



Cumulative Air Quality Assessment Toronto Wards 30 and 32 including South Riverdale and The Beaches

Toronto Fire & EMS Academy
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Outline

- Approach / Method
- Highlight of results
 - Non-carcinogens
 - Carcinogens
 - Criteria air contaminants
- Conclusions

What did Toronto Public Health do?

- In conjunction with the Toronto Environment Office. identified the substances to model
 - ChemTRAC substances
 - All the Criteria Air Pollutants
- Developed methodology to characterize health impact
- Estimated the cumulative impacts from
 - i. non-carcinogens
 - ii. carcinogens
 - iii. criteria air pollutants

Selection of substances

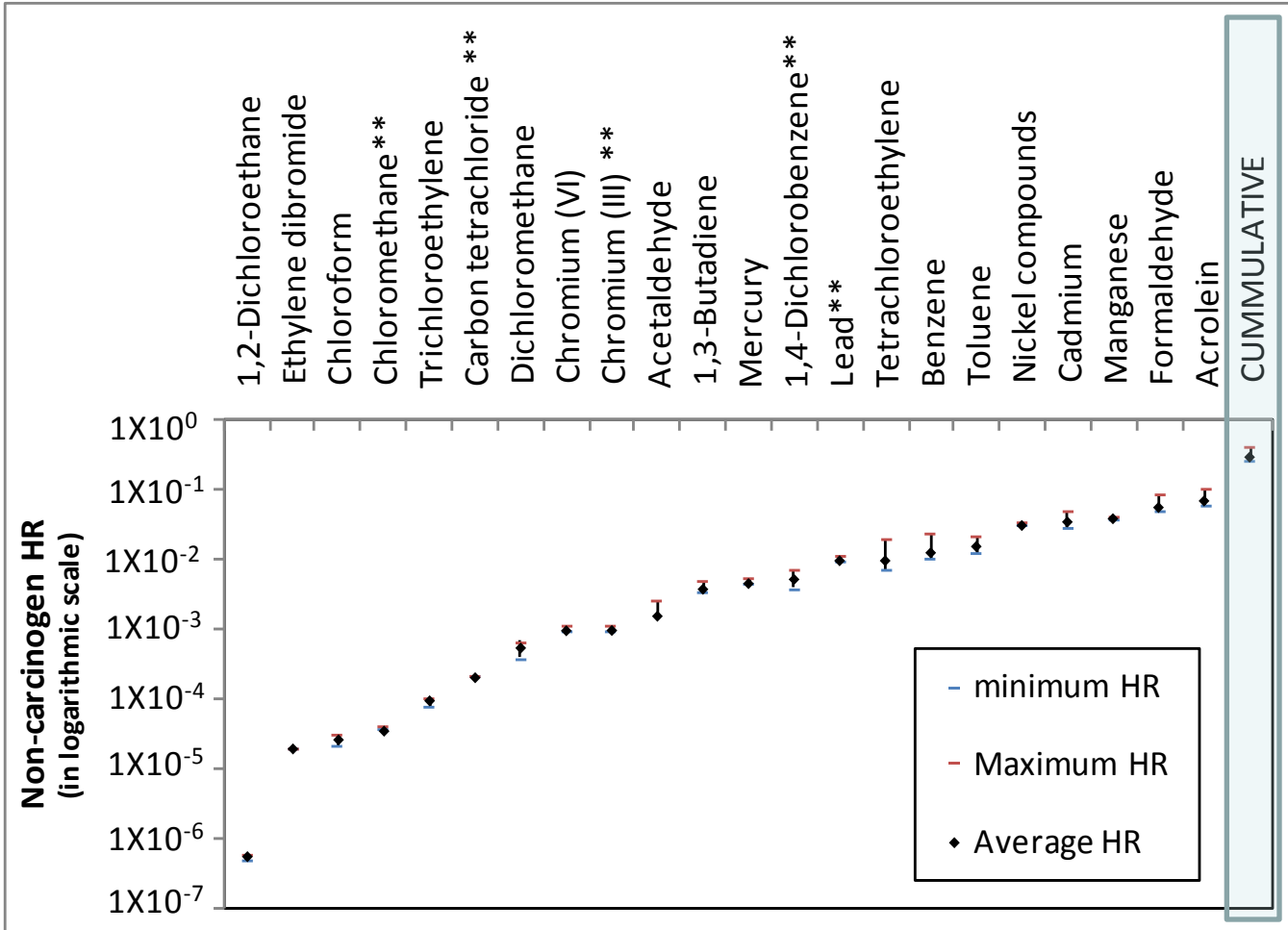
1. Priority chemicals listed in the Environmental Reporting and Disclosure Bylaw
 - These chemicals have been found in Toronto's air above health benchmarks
 - Data suggested they could be released in quantities that could be of health concern
2. Criteria Air Contaminants – known to contribute to the burden of illness from air pollution in Toronto
3. Toluene – volatile organic compound (VOC) released in highest quantity

Modelled concentrations were compared with provincial standards

Most substances met Ontario's air quality criteria (AAQCs)

- A few substances exceed their 24-hour standards on occasion:
 - Nitrogen oxides (NO_x)
 - Particulate matter (PM₁₀)
 - Benzene
 - Polycyclic aromatic hydrocarbons (PAHs)
- Benzene and PAHs exceed their annual AAQC in some areas

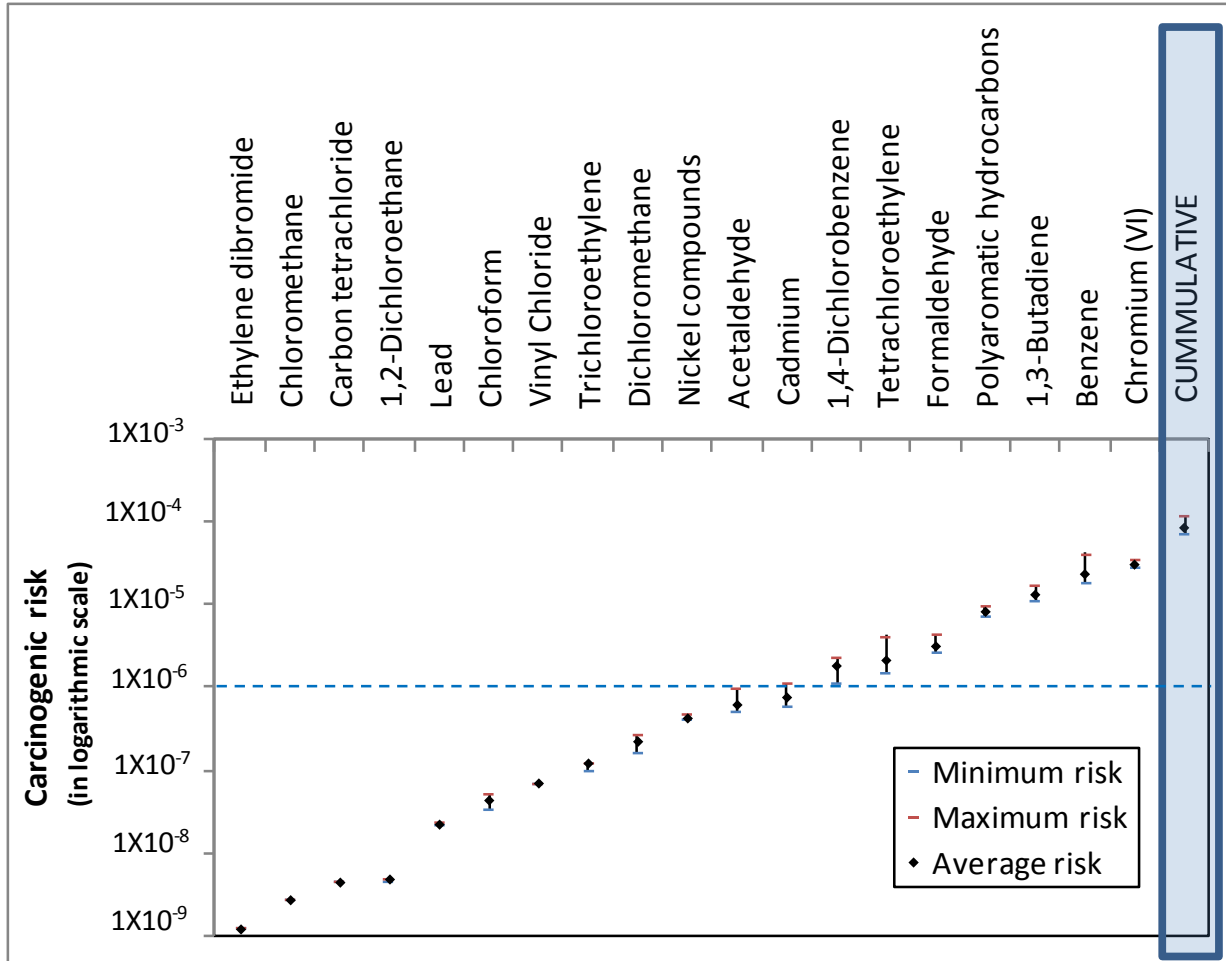
Cumulative Assessment: Non-cancer effects



Cumulative risk is 0.31, below the threshold for concern

Average, maximum and minimum non-cancer risk values estimated for each carcinogenic substance based on average annual concentrations from the 551 receptor sites

Cumulative Assessment: Cancer risk



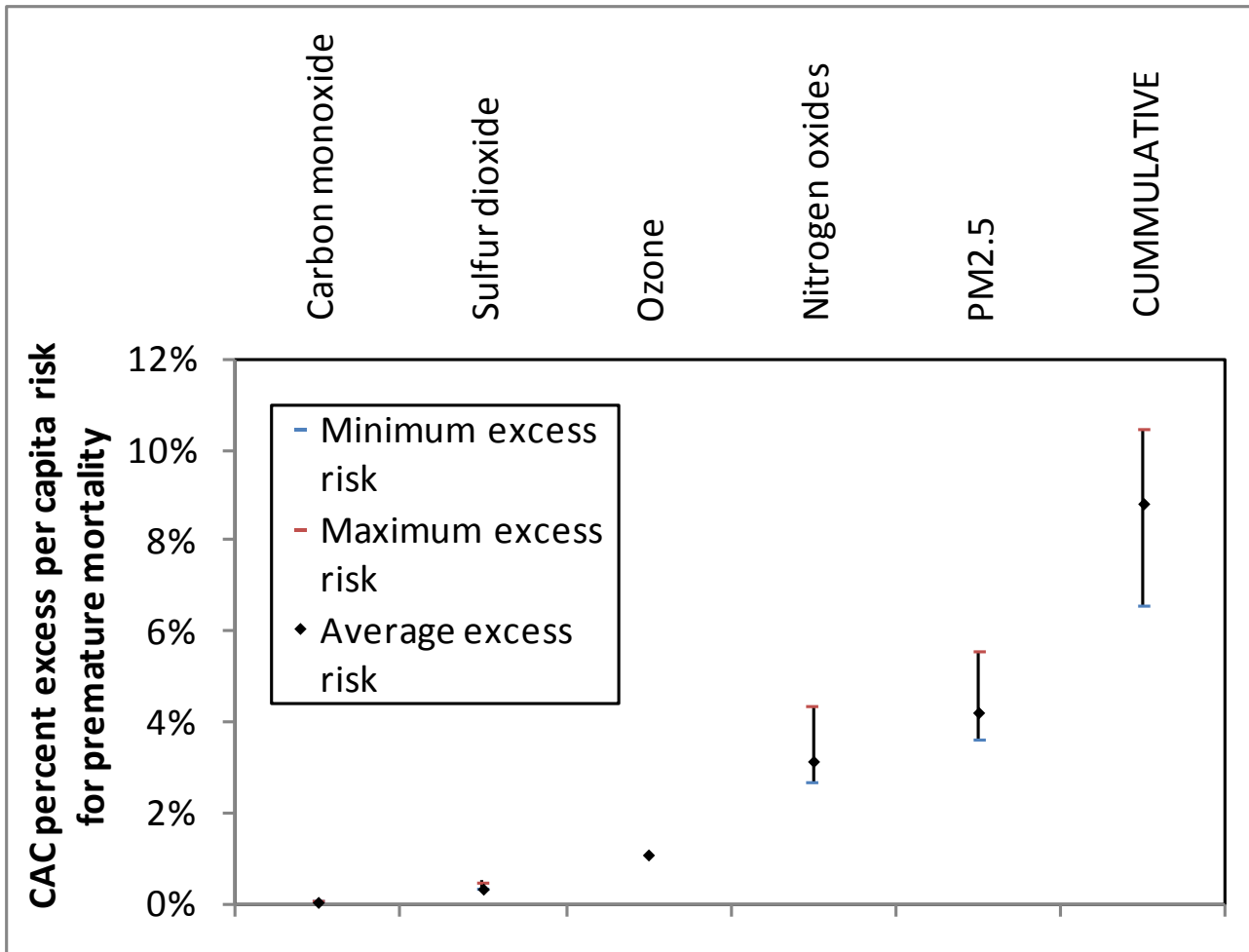
Cumulative cancer risk is 83 in 1 million

This is about 2 percent of the total cancer incidence rate in Toronto

Average, maximum and minimum cancer risk values estimated based on average annual concentrations from the 551 receptor sites.

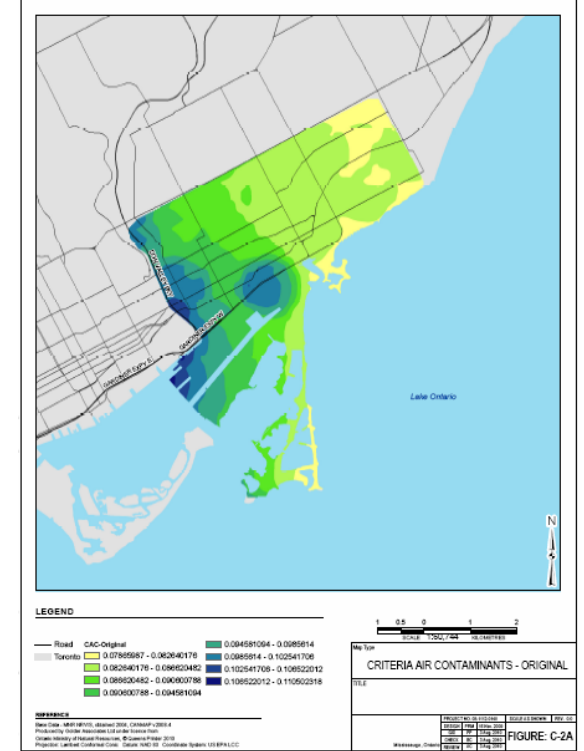
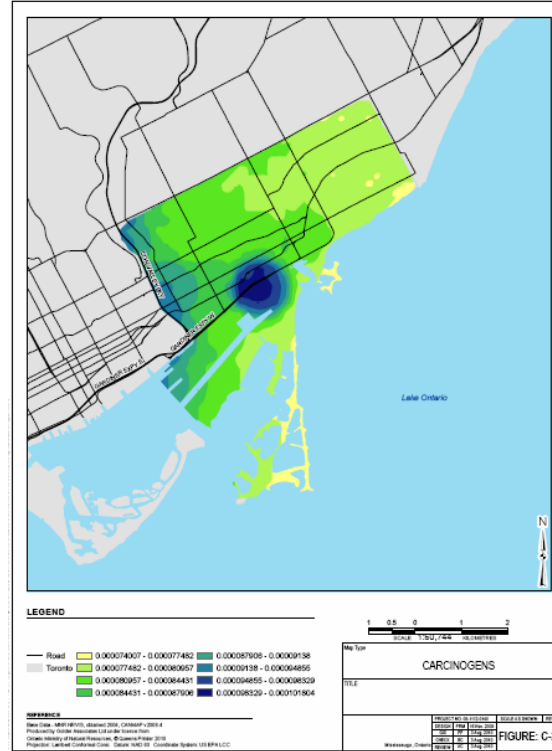
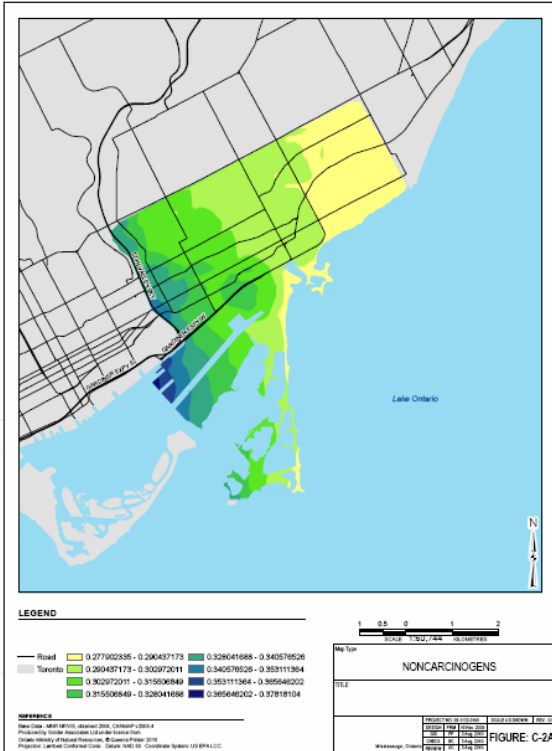
1 in 1 million excess lifetime cancer risk is the *de minimus* risk level

Cumulative Assessment: Criteria Air Contaminants



Cumulative increased risk of premature death is 8.9 percent

Cumulative Health Assessment Maps



Distribution of cumulative risk from non-carcinogens

Distribution of cumulative risk from carcinogens

Distribution of cumulative risk of mortality from criteria air contaminants

Conclusions

- The non-carcinogenic contaminants occur below levels of concern to health, even when the combined exposure is taken into account
- Most carcinogens are below the one in one million excess cancer risk benchmark
- The cumulative risk from carcinogens is very low when compared to the total incidence rate of cancer in Toronto
- Criteria air contaminants such as ozone, nitrogen dioxides, and particulate matter contribute to the burden of illness

Conclusions (2)

- Some areas show a higher risk than others
- Considering cumulative impacts and airshed/airzone management strategies is important
- Current Ontario standards for criteria air contaminants are not fully protective of health

Conclusions (3)

- Many substances of greatest concern -- *benzene, 1,3-butadiene, and nitrogen oxides* -- locally generated emissions are mainly from transportation sources
 - Efforts to reduce air pollution from transportation sources continues to be a priority in the City
- Increased energy efficiency at home and in businesses will also help improve local air quality
- Reductions in emissions outside Toronto will also help improve air quality in the city

Potential Next Steps

- Use data from ChemTRAC as it becomes available to improve the results of the modelling and the health assessment
- Follow-up in areas that show higher concentrations of some pollutants, including encouraging pollution prevention in industrial and commercial facilities



Thank You!

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