

## Adopting global guidelines for air pollution: protecting the health of Canadians

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In 2014, the World Health Organization (WHO) called air pollution the world's single largest environmental health risk. Pollution is linked to one in eight deaths worldwide.<sup>1</sup> In May 2015, the World Health Assembly delivered the first resolution on air pollution, urging member states to take serious action to curb global levels of pollutants by developing air-quality monitoring systems and mechanisms to track illnesses caused by air pollution.<sup>1</sup> Many Canadians may not consider the large burden that air pollution places on our health. In 2008, it was estimated that more than 20 000 premature deaths related to outdoor air pollution occur each year in Canada.<sup>2</sup> Yet, current Canadian standards for air pollutant levels<sup>3</sup> lag behind WHO guidelines.<sup>4</sup>

What pollutes our air? A mix of fine particulates and gases are generated from natural and man-made sources. Fine particulates are formed from the burning of fossil fuels and wood, from dust from paved and unpaved roads, and from construction sources. The smaller the particulate, the more harmful it is to health; particulates of less than 2.5 µm in diameter (PM<sub>2.5</sub>) are considered to be the most harmful. Other substances classified as air pollutants include nitrogen oxides (from transportation and industrial emissions), volatile organic compounds (largely from industrial emissions) and ground-level ozone (formed by the interaction of sunlight with volatile organic compounds and nitrogen oxides).

Children are especially vulnerable to air pollution. A large cohort study in southern California found that increased concentrations of pollutants, particularly nitrogen dioxide and PM<sub>2.5</sub>, resulted in adverse effects on lung development in children that persisted as they reached adulthood.<sup>5</sup> This is important because reduction in lung function in adults is a strong risk factor for respiratory and cardiovascular illnesses. Following the improvement in air quality in the same region of California, more than 2000 children had their lung function measured. The observed decreases in levels of nitrogen dioxide and fine particulates were associated with improvements in lung function.<sup>6</sup>

Air pollution also has short- and long-term harmful effects on the health of adults.<sup>7</sup> Higher concentrations of pollutants have been associated with increased risks of hospital admission for respiratory and cardiovascular diseases and mortality,<sup>8</sup> as well as an increased risk of Alzheimer disease.<sup>9</sup>

The recently revised Canadian air-quality standards<sup>3</sup> do not meet WHO guidelines.<sup>4</sup> The Canadian standard for the peak 24-hour concentration of PM<sub>2.5</sub> is 28 µg/m<sup>3</sup>; WHO recommends 25 µg/m<sup>3</sup>. The Canadian standard for ground-level ozone is 65 parts per billion, 15 ppb above the WHO guideline. Even at the recommended WHO level, ozone can have substantial health effects, with an estimated increase in mortality of 1%–2%.<sup>4</sup>

Although air pollution is a global problem, pollutant levels

vary geographically. In 2012, the annual peak 24-hour concentration of PM<sub>2.5</sub> was 18.8 µg/m<sup>3</sup> nationally, but 26.7 µg/m<sup>3</sup> in southern Quebec.<sup>10</sup> That same year, the average ozone concentration was 60.6 ppb nationally, but 76.3 ppb in southern Ontario.<sup>10</sup>

Man-made sources of air pollution in Canada are diverse, including wood-burning stoves, and the oil and gas industry. Mobile sources, such as diesel-powered vehicles, contribute more than half of nitrogen oxide emissions.<sup>11</sup> About 10 million Canadians live near major highways and intersections and are exposed to traffic-related air pollution.<sup>2</sup> Schools close to highways and diesel-powered school buses expose our children to pollutants.

To address this health issue, Canada must adopt and enforce the WHO guidelines in all jurisdictions and improve monitoring of our air quality. Best practices for reducing pollution should be shared across jurisdictions and take into account local sources of pollutants. While national strategies catch up, we should also consider the harmful impact of air pollution as we drive our cars, heat and cool our homes, and head to the ballot box.

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