</tr>
<tr>
<td>51-100</td>
</tr>
<tr>
<td>101+</td>
</tr>
</tbody>
</table>

Canada Environment
Process to Develop the AQHI

- 2001-present
- Involvement
  - AQHI Committee and Working Groups
  - Stakeholder Workshops
- Iterative
- Peer review
Concept

Develop a communications tool:
- health-based
- scientifically accurate
- user-friendly
- nationally consistent
- regionally flexible
Tip of the Iceberg

dead
hospital admissions

emergency room visits
physician office visits
reduced physical activity
medication use
respiratory symptoms
impaired lung function
subclinical (subtle) effects
AQHI Presentation: Underpinnings

The “look” and messaging of the AQHI was developed using the following steps:

1. Public Opinion Survey (post “event” & “season”)
2. Mental Models Research
3. Message Development Workshop
4. Crafting Health Messages
5. Focus Testing
6. Pilot Testing(s)

The results from each preceding step were taken into account & built into the communication products tested.
AQHI Presentation: UV Index-Like

- Illustrates level of health risk with **colour & number scale** of 1-10+

- **Labels the level of HEALTH risk** as “low”, “moderate”, “high” or “very high”

- **Forecasts** local air quality for the current and next day

- **Empowers individuals** to decide how they might be at risk

- Provides **health messaging** to tell Canadians—both general & at-risk populations—how to minimize that risk
# AQHI Health Messages

<table>
<thead>
<tr>
<th>Level of Risk</th>
<th>Index Reading</th>
<th>What You Should Do At Risk Population</th>
<th>General Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1 – 3</td>
<td>• Enjoy your usual outdoor activities. • Follow your doctor’s advice for exercise.</td>
<td>• Ideal conditions for outdoor activities: sports, biking or walking.</td>
</tr>
<tr>
<td>Moderate</td>
<td>4 – 6</td>
<td>• If you have heart or breathing problems and experience symptoms, consider reducing physical exertion outdoors or rescheduling activities to times when the index is lower. • Follow your doctor’s usual advice about managing your condition.</td>
<td>• No need to modify your usual outdoor activities.</td>
</tr>
<tr>
<td>High</td>
<td>7-10</td>
<td>• Children, the elderly and people with heart or breathing problems should reduce or reschedule physical exertion outdoors to periods when the index is lower, especially if you experience symptoms. • Follow your doctor’s usual advice about managing your condition.</td>
<td>• Anyone experiencing discomfort such as coughing or throat irritation should consider reducing or rescheduling strenuous outdoor activities to periods when the index is lower.</td>
</tr>
<tr>
<td>Very High</td>
<td>Above 10</td>
<td>• Children, the elderly and people with heart or breathing problems should avoid physical exertion outdoors. • Follow your doctor’s usual advice about managing your condition.</td>
<td>• Everyone should consider reducing or rescheduling strenuous outdoor activities to periods when the index is lower, especially if you experience symptoms.</td>
</tr>
</tbody>
</table>
Self-calibration

At Risk Population:
People with heart or lung disease (including asthma) should monitor symptoms as the index reading increases.

General Population:
Even healthy people may have more difficulty breathing as air pollution increases.

• Paying attention to the index and your symptoms
• What does a particular index reading mean to you
Forecasting

• World’s first multi-pollutant forecast
• Challenges
  – Skill level with pollutants and understanding behaviour
    ▪ Ground Level Ozone
    ▪ Particulate Matter
    ▪ Nitrogen Dioxide
  – Supporting monitoring data
Monitoring Capacity
National Pilot: Description

- Staggered implementation across Canada
  - Toronto starting first week in July
  - Windsor, Vancouver and others in BC in October – other locations to follow this year
  - Big push in 2008
- No warnings or advisories issued with the AQHI
- AQI and AQHI issued concurrently
National Pilot: Roles and Responsibilities

- Monitoring
  - Provincial or municipal responsibility – data transferred in close to real time to EC

- Data Management
  - EC building data base for forecasters, Weather Office and partners

- Forecasting
  - EC - Training, developing forecast tools and expertise for multi-pollutant forecasts

- Dissemination
  - EC Weather Office primary vehicle but not exclusive
    - AirNow client

- Outreach and Communications
  - Local Public Health and Local partners with support from fed, provinces

- Evaluation
  - Jointly administered with federal lead
About the Air Quality Health Index

The quality of the air we breathe has long been recognized as an important element of public health. The new Air Quality Health Index (AQHI) is the first health-based index that combines the quality of air with known health effects. The AQHI takes into account how the level of exposure to multiple pollutants, even at low levels of exposure, can affect your health.

The AQHI is a personal health tool. It provides specific information to individuals who are ‘at-risk’ from air pollution and to the general Canadian public. This new index helps you make informed choices about your activities throughout the day to protect your health.

The AQHI is a national initiative, developed in partnership with federal, provincial and municipal governments and agencies. National tests/pilots of the AQHI will take place in locations across Canada starting on July 9, 2007 in Toronto. Visit this site often for updates on new pilot locations.
Toronto

Currently

<table>
<thead>
<tr>
<th>Temperature</th>
<th>31°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure/</td>
<td>101.6 kPa</td>
</tr>
<tr>
<td>Tendency</td>
<td></td>
</tr>
<tr>
<td>Visibility</td>
<td>24 km</td>
</tr>
<tr>
<td>Humidity</td>
<td>49 %</td>
</tr>
<tr>
<td>Humidex</td>
<td>37</td>
</tr>
<tr>
<td>Dewpoint</td>
<td>19°C</td>
</tr>
<tr>
<td>Wind</td>
<td>SSE 15 km/h</td>
</tr>
<tr>
<td>Air Quality Health Index</td>
<td>3</td>
</tr>
</tbody>
</table>

Sunny

5 Day Forecast from Environment Canada

<table>
<thead>
<tr>
<th>Wednesday</th>
<th>Wednesday night</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>High 34°C</td>
<td>Low 22°C</td>
<td>High 35°C POP 30%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunny with cloudy periods</td>
<td>A few clouds</td>
<td>Chance of showers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High 31°C</td>
<td>Low 22°C</td>
<td>High 31°C</td>
<td>Low 17°C</td>
<td>High 29°C</td>
<td>Low 17°C POP 60%</td>
</tr>
<tr>
<td>Chance of showers</td>
<td>Sunny</td>
<td>Chance of showers or thundershowers</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These icons are a summary. See complete text below

Imperial Units
Past 24 Hour Conditions
24 Hour Trends Graph
Another Forecast?

Text Forecast from Environment Canada

Toronto: Issued 11:31 AM EDT Wednesday 1 August 2007

Smog advisory in effect.

Today
Sunny with cloudy periods. High 34 except 27 near Lake Ontario. UV index 8 or very high.

Tonight
A few clouds. Low 22.

Thursday
Sunny with cloudy periods. 30 percent chance of showers in the afternoon and early in the evening with the risk of a thunderstorm. Wind becoming southwest 20 km/h in the afternoon. High 35 except 27 near Lake Ontario.

Friday

Saturday

Sunday
A mix of sun and cloud with 60 percent chance of showers and thunderstorms. Low 17. High 29.
Toronto

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>+</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 3 Low</td>
<td>4 - 6 Moderate</td>
<td>7 - 10 High</td>
<td>Above 10 Very High</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Current**
Observed at
12:00 PM EDT Wednesday 1 August 2007

**At-Risk Population:**
- Enjoy your usual outdoor activities.
- Follow your doctor's advice for exercise.

**General Population:**
- Ideal conditions for outdoor activities.

**Forecast Maximums**
Issued at 5:45 AM EDT Wednesday 1 August 2007

<table>
<thead>
<tr>
<th>Wednesday</th>
<th>Wednesday night</th>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Moderate Risk</td>
<td>4 Moderate Risk</td>
<td>7 High Risk</td>
</tr>
</tbody>
</table>

**Who is at risk?**
People with heart and lung conditions are most affected by air pollution.

**Did you know...?**
Everyone reacts differently to air pollution.
Messages

- The AQHI is first and foremost a communications tool for personal health protection
- The AQHI is based on trusted Canadian data and scientific expertise
- The AQHI forecast will be featured
- National Pilot began in July 2007