

# REVISED AIR QUALITY GUIDELINES FROM THE WORLD HEALTH ORGANIZATION AND ITS IMPLICATIONS ON LATIN AMERICAN COUNTRIES

## Context:

The World Health Organization will be releasing the revised air quality guidelines on 22 September 2021 after 16 years from the previous update. The current [WHO Air Quality Guidelines: Global Update 2005](#) are health based guidelines, as they provide an assessment of health effects of air pollution and thresholds for health-harmful pollution levels.

It should also be noted that since 2005 (last update on the WHO guidelines) several scientific studies have emerged highlighting the urgent need to revise the guidelines to make them more suitable to protect public health.

## What are 2005 guidelines for and what do they indicate?

The WHO 2005 guidelines are for the following parameters:

- Particulate Matter (PM)
- Ozone (O<sub>3</sub>)
- Nitrogen Dioxide (NO<sub>2</sub>)
- Sulfur Dioxide (SO<sub>2</sub>).

According to WHO, air pollution is a major environmental risk to health. By reducing air pollution levels, countries can reduce the burden of disease from stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma. The lower the levels of air pollution, the better the cardiovascular and respiratory health of the population will be, both long- and short-term.

In 2016, 91% of the world's population was living in places where the WHO air quality guidelines levels were not met. Ambient (outdoor) air pollution in both cities and rural areas was estimated to cause 4.2 million premature deaths worldwide in 2016. Some 91% of those premature deaths occurred in low- and middle-income countries, and the greatest number in the South-East Asian and Western Pacific regions. In addition to outdoor air pollution, indoor smoke is a serious health risk for some 3 billion people who cook and heat their homes with biomass, kerosene fuels and coal.

Policies and investments supporting cleaner transport, energy-efficient homes, power generation, industry and better municipal waste management would reduce key sources of outdoor air pollution.

## What are the revised guidelines?

The revised guidelines are more stringent than the 2005 values. Here is a comparison of the WHO 2021 levels with its 2005 guidelines.

**Table 1. Recommended 2021 AQG levels compared to 2005 air quality guidelines**

Pollutant	Averaging time	2005 AQGs	2021 AQG level
PM <sub>2.5</sub> , µg/m <sup>3</sup>	Annual	10	5
	24-hour <sup>a</sup>	25	15
PM <sub>10</sub> , µg/m <sup>3</sup>	Annual	20	15
	24-hour <sup>a</sup>	50	45
O <sub>3</sub> , µg/m <sup>3</sup>	Peak season <sup>b</sup>	–	60
	8-hour <sup>a</sup>	100	100
NO <sub>2</sub> , µg/m <sup>3</sup>	Annual	40	10
	24-hour <sup>a</sup>	–	25
SO <sub>2</sub> , µg/m <sup>3</sup>	24-hour <sup>a</sup>	20	40
CO, mg/m <sup>3</sup>	24-hour <sup>a</sup>	–	4

µg = microgram

<sup>a</sup> 99th percentile (i.e. 3–4 exceedance days per year).

<sup>b</sup> Average of daily maximum 8-hour mean O<sub>3</sub> concentration in the six consecutive months with the highest six-month running-average O<sub>3</sub> concentration.

Note: Annual and peak season is long-term exposure, while 24 hour and 8 hour is short-term exposure.

**PM2.5 and health:**

There is a robust association between several adverse health effects and ambient air particulate matter levels. Very small (fine) particles exert disproportionately more adverse health effects than do larger particles. According to the [United States Environmental Protection Agency](#):

“Particles less than 10 micrometers in diameter (PM10) pose a health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter (PM2.5) are referred to as “fine” particles and are believed to pose the largest health risks. Because of their small size (less than one-seventh the average width of a human hair), fine particles can lodge deeply into the lungs.

“Health studies have shown a significant association between exposure to fine particles and premature mortality. Other important effects include aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions, emergency room visits, absence from school or work, and restricted activity days), lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and cardiac arrhythmia. Individuals particularly sensitive to fine particle exposure include older adults, people with heart and lung disease, and children.”

**Air pollution in Latin American countries and the significance of the revised guidelines:**

[Air pollution is the largest environmental risk for public health in the Americas](#). According to the WHO, more than 150 million people in Latin America and the Caribbean live in cities with levels of air pollution exceeding WHO air quality guidelines of 2005.

According to an expert [report](#) by the Natural Resources Defence Council, “between January to May 2019, Mexico suffered terrible air pollution from raging [wildfires](#) throughout the country. These wildfires burned almost [849,000 acres](#) in 32 different jurisdictions. As a result, the air quality in Mexico reached [toxic levels](#) in various states, the government closed schools, and recommended that people stay inside. Around the same time, Chile was preparing for winter, the time of year when air pollution is at its worst due to the widespread use of wood for heating and cooking in homes and other buildings. Because of this, cities in central and southern Chile typically have air quality levels that are among the worst in the Western Hemisphere. [Ten million Chileans live in areas that are categorized as “saturated”](#) due to the high levels of fine particulate matter in the air. Furthermore, [most countries and cities](#) in the region do not have standards for fuel efficiency, vehicle emissions, or fuel quality, which are generally considered to be the basic standards for creating a cleaner transportation sector. This means that the majority of light- and heavy-duty vehicles in the region emit high levels of carbon dioxide and particulate matter, worsening air pollution—and at a rate that is growing due to the [increasing number of vehicles in the region](#).”

In addition, household air pollution (HAP) is associated with the inefficient combustion of solid fuels and kerosene is the one of leading environmental risk factors for death and disability in the world.

The Latin American Countries in Table 2 have legalized standards which are much higher than the 2005 WHO guidelines. For instance, Argentina’s annual standards for PM2.5 are at least twice higher than the WHO guidelines of 2005. This means that existing standards for PM2.5 in most of the Latin American Countries except for Brazil, are not health-based and were not designed with the protection of public health as their main goal. It also means that the existing legal guidelines for these countries should not be assumed automatically as healthy for their citizens. Furthermore, some of these countries also face challenges to enforce and implement these standards. In this context, it is critical that the revised WHO guidelines translate into adjusted national and local policy in order for them to have a real impact on public health in these countries.

Here is a glimpse of how some Latin American countries fare on their PM2.5 standards in comparison to WHO 2005 guidelines:

**Table 2: Comparison of PM2.5 standards of some countries with WHO 2005 Guidelines**

	Annual Mean ( $\mu\text{g}/\text{m}^3$ )	24-hour mean ( $\mu\text{g}/\text{m}^3$ )	
WHO 2021 Guidelines PM2.5	5	15	<a href="#">Pollution Ranking</a>
WHO 2005 Guidelines PM2.5	10	25	
<a href="#">Chile</a>	20	50	42
<a href="#">Mexico</a>	12	45	45
<a href="#">Peru</a>	15	25	50
<a href="#">Colombia</a>	25	50	59
<a href="#">Argentina</a>	15	65	66
<a href="#">Brazil</a>	10	25	68

#### **COVID-19, air quality and public health:**

Emerging research is indicating that people affected by air pollution are more vulnerable to risks and complexities of COVID-19. A [study](#) from Harvard University’s T.H. Chan School of Public Health has found correlation between air pollution and COVID-19 deaths in the US. “The results of this paper suggest that long-term exposure to air pollution increases vulnerability to experiencing the most severe Covid-19 outcomes.” Earlier, a [paper published](#) by the Italian Society of Environmental Medicine suggests that “the rapid increase of contagion rates that has affected some areas of Northern Italy could be tied to atmospheric particulate pollution acting as a carrier and booster there”. Air pollution is exacerbating the COVID-19 pandemic. Globally, approximately 15% of deaths from COVID-19 are [linked to PM2.5 air pollution](#). The authors estimate that average PM2.5 concentrations above  $3.6 \mu\text{g}/\text{m}^3$  (range: 0.0–6.7) increase the risk of death for COVID-19 patients, also underscoring the need to devise stringent health-based air quality standards.

#### **Need for regional collaboration in solving Latin America’s air pollution crisis:**

Air pollution knows no borders. There is plenty of evidence to show that efforts to control air pollution within a geographic limit often end up failing. Management of air pollution sources, particularly those which affect territories over thousands of kilometers, require high levels of co-ordination and co-operation among several institutions across states and countries. In other words, we need to evolve a new framework which focuses on reducing air pollution in an ‘airshed’, i.e., the entire area over which the pollutants disperse due to meteorological and geographical factors. The concept is very similar to ‘watershed’, an area of land that drains all the streams and rainfall into a common outlet like a river.

In an airshed approach, institutions in different jurisdictions would need to coordinate reductions in air emissions from all sources including industry, energy, vehicular and residential sources. Formal coordination mechanisms through working groups and advisory committees between local, regional, state, and central authorities can provide pathways to effective regulatory and scientific cooperation across jurisdictions and sectors. The key is also to build trust and dialogue to achieve compliance with regulations and respond to political demands.

## **What should the governments in the Latin American countries do?**

### **a) National level:**

- i) Countries should urgently revise their existing air quality standards and align them with the WHO guidelines, putting public health at the center of the standard setting process.
- ii) Countries should invest in policies and mechanisms to ensure enforcement of its air quality standards.
- iii) Countries should invest in increasing air quality monitoring capacity and disclosing data to the public about health impacts of the air quality in the form of health advisories.
- iv) Countries should have robust health adaptation and mitigation plans to combat the adverse health impacts of poor air quality.
- v) Countries should also set stringent emission standards for power plants, industries, transportation etc.

### **b) Regional level:**

- i) Recognize that air pollution knows no boundaries and there is a need for urgent cross border collaboration.
- ii) Set up mechanisms to ensure regional collaboration, exchange of information, data, policies and action to strategically tackle the air pollution and health crisis.
- iii) Commit to phase out of fossil fuels and invest in low carbon and healthy sources of energy options.