Pathologies associated with contaminated air: the case of the city of Buenos Aires

**Abstract**

As with so many threats from the environment, air pollution has not yet been eliminated in countries like ours, yet it conspires against health and ends with the life of the human being. In view of the fact that there is such a direct connection between the automotive vehicle and polluted air, especially in Buenos Aires (Argentina), this work has as its essential objective to mark with an adequate and perceptible language even for those who do not have specific knowledge, some pathologies caused by pollution caused by motor vehicles, except for other sources. The author deals with the subject in a clear and simple way but without losing its scientific quality.

**Keywords:** air pollution, atmospheric pollution, respiratory disease, environmental health

**Introduction**

The widespread use of the car has caused serious problems of air pollution in large cities. Despite legal restrictions aimed at reducing the pollution caused by their emissions, to date, however, measures to address the phenomenon remain insufficient. Significant quantities of products, such as carbon monoxide (CO), nitrogen oxides (NO\textsubscript{x}) and hydrocarbons (HC) are emitted directly from these sources without showing signs of declining so far. I should anticipate that most of the information that I have to explain below, although it is valid for many cities in Latin America, in the case of Buenos Aires is particularly noticeable. Here there are long periods of pollution due to the large traffic of vehicles that show marked differences with the rest of the cities in Latin America.\(^1\)

There are hundreds of substances that pollute the air. They are detached by factories and also issued by vehicles. However, the engines of automobiles and of any other type, badly in spite of some, never present a complete combustion and their fuel is always burned in such a way that they add to the ambient air significant quantities of pollutants causing measurable effects on human beings, animals and vegetables. Among the many substances generated by vehicles, carbon monoxide is one of the most toxic and dangerous. Also nitrogen oxides and hydrocarbons are incorporated into the air due mainly to cars.\(^2\)

**Toxicity**

CO in poorly ventilated streets and avenues can occur in concentrations that seriously affect health. The toxicity of CO in people exposed to this gas varies from one being to another, everything depends on the gas concentration, the time of exposure, the respiratory rate to which it is exposed, which is determined by the type of task that is performed the exposed subject and the temperature and relative humidity since these last factors affect the blood circulation. But it should be noted on the other hand that its toxicity is also conditioned to differences in individual susceptibility and percentage of hemoglobin in blood, all of which explains in many cases death with low percentage of blood saturation.\(^3\)

The level of COHb in blood is very directly related to the concentration of CO in the ambient air. The values in Table 1 are the ones that mark this particularity.

**Table 1** Balance of COHb in blood and CO in the air

<table>
<thead>
<tr>
<th>Concentration of CO in ambient air (ppm)</th>
<th>Equilibrium concentration of COHb in blood (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2.1</td>
</tr>
<tr>
<td>20</td>
<td>3.7</td>
</tr>
<tr>
<td>30</td>
<td>5.3</td>
</tr>
<tr>
<td>50</td>
<td>8.5</td>
</tr>
<tr>
<td>70</td>
<td>11.7</td>
</tr>
</tbody>
</table>

*Source: Guatelli Manuel A* "oxycarbonated poisoning. Biochemical study and analytical methodology"*

These values can be calculated using the following formula:

% COHb in blood = 0.16 x CO concentration of air in ppm + 0.5

The formula is applicable for those concentrations of CO in ambient air less than 100 ppm.

**Endogenous oxycarbonemia**

The value 0.5 is the normal background percentage of COHb in blood. Keep in mind that the metabolic processes of the organism originate a background level in the blood COHb.

**Observable effects**

The effects of this gas on health are usually studied in terms of the percentage of COHb in the blood. In this regard, no evidence has been found that indicates significant effects on health when the concentration of COHb in blood is less than 2%. Some tests indicate that levels of COHb between 2 and 5% have a deleterious effect on the execution of jobs that require time, visual or auditory discrimination. However, these conclusions are not shared by all researchers. There
are definitive tests that show that patients with coronary heart disease and pulmonary emphysema are especially vulnerable to COHb levels greater than 5%. Table 2 shows the observed effects of blood COHb levels in percentage terms.

Table 2 Effects on the health of cohb levels in blood

<table>
<thead>
<tr>
<th>Blood COHb level (%)</th>
<th>Proven effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1.0</td>
<td>No apparent effects.</td>
</tr>
<tr>
<td>From 1.0 to 2.0</td>
<td>Some evidence of effect on the effectiveness of behavior.</td>
</tr>
<tr>
<td>From 2.0 to 5.0</td>
<td>Effects on the central nervous system. Impairment of discrimination of time intervals, visual acuity, discrimination of brightness and some other psychomotor functions.</td>
</tr>
<tr>
<td>More than 5.0</td>
<td>Cardiac and pulmonary functional changes.</td>
</tr>
<tr>
<td>From 10.0 to 80.0</td>
<td>Headache, fatigue, drowsiness, coma, respiratory failure, death.</td>
</tr>
</tbody>
</table>

Source: Guatelli Manuel A. “Oxyboronated poisoning. Biochemical study and analytical methodology”.

Cancer and air pollution

Special concern generates this evil today. Although specialists attribute the resurgence of cancer in large cities to the growing consumption of tobacco, the responsibility that warms of air pollution as a cause of this type of affection should not be ruled out at all. For decades, it has been the most seriously threatening environmental risk capable of endangering thousands of people living in large cities. Cancer is defined as the set of diseases that are characterized by an anarchic and unlimited growth of certain cells in the body. This uncontrolled growth of cells that compresses and destroys tissues has the property of spreading to other parts of the body. However, when this anarchic growth is maintained within a perfectly defined area, it is usually a benign tumor that can eventually be fatal but is almost always surgically resectable. On the other hand, most malignant tumors (or cancer) are endowed with the property of spreading and many of them eventually invade very distant parts of the body as their cells are carried through the bloodstream or the lymphatic system. It usually happens that this disseminated cancer and not the original tumor is the cause of death. Air pollution has a significant incidence with cancer increases. The increase in lung cancer and air pollution are so closely associated or linked in large cities that it is not possible to assert an opinion to the contrary that this is not one of the causes that come together to generate this disease. But its confirmation or undoubted truth is impossible to determine because of the factors that must be taken into account and that also cause cancer. The city is full of people who have lung cancer and, on the other hand, it has been proven that this was caused precisely by air pollution. However, at present there are many tests that converge on suspicion that this disease in the cities causes cancer. Some varieties of hydrocarbons that have been identified in naphtha vehicles favor the appearance of tumors, which of course gives a dramatic danger to these sources.

Conclusion

We should stress, however, that traffic pollution does not play a decisive role on the part of the general public, much less on those who should take action to confront it. With few exceptions, it is not subject to much attention by environmentalists. We all have cars until there is something better available. It could be added that the edges on which social concern currently focuses are today, almost exclusively, due to the problems of traffic congestion, rather than its pollution, or the increase in travel times. Or also, by reductionist views of local

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air pollution that focus on some of its most visible agents, such as particulate material, for example, or even sound pollution. These are the basic issues and those to talk about. However, these concerns, undoubtedly legitimate, do not include the emission of gases that reheat the atmosphere. This is frightening, I sincerely warn you. Due to the characteristics of its energy matrix, Argentina is one of the countries whose main source of GHG reduction is urban motor transport. The park of these vehicles, of private use, in spite of the conjunctural obstacles, it is supposed that it will have in the long term, a foreseeable increasing presence in the country. This implies that there will be an incremental effect, if no control is foreseen, on the burning of fossil fuels and, therefore, an increasing impact on the process of global air pollution.

To overcome the current serious situation, it has been proposed in Buenos Aires through a series of measures to discourage the use of vehicles in the central areas. This proposal, although it is not new in the city, properly articulated, can generate a gradual improvement of the air. Since February 2012, private cars are strictly forbidden to circulate in the Buenos Aires microcentro under pain of being affected by heavy fines. Although this fact surely as it has always been conjunctural and periodic has the value of a sharp symptom that should alert the public opinion: the pollution is becoming more and more intense in spite of the official unlearning. The measure affects the central area between Córdoba, Mayo, Leandro N. Alem and Carlos Pellegrini avenues from Monday to Friday between 11 a.m. and 4 p.m. This provision is part of the supposed program of reorganization of the city’s traffic, and whose purpose is oriented, according to the government authorities, to decongest Buenos Aires traffic and promote the pedestrianization of the Central Area of the City. However, the underlying issue is none other than finding palliative to pollution.3

On this issue it is appropriate to insist on two points. The idea of limiting or in such a case prohibiting transit in central areas is not new and its original purpose has been to combat pollution in the historical centers when subjected to various processes of relentless destruction. Unfortunately, although considerable achievements have been made in terms of pollution with these restrictive measures, opinions have never been unanimous in recognizing them and efforts are being made to move them away so soon from the government’s agenda. This occurs, of course, when it is noticed that these measures may seem unpopular, and the government as such is discarded. Buenos Aires has suffered experiences of this type. When the closure of cars was implemented by the microcenter, its application generated great resistances on the part of the transport and the withdrawal of the measures shortly after having implemented them. Finally, and comparatively, has not gone so badly with these measures to other modern metropolises discouraging the vehicle in downtown areas. We can say in this regard that measures such as the one being carried out in Buenos Aires, London has caused its pollution to be reduced by 50%, Stockholm, which also applies this measure, has reduced traffic and pollution by 15%, in Berlin 10% and in Rotterdam that measure was the reduction of 30% of emissions. Its implementation is currently being considered in Barcelona.4–6

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Conflict of interest

Author has declared there is no conflict of interest.

References