

ANALYSIS OF RELATIONSHIP BETWEEN AIR POLLUTION AND HUMAN HEALTH

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Air pollution is still a very serious and important scientific problem as it has a wide-ranging impact on the whole environment. High particulate matter concentrations can affect vegetation and materials, as well as impacting on visibility and climate change. Another consequence of poor air quality accompanied by high concentrations of PM₁₀/PM_{2.5} can be increased rates of morbidity and mortality. For human health, small particles with diameter < 2.5 µm are particularly dangerous as they can penetrate deeply into the lungs and be transported directly into the bloodstream. Health effects depend on the length of time for which a subject is exposed to high concentrations of particles. Short-term exposure results in rapid reaction, e.g. cough, asthma severity, acute respiratory response and decreased lung function, while long-term exposure causes chronic diseases.

Many countries, including China, have made an effort to reduce atmospheric pollution, including PM_x. For example, Santiago (Chile) — an example of a city overwhelmed with smog—significantly improved air quality over 20 years by adopting emission controls on factories and cars, cleaner public transport and the use of cleaner gas and energy sources. The European Union has also tightened its requirements for the reduction of national emissions of major pollutants, including sulphur (mainly sulphur dioxide), nitrogen oxides, volatile organic compounds and ammonia. The last directive issued by the European Parliament, the so-called CAFE directive (2008/50/EC; EEA 2014), connected all previous directives and was supplemented to include PM_{2.5}. This directive is concentrated on ambient air quality and attaining cleaner air for Europe. In Poland, air quality improvement is still an open question, even if there is no longer a problem with the emission of sulphur oxides or nitrogen as was the case at the end of the twentieth century. Currently, the biggest air pollution issue in Poland is the high level of PM₁₀ and PM_{2.5} and benzo(a)pyrene, which is included in their composition. In cases of long-term exposure, one in every seven European citizens breaths the air and this does not satisfy the principles of the CAFE directive. According to the World Health Organisation rankings in 2016, 33 of the 50 most polluted towns in Europe were located in Poland.

The Polish National Health Fund (NFZ) cited such bad air quality as an important factor in increasing mortality in Poland. In 2017, total mortality amounted to 405,600 and was 3.8 % higher than in 2016. In January 2017 alone, when high levels of aerosols occurred, 44,400 deaths were recorded. This number was greater by 23.5 % in comparison with January 2016. The NFZ sees the reason as being the overlap of a number of adverse factors in January 2017, e.g. the average PM₁₀ concentration was at its maximum record level, while average air temperature was lower compared with similar periods over the last few years. Additionally, there was a peak of flu incidences in Poland during this month.