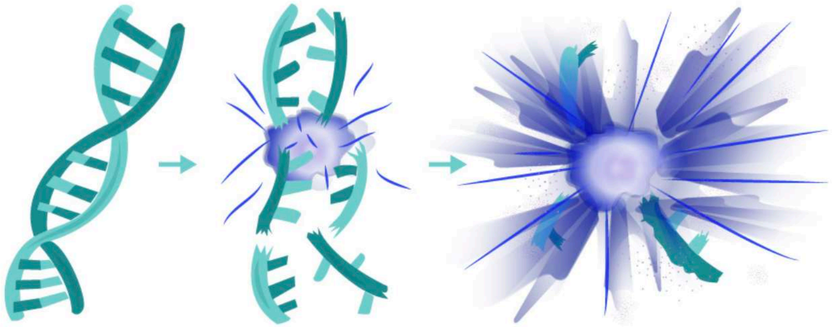
SMART AIR PURIFIERS

AIR PURIFICATION

TOMORROW IS ABOUT CREATING EXTRAORDINARY EXPERIENCE BUT YOU CAN'T USE YESTERDAYS TOOLS TO CREATE THE FUTURE

UV-C Room Air Purification Destroys Virtually All Bacteria, Virus, and Mold to Promote Health and Wellness

Germicidal UV-C has been recognized for decades as a powerful, safe, rapid, and chemical-free disinfection method. Germicidal ultraviolet light emitted at 254 nanometers deactivates the DNA of virus, bacteria, and fungi–destroying their ability to multiply and cause disease. By utilizing UV-C room air purification, microbes will essentially stop reproducing, and start to die off.



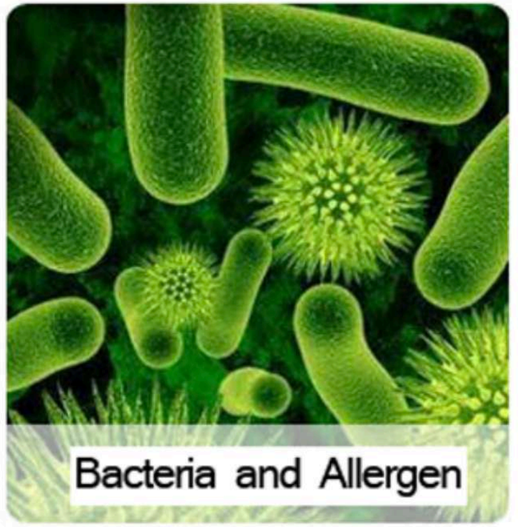

AIR
POLLUTION

Air Pollution

Smog PM2.5

Exhaust and Dust

Secondhand Smoke/ Smell



Bacteria and Allergen

What is particulate matter?

PM is a widespread air pollutant, consisting of a mixture of solid and liquid particles suspended in the air. Commonly used indicators describing PM that are relevant to health refer to the mass concentration of particles with a diameter of less than 10 μm (PM10) and of particles with a diameter of less than 2.5 μm (PM2.5). PM between 0.1 μm and 1 μm in diameter can remain in the atmosphere for days or weeks and thus be subject to long-range transboundary transport in the air.

PM is a mixture with physical and chemical characteristics varying by location. Common chemical constituents of PM include sulfates, nitrates, ammonium, other inorganic ions such as ions of sodium, potassium, calcium, magnesium and chloride, organic and elemental carbon, crustal material, particle-bound water, metals (including cadmium, copper, nickel, vanadium and zinc) and polycyclic aromatic hydrocarbons (PAH). In addition, biological components such as allergens and microbial compounds are found in PM.

$PM_{2.5}$, made up of any particles smaller than 2.5 micrometers in diameter, is emitted from various sources, including the combustion of fossil fuels and other organic matter. It has been linked to serious health problems, including heart, lung diseases and premature deaths, and that can be transported long distances in the air. This means that it may affect people in countries, regions and continents far from its source.

EGYPT AND AIR POLLUTION

The sustainable growth prospects in Egypt are hampered by pollution from traffic congestion, slash and burn land clearing, industrial power and open waste burning. The annual nationwide average PM2.5 concentration in Egypt reach 13.6 times greater than WHO 2021 recommended concentration levels – and it is concentrated in big cities.

data from sources like IQAir show high levels of PM2.5, with concentrations 13.6 times the WHO guideline value. Key contributors to this pollution include natural sources like sandstorms, and anthropogenic sources such as agricultural waste burning, urbanization, and industrial activities.

Major sources of air pollution

natural sources like sandstorms.
Transport.
Agricultural slash and burning.

Industrial power and electricity generation.

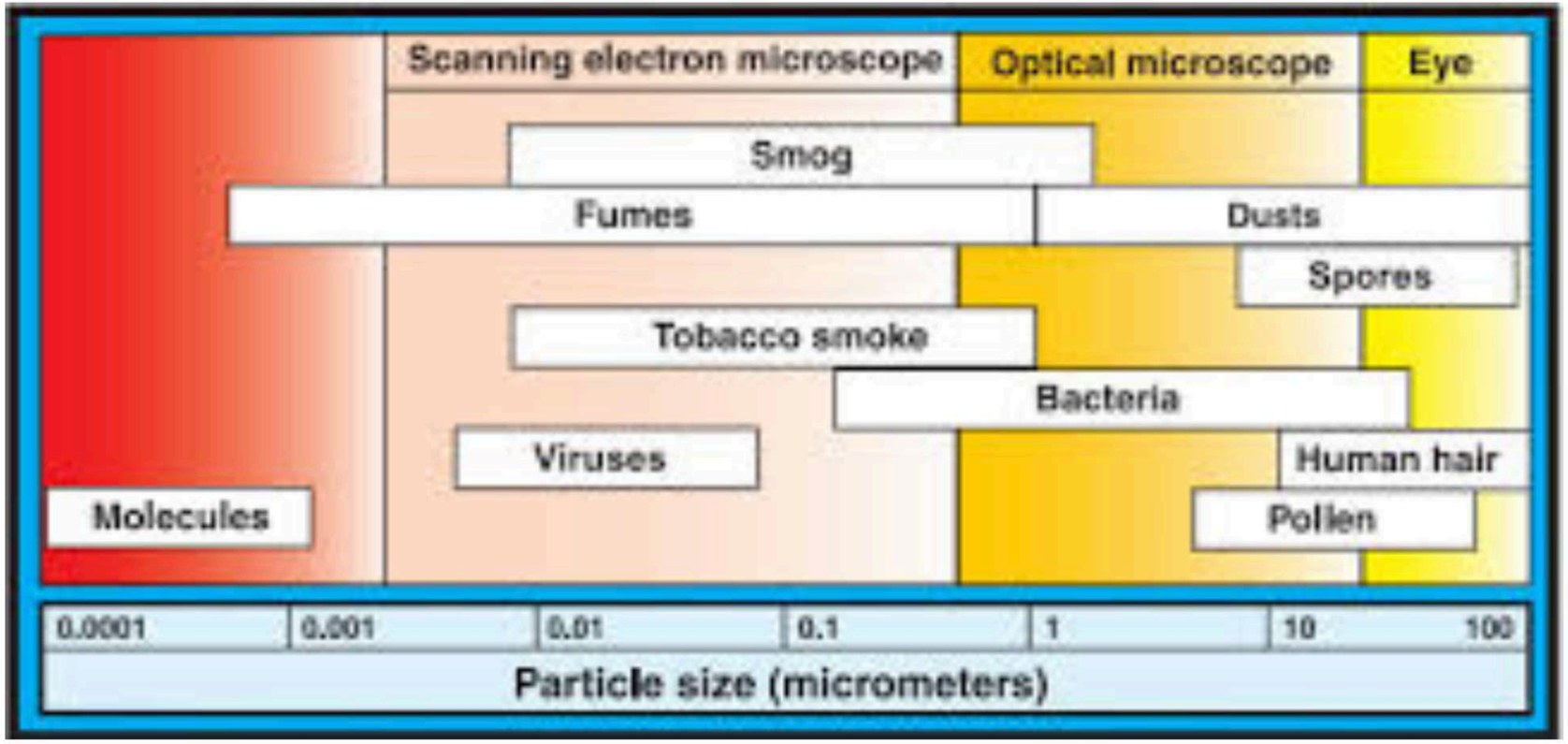
AIR POLLUTION AND HUMAN HEALTH

Air pollution is the fourth leading cause of death globally, accounting for nearly 7 million deaths annually. The large body of existing research has shown conclusively that both short- term (i.e., a few days to weeks) and long-term (i.e., months to years) exposures to air pollution can contribute to serious effects on health ranging from temporary to chronic, mild to debilitating, and even fatal conditions.

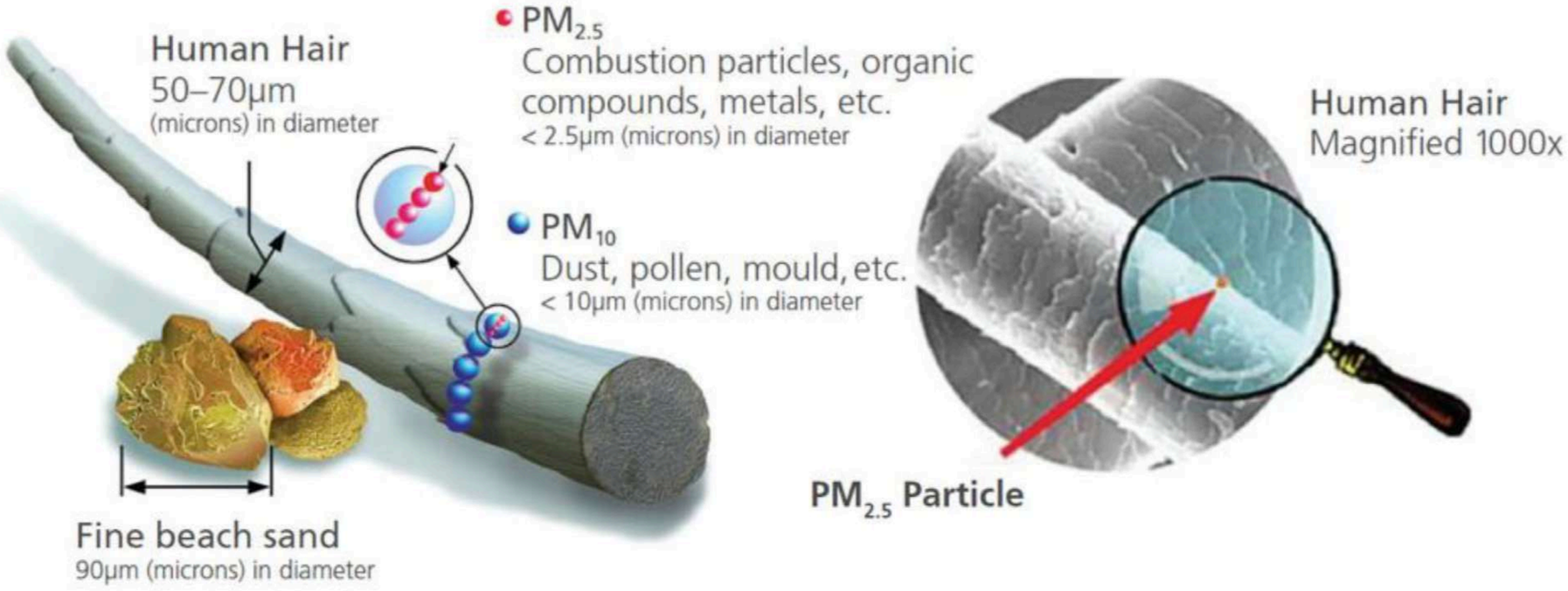
PM2.5 levels in Egypt's Greater Cairo area have been significantly higher than World Health Organization (WHO) guidelines, with annual averages of 37.2 μg/m³ in urban areas and 56.4 μg/m³ in industrial areas as of a 2023 study. A 2022 report from the Clean Air Fund indicated the nationwide annual average PM2.5 concentration was 13.6 times the WHO's 2021 recommended levels.

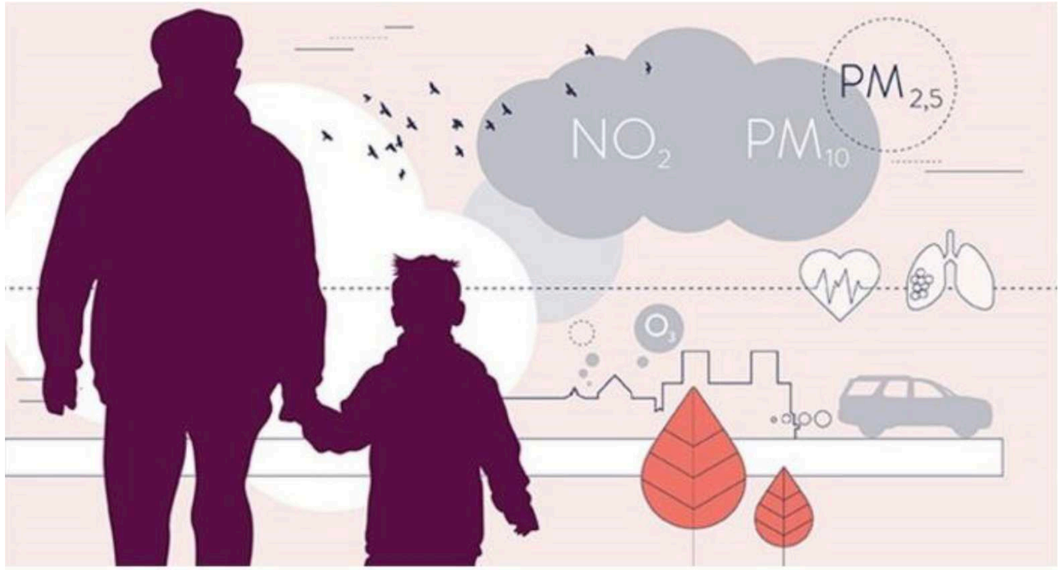
- **The WHO guideline is 5-10 μg/m³ ForParticulate matter (PM)**

Particle Size (Micrometers)



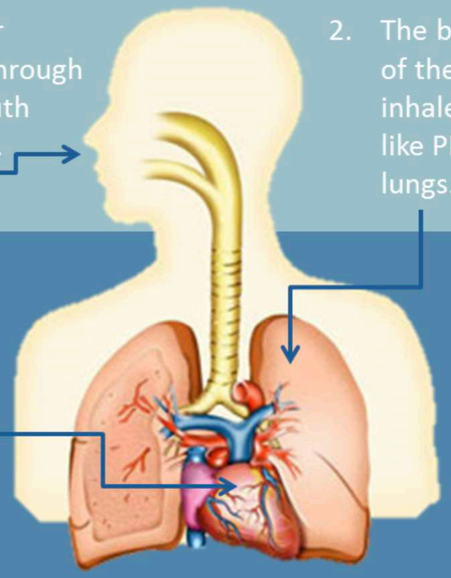
PM2.5 & PM10 Micro-Particles





HOW PARTICULATE MATTER ENTERS THE BODY

1. Particulate matter enters the body through the nose and mouth when we breathe.
2. The body eliminates most of the larger particles we inhale. Smaller particles like PM2.5 continue to the lungs.
3. PM2.5 can penetrate deep into the lungs, having serious health consequences for the lungs and heart.



How Air pollution Affects our health

Heart Diseases Heart attacks

Spending a long time in an air polluted environment can increase the risk of heart attacks, because air pollution can increase the speed of atherosclerosis, further triggering coronary artery disease. Cardiovascular events and particulate matter (normally short as PM2.5) gatherings are closely related.

Congenital Heart Defects

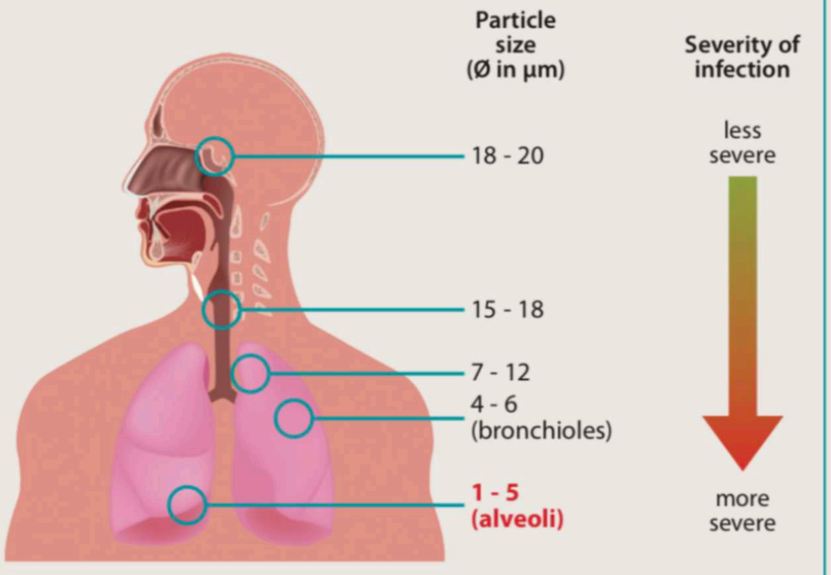
Most studies have proved that high levels of industrial pollution, have encouraged a rise in heart defects. According to a recent research, there is a correlation between the increase of cardiac ventricular septal defects and increased exposure to carbon monoxide. In addition, high levels of ozone may cause valvular, tranquil flaws and aortic.

Cardiac Arrhythmias

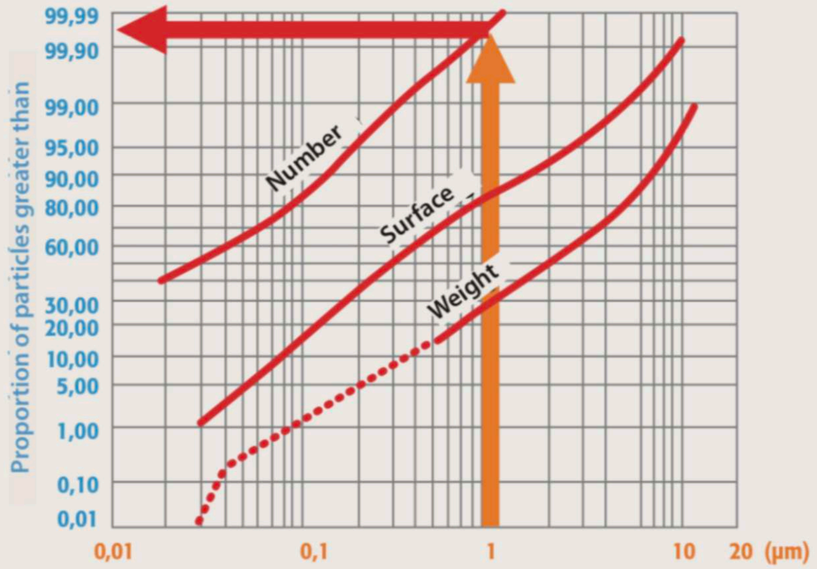
The occurrence of cardiac arrhythmias in high risk patients is partly caused by long-term exposure to PM2.5. For example, patients who have an implanted cardiverter defibrillator carry more risks if they are exposed to carbon monoxide and nitric oxide. The rise of death caused by arrhythmias is associated with PM10 and thick black smoke.

The Danger Of Particles Retention By Human body

Particle retention by the human body

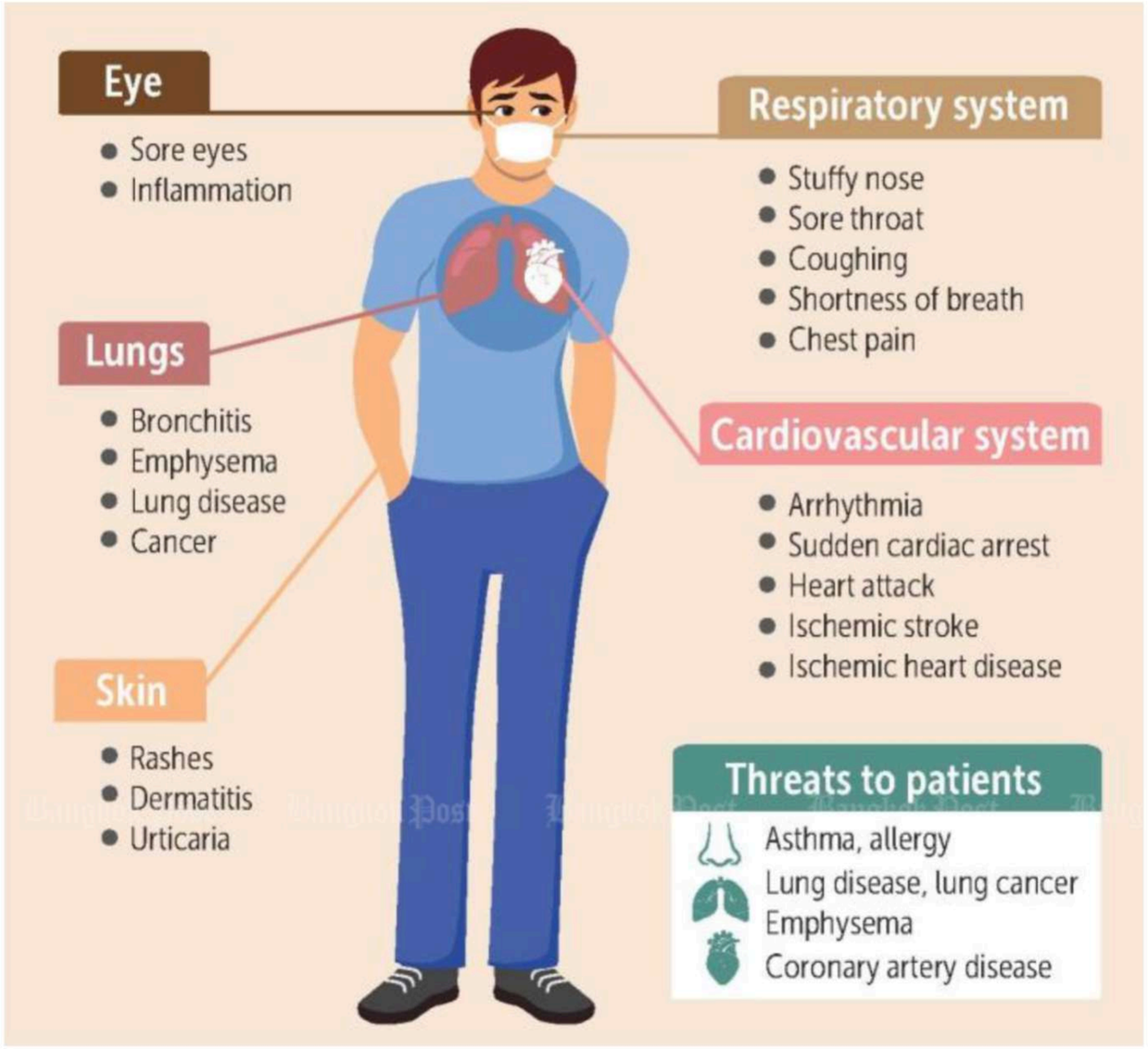


Particle dispersal in the air

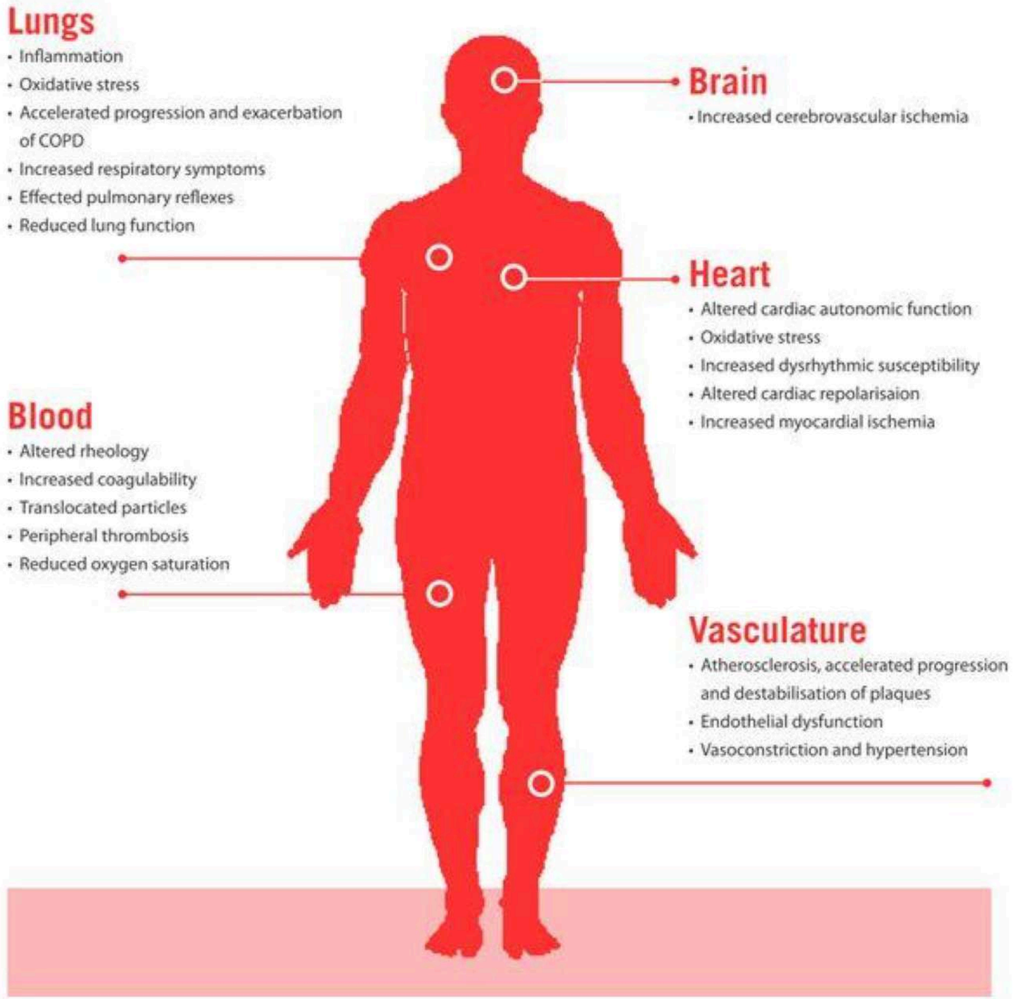


This diagram shows that over 99.9 % of airborne particles are smaller than 1 µm. This highlights the importance of filtering fine particles.

Micro Particles
The Health Effects Of PM2.5



Health effects of $PM_{2.5}$ exposure

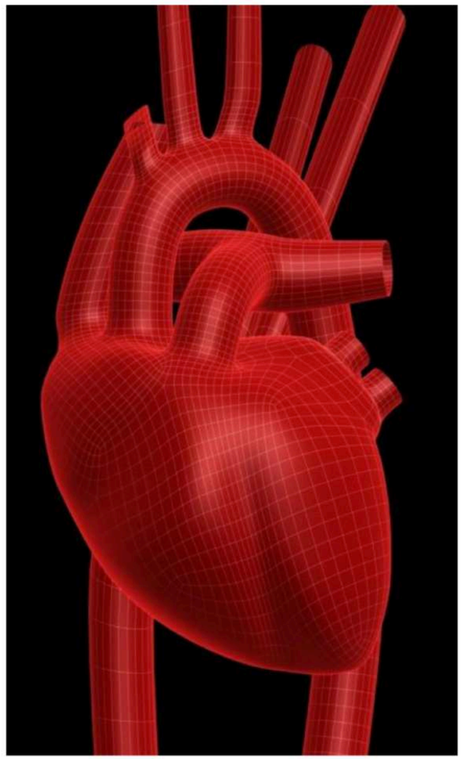


Particle Pollution Affects the Heart

- Inhaled particles can pass from the lungs into the bloodstream and affect the cardiovascular system

- **Effects of short-term(acute)exposure:**
  Irregular heart beat
  Nonfatal heart attacks

- **Effects of long-term(chronic)exposure:**
  Aggravation of existing heart diseases
  Premature death of people with heart disease



Hypertension

The particles suspended in the air are easily inhaled and then they may be able to enter into patient's blood vessels. Through inhaling pollutants for 15 minutes, blood pressure is obviously increased. The inhaled air pollutants stimulate blood vessels, which in turn rise up to protect themselves, as if they are being attacked by aliens. This inflammatory reaction in turn harms the blood vessels, through causing a complicated physiological response.

Brain diseases

Many studies have shown that air pollution may bring out some neurological diseases, such as a stroke, Parkinson's disease and Alzheimer's disease. Stroke. According to a study, people living in highly polluted area are more likely to have strokes than those who live in less polluted areas. As we known, the brain blood supplying is through the arteries, but air pollution is able to aggravate arteries, thus causing strokes. And the two internal layers of carotid artery can be thickened by high level fine particulate matter (PM 2.5), which may suppress the supplying of blood to the brain, neck and head.

Multiple sclerosis

People surrounded by second hand smoke over a long period of time, are at a higher risk of developing multiple sclerosis.

Parkinson's Disease

Parkinson's disease is a kind of neurodegenerative disease, which is mainly generated by the spreading of manganese in the air.

Alzheimer’s Disease

Alzheimer’s disease is a very widespread neurodegenerative disease that is sometimes caused by exposure to pesticides, toxic metals, or air pollution environments for an extended period.

Brain Development

It has a lasting negative effect on the development of the baby’s cerebellum if a pregnant woman is frequently exposed to ozone. Prenatal exposure to polluted air during the third trimester of pregnancy, can damage the baby’s neuro - developmental order and have a harmful effect on children (e.g. autism, neuro - psychiatric diseases).

Allergies

House dust contains flagellin that makes the symptom of allergic effects worse. In daily life, asthma and other allergic symptoms can be easily caused by house dust.

Diabetes

It has been proved that inner link between prolonged exposure to air pollution caused by vehicular exhaust and the possibility for an adult to have type 2 diabetes. Children living in highly polluted areas can also develop insulin resistance, which is usually considered as a precursor to diabetes.