

INFORMATION REPORT

TO:	Mayor and Members Board of Health
COMMITTEE DATE:	July 7, 2016
SUBJECT/REPORT NO:	Clean Air Hamilton 2015 Progress Report (BOH16017) (City Wide)
WARD(S) AFFECTED:	City Wide
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SUBMITTED BY & SIGNATURE:	Rob Hall Director, Health Protection Division Public Health Services Department

Council Direction:

Not applicable. Clean Air Hamilton reports annually to 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 2015 Air Quality Progress Report”, attached as Appendix A to Report BOH16017 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 identified ten strategic issues related to air quality improvements to focus on throughout 2015. 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 Grassroots Initiative from the Western New York Section of the Upstate Chapter of the American Planning Association and 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

Pollutant's annual percentages within many categories have decreased over time as measured at the downtown air monitoring site (Ministry of Environment (MOE) Station 29000). Total reductions in pollutant levels since the mid-1990s are: total suspended particulate (TSP) levels, 59% total reduction over 19 years; inhalable particulate matter (PM₁₀) levels, 30% total reduction over 18 years; respirable particulate matter (PM_{2.5}), 24% total reduction over 16 years; nitrogen dioxide (NO₂) levels, 51% total reduction over 19 years; sulphur dioxide (SO₂) levels, 44% total reduction over 19 years; total reduced sulphur odours, 99% total reduction over 19 years; benzene levels, 87% total reduction over 16 years; and polycyclic aromatic hydrocarbon (PAH, measured as benzo[a]pyrene), 72% total reduction over 19 years.

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.

The Ontario Ministry of the Environment and Climate Change (MOECC) replaced the Air Quality Index (AQI) on June 24, 2015 with the Air Quality Health Index (AQHI). An update to BOH (BOH10008 & BOH10008A) was made regarding the implementation of this new reporting structure in Hamilton. The AQHI is a scale designed to help people understand what the air quality around you means to your health. It is a health protection tool that will help limit your short-term exposure by providing advice to vulnerable people and recommended activity levels during all levels of air quality. The AQHI scale is from 1 to 10+ with ranges and activity recommendations for at risk populations and the general population.

Table 1.0 Air Quality Health Index Categories and Health Messages¹

Health Risk	Air Quality Health Index	Health Messages	
		At Risk Population*	General Population
Low	1 – 3	Enjoy your usual outdoor activity	Ideal air quality for outdoor activities
Moderate	4 – 6	Considering reducing or rescheduling strenuous activities outdoors if you are experiencing symptoms	No need to modify your usual outdoor activities unless you experience symptoms such as coughing and throat irritation
High	6 – 10	Reduce or reschedule strenuous activities outdoors. Children and the elderly should also take it easy	Consider reducing or rescheduling strenuous activities outdoors if you experience symptoms such as coughing and throat irritation
Very High	Above 10	Avoid strenuous activities outdoors. Children and the elderly should also avoid outdoor physical exertion	Reduce or reschedule strenuous activities outdoors, especially if you experience symptoms such as coughing and throat irritation

*People with heart or breathing problems are at greater risk. Follow your doctor's usual advice about exercising and managing your condition.

(¹Ontario Ministry of the Environment and Climate Change. (2016). What is the Air Quality Health Index? Retrieved from: http://www.airqualityontario.com/science/aqhi_description.php)

The MOECC have three air quality monitoring stations in Hamilton which provide the data used to calculate the AQHI. For approximate locations of air monitoring stations see Appendix A. Two different air quality alerts are issued during periods of poor air quality. A Special Air Quality Statement (SAQS) will be issued when the AQHI is a high risk (>6) and is forecast to last for 1 to 2 hours. If the high risk AQHI is forecast to be a persistent duration of at least 3 hours, then a Smog and Air Health Advisory (SAHA) will be issued.

Since the start of the AQHI reporting structure in 2015, there have been no SAQS or SAHA alerts issued for the City of Hamilton. 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.

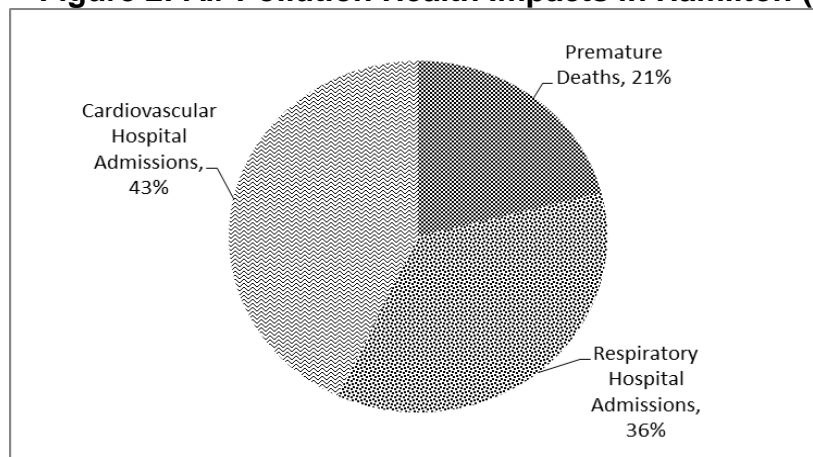
2.0 Air Quality & Health

In 2011, Clean Air Hamilton in partnership with Public Health Services (PHS) asked SENES Consulting to provide a comprehensive review of the scientific literature linking air pollutants and health effects. Ambient air data from Hamilton was used to determine the health impacts of air pollution in Hamilton. The study identified six key air pollutants in Hamilton:

- Nitrogen Dioxide (NO₂),
- Ground-Level Ozone (O₃),
- Inhalable Particulate Matter (PM_{2.5}),
- Sulphur Dioxide (SO₂), and;
- Carbon Monoxide (CO).

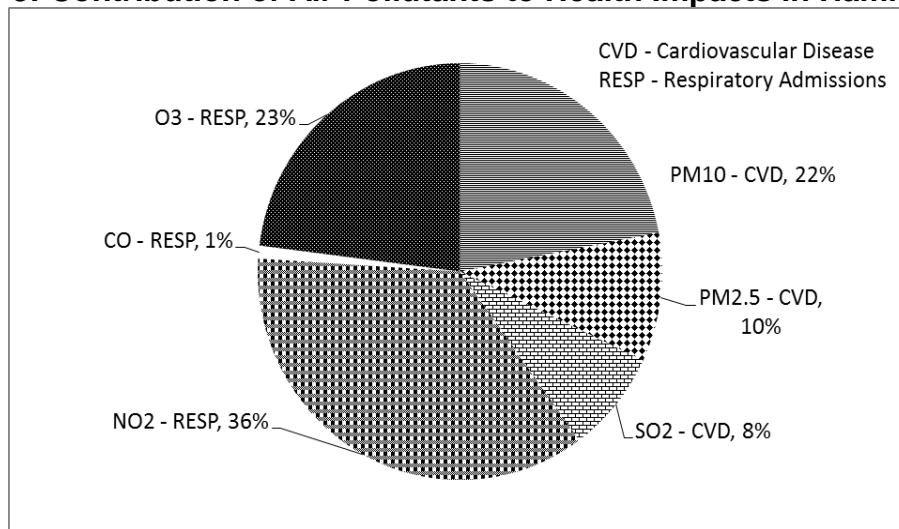
This study represents the most up to date information about health impacts associated with poor air quality in Hamilton. These six key air pollutants contribute to about 186 premature deaths, 395 respiratory hospital admissions and 322 cardiovascular hospital admissions each year in Hamilton (see **Figure 2**).

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



All air pollutants have the potential to contribute to negative health effects, however certain air pollutants can elicit different health outcomes. The main air pollutants contributing to respiratory admissions to hospitals are O₃, SO₂ and nitrogen oxides. On the other hand, particular matter (both PM₁₀ 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, Hamilton's air quality is improving. Although hospital admissions associated with respiratory ailments has remained unchanged since the 2003 study, admissions associated with cardiovascular effects have decreased significantly since 2003. Deaths due to air pollution have decreased 19% from 229 in 2003 to 186 in 2012. These values were not corrected for population increases, which would further improve the picture.

3.0 Air Quality Task Force and Airshed Model

The Air Quality Task Force (AQTF) was established in 2012 following a request from BOH to investigate and make recommendations to the City on actions that can be taken to reduce air pollution in Hamilton. The AQTF action plan was presented to BOH (BOH13029) in 2013 and included 10 recommendations:

1. Development of an advanced air model for the City of Hamilton.
2. Strengthen air monitoring activities.
3. Develop appropriate air quality related guidelines for new and redeveloping neighbourhood land use planning.
4. Promote green infrastructure.
5. Provide individuals with tools to minimize their personal exposure.
6. Develop and conduct particulate matter control workshops.
7. Expand the air quality outreach program within Hamilton schools.
8. Promote programs that encourage community – based environmental monitoring and engagement with the City of Hamilton.
9. Minimize generation and dispersion of airborne particulate matter by revising bylaws.
10. Implement strategies to improve street cleaning.

The creation of an advanced airshed model is currently being developed by Golder & Associates and is expected to be completed late 2016. Not-for-profit organizations such as Green Venture continually perform air quality outreach programs within Hamilton's community and schools through the support of Clean Air Hamilton and PHS. PHS initiated and is currently conducting particulate matter control workshops with local industries and businesses. The full Air Quality Task Force report can be found at: <http://www.cleanair.hamilton.ca/default.asp?id=72>

4.0 Air Quality Programs in 2015

Clean Air Hamilton undertook a number of air quality programs in the 2015 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 government and non – government organizations. Examples of these programs are provided below.

4.1 Phase 2 Neighbourhood Mobile Monitoring

Mobile air monitoring began in 2010 in partnership between Clean Air Hamilton, Corr Research and the MOECC. Originally 26 neighbourhoods requested monitoring.

In 2015, an additional 15 neighbourhoods were monitored including: Fruitland and Barton, Cope St., Sherman South, Sanford School Area, Jolley Cut Area, Durand,

Waterdown, Rymal/Mud Area, Linc/Red Hill Intersection Area, Nebo Rd., Upper Gage/Upper Ottawa/East Mountain Park, Gourley, Rymal and Paradise, Meadowlands, Ancaster, Mount Hope Area (Airport), and Ward 6 Areas (Kenilworth Access, Mountain Brow).

Air pollution concentrations were the lowest during south west prevailing winds, contrary higher pollution risk levels near the downtown core were noted during north east winds. Risk decreased greatly the farther from the downtown core area except for Nebo Road and Fruitland/Barton areas. The best air quality occurred at the southern edge of the city, furthest from the downtown industrial area.

4.2 “Trees for Hamilton”

“Trees for Hamilton” received funding from Clean Air Hamilton in September of 2015 and was able to coordinate three fall plantings in October. During the events Trees for Hamilton staff facilitated planting of 135 native trees, evergreens and shrubs. Locations of the planting included: Royal Botanicals Garden’s (RBG) property at Churchill Park, Hamilton Conservation Area’s (HCA) property at Mount Albion east entrance and HCA’s Mount Albion property west entrance. “Trees for Hamilton” staff successfully partnered with staff from HCA and RBG to plant all of these trees.

Additional sites are being scouted for planting in 2016 including negotiations to help plant trees and shrubs at McQuesten Urban Farm project.

4.3 “Fresh Air Kids”

“Fresh Air Kids” is a school air quality program that began in 2013 and aims to raise awareness of AQHI and air quality issues among school-age children. The program assists children to develop walking routes to school that would have the lowest pollutant exposures and encourage them to use active modes of transportation. Corr Research and Green Venture partnered with three Hamilton elementary schools in 2015 to provide six classes, a series of hands-on educational workshops. Partnering schools in 2015 included St. Brigid, Mount Hope and St. Joseph with two classes at each elementary school.

Workshops included activities both inside and outside the classroom where students learned more about the AQHI and are asked what actions they could take to reduce their personal exposure. Outside, students got to collect real-time data on the levels of PM 2.5 and PM 10 around their schools and around their neighbourhood. This program proves to be highly effective at teaching students about the importance of air quality and active/public transportation. A project team at one school have now developed anti-idling programs resulting in a major reduction of vehicle idling.

The “Fresh Air Kids” program has received funding to continue in 2016.

4.4 Totally Transit for Kids

Since 2007, Green Venture has partnered with the Hamilton Street Railway (HSR) to deliver “Totally Transit” to elementary aged students. “Totally Transit” is a unique bus education program that provides Hamilton elementary – aged students the tools required to build their confidence and influence their transportation choices, while making the connection between air quality, climate change and transportation.

Between 2007 and 2015, “Totally Transit” lessons reach over 4,600 elementary students while another 5,700 students participated in scaled – down presentations held at various school environmental fairs. In 2015 alone, 264 students representing 16 classes from seven schools participated in the “Totally Transit” for Kids program. This included a chartered HSR ride to EcoHouse and a tour.

The “Totally Transit” for Kids program has received funding to continue in 2016.

4.5 Climate Change Hamilton

In 2015, funding from Clean Air Hamilton helped Climate Change Hamilton reach over 20,000 residents to raise awareness about climate change, local action, and help them reach their adaptation and mitigation goals. The Climate Change Hamilton program achieves these goals through the Hamilton Climate Change Action Charter, Map Climate Change website, on-going support of charter signatories, providing tools and resources to meet charter commitments, as well as communication and promotion of positive social norms and behaviour.

The program assists local individuals, businesses, organizations and community groups in managing the environmental impacts of their operations through greenhouse gas reductions and adaptation measures.

4.6 DASH – MASH Assessment

DASH – MASH: A cross city active transportation superhighway for Hamilton, Ontario was examined by Corr Research Inc. for the potential of a multi-use trail network that would parallel the Niagara Escarpment. A commuter trail network across Hamilton connecting Hamilton from Stoney Creek to Dundas would provide benefits to members of the Hamilton community including: (1) Reduced on-street cycling, which will reduce the competition between vehicles and cyclists on the roads, (2) Improved connection between the upper and lower city, and (3) Increased opportunities for physical recreation.

The assessment identified that DASH – MASH would span 108 km, intersecting 13 of the 15 wards and 125,000 Hamilton residents are within a ten minute walk of the proposed multi use trail.

78 km of existing trail is already included in the DASH – MASH plan with 22 km of existing trail and sidewalk needing conversion. Only 7.9 km, or 7% of the entire system would require a complete build to complete the DASH – MASH.

5.0 Air Quality Programs in 2016

Clean Air Hamilton identified and BOH approved funding (BOH16016) for five programs to improve air quality in 2016: Totally Transit Kids (\$9,000); Eco Stars Classroom (\$10,000); Fresh Air for Kids (\$12,000), Air Quality Health Index Map (\$7,500); and Installation of Idling Signs (\$1,500).

The results of these programs will be reported on next year in the Clean Air Hamilton 2016 Air Quality Progress Report.

6.0 Future Actions

There has been substantial improvement in Hamilton's air quality since the 1970's, however air pollution continues to create adverse health impacts to Hamilton residents. Continued, concerted actions are imperative towards air quality improvements and reductions of greenhouse gas emissions in the City of Hamilton. Collaboration from individuals, organizations, industries, the City of Hamilton and other levels of government are required to reach our goals.

- 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 and transportation demand management.
- Encourage the continued efforts of the Ministry of Environment and Climate Change and industry to reduce air borne contaminants in the City of Hamilton and the Province of Ontario.

APPENDICES

Appendix A to Report BOH16017 – Clean Air Hamilton 2015 Air Quality Progress Report.