Air Quality Health Index
Variation across British Columbia

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September 2010

Abstract

The Air Quality Health Index (AQHI) is a tool that has been developed to provide Canadians with an estimate of the short-term health risk caused by degraded air quality. AQHI development was based on Canadian epidemiological health studies that estimated health risks from exposure to air pollution. These estimates represent exposure levels, exposure mixes and population characteristics in Canadian cities. Short-term health risks of concern are predominantly the exacerbation of pulmonary disorders and the impacts on cardiac function.

The AQHI is a function of the hourly ambient concentrations of nitrogen dioxide (NO_2), fine particulate matter ($PM_{2.5}$) and ozone (O_3). It is calculated each hour for many locations across Canada, and, along with a set of predicted values from Environment Canada, is provided online through a number of websites. The AQHI increases as health risk increases. The index is on an open-ended scale from 1 to 10+, and grouped into four broad categories. The AQHI also provides Canadians with health advice to help reduce their health risk (see Table 5 in the Appendix).

In British Columbia, with the exception of Prince George, urban areas in Metro Vancouver and the lower Fraser Valley generally have a higher frequency of days with Moderate Health Risk on the AQHI scale, compared to Interior communities of the province. However, Interior communities generally have a higher frequency of days reaching High Health Risk compared to coastal communities.

Introduction

Concerns about the impacts of air pollution on the public extend back as far as the 14th century[1]. However, when a significant increase in deaths occurred during a severe air pollution episode in London, England in 1952, air quality started to become an increasingly important public health issue[2]. This event resulted in the first modern legislation to reduce air emissions and has been followed by continuous improvements in air quality in many areas of the world to this day. Clean air is now considered to be a basic requirement for human health and well-being. However, air pollution continues to pose a significant threat to health[3].

The new Air Quality Health Index has been developed as a tool to communicate the health risks posed by air pollution in Canada. Individuals, particularly the elderly, the very young and others at risk, can use the Air Quality Health Index to help protect themselves from the negative effects of poor air quality[4]. Communication is a key component of the new Air Quality Health Index, since it provides Canadians with local air quality information on an hourly basis.

This report provides information on the Air Quality Health Index and how the health risk associated with this index varies across British Columbia.

Air Quality and Health

The Air Quality Health Index is the first tool internationally to recognize the cumulative nature of poor air quality on health. Current literature tends to focus on single-pollutant analysis of the health impacts of various types of particulate matter. Various other contributors to poorer air quality may be regionally relevant. A single-pollutant synthesis of literature confirms that the short-term health outcomes of concern are predominately exacerbation of pulmonary disorders such as chronic obstructive pulmonary disease (COPD), asthma and poorer lung function, and an impact on cardiac functioning, often correlated with an increase in heart attacks, cardiac arrhythmias, sudden death or worsening of congestive heart failure[5,6,7].

These major contributors to the acute or short-term increase in health problems, and death, should be recognized in the context of longer-term impacts of air pollution. Evidence has linked longer-term exposure to degraded air quality to increases in rates of allergies and asthma, low birth weight, atherosclerosis, poorer lung development in children, lung cancer and ear infections[8].

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[1] Brimblecombe, P. (1987). *The Big Smoke: A History of Air Pollution in London since Medieval Times*. New York: Mehuen.

[2] Bates, D.V. (1994). *Environmental Health Risks and Public Policy*. Seattle: University of Washington Press.

[3] World Health Organization. (2005). *Air Quality Guidelines - Global Update*. http://www.euro.who.int/__data/assets/pdf_file/0005/78638/E90038.pdf

[4] Environment Canada, Health Canada. Air Quality Health Index. http://AirHealth.ca

[5] Burnett, R.T., Dales, R.E., Brook, J.R. et al. (1997, March). Association between ambient carbon monoxide levels and hospitalizations for congestive heart failure in the elderly in 10 Canadian cities. *Epidemiology, 8(2,)*162-7.

[6] Goldberg, M.S., Burnett, R.T., Valois, M.F. et al. (2003, January). Associations between ambient air pollution and daily mortality among persons with congestive heart failure. *Environmental Research. 91(1),* 8-20.

[7] Goldberg, M.S., Giannetti, N., Burnett, R.T. et al. (2008, October). A panel study in congestive heart failure to estimate the short-term effects from personal factors and environmental conditions on oxygen saturation and pulse rate. *Occupational and Environmental Medicine. 65(10),* 659-66.

[8] BC Lung Association. (2008). State of the Air Report 2008. http://www.bc.lung.ca/airquality/stateoftheair-report.html

Recognizing that short-term health risk can be related to the cumulative effects of multiple pollutants, the Air Quality Health Index (AQHI) is based on three pollutants that are readily measurable and known to be correlated with short-term mortality: nitrogen dioxide (NO_2), ozone (O_3) and particulate matter smaller than 2.5 microns in diameter ($PM_{2.5}$). The AQHI has been scaled to range from 1 to 10, though values above 10 are possible in extremely polluted air in Canada, such as in the smoke plumes of severe wildfires.

The risk to health rises as the AQHI rises. The AQHI is based upon the risk for health impacts to whole populations. All people have the potential to develop health symptoms as air quality deteriorates. However, there is no absolute personal risk level related to each of the AQHI values, since it is recognized that the health risk will vary from person to person. The health advice provided by the AQHI system reflects this concept since the advice for the “at-risk” population is more stringent than for the general population (see Table 5 in Appendix). People are also encouraged to “self calibrate” to the AQHI by associating their pulmonary or cardiac symptoms with an AQHI value when air quality deteriorates. They can then take action in the future to reduce their exposure to air pollution when these AQHI values are either occurring or predicted.

The Air Quality Health Index has been divided into four Health Risk Categories:

- Low Health Risk – AQHI values from 1 to 3
- Moderate Health Risk – AQHI values from 4 to 6
- High Health Risk – AQHI values from 7 to 10
- Very High Health Risk – above 10. (A very rare occurrence, usually connected to wildfire smoke).

The AQHI was designed as a tool that could be used by people to reduce their short-term exposure to air pollution and plan, on a daily basis, to modify their behaviour and reduce their personal health risk. Therefore, the AQHI responds to the acute, or short-term, changing levels of risk associated with air pollution. The AQHI is not intended to address the health impact on individuals of long-term (multi-year or multi-decadal) exposure to air pollutants.

$$\textbf{AQHI} = 10/10.4*(100*(e^{(0.000871*\mathbf{NO_2})}-1+e^{(0.000537*\mathbf{O_3})}-1+e^{(0.000487*\mathbf{PM_{2.5}})}-1))$$

In this equation, NO_2, O_3 and $PM_{2.5}$ (nitrogen dioxide, ozone and fine particulate matter less than 2.5 microns in size, respectively) are concentrations averaged over three consecutive hours. Units are parts per billion for each gas and micrograms per cubic metre for $PM_{2.5}$.

The three pollutants that form the basis of the AQHI formula each have direct health impacts, but some, particularly nitrogen dioxide[9], are more likely surrogates for other pollutants that impact health but that are not included in the calculation[10]. These other pollutants include ultrafine particles, metals and other toxic substances. They may mimic the variations in concentrations of the three AQHI component pollutants when they are produced by the same processes (e.g., vehicle exhaust), but they are not routinely monitored. In particular, the health effects of the hundreds of products of combustion are likely being reflected in the health effects linked to NO_2 and $PM_{2.5}$ in the AQHI, since combustion is a primary source of these two pollutants.

[9] Stieb, D., Health Canada. (2008). Personal communication.

[10] Hidy, G., Pennell, W. (2010, June). Multipollutant Air Quality Management. *Journal of the Air and Waste Management Association, (60),* 645.

The Air Quality Health Index (AQHI) algorithm is an hourly function of the concentrations of the three pollutants (see **AQHI** box, above). All pollutant concentrations in this algorithm and throughout this report are three-hour rolling averages.

Air Quality and Health Risk in British Columbia

Between 25 and 250 deaths each year in British Columbia are estimated to result from the short-term health impacts of degraded air quality[11]. An estimated 130-1300 excess hospitalizations, and 170-1700 emergency room visits are also attributed to short-term degraded air quality in British Columbia[12]. While a measurable and concerning increase, the attribution of any single death to air pollutants is difficult. Better management of air emissions has reduced extremes of degraded air quality; today over 95% of negative health outcomes attributable to poor air quality occurs on days that would be considered Low or Moderate Health Risk. This supports the premise that air pollutants at even relatively low concentrations can still trigger health problems. Hence the importance of recognizing that irrespective of the quality of air in a community, efforts to improve the air quality will reduce negative health outcomes in both the short-term and over longer time periods.

British Columbia is generally blessed with relatively better air quality than Eastern Canada. Nonetheless, significant health risks related to air quality issues do occur in some B.C. communities, particularly at certain times of the year.

Nationally, an estimated 2,500 deaths occur annually due to short-term exposure to degraded air quality. In contrast, it is now estimated that up to 17,500 excess deaths occur due to long-term exposure[13]. Such estimates highlight the value of not only reducing the extreme air quality events, but also focusing on ensuring air quality remains the best possible at all times.

Historically, air quality monitoring was limited to a few sites broadly spaced over large population clusters. The monitoring data were used to estimate the impact of air quality on the general population. Missing in such approaches were the negative health impacts associated with proximity to sources such as busy roads and other linear transportation routes. These are known to produce significant increases in airborne diesel particles and fumes, which may have potentially more health impacts than wood smoke. Wood smoke, in turn, has more impact than crystalline particles such as dust from gravel roads. Though all types of particles can cause health problems, the example is merely to illustrate that local variations in source of particulate matter exposure are increasingly being identified as a significant variable that will need to be incorporated into health messaging and monitoring.

The Air Quality Health Index as a Measure of Health Risk

The AQHI is a newer tool for health-risk communication that is based on the best information available. It replaces an older index developed in the early 1980s. As with any new tool, there is a need to learn how to use the AQHI, and test it in a variety of situations and settings. Tools should continue to be engineered to make the AQHI more efficient and effective. Notwithstanding, the need for appropriate health risk communication will remain unchanged as we as a society are increasingly expecting health risks to be reduced and the impacts of environmental degradation minimized. The AQHI can provide a better ability to determine which

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[11] B.C. Ministry of Health Services. (2004). *Provincial Health Officer's Annual Report , 2003: Every Breath You Take*, 55.
[12] Ibid, 60.
[13] Canadian Medical Association. (2008). *No Breathing Room: National Illness Costs of Air Pollution*. http://www.cma.ca/index.php/ci_id/86830/la_id/1.htm

communities have better air quality, and which communities will require greater efforts at reducing sources of air pollution. This report provides an example of using the AQHI to determine which communities have lower health risks, due to air pollution than others in British Columbia.

The AQHI can provide individuals with information to help in decision making that may reduce their risk for poorer health. It remains to be seen how effective the AQHI is in supporting personal health decisions or in modifying personal behaviours to avoid negative health consequences, and such studies are beginning. As the tool is used, more research and information will become available to hone the AQHI, its messages and health advice.

Lacking from most discussions on air quality is what interventions can be offered for individuals who are at risk for developing negative health consequences from degraded air quality. Current health messaging is based on best available knowledge and expert opinion. Further exploration of the impacts of health messaging, and the acceptance by individuals to adopt recommended practices is required. For example:

- What changes are required in personal asthma or COPD plans, such as modification of medications or oxygen flow rates?
- Are there particular cardioprotective measures to be instituted in poorer air quality environments and days?
- Will some individuals have better health if relocated to different communities?

The usability of the AQHI tool will be improved as researchers, patients and interested people begin to explore how to employ the AQHI to both reduce negative health impacts and contribute to health improvement.

The foundation around which the Air Quality Health Index was developed was the impact of air pollutants on human health. The index is constructed by statistically linking air quality monitoring data with outcomes of human mortality, and has been favourably compared to a variety of other health outcomes such as hospitalization and emergency room visits[14]. With the solid basis in health, it is logical that the further applications of the index in improving health should be explored.

Only about 0.1% to 1% of mortality is attributable to air pollution[15]. Therefore, to establish robust epidemiological links between air pollution and mortality data, health studies need to rely on information from very large numbers of people. This necessitates the use of data from big urban centres where outdoor daily pollutant concentrations are similar for hundreds of thousands of people. The statistical relationships that are subsequently developed form the foundation of mortality-based air quality indices. The AQHI is such a mortality-based index and, as a result, reflects health risk related to *urban* air quality. It is not necessarily as applicable to smaller centres where the mix of air pollutants, exposures and population characteristics can be different from urban centres.

[14] David, M., Stein, D., et al. (2008, March). A New Multipollutant, No-Threshold Air Quality Health Index Based on Short-Term Associations Observed in Daily Time- Series Analyses, *Journal of the Air & Waste Management Association*.
[15] B.C. Ministry of Health Services. (2004). Health Officer's Annual Report, 2003: *Every Breath You Take*, 57.

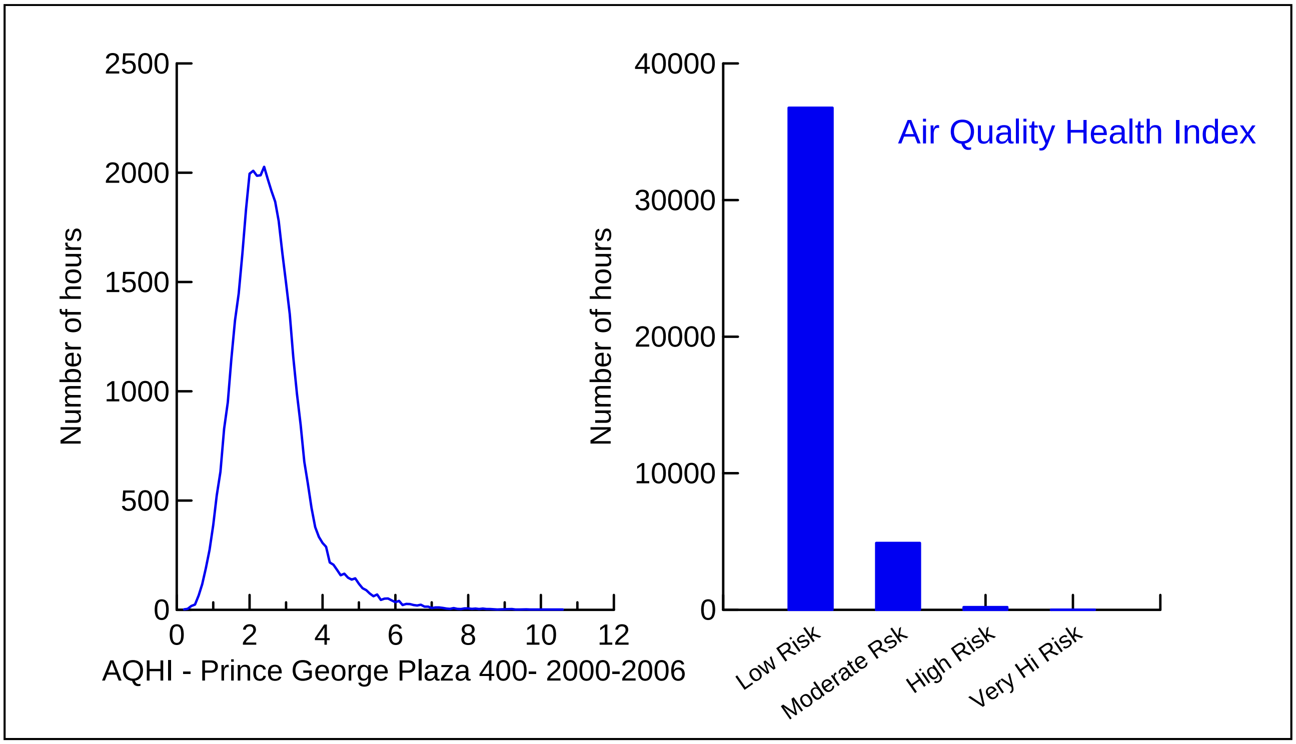

Figure 1. The distribution of the Air Quality Health Index in downtown Prince George
The graph on the left depicts the frequency distribution of the AQHI from 0 to 12, in increments of 0.1 units. The histogram on the right shows the same data, with bars for each health-risk category: Low, Moderate, High and Very High Health Risk. All communities monitored in this report are in the Low Health Risk category for the vast majority of the time. The figure is based on available data from 2000-2006.

Using the AQHI as a relative measure of short-term health risk, Figure 1 shows the frequency of occurrence of different values of the index and the related health risk in Prince George. The right-hand graph in Figure 1 shows that the health risk is Low for the vast majority of the time in Prince George (as it is in all other B.C. communities). The Health Rsk is Moderate only about 13% of the time. High or Very High Health Risk is rare in all locations in B.C., occurring much less than 1% of the time, including Prince George. More detailed information on the frequency distribution of the AQHI for Prince George is listed in Table 1. Similar distributions of Low, Moderate and High Health Risk exist throughout British Columbia.

Table 1. The frequency of each hourly AQHI value at Prince George Plaza 400, from 2000-2006
The most likely AQHI value is 2. AQHI categories are Low (0-3), Moderate (4-6), High (7-10) and Very High (10+) Health Risk. This table provides additional detail for the graphs in Figure 1.

AQHI	Number of Hours	Frequency
0	32	0.1%
1	4525	10.8%
2	17848	42.7%
3	14347	34.3%
4	3359	8.0%
5	1159	2.8%

AQHI	Number of Hours	Frequency
6	381	0.9%
7	130	0.3%
8	47	0.1%
9	13	0.0%
10	5	0.0%
11	1	0.0%

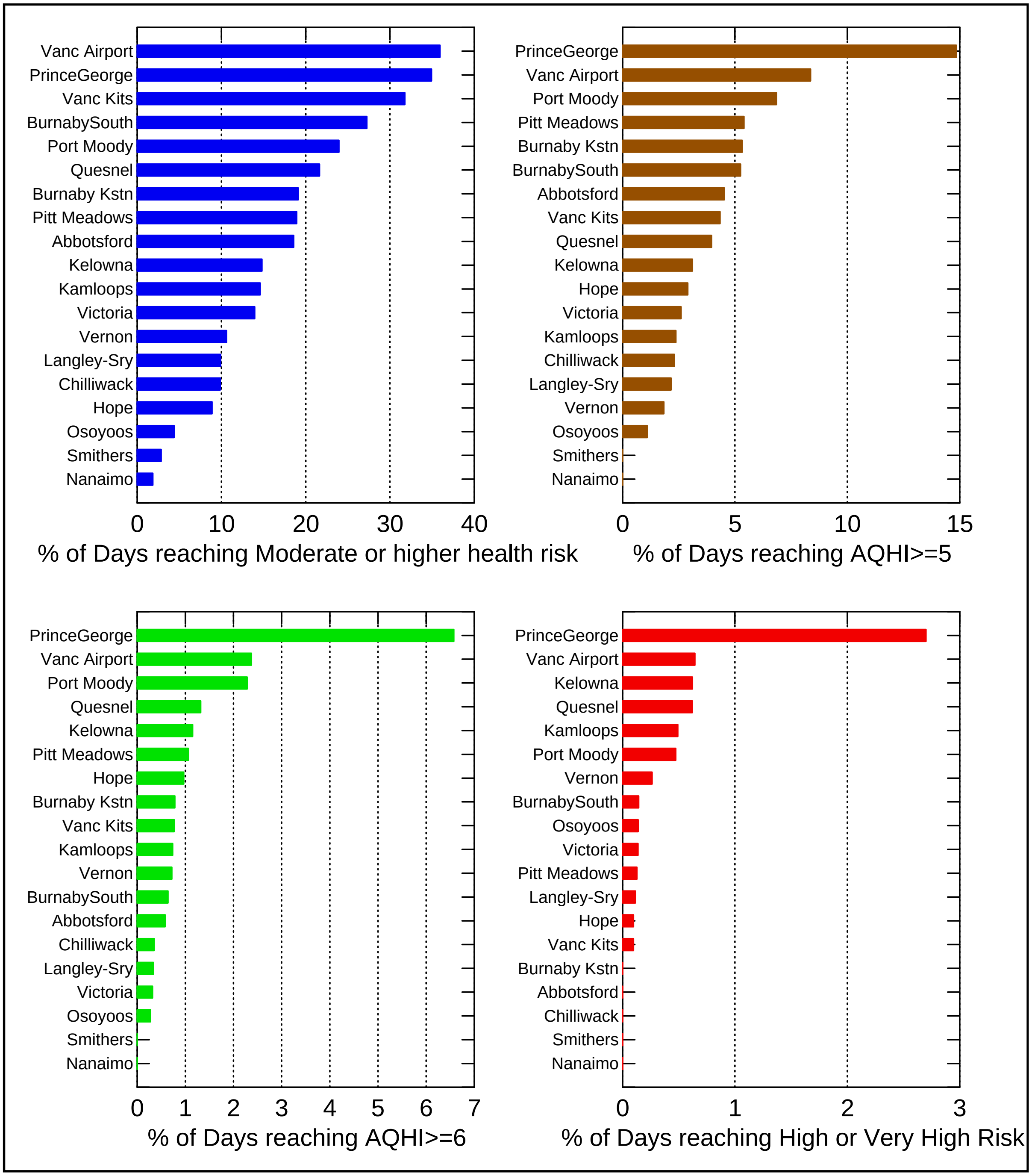

Figure 2. These four graphs compare the percent of days when the AQHI reached various thresholds for at least one hour, based on data from 2000-2006.
The thresholds for each of the four graphs are:

- Top left: AQHI greater or equal to 4 (Moderate Health Risk or above)
- Top right: AQHI greater or equal to 5
- Bottom left: AQHI greater or equal to 6
- Bottom right: AQHI greater or equal to 7 (High Health Risk or above)

Health Risk across British Columbia

Communities in B.C. do not all experience the same level of health risk from air pollutants. Using the AQHI as an indicator of health risk, Figure 2 compares the percent of days when the AQHI reached threshold health-risk levels for at least one hour in 19 communities in B.C. All analysis in this report is based on available hourly pollutant data for the seven years from 2000 to 2006.

Moderate Health Risk

The top left graph in Figure 2 compares the percent of days the hourly health risk reached the Moderate Health Risk category (AQHI equal to or greater than 4) in each of the 19 communities for at least one hour. Seven of the nine communities experiencing this for at least 15% of days were in Metro Vancouver and the Lower Fraser Valley. The Moderate Health Risk category was generally caused by high concentrations of nitrogen dioxide, and secondly $PM_{2.5}$, in late winter and early spring. In Metro Vancouver and the Lower Fraser Valley, Moderate Health Risk was experienced relatively frequently (more than 15% of the time) at these locations:

Monitoring Site	**Percent of Days Reaching an AQHI of 4 (Moderate Health Risk) for At Least One Hour**
Vancouver Airport	37%
Vancouver Kitsilano	32%
Burnaby South	27%
Port Moody	25%
Burnaby Kensington	19%
Pitt Meadows	19%
Abbotsford	18%

Vancouver Airport experienced the highest percent of days[16] reaching the Moderate Health Risk level (37% of the days)[17] with elevated levels of NO_2 (averaging 25 parts per billion in February) followed by relatively high levels of $PM_{2.5}$. This site is near a parking lot and within 0.5 km of a busy road (Russ Baker Way), which may have had an influence on its air pollutant concentrations.

In the Interior, those sites that experienced Moderate Health Risk on at least 15% of days were:

- Prince George (35%)
- Quesnel (21%)

Again, this occurred primarily in late winter and early spring and was due to elevated NO_2 and $PM_{2.5}$ concentrations.

[16] The "percent of days" refers to those days at a site when the AQHI reached a specific health risk level for at least one hour.

[17] Taylor, Eric. (2008). *The Air Quality Health Index and its Relation to Air Pollutants at Vancouver Airport*. B.C. Ministry of Environment.

High Health Risk

The bottom right graph in Figure 2 shows the percent of days that reached the High or Very High Health Risk category (AQHI equal to or greater than 7) in each location. Four of the top six locations in this graph were in the Interior. Prince George had the largest percent of High Health Risk days (2.8%) of this group. Again, the first three months of the year showed the most health risk in Prince George, particularly in February, when 10% of all days experienced at least one hour of High Health Risk[18].

Extreme Values of the AQHI

Using the 98th percentile as one measure of an extremely high AQHI value, Prince George, followed by Port Moody and Vancouver Airport (both in suburbs of Vancouver) measured the highest extreme values of the AQHI with values of 5.1, 4.3 and 4.3 respectively. Extremely high single-pollutant concentrations were as follows:

- Prince George had the highest extreme values (98th percentile) of $PM_{2.5}$ (40 micrograms per cubic metre) followed by Quesnel at 30 and Smithers at 24.
- The highest extreme hourly ozone concentrations were measured at Kamloops and Hope, each of which recorded 50 parts per billion as the hourly 98th percentile.
- Metro Vancouver locations (near the airport, in Kitsilano and in Burnaby) measured the highest extreme values of NO_2, a marker for vehicle exhaust.

Table 2 shows that the maximum hourly AQHI occurred in the B.C. Interior. These high AQHI values were measured at Kamloops (AQHI=21) during the intense wildfire events in the summer of 2003.

Table 2. The mean, 98th percentile and maximum AQHI of each of the three groups of B.C. air quality sites monitoring the three pollutants needed to calculate the AQHI
This analysis is based on data from 2000-2006.

Group	Mean AQHI	AQHI: 98th Percentile	Maximum AQHI
Lower Fraser Valley	2.3	4.1	13
Coastal	2.2	3.9	13
Interior	2.0	3.8	21

[18] Ibid.

Contribution of Each Pollutant to the Health Risk

The AQHI is a function of three pollutants, with the estimate of health risks of each pollutant added together to arrive at the final AQHI value. Each pollutant does not contribute equally to the index, and this contribution clearly varies among communities. Figure 3 suggests that NO_2 contributes relatively more to the AQHI in those locations with high average AQHI values (Vancouver Kitsilano, Port Moody and Burnaby South). Locations with the highest ozone contribution in the index (Nanaimo, Osoyoos and Smithers) also had the lowest average NO_2 concentrations, resulting in these three locations having the lowest average AQHI values in the province. $PM_{2.5}$ contributions to the AQHI were consistently lower than NO_2 and ozone at all locations, averaging about 12%.

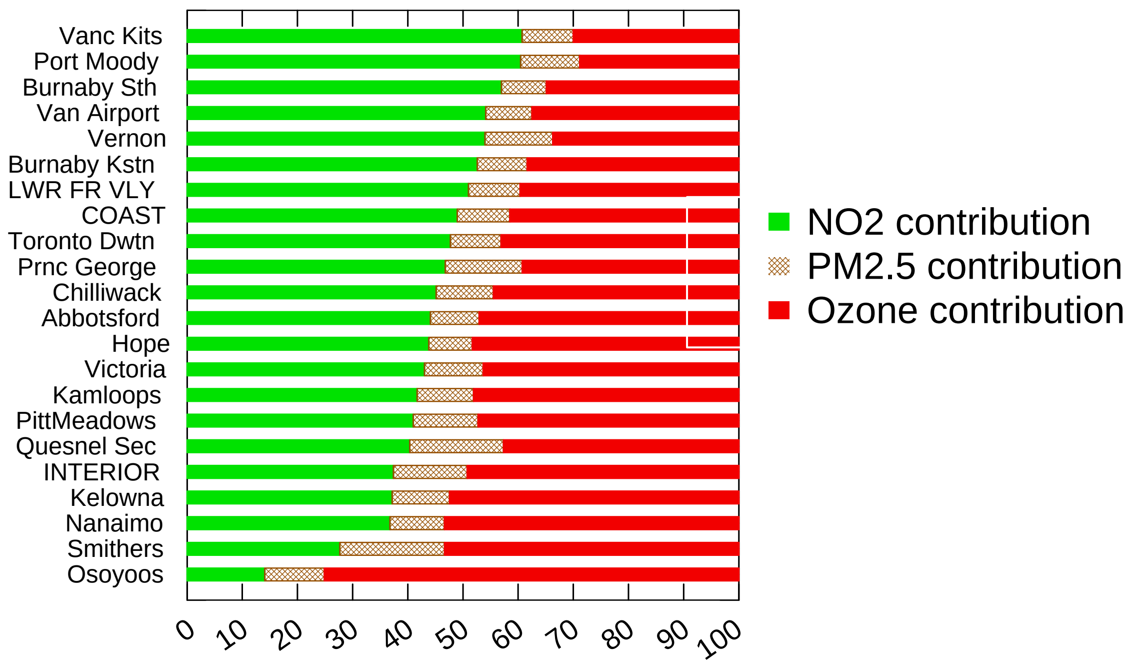

Figure 3. Comparison of the average percent contribution of each pollutant to the AQHI. Vancouver Kitsilano and Port Moody had the highest fraction of NO_2 in the AQHI, on average.

Air Quality as an Environmental Determinant of Health

Affluent areas of a community tend to be located upstream and generally upwind from industrial sectors of a community. Lower socioeconomic sectors of a community are often located in proximity to, and sometimes downwind from, emission sources that contribute to localized poorer air quality. Poorer housing stock tends to be located closer to high-volume transportation routes. Exposure to pollutants is known to be higher in areas close to transportation routes and downwind from emission sources.

For a variety of reasons, children, pregnant mothers, and others who reside in these settings have more poor-health outcomes than individuals living in sections of a community with better air quality. Distance setbacks are recommended for child care, schools, health-care facilities, seniors' housing and individuals who may be at higher risk for developing health consequences from exposure to poorer air quality. However, such setbacks are currently only guidelines[19].

Some of the contributors to poorer air quality may also contribute to climate change. While some effort is being extended to mitigate the future impacts of greenhouse gas emissions, similar efforts will be required to mitigate the current impacts of diesel emissions, particulate matter precursors in urban settings, and other manageable emission sources that contribute to poorer air quality.

Conclusion

The Air Quality Health Index promises to be a practical tool to provide Canadians with local air quality information, on an hourly and daily basis, that can be used to protect their health from the negative impacts of air pollution. It can also be used as a measure to compare the short-term health risk due to air pollution in different communities, with some caveats.

The good news is that air quality tends to be improving through the collective efforts of public education, monitoring and enforcement, better engineering, and mitigation of known polluting sources. Air quality can be measured through British Columbia's air quality monitoring system and can be synthesized into a simple communication tool in the AQHI. This index can reach the majority of residents and communities of the province, although some communities lack some of the monitoring required to generate the AQHI. Further experience with the AQHI will improve our ability to intervene with individuals and populations in order to reduce the risk posed by poor air quality.

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[19] Ministry of Environment. (2006, February). *Environmental Best Management Practices for Urban and Rural Land Development in British Columbia: Air Quality BMPs and Supporting Information*. http://www.env.gov.bc.ca/epd/bcairquality/reports/aqbmps_feb16_06.html

Appendix

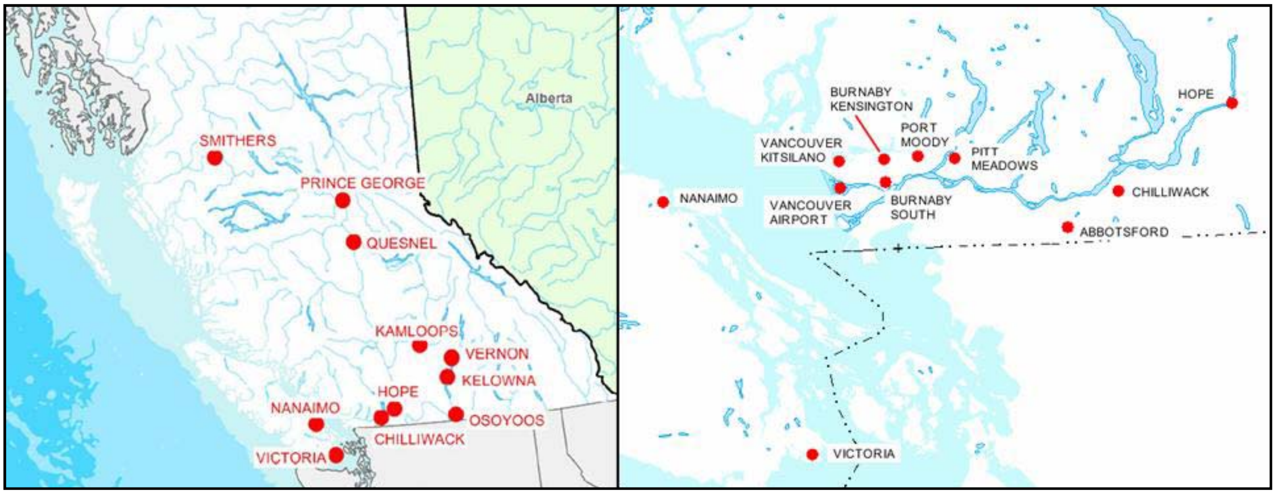

Figure 5. Locations of the 19 B.C. air quality monitoring sites analyzed in this report.
The map on the right is an enlargement of southwestern B.C.

The maps in Figure 4 show the 19 locations of the air quality monitoring sites used to determine the air quality health risk as indicated by the AQHI throughout this report. These locations are also grouped into three regions in this report to allow for inter-regional comparisons. The three regions are:

1. **Lower Fraser Valley (LFV)**: Vancouver Airport, Vancouver Kitsilano, Burnaby Kensington, Burnaby South, Port Moody, Pitt Meadows, Abbotsford, Chilliwack and Hope.
2. **Coastal**: Victoria, Nanaimo, plus all locations in the Lower Fraser Valley.
3. **Interior**: Osoyoos, Kelowna, Vernon, Kamloops, Quesnel, Prince George and Smithers.

Table 3. Names of air quality monitoring sites used in the graphs in this report

Abbreviation in Graphs	Location Name
LWR FRSR VLY	Lower Fraser Valley Group
COAST	Coastal (includes LFV)
INTERIOR	Interior Group
Abbotsford	Abbotsford
Burnaby Kstn	Burnaby Kensington
Burnaby Sth	Burnaby South
Chilliwack	Chilliwack
Hope	Hope
Kamloops	Kamloops
Kelowna	Kelowna
Nanaimo	Nanaimo
Osoyoos	Osoyoos

Abbreviation in Graphs	Location Name
PittMeadows	Pitt Meadows
Port Moody	Port Moody
Prnc George	Prince George
Quesnel Sec	Quesnel Secondary School
Smithers	Smithers
Langley-Sry	Langley-Surrey
Toronto Dwtn	Toronto Downtown
Van Airport	Vancouver Airport
Vanc Kits	Vancouver Kitsilano
Vernon	Vernon
Victoria	Victoria

Table 4. Locations of each air quality monitoring site used in this report

Monitoring Site	Station ID	Address	Latitude	Longitude	Elev. (m)
Abbotsford Airport - Walmsley Road	E246240	31790 Walmsley Road	49 01 31	122 20 38	71
Burnaby Kensington Park	310177	6400 E. Hastings	49 16 46	122 58 16	133
Burnaby South	E207418	5455 Rumble Street	49 12 56	122 58 57	145
Chilliwack Airport	E220891	Airport Road	49 09 22	121 56 26	10
Hope Airport	E223756	62715 Airport Road	49 22 11	121 29 58	39
Kamloops Brocklehurst	E206898	Mayfair Street	50 41 51	120 23 49	347
Kelowna College	500886	3333 College Way	49 51 40	119 28 30	300
Langley Central	E209178	23752 52nd Avenue	49 05 46	122 33 59	82
Nanaimo Labieux Road	E229797	2080a Labieux Road	49 12 03	123 59 38	122
Osoyoos Canada Customs	E257415	202 Hwy 97S	49 00 00	119 27 45	308
Pitt Meadows Meadowlands Elementary School	E232244	18477 Dewdney Trunk Road	49 14 43	122 42 33	20
Port Moody Rocky Point Park	310162	Moody Street and Esplanade	49 16 55	122 50 59	15
Prince George Plaza 400	450307	1011 4th Avenue	53 54 53	122 44 33	601
Quesnel Senior Secondary	E208096	585 Callanan Street	52 58 56	122 29 32	500
Smithers St Josephs	E206589	4020 Broadway Avenue	54 46 59	127 10 39	481
Vancouver International Airport #2	E232246	3153 Templeton Street	49 11 11	123 09 09	10
Vancouver Kitsilano	310175	2550 West 10th Avenue	49 15 40	123 09 49	63
Vernon Science Centre	E249492	2704 Highway #6	50 14 00	119 17 00	500
Victoria Topaz	E231866	923 Topaz	48 26 30	123 21 48	31

Table 5. Health messages provided for "at risk" individuals and the general public for each of the AQHI Health Risk categories

Health Risk	Air Quality Health Index	Health Messages	
		At Risk* Population	**General Population**
Low	**1 - 3**	**Enjoy** your usual outdoor activities.	**Ideal** air quality for outdoor activities.
Moderate	**4 - 6**	**Consider 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	**7 - 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.