



MEETING ABSTRACT

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Estimating the impact of temperature and air pollution on cardiopulmonary and diabetic health during the TORONTO 2015 Pan Am/Parapan Am Games

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Background

The TORONTO 2015 Pan Am/Parapan Am Games will attract thousands of visitors to Ontario, many of whom may suffer from chronic disease. It has been shown that those with asthma, asthma-related conditions, hypertension and diabetes are particularly sensitive to worsening air quality [1].

Objective

To predict patterns of temperature, humidity and air quality, as well as health service use for cardiopulmonary conditions and diabetes in July 2015.

Methods

Exposure data (temperature, humidity and air pollution) were obtained from Environment Canada for years 2003 to 2010. Using ArcGIS, the geospatial patterns of exposures were described for regions of Ontario hosting Pan Am events. A linear trend was used to forecast expected exposures for Pan Am regions in July 2015. Health outcomes (hospitalizations, emergency department visits and outpatient claims) for all-cause morbidity, asthma, asthma-related conditions, diabetes and hypertension were measured using data provided by the Institute for Clinical Evaluative Sciences. Associations between exposures and health outcomes were obtained from regression models. Health outcomes were predicted for

July 2015 using scenarios of 5% and 10% higher exposure levels than forecasted.

Results

Figure 1 shows the geospatial differences in temperature, humidity and air quality across Pan Am regions of Ontario in July 2010. Predicted daily rates of hospitalization and outpatient claims showed the largest increase under scenarios of increased exposure levels (Table 1). Given a 10% higher temperature than forecasted, predicted daily outpatient claims rates were 15% higher for all causes (Table 1), 20% higher for asthma and 20% higher for hypertension, compared to predicted rates using the forecasted temperature. Given a 10% higher Air Quality Health Index (AQHI) level than forecasted, predicted daily hospitalization rates were 6% higher for all causes (Table 1), 4% higher for asthma and 4% higher for asthma-related conditions, compared to predicted rates using the forecasted AQHI level.

Conclusions

With thousands more people being exposed to Ontario's weather and air pollution in July 2015, it is especially important to consider strategies to minimize the environmental impact of human activities. This will lessen the potential burden on individuals, especially those living with chronic disease.

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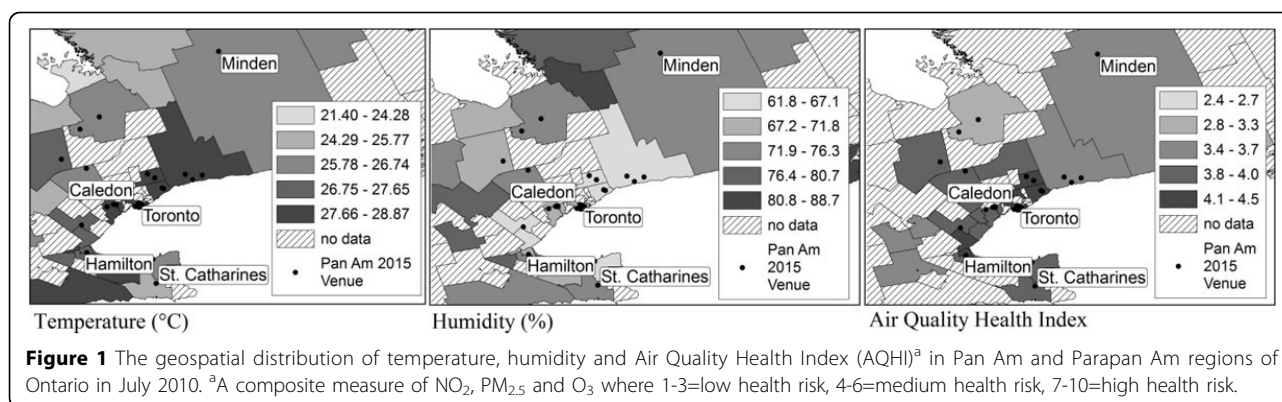


Table 1 For Pan Am regions: observed and forecasted exposures, with predicted daily health service use rates for all-cause morbidity in July 2015 under scenarios of 5% and 10% higher exposure levels than forecasted

Exposures	Observed	Forecasted	Hospitalizations ^c			Emergency Department Visits ^c			Outpatient Claims ^c		
	(July '03-'10)	(July '15)	Forecasted	5%↑	10%↑	Forecasted	5%↑	10%↑	Forecasted	5%↑	10%↑
Temperature (°C) ^a	25.66	25.74	3.36	3.62	3.88	10.95	10.99	11.02	253.46	272.30	291.15
Humidity (%) ^b	71.2	69.5	3.67	3.90	4.13	10.99	11.03	11.07	275.91	293.36	310.82
AQHI ^a	4.2	2.6	2.84	2.93	3.01	10.90	10.91	10.92	216.85	222.85	228.86

^aMonthly average of daily maximums. ^bMonthly average of daily averages. ^cPer 10,000 general population.

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