INFORMATION REPORT

TO:	Mayor and Members Board of Health
COMMITTEE DATE:	July 9, 2015
SUBJECT/REPORT NO:	Clean Air Hamilton 2014 Progress Report - BOH15014 (City Wide)
WARD(S) AFFECTED:	City Wide
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Council Direction:

Not applicable. Clean Air Hamilton reports annually to the Board of Health (BOH) on the trends in local air quality and the actions undertaken by members of Clean Air Hamilton to address local air quality in Hamilton.

The "Clean Air Hamilton Air Quality Progress Report 2014", attached as Appendix A to Report BOH15014 provides further details.

Information:

Clean Air Hamilton is a community initiative to improve air quality in the City of Hamilton. It has a diverse membership with representation from environmental organizations, industry, businesses, academic institutions, citizens, and different levels of government (federal, provincial and municipal). Initiated in 1998, Clean Air Hamilton works to improve air quality throughout the City of Hamilton and meet all ambient air quality criteria. BOH supports the work of Clean Air Hamilton through an annual budget of $56,000.

Clean Air Hamilton has identified 10 strategic activities related to air quality improvements on which to focus over the next two to three years. These include:

- public health protection,
- risk communication,

- active and sustainable transportation,
- smart drivers,
- land use planning,
- air monitoring,
- emission reduction strategies,
- climate change,
- energy conservation, and
- communication.

Further details are included in Appendix A.

In 2014, Clean Air Hamilton received an Award of Planning Excellence for Innovation in Sustaining Places from the New York Upstate Chapter of the American Planning Association for the 2013 Air Quality Task Force Action Plan (BOH13029).

1.0 Air Quality in Hamilton

The annual percentage decreases over time are significant in many pollutant categories as measured at the downtown air monitoring site (MOE Station 29000). The percentage decrease over the last year and total reduction since the mid-1990s, respectively were: total suspended particulate (TSP) levels, 2.9% (total 52%); inhalable particulate matter (PM_{10}), 1.7% (total 30%); respirable particulate matter ($PM_{2.5}$), 1.9% (total 28%); nitrogen dioxide (NO_2), 2.7% (total 49%); sulphur dioxide (SO_2), 2.0% (total 35%); total reduced sulphur odours, 5.6% (total 99%); benzene, 5.4% (total 87%); and Polycyclic aromatic hydrocarbon (PAH, measured as benzo[a]pyrene), 4.9% (total 78%). The trend in ozone (O_3) shows that the concentrations have been highly variable over the past 10 years. Overall, the trend line for ozone is flat or increasing slightly.

The combination of factors listed below contributes to Hamilton's unique situation related to air quality when compared to other communities in southern Ontario:

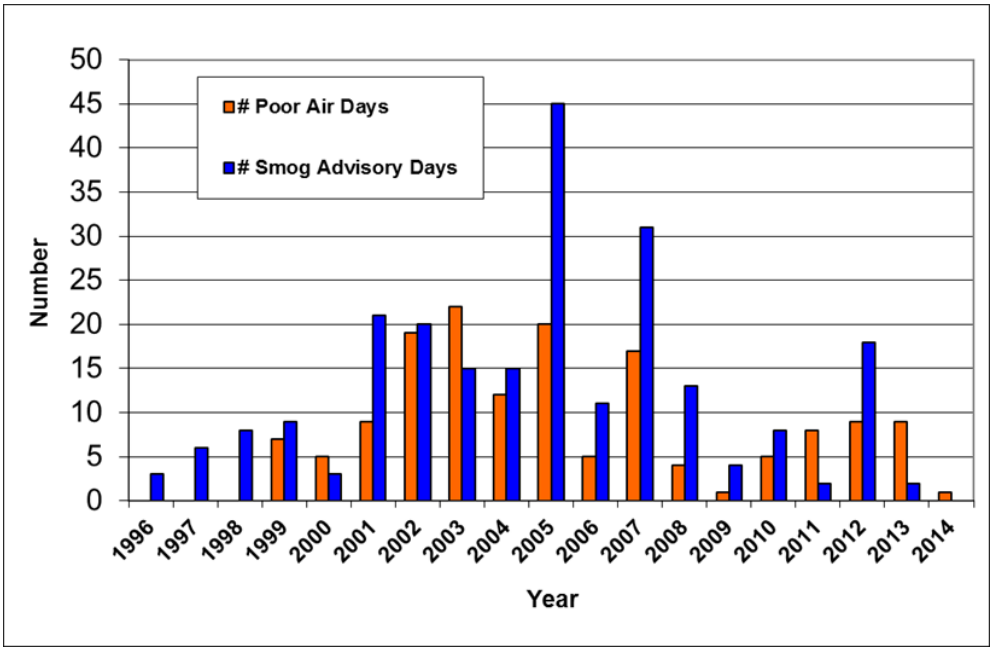
- The roads in and around Hamilton are heavily used by local citizens, commuters passing through Hamilton and long-distance car and truck traffic. As a consequence, the air quality is adversely impacted by the mobile emissions generated by gasoline-powered vehicles and diesel-powered transport trucks.
- Hamilton is home to a large number of small, medium and large industries.
- Hamilton is located at the west end of Lake Ontario and is surrounded by the escarpment, a combination that brings unique meteorological features to the area. The local topography (i.e., the escarpment) and prevailing weather conditions contribute to conditions where air pollution levels are usually higher below the escarpment where there are more industries and higher density urban development than above the escarpment.

- A few times a year unusual meteorological conditions can occur that give rise to atmospheric inversion events, which may last from 2 to 12 hours or longer. During these events, pollutant levels can rise dramatically for a short time. These events are most common in the spring and fall.
- Hamilton is also affected by trans-boundary air pollution, which is pollution that originates from outside the municipal boundary. Both distant and local sources contribute to Hamilton's overall air pollution make-up.

A smog advisory is issued by the Ontario Ministry of Environment (MOE) when the Air Quality Index (AQI) reaches or exceeds a value of 50; a smog advisory day is declared when it is predicted that the AQI may reach or exceed 50 on an upcoming day or the AQI has already reached a value over 50 and is expected to remain above 50 for the advisory period. The advisory's purpose is to alert the public that widespread elevated levels of air pollution exist.

There are three air quality monitoring stations in Hamilton which provide the data used to calculate the AQI. Poor Air Quality Days are days where the AQI actually exceeded a value of 51 for one hour. In 2014, no smog advisory days were declared by the MOE for the City of Hamilton (see Figure 1).

Figure 1: Number of Poor Air Quality Days and Smog Advisory Days in Hamilton between 1996 and 2014



Clean Air Hamilton does note that air quality can be variable at a local neighbourhood level and some areas of Hamilton can be impacted more than others by air pollutants.

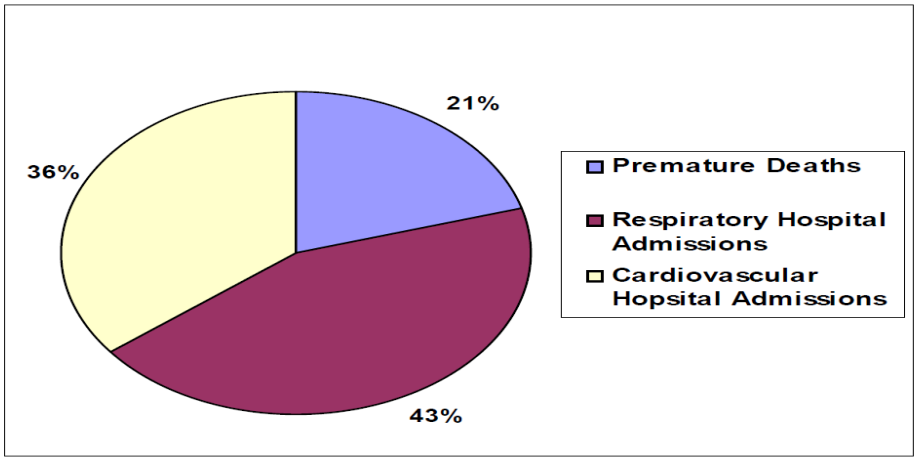
2.0 Air Quality & Health

Poor air quality is associated with a range of health effects. Some segments of the population, particularly young children and the elderly, are much more susceptible to the adverse health effects of poor air quality.

In 2011, Clean Air Hamilton in partnership with PHS asked SENES Consulting to undertake the task of providing a comprehensive review and update of the scientific literature linking air pollutants and health effects, and to use ambient air data from Hamilton to determine the health impacts of air pollution in Hamilton. PHS is planning to have this study updated in 2016 and every five years thereafter in order to better understand changes over time as they relate to health outcomes.

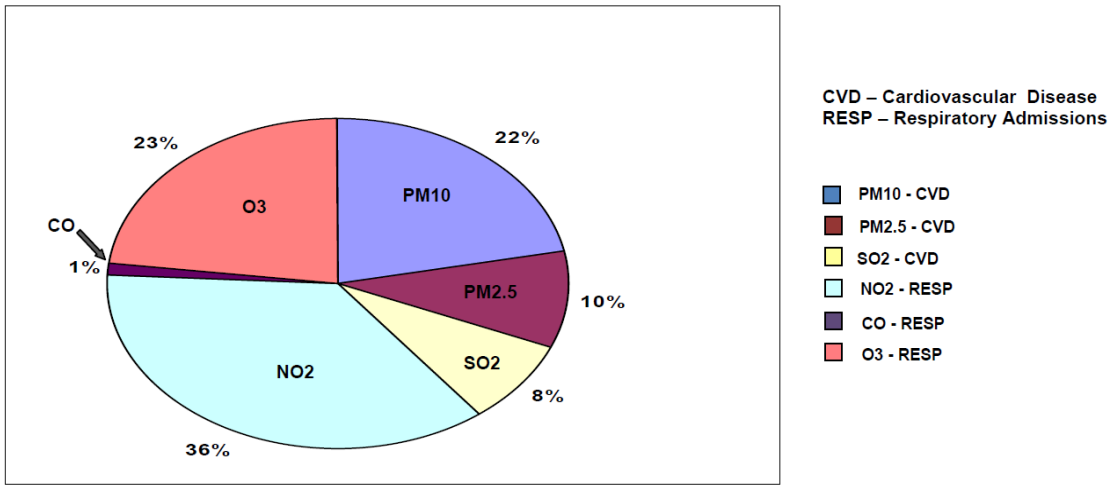
The 2011 Air Quality Health Assessment Study estimated that the six key air pollutants: NO_2, ground-level ozone (O_3), PM_{10}, $PM_{2.5}$, SO_2 and CO contribute to about 186 premature deaths, 395 respiratory hospital admissions and 322 cardiovascular hospital admissions each year in Hamilton (see Figure 2).

Figure 2: Air Pollution Health Impacts in Hamilton (%)



All of these air pollutants contribute to health effects outcomes; however, some health outcomes are linked to exposures to specific air contaminants. For example, the main air pollutants contributing to respiratory admissions to hospitals are O_3, SO_2 and nitrogen oxides. On the other hand, particular matter (both PM_{10} and $PM_{2.5}$) and CO were major contributors to cardiovascular admissions to hospitals. Figure 3 below outlines the relative contributions of air pollutants to health impacts in Hamilton.

Figure 3: Contribution of Air Pollutants to Health Impacts in Hamilton (%)



Overall, with the average measured air quality for the Hamilton region improving, the number of hospital admissions associated with respiratory ailments has remained unchanged since the 2003 study. However, hospital admissions associated with cardiovascular effects have decreased significantly since 2003. Overall, deaths due to air pollution decreased from 229 in 2003 to 186 in 2012; a 19% improvement. These values were not corrected for population increases, which would further improve the picture.

3.0 Air Quality Task Force and Airshed Model

In December 2012, Hamilton BOH requested that Clean Air Hamilton establish an Air Quality Task Force (AQTF) to investigate and make recommendations to the City on actions that can be taken to reduce air pollution in Hamilton. The AQTF Action Plan (BOH13029) was presented to the BOH in December 2013, and included 10 recommendations in the areas of air modelling and monitoring, planning, education and outreach, green infrastructure, and updating of municipal by-laws aimed at decreasing particulate matter in the environment. The full AQTF report can be accessed by going to the Clean Air Hamilton website at the following web address:
ttp://www.cleanair.hamilton.ca/downloads/AQTF%20Action%20Plan.pdf

The AQTF's first recommendation was for the City to "commit to partnerships with interested stakeholders to fund the development of an advanced airshed model for the City of Hamilton". In 2014, the City of Hamilton and the Hamilton Industrial Environmental Association (HIEA), both members of Clean Air Hamilton, partnered and HIEA retained Golder & Associates to build a model of the Hamilton airshed. The focus of the model will be to determine the contribution and nature of various local and background (i.e., trans-boundary) sources on ambient air concentrations in Hamilton,

and to accurately predict the air pollution level at any point in the region. The model will allow:

- characterization of air quality across the Hamilton area,
- determination of the contribution from different emission source sectors to air quality,
- development and prioritization of more effective air quality improvement actions,
- establishment of a tool to assess the impacts of population growth and land use and transportation policies on local air quality, and
- better informed urban planning.

An Advisory Committee comprised of representatives from local industry, City of Hamilton PHS, Clean Air Hamilton, Ministry of the Environment and Climate Change (MOECC), and Environment Hamilton was formed to advise on the development of the airshed model work. The airshed model is expected to be completed in early 2016 and PHS will present findings to members of the BOH shortly thereafter.

4.0 Air Quality Programs in 2014

Clean Air Hamilton undertook a number of air quality programs in the 2014 year to improve local air quality through research, education and communication. Several of these programs were supported and assisted by partnerships with the City and other organizations (MOECC, Green Venture). Examples of these programs are provided below.

4.1 Upwind Downwind 2014 Conference

Every two years Clean Air Hamilton hosts the Upwind Downwind Conference, an event which highlights the latest in air quality research, particularly as it applies to the human health impacts of air pollution, and strategies and activities to improve air quality on local, regional and national scales. 2014 marked the eighth Upwind Downwind Conference.

For further information and to access presentations from the 2014 Upwind Downwind Conference, visit the Clean Air Hamilton website at http://www.cleanair.hamilton.ca. The ninth Upwind Downwind Conference is being planned for February 22nd, 2016.

4.2 Air Quality Health Index Mapping Project

Air quality health indices (AQHI) are used by the Government of Canada to describe real-time risk for the mixture of air pollutants existing in our Canadian cities. People, particularly those who are most vulnerable, pre-existing respiratory or cardiac conditions, can use these AQHI values to make informed decisions about air quality risk and take appropriate actions. AQHI has been pilot tested since 2011 in

Hamilton by PHS, however the current AQHI system only gives one AQHI value for the entire city.

In order to give a more localized estimate of air pollution risk to assist citizens in Hamilton, a real-time, web based air pollution and AQHI map for Hamilton, Ontario was produced using both mobile and fixed air station monitoring. To access the map and explore the information available, visit the following website: http://www.hamiltonaqhi.com/index.html.

4.3 "Fresh Air Kids"

"Fresh Air Kids" is a school air quality program that aims to raise awareness of AQHI and air quality issues among school-age children and to assist children to develop walking routes to school that would have the lowest pollutant exposures and encourage them to use active modes of transportation. Partner schools included Queen Victoria Elementary School (grade 5 students), Cathy Weaver Elementary School (two classes of grade 3 and 4 students) Wilfred Laurier Elementary School (two classes of grade 5 students) Lake Avenue Elementary School (grade 2 students).

The "Fresh Air Kids" school air quality program has received funding to continue in 2015.

4.4 Totally Transit

Since 2007, Green Venture has partnered with the Hamilton Street Railway (HSR) to deliver "Totally Transit" to elementary aged students. Transit is a unique bus education program that teaches Hamilton elementary-aged students how to properly utilize the HSR while making the connection between air quality, climate change and transportation. Through hands-on experience, this one-of-a-kind program empowers students to feel confident about choosing transit and other forms of sustainable and active transportation.

In 2014, 252 students representing 19 classes from five schools, participated in the Totally Transit for Kids program, which includes a chartered HSR ride to Eco-House and a tour. Green Venture also delivered Totally Transit presentations to 1,529 students. Between 2007 and 2014, Totally Transit program has reached over 8,600 students in total. The Totally Transit for School Aged Children has received funding to continue in 2015.

5.0 Air Quality Programs in 2015

Clean Air Hamilton identified and BOH approved funding (BOH15001) for five programs to improve air quality in 2015: Totally Transit Kids ($5,500); Climate Change

Champions ($9,000); Fresh Air Kids ($11,500), Downtown Active Transportation Superhighway ($6,000); and Trees for Hamilton ($8,000).

The results of these programs will be reported on next year in the Clean Air Hamilton 2015 Progress Report.

6.0 Recommendations

Air quality improvements and reductions of greenhouse gas emissions in the City of Hamilton continue to be incremental and require actions on many fronts and continued, concerted actions of individuals, organizations, industries, the City of Hamilton and other levels of government.

- Continue to support and undertake all the recommendations of the Air Quality Task Force (BOH13029) in the areas of air modelling and monitoring, planning, education and outreach, green infrastructure, and updating of municipal by-laws aimed at decreasing particulate matter in the environment.
- Continue to support and encourage Hamiltonians to reduce their transportation-based emissions through the use of transportation alternatives including public transit, bicycles, walking, hybrid vehicles, etc. and in supportive policies such as “complete streets” (planning for streets to be accessible and safely usable for all modes of transportation) and transportation demand management.
- Encourage the continued efforts of the MOECC and industry to reduce air borne contaminants in the City of Hamilton and the Province of Ontario.

APPENDICES

Appendix A to Report BOH15014 – Clean Air Hamilton 2014 Air Quality Progress Report