



# Understanding children's exposure to air pollution

Indoor and outdoor air quality data in real time







# A radical new approach for tackling urban air pollution

Making air pollution visible at street level, right outside your school

## Air quality is too important to ignore

The list of diseases linked to air pollution is growing all the time.

Lung and heart disease, diabetes, obesity, Parkinson's, dementia and mental illness<sup>1</sup> – it affects every cell in the body. There is also evidence that air pollution harms unborn children during pregnancy<sup>2</sup>.

Air pollution reduces attention span and focus, affecting classroom attention and traffic safety. And recent scientific studies show that long term exposure to air pollution significantly increases the odds of dying from Covid-19<sup>3</sup>.

**4 in 10 young people living in cities see air pollution as one of the worst things about their city. Only traffic was more frequently cited as a bad thing about where they live<sup>4</sup>.**

## A hyper-local problem needs high-definition visibility

The problem with air pollution is that current information about air quality is vague at best or simply unavailable. Today's air quality monitoring stations are many kilometres apart.

They're unable to provide the full picture, when field research shows that air quality is hyper-local. It can vary from one side of the street to the other. So, unless you live next door to a monitoring station, it's anyone's guess what the air pollution level at your location is. In addition, existing monitoring stations tend only to provide hourly data instead of the minute-by-minute information needed to make important decisions about travel, exercise and recreation.

## Without hyper-local visibility and insight how can you make effective decisions?

For many years scientists have tried to compute what the local air pollution level is based on far away monitoring station readings. These computer models have some validity for background air pollution levels or annual averages. But they can't give you a real-time, detailed picture of air pollution right by your school.

The latest ultra-high definition TV screens have more than 8 million pixels. If high resolution is important for our entertainment, what about our health, the wellbeing of our children, our employees, our community?

The reality is that, at this moment, we only see air quality information in ultra-low definition.

In all of Italy, there are only 107 air quality monitoring stations<sup>5</sup>. You could be over 100 km or more away from your nearest reference point.

## Why depend on models if you can have the real measurements?

Now compare this with AirScape™, a ground-breaking system that provides air quality information in high definition. And instead of one measurement per hour, AirScape does a measurement every minute.

What does that mean in terms of air pollution data? In London, AirScape has a network **180X** more sensor locations per km<sup>2</sup> than is the case with reference monitoring stations. And AirScape has a **60X** higher data refreshment rate. The combined effect is **10,000X more data points per hour**. The best in the world. See it for yourself in Camden at [airscape.ai](https://airscape.ai).

**This is the equivalent of a leap from black-and-white photos to full colour high definition video.**

## How does it work?

The AirScape system consists of state-of-the-art, science-grade air quality sensor devices called AirNodes™. These AirNodes have been developed in our Research Lab in Copenhagen and are designed to meet the stringent requirements of the CEN /TC 264 "Air Quality Measurement" standard.

## An invisible threat to our health and wellbeing

How can you act if you can't see the air pollution you're exposed to?

Supported with advanced remote calibration, the accuracy of the measurements made by each AirNode are ensured to meet this CEN standard.

The AirScape platform gathers data from the AirNodes and provides a high-resolution, real-time picture of air quality at local level, not just isolated snapshots. This hyper-local air quality information can then be used and accessed in multiple ways.

**The data can provide schools, community groups and authorities with information to improve air quality and protect the most vulnerable.**

## It's all about outcomes

The purpose of AirScape is to give everyone in the community the information they need to make informed decisions and influence change. Actionable data to improve air quality and protect their health and wellbeing. This level of insight is unprecedented anywhere else in the world. Such insights allow schools, children and parents to take positive action:



**Choice of transport:  
public, bike, on foot**



**What routes to take  
to school**



**Where to  
exercise**



**When to schedule  
outdoor play**



**Moving home:  
especially for those who  
suffer from respiratory  
conditions**



**Teach children  
about air  
pollution**





# Healthy ventilation and indoor air quality impacts learning

Indoor air quality affects focus, productivity and overall health.

## Monitor your class environment for optimum learning

The wrong temperature, humidity, CO<sub>2</sub> and other pollutants can all impair learning. Even at low levels, they will affect engagement and performance. More than that, the law places the responsibility on schools to protect pupils against risks to their health.

## You can't manage or improve what you can't measure

Nodding off in class is common for students of any age. But it's not just sitting in a warm classroom after lunch, or even the teacher's delivery!

Some children are being exposed to higher levels of air CO<sub>2</sub> and pollution inside the classroom than outside, putting them at risk to life long health problems<sup>6</sup>.

The problem will not be solved by simply opening or closing windows and doors. You need the combined intelligence of indoor and outdoor measurement to be aware of and reduce sources of air pollution both inside and outside the classroom.

## Why are children more vulnerable?

Their airways are smaller and still developing. They also breathe more rapidly than adults, meaning they take in more polluted air. They're normally closer to the ground or at face level with car exhausts – whether that's walking or in a pram or buggy<sup>7</sup>

## There are no safe limits of air pollution.

If they breathe in high level of air pollution from a young age, children are at risk of:

- developing asthma
- lung disease and lung cancer as they get older
- increased susceptibility to cardiovascular disease
- coughing and wheezing
- infections, such as pneumonia

Being exposed to air pollution in the womb can affect a baby's lung development. It can also lead to premature birth and low weight. So you also have a duty of care to staff who may be pregnant.

## Engage young people for a wealth of ideas to transition to net-zero

Through identification of the problem, by measurement and building awareness, AirScape can show the tangible positive impacts of improving air quality in urban areas. Being able to predict, monitor, react and plan for environmental pollution changes is critical to the future of our planet and humanity.

**1kg of Ozone is the equivalent of 1000kg of CO<sub>2</sub> and fossil fuel soot is 2,500 times the CO<sub>2</sub> equivalent.**

NO<sub>2</sub> is a potent catalyst of atmospheric reactivity, reducing methane and producing ozone, acid rain and PM. Ozone creates a vicious circle of increasing temperatures, allowing more ozone to form, which increases temperatures ... and so on. And particulate matter leaves lasting effects on the environment and climate. As improvements are made to air quality, equivalent CO<sub>2</sub> is reduced.

### **Actionable air quality data is key to building awareness and creating change**

By understanding the problem, you can begin to manage how much air pollution your children and staff are exposed to. How does it vary during the day, from week to week, or through the seasons? You can identify the sources of emissions, such as nearby traffic or construction sites, for example. Teach your children, parents and carers, how they can reduce their emissions to play their part in positive change.



# Air pollution is a primary driver of climate change

Measurement is the key to progress.



## AirScape – from in-depth information to collective action

A tool that helps individuals, schools and communities minimise their exposure to air pollution, or change their behaviour to help reduce air pollution is a great step forward. But the ultimate aim is to improve the air quality in local communities through **actionable information**.

Equipped with this knowledge communities could join forces and work together to influence policies that affect air quality in the local area. To work as a team to bring about change and improve the environment for generations to come.

**The benefits are huge: a reduction in serious illnesses and respiratory related health issues, cleaner areas to live, work and play, and safer schools.**

## Contact

**Dmytro Chupryna** 

ESG Partnerships Director  
dmytro.chupryna@airscape.ai  
07823 699647

[airscape.ai](https://airscape.ai)

AirScape is a mission-driven company and a world-leading pioneer in air quality management. We are passionate about clean air as a human right and work tirelessly on technologies that help people around the world to reduce their exposure to air pollution and airborne pathogens and allergens.

AirScape is one of the few companies in the world which has deep intellectual property and know-how in air quality monitoring. We use this know-how to develop solutions that provide insight into air quality as well as protect people from the threats that poor air quality poses to their health and wellbeing.

